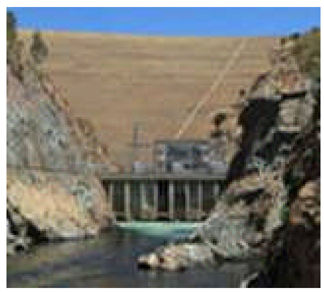
DON PEDRO PROJECT
FERC NO. 2299

PRE-APPLICATION DOCUMENT

VOLUME II OF II


WATER & POWER
Serving Central California since 1887

Modesto Irrigation District

Prepared by:
Turlock Irrigation District
Turlock, California
and
Modesto Irrigation District
Modesto, California

February 2011

For copies of this Pre-Application Document, contact:

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

Table of Contents

VOLUME II OF II

ACRONYM LIST AL-1

5.0 DESCRIPTION OF ENVIRONMENTAL CONDITIONS 5-1

5.1 Geology and Soils 5-1
5.1.1 Geologic Setting 5-1
5.1.1.1 Geologic Rock Units 5-1
5.1.1.2 Faulting 5-2
5.1.2 Geology 5-2
5.1.2.1 Geology Upstream of the Project 5-2
5.1.2.2 Geology within the Project Area 5-3
5.1.2.3 Geology Downstream of the Project 5-5
5.1.3 Tectonic History and Seismicity 5-5
5.1.4 Mineral Resources 5-8
5.1.5 Geomorphology 5-12
5.1.6 Soils 5-14
5.1.6.1 Upstream of the Project 5-17
5.1.6.2 Project Area 5-17
5.1.6.3 Downstream of the Project 5-17
5.1.7 Reservoir Shoreline Erosion 5-17
5.2 Water Resources 5-18
5.2.1 Water Quality 5-18
5.2.1.1 State Water Quality Standards - Designated Uses 5-19
5.2.1.2 State Water Quality Standards - Water Quality Objectives 5-22
5.2.1.3 Existing Water Quality Data 5-23
5.2.1.4 Contaminants in Fish 5-40
5.2.1.5 Water Temperature 5-42
5.2.2 Water Quantity 5-49
5.2.2.1 Drainage Area 5-54
5.2.2.2 Climate 5-54
5.2.2.3 General Description of Basin Hydrology 5-56
5.2.2.4 River Flow Data 5-58
5.2.2.5 Flood Hydrology 5-66
5.2.2.6 Drought Hydrology 5-68
5.2.2.7 Full Natural Flow 5-70
5.3 Aquatic Resources 5-70
5.3.1 Historical Distribution of Fish and Influences Affecting Tuolumne River Fisheries 5-70
5.3.1.1 Historical Distribution 5-71
5.3.1.2 Resident Fish 5-72
5.3.1.3 Anadromous Fish 5-74
5.3.2 Aquatic Resources in the Tuolumne River - Existing Conditions 5-76
5.3.2.1 Upper Tuolumne River 5-76
5.3.2.2 Project Area 5-88
5.3.2.3 Lower Tuolumne River 5-96

Table of Contents
(Continued)

5.3.3 Special-Status Aquatic Species ... 5-130
5.3.3.1 Fishes ... 5-131
5.3.3.2 Amphibians ... 5-134
5.3.3.3 Aquatic Turtles and Reptiles ... 5-134
5.3.4 Aquatic Invasive Species ... 5-135
5.4 Wildlife and Botanical Resources ... 5-136
5.4.1 Wildlife ... 5-136
5.4.1.1 Wildlife Habitat ... 5-136
5.4.1.2 Special-Status Wildlife Species ... 5-137
5.4.1.3 Commercially Valuable Wildlife Species ... 5-143
5.4.1.4 Wildlife Resources in the Tuolumne River Watershed ... 5-143
5.4.2 Botanical Resources ... 5-154
5.4.2.1 Special-Status Plants ... 5-154
5.4.2.2 Noxious Weeds ... 5-159
5.4.2.3 Upper Tuolumne River ... 5-159
5.4.2.4 Project Area ... 5-159
5.4.2.5 Lower Tuolumne River ... 5-167
5.4.3 Wetland, Riparian, and Littoral Habitat ... 5-168
5.4.3.1 Wetland, Riparian, and Littoral Communities within the Project Area ... 5-168
5.4.3.2 Upper Tuolumne River ... 5-171
5.4.3.3 Lower Tuolumne River ... 5-172
5.5 Threatened and Endangered Species ... 5-177
5.5.1 Applicable Laws, Regulations, and Guidance ... 5-177
5.5.1.1 Federal Endangered Species Act of 1972, as Amended (*16 USC § 1531 et seq.*) ... 5-177
5.5.1.2 Magnuson-Stevens Fishery Conservation and Management Act, as Amended *(16 USC § 1801 et seq.)* ... 5-178
5.5.1.3 California Endangered Species Act (*Fish and* Game *Code § 2050 - 2116*) ... 5-179
5.5.2 Federal ESA-Listed Species ... 5-179
5.5.3 CESA - Rare and Fully Protected Species ... 5-180
5.5.4 Life Histories of Threatened, Endangered and Fully Protected Species ... 5-185
5.5.4.1 Plant Species ... 5-185
5.5.4.2 Wildlife Species ... 5-190
5.5.5 Threatened and Endangered Species in the Tuolumne River ... 5-196
5.5.5.1 Upper Tuolumne River ... 5-196
5.5.5.2 Project Area ... 5-197
5.5.5.3 Lower Tuolumne River ... 5-200
5.6 Recreation and Land Use ... 5-204
5.6.1 Overview ... 5-205
5.6.2 Recreation Facilities Upstream of the Project ... 5-206
5.6.2.1 Camping Opportunities ... 5-208
5.6.2.2 Whitewater Boating Opportunities ... 5-208
5.6.2.3 Fishing Opportunities ... 5-210

5.6.3 Recreation Facilities and Opportunities within the Project Area 5-211
5.6.3.1 General Description of Project Recreation Opportunities 5-211
5.6.3.2 Detailed Description of Developed Recreation Opportunities.. 5-219
5.6.3.3 Project Recreation Use... 5-223
5.6.3.4 Dispersed Recreation Opportunities 5-225
5.6.3.5 Law Enforcement, Public Safety, and Invasive Mussel Monitoring 5-229
5.6.4 Recreation Facilities Downstream of the Project 5-235
5.6.4.1 Camping Opportunities... 5-235
5.6.4.2 Whitewater Boating Opportunities 5-235
5.6.4.3 Fishing Opportunities... 5-236
5.6.5 Recreation Needs Identified in Management Plans................................. 5-237
5.6.5.1 California Outdoor Recreation Plan....................................... 5-237
5.6.5.2 Survey on Public Opinions and Attitudes in Outdoor Recreation in California 2009 5-238
5.6.5.3 USFWS Recreational Fisheries Policy 5-239
5.6.5.4 Tuolumne County General Plan... 5-239
5.6.5.5 BLM Sierra Resource Management Plan 5-240
5.6.5.6 Tuolumne Wild and Scenic River Management Plan............. 5-240
5.6.5.7 Stanislaus National Forest, Forest Plan Direction 5-241
5.7 Aesthetic Resources.. 5-241
5.7.1 Regional Context 5-242
5.7.2 Aesthetic Resource Management Plans.. 5-242
5.7.2.1 Tuolumne County General Plan - Scenic Resources 5-242
5.7.2.2 BLM Sierra Resources Management Plan.............................. 5-243
5.7.3 Aesthetic Character within the Project Area 5-243
5.8 Cultural Resources.. 5-245
5.8.1 Nomenclature and Synonymy... 5-245
5.8.2 Area of Potential Effects... 5-246
5.8.3 Cultural Context.. 5-246
5.8.3.1 Prehistory and Archaeology.. 5-246
5.8.3.2 Ethnohistory 5-249
5.8.3.3 History... 5-251
5.8.4 Data Gathering Methods... 5-252
5.8.5 Data Gathering Results 5-253
5.8.5.1 Previous Cultural Resources Investigations............................ 5-253
5.8.5.2 Previously Recorded Cultural Resources................................ 5-255
5.8.5.3 Potential Historical Resources Identified on Historical Maps... 5-255
5.9 Socioeconomic Resources of the Project Area.. 5-267
5.9.1 Population Patterns in Tuolumne, Stanislaus, and Merced Counties 5-270
5.9.1.1 Tuolumne County 5-270
5.9.1.2 Stanislaus County.. 5-272
5.9.1.3 Merced County.. 5-274

5.9.2 Economic Patterns in Tuolumne, Stanislaus, and Merced Counties 5-277
5.9.2.1 Tuolumne County 5-277
5.9.2.2 Stanislaus County 5-278
5.9.2.3 Merced County 5-279
5.9.3 Irrigation Water Supply and Retail Electric Service 5-280
5.10 Tribal Resources 5-282
5.10.1 Background Research 5-283
5.10.1.1 Identification of Potentially-Affected Indian Tribes 5-283
5.10.1.2 Identification of Known Indian Trusts and Traditional Cultural Properties 5-283
5.10.2 Ethnohistory 5-285
5.11 Land Use 5-285
5.11.1 Upper Tuolumne River 5-285
5.11.2 Project Area 5-286
5.11.3 Lower Tuolumne River Area 5-287
5.12 Consistency with Comprehensive Plans 5-287
5.12.1 Qualifying Comprehensive Plans 5-287
5.12.1.1 Water Resources 5-288
5.12.1.2 Aquatic Resources 5-290
5.12.1.3 Wildlife Resources 5-290
5.12.1.4 Threatened, Endangered, and Fully Protected Species 5-290
5.12.1.5 Recreation Resources 5-291
5.12.1.6 Land Use 5-293
5.12.2 Non-Qualifying Comprehensive Plans and Agreements 5-293

7.0 LITERATURE CITED 7-1

ATTACHMENTS

ATTACHMENT 5.2.1-1 - RESERVOIR AND RIVER TEMERATURE DATA (*DUE TO FILE SIZE, THESE DATA ARE AVAILABLE, UPON REQUEST, IN CD FORMAT ONLY*)
ATTACHMENT 5.2.2-1 - FLOW DURATION CURVES
ATTACHMENT 5.3.2-1 - NUMBER OF FISH STOCKED IN DON PEDRO RESERVOIR FROM 1953 TO 2009
ATTACHMENT 5.4.1-1 - CNDDB OCCURRENCE REPORTS
ATTACHMENT 5.4.1-2 - CNDDB WILDLIFE MAPS
ATTACHMENT 5.4.2-1 - CALVEG MAPS
ATTACHMENT 5.4.2-2 - CNDDB PLANT OCCURRENCE MAPS
ATTACHMENT 5.4.3-1 - NWI MAPS
ATTACHMENT 5.5.3-1 - CNDDB RTE OCCURRENCE REPORTS

Table of Contents
(Continued)

VOLUME I OF II

ACRONYM LIST
1.0 INTRODUCTION
2.0 RELICENSING PROCESS PLAN, SCHEDULE, AND COMMUNICATIONS GUIDELINES
3.0 PROJECT FACILITIES AND OPERATIONS
4.0 GENERAL DESCRIPTION OF RIVER BASIN
6.0 POTENTIAL PROJECT EFFECTS AND RESOURCE ISSUES

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) [***contains Critical Energy Infrastructure Information - Not Released to the Public***]
APPENDIX E - DON PEDRO RECREATION AGENCY RULES AND REGULATIONS

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

List of Figures

Figure 5.1.2-1 Geological map of the Project vicinity showing major rock types and fault zones. 5-4
Figure 5.1.3-1 Historical seismicity. 5-7
Figure 5.1.4-1 Past and present mines in the general Project vicinity. 5-9
Figure 5.1.4-2 Past and present mines in the immediate Project area. 5-10
Figure 5.1.5-1 Tuolumne River geomorphic reach delineation. 5-13
Figure 5.1.6-1 Major soil associations in the Don Pedro Project area. 5-15
Figure 5.2.1-1 Water temperature data for locations in the upper Tuolumne River 2005-2008. 5-46
Figure 5.2.1-2 2006 water temperature data for the upper Tuolumne River. 5-46
Figure 5.2.1-3 Don Pedro reservoir water temperature profiles in May 2006 (Wet Year). 5-47
Figure 5.2.1-4 Don Pedro reservoir water temperature profiles in August 2006 (Wet Year). 5-47
Figure 5.2.1-5 Don Pedro reservoir water temperature profiles in October 2006 (Wet Year). 5-48
Figure 5.2.1-6 Don Pedro reservoir profiles in November 2006 (Wet Year). 5-48
Figure 5.2.1-7 Water temperatures of the lower Tuolumne River for 1977-1988, RM 51.8 and 16.2. 5-51
Figure 5.2.1-8 Water temperatures of the lower Tuolumne River, 1987-1997, RM 49.1, 36.5, and 31.6. 5-51
Figure 5.2.1-9 Water temperatures of the lower Tuolumne River, 1987-1998, RM 24.9, 12.3, and 3.5. 5-52
Figure 5.2.1-10 Water temperature of the lower Tuolumne River, 1996 to 2008, RM 51.8, 49.1, 45.5, and 39.5. 5-52
Figure 5.2.1-11 Water temperature of the lower Tuolumne River, 1996 to 2008, RM 36.7, 31.6, 23.6 and 3.4. 5-53
Figure 5.2.1-12 Average water temperature of the lower Tuolumne River in 2006. 5-53
Figure 5.2.2-1 Modesto monthly average evapotranspiration rates, June 1987 to present. 5-56
Figure 5.2.2-2 Schematic of gages, reservoirs and waterways in the Tuolumne River watershed. 5-60
Figure 5.2.2-3 Don Pedro Reservoir storage during WY 2006, representative wet WY type. 5-67
Figure 5.2.2-4 Don Pedro Reservoir storage during WY 2003, representative normal WY type (following relatively dry water years so initial storage is low). 5-67
Figure 5.2.2-5 Don Pedro Reservoir storage during WY 2001, representative dry WY type (following relatively wet years so initial storage is high). 5-68
Figure 5.3.2-1 Tuolumne River Chinook salmon escapement estimates, 1971-2009. 5-104
Figure 5.3.2-2 Tuolumne River Chinook salmon escapement estimates, 1940-1970. 5-106
Figure 5.3.2-3 Fish counting weir at RM 24 on the lower Tuolumne River. 5-106
Figure 5.3.2-4 Average density of juvenile Chinook salmon from seine surveys, 1986-2009. 5-108
Figure 5.3.2-5 Rotary screw trap in the lower Tuolumne River. 5-112

List of Figures
(Continued)

Figure 5.3.2-6 Results from USFWS (1995) instream flow study showing Chinook salmon habitat in the lower Tuolumne River as a function of stream flow. 5-118
Figure 5.6.2-1 Tuolumne River subbasins. 5-207
Figure 5.6.3-1 Access road locations. 5-213
Figure 5.6.3-2 Paved parking lot capacities for Fleming Meadows Recreation Area. 5-214
Figure 5.6.3-3 Paved parking lot capacities for Blue Oaks Recreation Area. 5-215
Figure 5.6.3-4 Paved parking lot capacities for Moccasin Point Recreation Area. 5-216
Figure 5.6.3-5 BLM lands near Project area. 5-220
Figure 5.6.3-6 Pattern of Project recreation use in recreation days for 2001-2007. 5-224
Figure 5.6.3-7 Pattern of Project recreation use in recreation days comparing 2001-2003 use and 2004-2007 use. 5-225
Figure 5.6.3-8 Don Pedro Lake dispersed area / lakeshore camping and navigation map. 5-226
Figure 5.9-1 TID service area map. 5-268
Figure 5.9-2 MID service area map. 5-269

List of Tables

Table 5.1.4-1 Mines in the lower Tuolumne River and Project area. 5-11
Table 5.1.5-1 Bedload impedance reaches on the Tuolumne River. 5-14
Table 5.1.6-1 Soil associations within the Don Pedro Project Boundary. 5-14
Table 5.1.6-2 Soil series and order summary description. 5-16
Table 5.2.1-1 Designated beneficial uses of the Tuolumne River from the Basin Plan. 5-20
Table 5.2.1-2 Section 303(d) List of Water Quality Limited Segments for the Project and downstream of the Project. 5-22
Table 5.2.1-3 Proposed 2010 additions to the 2006 CWA Section 303(d) List of Water Quality Limited Segments for the Project area and upstream and downstream of the Project. 5-22
Table 5.2.1-4 Summary of general water quality data ranges (physical parameters, minerals, and nutrients) upstream of the Project. 5-25
Table 5.2.1-5 Summary of water quality data (metals and microbiological) upstream of the Project. 5-26
Table 5.2.1-6 Summary of general water quality data ranges (physical parameters, minerals, and nutrients) within the Project area. 5-28
Table 5.2.1-7 Summary of water quality data (metals and microbiological) within the Project area. 5-29
Table 5.2.1-8 Summary of water quality data within Don Pedro Reservoir. 5-32
Table 5.2.1-9 General herbicide/pesticide use at DPRA facilities. 5-33
Table 5.2.1-10 Summary of general water quality data ranges (physical parameters, minerals, and nutrients) downstream of the Project. 5-34
Table 5.2.1-11 Summary of water quality data (metals and microbiological) downstream of the Project. 5-35
Table 5.2.1-12 Results of the SWAMP Lakes Survey for Reservoirs/Lakes on or near the Tuolumne River. 5-43
Table 5.2.1-13 Water temperature sampling locations upstream of Don Pedro Reservoir. 5-44
Table 5.2.1-14 Water temperature sampling locations downstream of Don Pedro reservoir. 5-50
Table 5.2.2-1 Drainage areas and lengths of Tuolumne River subbasins. 5-54
Table 5.2.2-2 Monthly climatological data for the Tuolumne River watershed. 5-55
Table 5.2.2-3 San Joaquin Valley water year hydrologic classifications. 5-58
Table 5.2.2-4 Flow and storage gages in the Tuolumne River watershed. 5-59
Table 5.2.2-5 Mean monthly flows for the WY 1975-2009 for Tuolumne River below Early Intake. 5-61
Table 5.2.2-6 Mean monthly flows for the WY 1975-2009 for Cherry Creek below Dion R Holm powerhouse. 5-61
Table 5.2.2-7 Mean monthly flows for the WY 1975-2009 for South Fork Tuolumne River near Oakland Recreation Camp. 5-62
Table 5.2.2-8 Mean monthly flows for the WY 1975-2009 for Middle Fork Tuolumne River at Oakland Recreation Camp. 5-62
Table 5.2.2-9 Don Pedro Project mean monthly outflows (cfs) 1997-2009. 5-63
Table 5.2.2-10 Mean monthly flows for the WY 1975-2009 for lower Tuolumne River 5-65

Table 5.2.2-11	Mean monthly flows for the WY 1975-2009 for Tuolumne River at Modesto.	5-66
Table 5.2.2-12	Tuolumne River at La Grange Dam mean monthly full natural flow 1975-2009.	5-70
Table 5.3.2-1	List of fishes reported to occur in the Tuolumne River.	5-77
Table 5.3.2-2	Popular resident trout and inland salmon fisheries and dependence on hatchery fish in the upper Tuolumne River and Don Pedro Reservoir.	5-79
Table 5.3.2-3	Annual average pounds and numbers of trout produced and stocked by the Moccasin Hatchery during the period 2004 through 2008.	5-83
Table 5.3.2-4	Macroinvertebrates sampled during the summer and fall of 1979 in Six-Bit Gulch, Sullivan Creek, and Hatch Creek.	5-87
Table 5.3.2-5	List of fishing contest permits (both pending and approved) for Don Pedro Reservoir from August 2010 through July 2011.	5-89
Table 5.3.2-6	Annual black bass fishing contest results for the Don Pedro Reservoir.	5-90
Table 5.3.2-7	Annual summary of the Florida strain black bass stocked by the DPRA in Don Pedro Reservoir from 1993 through 2009.	5-92
Table 5.3.2-8	Amphibians, aquatic turtles, and reptiles that may occur in the Project area.	5-92
Table 5.3.2-9	Lower Tuolumne River fish study methods and years of operation.	5-97
Table 5.3.2-10	Fishes documented in the lower Tuolumne River.	5-98
Table 5.3.2-11	Introduced fishes documented in the lower Tuolumne River.	5-100
Table 5.3.2-12	Life history timing for Central Valley fall-run Chinook salmon.	5-101
Table 5.3.2-13	Tuolumne River salmon spawning survey counts and escapement estimates, 1971-2009.	5-103
Table 5.3.2-14	Tuolumne River salmon spawning survey counts and escapement estimates, 1940–1970.	5-105
Table 5.3.2-15	Summary of Tuolumne River juvenile salmon seine surveys, 1986-2010.	5-107
Table 5.3.2-16	Location (by RM) and season of snorkel surveys on the lower Tuolumne River, 1982-2009.	5-109
Table 5.3.2-17	Salmonid observations from snorkel surveys on the lower Tuolumne River, 1982-2009.	5-111
Table 5.3.2-18	Rotary screw trap monitoring in the lower Tuolumne River, 1995-2009.	5-112
Table 5.3.2-19	Population estimates of *O. mykiss* for the lower Tuolumne River, 2008-2009.	5-115
Table 5.3.2-20	Selected instream flow model details for studies on the lower Tuolumne River in 1981 and 1992.	5-117
Table 5.3.2-21	Stranding surveys completed from 1986-2002.	5-120
Table 5.3.2-22	Location and period of record for thermographs in use from 1987 to present.	5-121
Table 5.3.2-23	TRTAC priority habitat restoration projects on the lower Tuolumne River.	5-123
Table 5.3.2-24	Benthic macroinvertebrate sampling locations (RM), dates, methods, and quantities of samples collected in the lower Tuolumne River (1987-2000).	5-127

Table 5.3.2-25 BMI sampling locations (RM), dates, methods, and quantities of samples collected in the lower Tuolumne River (2001-2009). 5-127
Table 5.3.2-26 Selected CMAP metrics for historical kick-net samples collected in the lower Tuolumne River, by RM (2001-2009). 5-128
Table 5.3.2-27 BMI community metrics for long-term Hess sampling sites at riffles R4A (RM 48.8) and R23C (RM 42.3) in the lower Tuolumne River (1988-2009). 5-129
Table 5.4.1-1 CWHR wildlife habitat types for the area within the Project Boundary and their equivalent CalVeg community types. 5-137
Table 5.4.1-2 CWHR wildlife habitat types for the area immediately surrounding the Project Boundary and their equivalent CalVeg community types. 5-137
Table 5.4.1-3 Special-status wildlife species occurring or potentially occurring in the area surrounding the Project. 5-139
Table 5.4.1-4 Commercially valuable wildlife species occurring or potentially occurring in the Project vicinity. 5-144
Table 5.4.2-1 Special-status plants known or with the potential to occur in the general vicinity of the Project. 5-155
Table 5.4.2-2 Noxious weeds known to occur or potentially occurring in the vicinity of the Project. 5-160
Table 5.4.2-3 Vegetation of the Project area. 5-162
Table 5.4.3-1 Definitions and general patterns of occurrence of NWI palustrine and riverine wetland types and littoral habitats within the Project area. 5-169
Table 5.4.3-2 Total surface area of riparian vegetation series and other land cover types mapped within the lower Tuolumne River corridor. 5-174
Table 5.5.2-1 Federal and State of California threatened or endangered species, and state rare or fully protected species occurring or potentially occurring in the vicinity of the Project. 5-181
Table 5.5.5-1 Bald eagle perching and night roost locations at Don Pedro Reservoir documented by BLM in 1979. 5-197
Table 5.5.5-2 Bald eagle and golden eagle BLM and CSAS mid-winter survey results on Don Pedro Reservoir. 5-198
Table 5.6.2-1 Campgrounds on the Tuolumne River upstream of the Project area. 5-209
Table 5.6.2-2 Known whitewater boating runs on the Tuolumne River upstream of the Project area. 5-210
Table 5.6.3-1 Summary of parking areas at Don Pedro Reservoir recreation areas. 5-212
Table 5.6.3-2 General and special fishing regulations for Don Pedro Reservoir. 5-217
Table 5.6.3-3 2010 fishing tournament schedule for Don Pedro Lake. 5-218
Table 5.6.3-4 Boating accidents at Don Pedro Reservoir 2005-2009. 5-219
Table 5.6.3-5 Summary of recreation facilities and other on-site amenities at Don Pedro Project developed recreation areas. 5-221
Table 5.6.3-6 2011 schedule of fees for Don Pedro Reservoir recreation areas. 5-222
Table 5.6.3-7 Project recreation use in recreation days at Don Pedro Reservoir, 2001-2007. 5-224
Table 5.6.3-8 Summary of Tuolumne County boating ordinance at Don Pedro Reservoir. 5-230

List of Tables
(Continued)

Table 5.6.3-9	Summary of Tuolumne County house boating ordinance at Don Pedro Reservoir.	5-231
Table 5.6.3-10	Summary of house boating rules and at Don Pedro Reservoir.	5-231
Table 5.6.3-11	Action steps taken toward monitoring invasive muscles.	5-234
Table 5.6.4-1	Known whitewater boating runs on the Tuolumne River downstream of Project area.	5-236
Table 5.6.4-2	Summary of fishing regulations for Tuolumne River downstream of Project area.	5-236
Table 5.6.5-1	California's recreation activities with high latent demand.	5-238
Table 5.6.5-2	Items that influence choice of favorite outdoor recreation activities.	5-238
Table 5.6.5-3	Level of agreement with statements concerning outdoor recreation lands / facilities.	5-239
Table 5.6.5-4	Summary of Stanislaus National Forest management regulations specific to recreation activities along the Tuolumne River.	5-241
Table 5.7.2-1	Visual Resource Management classes in and adjacent to the Project Boundary.	5-243
Table 5.7.3-1	Aesthetic character of Project features within the Don Pedro Project	5-244
Table 5.8.5-1	Previous studies within 0.25 mile of the Don Pedro APE.	5-253
Table 5.8.5-2	Previously recorded sites within the Don Pedro study area.	5-256
Table 5.8.5-3	Potential historic resources identified within the APE and 0.25-mile Project study area.	5-264
Table 5.9.1-1	Summary of Tuolumne County population and housing units, 1960-2010.	5-271
Table 5.9.1-2	Summary of Tuolumne County by age group, 2009.	5-271
Table 5.9.1-3	Summary of household units and income - Tuolumne County/state comparison.	5-271
Table 5.9.1-4	Summary of population by gender and race - county/state comparison	5-272
Table 5.9.1-5	Summary of Stanislaus County population and housing units, 1960-2010.	5-273
Table 5.9.1-6	Summary of Stanislaus County by age group, 2009	5-273
Table 5.9.1-7	Summary of household units and income - Stanislaus County/state comparison.	5-273
Table 5.9.1-8	Summary of population by gender and race - Stanislaus County/state comparison.	5-274
Table 5.9.1-9	Summary of Merced County population and housing units, 1960-2010.	5-275
Table 5.9.1-10	Summary of Merced County by age group, 2009	5-275
Table 5.9.1-11	Summary of household units and income - Merced County/state comparison.	5-276
Table 5.9.1-12	Summary of population by gender and race - Merced County/state comparison.	5-276
Table 5.9.2-1	Civilian labor force, employment and unemployment for Tuolumne County, 2000-2009.	5-277
Table 5.9.2-2	Summary of industry statistics for Tuolumne County, 2005	5-277
Table 5.9.2-3	Civilian labor force, employment and unemployment for Stanislaus County, 2000-2009.	5-278

List of Tables
(Continued)

Table 5.9.2-4 Summary of industry statistics for Stanislaus County, 2005. 5-279

Table 5.9.2-5 Civilian labor force, employment and unemployment for Merced County, 2000-2009. 5-279

Table 5.9.2-6 Summary of industry statistics for Merced County, 2005. 5-280

Table 5.9.2-7 Agricultural products value and product characteristics, 2007 5-281

Table 5.9.2-8 Summary of agricultural industry ranking in California and U.S. for Merced, Stanislaus, and Tuolumne counties. 5-281

Table 5.10.1-1 Tribal contacts list compiled by the Districts. 5-284

Table 5.11.1-1 Distribution of public and private lands in Tuolumne County. 5-285

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

5.0 DESCRIPTION OF ENVIRONMENTAL CONDITIONS

This section of the Pre-Application Document (PAD) contains a comprehensive review of the existing environmental conditions and environmental resources in the general area of the Don Pedro Project (Project). Where appropriate, the subsections have been divided into the upper Tuolumne River (above about river mile [RM] 80), the Project area (RM 54 to 80), and the lower Tuolumne River (RM 0 to 54). It is worth noting that the lower Tuolumne River has been the subject of almost continuous research and study the past 40 years. More than 200 individual studies of fish and aquatic resources have been completed. Annual monitoring and investigation of aquatic resources continues, with the publication of eight additional studies in March 2010. In total, these studies provide a wealth of useful data and information and can only briefly be summarized herein. A literature reference list is provided in Section 7.0 of the PAD.

5.1 Geology and Soils

5.1.1 Geologic Setting

The Don Pedro Project is located in the Western Sierra Nevada Metamorphic Belt (WSNMB), which is contained within the Sierra Nevada Block, a tilted fault block approximately 400 miles long that trends north-northwest, is 40 to 80 miles wide, and includes a broad region of foothills along the western slope of the Sierra Nevada Range (Harden 2004). The eastern face of the tilted Sierra Nevada Block is high and rugged, consisting of multiple fault scarps (Eastern Sierra Nevada Frontal Shear Zone) separating it from the Basin and Range Province. This contrasts with the gentle western slope that disappears under sediments of the Great Valley. The Sierra Nevada block continues under the Great Valley and is bounded on the west by an active fold and thrust belt that marks the eastern boundary of the Coast Range Province (Wentworth and Zoback 1989). The northern boundary of the tilted fault block is marked by the disappearance of typical Sierra bedrock under the volcanic cover of the Cascade Range. The southern boundary of the fault block is along the Garlock Fault located in the Tehachapi Mountains 210 miles southeast of the Project where characteristic rocks of the Sierra Nevada are abruptly truncated by this east-west fault system. The Project site is located a few miles east of the surficial boundary with the Great Valley geomorphic province.

5.1.1.1 Geologic Rock Units

The Western Sierra Nevada Metamorphic Belt, in the general vicinity of the Project, is composed of rocks of Paleozoic and early Mesozoic age (138 to 540 million years ago [mya]). The bedrock units include metamorphosed igneous and sedimentary rocks of oceanic origin intruded by younger Mesozoic age (65 to 138 mya) plutonic rocks and related dikes and vein deposits. The belt is the product of Mesozoic accretion (addition of crustal material) of oceanic terranes to the western North American margin (Dickinson 1981; Burchfiel and Davis 1982). The metamorphic rocks are intruded to the south and east by granitic rocks of the Sierra Nevada Batholith. They are overlain to the west by Cretaceous and Tertiary sediments of the Great Valley Sequence and are overlain to the north by Tertiary and Quaternary volcanic rocks of the Cascade Mountains.

The whole Western Sierra Nevada Metamorphic Belt is divided into three lithotectonic subunits, designated the Western, Central, and Eastern belts (Schweickert and Cowan 1975; Day et al. 1985). The Project area is situated within the Central Belt. The Western and Central belts are composed of Paleozoic and Mesozoic serpentinized peridotite (ultramafic rock) and metamorphosed volcanic and sedimentary sequences. Both belts represent oceanic terranes (Schweickert and Cowan 1975; Bogen 1985; Tobisch et al. 1987). The Eastern Belt is composed of Paleozoic and Mesozoic sedimentary and volcanic rocks and is generally accepted to have formed in near-continental to continental arc environments (Hannah and Moores 1986; Harwood 1988).

5.1.1.2 Faulting

The three lithotectonic subunits of the Western Sierra Nevada Metamorphic Belt are separated by steeply dipping major faults collectively referred to as the Foothills Fault System (FFS) (Clark 1960; Clark and Huber 1975). The FFS is a zone of complex deformation developed during the Nevadan orogeny (mountain building) episode approximately 123 to 160 mya. The dominant sense of shear along the FFS is east over west (reverse faulting) with a small component of left-lateral offset (Clark 1960; Day et al. 1985; Newton 1986; Paterson et al. 1987; Schweickert et al. 1988; Gefell et al. 1989). Right-lateral shear along the system occurred during the late stages of the Nevadan orogeny and during the early Cretaceous (Glazner 1991: Carlson et al. 1997; Unruh et al. 2003; Oldow 2003; Carlson et al. 2005). Some of the fault segments in the system were reactivated during the Cenozoic Era (<65 mya), and some as recently as during the Quarternary (0-1.8 Ma). One segment was reactivated in the recent past (Cleveland Hills Fault located about 134 miles northwest of the Project; Lake Oroville earthquake of August 1, 1975).

5.1.2 Geology

For purposes of this PAD, rock formations are described below in three general geographic areas, namely upstream of the Project area (upper Tuolumne River), within the Project area, and downstream of the Project area (lower Tuolumne River).

5.1.2.1 Geology Upstream of the Project

The upper Tuolumne River (RM 80 to headwaters)[1] runs through both metasedimentary rocks and granitic rocks. From the headwaters downstream to a point approximately 0.75 river miles above the confluence of the Tuolumne and Clavey rivers, the river runs through granitic rocks of the Sierra Nevada batholiths. From that point, extending downstream to the Project Boundary, the river runs through metasediments of the Calaveras Complex (Wagner et al. 1991). In the Calaveras Complex, the chief rock types include chert, argillite, and slate. Throughout the Calaveras Complex there are local layers of limestone (generally recrystallized to marble) and dolomite. Several bands of this recrystallized limestone cross the Tuolumne River above the Project area. The river canyon exposes Calaveras Complex rocks to a point approximately 0.75 river miles above the confluence of the Tuolumne and Clavey rivers. At that point, the Tuolumne River cuts through granitic rocks of the Sierra Nevada batholith. Approximately 0.5 miles above the contact with the granitic rocks, the river crosses the plane of the Shoo-Fly Thrust Fault. The fault plane has been eroded away by the river in the river canyon, revealing that this fault does not offset rocks within the batholith. The thrust fault is present both northwest and southeast of the river in the older Calaveras Complex rocks that overlie the intrusive plutonic rocks of the batholith.

[1] For purposes of this PAD, the upper Tuolumne River extends from approximately the confluence of the main stem and the North Fork to the headwaters.

5.1.2.2 Geology within the Project Area

The Central Belt in the Project area[2] consists of a Paleozoic ophiolite complex (a sequence of former sea floor to upper mantle strata, here known as the Tuolumne Ultramafic Complex), middle Triassic to early Jurassic volcanic rocks (Jasper Point and Peñon Blanco formations) and sedimentary rocks (Mariposa Formation) intruded by lower Jurassic plutons (Clark 1964; Morgan 1977; Bogen 1985). The lowest stratigraphic unit at the site is the above-mentioned Tuolumne Ultramafic Complex of late Paleozoic (about 300 mya) age (Saleeby 1982). It is overlain structurally and stratigraphically by the metavolcanic rocks of the Peñon Blanco Formation of middle Triassic to early Jurassic age. Overlying all the above rock units in places are several types of surficial deposits, primarily colluvial soils and local alluvium in drainage courses. Local artificial fill is also present. One large fill area, composed of tunnel muck from the Hetch Hetchy Aqueduct, which was removed through the Brown Adit along the northern Project Boundary, was placed along the channel of the Tuolumne River by the year 1929. The fill is composed mainly of metavolcanic rock (Jpb) and is in good condition with minor weathering (Devine Tarbell & Associates, Inc. [DTA] 2008).

Several faults and shear zones are present within the Central Belt. These faults transect the Project area, and include, from southwest to northeast, the Bear Mountains Fault, the Bowie Flat Fault, and the Melones Fault (Figure 5.1.2-1). All these faults are classified by the California Division of Safety of Dams (CDSOD) as conditionally active. None of these faults are classified by the California Geological Survey (CGS) as active within Holocene time (movement within the last 11,400 years), but are considered potentially active by CGS because they exhibit evidence of movement within the last 1.8 million years.

Details of the geologic investigations at the site of the new Don Pedro Dam and reservoir were described in the Basic Design Report (Bechtel 1967). According to that report, the rocks in the immediate Project area are metamorphosed sediments and volcanic. Gray, fine-grained schist is the predominant rock type. The schistosity is often poorly developed. Hornfels, quartzite, and other metamorphic rocks occur at the site. A wide zone of porphyritic meta-andesite rocks also occurs at the site. A wide zone of porphyritic meta-andesite crosses the river near the upstream toe of the dam and is also found downstream of the dam. The meta-andesite is gray, fine-grained and only slightly metamorphosed. The rock is moderately jointed resulting in a blocky to massive appearance.

At the dam site, there are prominent sets of joints. The schistosity and one set of joints strike northwest, slightly into the right abutment, and dip steeply southwest. The second set of joints also strikes northwest, but dips about 45° northeast. The third set of joints strikes northeast and dips steeply southeast. The joints are commonly spaced 3 inches to 2 feet apart, and are generally tight. Major shear zones were not observed in the area; however, three minor zones of weakness occur in, and are approximately parallel to, the channel, and another diagonally crosses the channel near the upstream toe of the dam. Folding has produced steep-sided isoclinal folds, which trend northeast, with the axial planes dipping southwest. Folding is not apparent in the immediate dam site area, but has been observed along the river canyon.

[2] For the purposes of this PAD, the Project area extends approximately from the tailwater of the Don Pedro powerhouse to the confluence of the main stem and the North Fork.

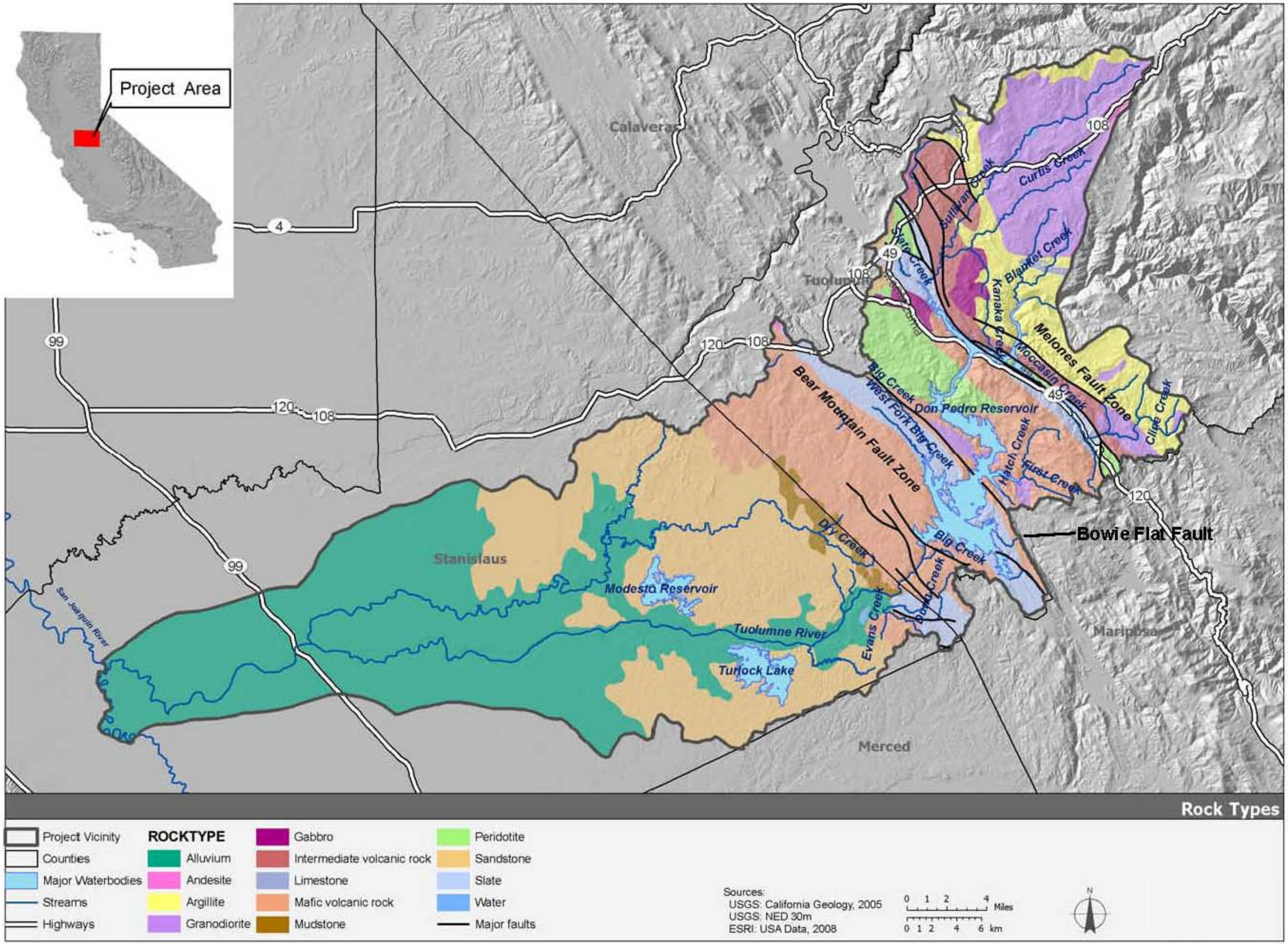


Figure 5.1.2-1 Geological map of the Project vicinity showing major rock types and fault zones.

The rock in the river channel section is hard and unweathered to slightly weathered. Many of the fractures in the rock have been rehealed, usually by quartz. The rock in the right abutment is generally more massive and blocky, and less schistose and weathered than the rock of the left abutment. In the spillway area, the rock is gray, fine-grained schist with some interbedded hornfels. The intensity and depth of weathering vary.

The foundation conditions were summarized in the fifth Part 12 report (Harza 1996) based on the geologic investigations described in the Basic Design Report (Bechtel 1967) and construction procedures were discussed in the Technical Record of Design and Construction (Bechtel 1972). The foundation of the dam beneath the central contact area was excavated to sound, firm and hard rock. Local areas of sheared or racked rock, gouge seams, and other unsuitable material were removed. Dental concrete was applied to these areas.

Median peak ground accelerations (PGA) at bedrock were estimated by DTA (2008) using two available ground motion attenuation models (Sadigh et al. 1997; Abrahamson and Silva 1997). Using those models, the estimated PGA for the Project area ranges from 0.50 to 0.60g.

5.1.2.3 Geology Downstream of the Project

The area downstream of the Project along the Tuolumne River is underlain by a series of bedrock and surficial deposits. From the base of Don Pedro Dam, the river runs westerly in metavolcanic rock of the Jurassic age Gopher Ridge Formation, through which windows of underlying Cretaceous age granitic rock crop out locally. To the west of the Gopher Ridge Formation, through most of the La Grange Reservoir, the river runs in slates of the Jurassic age Salt Springs and Merced Falls formations. West of the Salt Springs and Merced Falls slates, the river is underlain by the alluvium of Holocene Age, and is locally flanked by historical dredge tailings. Most of the riverbed between La Grange Regional Park and the confluence with the San Joaquin River runs in alluvium of Holocene Age that overlies the Riverbank, Turlock Lake, and Modesto Formations of Pleistocene age. These units are in turn generally underlain by Cenozoic valley fill.

Several unnamed faults related to the Bear Mountains Fault Zone cross the river in the La Grange Reservoir reach, striking northeasterly. These faults, like those in the Project area, are considered conditionally active by the CDSOD. None of these faults are classified by the CGS as active within Holocene time (movement within the last 11,400 years), but are considered potentially active by CGS.

5.1.3 Tectonic History and Seismicity

The structural features within the Western Sierra Nevada Metomorphic Belt record deformation related to at least three orogenic (mountain building) events during the Devonian, Permian-Triassic, and Jurassic (Dickinson 1981). The dominant northwest-trending structural grain of this Belt was imposed during the late Jurassic Nevadan orogeny (Schweickert 1981; Varga and Moores 1981; Schweickert et al. 1984; Day et al. 1985). This deformation produced the FFS, the northwest-trending folds, a variably developed fabric in the rocks, and regional greenschist-facies metamorphism. Present studies show an upward movement of the Sierran block of 20 to 30 inches per century (Avendian 1978). Most of the elevation of the Sierra Nevada range is due to late Cenozoic uplift and tilting associated with fault activity along the eastern margin (Wakabayashi and Sawyer 2001). The range slopes gently westward from the crest and slopes abruptly eastward from the crest.

Near the western margin of the Sierra Nevada range, in the vicinity of the Project, the FFS is a dominant structural feature. This fault system is an anastomosing (braided or interwoven) complex of north-northwest-striking fault-related structures with serpentinized or mineralized zones and sheared contacts between rocks (Clark 1960). There are two major fault zones in the FFS that cross the Tuolumne River as shown in Figure 5.1.2-1 above. These are the Bear Mountains Fault Zone and the Melones Fault Zone. The California Division of Mines and Geology (CDMG) open File Report 84-52 (1994) reports that the Bear Mountains and Melones Fault zones did not warrant zoning as active faults because they "either are poorly defined at the surface or lack evidence of Holocene (recent) displacement."

- **Bear Mountains Fault Zone**. The Bear Mountains Fault Zone is oriented northwest/southeast and extends through the central part of Don Pedro Reservoir. It is believed that the Bear Mountains Fault Zone represents a splay of the Melones Fault zone, and that the two merge at depth.
- **Bowie Flat Fault**. The Bowie Flat Fault is located in the northern part of the Project. It is a zone of intense deformation several hundreds of feet in width. Quaternary movement (within the last 1.6 million years) along this fault has been documented on a segment of the fault located approximately eight miles northwest of the dam site (Jennings 1994).
- **Melones Fault Zone**. The Melones Fault is located just north of the Project, and marks a division of dominantly oceanic rocks to the southwest from continental (land derived) rocks to the northeast. The fault zone varies in width from less than 1,000 feet to over 3,000 feet.

The Project area has experienced seismic shaking due to numerous earthquake events (see Figure 5.1.3-1 below). Bechtel Corporation performed a seismicity and ground motion study for the Don Pedro Dam in November 1992. The study showed that earthquakes from nearby faults (distances<6 miles from the dam) control the maximum ground motion felt at the dam rather than from more distant (>50 miles) active regional faults such as the San Andreas and Sierra Nevada Frontal faults. HDR Engineering and Geomatric Consultants, in a July 2000 Memorandum to TID, reviewed the Bechtel report and agreed with that assessment, but based on more recent seismic studies recommended that a random maximum earthquake of M6.5 (compared to M6.25 in the Bechtel study) be assigned to the fault traces in the Foothills Fault System. HDR/Geomatric considered all the faults in the system to be "conditionally active" based on the criteria cited by Fraser (1996). The criterion states that a "conditionally active" fault will be "treated as a seismic source for dam design or reevaluation because of the incomplete or inconclusive evidence, with the understanding that additional investigation or analysis could change the designation."

The Bowie Flat Fault is the closest fault trace to the reservoir site and is considered the potential seismic source. Earthquake ground motions were estimated assuming a maximum earthquake of M6.5. Median peak ground accelerations (PGA) at bedrock were estimated using two available ground motion attenuation models (Sadigh et al. 1997; Abrahamson and Silva 1997). These models were developed for strike-slip and reverse thrust faults in compressional stress regimes. As discussed, the Foothills Fault System has normal faulting in an extensional stress regime. PGA for normal faulting was found to be lower (20 percent to 30 percent) than strike-slip/reverse faulting in studies cited by HDR Engineering and Geomatrix Consultants (2000) They recommended that the PGAs determined by the attenuation models be scaled 80 percent to arrive at the site PGA.

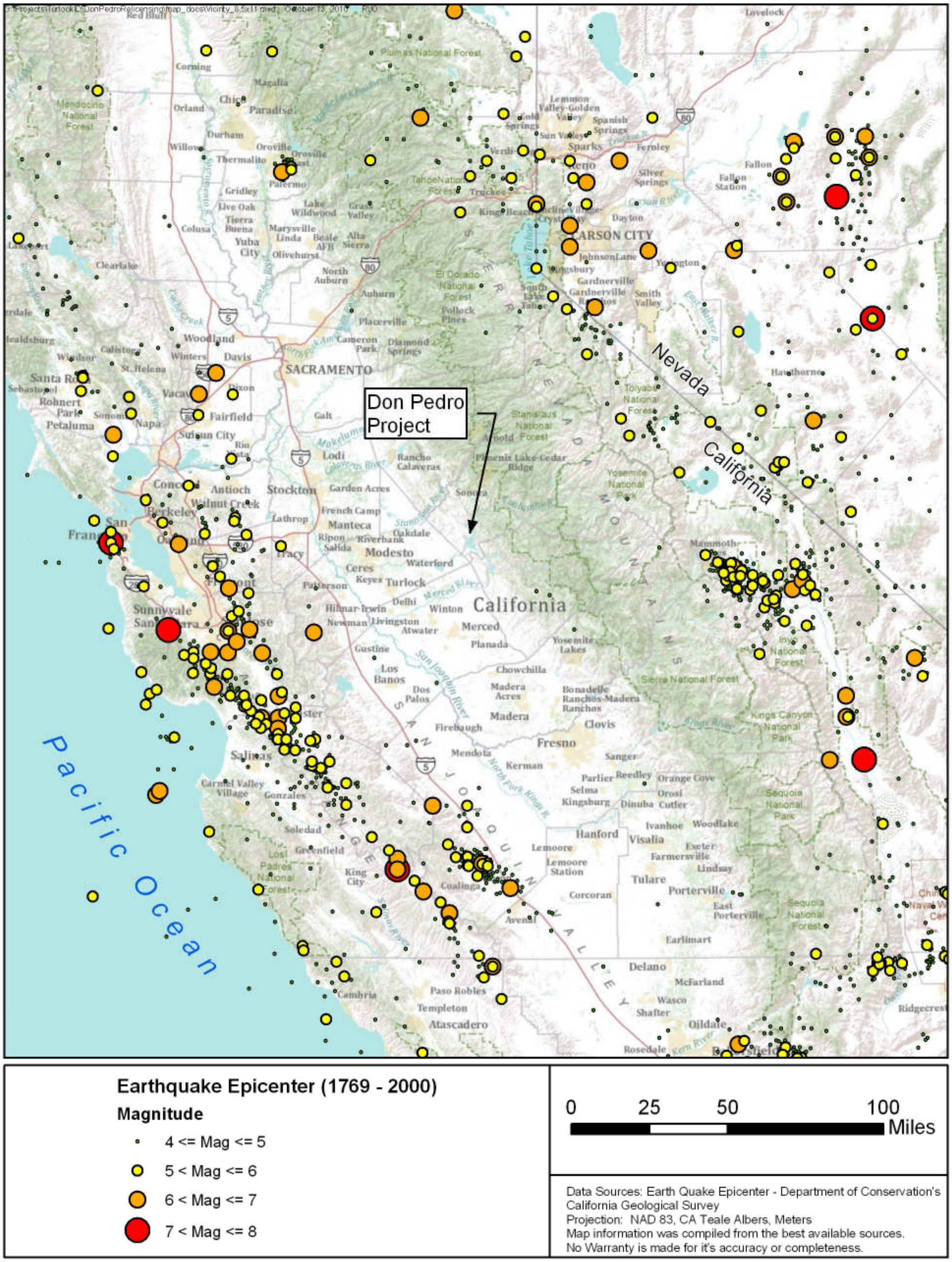


Figure 5.1.3-1 Historical seismicity.

5.1.4 Mineral Resources

Past and present mines in the vicinity of the Project are shown on Figures 5.1.4-1 and 5.1.4-2 and summarized in Table 5.1.4-1. The chief mineral commodity in the vicinity is gold. The immensely rich placers of Columbia and Springfield northwest of the Project produced approximately $55,000,000 in gold prior to 1899. The pocket mines of Sonora, Bald Mountain and vicinity have also been highly productive and exceptionally long-lived.

Marble and limestone products have been next to gold in value. The Columbia marble beds northwest of the Project had a long history of production prior to 1941, and two plants are at present processing the stone from these deposits.

From the 1860s to the 1940s, roughly 10,000 tons of chromite ore and several hundred tons of crude magnesite ore were mined. Most of the chromite came from the McCormick Mine, located northwest of the Project. All of the magnesite production in Tuolumne County occurred in the 1920s and came from two sites in the northern portion of the Red Hills located northwest of the Project.

Tuolumne County also contains deposits of copper, soapstone, scheelite (an ore of tungsten), limestone, marble, platinum, silver, sulphur, decorative stone, slate, sand and gravel.

Chrysotile (white asbestos) is found in veins in serpentinized ultramafic rocks, generally along the Melones Fault, near margins of serpentinite bodies. This mineral is known to occur in the Project area, but is not commercially exploited.

Gold mined in Stanislaus County has come predominantly from placers. Quaternary gravels of the Tertiary Tuolumne River channel near Waterford were among the most productive. In the early 1900s, large-scale dredging of Quaternary gravels began along the Tuolumne River between La Grange and Waterford, and most of the gold produced in Stanislaus County from 1932 through 1959 came from this area. In the late 1940s, gold mining declined sharply (Koschmann and Bergendahl 1968).

California leads the nation in aggregate production and virtually all is removed from alluvial deposits (Kondolf 1995). As of 1994 sand and gravel mining exceeded the economic importance of gold mining in the state. Large-scale in-channel aggregate mining began in the Tuolumne River corridor in the 1940s, when aggregate mines extracted sand and gravel directly from large pits located within the active river channel. Off-channel aggregate mining along the Tuolumne River has also been extensive. Aggregate in Stanislaus County is currently classified as Aggregate Resources (potentially useable aggregate that may be mined in the future but for which no mining permit has been granted) and Aggregate Reserves (aggregate resources for which mining and processing permits have been granted) (Higgins and Dupras 1993). An estimated 540 million tons (338 million cubic yards) of aggregate resources are located in six different geographic areas of Stanislaus County (Higgins and Dupras 1993). The lower Tuolumne River corridor is the largest of the six areas and contains an estimated 217 million tons (135 million cubic yards) in the channel and terraces (Higgins and Dupras 1993). The Gravel

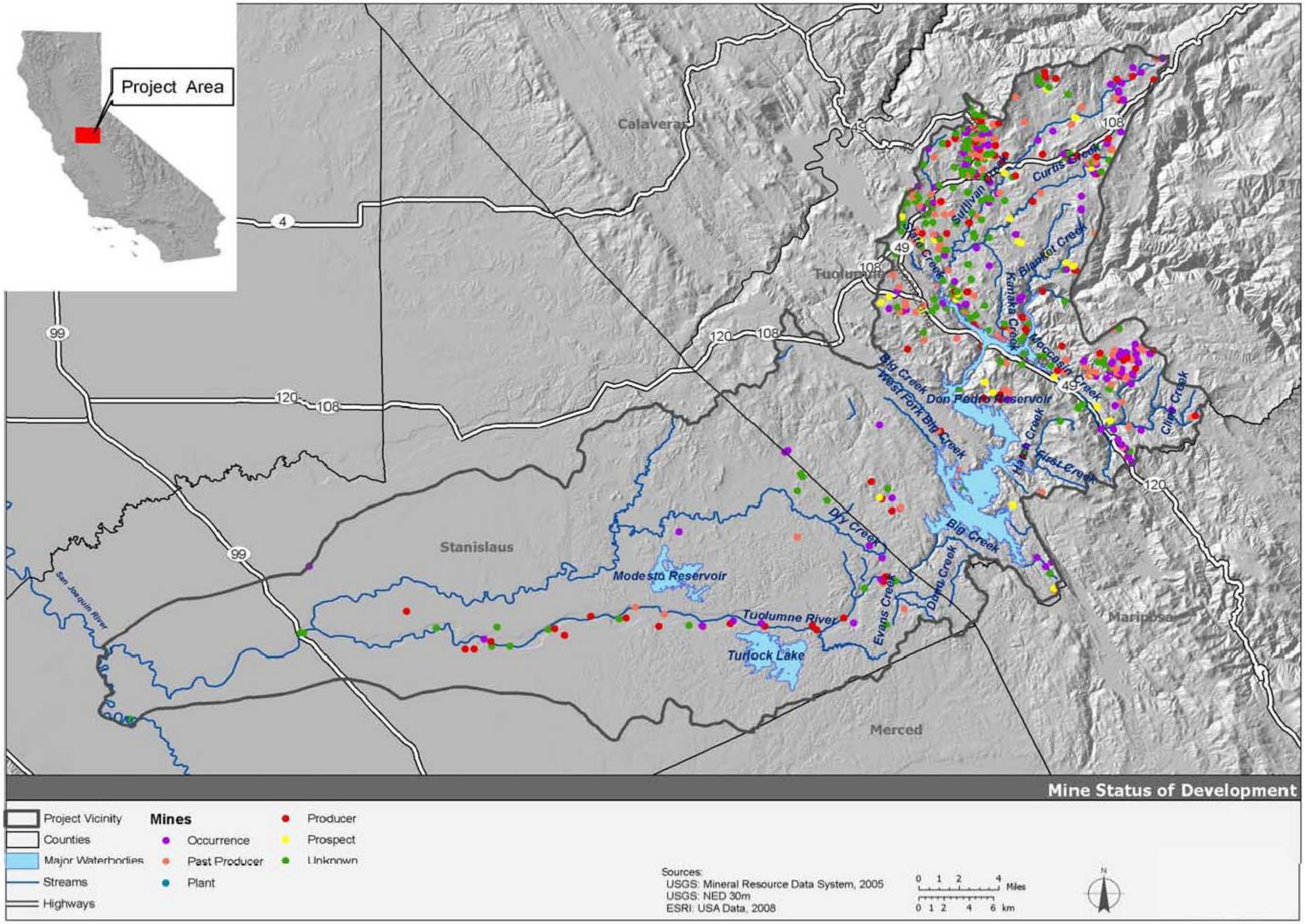


Figure 5.1.4-1 Past and present mines in the general Project vicinity.

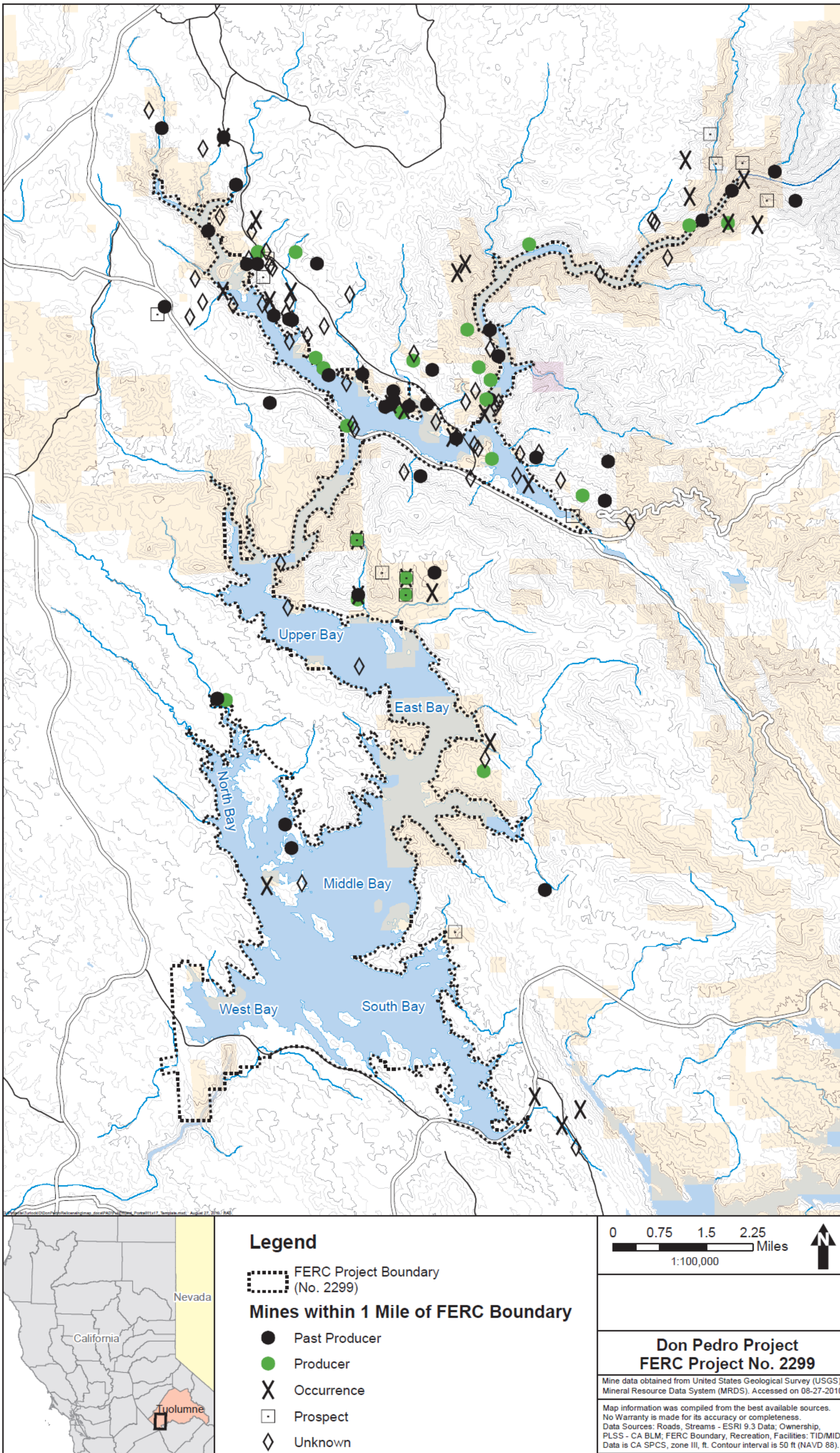


Figure 5.1.4-2 Past and present mines in the immediate Project area.

Table 5.1.4-1 Mines in the lower Tuolumne River and Project area.

Mineral	Status	Number of Mines
Asbestos	Prospect	1
Beryllium	Occurrence	1
Chromium	Occurrence	7
	Past Producer	11
	Producer	9
	Prospect	5
Clay	Occurrence	4
	Unknown	3
Copper	Occurrence	3
	Past Producer	7
	Prospect	5
	Unknown	2
Diatomite	Past Producer	1
	Producer	1
	Prospect	1
Gold	Occurrence	102
	Past Producer	123
	Producer	68
	Prospect	13
	Unknown	147
Gold, Silver	Occurrence	3
	Past Producer	1
	Plant	1
	Producer	3
Limestone, Dimension	Occurrence	3
	Prospect	6
Limestone, General	Prospect	1
Magnesite	Past Producer	1
	Producer	2
	Prospect	1
Manganese	Occurrence	1
	Producer	2
	Unknown	1
Sand and Gravel, Construction	Past Producer	2
	Producer	17
	Unknown	10
Silver, Gold	Producer	1
Slate, Dimension	Occurrence	1
Stone	Occurrence	1
	Past Producer	1
	Producer	2
	Unknown	1
Stone, Crushed/Broken	Occurrence	1
	Producer	1
Stone, Dimension	Unknown	1
Talc-Soapstone	Occurrence	1
Total	**----**	**580**

Mining Reach of the lower Tuolumne (RM 34.2 to 40.3) is currently the focus of development by commercial aggregate producers. Floodplain and terrace pits in the reach are typically separated from the channel by narrow berms that can breach during high flows, resulting in capture of the river channel. The January 1997 flood caused extensive damage to dikes separating deep gravel mining pits from the river, breaching or overtopping nearly every dike along the 6-mile-long reach.

5.1.5 Geomorphology

The Tuolumne River leaves a 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 cut into Quaternary alluvial deposits. 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-bedded 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) (Figure 5.1.5-1). 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.

Channel form in the gravel-bedded zone was historically a combination of single-thread and split channels that migrated and avulsed (McBain & Trush 2000). The transition from a gravel-bedded to sand-bedded river downstream of Geer Road (RM 24) caused a shift to single thread morphology with alternate bars and an increase in bankfull width. Particle size decreased from cobbles and boulders near La Grange (RM 50) to fine sand downstream of the Dry Creek confluence (RM 16).

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 stored bed material for gold dredging and aggregate extraction to depths below the river thalweg eliminated active floodplains and terraces and created large in-channel 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.

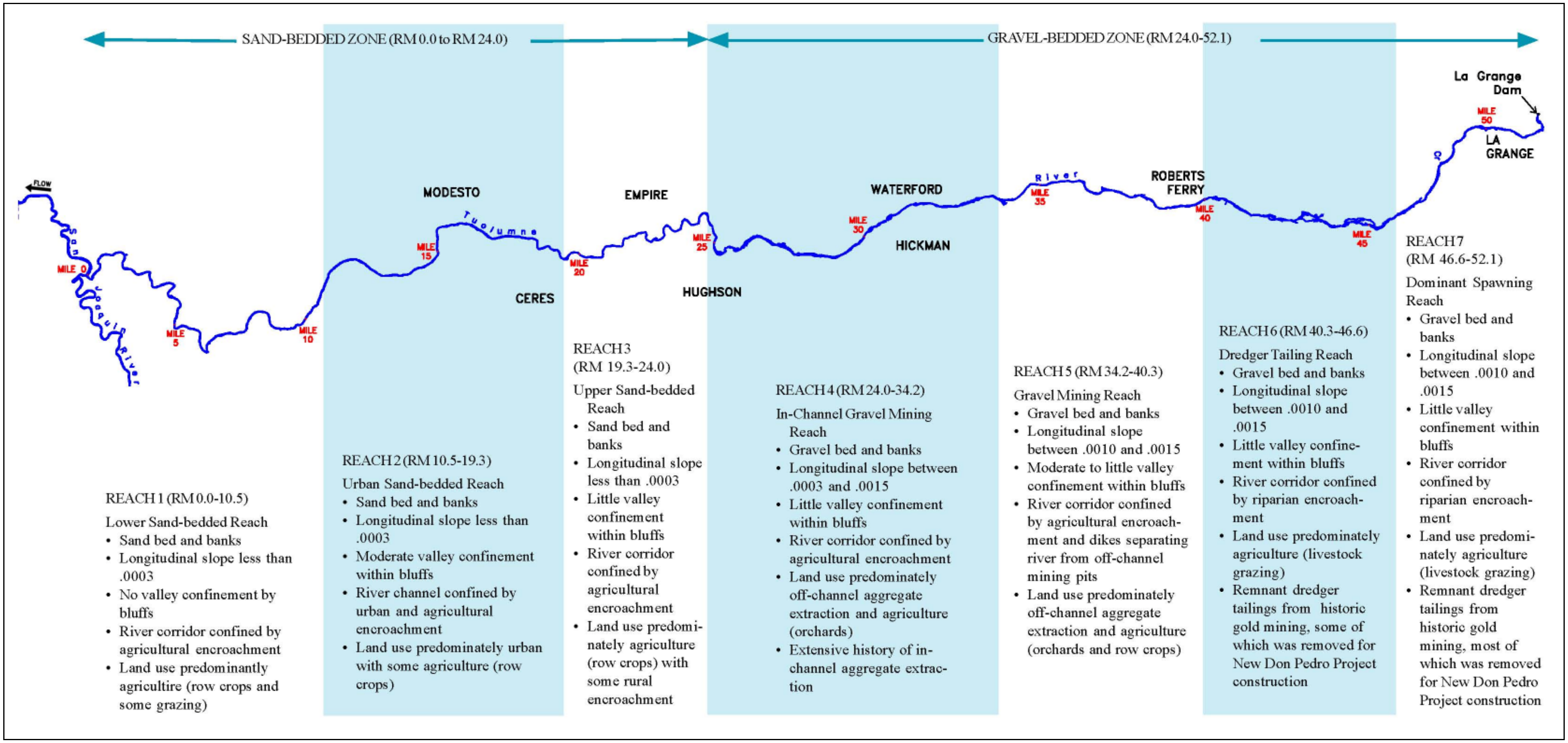


Figure 5.1.5-1 Tuolumne River geomorphic reach delineation.
Source: McBain & Trush 2000.

La Grange Dam (constructed in 1893) and the old and new Don Pedro Dams (completed in 1923 and 1971, respectively) trap all coarse sediment and most fine sediment. Bed mobilization occurs in most reaches of the lower Tuolumne River at flows above about 7,000 cfs. The average annual bedload transport at the downstream end of the spawning reach (Riffle 5A-4A) is approximately 1,900 tons/year (McBain & Trush 2000, 2004). Surveys of the channel downstream of La Grange Dam indicate channel downcutting, widening, armoring, and depletion of sediment storage features (e.g., lateral bars and riffles) due to sediment trapping in upstream reservoirs, mining, and other land use changes (California Department of Water Resources [CDWR] 1994; McBain & Trush 2004). Bedload impedance reaches, defined as locations where current hydraulic conditions are insufficient to transport coarse bed material (>4 mm) through the reach, were identified from La Grange Dam to the confluence of the San Joaquin River (Table 5.1.5-1) (McBain & Trush 2000). These reaches are associated with long scour pools and former instream aggregate extraction and gold dredger pits.

Table 5.1.5-1 Bedload impedance reaches on the Tuolumne River.

River Mile	Cause of Impedance	Site Name
47.2 - 47.8	Gold Dredging	Basso Bridge Run/Pool
45.0 - 45.4	Gold Dredging	Special Run Pool 2
43.4 - 43.8	Gold Dredging	Special Run Pool 3
41.0 - 41.5	Gold Dredging	Special Run Pool 4
36.7 - 36.8	Instream aggregate extraction	Clark's Pool
32.9 - 33.4	Instream aggregate extraction	Special Run Pool 5
30.15 - 30.8	Instream aggregate extraction	Special Run Pool 6
27.95 - 29.5	Instream aggregate extraction	Special Run Pool 7
26.0 - 27.7	Instream aggregate extraction	Special Run Pool 8
25.8 - 25.95	Instream aggregate extraction	Special Run Pool 9
25.1 - 25.4	Instream aggregate extraction	Special Run Pool

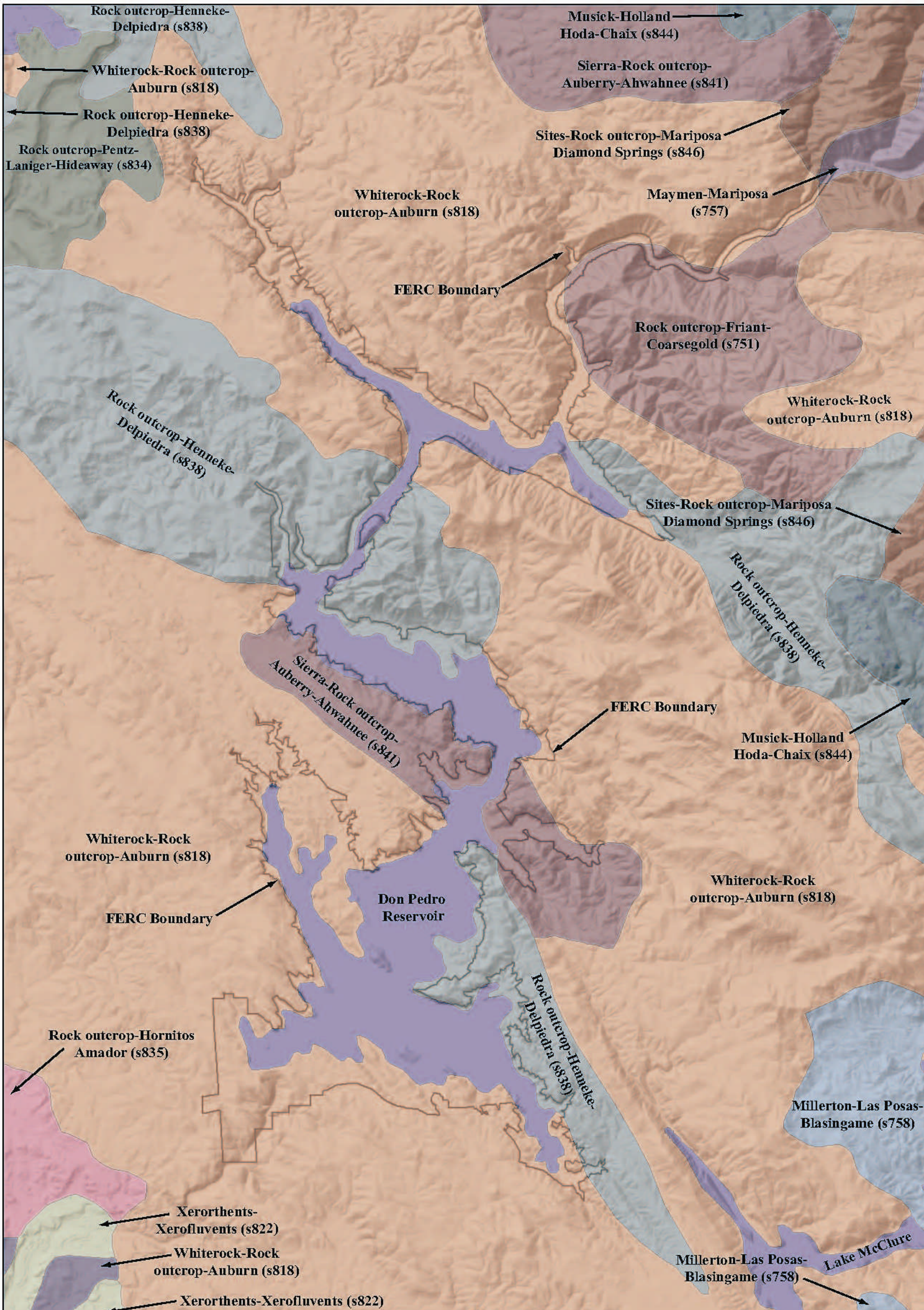
Source: McBain & Trush 2000.

5.1.6 Soils

The Project is located within the foothills of the Sierra Nevada near the Melones Fault Zone and the Bear Mountains Fault Zone. The soils in the vicinity are derived from a variety of parent materials, including schist, serpentine (ultramafic rocks), metavolcanic and metasedimentary rocks. Many of the soils are shallow, and associations with "rock outcrop" cover virtually the entire Project vicinity (Figure 5.1.6-1). Soil associates present in the Project Boundary are given in Table 5.1.6-1. Major characteristics of the soil series and orders are summarized in Table 5.1.6-2.

Table 5.1.6-1 Soil associations within the Don Pedro Project Boundary.

Soil No.	Soil Association	Acres	% of Total
s818	Whiterock-Rock outcrop-Auburn	4,556.9	70.6
s838	Rock outcrop-Henneke-Delpiedra	664.2	18.2
s841	Sierra-Rock outcrop-Auberry-Ahwahnee	488.6	7.8
s751	Rock outcrop-Friant-Coarsegold	281.1	3.2
s757	Maymen-Mariposa	13.7	Trace
s846	Sites-Rock outcrop-Mariposa-Diamond Springs	5.5	Trace
	Total	**6,009.9**	**100**



Soil Description	% of land within FERC Boundary
Whiterock-Rock outcrop-Auburn (s818)	70.6
Rock outcrop-Henneke-Delpiedra (s838)	18.2
Sierra-Rock outcrop-Auberry-Ahwahnee (s841)	7.8
Rock outcrop-Friant-Coarsegold (s751)	3.2
Maymen-Mariposa (s757)	0.2
Sites-Rock outcrop-Mariposa-Diamond Springs (s846)	0.1

0 0.5 1 1.5 2 2.5 Miles
N
1:100,000

Don Pedro Project
FERC Project No. 2299

Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness.
Data Sources: FERC Boundary: TID/MID. Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88). Soils: STATSGO Database

Figure 5.1.6-1 Major soil associations in the Don Pedro Project area.

Table 5.1.6-2 Soil series and order summary description.

Series	Parent Material	Geomorphic Position	Slope (%)	Elevation (feet)	Average Annual Precipitation (in)	Mean Annual Temperature (°F)	Drainage
Ahwahnee	Granitic	Footslopes, mountains	2-75	200-2800	30	60	Moderately deep, well drained
Auberry	Intrusive, acid igneous	Foothills, mountainous uplands	5-75	400-3500	22	62	Deep, well drained
Auburn	Amphibolite schist	Foothills	2-75	125-3000	24	60	Shallow to moderately deep, well drained
Coarsegold	Weathered schist	Mountains	8-75	500-4500	26	58	Moderately deep, well drained
Delpiedra	Gray, weathered serpentine	Steep to very steep ridges	Steep	500-2500	16-35	60	Shallow, well to somewhat excessively drained
Diamond Springs	Metamorphosed acid igneous and rhyolitic rocks	Foothills, mountainous uplands	Gently sloping to steep	1000-4000	30-50	54	Moderately deep, well drained
Friant	Mica and quartz schist and gneiss	Mountainous uplands	9-75	500-3500	18	62	Shallow, well drained
Henneke	Serpentine and similar	Mountains	5-75	500-4000	30	60	Shallow, well drained
Hideaway	Basalt flows	Tablelands	Nearly level to rolling	1500-2400	17-25	57-60	Shallow, well drained
Laniger	Rhyolite or rhyolitic tuff	Foothills	Gently sloping to steep	500-2000	20-45	60	Moderately deep, well to somewhat excessively drained
Maymen	Sandstone, shale, conglomerate	Mountains	5-100	400-4250	42	54	Shallow, excessively drained
Mariposa	Tilted slates and schists	Ridges, mountainsides	2-75	1600-5600	55	53	Moderately deep, well drained
Pentz	Basic andesitic tuffaceous	Mound, inter-mound microrelief, hill backslopes	2-50	110-600	19	60	Shallow, well drained
Sierra	Acid igneous	Foothills	Gently sloping to steep	200-3500	20-38	59-62	Deep, well drained
Sites	Metabasic and metasedimentary	Mountains	2-75	600-5000	50	53	Deep to very deep, well drained
Whiterock	Metasedimentary (Mariposa formation)	Foothills	3-60	160-2500	22	61	Shallow to very shallow, somewhat excessively drained

5.1.6.1 Upstream of the Project

Soil associations upstream of the Project are rock outcrop-Friant-Coarsegold association, Sites-rock outcrop-Mariposa-Diamond Springs association, and Maymen-Mariposa association. The rock outcrop-Friant-Coarsegold association formed in schist and gneiss, the Sites-rock outcrop-Mariposa-Diamond Springs association formed in metamorphic rocks such as slate and schist, and the Maymen-Mariposa association formed in metamorphic and sedimentary rocks.

5.1.6.2 Project Area

Only two soil associations cover 90 percent of the Project, Whiterock-rock outcrop-Auburn at 70.6 percent and rock outcrop-Henneke-Delpiedra at 18.2 percent. The areas to the southwest and northeast of Don Pedro Reservoir are dominated by soils of the Whiterock-rock outcrop-Auburn association, with bands of the rock outcrop-Henneke-Delpiedra and Sierra-Rock outcrop-Auberry-Ahwahnee associations bisecting the lake in a northwest to southeast direction. The area to the south of the Tuolumne River in the upper few river miles of the Project is rock outcrop-Friant-Coarsegold association, and there are very small areas of Sites-rock outcrop-Mariposa-Diamond Springs and Maymen-Mariposa associations in the uppermost Project area.

The Whiterock-rock outcrop-Auburn association is one of the more extensive associations in the foothills of the Sierra Nevada, and it typically develops in tilted slate, amphibolite schist, and partially metamorphosed sandstone formations. Whiterock soils tend to be shallower and less weathered than those of the Auburn series.

The Bear Mountains Fault Zone, which runs northwest to southeast through the Project, has serpentinized ultramafic rock in many areas along the zone. The areas underlain by these utramafic rocks are reflected by the presence of the Henneke and Delpiedra series, which are often shallow and poorly developed as shown by the large amount of "rock outcrop" in the association. Serpentine soils may support rare plants that are adapted to survival in low-nutrient conditions and that are adapted to soils containing elements in high concentrations that are toxic to many plant species.

5.1.6.3 Downstream of the Project

Soil associations and mapping units downstream of the Project include the rock outcrop-Hornitos-Amador association, the Whiterock-rock outcrop-Auburn association, and Xerorthents-Xerofluvents. Hornitos soils develop from sandstone and conglomerate, and Amador soils develop from rhyolitic tuff. The Whiterock-rock outcrop-Auburn association is described in Section 5.1.6.2 above. Xerorthents and Xerofluvents are very young soils that often lack the cohesiveness necessary for meaningful series placement. Xerofluvents are found in and around river and stream channels and Xerorthents have typically been mechanically disturbed or subjected to some other form of recent mixing. The Xerorthents in the Project area are gold rush era dredge tailings.

5.1.7 Reservoir Shoreline Erosion

The Don Pedro Reservoir covers about 12,960 acres at the normal maximum water surface elevation of 830 feet. Flood storage is reserved to the ACOE from elevation 801.9 to 830 feet each year for the period October 7 to April 27 of the following year. Historically, the Project reservoir has operated above elevation 801 feet about 20 percent of the time, and below elevation 725 feet about 10 percent of the time.

The Don Pedro Reservoir has approximately 160 miles of shoreline including the numerous small islands within the lake. Steep shorelines are predominately intact rock or rock/rubble/boulder not prone to erosion. There have been no large movements or mass movements of soil along the reservoir since the Project commenced operation. Mild slopes, less than eight percent, are generally soil. Erosion along the soil/water interface at elevation 830 is common, but predominantly occurs only along the shoreline and not upslope. A factor that contributes to the lack of upslope erosion is that the shoreline is either federal land (Bureau of Land Management [BLM]) or owned by the Districts and that the Districts do not permit any commercial or residential development on its Project lands except at its three developed recreation areas. Consequently, over 90 percent of the shoreline is protected and undeveloped.

Furthermore, the Districts' land use policy, implemented through the Don Pedro Recreation Agency (DPRA), prohibits shoreline disturbances such as dredging, docks, moorings, piers, or developed improvement of any kind. DPRA rules prohibit all off-road vehicle use on Project lands, as well as motorized boat access over Project lands except at designated boat launches. These and other rules (see Appendix E of the PAD) ensure that over 90 of the shoreline remains in its natural condition.

5.2 Water Resources

The water resources section provides information on the existing water quality and water quantity (hydrology) characteristics of the Don Pedro Project specifically and the Tuolumne River generally.

5.2.1 Water Quality

Section 401 of the federal Clean Water Act (CWA) requires that all applicants for federal licenses or permits seek certification from the appropriate state agency ensuring that the proposed activity will not violate state water quality standards. Certification may be conditioned to ensure compliance with standards. The State Water Resources Control Board (SWRCB) is the administrator of the CWA in the State of California. A water quality certificate was not issued under the current FERC license for the Project because the license was issued prior to the enactment of the CWA.

Congress delegated authority for implementing the CWA and its amendments to the U.S. Environmental Protection Agency (EPA). The EPA in turn has delegated certain authorities and responsibilities to the state. The State of California has designated the SWRCB as the water pollution control agency with authority to implement the CWA in California (Water Code §13160). The SWRCB and the state's nine Regional Water Quality Control Boards (RWQCBs) work in a coordinated manner to implement and enforce the CWA, as provided for in the state's Porter-Cologne Water Quality Act. The Project falls within the jurisdiction of the Central Valley Regional Water Quality Control Board (CVRWQCB), Region 5.

The CWA requires that the EPA adopt water quality standards for surface waters within the U.S., and that these standards be reviewed and revised, if necessary, at least every three years. The

SWRCB carries out its water quality protection responsibilities through the application of specific Basin Plans, formulated and adopted by the RWQCBs, which submit these plans to the SWRCB for review. SWRCB responsibilities include review, revision, and approval of Basin Plans (Water Code §13245).

5.2.1.1 State Water Quality Standards - Designated Uses

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)]. RWQCB 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) implementation programs designed to achieve those objectives. The RWQCBs are required to consider a number of items when establishing these designated uses, including (1) past, present, and probable future beneficial uses; (2) environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto; (3) water quality conditions that could reasonably be achieved through the coordinated control of all factors that affect water quality in the area; and (4) economic considerations.

SWRCB's management goals applicable to the Don Pedro Project are put forth in CVRWQCB's *Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins*, the 4th edition of which was initially adopted in 1998 (CVRWQCB 1998) and which was most recently revised in 2009. The Basin Plan sets forth existing and potential designated beneficial uses and water quality criteria necessary to attain these uses for the Tuolumne River. For example, a numerical criterion is established for dissolved oxygen of 8 mg/L specifically for the Tuolumne River below La Grange Dam between October 15 and June 15 for the protection of spawning, incubation, and early life stages of salmon.

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. Table 5.2.1-1 lists the designated beneficial uses for these units of the Tuolumne River.

Section 303(d) of the CWA requires that every two years each state submit to the EPA a list of rivers, lakes, and reservoirs in the state which have failed to meet designated uses or water quality standards. Table 5.2.1-2 identifies the surface water bodies in the Project area and downstream of the Project included in the State of California's 2006 Section 303(d) List of Water Quality Limited Segments and proposed Total Maximum Daily Load (TMDL) completion date. Table 5.2.1-3 provides the State's proposed additions to the 2006 Section 303(d) List of Water Quality Limited Segments.[3]

[3] On October 11, 2010, SWRCB submitted to EPA for approval its updated list of water quality limited segments requiring TMDLs. On November 12, 2010, EPA responded to the SWRCB with EPA's proposed changes to the SWRCB updated list. EPA's changes have been submitted for public comment; the comment period closed on December 23, 2010.

Table 5.2.1-1 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	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 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 Applies to streams and rivers only.

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.

Table 5.2.1-2 Section 303(d) List of Water Quality Limited Segments for the Project and downstream of the Project.

Waterbody Segment	Pollutant/Stressor	Potential Sources	Proposed TMDL Completion Date
Don Pedro Reservoir	Mercury	Resource Extraction	2020
Lower Tuolumne River (Don Pedro Reservoir to San Joaquin River)	Diazinon	Agriculture	2008
	Group A Pesticides	Agriculture	2011
	Unknown Toxicity	Source Unknown	2019

Source: SWRCB 2006.

Table 5.2.1-3 Proposed 2010 additions to the 2006 CWA Section 303(d) List of Water Quality Limited Segments for the Project area and upstream and downstream of the Project.

Waterbody Segment	Pollutant/Stressor	Potential Sources	Expected TMDL Completion Date
Sullivan Creek (Phoenix Reservoir to Don Pedro Reservoir)	Escherichia coli (E. coli)	Source Unknown	2021
Woods Creek (north side of Don Pedro Reservoir)	Escherichia coli (E. coli)	Source Unknown	2021
Lower Tuolumne River (Don Pedro Reservoir to San Joaquin River)	Chlorpyrifos	Agriculture	2021
	Mercury	Resource Extraction	2021
Dry Creek (tributary to Tuolumne River at Modesto)	Chlorpyrifos	Agriculture	2021
	Diazinon	Agriculture	2021
	Escherichia coli (E. coli)	Source Unknown	2021
	Unknown Toxicity	Source Unknown	2021

5.2.1.2 State Water Quality Standards - Water Quality Objectives

The CVRWQCB has adopted water quality objectives to protect the beneficial uses identified in Table 5.2.1-1. Water quality objectives are specific to the intended uses and can be numeric or qualitative. For example, the Basin Plan's water quality objectives for the drinking water beneficial use are the State's numeric drinking water standards, while the Basin Plan's water quality objectives for the aquatic life beneficial use are both numeric, as in the case of the pH water quality objective, or narrative, as in the case of the toxicity water quality objective. Examples of objectives and criteria for various uses are described in the paragraphs below.

For water designated for use as domestic or municipal supply, the CVRWQCB has incorporated, by reference, Title 22 of the California Code of Regulations, except for dissolved oxygen, pH, and iron. The Basin Plan states that municipal water shall not contain concentration of chemical constituents in excess of maximum contaminant levels (MCLs) for drinking water (CVRWQCB 1998), with the exception that more stringent criteria may apply as necessary for protection of specific beneficial uses. Health and Safety Code §116365(a) requires the California Department of Public Health (CDPH) to place primary emphasis on the protection of public health by establishing a contaminant's MCL at a level as close as is technically and economically feasible to its public health goal (PHG). The PHG, established by the state's Office of Environmental Health Hazard Assessment (OEHHA), is the contaminant's concentration in drinking water that does not pose any significant risk to health derived from a human health risk assessment. As part of the MCL process, CDPH's Drinking Water Program evaluates the technical and economic feasibility of regulating a chemical contaminant. Technical feasibility includes an evaluation of commercial laboratories' ability to analyze for and detect the chemical in drinking water, the costs of monitoring, and the costs of treatment required to remove it.

For water quality objectives related to aquatic toxicity (ammonia, nitrate, and trace metals), the California Toxics Rule (CTR) is the relevant regulation (EPA 2000). California has established Criterion Maximum Concentrations (CMC) as the highest concentration to which aquatic life can be exposed for a short period without deleterious effects (acute toxicity) based on extended sample collection and one-hour averaging. In addition, 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 (chronic toxicity). Adverse effects to aquatic organisms due to acute and chronic toxicity can occur as a result of a combination of individually non-toxic elements or compounds. Ambient water quality characteristics such as pH or hardness can cause some toxicity levels to vary. For example, certain metals are reportedly toxic to aquatic life at low hardness levels and ammonia toxicity is a function of both pH and temperature.

OEHHA also is responsible for issuing fish consumption advice for water bodies in California. Many advisories have been issued in the state due to mercury in fish. Neither Don Pedro Reservoir nor the Tuolumne River is listed in the *2009 Update of California Sport Fish Advisories* (OEHHA 2009).

5.2.1.3 Existing Water Quality Data

As part of its efforts to provide existing information related to water quality for inclusion in the PAD, the Districts reviewed the following source documents and data sources:

- EPA Storage and Retrieval (STORET) data and reports
- U.S. Geological Survey Water Resources (USGS) Data Reports and data collected for the National Water Quality Assessment (NAWQA) Program
- CVRWQCB reports prepared for the Surface Water Ambient Monitoring Program (SWAMP)
- Environmental Defense Fund's *Paradise Regained: Solutions for Restoring Yosemite's Hetch Hetchy Valley*, Appendix B
- National Park Service (NPS) report on Yosemite National Park
- CDWR data
- Districts' water quality monitoring data within Don Pedro Reservoir and in the lower Tuolumne River
- Various City and County of San Francisco (CCSF) reports
- East San Joaquin Water Quality Coalition data collection on Dry Creek
- City of Modesto water quality sampling on Dry Creek and the lower Tuolumne River
- Data collected on the lower Tuolumne River by TID to support its Regional Surface Water Supply Project

Upper Tuolumne River

As described more fully in Section 4, the Tuolumne River originates at roughly elevation 8,600 feet in the Tuolumne Meadows area of Yosemite National Park within Tuolumne County. From Tuolumne Meadows, the Tuolumne River flows westward through a number of waterfalls, before entering the grand canyon of the Tuolumne. The Tuolumne River then enters the Hetch

Hetchy Reservoir, still within the bounds of Yosemite National Park. From upstream of Tuolumne Meadows to where it enters Don Pedro Reservoir, the Tuolumne River is designated as a National Wild and Scenic River, except for an eight-mile reach at Hetch Hetchy Reservoir. Following is a brief summary of the more relevant data reviewed. The comments are presented by document or data set.

EPA. 1939-1989. STORET Database,

Surface water quality data for the upper Tuolumne River were retrieved from the EPA STORET database management system. Data were available for the period between 1977 and 1986, except for Tuolumne River at Tuolumne City, which was collected between 1939 and 1989. Results of the STORET query yielded two observations each on Eleanor Creek, Cherry Creek below Cherry Lake, and South Fork Tuolumne River; 10 observations on the Tuolumne River above Early Intake; and 490 observations on the Tuolumne River at Tuolumne City (EPA 2010). Data for general parameters, minerals, and nutrients are summarized in Table 5.2.1-4. Metals and microbiological data were only collected on the Tuolumne River at Tuolumne City (Table 5.2.1-5).

National Park Service. 1994. Baseline Water Quality Data - Inventory Analysis, Yosemite Park.

This document presents the results of surface water quality data retrievals for Yosemite National Park from the EPA's national databases. Data were also available for Tuolumne River below Hetch Hetchy (Tables 5.2.1-4 and 5.2.1-5).

Kratzer and Shelton. 1998. Water Quality Assessment of the San Joaquin-Tulare Basins, California: Analysis of Available Data on Nutrients and Suspended Sediment in Surface Water.

Nutrients and suspended sediment in surface water of the San Joaquin-Tulare Basins were assessed using 1972-1990 data from the USGS National Water Information System (NWIS) and the EPA STORET database.

One of the sites analyzed was Tuolumne River at Tuolumne City. Median data for specific conductance, pH, dissolved hardness, ammonia, total Kjeldahl nitrogen, phosphorus, orthophosphate, organic carbon, and suspended sediment are presented in this report.

Rosekrans et al. 2004. Paradise Regained: Solutions for Restoring Yosemite's Hetch Hetchy Valley.

Environmental Defense Fund staff evaluated the feasibility of restoring the Hetch Hetchy Valley. Appendix B to the report evaluates water quality for Hetch Hetchy Reservoir alternatives. Included in the evaluation are Hetch Hetchy Reservoir and Moccasin Reservoir water quality data, which are provided in Tables 5.2.1-4 and 5.2.1-5.

Hetch Hetchy water had extremely low specific conductance and hardness. The water was low in barium, copper, alkalinity, and minerals (chloride, sulfate, calcium, magnesium, silica, and sodium). Hetch Hetchy water is of high quality. *Giardia* (0.04 cysts/L) and *Cryptosporidium* (0.04 cysts/L) were present in Hetch Hetchy Reservoir. *Giardia* (0.01 cysts/L) and *Cryptosporidium* (0.01 cysts/L) were also present in Moccasin Reservoir.

Table 5.2.1-4 Summary of general water quality data ranges (physical parameters, minerals, and nutrients) upstream of the Project.

Location	Sampling Period	Temperature °C	Specific Conductance (µmhos/cm	Dissolved Oxygen mg/L	pH	Alkalinity, mg/L	Hardness, mg/L	Calcium, mg/L	Magnesium, mg/L	Sodium, mg/L	Potassium, mg/L	Chloride, mg//	Sulfate, mg/L	Ammonia , mg/L	Nitrate Nitrogen mg/L	Total Kjeldahl Nitrogen, mg/L	Total Phosphorus, mg/L	Orthophosphate, mg/L	Carbon, mg/L	Source
Eleanor Creek	1977	1.9-17.0	10-60	6.8-10	7.1-7.8	3-22	3.1-16.0	0.9-5.1	0.2-0.8	1.3-6.5	1.0	0.0-6.2	0.2-1.6	0.01-0.02	0.01-0.04	0.1-0.2	0.0-0.03	0.0-0.0	1.2-1.8	EPA 2010
Cherry Creek Below Dam	1977	10.0-11.7	10-10	9.8-12.0	7.0-7.7	4-4	3-4	0.8-1.4	0.01-0.2	0.7-1.3	0.2-0.2	0.0-0.0	0.3-1.2	0.01-0.01	0.01-0.01	0.01-0.01	0.0-0.2	0.0-0.0	1.8-1.9	EPA 2010
Hetch Hetchy Reservoir*	1995-2003	--	10.4	--	7.4	4.67	3.33	1.41	0.36	3.0	0.39	2.7	0.6	--	0.5	--	--	0.06	1.4	Rosekrans et al. 2004
Tuolumne River below Hetch Hetchy Reservoir	1981-1982	15.5-18.0	7-10	8.5-8.5	6.5-6.7	4-4	3-3	0.8-1.0	0.05-0.20	0.5-0.9	0.1-0.3	0.05-2.00	0.8-2.5	--	--	--	--	0.012-0.016	--	NPS 1994
Tuolumne River Above Early Intake	1973-1986	9.8-17.0	9-76	9.2-12.0	6.8-7.7	2-6	2-5	0.9-2.0	0.0-0.2	0.6-4.0	0.6	0.0-0.8	0.0-1.3	0.02	0.00-0.08	0.10-0.20	0.0-0.03	0.0	2.1-2.2	EPA 2010
Moccasin Reservoir*	2000-2003	--	14		6.8	5.3	4.8	1.0	0.4	3.0	0.5	3.0	0.7	--	0.2	--	--	0.07	--	Rosekrans et al. 2004
So Fork Tuolumne River near Oakland Recreation Camp	1977	18.0-22.4	41-130	9.8-9.9	8.2	19-71	15-69	4-19	1.2-5.2	2.9-3.4	1.8	0.3-0.8	0.8-4.4	0.03-0.04	0.00-0.03	0.10-0.20	0.01-0.02	0.00-0.01	1.9-3.1	EPA 2010
Tuolumne River at Tuolumne City	1939-1989	6-30	39-1104	4.0-12.8	7.0-8.4	14-145	14-236	4-62	1-38	2-140	0.6-10.0	2-262	0.0-60	0.00-0.13	0.10-14.0	0.20-0.85	0.03-0.6	0.01-0.4	0.12-6.5	EPA 2010

*only averages available

Table 5.2.1-5 Summary of water quality data (metals and microbiological) upstream of the Project.

Location	Sampling Period	Arsenic, µg/L	Cadmium, µg/L	Chromium, µg/L	Copper, µg/L	Iron, µg/L	Lead, µg/L	Manganese, µg/L	Mercury, µg/L	Molybdenum, µg/L	Nickel, µg/L	Selenium, µg/L	Zinc, µg/L	Total Coliform, MPN/100 mL	Fecal Coliform, MPN/100 mL	Notes
Hetch Hetchy Reservoir	1995-2003	3.8	1	2.6	6.6	30.4	1.7	5.7	0.6	--	6.1	5	9	6	2	Rosekrans et al. 2004
Tuolumne River below Hetch Hetchy Reservoir	1981-1982	--	--	--	--	5-15	--	--	--	--	--	--	--	--	5-15	NPS 2004
Moccasin Reservoir	2000-2003	1.8	1	1.3	7.5	59	1.8	4.5	0.5	--	1.5	5	12.8	17	2	Rosekrans et al. 2004
Tuolumne River at Tuolumne City	1969-1989	0-10	0-5	0-10	0-10	0.04-50	0-10	0.02-82	0-1	0-5	5-6	0-10	5-14	350-16000	49-2400	EPA 2010

San Francisco Planning Department. 2008. Final Program Environmental Impact Report for San Francisco Public Utilities Commission's Water System Improvement Program. Section 5.3, Tuolumne River System and Downstream Water Bodies.

The San Francisco Planning Department prepared a Program Environmental Impact Report (PEIR) for the San Francisco Public Utilities Commission's (SFPUC) Water System Improvement Program. The PEIR describes the water quality in Hetch Hetchy Reservoir as excellent. Plant nutrients such as nitrogen and phosphorus were typically near or below detection limits, and dissolved oxygen concentrations were typically at or near saturation. Total dissolved solids (TDS) concentrations were less than 10 milligrams per liter (mg/L), and average total organic carbon (TOC) concentrations were less than 2 mg/L. The SFPUC routinely samples water quality at various depths in Hetch Hetchy Reservoir. Monthly water temperatures at a depth of 140 feet for the period from 1997 to the present ranged between 6.5 and 13.8°C. This depth, which is approximately the middle of the water column, is representative of water released to the Tuolumne River.

Don Pedro Project Area

EPA. 1966-1982. STORET Database.

Tuolumne River surface water quality data were retrieved for the Project area from the EPA STORET database management system. Data were collected between 1966 and 1980. Results of the STORET query yielded 13 observations on Sullivan Creek, three observation on Woods Creek below Jamestown, and 4 observations on Woods Creek at Slate Creek (Table 5.2.1-6). Sullivan and Woods creeks enter the north side of the reservoir. Metals and microbiological data were also observed on Sullivan Creek and Woods Creek at Slate Creek (Table 5.2.1-7). Data for the Tuolumne River entering Don Pedro Reservoir were observed from three locations: Tuolumne River at Wards Ferry Bridge (11 observations), Tuolumne River above Don Pedro Reservoir (11 observations), and Don Pedro Reservoir at Influent (five observations) (Table 5.2.1-6).

EPA. 1978. Report on Don Pedro Reservoir, Tuolumne County, California.

This report was part of the National Eutrophication Survey. Information on nutrient sources in Don Pedro Reservoir and its watershed were collected to determine whether the reservoir was undergoing eutrophication. In March, June, and November 1975, the reservoir was sampled at five stations. Measurements were taken for temperature, dissolved oxygen, specific conductance, pH, total alkalinity, total phosphorus, orthophosphate, ammonia, nitrite + nitrate, inorganic nitrogen, total Kjeldahl nitrogen, total nitrogen, and chlorophyll a.

Survey data from 1975 indicated that Don Pedro Reservoir was mesotrophic (i.e., an intermediate level of productivity). The data also indicated a nitrogen limitation in March and a phosphorus limitation in June and November. Four wastewater treatment plants (WWTPs; Tuolumne County Water District #1, Jamestown, Sonora, and Tuolumne) contributed a little over 19 percent of the total phosphorus to the reservoir; the Sonora WWTP accounted for

Table 5.2.1-6 Summary of general water quality data ranges (physical parameters, minerals, and nutrients) within the Project area.

Location	Sampling Period	RM from Confluence with San Joaquin River	Temperature, °C	Specific Conductance, µmhos/cm	Turbidity, NTU	Dissolved Oxygen mg/L	pH	Alkalinity, mg/L	Hardness, mg/L	Calcium, mg/L	Magnesium, mg/L	Sodium, mg/L	Potassium, mg/L	Chloride, mg//	Sulfate, mg/L	Ammonia , mg/L	Nitrate Nitrogen mg/L	Total Kjeldahl Nitrogen mg/L	Total Phosphorus, mg/L	Orthophosphate, mg/L	Total Organic Carbon, mg/L	Source
Woods Creek																						
Woods Creek below Jamestown at Hwy 108	1968-1977	83.2	17.0-28.0	380-456	--	7.2-11.1	7.2-9.4	--	109-176	24-41	12-13	21-31	5.8-6.0	15-28	0.30-0.36	--	2.1-35	--	--	--	--	EPA 2010
Woods Creek at Mill Villa Drive	2003-2004	82.9	6.3-23.0	113-492	2.3-153	8.6-15.8	7.1-8.2	--	150-220	41-54	11-21	--	--	6.4-110	27-50	--	--	--	--	--	1.3-3.2	CVRWQCB 2010
Woods Creek at Slate Creek	1973-1975	--	11.9-14.0	188-356	--	9.7-13.5	8.0-8.4	--	--	--	--	--	--	--	--	0.01-0.02	0.45-1.70	0.30-0.52	0.28-1.10	0.26-0.77	--	EPA 2010
Sullivan Creek																						
Sullivan Creek at Jacksonville Road	1975	--	11.0-13.0	90	--	10.0-11.0	7.7-8.3	--	--	--	--	--	--	--	--	--	0.01-0.11	0.10	0.02-0.04	0.00-0.02	--	EPA 2010
Sullivan Creek at Algerine Road	2003-2004	79.0	5.8-23.0	86-170	1.7-200	7.6-15.1	7.5-8.2	--	41-47	9.9-11	3.8-45	--	--	2.8-3.7	2.2-3.7	--	--	--	--	--	1.5-4.8	CVRWQCB 2010
Curtis Creek at Algerine Road	2003-2004	79.0	6.2-28.0	109-317	0.7-300	9.1-16.0	7.7-8.7	--	100-130	24-31	11-14	--	--	--	--	--	--	--	--	--	2.8-4.9	CVRWQCB 2010
Curtis Creek																						
Tuolumne River at Wards Ferry Bridge	1973-1982	77.9	11.7-27.0	12-60	--	8.1-12.8	6.8-7.5	5-21	7-20	1.4-4.7	0.2-2.1	0.4-2.2	0.6	0.0-1.4	0.0-3.3	0.02	0.00-0.02	0.10	0.00-0.04	0.00	1.8-2.2	EPA 2010
Tuolumne River above Don Pedro Reservoir	1966-1976	--	6.7-28.0	18-58	--	8.6-13.0	6.8-7.6	7-23	7-22	1.9-7.2	0.2-2.4	1.0-2.2	0.2-0.6	0.0-1.5	0.0-2.8	0.1	0.1-0.5	0.10	0.0-0.2	0.0	--	EPA 2010
Don Pedro Reservoir																						
Don Pedro Reservoir at Influent	1976-1980	--	7.0-23.7	19-99	--	7.3-9.6	6.4-7.8	8-11	4-8	1.6-3.1	0.0-0.4	1.3-2.0	0.2-0.3	0.0	0.0-1.2	0.00-0.01	0.00-0.16	0.10-0.17	0.00-0.05	0.00-0.01	1.1-1.8	EPA 2010
Don Pedro Reservoir*	1995-2000	--	--	40	2	--	8.4	18	17	4	1.9	3	0.54	3	--	--	0.6	--	--	0.05	--	Rosekrans et al. 2004

*only averages available

Table 5.2.1-7 Summary of water quality data (metals and microbiological) within the Project area.

Location	Sampling Period	RM from Confluence with San Joaquin River	Arsenic, µg/L	Barium, µg/L	Cadmium, µg/L	Chromium, µg/L	Copper, µg/L	Iron, µg/L	Lead, µg/L	Mercury, µg/L	Nickel, µg/L	Selenium, µg/L	Zinc, µg/L	Total Coliforn, MPN/100 mL	E. coli, MPN/100 mL	Fecal Coliform, MPN/100 mL	Notes
Woods Creek																	
Woods Creek at Mill Villa Drive	2003-2004	82.9	<4.0-<4.0	--	0.23-0.76	<1.0-<1.0	<1.0-5.8	--	<5.0-<5.0	<0.2-<0.2	<5.0-<5.0	--	19-38	126->2420	6-1986	--	CVRWQCB 2010
Woods Creek at Slate Creek	1973-1975	--	0.0	--	0.0	0.0-60	10	90-140	0.0	0.1	--	--	0.0	23-6200	--	23	EPA 2010
Sullivan Creek																	
Sullivan Creek at Jacksonville Road	1975	--	--	--	--	--	--	--	--	--	--	--	--	2-2300	--	--	EPA 2010
Sullivan Creek at Algerine Road	2003-2004	79.0	<4.0-<4.0	--	<0.1-<0.1	<1.0-1.2	<1.0-2.9	--	<5.0-<5.0	<0.2-<0.2	<5.0-<5.0	--	<2.0-3.4	99->2420	12-2420	--	CVRWQCB 2010
Curtis Creek																	
Curtis Creek at Algerine Road	2003-2004	79.0	<4.0-<4.0	--	<0.1-<0.1	<1.0-<1.0	1.7-2.9	--	<5.0-<5.0	<0.2-<0.2	<5.0-<5.0	--	<2.0-<2.0	387->2420	101->2420	--	CVRWQCB 2010
Don Pedro Reservoir																	
Don Pedro Reservoir*	1995-2000	--	2	26	1	3.3	11	121	2.2	0.7	4.2	5	13	13	--	2	Rosekrans et al. 2004

*only averages available

11.3 percent. Tributaries studied include North Fork Tuolumne River, Hatch Creek, Moccasin Creek, Sullivan Creek, Woods Creek, and Turnback Creek, which were close to the upstream point sources. Only nitrogen and phosphorus parameters were measured. Because the water quality data were collected for a particular purpose (i.e., eutrophication) and exact station locations were not easily identifiable, these data were not included in Tables 5.2.1-6 and 5.2.1-7.

<u>Rosekrans et al. 2004. Paradise Regained: Solutions for Restoring Yosemite's Hetch Hetchy Valley.</u>

Environmental Defense Fund staff evaluated the feasibility of restoring the Hetch Hetchy Valley. Appendix B to the report evaluates water quality. Included in the evaluation is Don Pedro Reservoir water quality data, which are presented in Tables 5.2.1-6 and 5.2.1-7.

<u>Tuolumne County Stream Team. 2007-08 and 2008-09. Tuolumne County Stream Team Water Quality Monitoring Report 2007-08 and Tuolumne County Stream Team Water Quality Monitoring Report 2008-09.</u>

The Tuolumne County Stream Team was formed in 2006 through the Tuolumne County Department of Public Works and Engineering Services in conjunction with the preparation and adoption of the *Tuolumne County Water Quality Plan* (ESA 2007). In January 2007, the team was placed within the Tuolumne County Resource Conservation District. Members of the Tuolumne County Stream Team are volunteers from the community that attend training sessions provided through the SWRCB Clean Water Team. The purpose for the Stream Team is to collect information on the health of surface waters countywide as a means of assessing the effectiveness of the *Tuolumne County Water Quality Plan*.

The Stream Team monitored 24 sites monthly during the wet season (October/November through June) in 2007-08 and 22 sites in 2008-09. The sites were located on Mormon Creek (two sites), Peppermint Creek, Woods Creek (three sites), Sonora Creek, Curtis Creek (three sites), Turnback Creek (two sites), Mt. Eaton Ditch, Groveland Creek, Big Creek, Twain Harte Creek (two sites), and Sullivan Creek (six sites). Temperature, specific conductance, turbidity, dissolved oxygen, and pH were monitored. In 2008-09, E. coli was added to the monitoring.

<u>Stillwater Sciences. 2009. Don Pedro Reservoir Fish Mercury Study. Final Report.</u>

As part of a fish mercury study, water quality sampling was conducted at one site upstream and four sites within Don Pedro Reservoir (Moccasin Creek arm, Woods Creek arm, Middle Bay of reservoir, and Don Pedro Dam) from September 21 through October 1, 2008 to coincide with thermal stratification of the reservoir. The surface water in the Tuolumne River upstream of Don Pedro Reservoir was relatively cool (13.2ºC [55.7ºF]) with dissolved oxygen (10.2 mg/L) near 100 percent saturation, pH of 7.7, and low turbidity (0.8 NTU). Organic carbon and minerals (iron, manganese, and sulfate) concentrations were low. No mercury was detected in water samples collected from the Tuolumne River upstream of Don Pedro Reservoir.

Observations were made at four locations on Don Pedro Reservoir: Moccasin Creek Arm, Woods Creek Arm, Middle Bay of the reservoir, and Don Pedro Dam - east of Blue Oaks Recreation Area. Surface waters within Don Pedro Reservoir were characterized by uniform temperatures of 22 to 25°C (71 to 77°F) in the epilimnion, with the thermocline located at a depth of over 10 meters (35 feet). Water temperatures reached a minimum of 15.2°C (59.3°F) at the reservoir bottom in the shallow Moccasin Creek arm, whereas minimum hypolimnetic temperatures found at all other sites within Don Pedro Reservoir were 10 to 12°C (50 to 53°F). Although surface water dissolved oxygen levels were near 9 mg/L, the thermal stratification was accompanied by dissolved oxygen levels less than 7 mg/L at the thermocline, hypolimnetic DO levels of 6 to 7 mg/L in deeper water (less than 10 meters [35 feet]), and dissolved oxygen levels of two to three mg/L in data collected nearest the reservoir bottom in the shallower creek arms of the reservoir. Hypolimnetic pH levels ranged from 6.2 to 6.7 at these sites. Table 5.2.1-8 shows the data from the surface, 3 feet, thermocline, and near the bottom.

Within the hypolimnetic (bottom) waters of Don Pedro reservoir, the low dissolved oxygen levels were accompanied by more elevated levels of iron and manganese at all sites relative to surface water samples. Sulfate and organic carbon levels were generally low throughout the reservoir. Both total mercury (TotHg) and methylmercury (MeHg) were detected in hypolimnetic samples in the Moccasin Creek and Woods Creek arms of the reservoir. TotHg was non-detectable within Don Pedro Reservoir east of the Blue Oaks Recreation Area near the dam, and MeHg was non-detectable at the adjacent deep water site in the Middle Bay of Don Pedro Reservoir. Information on mercury levels observed in fish tissue are presented in Section 5.2.1.4 below.

<u>CVRWQCB. 2010. San Joaquin River Basin Rotational Sub-basin Monitoring: Eastside Basin: January 2003-April 2004. (Stanislaus, Tuolumne, and Merced River Watersheds and Farmington and Valley Floor Drainage Areas).</u>

This report focuses on data collected from the San Joaquin Eastside Basin twice a month between January 2003 and April 2004 as part of the State's Surface Water Ambient Monitoring Program (SWAMP). The Eastside Basin consists of the Stanislaus, Tuolumne, and Merced River watersheds and the Farmington and Valley Floor drainage areas. Temperature, specific conductance, turbidity, dissolved oxygen, pH, hardness, minerals (calcium, magnesium, chloride, and sulfate), total organic carbon, bacteria, toxicity, and trace metals (arsenic, cadmium, chromium, copper lead, mercury, nickel, and zinc) were monitored. Data are presented in Tables 5.2.1-6 and 5.2.1-7.

Temperatures within the tributaries entering Don Pedro Reservoir were comparable with median values near 14°C. The tributary temperatures were comparable to those for the tributaries below the reservoir, but somewhat lower than for the lower mainstem where measured temperatures range to 26°C though the median remains near 17°C.

Dissolved oxygen concentrations were very similar at all the sites, with a majority of measured concentrations reported between 8 and 13 mg/L. Slightly higher median concentrations were found in the tributaries to Don Pedro Reservoir than in the mainstem of the Tuolumne River.

Specific conductance minima and maxima were highest at the Woods Creek sites. Concentrations both at Woods Creek and throughout the river sites increased moving upstream to downstream. Maximum total coliform concentration were above reporting limits (>2,420 most probable number per 100 milliliters [MPN/100mL]) at all sites. All results for mercury, arsenic, lead, and nickel were below reporting limits. Woods Creek at Mill Villa Road was the only site where cadmium concentrations were above the reporting limit. Chromium concentrations were reported only at Sullivan Creek at Algerine Road.

Table 5.2.1-8 Summary of water quality data within Don Pedro Reservoir.

Sampling Date	Sample Depth ft	Temperature °C	Specific Conductance µmhos/cm	Dissolved Oxygen mg/L	Dissolved Oxygen % Saturation	pH su	Oxidation-Reduction Potential mV
Moccasin Creek Arm							
9/30/2008	0.5	23.3	35	9.1	107	7.7	259
	3	23.3	35	9.1	107	7.8	262
	45	20.3	31	7.1	79	6.7	282
	48	19.2	27	5.8	62	6.6	272
	81	15.0	65	3.1	30	6.8	-127
Woods Creek Arm							
9/30/2008	0.5	22.8	35	8.8	102	7.3	326
	3	22.8	35	8.8	102	7.3	326
	42	20.5	29	5.0	56	6.3	366
	45	19.5	31	1.9	21	6.1	366
	120	12.2	53	1.6	15	6.4	75
Middle Bay of Don Pedro Reservoir							
10/1/2008	0.5	24.9	36	8.7	105	7.7	212
	3	24.5	36	8.7	104	7.7	218
	42	19.8	26	5.5	60	6.6	239
	45	18.7	26	6.0	65	6.6	240
	275	9.8	46	7.2	63	6.8	279
Don Pedro Dam – East of Blue Oaks Recreation Center							
10/1/2008	0.5	23.6	37	8.7	102	7.8	213
	3	23.6	37	8.7	102	7.8	213
	45	19.5	30	5.6	60	6.6	219
	48	18.5	30	5.4	57	6.6	213
	165	11.72	55	1.68	16	6.8	196

Source: Stillwater Sciences 2009.

Don Pedro Recreation Agency. Undated. No Title.

The Don Pedro Recreation Agency (DPRA) contracts with a licensed applicator to apply herbicides/pesticides to certain land areas at the Project. To control ground squirrels, a pesticide is applied in early spring or late fall as needed in the areas of developed recreation facilities.

Herbicides/pesticides are applied after the first soaking rain in fall. Pre- and post-emergent herbicides are used to treat campsite pads and road edges. Other areas treated with herbicides/pesticides include: areas surrounding wastewater treatment facilities, wastewater ponds, shoreline trails and firebreaks, immediate areas around DPRA structures, immediate areas around shoreline restrooms, and semi-developed dispersed camping pads. Table 5.2.1-9 shows the year and herbicides/pesticides applied to DPRA facilities.

Table 5.2.1-9 General herbicide/pesticide use at DPRA facilities.

Year	Herbicide/Pesticide
2008	Round-Up Pro, Surflan, Reward, Scythe, Diuron, Krovar DF, Pendulum, Landmark, Oust, Round-Up.
2009	Round-Up Pro, Pendulum, Milestone VM, Surflan, Glyfos Aquatic, Pro Spreader, Aquamaster, Krovar DF, Dimension 2EW, Round-Up, Reward, pellet rodent bait (Diphacinone).
2010 (January-July)	Round-Up Pro, Milestone VM, Pendulum, Glyfos Aquatic, Reward, Cutrine Plus, pellet rodent bait (Diphacinone).

Lower Tuolumne River

EPA. 1951-1989. STORET Database.

Surface water quality data were retrieved for the lower Tuolumne River from the EPA STORET database management system. Data were collected between 1951 and 1989. Results of the STORET query yielded 133 observations on the Tuolumne River below Don Pedro Reservoir, 114 observations at Tuolumne River at La Grange Bridge, and 198 observations at Tuolumne River at Hickman Bridge near Waterford. Table 5.2.1-10 summarizes general water quality parameters, minerals, and nutrients downstream of Don Pedro Reservoir. Metals and microbiological data were only collected at La Grange Bridge (Table 5.2.1-11). In addition, 22 observations were made on Dry Creek near Modesto.

Dubrovsky et al. 1998. Water Quality in the San Joaquin-Tulare Basins, California, 1992-95.

This report summarizes the major findings of NAWQA for the San Joaquin-Tulare Basins Study Unit between 1992 and 1995.

Peak diazinon concentrations in the lower Tuolumne River were found to frequently exceed levels that can be acutely toxic to some aquatic life. Diazinon and other pesticides were also found to be transported to the lower Tuolumne River in stormwater runoff from the Modesto urban area. Six pesticides were detected in runoff from agricultural areas, and 15 pesticides were detected in runoff from urban areas. Chlorpyrifos, diazinon, DCPA, metolachlor, and simazine were detected in almost every sample. Median concentrations were higher in runoff from urban areas for all pesticides, except napropamide and simazine. The lower occurrence and concentrations in agricultural runoff was partly attributed to dilution by nonstorm base flow in the lower Tuolumne River and by storm runoff from nonagricultural land (primarily native vegetation).

Table 5.2.1-10 Summary of general water quality data ranges (physical parameters, minerals, and nutrients) downstream of the Project.

Location	Sampling Period	RM from Confluence with San Joaquin River	Temperature °C	Specific Conductance µmhos/cm	Turbidity, NTU	Dissolved Oxygen mg/L	pH	Alkalinity, mg/L	Hardness, mg/L	Calcium, mg/L	Magnesium, mg/L	Sodium, mg/L	Potassium, mg/L	Chloride, mg//	Sulfate, mg/L	Silica, mg/L	Ammonia , mg/L	Nitrate Nitrogen mg/L	Total Kjeldahl Nitrogen, mg/L	Total Phosphorus, mg/L	Orthophosphate, mg/L	Total Organic Carbon, mg/L	Source
Tuolumne River Below Don Pedro Dam	1951-1979	54.5	7.5-25.6	17-385	--	4.0-12.4	6.0-7.4	3-31	6-39	1.9-7.4	0.2-2.1	0.8-3.8	0.2-2.8	0.0-4.0	0.2-3.0	4.0-13.0	0.00-0.01	0.00-5.50	0.04-0.10	0.00-0.1	0.00	1.7-2.1	EPA 2010
Tuolumne River at Old La Grange Bridge	1952-1988; 2003-2004	51.4	7.0-15.0	25-77	0-18	7.3-12.7	6.4-8.4	8-28	7-27	2.5-7.1	0.2-2.6	1.0-4.0	0.4-1.0	0.0-2.1	0.0-5.4	7.0-19.0	0.00-0.20	0.01-1.20	0.00-0.20	0.00-0.46	0.00-0.10	0.9-2.7	EPA 2010 CVRWQCB 2010
Tuolumne River at Hickman Bridge near Waterford	1951-1977	31.6	7.8-29.4	44-593	--	5.3-19.4	6.0-8.6	14-107	14-146	5.2-33.0	0.4-43.0	2.3-65.0	0.1-6.8	1.5-125.0	1.3-8.6	13.0-54.0	--	0.00-6.00	--	0.08	0.04-0.16	--	EPA 2010
Tuolumne River at Legion Park	2003-2004	17.6	9.1-26	59-161	2.1-45	7.8-15.7	7.3-8.2	--	30-45	6.9-10	3.1-4.7	--	--	5.6-8.7	3.8-5.7	--	--	--	--	--	--	1.7-2.4	CVRWQCB 2010
Dry Creek at La Loma Road	2003-2004	18.7	5.8-26	98-369	1.2-54	6.0-16.0	7.2-8.1	--	38-69	8.4-15	4.0-7.9	--	--	4.2-11	3.3-8.0	--	--	--	--	--	--	5.4-11	CVRWQCB 2010
Dry Creek near Modesto	1976-1989	--	5.0-29.0	44-532	--	4.6-12.0	7.1-8.0	16-182	18-173	4.0-36.0	2.0-24.0	2.0-22.0	0.7-6.2	2.0-15.0	2.0-18.0	--	0.09	0.0-7.1	0.90	0.22-1.8	0.16-1.60	--	EPA 2010
Dry Creek at Gallo Bridge	2001	--	16.0-23.0	84-759	--	6.8-10.6	7.4-8.1	34-58	--	--	--	--	--	--	--	--	<0.04-<0.04	0.18-0.40	0.96-1.54	0.42-0.21	0.46-0.58	--	Kratzer et al. 2004
Tuolumne River at Modesto	1993-1995	16.0	8.0-27.2	48-1740		8.2-11.6	6.3-8.4	8-103	18-98	4.0-22.0	1.80-11.00	2.3-30.0	0.70-5.70	1.7-27.0	1.6-10.0	8.5-33.0	0.02-0.32	--	--	--	0.01-0.41	1.1-7.0	USGS 2010
Tuolumne River at Audie Peeples	2003-2004	12.9	8.7-26	65-183	1.7-16	7.3-15.7	7.4-8.4	--	42-57	9.8-13	4.2-5.8	--	--	7.9-11.0	4.9-6.9	--	--	--	--	--	--	2.5-3.4	CVRWQCB 2010
Tuolumne River at Shiloh Road	2000-2005	3.7	7.7-27.9	45-396	0.8-52.3	7.8-15.1	6.7-9.0	27-86	5-83	5-22	2-9	5-25	1.1-6.2	3-28	3-14	--	<0.01-0.08	--	0.30-3.69	0.06-0.40	0.04-0.50	0.5-7.0	CVRWQCB 2009 CVRWQCB 2010 Kratzer et al. 2004

Table 5.2.1-11 Summary of water quality data (metals and microbiological) downstream of the Project.

Location	Sampling Period	RM from Confluence with San Joaquin River	Arsenic, µg/L	Cadmium, µg/L	Chromium, µg/L	Copper, µg/L	Iron, µg/L	Lead, µg/L	Manganese, µg/L	Mercury, µg/L	Nickel, µg/L	Selenium, µg/L	Zinc, µg/L	Total Coliforn, MPN/100 mL	E. coli, MPN/100 mL	Notes
Tuolumne River at Old La Grange Bridge	1977-1988	51.4	<4.0-<4.0	<0.1-10	<1.0-<1.0	<1.0-1.2	0.05-30	<5.0-10	0.0-20	<0.2-0.5	<5.0-<5.0	0.0-20	<2.0-20	11->2420	<1-31	EPA 2010 CVRWQCB 2010
Tuolumne River at Legion Park	2003-2004	17.6	<4.0-<4.0	<0.1-<0.1	<1.0-<1.0	<1.0-2.1	--	<5.0-<5.0	--	<0.2-<0.2	<5.0-<5.0	--	<2.0-<2.0	345->2420	11-613	CVRWQCB 2010
Dry Creek at La Loma Road	2003-2004	18.7	<4.0-<4.0	<0.1-<0.1	<1.0-1.1	3.1-5.2	--	<5.0-<5.0	--	<0.2-<0.2	<5.0-<5.0	--	3.3-8	816->2420	39->2420	CVRWQCB 2010
Tuolumne River at Modesto	--	16.0	--	--	--	--	40-200	--	8.0-35.0	--	--	--	--	--	--	USGS 2010
Tuolumne River at Audie Peeples	2003-2004	12.9	<4.0-<4.0	<0.1-<0.1	<1.0-<1.0	1.1-1.6	--	<5.0-<5.0	--	<0.2-<0.2	<5.0-<5.0	--	<2.0-<2.0	649->2420	27-613	CVRWQCB 2010
Tuolumne River at Shiloh Road	2003-2004	3.7	<4.0-<4.0	<0.1-<0.1	<1.0-<1.0	1.5-2.1	--	<5.0-<5.0	--	<0.2-<0.2	<5.0-<5.0	--	<2.0-1.0	179->2420	8-649	CVRWQCB 2009 CVRWQCB 2010

Kratzer. 1998. Pesticides in Storm Runoff from Agricultural and Urban Areas in the Tuolumne River Basin in the Vicinity of Modesto, California.

This report compares the occurrence, concentrations, and loads of dissolved pesticides in storm runoff for two contrasting land uses in the Tuolumne River Basin during two different winter storms: agricultural areas (February 1994) and the Modesto urban area (February 1995). Both storms followed the main application of pesticides on dormant almond orchards. All samples were analyzed for 46 pesticides.

Six pesticides were detected in runoff from agricultural areas, and 15 pesticides were detected in runoff from urban areas. Chlorpyrifos, diazinon, DCPA, metolachlor, and simazine were detected in almost every sample. Except for napropamide and simazine, median concentrations were higher in the runoff from urban areas. At the time, none of the samples had pesticide concentrations that exceeded drinking water criteria.

Transport of pesticides from agricultural areas exceeded transport from urban areas for chlorpyrifos, diazinon, metolachlor, napropamide, and simazine. This greater transport from agricultural areas was due primarily to greater discharge and duration of storm runoff. Transport of DCPA was about the same from agricultural and urban sources. The main source of transport for the other pesticides could not be determined because of concentrations less than the method detection limit. In most cases, the occurrence and relative concentrations of pesticides found in storm runoff from agricultural and urban areas was related to pesticide application.

Kratzer and Shelton. 1998. Water Quality Assessment of the San Joaquin-Tulare Basins, California: Analysis of Available Data on Nutrients and Suspended Sediment in Surface Water, 1972-1990.

Nutrients and suspended sediment in surface water of the San Joaquin-Tulare Basins were assessed using 1972-1990 data from the USGS NWIS and the EPA STORET database.

Two of the sites analyzed were the Tuolumne River at La Grange Bridge and Tuolumne River at Modesto. Median data for specific conductance, pH, dissolved hardness, ammonia, total Kjeldahl nitrogen, phosphorus, orthophosphate, organic carbon, and suspended sediment are presented in this report.

Kratzer et al. 2004. Sources and Transport of Nutrients, Organic Carbon, and Chlorophyll-a in the San Joaquin River Upstream of Vernalis, California, during summer and fall, 2000 and 2001.

In 2001, USGS staff collected water quality samples at four San Joaquin River sites and at eight tributary sites, including Dry Creek at Gallo Bridge below Highway 132 at Modesto, Tuolumne River at Modesto, and Tuolumne River at Shiloh. The purpose of the study was to define the sources and transport of nutrients, organic carbon, and chlorophyll-a in the upstream San Joaquin Basin above Vernalis. A secondary purpose was to compare nutrient loads and concentrations from the 1970s and 1980s to the present.

Kratzer et al. found the lower Tuolumne River to be a significant source of nutrients and dissolved organic carbon and a minor source of chlorophyll-a for the San Joaquin River. Data for this study have been incorporated into Table 5.2.1-11.

Stillwater Sciences. 2004. Lower Tuolumne River Water Quality Monitoring Results May/June 2004.

This memorandum summarizes water quality conditions sampled between RM 52 and 36 of the lower Tuolumne River downstream of La Grange Dam (RM 52) and above the Dry Creek confluence in Modesto. The purpose of the study was to provide an initial record of water quality encountered by over-summering Chinook salmon and trout. Surveys for temperature, dissolved oxygen, conductivity, and pH included synoptic (i.e., multiple locations at or near the same time) water quality surveys that were supplemented by spot checks across the river cross section and vertically. In situ continuous monitoring of water quality was recorded for a period of 48 hours at two locations. In addition to these surveys, on June 7, 2004, a single round of upstream (RM 50.8) and downstream (RM 43) water chemistry sampling was conducted to include nutrients, and a screening analysis for common pesticides and herbicides.

The lowest dissolved oxygen levels (8 mg/L) were found at downstream locations. Water chemistry sampling resulted in non-detects for nutrients and contaminants. Comparisons with independent studies of water quality conditions in downstream locations below Modesto suggested that the lower Tuolumne River approaches natural background levels for nutrients. The combinations of non-detect values for nutrients and relatively high nighttime DO levels (8 to 10 mg/L) suggested that water quality conditions are suitable for all aquatic beneficial uses.

Kinsey et al. 2005. Data on Dissolved Pesticides and Volatile Organic Compounds in Surface and Ground Waters in the San Joaquin–Tulare Basins, California, Water Years 1992–1995.

The data contained in this report comes from four years (1992-1995) of data collection by the San Joaquin-Tulare Basin Study Unit of the USGS NAWQA Program. This report contains pesticide, volatile organic compound, major ion, nutrient, tritium, stable isotope, organic carbon and trace-metal data collected from 39 surface-water stream sites, including Tuolumne River at Modesto and Tuolumne River at Shiloh. Surface water samples taken from both sites contained chloropyrifos, DCPA, diazinon, metolachlor, napropamide, and simazine. All other pesticides were below detectable limits.

TID and MID. 2005. 2005 Ten Year Summary Report for New Don Pedro Project Pursuant to Paragraph (G) of the 1996 FERC Order issued July 31, 1996.

The Districts' 2005 Ten Year Summary Report to FERC summarizes electrical conductivity and turbidity data for 1996 through 2004 from Old La Grange Bridge (RM 50.5) to Shiloh Road (RM 3.4) on the Tuolumne River. Electrical conductivity (EC) and turbidity were measured at two-week intervals from January through May, June (except 1998), and September (2001-2004).

In the lower Tuolumne River, EC was generally low. Ranging from about 30 to 300 microSeimens per centimeter (µS/cm), EC depended largely on flow volume and distance downstream of the La Grange Dam. EC levels and variability increased with distance downstream as greater groundwater accretion accumulated within the river flow. A general decrease in EC occurred with increased flows as well as the increase in EC with distance from Old La Grange Bridge. Notable increases in EC occurred in the Tuolumne River below Dry Creek and below the confluence of the Tuolumne River and the San Joaquin River. The San

Joaquin River typically has much higher EC levels (200 to 2000 μS/cm) than the Tuolumne River. EC decreased approximately 300 μS/cm from locations above the Tuolumne/San Joaquin confluence to below the confluence.

Turbidity measured in the lower Tuolumne River is generally low, ranging from less than one to about 10 NTU, except during periods with high storm runoff. Below Old La Grange Bridge variability in turbidity was small and increased only slightly with distance downstream. Dry Creek, just downstream of RM 17, usually increased turbidity in the river from that point on with San Joaquin River turbidity consistently higher than lower Tuolumne River sites. San Joaquin River turbidity generally decreased by approximately 10 NTU from above to below the confluence with the Tuolumne River.

San Francisco Planning Department. 2008. Final Program Environmental Impact Report for San Francisco Public Utilities Commission's Water System Improvement Program. Section 5.3, Tuolumne River System and Downstream Water Bodies.

The San Francisco Planning Department prepared a PEIR for the SFPUC Water System Improvement Program. The PEIR describes the water quality in the reach of the Tuolumne River between Hetch Hetchy and Don Pedro reservoirs as very good, but its dissolved mineral and plant nutrient content increased somewhat in a downstream direction. This report refers to MID collection of TDS twice daily since 1997. These data show TDS concentrations that range from 15 to 26 mg/L, with an average of about 20 mg/L.

CVRWQCB. 2009. San Joaquin River Basin: Main Stem and Drainage Basin Sites. October 2000-2005.

This report summarizes the data gathered over a five-year sampling period (2000 to 2005) to address questions concerning the water quality of the San Joaquin River and inflows from sub-watersheds. As part of the project, the Tuolumne River at Shiloh was monitored monthly. Temperature, specific conductance, turbidity, dissolved oxygen, pH, alkalinity, hardness, minerals (calcium, magnesium, sodium, potassium, chloride, and sulfate), total organic carbon, nutrients, and toxicity. Data are presented in Tables 5.2.1-10 and 5.2.1-11. Over 50 percent of the samples collected from the Tuolumne River reported toxic events for the chronic fathead minnow test. The cause of the toxicity was undetermined.

Stillwater Sciences. 2009. Don Pedro Reservoir Fish Mercury Study. Final Report.

As part of a fish mercury study, water quality sampling was conducted at two sites downstream of Don Pedro Reservoir (Tuolumne River at Charles Road and at Shiloh Bridge) from September 21 through October 1, 2008. Below Don Pedro and La Grange reservoirs, these sites in the lower Tuolumne River exhibited warmer temperatures (23 to 24°C [73 to 75°F]) with dissolved oxygen levels of 8.6 mg/L (greater than 100 percent saturation) and pH levels of 7.6 to 7.9. Specific conductivity at these lower sites increased from 152 to 276 μS/cm from upstream of Dry Creek to downstream of Modesto, indicating an increase in mineral levels. Corresponding mineral levels (iron, manganese, and sulfate) for these sites were also elevated relative to upstream sites. While TotHg was found in surface water grab samples at 0.81 ng/L at Charles Road upstream of Dry Creek, MeHg was non-detectable. TotHg and MeHg were both detected (1.42 ng/L and 0.120 ng/L, respectively) at Shiloh Bridge downstream of Dry Creek.

CDWR. 2010a. Water Quality Report for Tuolumne River at Shiloh, 1998 and 1999.

From September 1998 through May 1999, CDWR sampled the water quality of Tuolumne River at Shiloh. General parameters (conductance, total dissolved solids, alkalinity, hardness, and pH), minerals (boron, calcium, chloride, magnesium, potassium, sodium, and sulfate), nitrate, and dissolved organic carbon were measured.

CDWR. 2010b. Hourly and Daily Data for Tuolumne River at Modesto.

CDWR currently monitors the Tuolumne River at Modesto for temperature and electrical conductivity. Data are available online from January 1, 2001 to present.

CVRWQCB. 2010. San Joaquin River Basin Rotational Sub-basin Monitoring: Eastside Basin: January 2003-April 2004. (Stanislaus, Tuolumne, and Merced River Watersheds and Farmington and Valley Floor Drainage Areas).

This report focuses on data collected from the Eastside Basin twice a month between January 2003 and April 2004 as part of the SWAMP. The Eastside Basin consists of the Stanislaus, Tuolumne, and Merced River watersheds and the Farmington and Valley Floor drainage areas. Temperature, specific conductance, turbidity, dissolved oxygen, pH, hardness, minerals (calcium, magnesium, chloride, and sulfate), total organic carbon, bacteria, toxicity, and trace metals (arsenic, cadmium, chromium, copper lead, mercury, nickel, and zinc) were monitored. Data are presented in Tables 5.2.1-10 and 5.2.1-11.

A seasonal oxygen sag appears to occur for sites in the Tuolumne River basin, except for immediately below Don Pedro Reservoir. The sag occurred as the inverse of temperature with concentrations dipping to 8 mg/L and below, between June and September. Dissolved oxygen concentrations were lowest at Dry Creek at La Loma Road (6 mg/L).

Specific conductance throughout the river increased moving upstream to downstream. The mainstem of the Tuolumne River demonstrated consistently increasing specific conductance moving downstream with a median near 200 µmhos/cm at Shiloh. Similar to temperature, consistent, year-round, specific conductance was reported at the site just below releases from Don Pedro Reservoir (ranging from 35 to 44 µmhos/cm). The remaining mainstem sites showed variations in concentration between locations, but not with the time of year except for three dips in specific conductance to concentrations similar to concentrations in the reservoir releases. The dips correspond to spikes in releases (end of April, mid October, and mid March).

Turbidity in the Tuolumne River remained low overall but showed a steady increase moving downstream from Don Pedro Reservoir, ranging from a mean of 1.7 nephelometric turbidity units (NTU) at La Grange to 10 NTU at Shiloh. The CVRWQCB has issued various Cleanup and Abatement Orders for the Tuolumne River and its tributaries. In 2004, the CVRWQCB issued an Order No. R5-2004-0718 for a discharger within the City of Hickman because a water retention pond at a nursery failed and caused 2,000 cubic yards of sediment and rock to enter the Tuolumne River. In 2008, the CVRWQCB issued Order No. R5-2008-0701 because two dischargers graded over 1,000 acres of land and caused significant discharges (11,200 NTU) of sediment into Peaslee Creek and the Tuolumne River. In 2009, the CVRWQCB issued Order

No. R5-2009-0707 because a discharger graded over 76 acres of land and caused significant discharges of sediment into an unnamed tributary to Peaslee Creek and into Peaslee Creek.

Maximum total coliform concentrations were above reporting limits (>2420 MPN/100mL) at all sites. E. coli steadily increased moving downstream from La Grange to Shiloh, although maximum concentrations stayed near 500 MPN/100mL.

Toxicity testing was conducted twice at the Tuolumne River at Shiloh. Both sets of samples resulted in 100 percent survival for both *Ceriodaphnia dubia* and *Pimephales promelas*.

Mineral results for calcium, magnesium, chloride, sulfate and hardness were lowest at the Tuolumne River at La Grange. All results for mercury, arsenic, lead, and nickel were below reporting limits.

<u>USGS. 2010. 1993-1995 San Joaquin- Tulare National Water-Quality Assessment Program. Basic-Fixed Site Assessment.</u>

The USGS San Joaquin-Tulare NAWQA Program collected water samples from 1993 through 1995 at the Tuolumne River at Modesto (Tables 5.2.1-10 and 5.2.1-11). Fifty-one observations were made at this location.

<u>Additional Sources of Water Quality Data for the Lower Tuolumne River.</u>

Additional data sources for water quality data on the lower Tuolumne River include the following:

- TID collected water quality data on the Tuolumne River from May 2006 to April 2008, in connection with the feasibility investigations of its Regional Surface Water Supply Project. A summary report was prepared in August 2008 and is available upon request.
- The City of Modesto collects water quality data in Dry Creek and in the lower Tuolumne River above and below Dry Creek. The Districts are in the process of obtaining these data.
- The East San Joaquin Water Quality Collection conducts water quality sampling on Dry Creek for the Irrigated Lands Program. Data have been collected for dissolved oxygen, pH, and electrical conductivity since at least January 2009.

5.2.1.4 Contaminants in Fish

Methylmercury poses a potential health risk to persons who consume fish caught in California lakes. Twenty-one percent of the lakes surveyed by Davis et al. (2009, 2010) had at least one fish species with an average methylmercury level high enough (greater than 0.44 parts per million [ppm]) for OEHHA to recommend no consumption of the contaminated species for women between 18 and 45 years of age and children from 1 to 17 years of age. In northern California, Davis et al. commonly found low concentrations in high-elevation lakes (above 2,000 feet) in the Sierra Nevada and Trinity Alps. Trout were the most frequently caught species in these lakes, and tend to accumulate relatively low methylmercury concentrations. In contrast, methylmercury concentrations in bass were higher than OEHHA’s 0.44 ppm threshold in 48 percent of the lower elevation lakes (below 2,000 feet) surveyed in northern California.

Mercury contamination of California water bodies is largely a legacy of historical mercury and gold mining, but also reaches lakes from local and global emissions to the atmosphere. In spite of the extensive mining activity in California, however, the degree of mercury contamination in the state's lakes is not that unusual and comparable to the average condition observed across the U.S. in a recent national lakes survey (Davis et al. 2010).

Davis et al. (2009, 2010) found that PCBs were second to methylmercury as a potential health concern to consumers of fish caught from California lakes. However, only 1 percent of the lakes sampled had a species with an average concentration that exceeded OEHHA's threshold for considering a recommendation of no consumption (120 parts per billion [ppb]). PCBs are persistent chemicals that are now banned, but were commonly used in electrical, industrial and other applications. Concentrations of other pollutants (dieldrin, DDT, chlordane, and selenium) were generally low, and infrequently exceeded OEHHA thresholds.

<u>de Vlaming. 2008. Organochlorine Pesticides and Polychlorinated Biphenyls (PCB) Concentrations in Muscle Tissue of Fish Collected from the San Joaquin River and Sacramento River Watersheds and Delta During 2005.</u>

The purpose of this study was to analyze organochlorine pesticides and polychlorinated biphenyls (PCB) in fish collected during 2005 from the Sacramento River and San Joaquin River watersheds, and the Delta. White catfish and Sacramento suckers were the favored species for analyses because they are fatty bottom fish that tend to accumulate the contaminants of concern to a much greater extent than less fatty pelagic fish. The Tuolumne River at Shiloh Road was one of the sampling sites for the study.

The sum of DDTs in two composites (339 and 269 nanograms per gram [ng/g]) of Sacramento sucker (unpopular for human consumption) from the Tuolumne River exceeded the OEHHA 1999 screening value (100 ng/g). These levels were among the highest levels of DDT found in the study. DDTs in composites of carp and channel catfish collected from the Tuolumne in 2005 were considerably below the screening value.

High levels of fish tissue PCB contamination were observed in Sacramento sucker in the Tuolumne River at Shiloh. However, in contrast to PCB concentrations in a composite of Sacramento sucker (38 and 32 ng/g) caught from the Tuolumne River in 2005, levels in channel catfish and carp from that site were below the OEHHA reporting level of 20 ng/g.

Chlordane levels (14 and 12 ng/g) in Sacramento sucker composites at Shiloh were the highest concentrations detected during the study.

While the dieldrin concentration in a composite of Sacramento sucker caught from the Tuolumne River at Shiloh was 2.5 ng/g, levels in a second Sacramento sucker composite, a carp composite, and a channel catfish composite from fish collected at this site were below OEHHA reporting level (2.0 ng/g). It appeared that only older, very fatty Sacramento sucker from the Tuolumne River manifest dieldrin levels above the OEHHA screening value.

Davis et al. 2009. Contaminants in Fish from California Lakes and Reservoirs: Technical Report on Year One of a Two-Year Screening Study.

As part of SWAMP, Davis et al. studied bioaccumulation of heavy metals and pesticides in fish from California lakes and reservoirs. The overall goal of this one-year of a two-year screening study was to determine whether or not fish in California lakes have concentrations of contaminants that exceed thresholds for protection of human health. Sport fish tissue concentrations were evaluated using thresholds developed by the OEHHA for methylmercury, PCBs, dieldrin, DDTs, chlordanes, and selenium. The study focused on sampling indicator species that tend to accumulate high concentration of the contaminants of concern. Primary target species were selected that are popular for human consumption (e.g., rainbow trout), and/or are effective at documenting spatial trends (e.g., largemouth and black bass) or organics (e.g., channel catfish and common carp). Over 6,000 fish from 18 species were collected from 152 lakes and reservoirs, which included Hetch Hetchy and Don Pedro reservoirs. Table 5.2.1-12 shows the result for Hetch Hetchy, Don Pedro, La Grange and Modesto reservoirs and Turlock Lake. Year 2 of the study was a summary report that did not provide additional information.

Stillwater Sciences. 2009. Don Pedro Reservoir Fish Mercury Study. Final Report.

This fish mercury study examined nine sites within Don Pedro Reservoir and upstream and downstream of the reservoir between fall 2008 and spring 2009. The targeted species were rainbow trout, largemouth bass, spotted bass, and channel catfish. In addition to TotHg and MeHg, water temperature, dissolved oxygen, conductivity, pH, turbidity, total suspended solids, organic carbon, iron, manganese, and sulfate were sampled at each site.

Both TotHg and MeHg were detected in hypolimnetic samples in the Moccasin Creek (0.92 and 0.15 ng/L) and Woods Creek (1.17 and 0.145 ng/L) arms of Don Pedro Reservoir. TotHg and MeHg were not detected upstream of or in Don Pedro Reservoir or in La Grange Reservoir waters. Only TotHg was detected in the lower Tuolumne River at Charles Road (0.81 ng/L) upstream of Dry Creek. TotHg and MeHg were both detected (1.42 and 0.120 ng/L, respectively) at Shiloh Bridge.

The highest fish tissue mercury concentrations (0.29 to 0.99 milligrams/kilogram [mg/kg]) were observed in largemouth bass sampled from the shallow Moccasin Creek and Woods Creek arms of Don Pedro Reservoir. Concentrations in excess of the EPA (2001) fish tissue residue criterion (0.3 mg/kg) were found at all sites within Don Pedro Reservoir, as well as downstream of La Grange Dam in the lower Tuolumne River. Largemouth bass mercury levels were slightly in excess of data from other regional reservoirs, while catfish and rainbow trout mercury levels (0.11 and 0.05 mg/kg, respectively) were generally below the ranges for regional riverine samples.

5.2.1.5 Water Temperature

Water temperature is an important water quality parameter in the Tuolumne River. Temperature data are reported separately in this PAD because several previous studies have been completed that were focused exclusively on water temperature.

Table 5.2.1-12 Results of the SWAMP Lakes Survey for Reservoirs/Lakes on or near the Tuolumne River.

Reservoir or Lake	Fish	Sample Type	Mercury µg/g ww	Dieldrin ng/g ww	Selenium µg/g ww	Sum of Chlordanes ng/g ww	Sum of DDTs ng/g ww	Sum of PCBs ng/g ww
Don Pedro	Common Carp	Composite Location 1	0.15					
	Common Carp	Composite Location 2	0,20					
	Common Carp	Composite Location 3	0.16					
	Common Carp	Lakewide Composite		0.0	0.50	3.1	3.2	11.3
	Largemouth Bass	Average for 350-mm fish at location 1	0.46					
	Largemouth Bass	Average for 350-mm fish at location 2	0.40					
	Largemouth Bass	Average for 350-mm fish at location 3	0.46					
Hetch Hetchy	Brown Trout	Composite Location 1	0.54					
	Brown Trout	Composite Location 2	0.96					
	Brown Trout	Lakewide Composite		0.0		0.2	7.0	2.6
La Grange	Rainbow Trout	Composite Location 1	0.02	0.0		0.2	0.7	2.8
	Rainbow Trout	Composite Location 2	0.03					
Modesto	Common Carp	Composite Location 1	0.22					
	Common Carp	Composite Location 2	0.31					
	Common Carp	Lakewide Composite		0.0	0.27	3.3	8.8	7.9
	Smallmouth Bass	Average for 350-mm fish at location 1	0.20					
	Smallmouth Bass	Average for 350-mm fish at location 2	0.27					
Turlock	Common Carp	Composite Location 1	0.28					
	Common Carp	Composite Location 2	0.52					
	Common Carp	Composite Location 3	0.42					
	Common Carp	Lakewide Composite		0.0	0.24	3.5	13.6	7.8
	Largemouth Bass	Average for 350-mm fish at location 1	0.24					
	Largemouth Bass	Average for 350-mm fish at location 2	0.23					
	Largemouth Bass	Average for 350-mm fish at location 3	0.21					

The Districts reviewed the following source documents related to water temperature:

- San Francisco Public Utilities Commission's (SFPUC) Upper Tuolumne River: Available Data Sources, Field Work Plan, and Initial Hydrology Analysis (October 2006)
- SFPUC's Final Program Environmental Impact Report for the Water System Improvement Program (June 2007)
- CCSF Upper Tuolumne River Ecosystem Project Phase II Report, October 2010
- Merritt Smith Consulting's Upper Tuolumne River Ecosystem Project: Preliminary Analysis of Available Data for Modeling Temperature in the Hetch Hetchy Reach (O'Shaughnessy Dam to Cherry Creek) (September 2008)
- CDFG temperature data collected since 1997
- TID and MID Real-Time Monitoring (RTM) data collection 1987 to 2008
- TID and MID's Review of 2008 Summer Flow Operation (March 2009)
- CALFED's San Joaquin River Basin Water Temperature Modeling and Analysis (October 2009)
- TID and MID's Review of 2009 Summer Flow Operation (March 2010)

Water temperature data collected upstream of, at, and downstream of the Project are provided in Attachment 5.2.1-1. Due to file size, the attachment is being filed with FERC as a CD under separate cover.

Upper Tuolumne River

As described more fully in Section 3.0, the Tuolumne River originates in Yosemite National Park in Tuolumne County in the Sierra Nevada Mountain Range. From its origin, the river flows west-northwest, meandering through Yosemite National Park and into Hetch Hetchy Reservoir. From Hetch Hetchy Reservoir, the Tuolumne River continues west-southwest through the Stanislaus National Forest.

The upstream end of the Project Boundary on the Tuolumne River is at approximate RM 79, west of where the Tuolumne River exits the Stanislaus National Forest.

The California Department of Fish and Game (CDFG) has been collecting water temperature data in the Tuolumne River upstream of the Don Pedro Reservoir since 2005. Table 5.2.1-13 shows the locations and availability of data from Hetch Hetchy Reservoir to above Don Pedro Reservoir.

Table 5.2.1-13 Water temperature sampling locations upstream of Don Pedro Reservoir.

Location	River Mile	Sampling Period	Water Temperature (°C)
Early Intake	106	7/19/05 - 4/3/08	1.27 - 23.25
Cherry Creek powerhouse	On Cherry Ck	4/27/05 - 4/3/08	3.40 - 20.60
Above South Fork	97	4/27/05 - 4/3/08	1.92 - 21.01
South Fork Confluence	On South Fork Tuolumne River	4/27/05 - 4/3/08	-0.05 - 24.53
Below South Fork	96	4/27/05 - 4/3/08	1.17 - 20.19
Near Lumsden Campground	97	4/27/05 - 1/31/07	1.18 - 20.12
Above Wards Ferry Bridge	79	5/24/05 - 4/10/07	3.31 - 25.98

The data at "Above Wards Ferry Bridge" was not included in the analysis since this location is sometimes riverine and at other times part of the reservoir. Since it is difficult to determine when it is strictly riverine, the data would not provide truly riverine water temperature readings.

Figure 5.2.1-1 provides the water temperature data available for the locations listed in Table 5.2.1-13. Figure 5.2.1-2 provides the water temperature data specifically for 2006.

SFPUC (2007)

For their 2007 Water System Improvement Program (WSIP) environmental impact report (EIR), SFPUC developed a water temperature model for the Tuolumne River. The model looked at two reaches separately; specifically, below Hetch Hetchy Dam and from La Grange Dam to the confluence with the San Joaquin River.

The water temperatures collected were analyzed in conjunction with flow to determine when thermal conditions might be of concern. Thermal loading in the reach below Hetch Hetchy Dam is typically of potential concern from May through October; the study, therefore, focused on these months. Other criteria used to select periods for analysis were (1) when reductions in full natural flow occurred on the order of 50 percent or more and (2) when base flows from the dam were less than 200 cfs.

The report determined that the only month when water temperature might have been adversely affected by Hetch Hetchy operations was May. The report also stated that since May is the month when the most snowmelt runoff occurs, temperatures would only stay elevated for short periods of time.

Project Area

Don Pedro Reservoir has a gross storage capacity of 2,030,000 ac-ft. Reservoir levels, both rising and falling, change slowly. Reservoir levels are generally between elevation 830 and 750 feet. The inlet centerline to the power tunnel delivering water to the Don Pedro powerhouse is at elevation 534 feet. Mean residence time is on the order of one year.

There is cold water inflow at Wards Ferry Bridge in the winter and early spring. Thermal stratification in the reservoir is well established by May and extends into November. The temperature drops off quickly at 10 meters (m) below the surface, forming a stable epilimnion and then gradually cools at greater depths of the reservoir.

The water below 10 m begins to warm and destratify through the fall, becoming almost fully destratified by early winter. The cold inflow at Wards Ferry Bridge begins again in late winter. By the middle of spring, stratification has been re-established.

Reservoir profiles are available from August 2004 through April 2010. Figures 5.2.1-3 through 5.2.1-6 show reservoir profiles for 2006 in order to better visualize the trends described above. Attachment 5.2.1-1 contains the available reservoir profiles for the period of record.

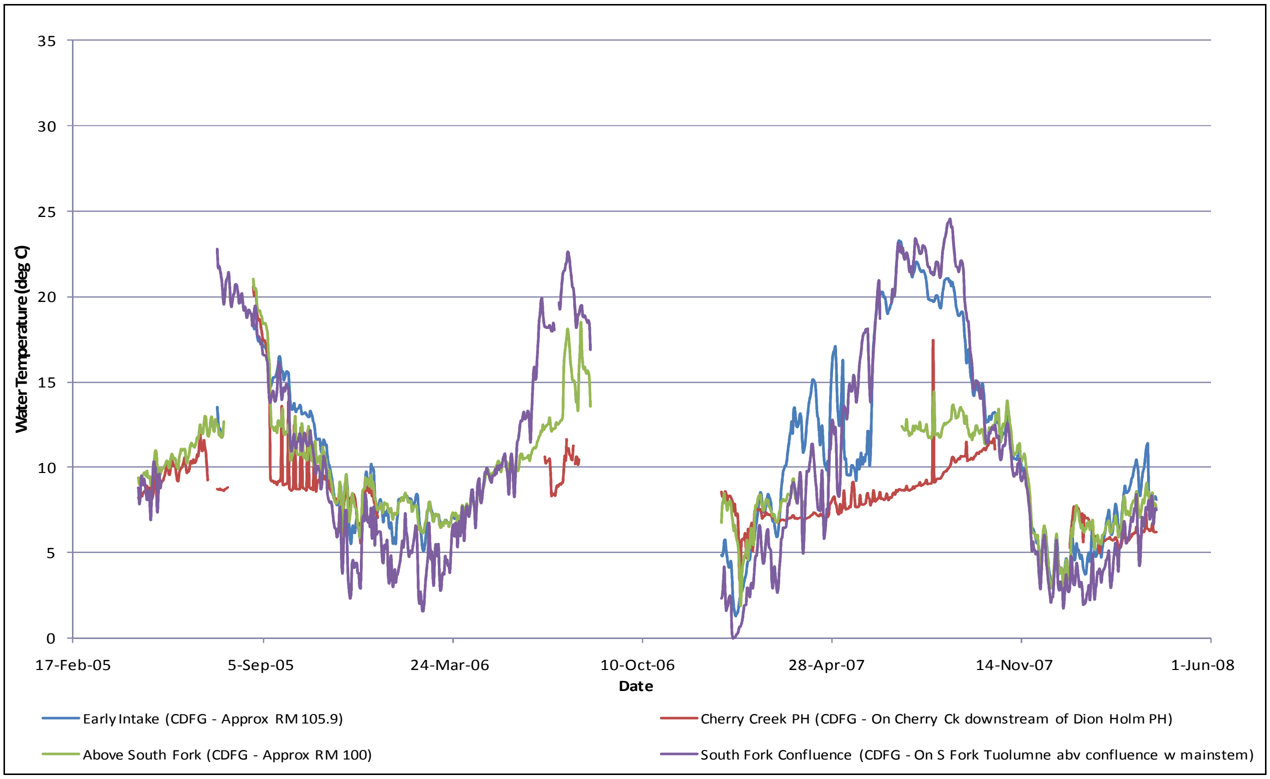


Figure 5.2.1-1 Water temperature data for locations in the upper Tuolumne River 2005-2008.

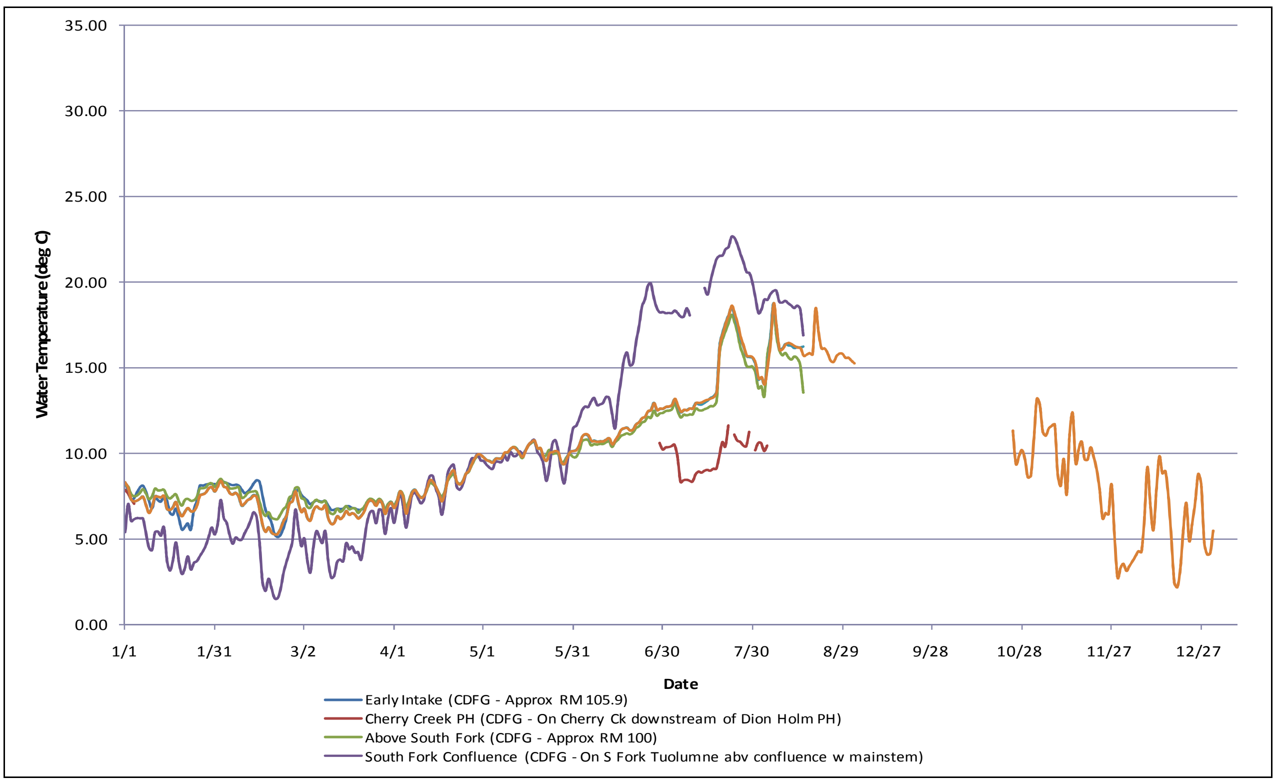


Figure 5.2.1-2 2006 water temperature data for the upper Tuolumne River.

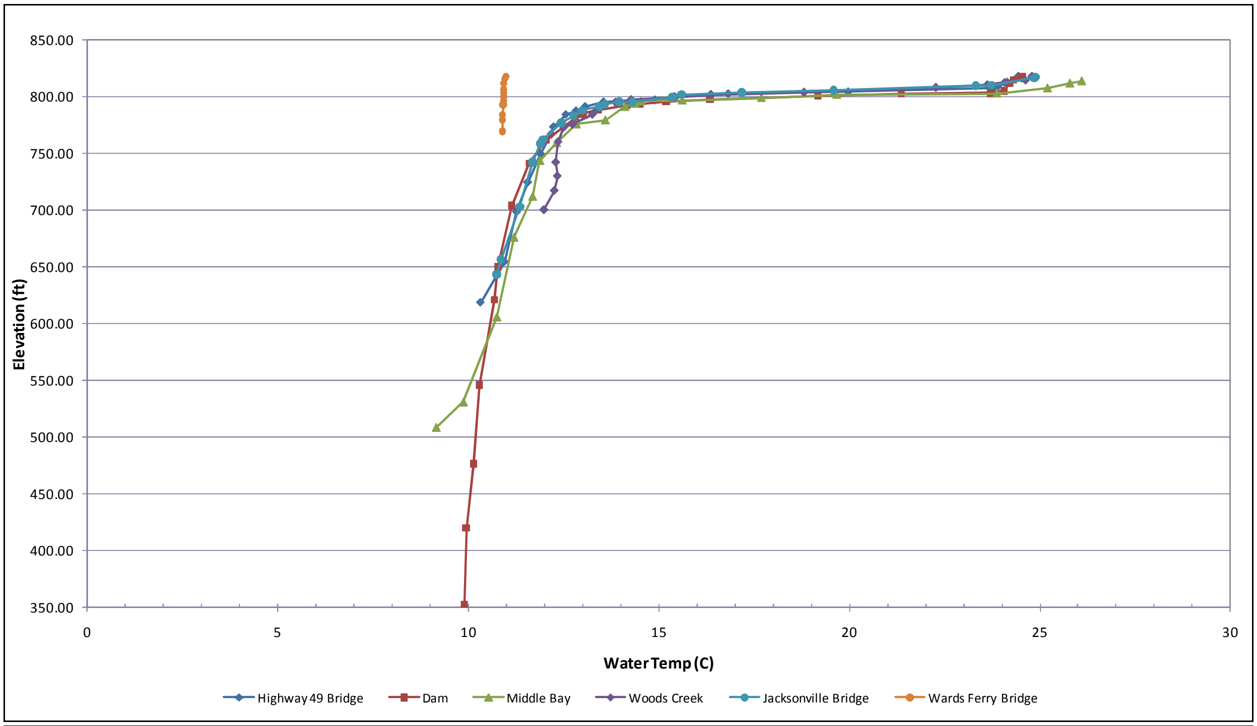


Figure 5.2.1-3 Don Pedro reservoir water temperature profiles in May 2006 (Wet Year).

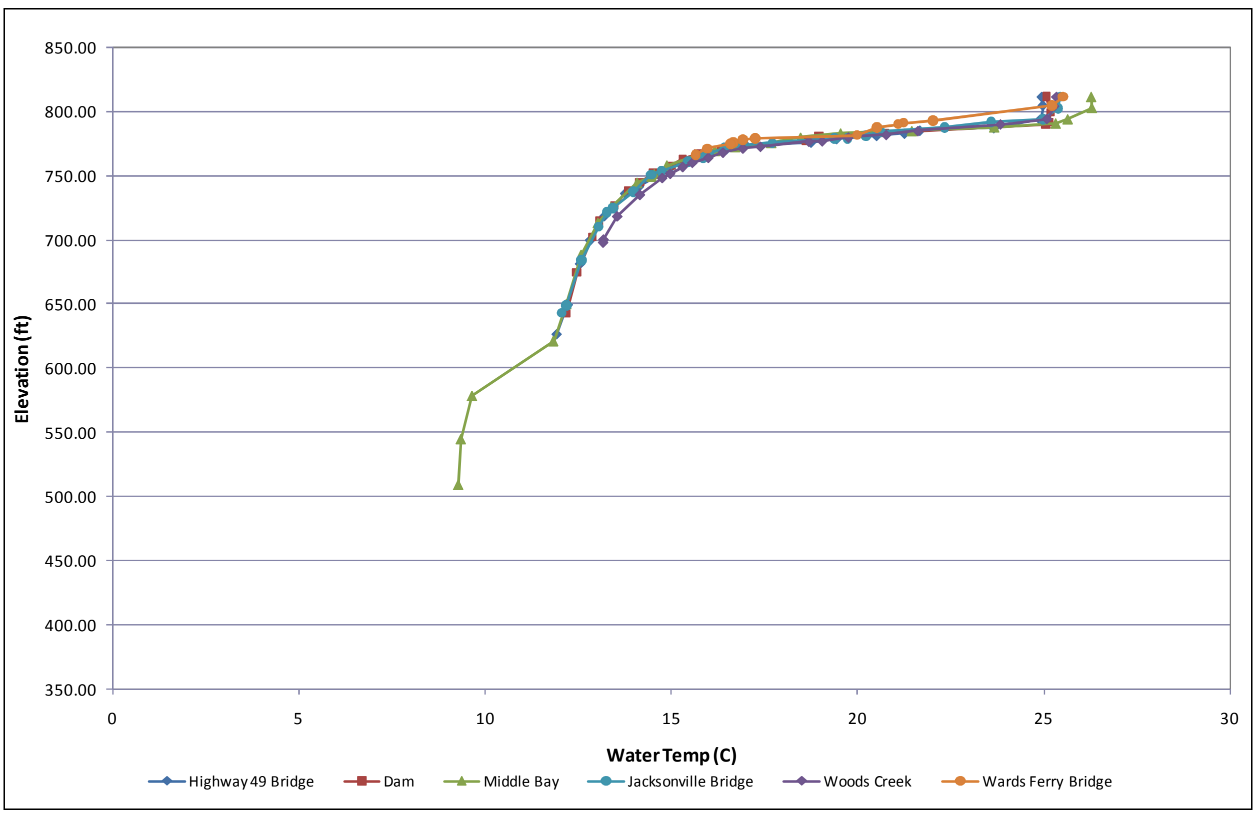


Figure 5.2.1-4 Don Pedro reservoir water temperature profiles in August 2006 (Wet Year).

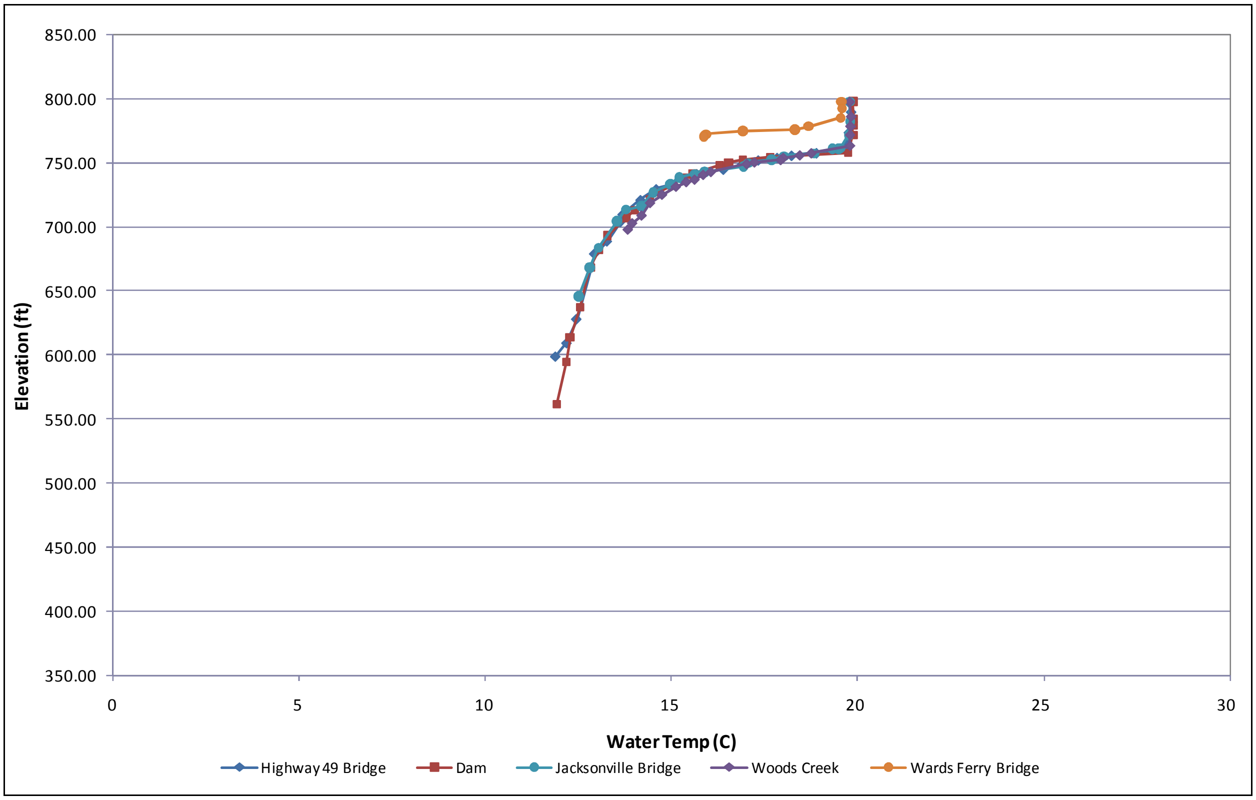


Figure 5.2.1-5 Don Pedro reservoir water temperature profiles in October 2006 (Wet Year).

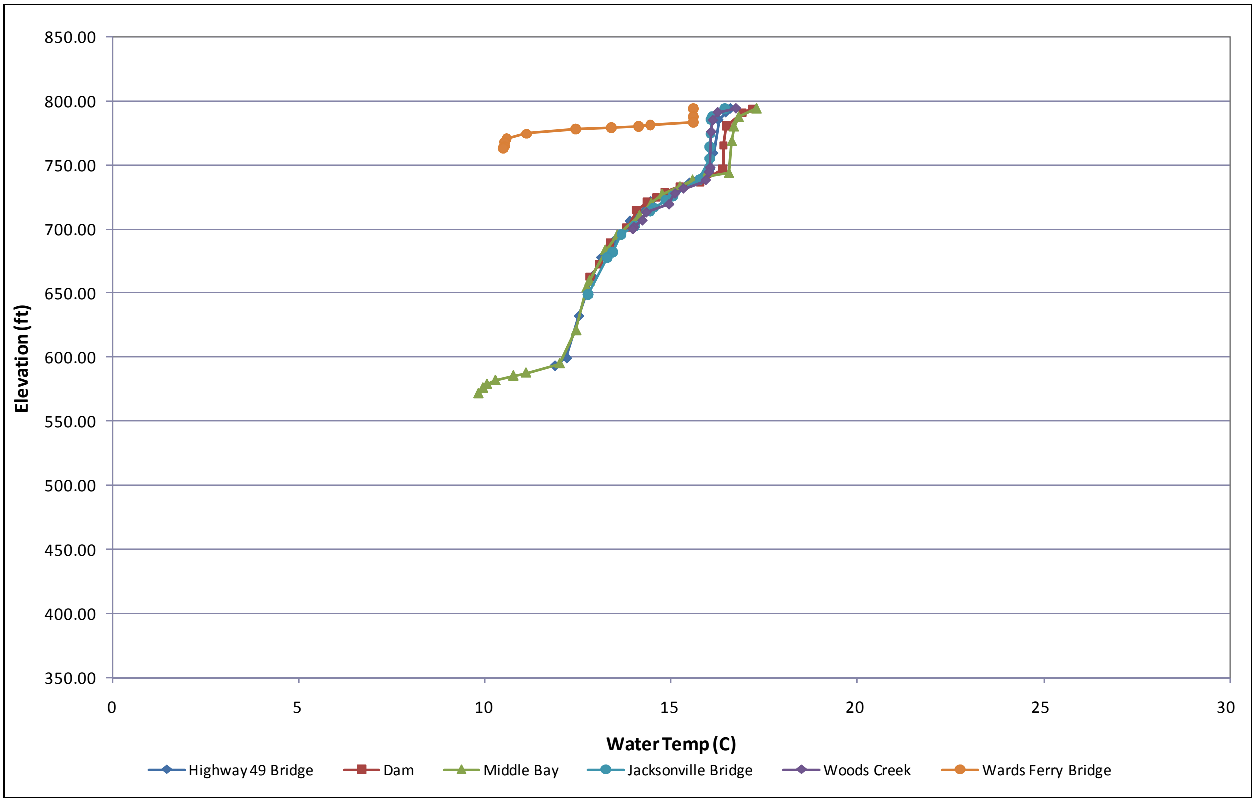


Figure 5.2.1-6 Don Pedro reservoir profiles in November 2006 (Wet Year).

SFPUC (2007)

The SFPUC's WSIP EIR is discussed above in Section 5.2.1.4. In addition to analyzing water temperatures in the Tuolumne River, the report reviewed temperatures in Don Pedro Reservoir as well. The report concludes that the reservoir reaches and maintains isothermal conditions each winter.

Lower Tuolumne River

The Districts and CDFG have been collecting water temperature data in the lower Tuolumne River downstream of the La Grange Dam since 1977. Table 5.2.1-14 provides the locations and availability of data from below Don Pedro Reservoir to the confluence with the San Joaquin River.

Figures 5.2.1-7 through 5.2.1-11 portray the water temperatures for representative locations on the lower Tuolumne River, grouped generally by decade. Figure 5.2.1-12 provides more detailed water temperature data for 2006. Attachment 5.2.1-1 provides water temperature data collected downstream of the Project on the lower Tuolumne River.

SFPUC (2007)

The 2007 WSIP EIR is discussed in Section 5.2.1.4. One of the reaches modeled as part of this EIR for water temperature was the reach from La Grange Dam to the San Joaquin River. The report found that thermal processes in this reach are affected more by meteorological conditions than they are by a change in flows. The report concludes that June is the only month in which flow reductions may affect thermal conditions in this reach.

5.2.2 Water Quantity

A general description of the Tuolumne River basin is provided in Section 4 of this PAD. Like other rivers originating in the western side of the Sierra Mountains and flowing westerly to the Central Valley, the waters of the Tuolumne River have served many purposes since the mid-1800s. The first dam on the Tuolumne, Wheaton Dam, was constructed in 1871 for the purpose of diverting flow from the river to support farming and domestic needs. TID's and MID's interest in developing the water resources of the Tuolumne River extends back to at least 1887 when each District filed for water rights. San Francisco's interests in developing the Tuolumne River date back to 1901 when the city first announced plans to build a dam in Hetch Hetchy Valley. Major water resource development projects were built on the river from 1893 (La Grange Dam) through the early 1970s (Cherry Dam - 1955; Kirkwood powerhouse - 1967; New Don Pedro Dam - 1971). TID, MID, and the CCSF have jointly managed the waters of the Tuolumne River, following the flood control rules of the ACOE, for almost 100 years. This coordinated management and use has altered the hydrology of the Tuolumne River.

The climate and hydrology of the 1,960-square-mile Tuolumne River watershed vary considerably over the river's 150-mile length. The upper watershed is mountainous and the average annual precipitation level can exceed 60 inches at the higher elevations, falling primarily as snow, while the lower watershed is a semi-arid, low-lying valley receiving less than 12 inches of precipitation a year. The extreme variations in climate combined with the large amount of water resources development produce the present-day hydrology.

Table 5.2.1-14 Water temperature sampling locations downstream of Don Pedro reservoir.

Location	River Mile	Sampling Period	Source	Water Temperature (°C)
La Grange Dam	51.8	11/14/01 - 2/6/07	CDFG	9.60 - 12.79
		1/8/77 - 7/9/88	TID	9.10 - 22.70
Riffle A1	51.6	6/18/01 - 3/27/08	CDFG	9.40 - 14.14
Riffle A7	50.7	11/14/01 - 2/6/07	CDFG	9.65 - 13.71
Riffle C1	49.7	6/14/01-1/28/08	CDFG	9.49 - 19.13
Riffle 3B	49.1	12/10/97 - 2/6/07	CDFG	9.06 - 19.67
		1/18/90 - 12/8/97	TID	8.20 - 27.20
Riffle 4B	48.4	4/1/87 - 6/20/89	TID	8.00 - 28.50
Basso Bridge	47.5	6/15/01 - 1/28/08	CDFG	9.19 - 21.61
Riffle 13B	45.5	11/14/01 - 2/6/07	CDFG	9.00 - 22.07
Riffle 19	43.3	12/10/97 - 5/27/04	CDFG	8.97 - 26.64
Riffle I2	43.2	6/16/01 - 1/28/08	CDFG	8.41 - 26.97
Riffle 21	42.9	5/27/04 - 2/6/07	CDFG	8.76 - 22.55
Riffle K1	42.6	6/16/01 - 1/29/08	CDFG	8.32 - 26.47
Turlock Lake State Recreation Area	42.0	5/9/87 - 3/17/94	TID	6.90 - 24.30
Roberts Ferry Bridge	39.5	8/11/98 - 2/6/07	CDFG	8.21 - 26.96
7-11 Gravel	38.0	6/16/01 - 1/29/08	CDFG	8.13 - 28.23
Ruddy Gravel	36.5 or 36.7	7/2/96 - 2/6/07	CDFG	7.54 - 27.82
		4/1/87 - 12/8/97	TID	5.50 - 28.30
Santa Fe Gravel	36.5	5/31/02 - 1/29/08	CDFG	7.98 - 27.33
Riffle Q3	35.0	5/31/02 - 1/29/08	CDFG	7.93 - 27.13
Above Hickman Spill		3/9/05 - 1/29/08	CDFG	
Hickman Bridge	31.6 or 31.0	7/15/02 - 10/26/07	CDFG	7.61 - 27.95
		3/27/87 - 6/30/91	TID	4.20 - 29.00
Below Hickman Spill		3/9/05 - 1/29/08	CDFG	
Upper RST at Waterford	29.8	10/8/08 - 7/16/09	TID	
Fox Grove	26.1	8/11/98 - 1/29/99	CDFG	
Fox Grove Bridge	26.0	8/11/98 - 6/6/07	CDFG	
Charles Road	24.9	6/22/88 - 7/2/96	TID	5.70 - 29.30
Hughson Treatment Plant	23.6	12/10/97 - 2/6/07	CDFG	7.17 - 28.92
Empire Bridge	21.6	10/1/87 - 6/13/88	TID	9.00 - 23.70
Mitchell Road	19.0	8/12/05 - 6/6/07	CDFG	8.74 - 22.95
Above Dry Creek		7/25/06 - 6/6/07	CDFG	
Dry Creek	16.5	2/3/06 - 9/20/07	CDFG	
Modesto USGS Gage	16.2	10/10/77 - 9/30/88	TID	6.00 - 30.00
Riverdale Park	12.3	1/16/88 - 1/29/96	TID	4.10 - 29.50
Carpenter Road	12.0	8/12/05 - 6/6/07	CDFG	8.59 - 25.09
Lower RST at Grayson	5.2	10/8/08 - 7/16/09	TID	
Shiloh Bridge	3.4 or 3.5	2/16/05 - 9/3/07	CDFG	6.78 - 29.49
		4/2/87 - 12/9/97	TID	3.60 - 29.50

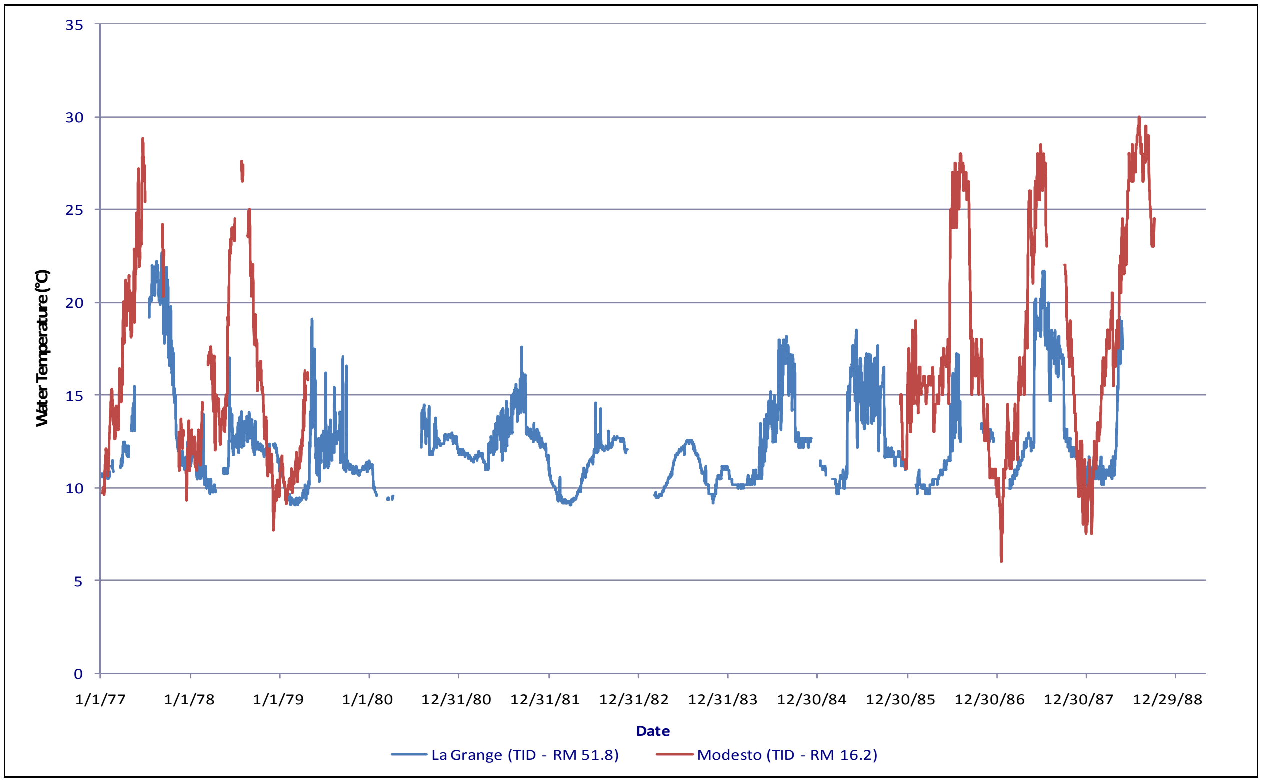


Figure 5.2.1-7 Water temperatures of the lower Tuolumne River for 1977-1988, RM 51.8 and 16.2.

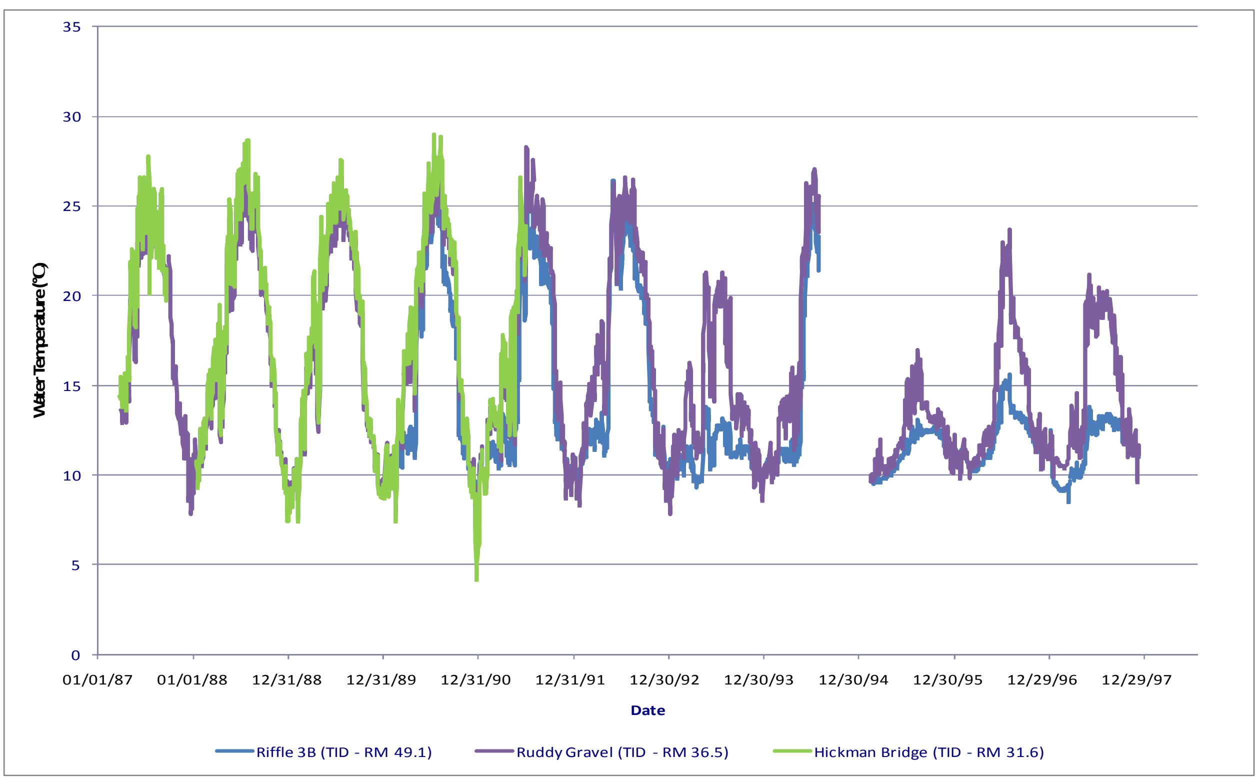


Figure 5.2.1-8 Water temperatures of the lower Tuolumne River, 1987-1997, RM 49.1, 36.5, and 31.6.

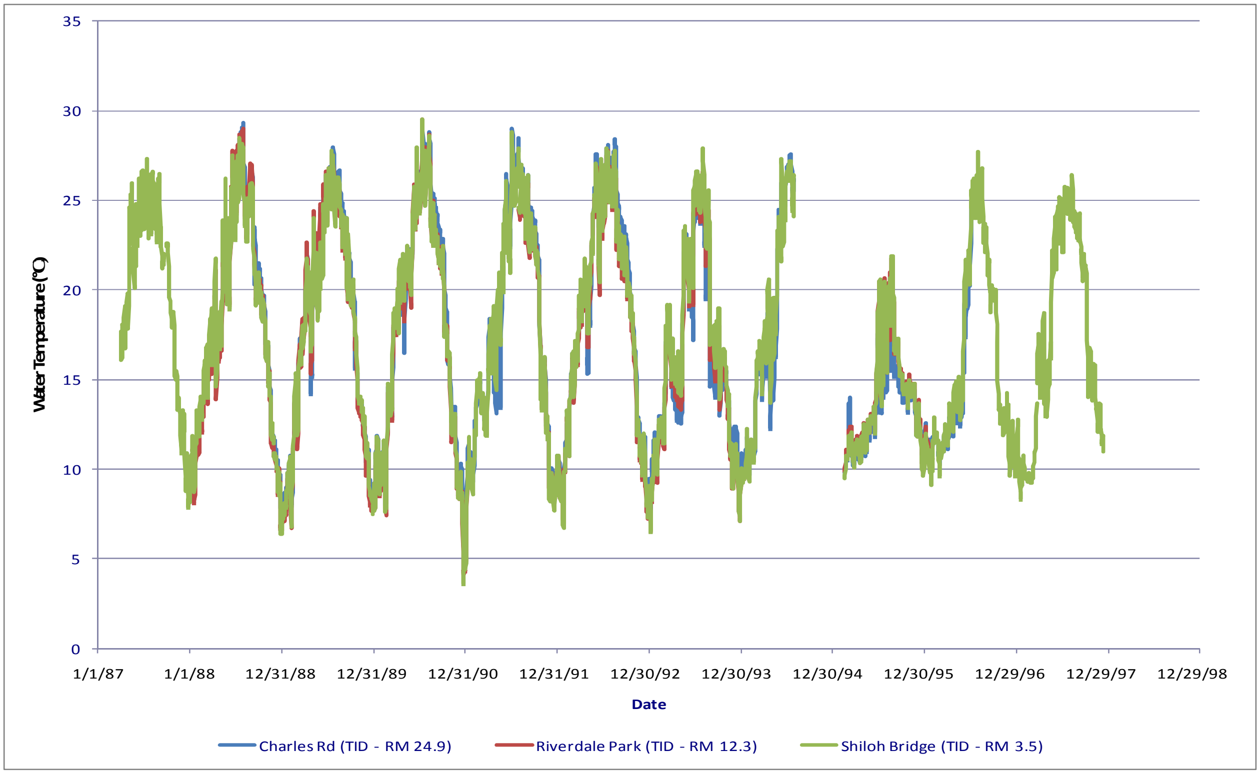


Figure 5.2.1-9 Water temperatures of the lower Tuolumne River, 1987-1998, RM 24.9, 12.3, and 3.5.

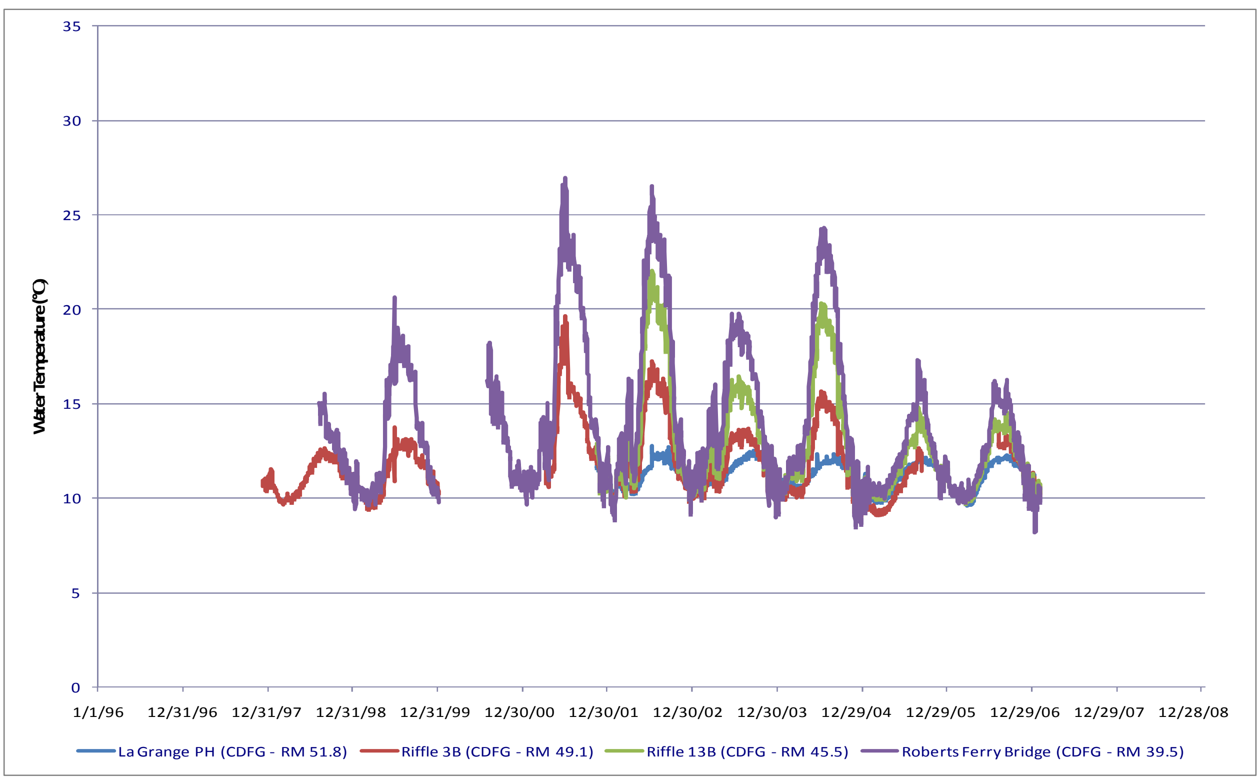


Figure 5.2.1-10 Water temperature of the lower Tuolumne River, 1996 to 2008, RM 51.8, 49.1, 45.5, and 39.5.

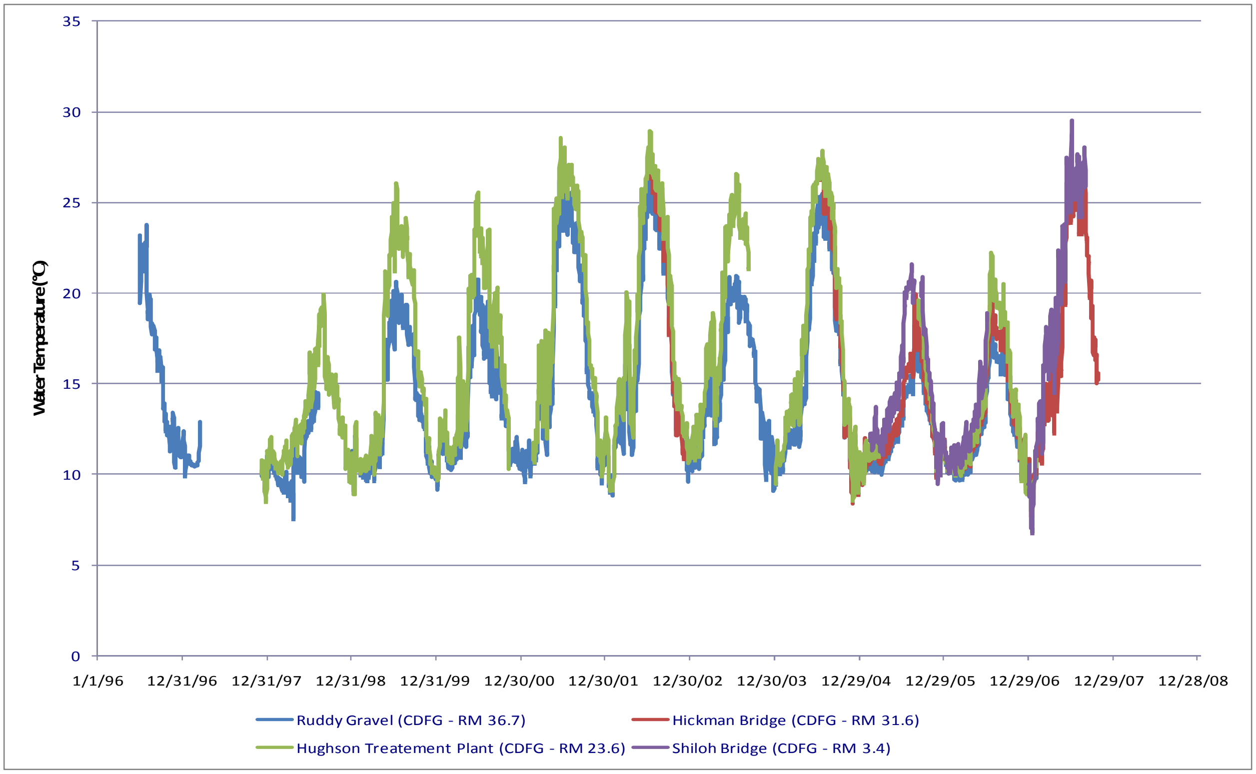


Figure 5.2.1-11 Water temperature of the lower Tuolumne River, 1996 to 2008, RM 36.7, 31.6, 23.6 and 3.4.

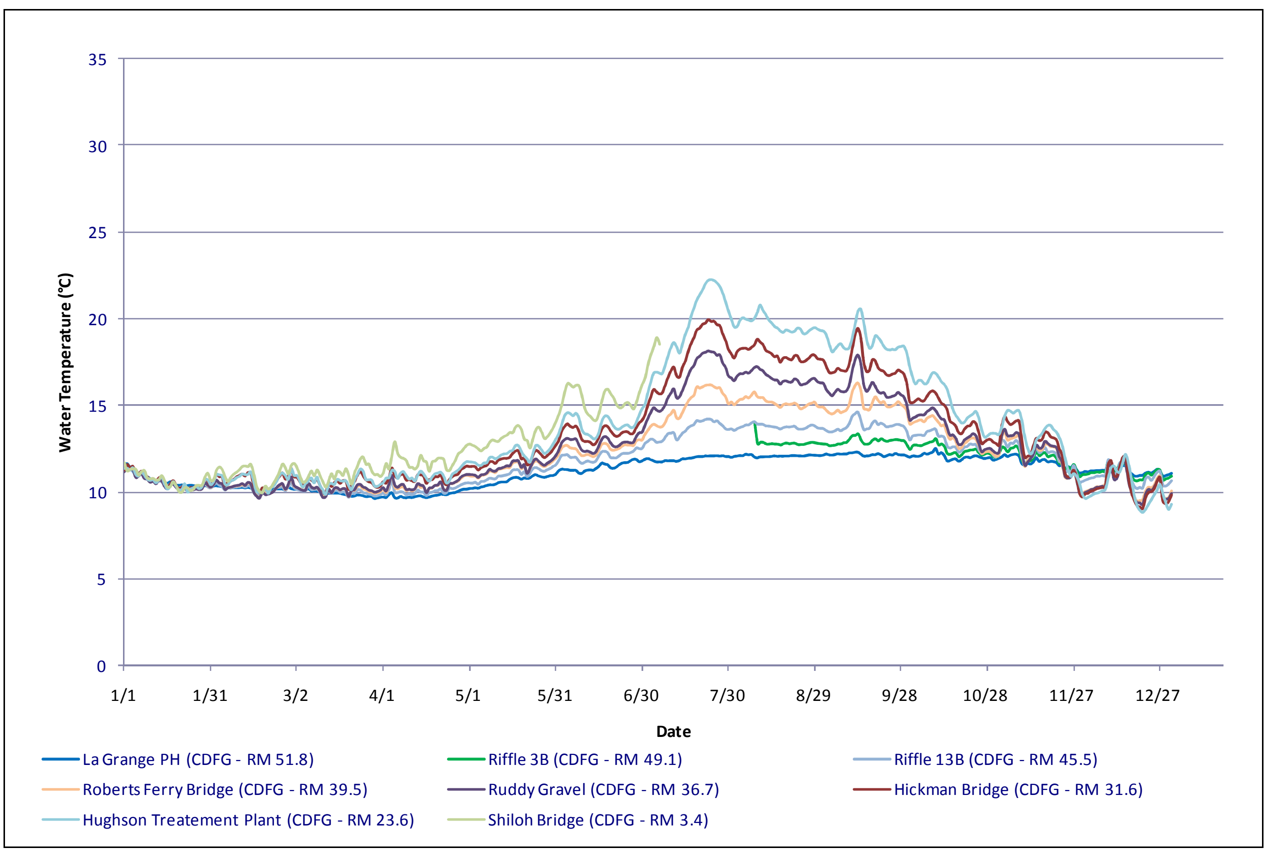


Figure 5.2.1-12 Average water temperature of the lower Tuolumne River in 2006.

5.2.2.1 Drainage Area

For the purpose of this PAD, the Tuolumne River is divided into three subbasins—the upper Tuolumne River, the Don Pedro Project area, and the lower Tuolumne River. Table 5.2.2-1 provides the approximate drainage areas and length of reaches of the Tuolumne River in each of these subbasins.

Table 5.2.2-1 Drainage areas and lengths of Tuolumne River subbasins.

Subbasin	Total Length of Reach (miles)	Drainage Area (square miles)	Total Upstream Drainage Area (square miles)
Upper Tuolumne River	70	1,300	1,300
Project area	26	230	1,530
Lower Tuolumne River	54	430	1,960

5.2.2.2 Climate

The climate of the Tuolumne River Basin is characterized by moderate winters and hot summers in the valley area, wet cold winters and hot dry summers in the higher watershed areas, and severe winters with cool summers at the highest elevations. The winter storms affecting the area are caused by cyclonic wave disturbances along the polar front which usually originate in the vicinity of the Aleutian Islands. Most of the precipitation over the Tuolumne River basin associated with these storms is concentrated by orographic effects on the western slope of the Sierra Nevada, with marked differences in precipitation amounts within short distances (ACOE 1972).

The normal annual precipitation is less than 12 inches on the valley floor, 19 inches at Don Pedro Dam, and up to 60 inches in the upper reaches of the watershed. The basin mean above Don Pedro Dam is about 44 inches. About 88 percent of the annual precipitation occurs during the period of November through April. Precipitation usually occurs as rain at elevations below 4,000 feet and as snow at higher elevations, although snow has occurred in the valley and rain may occur at elevations above 10,000 feet. Snow cover below 5,000 feet is generally transient and may accumulate and melt several times during a winter season. Normally the snow accumulates at higher elevations until about April 1, when the melt rate exceeds snowfall.

The range in climatological conditions across the basin is demonstrated by the temperature and precipitation statistics provided in Table 5.2.2-2. The table also serves to demonstrate the dependence of the Central Valley agricultural industry on the availability of irrigation water. Cumulative precipitation through the hot summer months of May through September is less than 1 inch of moisture for the entire period. When combined with high temperatures and abundant sunshine, sustainable agriculture, requiring between 0.20 and 0.25 inches of water per day during the hot summer days, is entirely dependent on a reliable irrigation water supply. Figure 5.2.2.-1 shows representative mean monthly evapotranspiration rates for the Modesto area.

Table 5.2.2-2 Monthly climatological data for the Tuolumne River watershed.

	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 feet***												
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 feet***												
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 feet***												
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.

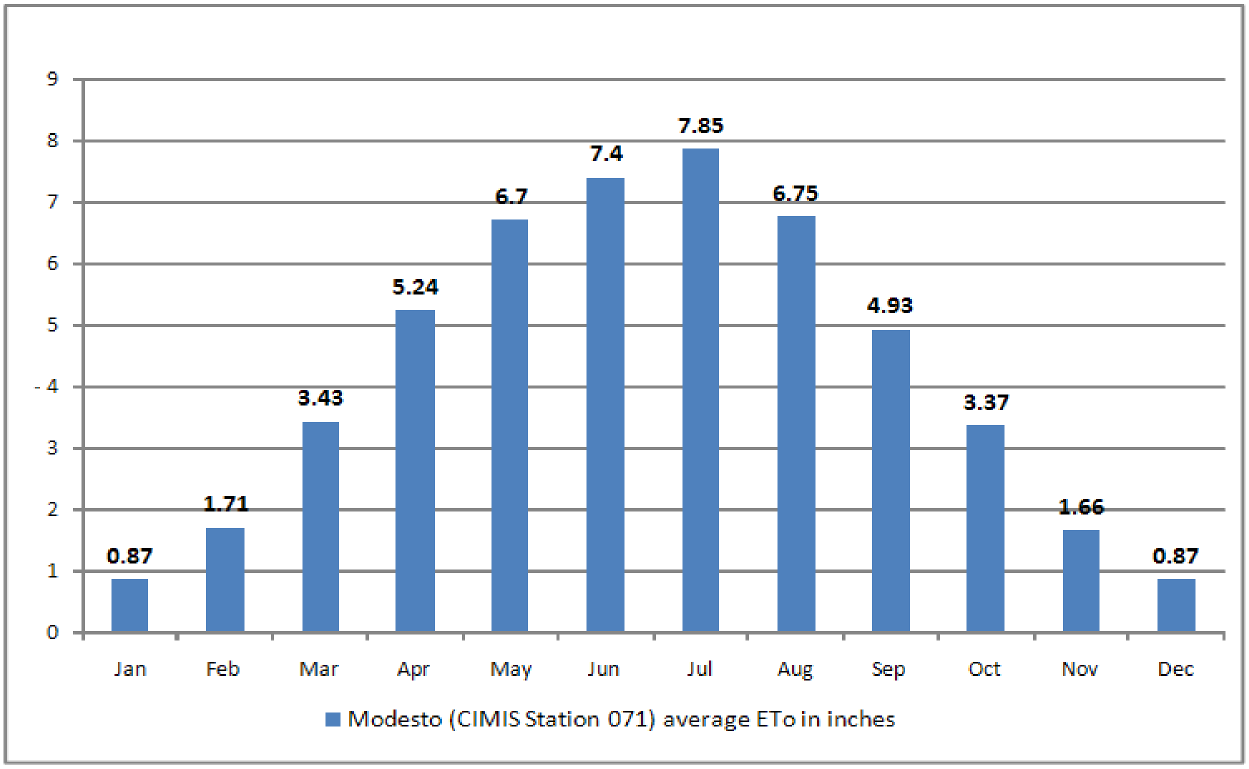


Figure 5.2.2-1 Modesto monthly average evapotranspiration rates, June 1987 to present.
Source: Data from http://wwwcimis.water.ca.gov/cimis/frontMonthlyEToReport.do.

5.2.2.3 General Description of Basin 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 suggested by the climate data above, the Tuolumne River spans at least 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.

At its higher elevations 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. Smaller streams in this system may have extremely low flows in summer, although groundwater and interflow continues to feed many. Approximately 75 percent of the runoff in these areas occurs between April and July, with only 20 percent or less occurring in the winter months from December through March, and as little as 5 percent occurring from August through November (ACOE 1972).

In the middle elevations of the watershed, 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, from 3,000 to 5,000 feet in elevation (Hetch Hetchy Water and Power [HHWP] 2006 [SFPUC, HHW&P, MAH 010721, BJM Rev 070626, undated]). A greater proportion of runoff in these elevations occurs December through March during winter rainstorms, with much of the remaining runoff still 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.

Although the Don Pedro Reservoir is located at a significantly lower elevation than where snowfall is common, the mainstem Tuolumne derives much of its flow from these higher elevations prone to significant snow accumulation. Using estimates of full natural flow, the reservoir would normally receive about 88 percent of its runoff in the period January through July. It should be noted, however, that because of regulation and water diversions upstream of the Project, the current pattern of inflow is not entirely natural due to regulation of flows. Some smaller tributaries that are unregulated and almost exclusively rain-driven flow directly into Don Pedro Reservoir, but these streams generally provide only minimal inflow to the reservoir. Based on estimates of unimpaired flows in the basin, the average annual unimpaired flow of the Tuolumne River at Don Pedro is approximately 1.9 million ac-ft (Pers. comm., TID W. Monier, April 2010). Due to the low elevation of the Project, the area is subject to rain-floods and rain-on-snow floods (most likely in winter and early spring) as well as snowmelt-floods (most likely in spring through early summer). Consequently, the flood control manual for the Project (ACOE 1972) requires the maintenance of a flood envelope of at least 340,000 ac-ft of space for a long period of the year—from October 7 through April 27—and conditional flood space depending on the anticipated snowmelt runoff during April, May, and possibly even June. Details on flood control operations are provided in Section 3.0 of this PAD.

The new Don Pedro Dam, completed in 1971, inundated the original Don Pedro Dam that was constructed in 1923. The original dam lies approximately 1.5 river miles upstream of the current dam. Downstream of the Project, water flows from the powerhouse or outlet works tunnel into a portion of the Tuolumne River impounded by the La Grange Dam, an irrigation diversion dam that is not part of the Project.

Downstream of the Project, the Tuolumne River becomes a lower-gradient meandering stream on its journey to the San Joaquin River, especially below RM 24. In this low-elevation area, the vast majority of runoff during the year occurs during winter rainstorms between December and March, around 75 percent (ACOE 1972). Some of the streamflow in this area, however, is derived from groundwater inflow. The lower Tuolumne River is generally a gaining stream. This groundwater contribution to the Tuolumne has not been well quantified.

Throughout California's water systems, hydrologic year types have been developed for regional use because the precipitation and snowfall vary substantially within the state and from one year to the next. These indices allow for coordinated water supply planning based on the water availability in a given year. The Tuolumne River, located in the San Joaquin River basin, has a regional water year type calculation scheme sometimes referred to as the 60-20-20 index. This San Joaquin River index uses information from four rivers (the Stanislaus, Tuolumne, Merced and mainstem San Joaquin). It divides water years into five categories (wet, above normal, below normal, dry, and critical) based on an index calculated as shown below. Table 5.2.2-3 shows the WYI categories:

Table 5.2.2-3 San Joaquin Valley water year hydrologic classifications.

Year Type	Calculated Water Year Index[1]
Wet	Equal to or greater than 3.8
Above Normal	Greater than 3.1, and less than 3.8
Below Normal	Greater than 2.5, and equal to or less than 3.1
Dry	Greater than 2.1, and equal to or less than 2.5
Critical	Equal to or less than 2.1

1 San Joaquin River Runoff is used to calculate this index, and is equal to the sum of Stanislaus River inflow to New Melones Lake, Tuolumne River inflow to New Don Pedro Reservoir, Merced River inflow to Lake McClure, and San Joaquin River inflow to Millerton Lake (in millions of ac-ft.) San Joaquin Valley Water Year Index is calculated as: 0.6 * Current Apr-Jul Runoff Forecast (in millions of ac-ft) + 0.2 * Current Oct-Mar Runoff (in millions of ac-ft) + 0.2 * Previous Water Year's Index (if the Previous Water Year's Index exceeds 4.5, then 4.5 is used)

Source: CDWR, CDEC Historical Water Year Hydrologic Classification Indices.

WYI = 0.6 x Current April-July Runoff Forecast (in million ac-ft)
+ 0.2 x Current October-March Runoff (in million ac-ft)
+ 0.2 x Previous Water Year's Index
(if the Previous Water Year's Index exceeds 4.5, then 4.5 is used)

The 60-20-20 index used in conjunction with Article 37 of the Project’s license is a modified version of the 60-20-20 index described above.

5.2.2.4 River Flow Data

Flow is reported by the USGS for several locations within the Tuolumne River watershed and storage levels are reported for Don Pedro Reservoir. At some of the gage locations along the Tuolumne, water temperature or other water quality data are available as well. Table 5.2.2-4 provides the gage names and USGS numbers for the primary gages along the Tuolumne River and its larger tributaries, as well as the period of record reported by the USGS. Note that some of the gages, particularly those with long-term records, may have missing data during some periods. All gage information is taken from the USGS NWIS, and data from these locations is available to the public on the USGS NWIS website at: http://waterdata.usgs.gov/nwis/dv/?referred_module=sw. Figure 5.2.2-2 provides a schematic view of the Tuolumne River watershed, and the location of gages relative to major regulating structures and reservoirs.

Upper Tuolumne River

There are a number of streamflow gages on the upper Tuolumne River, either presently maintained or historical, that are relevant to the Don Pedro Project as representing much of the inflow to the reservoir. In particular, there are four streamflow records below the last points of regulation on the mainstem Tuolumne or its larger tributaries. The sum of these four gages constitute flow from the majority of the Tuolumne River watershed; that is, approximately 875 square miles of the 1,533 square miles of the watershed upstream of Don Pedro Dam. The gages are below the vast majority of regulation that occurs upstream of the Project. Some regulation by smaller reservoirs occurs on Sullivan Creek and Big Creek (USGS 2008), but the regulation of Cherry and Eleanor creeks and the upper mainstem Tuolumne River constitutes the majority of diversions, storage and hydropower regulation on the upper Tuolumne River. The most relevant data available from the USGS are presented for the following locations: the

Table 5.2.2-4 Flow and storage gages in the Tuolumne River watershed.

Gage (#)	Gage Name	Period of Record	Notes
Relevant Streamflow Gages Upstream of Don Pedro Reservoir			
11276500	Tuolumne River Near Hetch Hetchy CA	10/1/1910-present	Located downstream of CCSF's Hetch Hetchy reservoir. Period of record spans period of construction of O'Shaughnessy Dam
11276900	Tuolumne River Below Early Intake Near Mather CA	10/1/1966-present	Downstream of Hetch Hetchy and Kirkwood Powerplant
11278400	Cherry Creek Below Dion R Holm PH, Near Mather CA	4/1/1963-present	
11281000	South Fork Tuolumne River Near Oakland Recreation Camp CA	4/1/1923-9/30/2002[1]	
11282000	Middle Tuolumne River At Oakland Recreation Camp CA	10/1/1916-9/30/2002[1]	
Don Pedro Reservoir Gage			
11287500	Don Pedro Reservoir Near La Grange CA	1923present	The period 1923-1970 reflects original Don Pedro Reservoir storage (max. 290,400 ac-ft)
Relevant Streamflow Gages Downstream of Don Pedro Reservoir			
11289650	Tuolumne River Below La Grange Dam Near La Grange CA	12/1/1970-present	Flow and temperature (from 11/10/1970)
11289000	Modesto Canal Near La Grange CA	12/1/1970-present	
11289500	Turlock Canal Near La Grange CA	12/1/1970-present	
11289651	Combined Flow Tuolumne River, Modesto Canal + Turlock Canal CA	10/1/1970-present	
11290000	Tuolumne River At Modesto CA	1/1/1895-present	Location of 9,000 cfs restriction

[1] Gages re-installed in 2006 by CCSF HHWP, but data after 2002 are not reported on USGS. Recent data available through CDEC.

Tuolumne River below CCSF's Early Intake and Kirkwood powerhouse; Cherry Creek below CCSF's Cherry Lake, Lake Eleanor and Holm Powerhouse; and the South Fork and Middle Fork Tuolumne River near the confluence with the mainstem Tuolumne. Total flows of the upper Tuolumne River are also approximated and reported real-time based on the above gages via the Dreamflows website, intended to facilitate whitewater rafting and kayaking (http://www.dreamflows.com/ realtime.php).

Tuolumne River below Early Intake, Near Mather, California (USGS Gage No. 11276900)

This location represents the flow in the mainstem Tuolumne River below Hetch Hetchy Reservoir plus discharges from Robert C. Kirkwood Powerplant that exceed the capacity of CCSF's Mountain Tunnel below the Kirkwood Powerplant (Table 5.2.2-5).

Cherry Creek below Dion R Holm Powerhouse, Near Mather, California (USGS Gage No. 11278400)

Cherry Creek and its tributary, Eleanor Creek both have regulating reservoirs upstream of this point; in addition, the Dion R. Holm powerhouse discharges above the gage. This gage lies immediately downstream of the powerhouse about 600 feet upstream of the confluence of Cherry Creek with the Tuolumne and so represents nearly the full regulated flow of Cherry Creek (Table 5.2.2-6).

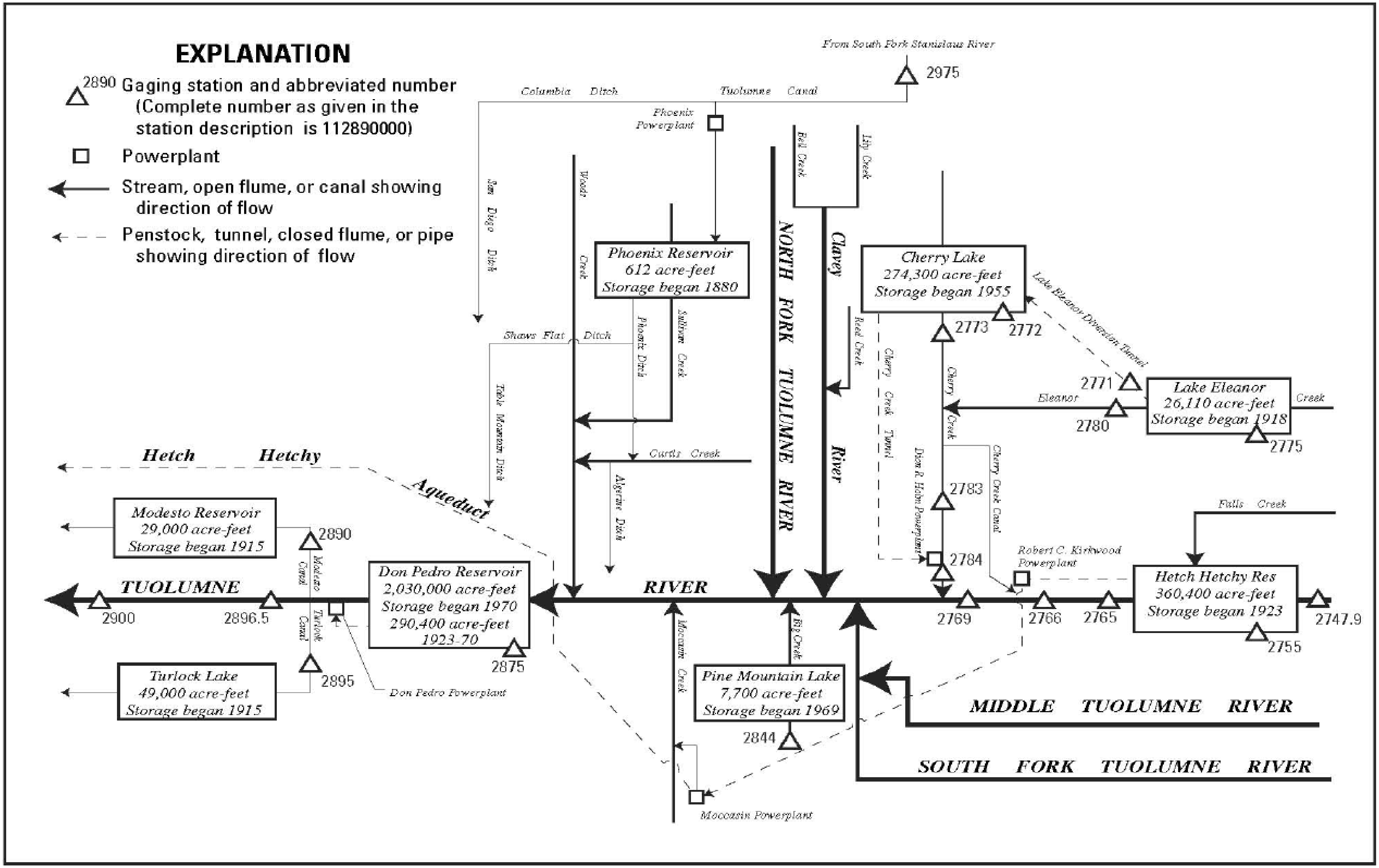


Figure 5.2.2-2 Schematic of gages, reservoirs and waterways in the Tuolumne River watershed.

Note: Early Intake is located on the Tuolumne River downstream of the Kirkwood powerplant and between USGS gages 2766 and 2769.

Source: USGS 2008..

Table 5.2.2-5 Mean monthly flows for the WY 1975-2009 for Tuolumne River below Early Intake.

Month	Mean Monthly Flow (cfs)	Lowest Mean Monthly Flow (cfs)	Highest Mean Monthly Flow (cfs)
Jan	270	31	2,917
Feb	307	35	1,039
Mar	429	38	1,103
Apr	584	34	1,694
May	1,552	52	4,028
Jun	2,016	37	6,260
Jul	954	30	5,530
Aug	222	31	1,726
Sep	114	29	370
Oct	76	30	247
Nov	92	35	313
Dec	149	29	1,169

Source: USGS 11276900.

Table 5.2.2-6 Mean monthly flows for the WY 1975-2009 for Cherry Creek below Dion R Holm powerhouse.

Month	Mean Monthly Flow (cfs)	Lowest Mean Monthly Flow (cfs)	Highest Mean Monthly Flow (cfs)
Jan	625	4	3,266
Feb	719	4	1,528
Mar	824	4	1,497
Apr	960	3	2,199
May	1,293	3	3,768
Jun	1,215	4	3,728
Jul	733	11	2,643
Aug	470	26	1,161
Sep	391	20	898
Oct	338	13	962
Nov	362	15	1,445
Dec	462	6	1,394

Source: USGS 11278400.

South Fork Tuolumne River near Oakland Recreation Camp, CA (USGS Gage No. 11281000)

Historical data are available at this USGS gage for the period from 1923 through 2002 (Table 5.2.2-7). The gage was discontinued at the end of September 2002, but has since been reinstalled by CCSF. Data are now reported on the California Data Exchange Center website, and provide real-time information on unregulated flows in the Tuolumne River watershed. There are no known diversions in this watershed.

Middle Fork Tuolumne River at Oakland Recreation Camp, CA (USGS Gage No. 11282000)

Historical data are available at this USGS gage for the period from 1923 through 2002 (Table 5.2.2-8). The gage was discontinued at the end of September 2002, but has since been reinstalled by CCSF. Data are now reported on the California Data Exchange Center website, and provide real-time information on unregulated flows in the Tuolumne River watershed. There are no known diversions on this stream.

Table 5.2.2-7 Mean monthly flows for the WY 1975-2009 for South Fork Tuolumne River near Oakland Recreation Camp.

Month	Mean Monthly Flow (cfs)	Lowest Mean Monthly Flow (cfs)	Highest Mean Monthly Flow (cfs)
Jan	96	8	429
Feb	159	9	725
Mar	200	3	750
Apr	214	0	730
May	238	1	654
Jun	138	2	656
Jul	43	3	242
Aug	16	0	58
Sep	16	1	162
Oct	22	2	207
Nov	44	6	346
Dec	65	6	416

Source: USGS 11281000.

Table 5.2.2-8 Mean monthly flows for the WY 1975-2009 for Middle Fork Tuolumne River at Oakland Recreation Camp.

Month	Mean Monthly Flow (cfs)	Lowest Mean Monthly Flow (cfs)	Highest Mean Monthly Flow (cfs)
Jan	160	13	476
Feb	263	18	598
Mar	184	7	875
Apr	58	1	361
May	25	0	339
Jun	28	0	479
Jul	16	0	68
Aug	29	2	138
Sep	40	2	234
Oct	82	2	450
Nov	94	2	345
Dec	107	2	354

Source: USGS 11282000.

Project Area

Don Pedro Project operations are described in Section 3.0 of this PAD. The Project provides water storage for irrigation, municipal, and industrial water supply, flood control, power generation, water for recreation, and scheduled releases for fish in the lower Tuolumne River. The Don Pedro Reservoir also provides a “water bank” available to CCSF which helps it manage its water supply delivered to over two million Bay Area water users.

Inflows to Don Pedro Reservoir are affected by upstream reservoir operations by CCSF. Outflows from Don Pedro reflect real-time operations by the Districts to manage flows in accordance with storage requirements, ACOE flood control guidelines, and downstream demand for water, including instream flow requirements contained in the current FERC license. Table 5.2.2.9 provides the Don Pedro outflow hydrology since the first full calendar year following the 1996 FERC order incorporating terms of the 1995 settlement agreement.

Table 5.2.2-9 Don Pedro Project mean monthly outflows (cfs) 1997-2009.

Month	Monthly mean 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 (cfs)																
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 (cfs)																
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 (cfs)																
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	Monthly mean 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) ** (cfs)																
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 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 1,769 and 2,170 cfs, respectively.

Lower Tuolumne River

Flows for the lower Tuolumne River above La Grange Dam are computed from three distinct locations whose data are then combined to estimate total flow (USGS Gage 11289651). This total flow is essentially equivalent to the releases from the Don Pedro Project as provided in Table 5.2.2-9. Records for these locations are available from the USGS NWIS website for the period from October 1, 1970 to September 30, 2009. The gages continue to be reported by USGS, and data are updated at least annually. The mean flow at this location as reported by USGS is 2,300 cfs for the period following completion of reservoir filling (WY 1975-2009). Flow duration curves based on daily data for the same locations are provided in Attachment 5.2.2-1. Mean monthly flows are provided in Table 5.2.2-10.

Table 5.2.2-10 Mean monthly flows for the WY 1975-2009 for lower Tuolumne River

Month	Below La Grange Dam (cfs)	Modesto Canal near La Grange (cfs)	Turlock Canal near La Grange (cfs)
Jan	1,485	69	124
Feb	1,860	67	183
Mar	1,955	270	608
Apr	1,873	559	1,092
May	1,747	661	1,213
Jun	902	790	1,475
Jul	496	886	1,795
Aug	265	781	1,562
Sep	466	511	796
Oct	614	290	401
Nov	337	173	180
Dec	810	126	191

Source: USGS 11289650, 11289000, and 11289500.

Tuolumne River at 9th Street Bridge in Modesto, California (USGS Gage No. 11290000)

USGS also reports flows for a gage located further downstream at the City of Modesto. This gage has relevance to the operation of the Don Pedro Project via the ACOE 1972 Flood Control Manual for the Project. Generally, this may affect Project releases when the flow at this location is near 9,000 cfs, as flows over 9,000 cfs have potential to cause significant property damage. This restriction has the greatest potential to affect operation of the Project during the wet winter and spring snowmelt months when diversions for irrigation or M&I use are low and maintenance of flood control space in Don Pedro Reservoir is vital. Operational constraints and considerations, including this flow restriction, are described in greater detail in Section 3.0.

This gage has been continuously maintained since 1895, so it provides a substantial amount of long-term data for the Tuolumne River. Despite the long-term nature of this gage, the flows still reflect some degree of regulation for most of its period of record due to the long history of diversion and regulation in the watershed. Table 5.2.2-11 provides the mean, minimum, and maximum monthly flows for the period 1975 to 2009.

Table 5.2.2-11 Mean monthly flows for the WY 1975-2009 for Tuolumne River at Modesto.

Month	Mean Monthly Flow (cfs)	Lowest Mean Monthly Flow (cfs)	Highest Mean Monthly Flow (cfs)
Jan	1,839	154	15,500
Feb	2,204	166	8,782
Mar	2,306	239	7,658
Apr	2,119	169	9,268
May	1,956	138	10,420
Jun	1,093	95	5,683
Jul	673	79	4,244
Aug	448	68	2,225
Sep	666	73	4,041
Oct	841	78	4,760
Nov	629	93	2,089
Dec	1,048	110	5,431

Source: USGS 11290000.

5.2.2.5 Flood Hydrology

Since completion of the new Don Pedro Dam in 1971, the flood of record occurred January 1997 (the "1997 New Year's Flood"). The peak inflow was 120,935 cfs and peak outflow was 59,462 cfs measured at La Grange (2 miles downstream of dam). This has been the only occurrence of flows over the Project spillway at the new Don Pedro Project.

Prior to the new Don Pedro Dam, the unregulated historical flood of record occurred in January 1862, with an estimated discharge of 130,000 cfs. A more recent flood (post-original Don Pedro Dam construction) occurred in December 1950 with an estimated discharge of 61,000 cfs.

The design flood for the Project is the Probable Maximum Flood (PMF). The flood hydrograph for such an event was recomputed in 2006 during the Project's Potential Failure Mode Analysis assessment as required by FERC. The inflow was estimated to be 706,900 cfs and peak outflow was established to be 525,600 cfs. The PMF is passed at the Project with a resulting reservoir elevation of 852 feet, or 3 feet below top of dam.

Figures 5.2.2-3 through 5.2.2-5 present reservoir storage levels for representative wet (2006), normal (2003), and dry (2001) WY types under recent operations.

Note that the "maximum storage" presented in these charts is a generalized rule curve for the rain-flood storage requirement, and does not represent the year-by-year storage guidance according to the flood control manual, which varies by year.

Detailed information on the seasonal and inter-annual variability of operations and flood control guidance can be found in Section 3.0 of this PAD.

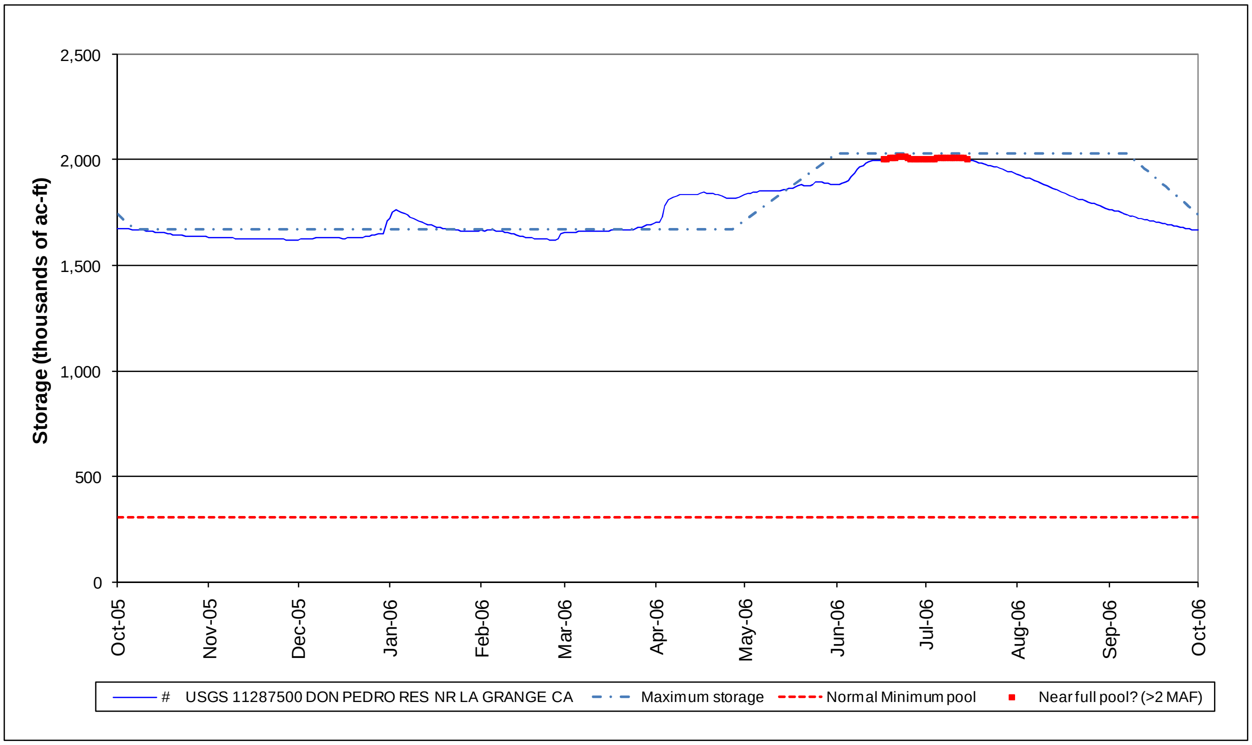


Figure 5.2.2-3 Don Pedro Reservoir storage during WY 2006, representative wet WY type.

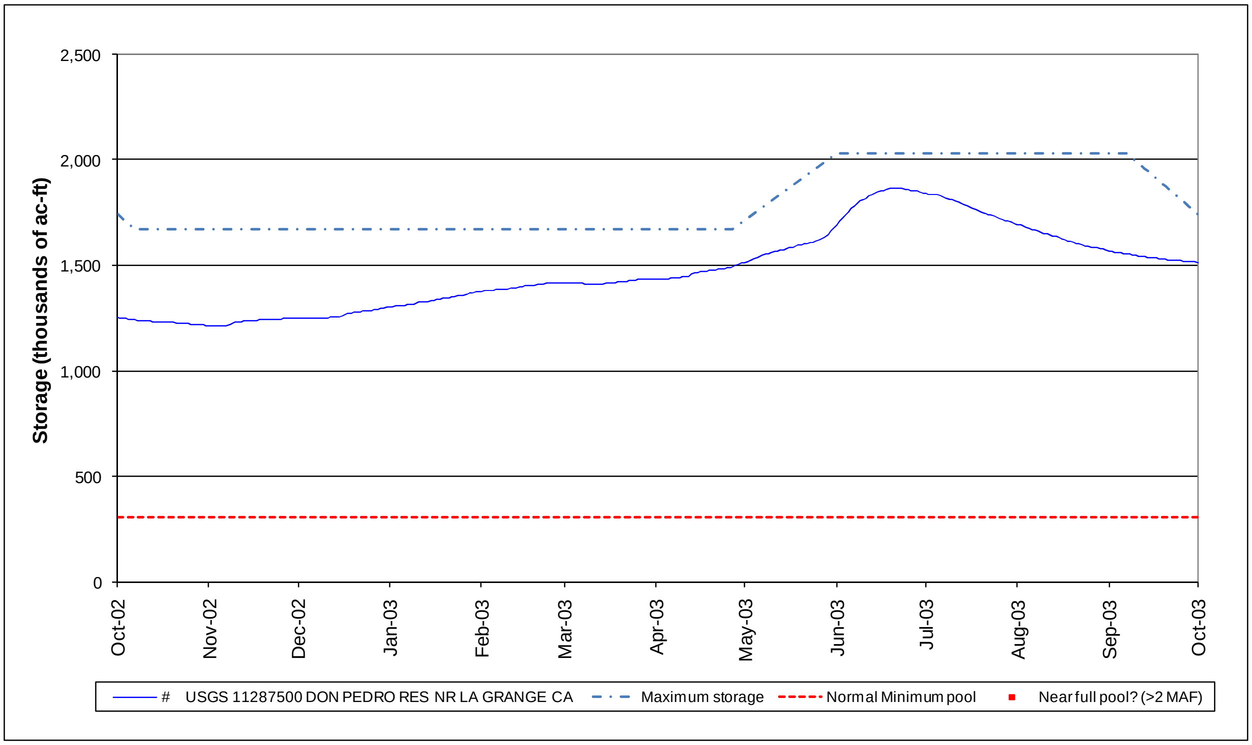


Figure 5.2.2-4 Don Pedro Reservoir storage during WY 2003, representative normal WY type (following relatively dry water years so initial storage is low).

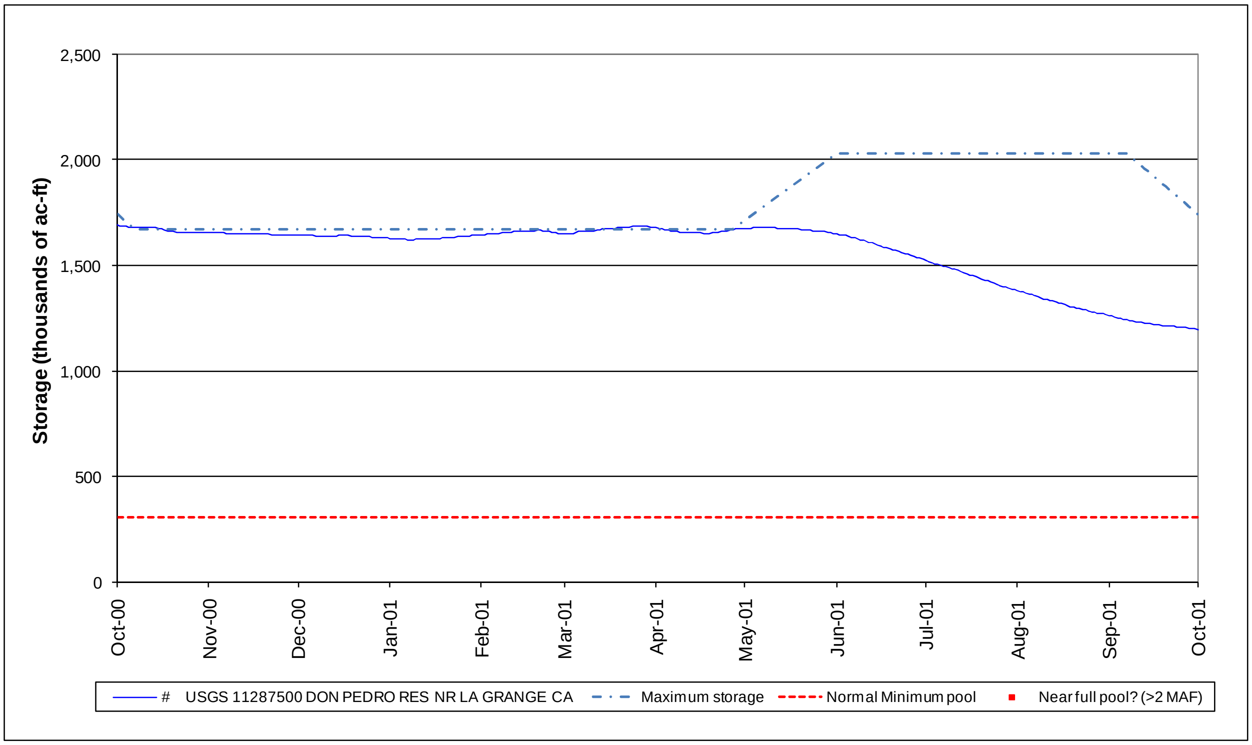


Figure 5.2.2-5 Don Pedro Reservoir storage during WY 2001, representative dry WY type (following relatively wet years so initial storage is high).

5.2.2.6 Drought Hydrology

Annual full natural flow of the Tuolumne River above Don Pedro Reservoir has averaged about 1.97 million ac-ft since 1975, or about 1.8 cfs per square mile. Much of this runoff comes from November to April storms, which occur primarily as rain below about 4,000 feet and snow above this elevation. The amount of precipitation in the Tuolumne watershed above Don Pedro can vary considerably from year to year. The maximum annual unimpaired runoff since 1975 occurred in WY 1983 at 4.6 million ac-ft (4.1 cfs per square mile) and the minimum occurred in WY 1977 at 0.47 million ac-ft (0.4 cfs per square mile), or just 23 percent of the mean flow. At the current time, the normal year water demands for Tuolumne River water are approximately 1.5 million ac-ft[4]. Full natural flow since 1975 at Don Pedro Dam has been less than 1.5 million ac-ft over 60 percent of the years. This very cursory accounting underscores the need for water storage in the basin.

Especially challenging for water managers is the occurrence of successive dry years. Accepted practice in water management planning is based on supplying adequate amounts of water to meet water demands through successive dry years, or the “design drought” conditions, just as spillways are engineered to pass the “design flood”. Since 1971, two drought periods have occurred. Water years 1976 and 1977 were successive low-flow years, with a combined two-year full natural flow of 1 million ac-ft or just 26 percent of the two-year mean of 3.9 million ac-ft. These two years are the driest two consecutive years in recorded history. The longest drought occurred during the water years 1987 through 1992. The full natural flow over these six years

[4] Roughly estimated as 0.9 million ac-ft by TID and MID, 0.25 million ac-ft by CCSF, and 0.3 million ac-ft for minimum flows below La Grange Dam.

was 5.6 million ac-ft, or just 46 percent of the mean. In the entire WY 1987 to 1992 period, not a single year exceeded 70 percent of the mean annual flow. Furthermore, demand for irrigation water during drought years is greater than during normal or wet years due to the lack of precipitation. Use of groundwater during drought periods can offer only temporary relief from droughts at best. The majority of groundwater recharge in both the Turlock and Modesto groundwater basins comes from irrigation water supplies. Recent groundwater studies have shown that the Turlock groundwater basin is already locally overdrafted (TID 2009). There are no data to indicate that the Modesto groundwater basin is currently overdrafted. There had been a cone of depression beneath the City of Modesto; however, this has recovered since MID started to provide treated surface water to the City, thereby reducing the City's groundwater withdrawal.

Irrigated Agriculture

TID and MID serve over 200,000 acres of high-value farmland north and south of the Tuolumne River through Tuolumne River diversions at the non-project La Grange Dam. For annual crops (grains, pasture, vegetables), initial decisions on and financial commitments to the number of acres to plant must be made by late January or early February of the calendar year—at a time when total water year precipitation levels and runoff are unknown. Many of these annual crops must be grown every year to support the large regional dairy industry. Not only does this provide a source of feed for cows, but also is the means by which to dispose of nutrient materials created by the herds. Additionally, a significant portion of the Districts' irrigated acreage consists of orchards and other permanent crops. Orchards and annual feed crops must be adequately irrigated every year to prevent substantial losses. Income levels for irrigation water users are directly affected by acreage planted (and successfully irrigated).

Municipal and Industrial Water

Demand for municipal and industry water is not substantially diminished during successive dry years. Domestic water demand can be reduced during drought conditions, but not anywhere close to the ratio of drought year flows to normal year flows. The City of Modesto (population: 210,000) (served by MID), the community of La Grange, and portions of the Bay Area (served by CCSF) depend on the Tuolumne River for water. This combined demand, which exceeds 300,000 ac-ft of water, must be substantially met every year.

Fish Habitat Enhancement Flows

Don Pedro Reservoir provides flows that are released to the lower Tuolumne River to protect and enhance resident and anadromous fish. Under the current license, this amount varies from about 100,000 to 300,000 ac-ft per year, depending on the hydrologic year type.

One can readily understand that the demand for Tuolumne River water can significantly exceed supply during dry years, and especially successive dry years (e.g., 1976-1977; 1987-1992). The ability to store water in wetter years for use during dry years is the design basis for the Don Pedro Project and CCSF's upstream storage reservoirs. However, significant droughts, like the two since 1971, can severely tax the ability to meet all demands. In fact, actual operations have shown that current storage is not adequate to meet all water demands during these drought periods, and shortages already occur. While groundwater contributions can supplement surface water supplies, groundwater storage is rapidly depleted during intense pumping periods, as occurred during the 1987 to 1992 drought.

5.2.2.7 Full Natural Flow

The full natural flow of the Tuolumne River is calculated on a daily basis by the CDWR for the Tuolumne River at La Grange Dam (Station ID TLG.) The drainage area at this location, according to the CDWR's California Data Exchange Center (CDEC) system, is approximately 1,548 square miles. Historical computed flows are available from CDEC on a daily basis beginning in April 1986, and on a monthly basis from October of 1900 through the present. Note that because these data are computed on a daily basis, using a constellation of gages for an arithmetic water-balance (including changes in storage at Don Pedro Reservoir) full natural flows for the Tuolumne River vary from day to day and occasionally show negative flows. These flows over time, however, are a good representation of the total amount of natural runoff in the Tuolumne River. Table 5.2.2-12 presents a summary of the data from CDEC of the average monthly full natural flow for the period from 1975 to 2009.

Table 5.2.2-12 Tuolumne River at La Grange Dam mean monthly full natural flow 1975-2009.

Month	Full Natural Flow Monthly Average (ac-ft - 1975-2009)
January	152,888
February	162,757
March	229,573
April	277,009
May	453,787
June	344,535
July	141,934
August	35,952
September	18,764
October	23,007
November	46,820
December	79,136
Total	**1,966,162**

Source: CDEC full natural flow monthly averages.

5.3 Aquatic Resources

5.3.1 Historical Distribution of Fish and Influences Affecting Tuolumne River Fisheries

There has been considerable research, reports, and studies of the aquatic resources of the Tuolumne River. This especially applies to fish resources below La Grange Dam due to the large number of studies conducted by the Districts over the last 40 years. This section of the PAD presents an overview of the available and relevant information and identifies a complete set of references for those interested in further research. This section of the PAD first contains a description of the historical influences on aquatic resources, then describes the existing aquatic resource conditions, and finally, provides descriptions of Special-Status aquatic species.

5.3.1.1 Historical Distribution

Moyle (2002) provides a comprehensive description of the history of fish species composition and distribution within the Sacramento-San Joaquin Province, from pre-European settlement to the present that provides insight into the history of the river's fish populations. His account, although not specific to the Tuolumne River, covers the zoogeographic provinces and fish assemblages that comprise the Tuolumne River and, as a result, provides a fairly detailed characterization of the history of the river, including the reaches within, upstream and downstream of the Project. Zoogeographic provinces are regions of distinctive fauna. The Tuolumne River is part of the Central Valley Subprovince. Species native to this region reflect an evolutionary history of adaptation to a unique climate characterized by extended droughts as well as massive floods (Moyle 2002). The four main fish assemblages that occur in the Central Valley Subprovince are (1) the rainbow trout assemblage, (2) the California roach assemblage, (3) the Sacramento pikeminnow-hardhead-sucker assemblage, and (4) the deep-bodied fish assemblage.

Central Valley Floor

The Central Valley floor is composed of warm waterways including sluggish river channels, swamps, sloughs, and long stretches of open water. Much of the lower Tuolumne River is within this area. The Central Valley floor fish fauna is composed primarily of species from the deep-bodied fish assemblage. Native deep-bodied fishes, such as Sacramento perch and tule perch, and juvenile fishes occupy the stagnant backwaters, while specialized adult cyprinids (hitch, blackfish, and splittail) inhabit the long stretches of open water. Large pikeminnows and suckers are also abundant, migrating upstream to spawn in tributaries to the San Joaquin River, including the Tuolumne River. Anadromous salmon, steelhead, and sturgeon pass through this zone on their way upstream to spawn (Moyle 2002). This domain is now dominated by introduced species including largemouth bass and white and black crappie, bluegill, inland silverside, white catfish, brown and black bullhead, and common carp.

Central Valley Foothills

Central Valley foothill streams and rivers extend from the valley floor to the Sierra (and Coast Range) mountains. The Project bisects this area, which includes the upper reaches of the lower Tuolumne and the lower reaches of the upper Tuolumne. These streams and rivers are home to three fish assemblages as defined by Moyle (2002). From lowest to highest elevation, they are the pikeminnow-hardhead-sucker assemblage, the California roach assemblage, and the rainbow trout assemblage. In the San Joaquin drainage, the pikeminnow-hardhead-sucker assemblage occurs just above the valley floor at elevations of 80 to 1,500 feet. This assemblage typically inhabits streams with deep, rocky pools and wide shallow riffles. Water quality and habitat complexity is usually high, although some streams may become intermittent during summer, and summer water temperatures may exceed 77°F. Sacramento pikeminnow and Sacramento sucker are generally the most abundant fishes of this assemblage, while hardhead are confined to cooler waters in reaches with deep, rock-bottomed pools.

The California roach assemblage overlaps substantially in elevation with the pikeminnow-hardhead-sucker assemblage, although it does not extend to the lowest elevations. In the Tuolumne River watershed, this assemblage is unique in supporting the endemic Red Hills roach, as discussed below. This assemblage is found in small, warm tributaries to larger streams that flow through open foothill woodlands of oak and foothill pine. These streams are typically intermittent during summer, resulting in the formation of stagnant pools that can exceed 86°F during the day. In the winter and spring these streams are swift and vulnerable to flooding. These streams provide habitat for the California roach, which is capable of withstanding high temperature and low oxygen levels due to its small size.

The rainbow trout assemblage overlaps with the upper elevations of the pikeminnow-hardhead-sucker and California roach assemblage and extends to the highest elevations. These streams are characterized by swift, permanent flows, steep gradients, and cool temperatures. The water is well oxygenated and cover is abundant. Sculpin, Sacramento sucker, and speckled dace are often part of this assemblage. Introduced brook and brown trout are often found in this assemblage as well, although they generally do not occur at the lower elevations.

Central Valley Reservoirs

Dams constructed to store water in the Central Valley of California now provide habitat for a mix of exotic and native species. The nature of the fish fauna in a given reservoir is determined by its elevation, size, location, and water quality. California reservoirs range from clear, oligotrophic, cold-water impoundments at high elevations to turbid, eutrophic, warm-water impoundments at low elevations, but most are found at middle elevations in the foothills. These reservoirs usually provide habitat for warm-water fishes in surface and edge waters and salmonids in deeper, cooler water. Available data suggest Don Pedro, like most of these foothill reservoirs, is mesotrophic.

5.3.1.2 Resident Fish

Historically, over 20 species of native resident fish occurred within the Sacramento-San Joaquin Province, most of which likely occurred in the Tuolumne River. The current composition in the Province includes 13 native, resident fishes and 30 introduced fishes (Dubrovsky et al. 1998; Moyle 2002).

Upper Tuolumne River

The upper Tuolumne River, from the upper limit of Don Pedro Reservoir to the river's headwaters, encompasses three fish assemblages and a large region that was historically fishless. The glacial geologic history of the Tuolumne River left the upper drainage void of fish, as the glaciers moved downstream, clearing their paths of fish and leaving barriers to recolonization as they receded. As a result, the upper, natural limit of fish access due to this glacial activity was near the 3,600-foot elevation. Rainbow trout, Sacramento sucker, sculpin, and speckled dace comprise the rainbow trout assemblage and are the native fishes resident to the uppermost, accessible reaches of the Tuolumne River. Brown trout, brook trout, and green sunfish now also occur within the upper reaches of the upper Tuolumne River. These fishes are common in the upper reaches of most Sierra streams, the result of fish planting conducted by resource agencies to improve fishing in local lakes and streams.

Competition and predation associated with introduced species, especially brown trout, have likely reduced abundance and distribution of native fishes. Changes in habitat, primarily due to dam construction that impounds water, and changes to downstream flow and temperature conditions, have also influenced abundance and distribution of native fishes. Rainbow trout and suckers also use the reservoirs, which has increased the number of larger fish.

The California roach assemblage occurs just upstream of Don Pedro Reservoir, within a narrow elevational band of the foothills that also contains the pikeminnow-hardhead-sucker assemblage. Don Pedro inundates a portion of the historic roach range (Moyle 2002). The Sacramento-San Joaquin roach and the Red Hill roach, both subspecies of California roach, occur within this portion of the upper Tuolumne River watershed. Other fishes that may ephemerally occur within the areas unique to the roach include sucker and native minnows and introduced centrarchids (black bass and sunfish). Moyle (2002) suggests that the roach habitat within the San Joaquin River tributaries is characteristically warm and intermittent and would typically only contain non-roach during the winter-spring period.

Sacramento sucker and pikeminnow are the dominant native resident fishes in the river between the rainbow trout reach and Don Pedro. Introduced fishes, including Common carp, bluegill, smallmouth bass, brown bullhead, mosquitofish, green sunfish, and largemouth bass also occur within this reach of the upper Tuolumne River.

Project Area

The historical native resident fish composition within the Project area was most likely characteristic of the pikeminnow-hardhead-sucker assemblage. Current native fish composition would be restricted to those species that are able to reside in a lacustrine environment (e.g., Sacramento sucker and pikeminnow). Don Pedro Reservoir supports a diverse assemblage of introduced fishes, including Centrarchids, and non-native trout and salmon (e.g., coho salmon and kokanee salmon) that have been introduced to support several popular cold- and warm-water fisheries. Other non-native fishes, such as threadfin shad, fathead minnows, and golden shiners, may be remnant of attempts to provide forage for introduced gamefish, or as bait.

Lower Tuolumne River

Downstream of Don Pedro Dam, the historical, native, resident fish populations were part of the deep bodied fish assemblage. That assemblage in the lower Tuolumne River likely included tule perch, Sacramento splittail, Sacramento blackfish, hitch, as well as the extirpated Sacramento perch and the extinct thicktail chub, along with Sacramento sucker and pikeminnow. Today, eight native, resident fishes still occupy the lower river, including Sacramento sucker, Sacramento pikeminnow, Sacramento splittail, hardhead, hitch, Sacramento blackfish, tule perch, and riffle sculpin (Ford and Brown 2002). Twenty-one species of introduced fishes occupy the lower river, including threadfin shad, bullhead, white and channel catfish, common carp, fathead minnow, golden shiner, goldfish, redshiner, striped bass, largemouth bass, smallmouth bass, western mosquitofish, and inland silversides.

5.3.1.3 Anadromous Fish

Historical Range

Anadromous fish fauna historically included three anadromous fishes—Chinook salmon, steelhead trout, and Pacific lamprey. In the Tuolumne River these anadromous fishes did not reach Hetch Hetchy Valley (3,600 feet) (Moyle et al. 1996).

Spring- and fall-run Chinook salmon historically used the Tuolumne River (Yoshiyama et al.1996; National Marine Fisheries Service [NMFS] Website date unknown). Clavey Falls (10 to 15 feet high), at the confluence of the Clavey River, may have obstructed the salmon at certain flows, but spring-run Chinook salmon in some numbers reportedly ascended the mainstem a considerable distance (Yoshiyama et al. 1996). The spring-run were most likely stopped by the formidable Preston Falls located four miles above Early Intake Dam near the boundary of Yosemite National Park (about 51 miles upstream of present New Don Pedro Dam) (Yoshiyama et al.1996; NMFS Website date unknown).

In addition to fall- and spring-run Chinook salmon, Yoshiyama et al. (1996) report that steelhead may have ascended several miles into Cherry Creek, a tributary to the mainstem about one mile below Early Intake.

Steep sections of stream in the Clavey River and the South and Middle forks of the Tuolumne shortly above their mouths most likely obstructed the salmon migration. In the lower South Fork, a tall (25- to 30-foot-high) waterfall, probably prevented further access up that fork (Stanley and Holbek 1984, *as cited* in Yoshiyama et al. 1996). The North Fork, with a 12-foot waterfall about one mile above the mouth, likewise offered limited access. Probably few, if any, salmon entered those upper reaches of the Tuolumne drainage (Yoshiyama et al. 1996). The waterfalls just below present Hetch Hetchy Dam on the mainstem, about 10 miles above Preston Falls, evidently stopped all fish that might have ascended that far, and John Muir wrote that the river was barren of fish above the falls (Muir 1902, *as cited* in Yoshiyama et al. 1996). Yoshiyama et al. (1996) report that there are no indications that salmon ever reached Hetch Hetchy Valley, or Poopenaut Valley farther downstream. Just as with the Merced River, there is no archaeological or ethnographic evidence indicating that salmon were part of the subsistence economics of the native inhabitants along the upper Tuolumne River (Snyder 1993 unpublished memorandum *as cited* in Yoshiyama et al. 1996).

Influences Affecting Anadromous Fish Abundance

Historically, the Tuolumne River “at one time was one of the best salmon streams in the State” (California Fish and Game Commission 1886, *as cited* in Yoshiyama et al. 1996) supporting large runs of both fall- and spring-run Chinook salmon. Fall-run Chinook salmon spawning escapement to the Tuolumne River during some years was larger than the escapement to any other Central Valley stream, except for the mainstem Sacramento River, and was estimated at 122,000 spawners in 1940 and 130,000 spawners in 1944 (CDFG 1946; Fry 1961, *as cited* in Yoshiyama et al. 1996). Reynolds et al. (1993) suggested that, at times, the Tuolumne River fall-run Chinook salmon run comprised up to 12 percent of the total Central Valley fall-run spawning escapement (Yoshiyama et al. 1996).

The Tuolumne River anadromous fish populations have been reduced by habitat degradation and extensive instream and floodplain mining beginning in the mid-1800s. Dams and water diversions associated with mining had undoubtedly affected migration as early as 1852 (Snyder 1993 unpublished memorandum, *as cited* in Yoshiyama et al.1996). Access to historic spawning and rearing habitat was significantly restricted beginning in the 1870s when a variety of dams and irrigation diversion projects were constructed. Wheaton Dam, built in 1871 at the site of present-day La Grange Dam, was a barrier to salmon migration. In 1884, the California Fish and Game Commission reported that the Tuolumne River was "dammed in such a way to prevent the fish from ascending" (California Fish and Game Commission 1884, *as cited* in Yoshiyama et al. 1996).

The construction of the new Don Pedro Dam (upstream of the La Grange Dam) in the late 1960s for hydroelectric production, irrigation storage, and flood control complied with conditions in a FERC settlement agreement that defined minimum flows as well as pulse flows for spawning and rearing purposes below La Grange Dam. These flows were intended to improve conditions for fall-run Chinook salmon.

Gravel and gold mining, and other similar activities that degraded the river in the mid 1800s, undoubtedly adversely affected the salmon runs before the early period of dam construction on the Tuolumne (TID and MID 2005). These activities left a legacy of large pits that have altered the river's morphology and flow and that harbor populations of predators (such as largemouth and smallmouth bass) that can substantially reduce salmonid survival. Predation is often a major source of mortality for juvenile salmon, and it may be the reason why high spring flows have been correlated with larger recruitments. High flows may reduce predation on emigrating smolts by increasing turbidity, which can limit the predatory efficiency of sight-feeding fish such as black bass (largemouth and smallmouth bass), and by increasing velocity, which can both limit the predator's efficiency and access to smolts and decrease the exposure time of smolts to predation by decreasing their travel time (TID/MID 1992 Appendix 22). Studies conducted between 1987 and 1990 indicate that introduced predators (largemouth and smallmouth bass, and black crappie) are capable of significant predation, and may be the cause of an estimated mortality rate of 50 to 70 percent for smolts migrating out of the Tuolumne River during spring pulse flows (Orr 1997).

Orr (1997) reports that analysis of the predator population data indicates that the greatest concentrations of predators is in the wide, deep, slow-moving, pond-like areas that are especially prevalent in the middle section of the river downstream of the major spawning areas. These areas likely resulted from instream sand and gravel mining operations (Orr 1997). The predators using these habitats are species that were introduced in the late 1800s and 1900s to create a sport fishery. Orr (1997) reports that it is therefore likely that the present pattern and degree of predation mortality in the Tuolumne River is to a large extent a result of past sand and gravel mining and the introduction of piscivorous fish species.

In 2005, TID and MID reported that in addition to the above-mentioned influences, water management, riparian diversions, Delta and Bay development activities, state and federal Delta water exports, water quality issues, hatcheries, harvest, poaching, and ocean conditions have all had an affect on anadromous fish abundance in the Tuolumne River.

5.3.2 Aquatic Resources in the Tuolumne River - Existing Conditions

5.3.2.1 Upper Tuolumne River

The Tuolumne River originates in Yosemite National Park at an elevation of approximately 8,600 feet in the Sierra Nevada. From its origin, the river drains the entire northern portion of Yosemite National Park, an area of approximately 669 square miles (NPS 2004a). The river flows through the Yosemite Valley before plunging into Glen Aulin and on to the Grand Canyon of the Tuolumne River and the Muir Gorge. From Pate Valley, the Tuolumne continues before it drains into Hetch Hetchy Reservoir. Beyond O'Shaughnessy Dam, the Tuolumne River cascades and meanders through Poopenaut Valley before it leaves the Yosemite National Park boundary and continues through the Sierra foothills, eventually flowing into Don Pedro Reservoir.

The river above Don Pedro Reservoir is regulated by three reservoirs (Cherry Lake, Lake Eleanor, and Hetch Hetchy Reservoir) owned and operated by the CCSF. These reservoirs have a combined storage capacity of 660,000 ac-ft. During each of the past 10 years, approximately 250,000 ac-ft of Tuolumne River water has been annually exported to San Francisco. Hetch Hetchy Reservoir, with 360,000 ac-ft of storage capacity, is the largest reservoir in the upper watershed.

Hetch Hetchy and Lake Eleanor reservoirs are in Yosemite, within the Tuolumne River watershed. Hetch Hetchy is on the main stem of the Tuolumne River and Lake Eleanor is on Eleanor Creek, upstream of its confluence with Cherry Creek. Cherry Creek joins the Tuolumne River downstream of the Yosemite National Park's western boundary (NPS 2004b). Hetch Hetchy is dammed by the 430-foot-tall O'Shaughnessy Dam and its storage capacity of 360,000 ac-ft is the primary water source for about 2.4 million residents in the San Francisco Bay area. Lake Eleanor's maximum volume of 27,000 ac-ft was created by building the 70-foot-tall Lake Eleanor Dam in 1918 (NPS 2004b).

The Middle Tuolumne River drains a small portion of the Yosemite National Park's extreme western edge, south of Hetch Hetchy Reservoir and northwest of the Tioga Road. The headwaters are between 7,000 and 8,000 feet in elevation (NPS 2004b). Cottonwood Creek is a major tributary. The Middle Tuolumne River exits the Yosemite National Park at an elevation of 5,000 feet and joins the South Fork Tuolumne River downstream of the Yosemite National Park (NPS 2004b).

The South Fork Tuolumne River drains a small portion of the western edge of Yosemite National Park. The headwaters begin between White Wolf and Yosemite Valley at elevations between 8,000 and 8,500 feet. The South Fork Tuolumne River exits the park at an elevation of 4,500 feet, just north of Hodgdon Meadow and upstream of its confluence with the main Tuolumne River (NPS 2004b).

Fish Resources

The Districts have reviewed seven source documents and various sources of anecdotal information, each of which is summarized below, regarding the existing fisheries resource in the upper Tuolumne River. A list of fish reported to occur in the Tuolumne River is presented in Table 5.3.2-1.

Table 5.3.2-1 List of fishes reported to occur in the Tuolumne River.

Species	Origin*	Special Status	Distribution in Tuolumne River		
			Upstream of Project	In Project Area	Downstream of Project
			Above Don Pedro	In Don Pedro	Downstream of Don Pedro
Pacific lamprey *Lampetra tridentata*	N	None			1,3
River lamprey *Lampetra ayresii*	N	None			3
Threadfin shad *Dorosoma petenense*	I	None		7	1,3
Chinook (king) salmon *Oncorhynchus tshawytscha*	N	None; FT & ST; or NMFS-S & SSC (B)		6, 7	1,3
Coho salmon *Oncorhynchus kisutch*	I	None		6	
Rainbow trout *Oncorhynchus mykiss*	N	None	6, 10	6,7	1,3,6
Steelhead trout *Oncorhynchus mykiss*	N	FT			1,3,6
Brown trout *Salmo trutta*	I	None	10	6, 7	
Brook trout *Salvelinus fontinalis*	I	None		6, 7	
Kokanee salmon *Oncorhynchus nerka*	I	None		6, 7	
White sturgeon *Acipenser transmontanus*	N	None			3
Common Carp *Cyprinus carpio*	I	None			1,3
Goldfish *Carassius auratus*	I	None			1,3
Golden shiner *Notemigonus chrysoleucas*	I	None			1,3
Sacramento blackfish *Orthodon microlepidotus*	N	None			1,3
Hitch *Lavinia exilcauda*	N	None	1		1,3
Red Hills roach *Hesperoleucus symmetricus*	N	SSC, BLM-S	8		
California roach *Lavinia symmetricus*	N	SSC	5, 10		
Hardhead *Mylopharodon conocephalus*	N	SSC	2		1,3
Sacramento pikeminnow *Ptychocheilus grandis*	N	None	4		1,3
Sacramento splittail *Pogonichthys macrolepidotus*	N	SSC			1,3
Red shiner *Cyprinella lutrensis*	I	None			1,3
Fathead minnow *Pimephales promelas*	I	None			1,3
Sacramento sucker *Catostomus occidentalis*	N	None	5, 8, 10		1,3
Channel catfish *Ictalurus punctatus*	I	None		7	1,3

Species	Origin*	Special Status	Distribution in Tuolumne River		
			Upstream of Project	In Project Area	Downstream of Project
			Above Don Pedro	In Don Pedro	Downstream of Don Pedro
White catfish *Ameiurus catus*	I	None			1,3
Brown bullhead *Ameiurus nebulosus*	I	None			1,3
Wagasaki *Hypomesus nipponensis*	I	None			3
Western mosquitofish *Gambusia affinis*	I	None	8		1,3
Inland silverside *Menidia beryllina*	I	None			1,3
Striped bass *Morone saxatilis*	I	None			1,3
White crappie *Pomoxis annularis*	I	None			1,3
Black crappie *Pomoxis nigromaculatus*	I	None		7	1,3
Warmouth *Lepomis* gulosis	I	None			1,3
Green sunfish *Lepomis cyanellus*	I	None	8		1,3
Bluegill *Lepomis macrochirus*	I	None		7	1,3
Redear sunfish *Lepomis microlophus*	I	None			1,3
Largemouth bass *Micropterus salmoides*	I	None	8	7, 9	1,3
Smallmouth bass *Micropterus dolomieu*	I	None	4	7, 9	1,3
Bigscale logpearch *Percina macrolepida*	I	None			1,3
Tule perch *Hysterocarpus traskii*	N	None			1,3
Prickly sculpin *Cottus asper*	N	None			1,3
Riffle sculpin *Cottus gulosus*	N	None	5, 10		1,3

Origin: N = native; I = non-native
[1] TID and MID (2006).
[2] CDFG and U.S. Fish and Wildlife Service (USFWS) 2010a,b.
[3] TID and MID (2005).
[4] http://watershed.ucdavis.edu/tuolumne/flogs.aspxf.
[5] Yoshiyama et al. 1996.
[6] CDFG Stocking Information (annual and daily reports).
[7] Anecdotal (fishsniffer and motherlodelakes.com).
[8] Jones et al. 2002.
[9] Don Pedro Recreation Agency Black bass planting summary.
[10] Moyle and Marchetti (1992).

CCSF has notified the Districts that a new report will be issued in 2011 presenting recommendations for new O'Shaughnessy Dam releases for the reach from the dam to Early

Intake. This report is to include a summary of three years of recent studies and data, including water temperature model information.

NPS (2009)

NPS (2009) is the Yosemite Fire Management Plan/Environmental Impact Statement (EIS) which provides a chapter on the affected environment. NPS (2009) reports that the last period of glaciation eliminated all fish from the high country and the high waterfalls prevented repopulation by upstream migration so that only the lower systems of the Tuolumne River were populated with native fish (i.e., rainbow trout, Sacramento sucker, Sacramento pike-minnow, hardhead, California roach, and riffle sculpin).

BLM (2009)

BLM (2009) reports that fish in the Red Hills, found in Six Bit Gulch and Poor Man's Creek, include the green sunfish, largemouth bass, Sacramento sucker, and the mosquito fish, all of which are considered predators to the Red Hills Roach.

CDFG and USFWS (2010)

CDFG and USFWS (2010) report that fish populations of many of the water bodies upstream of the Don Pedro Project are totally dependent on hatchery fish. CDFG has classified the most popular resident trout and inland salmon fisheries and their dependency on hatchery fish (CDFG and USFWS 2010) by CDFG region, county and type of water. Those fisheries corresponding to CDFG Region 4, Tuolumne County in and upstream of the Project area are summarized in Table 5.3.2-2.

Table 5.3.2-2 Popular resident trout and inland salmon fisheries and dependence on hatchery fish in the upper Tuolumne River and Don Pedro Reservoir.

Fishery Location Name	Type of Water[1]	Hatchery Fish Dependence
Basin Creek	S	100%
Cherry Valley Reservoir	R	100%
Don Pedro Reservoir	R	100%
Moccasin Creek	S	100%
Tuolumne River, middle fork	S	100%
Tuolumne River, north fork	S	100%
Tuolumne River, south fork	S	100%

[1] R = Reservoir; S = Stream

Source: CDFG and USFWS (2010).

U.S. Forest Service (2006)

The U.S. Forest Service (USFS) (2006) prepared the Clavey River Watershed Existing Condition - Stream, Aquatic and Riparian Project Study Report. The purpose of this report was to better inform the Clavey River Watershed Analysis, a landscape assessment conducted by the Clavey River Ecosystem Project. In their study, they identified Sacramento sucker, California roach, and Sacramento pikeminnow in the Clavey River watershed.

Moyle and Marchetti (1992)

Moyle and Marchetti (1992) prepared a draft report, *Temperature Requirements of Rainbow Trout and Brown Trout in Relation to Flows between O'Shaughneasy Dam and Early Intake on the Tuolumne River, California*. In this report, Moyle and Marchetti (1992) examined the role of temperature in maintaining the fish communities of a four-mile stretch from Preston Falls to Early Intake. During their examination, a review of literature was summarized on the temperature requirements of the various life history stages of rainbow and brown trout, focusing especially on rainbow trout because it is a native species to the river, as well as those of other fishes native to this reach of the river. Part of their examination included a summary of a 1976 USFWS survey for the above-mentioned reach. In summary, brown trout dominated the fish community above Preston Falls; however, below the falls rainbow trout dominated and Sacramento sucker, California roach, and riffle sculpin were present as well.

Moyle and Marchetti (1992) reported that the most detailed survey of the fishes of the O'Shaughnessy-Early Intake stretch of the river was the USFWS survey in 1976. This survey indicated there were five distinct habitat reaches: (1) O'Shaughnessy Dam to Poopenaut Valley; (2) Poopenaut Valley; (3) the Tuolumne Gorge; (4) mouth of the gorge to Preston Falls; and (5) Preston Falls to Early Intake. In comparing these five reaches, the USFWS study found the following:

1. Non-native brown trout predominate in the uppermost reach (83 percent of the catchable size [175+ mm] trout in 1976) but become proportionally less abundant in a downstream direction. Rainbow trout predominate (55 percent of catchable-size trout) in the lowermost reach.
2. In 1976, trout densities were highest in the Gorge (925 catchable-size trout per mile), followed by the above falls reach (762 catchable trout per mile), the below falls reach (600), the dam reach (553), and the Poopenaut Valley (451). Moyle and Marchetti (1992) stated that presumably, this general situation still existed at the time of their report, although densities are likely to vary considerably from year to year due to natural factors.
3. Preston Falls serves as a natural barrier to the upstream distribution of native freshwater fishes, except trout. Other species found in the reach below the falls are Sacramento sucker, California roach, and riffle sculpin.

BLM (1980)

BLM (1980) inventoried all permanent streams within the public lands it administers during the summer and fall of 1979, and summer of 1980. The Tuolumne River drainage was one of many surveyed. Based on a review of field data sheets associated with the report, tributaries sampled included: (1) Poor Man's Gulch/Chinese Camp; (2) Six-Bit Gulch; (3) an unnamed intermittent tributary to Don Pedro Reservoir; and (4) Sullivan Creek. BLM (1980) reports that most of the creeks on public land in the Tuolumne River drainage fall in the California roach zone (warm intermittent to permanent streams in the 1,400- to 1,500-foot elevation). Roach and green sunfish made up 79 percent of fish species captured. Sacramento pikeminnow (referred to as squawfish in report) and Sacramento suckers made up to 11 percent and rainbow trout made up nine percent of the fish species captured. Other fish species collected included largemouth bass, mosquito fish, and blue gill.

Anecdotal Information

The source of anecdotal information is from UC Davis' Tuolumne River Ecogeomorphology Field Course field log (http://watershed.ucdavis.edu/tuolumne/flogs.aspx):

> *…What was surprising about this fish wasn't the species (smallmouth bass, a voracious invasive that has long been recorded in the North Fork) or the size (a mere six inches or so, a far cry from the monstrous pikeminnow roaming the Clavey)...*
>
> *…Pikeminnow are historically the dominant piscivore in the Lumsden reach of the Tuolumne… The next pool was, fortunately and amazingly, the antithesis of the first barren stretch. Where you had to work to find a fish in the first pool, you could not miss them in the second. Schools of large pikeminnow swarmed around us as we dove the sparkling waters, conjuring up Discovery Channel footage of salmon runs in Alaska. Though most of the fish were less than 18 inches, some true bruisers also lurked in the depths…*
>
> *…The North Fork is an angler's paradise, with aggressive rainbows holding in the bubble curtains, and fired up smallmouth bass in the pools…*
>
> *… The jaw dropper came on our first week of study on the North Fork Tuolumne confluence. The famous angler, Carson, caught a brook trout on mainstem Tuolumne. That may not sound exceptionally surprising; particularly if you are not an angler or a fish enthusiast, (two other trout species are present in the Tuolumne, why not a third?)…*

While this information is anecdotal, it is considered a generally reliable report on fish presence in the Tuolumne River upstream of the Project due to its affiliation with an accredited university, and the information is included in Table 5.3.2-1.

CDFG manages the Tuolumne River upstream of the Project for trout. In general, to manage trout CDFG employs one of three techniques that combine stocking and regulating fishing: (1) "Self-Sustaining Fishery", (2) "Put-and-Grow Fishery", and (3) "Put-and-Take Fishery" (CDFG and USFWS 2010).

The "Self-Sustaining Fishery" management technique is applied to most of the trout streams and many lakes in California. Self-sustaining trout populations consist of naturally spawning wild trout that do not need or require hatchery supplementation. Angler harvest in most of these waters is regulated by the general trout daily bag and possession limits. Self-sustaining fisheries generally require a viable aquatic ecosystem where trout reproduction, growth, and survival are adequate to perpetuate the population, and only habitat protection management strategies are required, in addition to angling regulations. The licensees are not aware of CDFG managing any of the trout fisheries in the Tuolumne River upstream of the Don Pedro Reservoir by this technique (CDFG and USFWS 2010).

The "Put-and-Grow Fishery" management technique is used in waters where reproduction capability is limited but habitat conditions support good growth and survival of juveniles and adults. Trout, usually smaller than catchable sizes, are planted in waters where they will grow to a larger size. Hatchery-produced fingerlings are used in put-and-grow managed waters (CDFG and USFWS 2010).

The “Put-and-Take Fishery” is used in waters that are easily accessible to the general public, where angling demand is high, and where habitat conditions are not suitable to support a satisfactory fishery. Catchable-sized trout are planted in selected waters, and at least half of the trout released are expected to be harvested (CDFG and USFWS 2010). Most trout fisheries in the Tuolumne River upstream of the Don Pedro Reservoir are managed by CDFG through a “Put-and-Take Fishery” technique, although a few trout fisheries and those for kokanee and Chinook salmon may be managed through the “Put-and-Grow Fishery” technique, given the incidence of fingerling releases in CDFG stocking records.

CDFG owns and operates the Moccasin Hatchery in the Tuolumne River upstream of the Project. Opened in 1954, the Moccasin Hatchery is one of the early hatcheries created from Wildlife Conservation Act funds (CDFG and USFWS 2010). Moccasin Hatchery is located at the intersection of Highways 120 and 49 at Moccasin, California 95347, just downstream of CCSF’s Moccasin Reservoir.

The Moccasin Creek Hatchery site was selected after lengthy investigations and search for a suitable fish hatchery site in the vast area between Lake Tahoe and Yosemite Valley. Tests to determine the suitability of the Moccasin Creek Hatchery site were undertaken in 1949, and negotiations with the city of San Francisco for use of the property were started about that time. The hatchery is located entirely on property belonging to the CCSF, and water is taken from the afterbay of the Moccasin Creek powerhouse, which is a part of the Hetch Hetchy water supply system. The property and permission to use the water are held on a long-term lease with CCSF (Leitritz 1969). The initial installation, completed in 1954, consisted of 24 ponds, an 88-trough hatchery building, garage and equipment shed, feed preparation and storage building, and six employees’ houses. Twelve ponds and two additional houses were added in 1956. By 2007, the hatchery had 48 rearing ponds and eight raceways. Approximately 360,000 pounds of harvested trout (400,000 pounds maximum) are processed annually. The maximum monthly use of fish food was 70,000 pounds and occurred during the month of April. Wastewater discharges include effluent from the hatchery building and production ponds that flows through the settling pond prior to discharge to Moccasin Creek, a tributary to Don Pedro Reservoir and the Tuolumne River. Additional wastewater is also discharged on occasion during the cleaning of the settling pond (SWRCB 2007).

CDFG characterizes the Moccasin Creek Hatchery as a production hatchery with minor brood stock operations (CDFG and USFWS 2010). CDFG defines a production hatchery as a facility that does not maintain and spawn brood stock as a significant part of its operation. Production hatcheries typically receive eggs from the brood stock hatcheries, maintain the eggs in enclosed buildings until the fish hatch, and then transfer the fry to raceways or ponds for the rearing process. The major management activities associated with the rearing stage are feeding and maintaining good fish health. The fish are raised to desired size based on the stocking strategy and then removed from the ponds and raceways for transfer to the stocking locations (CDFG and USFW 2010). On the other hand, a brood stock hatchery provides facilities to rear, maintain, and periodically harvest adult fish that provide eggs and milt for the production of hatchery trout. The brood stock for trout hatcheries come from multiple sources, including native fish collected from the wild, from fingerlings selected on the basis of parental characteristics, from production fingerlings, and occasionally from fish or eggs imported from out-of-state sources (CDFG and USFW 2010).

CDFG has published the annual average pounds and numbers of trout produced and stocked by the Moccasin Creek Hatchery facility during the period 2004-2008 (Table 5.3.2-3) (CDFG and USFWS 2010).

Table 5.3.2-3 Annual average pounds and numbers of trout produced and stocked by the Moccasin Hatchery during the period 2004 through 2008.

Activity	Planted		Transferred[1]		Received[2]		Production[3]	
	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number
Size by Species	***Fingerlings***							
Brook trout	107	25,413	38	6,000	0	0	145	33,413
Brown trout	784	37,630	12	12,596	48	13,872	748	36,354
Cutthroat trout	35	21,317	0	0	6	1,854	29	19,463
Eagle Lake trout	115	8,516	1,250	27,688	150	33,036	1,215	3,168
Rainbow trout	2,361	182,027	1,045	105,374	841	47,476	2,564	239,925
Total	3,401	274,903	2,345	151658	1,045	96,238	4,701	332,323
Size by Species	***Subcatchables/Advanced Fingerlings***							
Brook trout	339	3,597	0	0	0	0	339	3,597
Brown trout	4,495	51,446	3	39	0	0	4498	51,485
Cutthroat trout	75	750	59	881	0	0	134	1,631
Eagle Lake trout	494	6,913	0	0	0	0	494	6,913
Rainbow trout	4,501	38,100	1,175	10,975	54	499	5,622	48,576
Total	9,904	100,806	1,237	11,895	54	499	11,087	112,202
Size by Species	***Catchables/Yearlings***							
Brook trout	4,200	6,498	0	0	725	870	3,475	5,628
Brown trout	0	0	0	0	0	0	0	0
Cutthroat trout	30	181	0	0	0	0	30	181
Eagle Lake trout	62,559	106,247	1,881	7,622	244	63	64,196	113,807
Rainbow trout	266,709	495,925	13,113	24,709	838	1,675	278,984	518,958
Total	333,498	608,851	14,994	32,331	1,807	2,608	346,685	638,574

1 "Transferred" refers to fish hatched at the facility and transferred to other facilities at various sizes prior to stocking

2 "Received" refers to fish hatched at other facilities and transferred in for additional growth and eventual stocking.

3 The number of fish produced by the hatchery results from the formula: "Production" = "Planted" + "Transferred" - "Received"

Source: CDFG and USFWS (2010).

CDFG uses the trout production of the Moccasin Creek Hatchery as well as that of other facilities (e.g., San Joaquin Hatchery) to stock Don Pedro Reservoir as well as water bodies in the upper Tuolumne River. CDFG lists the California water bodies, by CDFG Region and county, scheduled to be stocked in 2009 and those not stocked by CDFG (CDFG and USFWS 2010). In 2009, besides Don Pedro Reservoir, CDFG scheduled to stock the following water bodies of the upper Tuolumne River, upstream of Don Pedro Reservoir: (1) Big Lake, (2) Black Bear Lake, (3) Lower Buck Lake, (4) Upper Buck Lake, (5) Camp Lake, (6) Cherry Valley Reservoir, (6) Clear Lake, (7) Gem Lake, (8) East Grizzly Peak Lake, (9) Grouse Lake, (10) Hyatt Lake, (11) Jewelry Lake, (12) Moccasin Creek, (13) Piute Lake, (14) Tuolumne River South Fork, (15) Tuolumne River Middle Fork, and (16) Yellowhammer Lake. On the other hand, CDFG did not stock Basin Creek, Sullivan Creek, and Tuolumne River North Fork (CDFG and USFWS 2010).

Amphibians

Five source documents (including anecdotal information) were reviewed, each of which is summarized below, regarding existing amphibians resources in the upper Tuolumne River. While there are no records or observations (CNDDB, California Academy of Sciences (CAS), USFWS species list, etc.) of the California red-legged frog (CRLF) in the upper Tuolumne River, the species recovery plan (USFWS 2002) has identified the Tuolumne River watershed in its Sierra Nevada Foothills and Central Valley Recovery Unit. Furthermore, within the general vicinity of the Tuolumne River, USFWS (2002) reports that many historical sites exist. For example, a collection from the Mather vicinity was taken in 1922, and again in 1945; however, no confirmed sightings have been observed or collected in the Tuolumne River drainage for several decades (USFWS 2002).

BLM (2009)

BLM (2009) reports that although the Red Hills has no perennial streams, this area has a number of intermittent streams that have spring fed reaches and pools, which the foothill yellow-legged frog (*Rana boylii*) utilizes. The foothill yellow-legged frog has been found in the western portion of the Red Hills in the Andrews Creek drainage. BLM has also reported foothill yellow-legged frog in a seasonal stream near Moccasin Peak (P. Cranston, pers. comm., 2010).

California Academy of Sciences (2010)

The CAS Herpetology Classification Database was reviewed for amphibians using California and Tuolumne River as search filters. The query produced three amphibian records for the upper Tuolumne River; specifically, the South Fork of the Tuolumne River. All three collections were of American bullfrogs (*Lithobates catesbeianus*) from 1992 (CAS Collection Nos. 185369, 185370, 185372). No special-status amphibian records are in the CAS Collection.

USFS (2006)

As mentioned above, the USFS (2006) prepared the Clavey River Watershed Existing Condition - Stream, Aquatic and Riparian Project Study Report. The CRLF was not detected during their surveys within suitable habitat. Streams that were surveyed within the elevation range of the species include the Clavey River at the Tuolumne River confluence. In 2006, 74 juvenile (recently metamorphosed) foothill yellow-legged frogs were encountered in the lower end of the Clavey River (RM 0 to 0.5), above the confluence with the Tuolumne River; adult and sub-adult yellow-legged frogs were not encountered in this reach.

CDFG and USFWS (2010)

CDFG and USFWS (2010) identified the Sierra newt (*Taricha sierrae*), western toad (*Anaxyrus boreas*), Sierran tree frog (*Pseudacris sierra*), and foothill yellow-legged frog in the vicinity of CDFG's Moccasin Creek Fish Hatchery. CDFG and USFWS (2010) define the hatchery vicinity to extend 0.25 miles upstream and three miles downstream of the hatchery.

Anecdotal Information

The source of anecdotal information is from UC Davis' Tuolumne River Ecogeomorphology Field Course field log (http://watershed.ucdavis.edu/tuolumne/flogs.aspx):

> *… In the Tuolumne River watershed, there is a co-evolutionary arms race occurring between the Sierra garter snake (*Thamnophis couchii*) and the Sierra newt (*Taricha sierrae*) and it has become apparent that the Sierra garter snake is winning…*
>
> *… If you are planning to go 'herping,' or searching for reptiles and amphibians, on the Tuolumne River, the following words of advice should be followed. Sierra newts can be found in abundance during their breeding season, January through May, in a small tributary that is located on the other side of the river from the frequently visited campsite Indian Creek…*
>
> *… I had never heard of the Foothill Yellow Legged Frog. I found it interesting that they are a species of concern. I was filled with excitement with the prospect of actually seeing one on the Tuolumne River. Finally, on the third trip Adam spotted one resting in the water. I have no idea how he spotted it because it was very well disguised in a small pool…*

While this information is anecdotal, it is considered to be a generally reliable report on amphibian resources in the Tuolumne River upstream of the Project due to its affiliation with an accredited university.

Aquatic Turtles and Reptiles

Four source documents and anecdotal information were reviewed, each of which is summarized below, regarding existing aquatic turtle (Class Chelonia) and reptile (Class Reptilia) resources in the Tuolumne River upstream of the Don Pedro Project.

BLM (2009)

BLM (2009) reports the presence of the western pond turtle (*Actinemys marmorata*) in the eastern portion of the Red Hills in Poor Man's Gulch. BLM has also reported western pond turtle in seasonal stream near Moccasin Peak and in First Creek (P. Cranston, pers. comm., 2010).

California Academy of Sciences (2010)

The CAS Herpetology Classification Database was reviewed for aquatic turtles and reptiles using California and Tuolumne River as search filters. The query produced two records for the upper Tuolumne River; specifically, the South Fork of the Tuolumne River. Both collections were of Sierra garter snake (*Thamnophis couchii*) from 1993 (CAS Collection Nos. 191843, 192810). No special-status aquatic reptile records are in the CAS Collection for the upper Tuolumne River.

USFS (2006)

As described above, the USFS (2006) prepared the Clavey River Watershed Existing Condition - Stream, Aquatic and Riparian Project Study Report. During 2005 and 2006, no western pond turtles were encountered in their study area; however, incidental conversations with whitewater guides indicated a very infrequent observation of pond turtles in the Tuolumne River in the vicinity of the Clavey River.

CDFG and USFWS (2010)

CDFG and USFWS (2010) identified the western pond turtle, common garter snake (*Thamnophis sirtalis*), mountain garter snake (*Thamnophis elegans elegans*), and the Sierra garter snake, in the vicinity of CDFG's Moccasin Creek Fish Hatchery.

Benthic Macroinvertebrates

Three source documents were reviewed related to existing benthic macroinvertebrates (BMI) in the upper Tuolumne River.

Holmquist and Schmidt-Gengenbach (2009)

Holmquist and Schmidt-Gengenbach (2009) reported that during 2007 and 2008, they collected baseline data on the BMI assemblage in the upper Tuolumne River in the Poopenaut Valley reach of the river (including Yosemite National Park Planning Segment 5 and part of Segment 6). The study characterized the Poopenaut Valley invertebrate assemblage and investigated the response of the assemblage to an experimental spring flood event (during spring of 2008). The study sampled macroinvertebrates in the riffles of the Poopenaut Valley reach at approximately six-week intervals for one year. This sampling produced baseline data on assemblage structure, trophic groups, the level of "tolerance" exhibited by the fauna to altered conditions (a population dominated by intolerant species generally indicates healthy stream conditions), the physical environment, and overall habitat quality.

A total of 69 invertebrate taxa were collected, representing 25 families and eight orders. Ephemeroptera were found in every sample, and this order was dominated by Baetidae, Ephemerellidae, and Leptophlebiidae. Plecoptera were lower in abundance but were still found in every sample. Trichoptera were similar to Plecoptera in abundance, and the most common caddisfly families were Hydropsychidae, Hydroptilidae, and Philopotamidae. Coleoptera were relatively uncommon, and Elmidae and Hydrophilidae were the only families collected. Diptera was the most abundant order, and in turn Chironomidae and Simuliidae were the most common dipterans.

BLM (1980)

As described above, BLM (1980) inventoried several tributaries to the Tuolumne River (upstream of the Project area) during 1979 and 1980. For several creeks (Six-Bit Gulch, Sullivan, and Hatch creek), BLM not only collected fisheries data, but macroinvertebrate information as well (Table 5.3.2-4).

Table 5.3.2-4 Macroinvertebrates sampled during the summer and fall of 1979 in Six-Bit Gulch, Sullivan Creek, and Hatch Creek.

Six-Bit Gulch		Sullivan Creek		Hatch Creek	
Name	**Percent of Total**	**Name**	**Percent of Total**	**Name**	**Percent of Total**
Psephenidae	9.1	Ephemeroptera	36.6	Tricoptera	42.7
Limnephilidae	1.6	Tricoptera	14.9	Psephenidae	31.2
Elmidae	0.8	Simuliidae	43.6	Anisoptera	1.3
Helicopsychidae	80.7	Oligochaeta	2.0	Zygoptera	2.6
Leptophlebiidae	5.1	Chironomidae	2.0	Ephemeroptera	11.1
Chironomidae	0.4	Diptera	1.0	Naucoridae	0.1
Hydropsychidae	0.4			Stratiomyidae	6.7
Zygoptera	0.4			Chironomidae	1.3
Dytiscidae	0.8			Simuliidae	0.5
Dryopidae	0.8			Elmidae	1.2
				Lepidoptera	0.5
				Veliidae	0.1

Fields (1984)

Fields (1984) provides a short discussion of the nature of the benthic fauna of the Tuolumne River. The study sampled several sites in the mainstem and several tributaries to the Tuolumne River. A total of 196 species were collected during the short collection, representing seven orders of insects and 11 of non-insect, including but not limited to Ephemeroptera, Odanata, Megaloptera, Diptera, and Hydroida.

In summary, Fields (1984) found that the mainstem of the Tuolumne River below Early Intake Reservoir and Cherry Creek supported a modest bottom fauna, review of the 196 species collected revealed that a core group of species were present at all of the stream sites sampled. Intolerant species were abundant in the tributaries and above Early Intake. Species richness varied from high to extremely high at these sites.

Mussels and Aquatic Snails

Two source documents (including anecdotal information) were reviewed related to existing mussel and snail populations in the upper Tuolumne River.

Holmquist and Schmidt-Gengenbach (2009)

As summarized above, Holmquist and Schmidt-Gengenbach (2009) reported that during 2007 and 2008, they collected baseline data on the BMI assemblage in the upper Tuolumne River in the Poopenaut Valley reach of the river. In addition to the baseline data on the BMI assemblage, they reported that no New Zealand mudsnails (*Potamopyrgus antipodarum*), or any other gastropods, were collected. Their report concluded that it was likely that Yosemite National Park was free of these exotics at the time of the report.

Anecdotal Information

Anecdotally, Shaul (2007) reports that five species of native mussels occur in California, none of which are considered special-status. These are California floater (*Anodonta californiensis*), Oregon floater (*Anodonta oregonensis*), western ridged mussel (*Gonidea angulata*), western pearlshell (*Margaritifera falcata*), and fingernail clam (*Pisidium ultramontanum*). CDFG's California Natural Diversity Database (CNDDB) (2010b) does not identify any mussels in the Project area or upstream of the Project.

River Restoration Projects and Ongoing Aquatic Studies

NMFS (2009) reports that the upper Tuolumne River is characterized as having a moderate potential to support a spawning population of spring-run salmon and steelhead. Furthermore, NMFS reports that habitat quality above the Don Pedro Reservoir historically was good and supported a population of spring-run Chinook salmon.

5.3.2.2 Project Area

Fish Resources

CDFG (2010b) reports that Don Pedro Reservoir contains bass, catfish, panfish, hatchery salmon, and hatchery trout. In addition to CDFG (2010b), three additional source documents were reviewed (including anecdotal information) related to fisheries resources of Don Pedro Reservoir.

SJRRP (1999)

SJRRP (1999) indicates that the following principal fish species occupy Don Pedro Reservoir: (1) trout; (2) catfish; (3) bluegill; (4) crappie; (5) sunfishes; (6) silver salmon; and (7) black bass.

Sportfishing Data

In California, CDFG regulates fishing contests through permits. Fishing contests permits are categorized in two types: event and annual. An 'Event' type permit is required for contests in which more than 50 anglers will participate or the sponsor is offering $1,000 or more in prizes or other inducements (Murphy 2010). An 'Event' contest usually has a limited duration (e.g., for black bass may not exceed three days duration) and no more than one 'Event' type contest may be held on any water on the same day with the exception of the Sacramento - San Joaquin Delta (Delta). On the other hand, an ''Annual'' type permit is required for contests with 50 or fewer participants and the sponsor is offering less than $1,000 in prizes or other inducements. Up to 12 individual contests may appear on each ''Annual'' type permit, and there is no limit to the number of ''Annual'' type permits that can be issued for each date and/or water (Murphy 2010). As an example, all 37 fishing contest permits (both pending and approved) for Don Pedro Reservoir from August 2010 through July 2011 were issued for black bass, and consisted of 16 annual and 21 event permits for a total of 41 contest days with the following monthly distribution: three days in August, six days in September, four days in October, one day in November, two days in December, one day in January, three days in February, nine days in March, three days in April, three days in May, five days in June, and one day in July (Table 5.3.2-5). The sponsors of approved contests need to fill in and submit to CDFG contest report forms at the end of the fishing contests. CDFG collects and processes the information on

Table 5.3.2-5 List of fishing contest permits (both pending and approved) for Don Pedro Reservoir from August 2010 through July 2011.

Contest Dates		Number of Days	Fishing Contest Target Species	Status	Sponsor Name	Permit Type
Start	End					
08/07/10	08/07/10	1	Black Bass	Approved	Point Seekers Bass Club	Annual
08/13/10	08/13/10	1	Black Bass	Approved	Do Poe Men	Annual
08/27/10	08/27/10	1	Black Bass	Approved	Do Poe Men	Annual
09/03/10	09/03/10	1	Black Bass	Approved	Do Poe Men	Annual
09/11/10	09/11/10	1	Black Bass	Approved	Mid Valley Bass Club	Annual
09/11/10	09/11/10	1	Black Bass	Approved	Gilroy Bass masters	Annual
09/17/10	09/17/10	1	Black Bass	Approved	Do Poe Men	Annual
09/24/10	09/24/10	1	Black Bass	Approved	Do Poe Men	Annual
09/25/10	09/25/10	1	Black Bass	Approved	Badge Packers	Event
10/09/10	10/09/10	1	Black Bass	Approved	Contra Costa Bass Club	Annual
10/09/10	10/09/10	1	Black Bass	Approved	Oro Madre Bass Anglers	Annual
10/10/10	10/10/10	1	Black Bass	Approved	Jigs Bait and Tackle	Event
10/16/10	10/16/10	1	Black Bass	Approved	Christian Bass League	Annual
11/13/10	11/13/10	1	Black Bass	Approved	Anglers choice	Event
12/05/10	12/05/10	1	Black Bass	Approved	River Bank Bass Anglers	Annual
12/11/10	12/11/10	1	Black Bass	Approved	Western Outdoor News	Event
01/22/11	01/22/11	1	Black Bass	Approved	Western Outdoor News	Event
02/05/11	02/05/11	1	Black Bass	Approved	American Bass Association	Event
02/05/11	02/05/11	1	Black Bass	Pending	Sonora Bass Anglers	Annual
02/12/11	02/12/11	1	Black Bass	Approved	Northern California Bass Federation	Event
03/06/11	03/06/11	1	Black Bass	Approved	Fresno Bass Club	Event
03/12/11	03/12/11	1	Black Bass	Approved	Western Outdoor News	Event
03/13/11	03/13/11	1	Black Bass	Approved	Fresno Bass Club	Event
03/19/11	03/19/11	1	Black Bass	Approved	Western Outdoor News	Event
03/19/11	03/20/11	2	Black Bass	Approved	Kerman Bass Club	Annual
03/20/11	03/20/11	1	Black Bass	Approved	California Bass Federation	Event
03/26/11	03/27/11	2	Black Bass	Approved	Sierra Bass Club	Event
04/09/11	04/09/11	1	Black Bass	Approved	Anglers Choice	Event
04/16/11	04/16/11	1	Black Bass	Approved	Anglers Choice	Event
04/23/11	04/23/11	1	Black Bass	Approved	Future Pro Tour	Event
05/14/11	05/14/11	1	Black Bass	Approved	Northern California Bass Federation	Event
05/21/11	05/21/11	1	Black Bass	Approved	American Bass Association	Event
05/21/11	05/21/11	1	Black Bass	Approved	Kerman Bass Club	Annual
06/11/11	06/12/11	2	Black Bass	Approved	Modesto Ambassadors	Event
06/11/11	06/11/11	1	Black Bass	Pending	Sonora Bass Anglers	Annual
06/25/11	06/26/11	2	Black Bass	Approved	Anglers Choice	Event
07/09/11	07/09/11	1	Black Bass	Approved	Western Outdoor News	Event

Source: CDFG Fishing Contests Website http://nrm.dfg.ca.gov/FishingContests/default.aspx.

the submitted forms. For black bass contests, CDFG compiles the gathered information and publishes as annual Summary Reports of Black Bass Fishing Contests held in California (Murphy 2010 and 2009). These reports summarizes the annual information by California water body in terms of total contest days, total fish counted and weighted, total number of fish reported dead, total number of contest competitors, total contest hours, total fishing hours or effort, annual catch per hour (i.e., total fish counted/total fishing hours) and mean weight per fish. Table 5.3.2-6 summarizes this information for Don Pedro Reservoir for the years 1985 through 2009.

Table 5.3.2-6 Annual black bass fishing contest results for the Don Pedro Reservoir.

Year	Contest Days[1]	Total Fish Count[2]	Total Fish Weight[2]	Total Reported Dead Fish	Number Of Competitors	Total Contest Hours	Total Hours Effort	Total Catch Per Hour[2]	Mean Weight Per Fish[2]
2009	73	3,798	7,409.4	43	1,937	556.50	17,380.00	0.22	1.95
2008	82	6,006	12,180.1	35	2,447	584.50	21,571.50	0.28	2.03
2007	54	5,463	12,694.5	67	1,796	395.20	17,357.00	0.31	2.32
2006	74	6,153	14,264.0	135	2,400	543.80	21,335.00	0.29	2.32
2005	73	5,266	10,913.6	62	2,283	570.50	21,781.00	0.24	2.07
2004	77	5,676	12,016.0	90	2,482	584.50	24,007.00	0.24	2.12
2003	82	5,430	10,513.8	70	2,607	613.50	23,830.00	0.23	1.94
2002	77	5,694	10,482.8	67	2,535	582.50	24,620.00	0.22	1.91
2001	89	6,572	14,296.4	112	3,012	640.50	27,883.00	0.24	2.18
2000	70	7,312	13,674.0	121	3,112	542.50	31,080.50	0.24	1.87
1999	24	2,194	3,976.0	10	1,262	195.00	11,269.00	0.20	1.80
1998	55	5,777	10,745.0	71	2,377	432.50	22,753.00	0.25	1.86
1997	82	10,036	19,120.0	149	3,459	654.50	33,872.00	0.30	1.91
1996	63	6,461	12,582.0	86	2,260	512.00	23,299.50	0.28	1.95
1995	69	6,084	10,364.0	72	2,841	542.50	27,731.50	0.22	1.70
1994	64	5,777	10,364.0	97	1,978	479.00	17,911.50	0.32	1.79
1993	60	4,280	7,147.0	54	1,964	491.00	19,542.00	0.22	1.67
1992	76	4,996	8,096.0	105	2,460	602.00	23,354.50	0.21	1.62
1991	82	4,515	6,682.0	62	3,297	620.50	30,559.00	0.15	1.52
1990	71	5,944	9,421.0	152	3,261	569.00	28,811.00	0.21	1.58
1989	26	4,408	6,584.0	114	2,205	198.00	19,796.00	0.22	1.49
1988	28	3,614	5,230.0	78	1,993	234.00	19,452.50	0.19	1.45
1987	11	2,892	4,648.0	91	1,280	107.00	12,141.00	0.24	1.61
1986	11	1,305	1,704.0	35	1,027	105.00	11,895.00	0.11	1.31
1985	3	631	801.0	18	338	27.00	3,042.00	0.21	1.27

1 Data represents results for permitted contests with complete contest reports only.

2 Tournament organizers seldom distinguished between species, so the Total Fish Count, Total Fish Weight, Total Catch per Hour and Mean Weight per Fish are for largemouth, smallmouth, and spotted bass combined.

Source: CDFG Summary Reports of Black Bass Fishing Contests held in California.

Anecdotal Information

A large volume of anecdotal information on the Don Pedro Reservoir fishery can be found from fishing guides. The best fishing season and sites, detailed biological descriptions of main species caught in Don Pedro Reservoir, general fisheries status, record fish species, and coming angling tournaments are all found on sport fishing websites (e.g., http://www.fishsniffer.com/maps/donpedro.html and http://www.motherlodelakes.com/LakeDonPedro.html).

Anecdotal information suggests that Don Pedro Reservoir features one of the most diverse arrays of fishes found in any California lake. Additionally, these sites identify the fishing season for rainbow and brook trout as spring, fall and winter, while that for kokanee salmon as extending from late April through August. Fishing for channel catfish, black crappie and bluegill picks up in the spring and summer months. Black bass are another mainstay of the Don Pedro fishery. Largemouth bass predominate in the fishery, but smallmouth bass can also be productive at times. The fishing season usually peaks in spring (March, April, and May) when the surface waters begin to warm up.

While this information is anecdotal, it is generally a reliable report on the presence of game fishes in the Don Pedro Reservoir and has been included in Table 5.3.2-1.

Fishery Management

Most trout fisheries in Don Pedro Reservoir are managed by CDFG through a “Put-and-Take Fishery” technique, although a few trout fisheries and those for kokanee and Chinook salmon may be managed through the “Put-and-Grow Fishery” technique, given the incidence of fingerling releases in CDFG stocking records.

CDFG has characterized the resident trout and inland salmon fisheries of Don Pedro Reservoir as totally dependent on hatchery fish (Table 5.3.2-2). CDFG has planted fish in Don Pedro Reservoir that originated primarily from the Moccasin Creek Hatchery and the San Joaquin Hatchery, including brook trout (since at least 1959), rainbow trout (since at least 1964), Eagle Lake trout (since at least 1976), brown trout (since at least 1979), kokanee salmon (since at least 1953), coho salmon (since at least 1972) and Chinook salmon (since at least 1982) (see Tables 1 through 8 and Figures 1 and 2 in Attachment 5.3.2-1).

The trout and salmon fisheries of Don Pedro Reservoir have apparently recovered from the copepod infestation that affected them during the early 1990s. CDFG stocked only brook and brown trout during the infestation years, since these fish are not susceptible to these parasites like rainbow trout and Chinook salmon are. Rainbow plants resumed in 1997, resulting in a rebound in the trout fishery (article “Trout Trolling at Don Pedro, a Lake of Contrasts”, by Dan Bacher on September 13, 1999 at http://www.fishsniffer.com/ maps/donpedro.html).

Black bass are also planted in Don Pedro Reservoir by the DPRA (Table 5.3.2-7).

Amphibians, Aquatic Turtles, and Reptiles

A list of amphibians, aquatic turtles, and reptiles likely to occur in the Project area is provided in Table 5.3.2.8. Regarding amphibians in the area of the Project, deep, permanent lakes like Don Pedro Reservoir with large fish populations generally do not support native amphibians. However, several amphibians potentially occur in the general Project area.

Table 5.3.2-7 Annual summary of the Florida strain black bass stocked by the DPRA in Don Pedro Reservoir from 1993 through 2009.

Year	Number of Fish	Fish Size	Cost
1993	15,000	Fingerling	$5,000
1994	2,222	4″ Minimum	$5,000
1995	2,711	4″ Minimum	$6,100
1996	2,222	4″ Minimum	$5,000
1997	2,222	4″ Minimum	$5,000
1998	2,222	3.5-4″ Minimum	$5,000
1999	1,458 224	3.5″ Minimum 5-6.5″	$3,712 $1,288
2000	1,959 21	3.5-5″ Minimum 5.5-7.5v	$5,000
2001	2,758	3-4″	$5,000
2002	219 1,500	5-7″ 3-4″	$5,000
2003	135 1,690	5-7″ 3″ Minimum	$5,000
2004	3,621	2.5-3″ Minimum	$5,000
2005	2,000	3″ Minimum	$5,000
2006	182 75 805	6.5-8.5″ 4-5″ 3-3.5″	$5,000
2007	1,667	2.5-3″ Minimum	$5,000
2008	1,680	2-3″ Minimum	$5,000
2009	1,133 172 62	3″ Minimum 5-6″ 4-14″	$5,000

Table 5.3.2-8 Amphibians, aquatic turtles, and reptiles that may occur in the Project area.

Species/Status[1]	General Ecology and Distribution
Amphibians (Class Amphibia)	
California tiger salamander[FT, CT] *Ambystoma californiense*	Breeds in seasonal ponds (or permanent ponds where fish are absent, and occasionally in intermittent streams). Adults are terrestrial (fossorial) in grasslands, savanna, and open, oak woodlands of Central Valley and foothills. See Section 5.5.2.
Sierra newt *Taricha sierra*	Breeds in ponds, lakes, reservoirs, and streams mostly at low to middle elevations in forest and woodland areas. Widespread and common species.
Ensatina *Ensatina eschscholtzii*	Completely terrestrial and associated with forest and woodland areas. Widespread and common species.
Arboreal salamander *Aneides lugubris*	Completely terrestrial. Sierra Nevada foothill populations occur in black oak and yellow pine forests and are geographically isolated from coastal oak woodland populations.
Hell Hollow slender salamander *Batrachoseps diabolicus*	Completely terrestrial. Occurs in mixed pine-oak woodlands and chaparral in the foothills of the Sierra Nevada from the North Fork of the American River south to the Merced River at elevations below 2,030 feet.
Sierran treefrog (chorus frog) *Pseudacris sierra*[2]	Breeds in ponds, lake and reservoir edges, ditches, and slow-moving or still sections of streams. Widespread and common species over a wide range of elevations.
Western toad *Anaxyrus boreas*[3]	Breeds in ponds, lake and reservoir edges, and slow-moving or still sections of streams. Widespread species, across a wide range of elevations, but uncommon in some parts of historical range.

Species/Status[1]	General Ecology and Distribution
California red-legged frog[FT, CT] *Rana draytonii*[4]	Generally aquatic except during dispersal and aestivation. Breeds in slow-moving or still sections of streams and ponds, usually where there is emergent and aquatic vegetation. Nearly extirpated in the Sierra Nevada. Formerly occurred on at least 30 drainages in the foothills (mostly below 3,500-foot elevation). See Section 5.5.2.
Foothill yellow-legged frog[CSC] *Rana boylii*	Aquatic in all life stages on small to large streams and rivers with pools and low-gradient riffles (small streams are probably non-breeding habitat). Most known occurrences are between 600- to 5,000-foot elevation. See Section 5.3.3.2.
American bullfrog *Lithobates catesbeianus*[5]	Aquatic except during dispersal. Introduced and well established in slow-moving streams, stock ponds, lakes, and reservoirs. The presence of bullfrogs may be associated with declines of other native frogs.
Turtles (Class Chelonia)	
Western pond turtle *Actinemys* [*Emys*] *marmorata*[6, CSC]	Occurs in a wide variety of aquatic habitats across a broad range of elevations, particularly permanent ponds, lakes, side channels, backwaters, and pools of streams, but is uncommon in high-gradient streams. Often overwinters in forested habitats and oviposits in summer at upland sites as much as 1,200 feet from aquatic habitats. See Section 5.3.3.2.
Aquatic Reptiles (Class Reptilia)	
Sierra garter snake *Thamnophis couchii*	Highly-aquatic snake occurring in the Sierra Nevada at elevations of 300 to 8,000 feet.
Western terrestrial garter snake *Thamnophis elegans*	Occurs throughout the Sierra Nevada up to 13,100-foot elevation. Often forages in or near aquatic habitats.
Common garter snake *Thamnophis sirtalis*	Widespread throughout northern California, occurs east and west of the high Sierras and south to San Joaquin Valley. Often forages in or near aquatic habitats.

1 Status: FT = federal threatened, FC = federal candidate, CT = California threatened, CSC = CDFG California species of special concern, BLM-S = BLM sensitive species.

2 Previously classified as *Hyla regilla* (Pacific treefrog) (see Recuero et al. 2006a, 2006b). Retention of the common name "treefrog" reflects longstanding, popular usage.

3 Previously classified as *Bufo boreas* (see Frost et al. 2006).

4 Previously classified as *Rana aurora draytonii* (see Frost et al. 2006).

5 Previously classified as *Rana catesbeiana* (see Frost et al. 2006).

6 Previously classified as *Clemmys marmorata* or *Emys marmorata*.

Based on distributional range developed by Jennings and Hayes (1994) and Jennings (1996), it is likely that Sierran treefrog can be found throughout the Project area. CDFG and USFWS (2010) noted that the species is present in the vicinity of the Moccasin Creek Hatchery. The range of the Sierran treefrog occurs throughout California, including the high mountains from sea level to elevations near 11,600 feet; it is absent from most of the southeast deserts. It inhabits a wide variety of habitats often far from water, including forest, woodland, chaparral, grassland, pastures, desert streams and oases, and even urban areas. Despite the name, the Sierran treefrog is primarily a ground-dweller, living among shrubs and grass close to water. Its large toe pads allow it to climb easily, and cling to twigs or grass.

The Sierran treefrog (family Hylidae) is a small frog (0.8 to 2.0 inches) with large head and eyes, a slim waist, long, slender legs, and round pads on the toe tips. A dark distinctive stripe runs through the middle of the eye, extending from the nostrils to the shoulders. Its skin is smooth and moist and coloration is highly variable ranging from green, tan, brown, gray, reddish, and cream; it is most often observed as green or brown. To camouflage itself, its color can quickly change from dark to light.

The Sierran treefrog can be active both day and night. Breeding may begin in November and continue though July, depending on elevation. Locations include a variety of habitats including slow streams, permanent and seasonal ponds, reservoirs, ditches, lakes, marshes, shallow vegetated wetlands, and wet meadows. Females lay small, loose, irregular clusters of 10 to 70 eggs, and attach them to sticks, stems, or grass in quiet shallow water. Eggs hatch in two to three weeks. Tadpoles are brown and up to 1.9 inches long. Tadpoles metamorphose between June and late August; in the summer, large congregations of newly metamorphosed juvenile frogs may be seen along the banks of breeding pools.

Western toad is also likely present in the Project area. Widely distributed in California, the western toad is present everywhere except the deserts and highest mountains. Elevations of occurrence extend from sea level to 10,000 feet (CDFG 2008 - California Wildlife Habitat Relationship [CWHR] System). It is uncommon in the high Sierra and in densely forested areas. This species ranges into various upland habitats around ponds, lakes, reservoirs, and slow-moving rivers and streams; sometimes they move up to a few kilometers through uplands. For shelter, they dig their own burrow in loose soil or use those of small mammals or seclude themselves under logs or rocks (NatureServe© 2009). Although the western toads range can be scarce or common, depending on habitat quality, rapid losses and declines have occurred in many populations across the range for unknown reasons, even in relatively pristine environments (NatureServe© 2009). CDFG and USFWS (2010) noted that the western toad is present in the vicinity of the Moccasin Creek Hatchery.

Breeding and egg-laying normally occur in quiet waters less than 12 inches deep. Almost any source of standing water can be used for reproduction, including lakes, ponds, vernal pools, roadside ditches, irrigation canals, permanent and intermittent streams, and rivers. The presence of predatory fishes may reduce tadpole survival (CDFG 2008 - CWHR System).

In California, the breeding season extends from January to July depending on local conditions (NatureServe© 2009). For example, the breeding season may begin in January at low elevations, but not until late spring or summer, as the winter snowpack begins to melt, in the high mountains (NatureServe© 2009). Breeding at any specific locality is usually synchronous. Females lay up to 16,500 eggs in large stringy masses. They are deposited in double rows and become entangled with each other, submerged vegetation and bottom debris as the female moves about while laying. Tadpoles metamorphose during the summer or fall, when they may emerge and disperse from the breeding sites by the hundreds or thousands.

American bullfrog is also likely to be found throughout the Project area, based on distributional range developed by Jennings and Hayes (1994) and Jennings (1996. Bullfrogs are native to North America east of the Rocky Mountains, but have been widely introduced in California. Their introduction in California began in 1896 after over-harvesting of the native frog populations (particularly of the red-legged frog, *Rana aurora/Rana draytonii*) opened up a niche in the market as an alternate food item for the growing human population. Declines of native ranid frog populations have coincided with the introduction and massive range expansion of bullfrogs. Bullfrogs have been implicated in out-competing native frogs for space and food and often prey upon native fish and amphibian species thus rapidly decreasing populations.

The bullfrog is the largest North American true frog (family Ranidae) and is distinguished from California native frogs by the lack of a dorsolateral fold and large tympanums. This species is also typically much larger than California native frogs and may range from 4.3 to 7.2 inches snout to vent length.

Bullfrogs are highly aquatic but their activities are largely independent of rainfall. They can be found in prairie, woodland, chaparral, forests, desert oases, and farmland. They prefer quiet waters such as marshes, ponds, lakes, reservoirs, and streams with low velocities and dense aquatic vegetation for cover. Breeding occurs February through May and a single female may lay two clutches per year in some localities. Egg masses are laid in sheets of up to 20,000 eggs. Tadpoles can overwinter for up to three years and become sexually mature one to two years after metamorphosis.

Sierra newt may be present in the Project area. The Sierra newt, a medium-sized salamander, is one of two species of newts present in the Sierra Nevada of California, the other being *Taricha granulosa*, the northern rough-skinned newt. The Sierra newt ranges along the western slopes of the Sierra Nevada between the Sacramento and San Joaquin river drainages and around Tulare Lake (Jennings 1996). Adult Sierra newts inhabit a variety of usually terrestrial habitats, becoming aquatic when breeding. During the summer, the Sierra newt prefers moist habitats under woody debris or in animal burrows (AmphibiaWeb 2010).

Adults generally breed in relatively swift-flowing streams, but will sometimes use still water, including farm ponds, lakes, or ditches (AmphibiaWeb 2010). Adult Sierra newts migrate to breeding streams in January and February; and breeding activity occurs from early March through early May and is dependent on elevation, local site conditions, and seasonal rainfall (AmphibiaWeb 2010). While they sometimes breed in temporary pools and other bodies of water with minimal current, they can also breed in faster-flowing streams (AmphibiaWeb 2010). They have a diet consisting mostly of worms, snails, eggs, larvae, insects, sowbugs, slugs, and other invertebrates, but may opportunistically take other prey, such as larval newts. The Sierra newt is stable in its current home range, perhaps because it is more able to adapt to fluctuating conditions in streams than other aquatic salamanders (Jennings 1996). The Sierra newt is currently not threatened, due partly to its stream-breeding ability which offers larvae a monopoly on resources. Although this species is fairly stable in its current home range, there is a possible threat to aquatic newt larvae from introduced fishes such as stocked trout (AmphibiaWeb 2010). Introduced bullfrogs have also been observed to eat juvenile and adult newts (Jennings 1996).

A number of reptiles and aquatic turtles may be found in the Project area. The Sierra garter snake is a wide-ranging species and has been documented upstream of the Project area and surrounding vicinity (CAS 2010). The Sierra garter snake is known to occur at elevations from 600 to 6,000 feet. In California, they can be found from the northern Sierra Nevada to the southern end of the Cascade Mountains in the Pit River drainage. Habitats of this highly aquatic snake include pools of permanent or seasonal streams (often rocky), meadow ponds, lakes, reservoirs, and associated riparian zones (e.g., cottonwood, willow, sycamore, alder), in areas with oak woodland, grassy valleys, chaparral, montane coniferous forest, or (east of the Sierra crest) pine-juniper-sagebrush (NatureServe© 2009). This species is not known to be threatened, but may be negatively impacted by competition with introduced bullfrogs and non-native fish in some areas (CaliforniaHerps Website 2010).

Adult Sierra garter snakes (family Colubridae) range from 18 inches to slightly over 36 inches in length. Sierra garter snakes can be found in rocky permanent streams, sluggish streams, ponds, and small lakes. Along permanent streams and rivers they will be found in areas with exposed boulders and heavy riparian vegetation. They bask on boulders along banks and in mid-stream and seek cover in water under rocks or among exposed tree roots. Sierra garter snakes are primarily diurnal. Females are live-bearers and can produce between five and 38 young at a time. Young snakes are born from July through September depending on elevation.

The common garter snake is a wide-ranging and locally very abundant species, absent only from Alpine Country southward (east of the Sierra crest), the southern desert regions, and coastally from northern San Diego County, south to the Mexican border (CDFG 2008 - CWHR System). Garter snakes are found in a wide variety of natural habitats, from sea level to high elevations, including forests, grasslands, shrubland and chaparral, marshes, all types of ponds, lakes, streams and rivers, and even in rocky creeks in the desert. They are commonly found in grassy areas near water, laying on top of vegetation or along the banks of ponds, or in the still edges of streams. They may also be found in open areas or in woods away from water. This species is associated with permanent or semi-permanent bodies of water in a variety of habitats; however, they are typically found foraging on land or in quiet pools, generally avoiding swift water (CDFG 2008 - CWHR System). They are known to forage food treefrogs, fish, mice, leeches, earthworms, and toads. CDFG and USFWS (2010) noted the common garter snake in the vicinity of the Moccasin Creek Hatchery.

5.3.2.3 Lower Tuolumne River

Fish Resources

The lower Tuolumne River extends approximately 52 miles from La Grange Dam (RM 52.2) downstream to the confluence with the San Joaquin River (RM 0). The lower Tuolumne River contains fish communities similar to those found throughout the San Joaquin Basin, and supports the largest naturally reproducing population of Chinook salmon in any San Joaquin River tributary.

The lower Tuolumne River can be divided into two distinct geomorphic zones broadly defined by the channel slope and bed material. The upper reach (RM 24 to 52) is gravel-bedded with moderate slope (0.10 to 0.15 percent), while the lower reach (RM 0 to 24) is sand-bedded with a slope generally <0.03 percent (McBain & Trush 2000). Both reaches have undergone significant alteration since the mid-1800s as a result of dredger mining for gold, commercial gravel (aggregate) mining, streamflow regulation and diversion, and other uses. The first major dam on the Tuolumne River, Wheaton Dam, was constructed in 1871. Large-scale regulation of the lower Tuolumne River began in 1893 with the construction of La Grange Dam. Gold dredging occurred downstream of La Grange Dam during the first half of the 20th Century. By the end of the gold mining era, 12.5 miles of river channel and floodplain (from RM 50.5 to 38) had been dredged and converted to tailings piles, and much of the gravel-bedded zone of the river had been converted to long, deep dredger pools. Large-scale aggregate mining in the river began in the 1930s and continues today. Historically, aggregate mines excavated sand and gravel directly from the river channel, creating large, in-channel pits now referred to as “special run-pools” (SRPs). These SRPs are as much as 400 feet wide and 35 feet deep and occupy 32 percent of the channel length in the gravel-bedded zone. These uses have individually and cumulatively impacted the aquatic resources of the lower Tuolumne River.

There have been numerous fish studies undertaken in the lower Tuolumne River, primarily designed to provide information to aid the Chinook salmon populations. Data on fish captured and observed in the lower Tuolumne River have been collected since 1973 in conjunction with a variety of studies using methods that included fyke net, electrofishing, seine, snorkel, and rotary screw traps (Table 5.3.2-9). A comprehensive summary of these studies can be found in the 2009 Annual Summary Report (TID and MID 2009).

Table 5.3.2-9 Lower Tuolumne River fish study methods and years of operation.

Study Method	Years of Operation
Fyke Net	1973, 1974, 1977, 1980-1983, 1986
Electrofishing	1988-1994
Seine	1988-Present
Snorkel	1988-Present
Rotary Screw Trap	1995-Present

A total of 34 fish species have been reported in the lower Tuolumne River, with 12 species native to California and 22 non-native (introduced) species (Table 5.3.2-10).

Resident Fish

Most of the native resident fish species are riffle spawners and are generally more abundant in the gravel-bedded upper reach. Chinook salmon also spawn in the gravel-bedded reach (see Chinook salmon section, below). Based on data from electrofishing, seine, and snorkel surveys, the Sacramento sucker is the most abundant and widespread native fish species found in the lower Tuolumne River. Non-native fishes are present throughout the lower Tuolumne River, but are typically most abundant in the sand-bedded reach and the lower six to seven miles of the gravel-bedded reach where water temperatures are warmer and the large, low-velocity SRPs created by in-channel mining provide optimal habitat conditions (Ford and Brown 2001). Electrofishing, seine, and snorkel survey data indicate that sunfish species (e.g., bluegill, redear sunfish, green sunfish) are typically the most abundant and widespread non-native fish species in the lower Tuolumne River. The distribution of both native and non-native fishes is influenced by water temperature and velocity and varies seasonally and in response to the previous year's flow regime (Ford and Brown 2002). The non-native fish community in the lower Tuolumne River includes largemouth and smallmouth bass, which are important and abundant predators on juvenile Chinook salmon (TID and MID 1992, Appendix 22; TID and MID 2007, Report 2006-8).

Predation studies in the lower Tuolumne River have identified 12 fish species that could potentially prey on fry and juvenile Chinook salmon, but largemouth and smallmouth bass were found to be the primary predators (TID and MID 1992, Appendices 22 and 23). Predatory bass were found to be concentrated in the large in-channel mining pits (SRPs). Focused studies on piscivorous fish species were conducted to evaluate the potential impact of predation on juvenile Chinook salmon in the lower Tuolumne River. Studies were conducted to identify the predator species and their abundance, predation efficiency, and prey consumption rate (TID and MID

Table 5.3.2-10 Fishes documented in the lower Tuolumne River.

Family/ Common Name	Scientific Name	Native (N) Or Introduced (I)	Resident (R) Or Migratory (M)
Lampreys (petromyzontidae)			
Pacific lamprey	*Lampetra tridentate*	N	M
Shad and Herring (clupeidae)			
Threadfin shad	*Dorosoma petenense*	I	R
Salmon and Trout (salmonidae)			
Chinook salmon	*Oncorhynchus tshawytscha*	N	M
Rainbow trout/steelhead	*Oncorhynchus mykiss*	N	R/M
Minnows (cyprinidae)			
Common carp	*Cyprinus carpio*	I	R
Fathead minnow	*Pimephales promelas*	I	R
Golden shiner	*Notemigonus crysoleucas*	I	R
Goldfish	*Carassius Auratus*	I	R
Hardhead	*Mylopharodon Conocephalus*	N	R
Hitch	*Lavinia Exilicauda*	N	R
Red shiner	*Cyprinella lutrensis*	I	R
Sacramento blackfish	*Orthodon microlepidotus*	N	R
Sacramento splittail	*Pogonichthys macrolepidotus*	N	M
Sacramento pikeminnow	*Ptychocheilus grandis*	N	R
Suckers (catostomidae)			
Sacramento sucker	*Catostomus occidentalis*	N	R
Catfish (ictaluridae)			
Black bullhead	*Ameiurus melas*	I	R
Brown bullhead	*Ameiurus nebulosus*	I	R
Channel catfish	*Ictalurus punctatus*	I	R
White catfish	*Ameiurus catus*	I	R
Livebearers (poeciliidae)			
Western mosquitofish	*Gambusia affinis*	I	R
Silversides (atherinidae)			
Inland silverside	*Menidia beryllina*	I	R
Temperate Basses (percichthyidae)			
Striped bass	*Morone saxatilis*	I	M
Basses and Sunfish (centrarchidae)			
Black crappie	*Pomoxis nigromaculatus*	I	R
Bluegill	*Lepomis Macrochirus*	I	R
Green sunfish	*Lepomis cyanellus*	I	R
Largemouth bass	*Micropterus salmoides*	I	R
Redear sunfish	*Lepomis microlophus*	I	R
Smallmouth bass	*Micropterus dolomieu*	I	R
Warmouth	*Lepomis Gulosus*	I	R
White crappie	*Pomoxis annularis*	I	R
Perch (percidae)			
Bigscale logperch	*Percina macrolepida*	I	R
Surf Perch (embiotocidae)			
Tule perch	*Hysterocarpus traski*	N	R
Sculpins (cottidae)			
Prickly sculpin	*Cottus asper*	N	R
Riffle sculpin	*Cottus gulosus*	N	R

Sources: Ford and Brown 2001; TID and MID 2009, Reports 2009-3, 2009-4, and 2009-5.

1992, Appendix 22). Results of these studies, conducted over the entire length of the lower river (RM 52 to 0) indicated that largemouth bass and smallmouth bass were the primary predators of juvenile salmon, with largemouth bass densities of six to 758 fish per mile of river shoreline (or one to 139 fish per acre) and smallmouth bass densities of two to 158 fish per shoreline mile (or one to 16 fish per acre). Based on estimates of predator abundance from mark-recapture electrofishing surveys and estimated rates of consumption from gut samples, predation rates for largemouth bass were estimated to be approximately 8,600 to 14,300 juvenile salmon per day during the spring pulse flow period (TID and MID 1992, Appendix 22).

Predatory bass populations were again monitored in 1998, 1999, and 2003 in conjunction with the 2001 restoration of river and floodplain habitat at SRP 9 (RM 25.7 to 25.9). Monitoring of largemouth and smallmouth bass abundance at the project site and control sites documented a pattern of population depletion following the 1997 flood of record and subsequent recovery (TID and MID 2007, Report 2006-8). Monitoring in 2003, following restoration of SRP 9, showed that abundance of both species increased at the project and control sites, though largemouth bass were more abundant than smallmouth bass. This finding is consistent with reproductive requirements for these species and river flows and temperatures from 1999 through 2003. From 1999 through 2003, low spring and summer flows in the river provided suitable spawning temperatures and flow velocities for these species.

Although the single year of post-project monitoring (2003) documented increased bass abundance at SRP 9 following restoration, the project may have successfully reduced predation efficiency of bass (TID and MID 2007, Report 2006-8). The SRP 9 project replaced the wide, deep SRP 9 mining pit with a narrower and shallower channel and floodplain. By creating a smaller channel cross section, the project increased flow velocity relative to pre-project conditions. Results of two-dimensional habitat modeling suggest that the post-project channel and floodplain morphology at SRP 9 provides a “safe velocity corridor” for Chinook salmon outmigrants through the site during typical spring outmigration flows. Within this safe velocity corridor, higher flow velocities that exclude largemouth and smallmouth bass from the center of the channel segregate outmigrant salmon from these non-native predators and reduce bass predation efficiency.

Of the 22 non-native fishes in the Tuolumne River, 18 were introduced by state or federal agencies (CDFG, NMFS, USFWS, and the State Board of Human Health) between 1874 and 1954, and one was introduced with permission from CDFG (1967) (Dill and Cordone 1997; Moyle 2002). The remaining three were introduced by aquarists (goldfish in 1862), catfish farms (red shiner in 1954), or private individuals (Common Carp in 1877—although released in the same year by CDFG) (Dill and Cordone 1997). Sixteen of the fishes released by state or federal agencies were introduced intentionally for the sport/commercial fishery, as a prey base for sport fish, or for mosquito control; two were introduced incidentally with shipments of sportfish (Table 5.3.2-11) (Dill and Cordone 1997).

Table 5.3.2-11 Introduced fishes documented in the lower Tuolumne River.

Common Name	Introduction Date	Reference	Notes
Threadfin shad	1951	Dill and Cordone 1997	Threadfin shad was first introduced to CA in 1951 by CDFG as a forage fish
Common carp	1877	Dill and Cordone 1997	Common carp was first introduced to CA ~ 1877 by a private individual (although CDFG had already applied for a shipment and received carp from Japan in 1877) for a food source
Fathead minnow	1953	Dill and Cordone 1997	Fathead minnow was first introduced to CA in 1953 by NMFS
Golden shiner	1891	Dill and Cordone 1997	Golden shiner was first introduced to CA in 1891 by NMFS as a forage fish
Goldfish	Pre-1862	Dill and Cordone 1997	Goldfish was first introduced to CA before 1862 and spread by aquarists and bait fishermen
Red shiner	1954	Dill and Cordone 1997	Red shiner was first introduced to CA in 1954 by catfish farms, then by CDFG as a forage fish
Black bullhead	1940	Dill and Cordone 1997	Black bullhead were likely first introduced with other "bullheads" (assuming by CDFG as with other bullhead species) but not officially identified in CA until 1942. It is unconfirmed who actually planted the first one.
Brown bullhead	1874	Dill and Cordone 1997	Brown bullhead was first introduced to CA in 1874 by CDFG
Channel catfish	1891	Dill and Cordone 1997	Channel catfish was first introduced to CA in 1891 by NMFS
White catfish	1874	Dill and Cordone 1997	White catfish was first introduced to CA in 1874 by CDFG for sport fishing
Western mosquitofish	1922	Dill and Cordone 1997	Western mosquitofish was first introduced to CA in 1905 by the CA State Board of Public Health for mosquito control
Inland silverside	1967	Dill and Cordone 1997	Inland silverside was first introduced to CA in 1967 by Lake County (with permission from CDFG) as a forage fish, followed by unauthorized releases.
Striped bass	1879	Moyle 2002, Dill and Cordone 1997	Striped bass was first introduced to the SF Bay in CA in 1879 by CDFG. It supported a commercial fishery and a sport fishery. CDFG's goal even in recent times was to "stabilize and restore the estuary's striped bass fishery."
Black crappie	1891	Dill and Cordone 1997	Black crappie was first introduced to CA in 1891 for sport fishing
Bluegill	1891	Moyle 2002, Dill and Cordone 1997	Bluegill was first introduced to CA in 1891 by CDFG for sport fishing
Green sunfish	1891	Dill and Cordone 1997	Green sunfish was first introduced to CA in 1891, accidentally with other species.
Largemouth bass	1891	Dill and Cordone 1997	Largemouth bass was first introduced to CA in 1891 by CDFG for sport fishing
Redear sunfish	1951-1954	Dill and Cordone 1997	Redear sunfish was first found in the Colorado River in 1951 (assumed planted by Arizona Department of Fish and Game). CDFG brought them to the state for plantings in 1954.
Smallmouth bass	1874	Dill and Cordone 1997	Smallmouth bass was first introduced to CA in 1874 by CDFG or for sport fishing
Warmouth	1891-1895	Dill and Cordone 1997	Warmouth was first introduced to CA in 1891 (apparently identified at the time as rock bass)

Common Name	Introduction Date	Reference	Notes
White crappie	1891	Dill and Cordone 1997	White crappie was first introduced to CA in 1891 for sport fishing
Bigscale logperch	1953	Dill and Cordone 1997	Bigscale logperch was first introduced to CA in 1953 by USFWS inadvertently with a shipment of bass, sunfish, and bulheads

Sources: Dill and Cordone 1997; Ford and Brown 2001; Moyle 2002; TID/MID 2009, Reports 2009-3, 2009-4, and 2009-5.

The most abundant and widespread non-native fish species in the lower Tuolumne River (bluegill, redear sunfish, and green sunfish) were first released into California between 1891 and 1954. The primary predators (largemouth and smallmouth bass) were first released into California by CDFG between 1874 and 1891 (Dill and Cordone 1997; TID/MID 1992).

Fall-Run Chinook Salmon

Life History

The lower Tuolumne River supports a population of Central Valley fall-run Chinook salmon. These anadromous salmon are characterized by adults that spawn soon after entering fresh water and a relatively short juvenile rearing period prior to emigrating back to the ocean (Moyle 2002). Table 5.3.2-12 shows the generalized life history timing for Central Valley fall-run Chinook salmon.

Table 5.3.2-12 Life history timing for Central Valley fall-run Chinook salmon.

Migration Period	Peak Migration	Spawning Period	Peak Spawning	Juvenile Emergence	Juvenile Rearing
October-early January	November	Late October-January	November	December-April	1-5 months

Source: Yoshiyama et al. 1998.

Spawning and Redd Distribution

In the lower Tuolumne River, Chinook salmon spawning occurs in the gravel-bedded reach (upstream of RM 24) where water temperatures are suitably cool and suitable spawning riffles are present. Spawner data collected prior to the construction of new Don Pedro Dam are based upon historical compilations (Fry 1961; Fry and Petrovitch 1970). Fry (1961) reports that weir counts were made by the CDFG at the Modesto Dam fish ladder near present day 9th Street in 1940–1942, and 1944, with incomplete counts in 1941. The USFWS made a full-year count at this location in 1946. Following the dam’s condemnation in 1947, all counts were based upon carcass surveys conducted by CDFG. Since the completion of Don Pedro Dam in 1971, CDFG has conducted annual spawning surveys from October to December over a reach extending from the La Grange powerhouse (RM 51.8) downstream to the Fox Grove fishing access at RM 26. Spawning run estimates have been made using the Schaefer mark-recapture escapement estimation model (Schaefer 1951), although other statistical methods are sometimes used when sample size is low.

Escapement estimates for 1971 to 2009 are shown in Table 5.3.2-13 and Figure 5.3.2-1. Escapement estimates for the 1940 to 1970 period are shown in Table 5.3.2-14 and Figure 5.3.2-2. For the full period of record, the maximum and minimum run sizes are 130,000 spawners in the lower Tuolumne River in 1944 (Fry 1961) to a minimum estimate of 100 in 1963 (Fry and Petrovich 1970). Since the completion of Don Pedro Dam (1971 to 2009), spawning estimates have ranged widely from a low of 77 in 1991 to a high of 40,300 in 1985 (TID/MID 2010, Report 2009-2). For the 1971 to 2009 survey period, the earliest date of the peak weekly live spawner count was October 31, 1996 and the latest peak was November 27, 1972, with a median date of November 12 for peak spawning activity (TID/MID 2010, Report 2009-2).

Counting Weir

Since fall 2009, escapement monitoring has been conducted at a counting weir established at RM 24.5, just below the downstream boundary of the gravel-bedded (i.e., spawning) reach (Figure 5.3.2-3) (TID and MID 2010, Report 2009-8). Weir monitoring is jointly funded by TID, MID, and the CCSF. The counting weir is composed of a resistance board weir (Tobin 1994; Stewart 2002, 2003) and Vaki Riverwatcher fish counting system (Vaki system), which uses infrared and digital photo-video technology to distinguish and enumerate individual fish passing upstream through the weir. The objectives of the Tuolumne River Weir Project include:

- Determine escapement of fall-run Chinook salmon and steelhead to the Tuolumne River through direct counts.
- Document migration timing of adult fall-run Chinook salmon and steelhead in the Tuolumne River and evaluate potential relationships with environmental factors.
- Determine size and gender composition of returning adult salmon population.
- Estimate hatchery contribution to spawning population.
- Document passage of non-salmonids.

The weir provides direct counts and more precise timing of migration when compared with the traditional spawning survey methods. The ability to address upstream spawning distribution patterns remains unchanged with the use of the counting weir.

Results from the initial operation of the weir between September 22, 2009 and January 31, 2010 detected a total of 282 adult Chinook salmon (TID and MID 2010, Report 2009-8). Daily passage ranged between zero and 19 Chinook, with 78 percent of the total cumulative passage (n=218) occurring by December 1. Total fall-run Chinook salmon passage was composed of 63 percent male (n=177), 31 percent female (n=87), and six percent unknown (n=18). Adipose fin clips suggesting hatchery origin were observed in 15 percent of Chinook counted during 2009. A total of 11 other incidental species (three native and eight introduced) were identified. One *O. mykiss* was recorded passing the weir on November 7, 2009, with an estimated length of 276 mm.

Table 5.3.2-13 Tuolumne River salmon spawning survey counts and escapement estimates, 1971-2009.

Year	Total Carcasses	% Female	Tagged Carcasses			(Weekly) Maximum Live Count	(Weekly) Maximum Redd Count[1]	Estimated Run
			Number Tagged	Number Recovered	% Recovered			
1971	2,283	58.0			10.4[e]	2,128	1,598	21,885
1972	537	52.0			10.5[e]	349	423	5,100
1973	351	59.0	270	35	13.0			1,989
1974	90	55.0	84	7	8.3			1,150
1975	130	60.0	125	8	6.4	154	212	1,600
1976	336	51.0	330	61	18.5	241	312	1,700
1977	45	62.0						450
1978	116	67.0	35	2	9.0[e]	81	119	1,300
1979	305	51.0	75	22	29.3	153	204	1,184
1980	248	61.0	74	30	40.5	112	117	559
1981	5,819	44.0	664	334	50.3	1,646	1,650	14,253
1982	2,135	60.0	293	123	42.0	530	1,111	7,126
1983	1,280	25.0	270	25	9.3	263	465	14,836
1984	3,841	34.0	693	201	29.0	1,084	1,143	13,689
1985	11,651	56.0	895	273	30.5	2,986	3,034	40,322
1986	2,463	48.0	456	172	37.7	1,123	1,250	7,288
1987	5,280	31.0	1,069	461	43.1	2,155	850	14,751
1988	3,011	60.0	2,171	1,316	60.6	1,066	1,936	6,349
1989	625	52.0	491	318	64.8	291	461	1,274
1990	37	32.0	30	14	46.7	44	42	96
1991	30	45.0	12	7	58.3	24	51	77
1992	55	42.6	47	26	55.3	49	38	132
1993	187	61.3	169	96	56.8	94	215	431
1994	215	49.7	185	110	59.5	226	264	513
1995	461	54.1	415	175	42.2	270	174	928
1996	1,301	34.9	1,186	369	31.1	636	216	4,362
1997	1,520	58.6	1,056	253	24.0	1,258	716	7,548
1998	2,712	50.6	2,170	679	31.3	1,058	448	8,967
1999	3,980	45.9	2,375	1,398	58.9	1,403	404	7,730
2000	6,884	62.6	2,162	870	40.2	3,269	2,104	17,873
2001	5,400	53.9	1,170	717	61.3	1,865	1,251	9,222
2002	4,702	54.4	1,283	826	64.4	1,366	478	7,125
2003	1,489	59.7	585	328	56.1	463	349	2,961
2004	1,224	59.3	529	344	65.0	718	455	1,700
2005	312	66.5	176	58	33.0	129	124	719
2006	152	45.1	91	21	23.1	114	115	625
2007	87	37.8	37	15	40.5	92	107	211
2008	161	57.1	105	46	43.8	200	165	372
2009[2]	40	56.8	23	18	78.3	69	62	300

1 Redd counts were taken from TID and MID summary tables after 1980; redd counts for 1986 partially based on aerial photographs taken on November 26, 1986.

2 2009 population estimate is based on weir counts.

e estimated

Source: TID and MID 2010, Report 2009-2.

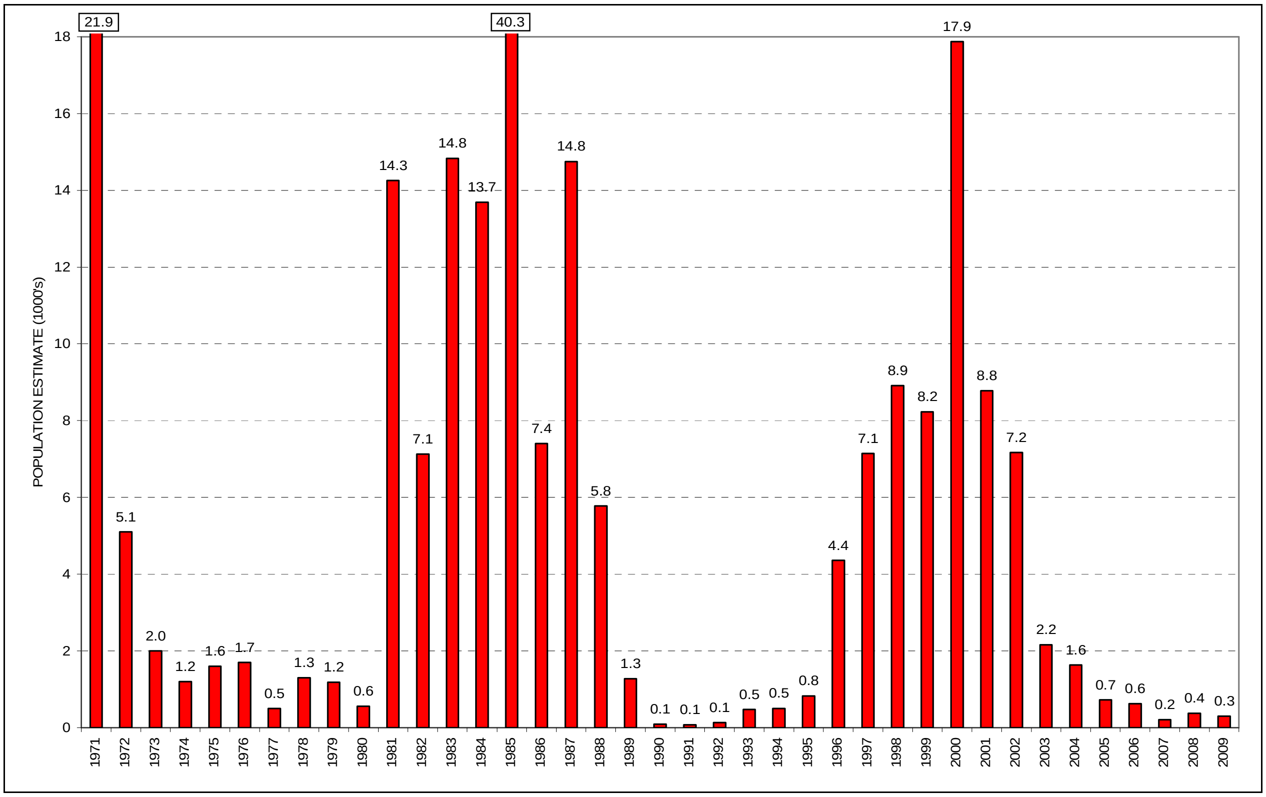


Figure 5.3.2-1 Tuolumne River Chinook salmon escapement estimates, 1971-2009.
Source: TID and MID 2010, Report 2009-2.

Table 5.3.2-14 Tuolumne River salmon spawning survey counts and escapement estimates, 1940–1970.*

Year	Peak Live Count	Estimated Run
1940	5,447	122,000
1941	2,807	27,000
1942	3,386	44,000
1943	10,039	ND**
1944	6,002	130,000
1945	5,447	ND
1946	2,807	61,000
1947	ND	50,000
1948	ND	40,000
1949	ND	30,000
1950	ND	ND
1951	ND	3,000
1952	ND	10,000
1953	ND	45,000
1954	ND	40,000
1955	ND	20,000
1956	ND	6,000
1957	ND	8,000
1958	ND	32,000
1959	ND	46,000
1960	ND	45,000
1961	ND	500
1962	ND	200
1963	ND	100
1964	ND	2,010
1965	ND	3,200
1966	271	5,100
1967	184	6,800
1968	1,490	8,600
1969	ND	32,200
1970	1,517	18,400

*Estimates based on historical compilations including weir counts and carcass surveys.
**ND = No Data

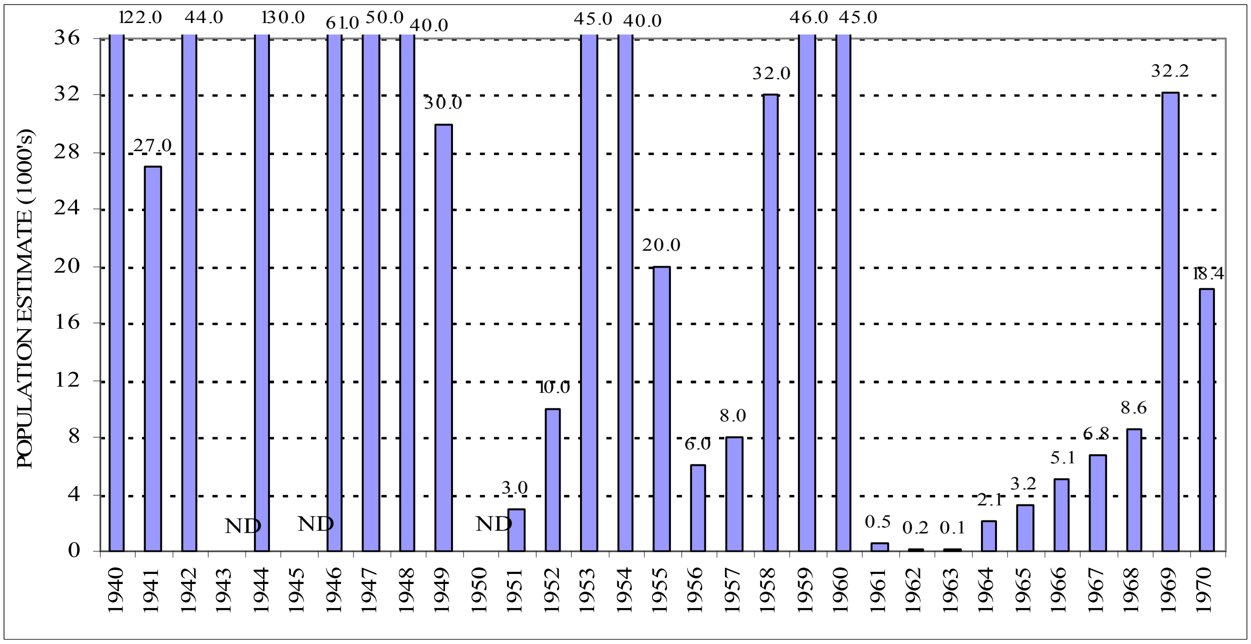


Figure 5.3.2-2 Tuolumne River Chinook salmon escapement estimates, 1940-1970.

Figure 5.3.2-3 Fish counting weir at RM 24 on the lower Tuolumne River.

<u>Juvenile Salmon Surveys and Smolt Survival</u>

Annual seine surveys in the lower Tuolumne River have been conducted by the Districts since 1986. The surveys monitor distribution and density of juvenile Chinook salmon along the entire length of river from Old La Grange Bridge (RM 50.5) downstream to Shiloh Road Bridge (RM 3.4). The number and location of samples and the sampling frequency have varied over time, with a more standardized approach beginning in 1997 (TID and MID 2010, Report 2009-3). Sampling is typically conducted at two-week intervals beginning in January and ending in May or June. Table 5.3.2-15 summarizes the sampling effort, juvenile salmon captures, densities, and growth rate indices from 1986 to 2010. Figure 5.3.2-4 shows average density of juvenile salmon for years 1986 to 2010.

Table 5.3.2-15 Summary of Tuolumne River juvenile salmon seine surveys, 1986-2010.

Sampling Year	Sampling Periods	Salmon Captured	Sites Sampled	Average Density[1]	Growth Rate Index[2]	Start Date	End Date
1986	18	5,514	8	20.7	0.45	22JAN	27JUN
1987	21	14,825	11	22.4	0.45	05JAN	04JUN
1988	14	6,134	11	14.3	0.58	05JAN	17MAY
1989	13	10,043	11	27.0	0.64	05JAN	12MAY
1990	14	2,286	11	6.0	0.57	04JAN	11MAY
1991	8	120	11	0.5	---	15JAN	24MAY
1992	5	144	7	1.2	---	27JAN	13MAY
1993	7	124	8	0.8	0.68	26JAN	12MAY
1994	7	2,068	5	21.6	0.65	25JAN	20MAY
1995	8	512	5	6.1	0.79	09FEB	12JUL
1996	8	785	6	7.6	0.66	17JAN	13JUN
1997	10	379	7	2.7	0.48	14JAN	28MAY
1998	10	1,950	7	14.4	0.46	14JAN	21MAY
1999	10	3,443	8	24.6	0.54	14JAN	19MAY
2000	10	3,213	8	27.0	0.46	11JAN	17MAY
2001	11	5,567	8	41.3	0.67	09JAN	30MAY
2002	10	3,486	8	25.6	0.64	15JAN	21MAY
2003	10	5,983	8	39.3	0.68	21JAN	28MAY
2004	11	3,280	8	19.3	0.55	20JAN	25MAY
2005	10	1,341	8	8.9	0.53	19JAN	25MAY
2006	11	1,558	8	10.2	0.79	20JAN	15JUN
2007	10	204	8	1.5	0.58	17JAN	23MAY
2008	10	198	8	1.4	0.66	22JAN	27MAY
2009	11	779	8	4.7	0.64	13JAN	02JUN
2010	10	386	8	2.9	0.65	26JAN	08JUN

[1] Salmon per 1,000 square miles.

[2] Millimeters per day.

Source: TID and MID 2010, Report 2009-3.

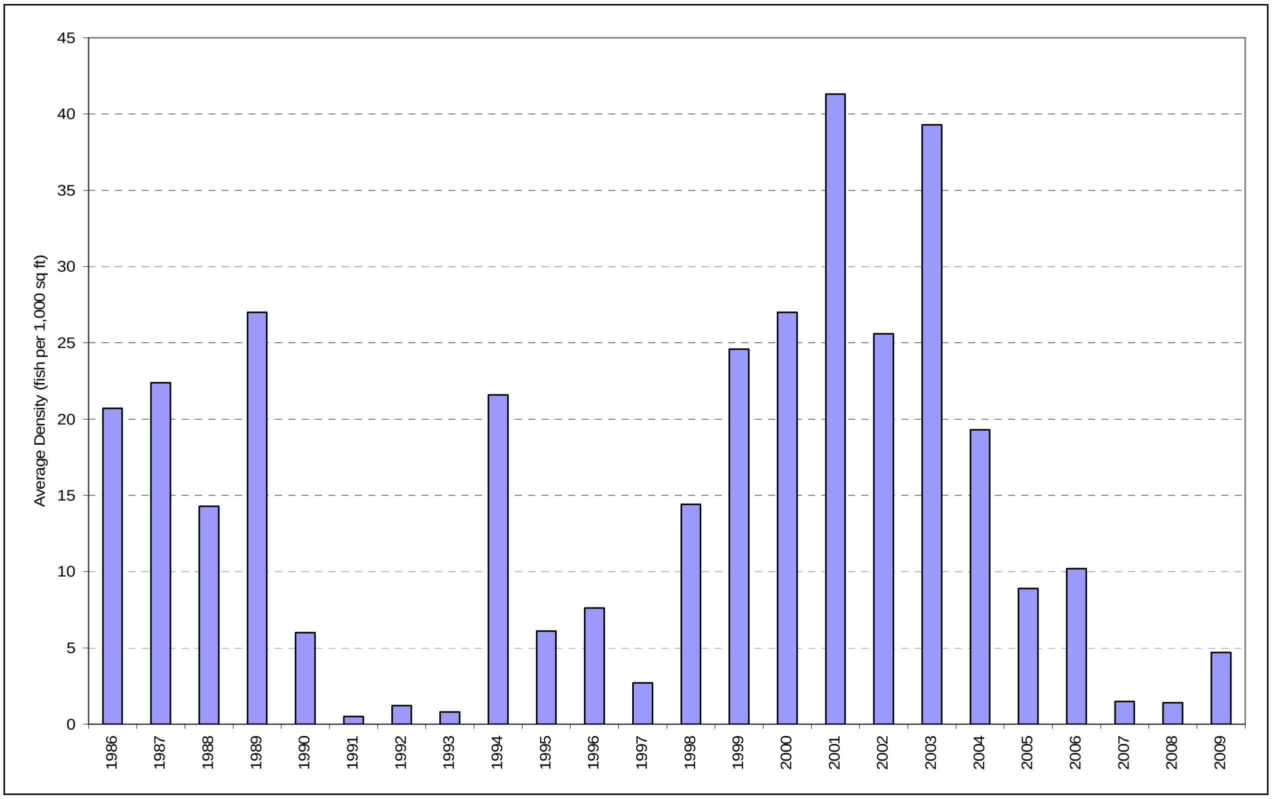


Figure 5.3.2-4 Average density of juvenile Chinook salmon from seine surveys, 1986-2009.

Source: TID and MID 2010, Report 2009-2.

Snorkel surveys in the lower Tuolumne River have been conducted by the Districts since 1982, with the exception of years when high-flow conditions prevented safe or effective sampling. The number, location, area sampled, and season have varied over the years. The 1982 to 1987 surveys were conducted as monitoring studies with a seasonal component to evaluate salmonids and other resident fish. The 1988 to 1994 surveys implemented an early-summer and late-summer sampling protocol to evaluate the effects of low flow conditions on salmonids and resident fish. The 1996 to 2007 studies were conducted as over-summer monitoring studies to help evaluate the effects of the 1995 FERC Settlement Agreement flows on salmonids. Snorkel surveys conducted since 2007 are a continuation of the post-Settlement Agreement monitoring and have also been used as "reference" surveys to help establish the downstream extent for sampling as part of the *O. mykiss* population estimate study. Table 5.3.2-16 summarizes the locations and sampling season of snorkel surveys conducted in the lower Tuolumne River from 1982 to 2009 (TID and MID 2010, Report 2009-5). An "X" in the table indicates the occurrence of a survey, but not necessarily an *O. mykiss* observation.

Observations of salmonids compiled from all snorkel survey data are summarized in Table 5.3.2-17. The data show a general pattern for juvenile Chinook salmon of higher density from winter to late spring with decreasing density in summer and fall. This is reflective of the life history traits of fall-run Chinook salmon, as well as an indication of unfavorable river habitat conditions over the summer months, especially prior to implementation of the 1995 FSA flow schedule. The pattern shown for *O. mykiss* indicates generally low density prior to the drought

Table 5.3.2-16 Location (by RM) and season of snorkel surveys on the lower Tuolumne River, 1982-2009.

	RM	51.6	50.7	50.4	49.9	49.1	48.4	48.0	46.9	46.4	45.8	45.6	44.4	42.9	42.3	42.0	40.9	40.3	38.5	38.1	37.8	37.0	36.7	36.2	35.4	35.3	34.0	32.2	31.5	24.9
	Riffle	A3/ A4	A7	1A	2	3B	4B	5B	7	9	12	13A -B	17A2	21	23B- C	24	26	27	30B	31	33	35A	36A	37	39- 40	41A	46	52B	57- 58	Charles
1982	AUG				X		X	X																						
1984	APR						X	X																					X	
	AUG	X	X		X			X																						
1985	MAR	X					X	X																					X	
1986	JUL						X									X											X			
	AUG	X	X		X		X	X																						
	JAN				X			X																			X			
1987	APR			X	X			X																X						
	OCT	X	X																											
1988[1]	MAY	X			X			X		X					X						X				X			X		X
	SEP	X			X			X		X					X						X				X			X		X
1989[1]	MAY	X	X		X			X		X					X						X				X				X	X
	SEP	X	X		X			X		X					X						X				X				X	X
1990[1]	JUN	X			X			X		X					X						X				X				X	X
	SEP	X			X			X		X					X						X				X				X	X
1991	JUN	X			X			X		X					X										X				X	X
	SEP	X			X			X		X					X										X				X	X
1992	JUN	X			X			X		X					X										X				X	X
	SEP	X			X			X		X					X										X				X	X
	MAY	X	X	X	X		X	X		X		X				X							X						X	
1993	JUN	X	X	X	X					X															X				X	X
	JUL	X	X					X							X								X							
	OCT	X	X	X	X					X															X				X	X
1994	MAY		X					X							X								X						X	
	JUL	X			X			X		X															X				X	
	OCT	X			X			X		X															X				X	X
1995	NOV	X	X					X								X														
1996	JUL		X	X	X	X	X	X	X					X								X	X						X	
1997	JUN	X	X		X	X		X	X						X								X						X	
1999	JUN		X		X	X		X	X						X				X				X						X	
2000	JUN		X	X		X		X	X		X	X	X	X	X		X	X		X		X		X		X	X	X	X	
2001	JUL		X		X	X		X	X			X		X	X					X				X		X			X	
	SEP		X		X	X		X	X			X		X	X					X				X		X			X	
2002	JUN		X		X	X		X	X			X		X	X				X			X				X			X	
	SEP		X		X	X		X	X			X		X	X				X			X				X			X	

	RM	51.6	50.7	50.4	49.9	49.1	48.4	48.0	46.9	46.4	45.8	45.6	44.4	42.9	42.3	42.0	40.9	40.3	38.5	38.1	37.8	37.0	36.7	36.2	35.4	35.3	34.0	32.2	31.5	24.9
	Riffle	**A3/ A4**	**A7**	**1A**	**2**	**3B**	**4B**	**5B**	**7**	**9**	**12**	**13A -B**	**17A2**	**21**	**23B- C**	**24**	**26**	**27**	**30B**	**31**	**33**	**35A**	**36A**	**37**	**39- 40**	**41A**	**46**	**52B**	**57- 58**	**Charles**
2003	JUN		X		X	X		X	X			X		X	X					X		X				X			X	
	SEP		X		X	X		X	X			X		X	X					X		X				X			X	
2004	JUN		X		X	X		X	X			X		X	X					X		X				X			X	
	AUG	X	X	X	X	X	X	X	X	X		X		X	X					X		X				X			X	
	SEP		X		X	X		X	X			X		X	X					X		X				X			X	
2005	SEP		X		X	X		X	X			X		X	X					X		X				X			X	
2006	SEP		X		X	X		X	X			X		X	X					X		X				X			X	
2007	JUN		X		X	X		X	X			X		X	X					X		X				X			X	
	SEP		X		X	X		X	X			X		X	X					X		X				X			X	
2008	JUN		X		X	X		X	X			X		X	X					X		X				X			X	
2009	JUN		X		X	X		X	X			X		X	X					X		X				X			X	

[1] Some limited additional snorkeling was conducted during the summer flow study period in these years.

Adapted from TID and MID 2005a (Ten-Year Summary Report).

Table 5.3.2-17 Salmonid observations from snorkel surveys on the lower Tuolumne River, 1982-2009.

Year	Season	Juvenile Salmon	*O. mykiss*	Year	Season	Juvenile Salmon	*O. mykiss*
1982	AUG	0	2	1994	MAY	36	0
1984	APR	0	12		JUL	0	0
	AUG	7	53		OCT	0	0
1985	MAR	100	2	1995	NOV	24	3
1986	JUL	48	5	1996	JUL	289	384
	AUG	210	64	1997	JUN	3	8
1987	JAN	1,030+	0	1999	JUN	213	79
	APR	690+	0	2000	JUN	338	180
	OCT	0	0	2001	JUL	404	31
1988	MAY	161	0		SEP	21	12
	SEP	0	0	2002	JUN	567	28
1989	MAY	127	0		SEP	3	12
	SEP	0	0	2003	JUN	537	101
1990	JUN	12	0		SEP	13	71
	SEP	0	0	2004	JUN	491	91
1991	JUN	0	0		AUG	80	76
	SEP	0	0		SEP	0	40
1992	JUN	0	1	2005	SEP	5	139
	SEP	0	0	2006	SEP	40	543
1993	MAY	138	0	2007	JUN	67	343
	JUN	38	0		SEP	0	198
	JUL	5	0	2008	JUN	43	232
	OCT	45	0	2009	JUN	1,902	142

Source: TID and MID 2010, Report 2009-5.

years of 1988 to 1994, with virtually no observations during the 1988 to 1994 drought conditions, followed by increased, but variable density afterwards. Since *O. mykiss* typically reside in the river over the summer months, these observations suggest that summer habitat suitability for *O. mykiss* has increased since implementation of the 1995 FSA flow schedule.

Rotary screw trap (RST) sampling in the lower Tuolumne River was initiated in 1995 (Figure 5.2.3-5). The number and location of traps has varied over the years. Currently there are two traps being operated—an upstream trap near the City of Waterford at RM 29.8, and a downstream trap near the town of Grayson at RM 5.2. This configuration has been in place since 2006. The traps typically are operated seasonally from January to June and are used primarily to monitor the abundance and outmigration timing of juvenile salmonids, but the traps also provide data on the occurrence of other fish species. The Districts, along with the CCSF, funded the RST program in 1995 to 1997, at two to three upstream sites in 1998 to 2000, and in 2003 to 2009. Funding in other years was provided by other sources. Table 5.3.2-18 summarizes the rotary screw trap sampling effort in the lower Tuolumne River from 1995 to 2009, along with total catch and estimated passage of juvenile salmon. The number of other species captured at the rotary screw traps varies by year. In 2009, there were a total 26 species (five native, 21 introduced) captured during operation of the Waterford and Grayson traps (TID and MID 2010, Report 2009-4).

Figure 5.3.2-5 Rotary screw trap in the lower Tuolumne River.

Table 5.3.2-18 Rotary screw trap monitoring in the lower Tuolumne River, 1995-2009.

Year	Site	Period Sampled	Proportion of Outmigration Period Sampled (%)	Total Catch	Total Estimated Juvenile Salmon Passage	Method of Passage Estimation
1995	Shiloh (RM3.4)	Apr 25-Jun 01	24	141	15,667	n/a
1996	Shiloh	Apr 18-May 29	27	610	40,385	n/a
1997	Shiloh	Apr 18-May 24	24	57	2,850	n/a
1998	Turlock Lake State Rec. (RM 42.0)	Feb 11-Apr 13	41	7,125	259,581	Mean efficiency
	7/11 (RM 38.5)	Apr 15-May 31	31	2,413		
	Charles Road (RM 25.0)	Mar 27-Jun 01	43	981	66,848	Mean efficiency
	Shiloh	Feb 15-Jul 01	70	2,546	1,615,673	Regression
1999	7/11	Jan 19-May 17	79	80,792	1,737,052	% Flow sampled
	Hughson (RM 23.7)	Apr 08-May 24	31	449	7,175	% Flow sampled
	Grayson (RM 5.2)	Jan 12-Jun 06	93	19,327	755,604	Multiple regression
2000	7/11	Jan 10- Feb 27	32	61,196	298,755	% Flow sampled
	Deardorf (RM 35.5)	Apr 09-May 25	31%	634	15,845	% Flow sampled
	Hughson	Apr 09-May 25	31	264	2,942	% Flow sampled

Year	Site	Period Sampled	Proportion of Outmigration Period Sampled (%)	Total Catch	Total Estimated Juvenile Salmon Passage	Method of Passage Estimation
	Grayson	Jan 09-Jun 12	95	2,250	99,797	Multiple regression
2001	Grayson	Jan 03-May 29	97	6,478	99,584	Multiple regression
2002	Grayson	Jan 15-Jun 06	91	436	14,135	Multiple regression
2003	Grayson	Apr 01-Jun 06	40	359	9,091	Multiple regression
2004	Grayson	Apr 01-Jun 09	40	509	17,771	Multiple regression
2005	Grayson	Apr 02-Jun 17	39	1,317	255,710	Multiple regression
2006	Waterford 1 (RM 29.8)	Jan 25-Apr 12	79	8,648	178,034	% Flow sampled
	Waterford 2 (RM 33.5)	Apr 21-Jun 21		458	178,034	
	Grayson	Jan 25-Jun 22	84	1,594	71,670	Multiple regression
2007	Waterford (RM 29.8)	Jan 11-Jun 05	93	3,312	57,801	Average trap efficiency
	Grayson	Mar 23-May 29	45	27	923	Multiple regression
2008	Waterford (RM 29.8)	Jan 8-Jun 2	96	3,350	24,894	Average trap efficiency
	Grayson	Jan 29-Jun 4	82	193	3,283	Multiple regression
2009	Waterford (RM 29.8)	Jan 7-Jun 9	96	3,725	37,174	Average trap efficiency
	Grayson	Jan 8-Jun11	95	155	4,677	Multiple regression

Adapted from TID and MID 2010, Report 2009-4.

Salmon Population Models

Two salmon population models were developed by the Districts to identify and assess the relative importance of factors influencing Tuolumne River Chinook salmon population abundance and to evaluate the effects of management actions on the population:

- The Stock-Recruitment model (TID and MID 1992, Appendix 2; TID and MID 1997, Report 1996-5); and
- The EACH population model (TID and MID 1992, Appendix 1).

These models assess long-term changes in the abundance of Tuolumne River Chinook salmon and help identify factors contributing to the overall dynamics of the population that cannot be attained by a simple comparison of mean escapement levels. The models address a primary difficulty in determining whether there is a change in the long-term productivity of the Tuolumne River by predicting whether a change is likely to be ongoing rather than temporary.

The Stock-Recruitment Model (TID and MID 1992, Appendix 2) uses a stock-recruitment relationship developed for Tuolumne River Chinook salmon to help understand the implications of river management on the dynamics of the salmon population. The stock-recruitment relationship is determined by a number of density-dependent (e.g., food supply, juvenile habitat, spawning gravel availability) and density-independent factors (e.g., spring outflow, Delta export pumping, gravel quality, water quality, predation, harvest). Based upon the long-term escapement data collected prior to the 1995 Settlement Agreement, San Joaquin River system Chinook salmon runs in some years contain a large proportion of two-year olds in the run and many of these are female (TID and MID 1992, Appendix 2). By representing the proportions of two-, three-, and four-year-old fish in the run, a smoothed Ricker-type relationship between spawners and subsequent recruits was derived with a peak recruitment occurring at approximately 15,000 to 20,000 spawners.

The Stock Recruitment Model uses statistical analysis to predict how density-independent mortality, as influenced by spring flow, combines with density-dependent mortality to affect the rate and magnitude of changes in population of the San Joaquin system's Chinook salmon. By incorporating recruits, the model provides a more accurate measure of salmon production than escapement alone because escapement is composed of spawners of three different age cohorts. Model results have shown that general escapement levels for the San Joaquin basin as a whole are predicted very well but that the model tends to underestimate escapement in peak years (TID and MID 2005a).

The EACH model (TID and MID 1992, Appendix 1) is a deterministic simulation that represents the dynamics of populations from each of the three salmon-bearing tributaries to the San Joaquin River (Merced, Tuolumne, and Stanislaus rivers). The Districts originally developed the EACH model in 1987 to 1991 to place knowledge specific to individual life-stages and geographical locations into a life history context, and to provide a tool for studying the multigenerational dynamics of the populations in the presence of constantly changing environmental conditions. The model represents populations from each of the three salmon-bearing tributaries to the San Joaquin River and tracks each group of fish through their life cycle and migration. The model uses flow to represent environmental conditions, and mortality at each life stage is assumed to be either constant or linearly related to flow. Results indicate that the EACH model tracks long term averages and trends in Tuolumne River population abundance (TID and MID 2005a).

Steelhead/Rainbow Trout (O. mykiss)

Life History

The species *Oncorhynchus mykiss* exhibits two life history forms: a resident form commonly known as rainbow trout, and an anadromous form commonly known as steelhead. Central Valley steelhead begin to enter fresh water in August, followed by peak spawning from December through April. After spawning, adults may survive and emigrate back to the ocean. Steelhead progeny will rear for one to three years in fresh water before they emigrate to the ocean where most of their growth occurs. Spawning by resident rainbow trout in the Central Valley coincides with steelhead. It is possible for steelhead and resident rainbow trout to interbreed, with progeny displaying either anadromous or resident life history traits.

Population Studies

Specific studies to estimate the population of *O. mykiss* in the lower Tuolumne River have been conducted by the Districts since 2008 and are currently ongoing (Ford and Kirihara 2010). These studies incorporate snorkel surveys using a bounded count methodology (Hankin and Mohr 2001) to estimate the population size. The studies are scheduled for completion in 2011. Table 5.3.2-19 summarizes the results of these estimates through July 2009.

Table 5.3.2-19 Population estimates of *O. mykiss* for the lower Tuolumne River, 2008-2009.

Survey Date	*O. mykiss* <150 mm				*O. mykiss* ≥150 mm			
	Obs.[1]	Estimate	St. Dev.	95% Interval[2]	Obs.[1]	Estimate	St. Dev.	95% Interval[2]
July 2008	128	2,472	616.9	1,263-3,681	41	643	217.7	217-1,070
March 2009	5	63	--	--	7	170	86.3	7-339
July 2009	641	3,475	1,290.5	945-6,004	105	963	254.4	464-1,461

1 Largest numbers seen in any single dive pass for each unit, summed over units.
2 Nominal confidence intervals (CI) calculated as ± 1.96 standard deviations (SD).
Adapted from Ford and Kirihara 2010.

In addition to the bounded count snorkel surveys, a tracking study for *O. mykiss* was initiated in spring 2010. The tracking study utilizes acoustic tags implanted into adult fish captured by angling. These fish are then monitored using hydrophones and data loggers to track their movement and habitat use. Final analysis and results for this study are pending completion of the final sampling period, which is scheduled for 2011.

In 2004, the California Rivers Restoration Fund (CRRF) mapped locations on the lower Tuolumne River where adult *O. mykiss* are routinely caught by angling (CRFF 2004). The mapping surveys were conducted in January and February 2004 in the upper portion of the river from Old La Grange Bridge (RM 50.5) downstream to Robert's Ferry Bridge (RM 39.5). A total of 47 sites were surveyed using a hand-held GPS and later overlayed onto maps developed by McBain & Trush (McBain & Trush 2004).

Low numbers of anadromous *O. mykiss* have been documented in the Tuolumne River (Zimmerman et al. 2008), but there is no empirical scientific evidence of a self-sustaining "run" or population of steelhead currently in the Tuolumne River. Of the 147 individual fish examined by Zimmerman et al. (2008), the otolith chemistry results indicated that one was a steelhead (had displayed anadromy) and eight were spawned by a steelhead (i.e., of anadromous maternal origin). Of the eight *O. mykiss* with an anadromous parent, the range of age classes indicated that not all were spawned at the same time, and therefore did not originate from the same parent. Further, the prevalence of older life stages (age 3+ and 4+ fish) suggests that these progeny were not likely to emigrate to the ocean and become anadromous. Nielsen et al. (2005) examined the relatedness and origins of Central Valley *O. mykiss* using genetic techniques and determined that *O. mykiss* populations in Central Valley rivers, including the Tuolumne River, are not genetically distinct from one another. Nielsen et al. (2005) also found that Tuolumne River *O. mykiss* residing upstream of Don Pedro Reservoir exhibited genetic separation from those found downstream of La Grange Dam in the lower Tuolumne River.

Assessment of Aquatic Habitat in the lower Tuolumne River for Chinook Salmon

Spawning Gravel

The availability, distribution, and quality of spawning gravel for spawning by Chinook salmon in the lower Tuolumne River was assessed through a series of studies conducted by the Districts from 1986 to 1992. Aerial photographs were taken and used to create a Geographic Information System (GIS) coverage of channel features including riffle areas and wetted perimeter at differing flows. These data were compiled and used to calculate a maximum spawning gravel estimate of approximately three million square feet, with riffle areas extending downstream to approximately RM 23.0, although the actual area available for spawning would be less due to site-specific flow characteristics and gravel quality (TID and MID 1992, Appendix 6). Gravel augmentation projects, beginning in 2001, aimed at improving the quality of spawning gravel in the lower Tuolumne River are discussed below (see Habitat Restoration).

The studies also investigated the substantial preference for Chinook salmon spawning in the upstream portion of the reach (above RM 48) as shown in the results from spawning surveys. Five riffle areas were used to locate, mark, and monitor salmon redds over an entire spawning season in 1988-1989 to determine the degree to which overutilization of spawning riffles resulted in redd superimposition (the act of spawning salmon constructing a redd on a pre-existing redd) and the potential impact on fry production. The study determined that superimposition occurred at 44 percent of all redds within the study area, with an increased occurrence at the uppermost riffles, resulting in an estimated 20 percent average egg loss (TID and MID 1992, Appendix 8; McBain & Trush 2000).

The quality of spawning gravel was assessed using bulk samples collected from both riffles and Chinook salmon redds in 1987-1989. Random samples from riffle areas were collected prior to spawning to characterize the average gravel quality found in the study reach. After spawning, similar samples were collected at redds to evaluate the extent to which gravel quality is affected by redd construction. Overall gravel quality was based on the relationship of particle size distribution to percent egg survival. Gravel samples containing a higher proportion of fine sediments are predicted to be correlated with lower egg survival, and are characterized as poor quality. Overall results from the gravel quality study showed very poor gravel quality in riffles, with predicted survival-to-emergence of eggs to swim-up fry averaging 16 percent (TID and MID 1992, Appendices 7 and 8). Gravel quality of samples collected in redd locations was greater, but still considered poor, with an overall average estimated survival-to-emergence of 34 percent.

Several follow-up studies were conducted in response to large fine sediment volumes deposited in the lower Tuolumne River following the 1997 flood events. A river-wide spawning gravel quality assessment was undertaken in 1999-2000 (TID and MID 2001, Report 2000-7). A survey of fine sediment deposits accumulated in the lower Tuolumne River was completed as part of the Coarse Sediment Management Plan (TID and MID 2005b, Report 2004-12). In addition, direct survival-to-emergence evaluations were conducted during two separate programs in 1989-1990 and 2001.

In the survival-to-emergence study, emergence traps were placed on redds in 1989 to obtain a direct check of egg survival estimates. Results obtained from the 1989 survival-to-emergence study closely approximated those predicted from in-redd gravel samples, with an estimated average survival-to-emergence of 32 percent (TID and MID 1992, Appendix 8). A follow-up survival-to-emergence study was conducted in response to large fine sediment volumes deposited in the lower Tuolumne River following the 1997 flood events. The results showed a strong positive relationship between permeability and egg survival-to-emergence, with fry emergence ranging from near zero in the lowest permeability treatments to approximately 40 percent in redds with the highest permeability (TID and MID 2007, Report 2006-7). On the basis of data collected in the 1993 Tuolumne River gravel cleaning experiments (TID and MID 1992, Appendices 8 and 9), analyses conducted under the Coarse Sediment Management Plan (TID and MID 2005b, Report 2004-12) evaluated improvements in gravel quality and incubation success through systematic gravel cleaning approaches.

Instream Flow

There have been two instream flow studies conducted in the lower Tuolumne River for the purpose of developing a relationship between stream flow and physical habitat availability for salmonids. Instream flow studies utilize site-specific field measurements of hydraulic conditions found in the stream (e.g., water depth and velocity) in combination with habitat suitability information of various lifestages for targeted species to produce a habitat index related to how much habitat area is available for any given lifestage over a range of simulated flows. Table 5.3.2-20 shows selected characteristics of the two instream flow studies conducted in the lower Tuolumne River.

Table 5.3.2-20 Selected instream flow model details for studies on the lower Tuolumne River in 1981 and 1992.

Study	Upper RM	Lower RM	Total Transects	Calibration Flows (approx. cfs)			Simulation Range (cfs)
				Low	Mid	High	
CDFG reanalysis (TID and MID 1992)	50.5	42.0	19	120	260	410	20-600
USFWS (1995)	52.2	0.0	25 (23 used)	250	600	1,050	25-1,200

Source: TID and MID 1992 and USFWS 1995.

The instream flow study conducted by CDFG in 1981 was specifically directed to spawning and rearing conditions found in the upper portion of the river (RM 50.5 to 42.0) (TID and MID 1992, Appendix 4). A reanalysis of this study was conducted by the Districts in 1991 to examine what factors had the most influence on the original results (TID and MID 1992, Appendix 5). The reanalysis incorporated different, but analogous, model software (PHABSIM vs. REMFISH), included a slight modification to spawning suitability criteria, and provided output for Chinook salmon fry and rainbow trout that was not included in the original model. The reanalysis concluded that although the original results were adequately representative of the study reaches, there were limitations to how well they represented other segments of the river. The reanalysis also identified the pronounced effect of a single transect in the downstream study reach as overly influencing the results for juvenile Chinook salmon in that reach.

The instream flow study conducted by the USFWS in 1992 addressed some of the limitations from the previous study and included results representative of the entire length of the river, as well as expanding the range of simulated flows (USFWS 1995). The study results for Chinook salmon (Figure 5.3.2-6 show that fry habitat relationship was bimodal, with peak habitat area occurring at 25 cfs and a secondary peak at 925 cfs. Similarly, results for juvenile Chinook salmon show that peak habitat occurs at flows of 150 and 1,175 cfs. Chinook salmon spawning habitat area was shown to peak at 275 cfs. Results for rainbow trout were generated by habitat type only and showed riffles providing the most habitat, with peak habitat for juveniles occurring at 125 cfs and peak habitat for adults at 325 cfs (USFWS 1995). In response to an August 28, 2003 information request by FERC regarding steelhead presence in the Tuolumne River and Project effects, TID and MID (2003) provided documentation of an effective weighted useable area (EWUA) evaluation of summertime habitat area as a function of river flow and temperature for *O. mykiss* (Stillwater Sciences 2003). This analysis indicated that there is a trade off between providing additional river flow to extend colder water temperatures farther downstream and diminishing physical habitat for rearing due to the associated higher water velocities. In other words, above certain threshold flows the gain in "effective" habitat area from more suitable (colder) water temperatures is more than offset by the loss of effective habitat due to less suitable water velocities. The current FERC-Ordered IFIM study (128 FERC 61,035) will re-evaluate WUA and water temperature on the basis of updated habitat suitability criteria, hydraulic modeling, and water temperature modeling.

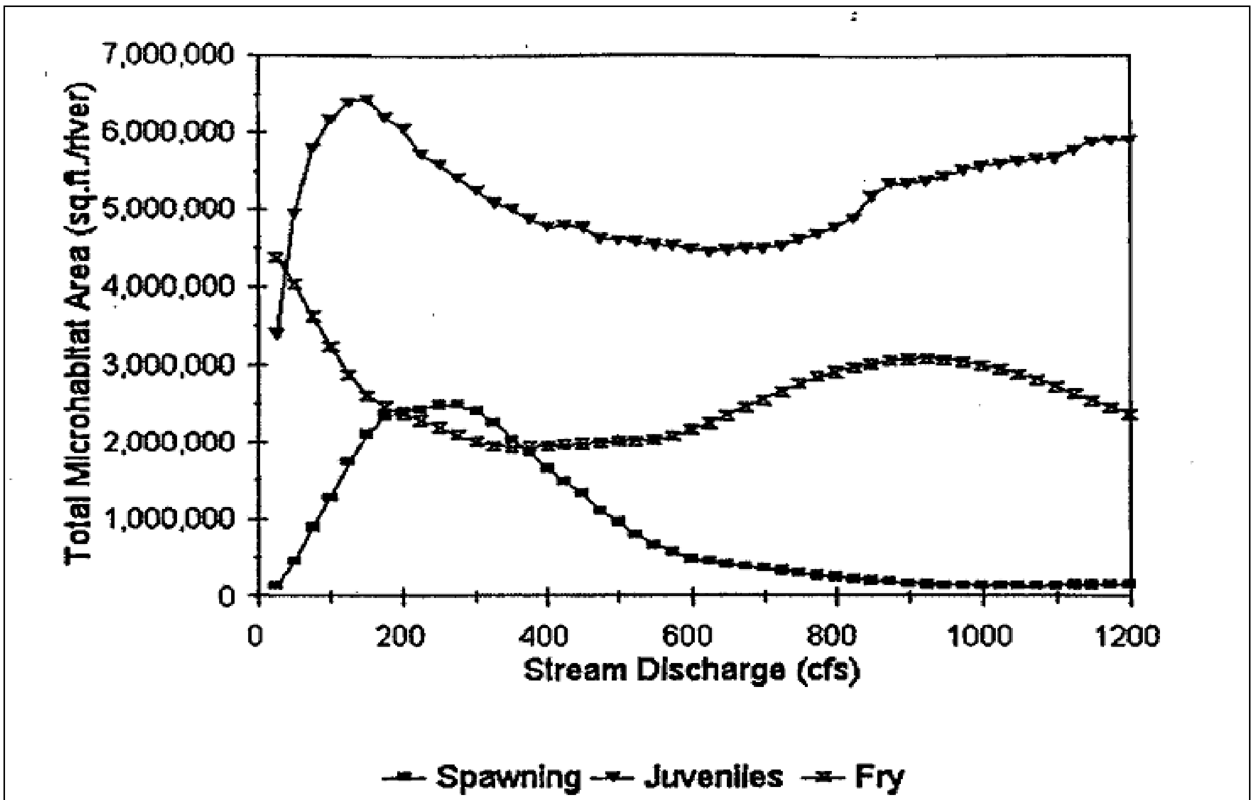


Figure 5.3.2-6 Results from USFWS (1995) instream flow study showing Chinook salmon habitat in the lower Tuolumne River as a function of stream flow.

Source: USFWS 1995.

Flow Fluctuation

Surveys to assess the impact of flow fluctuations on salmonids in the lower Tuolumne River were conducted from 1986 to 2002. Rapid flow reductions can cause stranding and entrapment of fry and juvenile salmon on gravel bars and floodplains and in off-channel habitats that may become cut off from the channel when flows are reduced. A comprehensive evaluation of stranding surveys was conducted on the lower Tuolumne River in compliance with the 1996 FERC Order (TID and MID 2000, Report 2000-6) and is summarized in the 2005 Ten-Year Summary Report (TID and MID 2005a). This evaluation indicated the highest potential for stranding occurred at flows between 1,100 and 3,100 cfs, which corresponds to the inundation of a floodplain zone in several areas of the spawning reach. Table 5.3.2-21 provides summarized results from stranding surveys conducted on the lower Tuolumne River from 1986-2002.

The Districts have not released large hydropower flow fluctuations to the river with repeated daily patterns since well before the 1995 Settlement Agreement, which established ramping rates developed to minimize the potential for stranding. As such, there were no specific monitoring requirements for stranding beyond 2002, although all floodplain restoration projects have design requirements to minimize stranding potential.

Water Temperature

Water temperature monitoring has been conducted by the Districts in the lower Tuolumne River since 1987 and is currently ongoing. Water temperatures are measured and recorded by thermographs deployed in the river which are retrieved and downloaded on a regular basis. The locations, period of record, and instruments have varied over the years. Table 5.3.2-22 lists the location and period of record for thermographs deployed by the Districts during the period of record. Other sources of long-term water temperature data for the lower Tuolumne River are USGS stations located at the cities of La Grange (USGS Gage No. 11289650) at RM 51.6 and Modesto (USGS Gage No. 11290000) at RM 16.2.

Water temperature monitoring results for summer conditions are summarized in TID and MID (2010, Report 2009-9). The river thermograph data for the entire period of record are available on the TRTAC website at http://tuolumnerivertac.com/data.htm. In general, water temperatures increase with increasing distance downstream of the La Grange powerhouse, except during colder winter periods. Annual ranges and rate of increase are dependent on flow rate and ambient air temperatures. Daily average water temperatures at the USGS La Grange gage location from 1995-2004 generally ranged from about 50 to 55°F (10 to 13°C). Daily average water temperatures downstream to Riffle 19 (RM 43.4) during this period did not exceeded 73°F (23°C) except for a brief period in the drought year summers of 2001 and 2002, whereas RM 23.6 and below has routinely exceeded 73°F (23°C) in daily average during summer (TID and MID 2005a).

Table 5.3.2-21 Stranding surveys completed from 1986-2002.

Year	Month	Beginning Flow (cfs)	Ending Flow (cfs)	Change in Flow (cfs)	No. of Sites Surveyed	No. of Stranded Salmon
1986	Dec	4,700	500	4,200	3	16
1986	Dec	4,000	200	3,800	6	16
1987	Jan	2,600	200	2,400	7	25
1987	Jan	1,200	500	700	5	20
1987	May	550	200	350	1	52
1987	Jun	200	3	197	6	403
1988	Jan	550	125	425	3	9
1988	Feb	300	120	180	7	18
1988	Apr	550	115	435	11	17
1988	Apr	550	100	450	9	5
1988	May	67	10	57	4	53
1989	Apr	730	120	610	7	0
1989	Apr	1,050	400	650	7	52
1990	Mar	167*			5	12
1990	Mar	162*			6	34
1990	Mar	174*			3	17
1990	Mar	180*			8	30
1990	Mar	220	120	100	6	11
1990	May	560	280	280	7	5
1991	May	1,120	667	453	7	0
1991	May	667	284	383	3	0
1992	May	1,000	550	450	6	0
1992	May	160	50	110	10	0
1994	Apr	1,100	550	550	5	0
1995	Mar	2,900	1,200	1,700	4	98
1995	Mar	7,700	4,700	3,000	5	2
1995	Mar	4,700	1,900	2,800	4	2
1995	Jun	8,600	1,000	7,600	2	0
1996	Feb	5,000	3,000	2,000	6	54
1997	Jan	9,700	5,700	4,000	3	1
1997	May	1,900	800	1,100	4	0
1999	May	3,500	500	3,000	25	21
2000	Mar	7,000	5,400	1,600	17	16
2000	Mar	7,000	4,000	3,000	31	81
2002	May	1,300	900	400	6	0
2002	May	900	600	300	5	0
2002	May	243	193	50	3	1
2002	June	226	99	127	4	0

* These values are mean daily flows reported by the USGS for the Tuolumne River below La Grange Dam, near La Grange (USGS Gage No. 11289650). Instantaneous flows and flow fluctuations were not reported in the FERC documents for these surveys.

Source: TID and MID 2005a.

Table 5.3.2-22 Location and period of record for thermographs in use from 1987 to present.

Location	River Mile	Water Temperature			
		Daily Data Period of Record		Hourly Data Period of Record	
La Grange Bridge	51.8	---	---	11/14/2001	Present
Riffle A7	50.8	---	---	11/14/2001	Present
Riffle 3B	49.0	1/18/1990	12/8/1997	12/10/1997	Present
Riffle 4B	48.4	4/1/1987	6/20/1989	---	---
Riffle 13B	45.5	---	---	11/14/2001	Present
Riffle 19	43.4	1/30/1996	12/8/1997	12/10/1997	5/27/2004
Riffle 21	42.9	---	---	5/27/2004	Present
Turlock State Rec. Area	42.0	5/9/1987	3/17/1994	---	---
Roberts Ferry	39.5	---	---	8/11/1998	Present
Ruddy Gravel	36.7	4/1/1987	12/8/1997	12/10/1997	Present
Hickman Bridge	31.8	3/27/1987	6/30/1991	---	---
Charles Road	24.9	6/22/1988	7/2/1996	---	---
Hughson Sewer	23.6	3/20/1997	12/9/1997	12/10/1997	Present
Empire	21.6	10/1/1987	6/13/1988	---	---
Dry Creek thermograph	5.4	3/27/1987	7/18/1990	---	---
Riverdale Park	12.3	1/16/1988	1/29/1996	---	---
Shiloh Road	3.4	4/2/1987	12/9/1997	12/11/1997	Present
Dos Rios Road (SJR)	86.2	1/16/1988	1/29/1996	---	---
Gardner Cove (SJR)	79.1	4/2/1987	12/9/1997	12/11/1997	Present

Two water temperature models have been adapted for use in the lower Tuolumne River. Using water temperature and meteorological data collected from 1978-1988, a stream network temperature (SNTEMP) model (Theurer et al. 1984) was developed for the lower Tuolumne River during the late 1980s (TID and MID 1992, Appendix 18). The SNTEMP model used channel and basin geometry along with local meteorological data (i.e., air temperature, relative humidity, solar insolation, and wind speed) collected at the Modesto CIMIS weather station (with corrections for differences in elevation) to predict five-day average river temperatures from La Grange Dam (RM 52.2) to near the San Joaquin River confluence (RM 2.6) at various times throughout the year under different flow release scenarios. Seasonal results (winter, spring, summer, fall) were generated over a simulated flow range of 10 to 6,000 cfs and are presented in TID and MID (1992, Appendix 19). This SNTEMP model was used in conjunction with results of the CDFG instream flow study of habitat areas for key salmonid life stages (TID and MID 1992, Appendices 4 and 5) and the USFWS instream flow study (USFWS 1995) to evaluate combined physical and thermal habitat conditions for salmon.

More recently, a HEC-5Q model was developed for the Tuolumne River and other rivers in the San Joaquin basin as part of a CALFED-funded temperature modeling project (RMA 2008). The Tuolumne River HEC-5Q sub-model was calibrated using updated water temperature and meteorological data collected from 1996-2006. The SNTEMP model has a predicted error of ±2.7°F (1.5°C) with a 90 percent confidence interval of ±5°F (3.0°C) (TID and MID 1992, Appendix 18). The HEC-5Q model report provided no estimate of predicated error or confidence interval. The HEC-5Q model is currently undergoing review as part of a FERC ordered water temperature modeling study.

Habitat Restoration Projects

TRTAC Projects

As directed under the 1995 Settlement Agreement, the Tuolumne River Technical Advisory Committee (TRTAC) developed 10 top priority habitat restoration projects aimed at improving both geomorphic and biological components of the lower Tuolumne River corridor. These selections were made from a larger list of potential projects and were largely based on information provided in the Habitat Restoration Plan for the lower Tuolumne River Corridor (McBain & Trush 2000). The underlying conceptual models and geomorphic process based approach are described in TID and MID (2002, Report 2001-7). The selected restoration projects were separated into three broad classes based on the project goals and type of restoration activity and are described in detail in the Ten Year Summary Report (TID and MID 2005a). The following is a brief discussion of the Project classifications, adapted from TID and MID (2005a).

> *Channel and Riparian Restoration - Channel restoration types of project were identified in the Gravel Mining Reach from RM 40.3 to RM 34.3, where terrace aggregate mining is currently active. The restoration work involves channel reconstruction, setting back existing dikes between the mining pits and the river to widen the floodway, reconstruction of riffle pool sequences to increase spawning and rearing area, and planting riparian forest on the newly created floodway benches. These are considered large-scale projects given the six-mile length of the reach and the magnitude of the materials used for the restoration construction. The Gravel Mining Reach was divided into four stand alone projects (Phases I-IV).*
>
> *Predator Isolation - These types of projects are focused on reducing predator habitat and improving the survival of fry and smolts as they rear and swim through these predator habitat areas. In-channel mining created the SRPs, therefore the primary restoration activity is filling the former mined area and recreating riverine habitat more suitable for juvenile salmonid rearing and outmigration survival. Newly created floodway benches are replanted with trees and understory riparian species. There were four SRP projects initially identified in the Restoration Plan and the two SRPS at the lowest point of the SRP reach were selected as priority projects (SRP 9 and SRP 10).*
>
> *Sediment Management - The third class of projects involve sediment management ranging from cleaning fine sediments deposited in existing riffles, reducing transport of fine sediments into the principle spawning areas between Basso Bridge and La Grange, and gravel additions or infusions to create more riffles and to provide improved continuity of sediment transport for the long-term maintenance of natural fluvial process in segments of the river. There were four sediment management projects identified by the TRTAC.*

Table 5.3.2-23 summarizes the TRTAC habitat restoration projects along with the current status of each project. There are no TRTAC projects currently active.

Table 5.3.2-23 TRTAC priority habitat restoration projects on the lower Tuolumne River.

TRTAC Habitat Restoration Priority Project	Current Status	Report Reference
Channel and Riparian Restoration Projects		
Gravel Mining Reach Phase I	Completed in 2003	TID and MID (2007, Reports 2006-10 and 2006-11)
Gravel Mining Reach Phase II	Grant Funding withheld	
Gravel Mining Reach Phase III	Grant Funding withheld	
Gravel Mining Reach Phase IV	Not active	
Predator Isolation Projects		
Special Run-Pool (SRP) 9	Completed in 2001	TID and MID (2007, Report 2006-8)
Special Run-Pool (SRP) 10	Not active	
Sediment Management Projects		
Riffle Cleaning (Fine sediment)	Not active	
Gasburg Creek basin (Fine sediment)	Completed in 2007	Unknown
Gravel augmentation (Coarse sediment)	Grant Funding withheld	
River Mile 43 (Coarse sediment)	Completed in 2005	TID and MID (2006, Report 2005-7)

Source: TID and MID 2005a.

Other Habitat Restoration Projects

In addition to the TRTAC priority habitat restoration projects, other restoration efforts have been designed and implemented in the lower Tuolumne River corridor. These projects were undertaken by various agency and non-agency groups, including Friends of the Tuolumne (FOT), Tuolumne River Trust (TRT), National Resource Conservation Service (NRCS), East Stanislaus Resource Conservation District (ESRCD), USFWS, CDFG, Stanislaus County, and the cities of Waterford, Ceres and Modesto. The following is a brief listing of projects relating to aquatic resources.

CDFG Spawning Habitat Enhancement

CDFG placed about 27,000 cubic yards of gravel into the river near La Grange from 1999-2003 to increase spawning gravel area to help offset gravel losses due to the 1997 flood.

A project description and summary report was prepared by CDFG in 2004 (TID and MID 2007, Report 2006-10).

Grayson River Ranch Project

The FOT, TRT, NRCS, and ESRCD have implemented several large floodplain restoration projects on the lower Tuolumne River near Modesto, including the Grayson River Ranch project, which is a 140-acre floodplain parcel on the south bank of the Tuolumne River between RM 5 and 6. In response to severe flooding in 1997 and frequent past flooding, the property owners applied for and received a "perpetual conservation easement" for their property. The NRCS administers easement agreements in cooperation with the ESRCD, linking with various local, state, federal, and non-profit partners for funding and restoration coordination (McBain & Trush 2000).

The Grayson River Ranch project was completed in 2000-2003 by FOT. Post-project fish monitoring results are reported in Fuller and Simpson (2005).

Big Bend Floodplain Restoration Project

The TRT, in partnership with the NRCS, the CDWR, the National Oceanic and Atmospheric Association (NOAA), and the ESRCD have acquired approximately 250 acres of property on both sides of the Tuolumne River from RM 5.8 to 7.4 ("Big Bend"), approximately 5.5 miles west of the City of Modesto. The following project objectives drove the design and implementation of the project:

1. Facilitate protection of a contiguous habitat corridor along the lower Tuolumne River;
2. Improve channel-floodplain connectivity to improve natural regeneration of native riparian species, allow inundation at a greater frequency, and improve spawning habitat for Sacramento splittail and rearing habitat for juvenile Chinook salmon and steelhead trout;
3. Preserve existing riparian vegetation and plant native riparian vegetation within the floodplain appropriate to each species' life history requirements;
4. Remove invasive exotic hardwood and herbaceous vegetation; and
5. Preserve flood conveyance channel capacity and reduce risk of flood damage.

Funding covered purchase of the site as an easement, restoration design, permitting, a portion of the implementation cost, and three years of post-implementation monitoring. Project design for both grading and revegetation was completed in 2004. Current funding for implementation covers grading (minimal) on the entire site and revegetation of two of the 10 fields (approximately 60 acres) on the site. Implementation began in November 2004 with notching of berms surrounding the agricultural floodplain fields; planting of woody vegetation on the north side of the river was completed in fall 2004. Planting of woody vegetation on the south side of the river occurred in 2005 and herbaceous vegetation was planted in 2006. Three years of post-implementation monitoring are also included in the project, including monitoring of (1) floodplain inundation extent and duration, (2) fish utilization of the floodplain during high flows, and (3) establishment of riparian vegetation for both horticultural revegetation and natural recruitment.

Restoration at the Big Bend project site was completed in 2004-2006 and monitoring was conducted in 2004-2007. A Final Technical Memorandum describing the results of post-project monitoring was prepared by Stillwater Sciences and provided to the TRTAC in March 2008.

Bobcat Flat Project

Further upstream in the dredger tailings reach, CBDA has funded a proposal by FOT to acquire about 250 acres of river and floodplain habitat at Bobcat Flat (RM 42.4 to 44.6). A restoration plan was developed (TRTAC RM 43 project is within this area), with a goal of enhancing natural floodplain function at the parcel, which has approximately two miles of river frontage (McBain & Trush 2000). The Phase I Project Completion Report was prepared by McBain & Trush in March 2006 TID and MID (2006, Report 2005-7).

Adaptive Management Forum

The Adaptive Management Forum (AMF) was initiated in 2001 to review designs for current restoration projects in Central Valley rivers and assist the resource agencies and the individual tributary restoration teams with the incorporation of adaptive management, as defined in the CALFED Ecosystem Restoration Program Plan, Strategic Plan for Ecosystem Restoration (CALFED Bay Delta Program 2000), into the design, implementation and monitoring of restoration. The AMF panel of scientific and technical experts reviewed and made recommendations concerning each tributary restoration project individually. In its final report the AMF described institutional constraints and technical issues facing Tuolumne River restoration projects and made recommendations for incorporating adaptive management into projects and maximizing restoration success (Adaptive Management Forum Scientific and Technical Panel, and Information Center for the Environment 2004).

Current Fish Resource Management Plans

To implement the Section 8 adaptive management strategy and achieve the Section 9 goals, the 1995 Settlement Agreement and the 1996 FERC Order established a fish management program for the lower Tuolumne River to be administered by the Districts. The program consists of the following elements:

- Program Administration and Coordination;
- Instream Flow Management;
- Non-Flow Measures (Habitat Restoration Projects);
- Restoration Project Monitoring; and
- Riverwide Monitoring (Physical Conditions, Chinook Salmon, and Biological Communities).

The results and status of these program elements as they pertain to aquatic resources are summarized above. Additional detail is provided in the 2005 Ten Year Summary Report (TID and MID 2005a). The Districts are continuing to implement some program activities on a voluntary basis, beyond the 10-year term of the 1996 FERC Order.

Additional fish resource management plans or programs that apply to the lower Tuolumne River include:

- Vernalis Adaptive Management Program (VAMP). VAMP was initiated in 2000 as part of SWRCB Decision 1641. It is a large-scale, long-term (12-year) management program designed to protect juvenile Chinook salmon outmigrating from the Tuolumne, Merced, and Stanislaus Rivers through the Sacramento-San Joaquin Delta. VAMP is also a scientific experiment designed to assess salmon survival rates in response to modifications in San Joaquin River flows, SWP/CVP exports, and the installation of the Head of Old River barrier (HORB).
- CALFED Ecosystem Restoration Program Plan, Strategic Plan for Ecosystem Restoration (CALFED Bay Delta Program 2000);
- Final Restoration Plan for the Anadromous Fish Restoration Program: A Plan to Increase Natural Production of Anadromous Fish in the Central Valley of California (USFWS 2001);

- 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 2009).

Benthic Macroinvertebrate

Benthic macroinvertebrate (BMI) monitoring has been conducted by the Districts in the lower Tuolumne River since 1987. The sampling locations, design, methodology, and analysis metrics have varied over the years (Table 5.3.2-24).

The initial studies conducted in 1987 assessed the effects of flow magnitude on wetted areas and food supply for salmonids and other resident fish. The results showed the lower Tuolumne River supports a high species diversity of aquatic invertebrates and indicated that juvenile Chinook salmon preferentially preyed on chironomids (midges), ephemeropterans (mayflies), and dipterans (true flies) (TID and MID 1992, Appendix 16). BMI monitoring continued through 2000 in conjunction with summer flow fisheries monitoring, with sampling conducted primarily at Riffle 4A (RM 48.8) using Hess sampling methodology (Table 5.3.2-1). Taxonomic identification and analysis methods for these samples generally followed those described by Plafkin et al. (1989) for use in Rapid Bioassessment Protocols (RBP) of the EPA (TID and MID 1992, Appendix 28). No samples were collected in 1999 due to logistical reasons, or in the high flow years of 1995 and 1998.

Beginning in 2001, BMI sampling in the lower Tuolumne River was modified to adapt to the CDFG version of EPA's RBP then known as the California Stream Bioassessment Procedure (CSBP) and later, since 2004, the California Monitoring and Assessment Program (CMAP) (both of which are precursors to the current SWAMP protocol). Both CSBP and CMAP protocols employ standardized methods for assessing the BMI community and physical habitat within a stream and utilize cross-sectional kick-net sampling as the primary data collection method. Sampling was initiated at several new sites in the lower Tuolumne River beginning in July 2001 to increase longitudinal coverage in the river and ensure consistency with CSBP/CMAP protocols. In addition to these sites, Hess sampling was continued at Riffle 4A and introduced at Riffle 23C (RM 42.3) to maintain consistency with previous results and provide a means of quantifying BMI density more precisely than kick-net methodology. A summary of the BMI sampling from 2001-2009 is shown in Table 5.3.2-25. No samples were collected in 2006 due to high flows.

Results of the CSBP/CMAP metrics from kick-net samples collected at lower Tuolumne River sites exhibit a pattern of generally decreasing habitat quality from upstream (high) to downstream (low) (Table 5.3.2-26).

Although long-term comparisons of historical data collected prior to water year 2000 are somewhat confounded by differences in invertebrate emergence timing as well as sampling methodology, Table 5.3.2-27 provides a long-term comparison of Hess samples collected at Riffles 4A (RM 48.4) and 23C (RM 42.3). Analysis of Hess sampling data gathered from 1988-2009 at Riffle 4A (RM 48.8) support the observations that increased summer flows since the

Table 5.3.2-24 Benthic macroinvertebrate sampling locations (RM), dates, methods, and quantities of samples collected in the lower Tuolumne River (1987-2000).

Year	Month	Sampling Location									Notes
		Riffle 4A			Riffle 5	Charles Rd.		McClesky			
		RM 48.8			RM 48.0	RM 24.9		RM 6.0			
		Sampling Methodology and Number of Samples[1]									
		Hess	Kick	Drift	Kick	Kick	Drift	Hess	Drift	Ponar	
1987	MAY	28 (32)		17		16	22 (24)	20	12 (24)	8 (9)	Collected near fry rearing observations
	SEP	11 (12)		8 (36)		11 (12)	8 (27)	5	6 (27)	12	
1988	FEB	20		20 (30)		18 (20)	10 (30)	20	10 (30)	0 (9)	Summer flow study baseline
	MAY	12	1		1						Summer flow studies (TID-MID 1992, 1997)
	SEP	12			1						
1989	APR	12	2 (2)								
	MAY	12									
	SEP	12									
1990	MAY	12									
	OCT	12									
1991	JUN	12									
	SEP	12									
1992	MAY	6 (12)									
	SEP	6 (12)									
1993	MAY	6 (12)									
	OCT	6 (12)									
1994	AUG	6 (12)									Interim Riffle 4A monitoring (see TID-MID 2003)
1996	AUG	6 (12)									
1997	JUL	6 (12)									
2000	JUL	6 (12)									

[1] Numbers in parentheses indicate total samples collected, as compared with number of samples analyzed.
Source: TID and MID 2010, Report 2009-7.

Table 5.3.2-25 BMI sampling locations (RM), dates, methods, and quantities of samples collected in the lower Tuolumne River (2001-2009).

Year	Month	Sampling Location													
		Riffle A4	Riffle 4A		Riffle 7	Riffle 13B	Riffle 17	Riffle 20C	Riffle 21	Riffle 23C		Riffle 31	Riffle 33	Riffle 57	Riffle 72
		RM 51.6	RM 48.8		RM 46.9	RM 45.5	RM 44.2	RM 43.2	RM 42.9	RM 42.3		RM 38.1	RM 37.7	RM 31.5	RM 25.4
		Sampling Methodology													
		Kick	Hess	Kick	Kick	Kick	Kick	Kick	Kick	Hess	Kick	Kick	Kick	Kick	Kick
2001	JUL	1	6						1	6				1	
2002	JUL	1	6	6						3	3		1	1	1
2003	JUL	1	3	1						3	1	1		1	1
2004	JUL	1	3	2						3	1	1		1	1
2005	AUG	1	6	1						6	1	1		1	1
2007	JUL	1	6	1						6	1	1		1	1
2008	MAY				3	3	3	3			3				
	JUL	1	6	1						6	1	1		1	1
2009	JUL	1	6	1						6	1	1		1	1

Adapted from TID and MID 2010, Report 2009-7.

Table 5.3.2-26 Selected CMAP metrics for historical kick-net samples collected in the lower Tuolumne River, by RM (2001-2009).

Year	***2001***						***2002***						***2003***					
Riffle	**A4**	**4A**	**23C**				**A4**	**4A**	**23C**	**31**	**57**		**A4**	**4A**	**23C**	**31**	**57**	**72**
RM	**51.6**	**48.8**	**42.3**				**51.6**	**48.8**	**42.3**	**38.1**	**31.5**		**51.6**	**48.8**	**42.3**	**38.1**	**31.5**	**25.4**
Taxonomic Richness	25	21	25				20	22	20	25	23		25	33	21	21	30	22
EPT Taxa	8	6	7				5	7	5	8	5		7	8	9	7	10	7
Ephemeroptera Taxa	2	4	3				1	3	2	5	4		3	3	5	5	6	3
Plecoptera Taxa	1	0	0				1	0	0	0	0		1	0	0	0	0	0
Trichoptera Taxa	5	2	4				3	4	3	3	1		3	5	4	2	4	4
Abundance (total in sample)	1,307	835	1,642				6,680	833	310	1,642	944		3,554	7,548	1,611	943	1,110	335
Density (No./m^2)	6,873	3,655	8,634				35,953	4,482	1,668	8,634	5,079		6,231	13,234	2,825	1,654	1,946	587
Year	***2004***						***2005***						***2007***					
Riffle	**A4**	**4A**	**23C**	**31**	**57**	**72**	**A4**	**4A**	**23C**	**31**	**57**	**72**	**A4**	**4A**	**23C**	**31**	**57**	**72**
RM	**51.6**	**48.8**	**42.3**	**38.1**	**31.5**	**25.4**	**51.6**	**48.8**	**42.3**	**38.1**	**31.5**	**25.4**	**51.6**	**48.8**	**42.3**	**38.1**	**31.5**	**25.4**
Taxonomic Richness	28	23	20	25	27	26	31	33	37	23	20	16	25	28	28	17	23	22
EPT Taxa	8	9	7	10	11	8	7	10	7	5	4	5	9	8	9	6	11	8
Ephemeroptera Taxa	4	4	5	7	7	4	3	5	5	3	3	3	5	5	5	4	6	4
Plecoptera Taxa	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0
Trichoptera Taxa	3	5	2	3	4	4	3	4	2	1	1	2	4	3	4	2	5	4
Abundance (total in sample)	3,519	3,468	2,749	2,232	813	659	1,057	1,031	463	1,201	513	273	306	522	388	247	428	240
Density (No./m^2)	6,169	6,081	4,820	3,913	4,276	3,466	1,853	1,808	812	2,106	899	479	537	915	680	433	750	421
Year	***2008***						***2009***											
Riffle	**A4**	**4A**	**23C**	**31**	**57**	**72**	**A4**	**4A**	**23C**	**31**	**57**	**72**						
RM	**51.6**	**48.8**	**42.3**	**38.1**	**31.5**	**25.4**	**51.6**	**48.8**	**42.3**	**38.1**	**31.5**	**25.4**						
Taxonomic Richness	24	30	16	16	23	27	27	33	27	27	30	29						
EPT Taxa	7	10	9	9	7	7	5	9	9	11	10	8						
Ephemeroptera Taxa	3	6	7	6	4	2	2	5	6	6	6	4						
Plecoptera Taxa	0	1	0	0	0	0	0	1	0	0	0	0						
Trichoptera Taxa	4	3	2	3	3	5	3	3	3	5	4	4						
Abundance (total in sample)	296	360	275	185	118	345	4,720	1,507	2,146	882	428	1,189						
Density (No./m^2)	520	632	483	324	207	606	8,280	2,643	3,765	1,547	750	2,086						

Adapted from TID and MID (2010, Report 2009-7).

Table 5.3.2-27 BMI community metrics for long-term Hess sampling sites at riffles R4A (RM 48.8) and R23C (RM 42.3) in the lower Tuolumne River (1988-2009).

Year	San Joaquin Valley Water Year Indexa	Summer Flow (cfs)	30-Days Prior Flow (cfs)	Sampling Location	EPT Index (%)	EPT / Chironomid Ratio	Shannon Diversity	Percent Chironomid	Percent Insects	Percent Dominant Taxon	Density [No./m^2]
1988	1.48 (C)	16	16	R4A	9	0.52	2.28	29	53	19	33,700
1989	1.96 (C)	47	45	R4A	35	0.94	2.4	38	81	24	34,400
1990	1.51 (C)	21	26	R4A	14	0.26	2.13	53	81	33	52,658
1991	1.96 (C)	25	22	R4A	26	1.05	2.64	25	60	19	35,047
1992	1.56 (C)	20	23	R4A	14	0.28	2.13	60	76	38	23,272
1993	4.2 (W)	466	464	R4A	15	0.38	1.77	44	66	41	24,813
1994	2.05 (C)	23	23	R4A	22	1.73	2.62	17	42	22	3,897
1996	4.12 (W)	335	189	R4A	84	11.09	1.59	8	93	47	22,987
1997	4.13 (W)	283	290	R4A	28	0.45	1.31	63	94	62	20,780
2000	3.38 (AN)	459	305	R4A	52	2.57	2.13	25	79	33	28,832
2001	2.2 (D)	91	89	R4A	44	1.44	2.7	30	30	25	17,037
				R23C	48	2.17	2.43	22	75	30	15,528
2002	2.34 (D)	85	87	R4A	49	1.52	2.0	34	84	40	24,798
				R23C	11	0.38	2.26	32	59	31	11,649
2003	2.82 (BN)	241	240	R4A	41	0.85	2.32	48	90	32	23,547
				R23C	51	8.16	2.37	8	65	28	11,767
2004	2.21 (D)	113	114	R4A	68	3.18	1.92	21	90	52	28,994
				R23C	79	26.86	1.79	3	84	48	19,120
2005	4.75 (W)	1706	803	R4A	76	7.52	1.56	10	95	64	27,440
				R23C	85	15.34	1.42	3	98	66	6,710
2007	1.96 (C)	110	118	R4A	58	1.91	2.73	30	90	26	10,040
				R23C	80	15.95	1.84	5	89	59	4,143
2008	2.07 (C)	96	102	R4A	61	0.88	2.58	18	80	28	4,733
				R23C	68	23.28	2.12	3	86	48	2,762
2009	2.73 (BN)	116	110	R4A	50	1.82	2.79	28	79	19	28,516
				R23C	49	12.99	2.33	4	71	36	23,917

Source: TID and MID 2010, Report 2009-7.

1995 FSA have resulted in beneficial shifts in food supply for fishes. Although overall invertebrate abundances in Riffle 4A samples declined slightly in the post-FSA period (1996 to the present), community composition shifted away from pollution-tolerant organisms and towards those with higher food value for juvenile salmonids and other fish (TID and MID 2010, Report 2009-7).

Aquatic Turtles and Reptiles

One source document was identified regarding aquatic turtle and reptile sources in the lower Tuolumne River:

California Academy of Sciences (2010)

The California Academy of Sciences Herpetology Classification Database was queried using California and Tuolumne River as search filters. Queries produced one record for the lower Tuolumne River. The western pond turtle was collected in 1989 (CAS Collection No. 173759) in the Tuolumne River, approximately one mile upstream from the Shiloh Road Bridge, near the confluence with the San Joaquin River.

5.3.3 Special-Status Aquatic Species

For the purpose of this PAD, a species is considered to be a special-status aquatic species (i.e., fish, amphibian, aquatic reptile, mollusk, or invertebrate) if it has a reasonable possibility of occurring in the immediate Project area and meets one or more of the following criteria:

- Found on public land administered by the BLM, and formally listed as Sensitive (BLM-S) on BLM’s Animal Sensitive Species List (BLM 1980).
- Found on NMFS List of Species of Concern (NMFS 2009), and listed as a Species of Concern (NMFS-S).
- Found on the CDFG Commission’s list of State and Federally Listed Endangered and Threatened Animals of California (CDFG 2010a). Species on the list that are considered special-status for the purpose of this relicensing are those that are candidates for listing under the CESA as endangered (SCE), threatened (SCT), or a candidate for delisting (SCD). Also considered special-status, are those wildlife species CDFG has designated Species of Special Concern (SSSC)[5].
- Species found on the list of species afforded protection under the federal ESA that are proposed for listing as endangered or threatened under the ESA (FPE and FPT, respectively), a candidate for listing under the ESA (FC), or proposed for delisting from the ESA (FPD)[6] and occur in the Project area, which includes the USGS 1:24,000 topographic quadrangles Chinese Camp (458C), La Grange (440B), Moccasin (458D), Penon Blanco Peak (440A), Sonora (458B), and Standard (458A) (USFWS 2010,

[5] Species listed as threatened (ST) or endangered (SE) under the CESA, and species that are considered Fully Protected (SFP) are not considered special-status for the purpose of the relicensing proceeding. These species are discussed separately in the Threatened and Endangered section of this PAD (Section 5.5).

[6] Species listed as threatened (FT) or endangered (FE) under the ESA are not considered special-status for the purpose of the relicensing proceeding. These species are discussed separately in the Threatened and Endangered section of this PAD (Section 5.5).

Appendix B). Species listed or proposed for listing as endangered or threatened under the ESA are discussed in Section 5.5. (USFWS 2010a,b)

Based on these criteria, eight special-status aquatic species may occur in the Project area or otherwise be affected by Project operations and maintenance activities. These include:

- **Fishes**
  - Central Valley Fall- and Late-Fall Run Chinook Salmon (*Oncorhynchus tshawytscha*) Evolutionarily Significant Unit (ESU) (NMFS-S, SSC)
  - Hardhead (*Mylopharodon conocephalus*) (SSC)
  - Sacramento Splittail (*Pogonichthys macrolepidotus*) (SSC)
  - Sacramento-San Joaquin Roach (*Lavinius symmetricus symmetricus*) (SSC)
  - Red Hills Roach (*Hesperoleucus symmetricus*) (SSC, BLM-S)
- **Amphibians**
  - Foothill yellow-legged frog (*Rana boylii*) (SSC, BLM-S)
- **Aquatic Reptiles**
  - Western pond turtle (*Actinemys marmorata*) (SSC)

5.3.3.1 Fishes

Central Valley Fall- and Late-Fall Run Chinook Salmon ESU (NMFS-S, SSC)

Chinook salmon are the largest of the Pacific Salmon, with adults often exceeding 40 pounds; individuals over 120 pounds have been reported. Chinook salmon appear similar to Coho salmon while at sea (blue-green back with silver flanks), except for their large size, small black spots on the tail, and black along the base of the teeth. Adults migrate from the ocean into the freshwater streams and rivers of their birth to mate (called anadromy). They spawn once and then die (called semelparity). Chinook feed on terrestrial and aquatic insects and other crustaceans while young, and mostly on other fishes when older. Their population exhibits considerable variation in size and age of maturation and migration timing.

In the Central Valley, juvenile fall-run Chinook can spend up to six months rearing in freshwater before emigrating; late-fall-run Chinook salmon oversummer in their natal reaches and can remain there for as much as a year before migrating to sea. As the time for migration to the sea approaches, juveniles lose their parr marks, the vertical bars and spots useful for camouflage, and gain the dark back and light belly colors of open water fish. They seek deeper water, avoid light, and their gills and kidneys begin to change so that they can process salt water. They then spend one to four summers at sea, with San Joaquin River fall-run Chinook spending the least, and late-fall-run Chinook spending the most time at sea, on average (Myers et al. 1998). Fall-run Chinook return to freshwater in September-October and late-fall run Chinook in December or January. Adult females will prepare a redd (or nest) in a stream with suitable gravel type, water depth and velocity. The adult female may deposit eggs in four to five "nesting pockets" in a single redd. After laying eggs, adults guard them for four to 25 days before dying. The eggs hatch, depending upon temperature, after 90 to 150 days. Presently, fall- and late-fall-run Chinook spawn in the Tuolumne River.

Adult Chinook salmon typically enter the lower Tuolumne River to spawn, downstream of the Project (see Table 5.3.2-1 above), from October through December. Spawning activity usually peaks in November. The age of returning adults ranges from two to five years, with the majority of returning females being three-year olds (TID and MID 2005). Spawner abundance varies by year-class depending on a myriad of conditions, including freshwater survival, ocean conditions, harvest, and other factors (TID and MID 2005).

TID and MID (2005) report that the majority of Chinook salmon spawning occurs upstream of Waterford (RM 30) and is heavily concentrated in the reach upstream of RM 46 near La Grange. The period of fry emergence varies, depending upon the timing of adult arrival and incubation temperature. It typically extends from January through March but has been documented to occur as early as December and as late as May (potentially late-fall-run Chinook salmon) (TID and MID 2005). Young salmon leave the river as fry, juveniles, sub-yearlings (smolts), or yearlings. Large numbers leave the river as fry (<2 inches fork length [FL]), particularly during years with higher winter flows, to enter the San Joaquin River and Delta. Sub-yearlings emigrate from February through May, with most smolts being >3 inches FL and migrating from March through May (TID and MID 2005). A few salmon may over-summer in the river and emigrate during the late fall or early winter. The relative importance of these life history strategies in contributing to recruits is not well understood, but it generally appears that fry and sub-yearlings have better survival in wetter years (TID and MID 2005).

Hardhead (SSC)

The hardhead is a large cyprinid (minnow) species (up to 23 inches long) that generally occurs in large, undisturbed, low- to mid-elevation, cool- to warm-water rivers and streams (Moyle 2002). Hardhead was designated a SSC by CDFG in 1995, and is listed as a Class 3 Watch List species, meaning that it occupies much of its native range but was formerly more widespread or abundant within that range (CDFG 2009, 2010a). Hardhead mature following their second year. Spawning migrations in the spring into smaller tributary streams are common. The spawning season may extend into August in the foothill streams of the Sacramento and San Joaquin River basins. Spawning behavior has not been well documented, but hardhead appear to elicit mass spawning in gravel riffles (Moyle 2002). Little is known about life stage-specific temperature requirements of hardhead; however, temperatures ranging from approximately 65 to 75°F are believed to be suitable (Moyle 2002). Hardhead are omnivores, feeding primarily on benthic invertebrates and aquatic plant material (Moyle 2002).

Historically, hardhead were widely distributed and locally abundant in the Central Valley. Their specialized habitat requirements, widespread alteration of downstream habitats, and predation by smallmouth bass have resulted in population declines and isolation of populations (Moyle 2002). Hardhead also have been abundant in reservoirs. However, most of these reservoir populations have proved to be temporary, presumably the result of colonization of the reservoir by juvenile hardhead before introduced predators became established. Brown and Moyle (1993) observed that hardhead disappeared from the upper Kings River when the reach was invaded by bass. Hardhead have been found in the Tuolumne River both upstream and downstream of the Project, as described above in Table 5.3.2-1.

Sacramento Splittail (SSC)

The Sacramento splittail, a minnow, was federally listed as threatened on February 8, 1999, and delisted on September 22, 2003 (68 FR 55139-55166). They are currently designated as a SSC

(CDFG 2009). Splittail are large cyprinids that can grow to 12 inches or more. Unlike most minnows, they are adapted to living in estuarine habitats and alkaline lakes and sloughs as well as freshwater (Moyle 2002).

Historically, splittail inhabited sloughs, lakes, and rivers of the Central Valley with populations extending upstream to Redding in the Sacramento River, to Butte Creek/Sutter Bypass, to Oroville in the Feather River, to Folsom in the American River, and to Friant in the San Joaquin River (Moyle et al. 2004). The current distribution is limited by dams and other barriers. The species largely confined to the Delta, Suisun Bay, Suisun Marsh, Napa River, Petaluma River, and other parts of the Sacramento-San Joaquin estuary (Moyle 2002). Currently, the species is known to migrate up the Sacramento River to Red Bluff Diversion Dam and up the San Joaquin River to Salt Slough in wet years as well as into the lower reaches of the Feather and American Rivers. Successful spawning has been recorded in the lower Tuolumne River during wet years in the 1980s, with both adults and juveniles observed near Modesto, near RM 8.

Sacramento-San Joaquin Roach (SSC)

The Sacramento-San Joaquin roach, a SSC, is part of the California roach complex, which is composed of various subspecies. The Sacramento-San Joaquin roach is found in the Sacramento and San Joaquin River drainages, except the Pit River, as well as other tributaries to San Francisco Bay. Sacramento-San Joaquin roach are generally found in small, warm intermittent streams, and are most abundant in mid-elevation streams in the Sierra foothills and in the lower reaches of some coastal streams (Moyle 2002). Assuming that the Sacramento-San Joaquin roach is indeed a single taxon (which is unlikely), it is abundant in a large number of streams although it is now absent from a number of streams and stream reaches where it once occurred (Moyle 2002). Roach are tolerant of relatively high temperatures (86 to 95°F) and low oxygen levels (one to two ppm) (Taylor et al. 1982). However, they are habitat generalists, also being found in cold, well-aerated clear "trout streams (Taylor et al. 1982), in human-modified habitats (Moyle 2002) and in the main channels of rivers. Adult Sacramento-San Joaquin roach have been observed and documented in the general vicinity of the Project, more specifically in Hatch and Second Creeks, and Rough and Ready Creek.

Red Hills Roach (SSC)

The Red Hills roach, also part of the California roach complex, is a peculiar but un-described subspecies (or species) of roach (Moyle 2002). The Red Hills roach is a recently discovered population of California roach (Brown et al. 1992 *as cited* in Jones et al. 2002), with abundant populations found in several pools of permanent water located along the intermittent streams which drain into Six Bit Gulch and Poor Man's Gulch (Brown et al.1992; Moyle et al. 1995 *as cited* in Jones et al. 2002; BLM 2009). It is thought that the permanent pools are spring-fed (BLM 2009). During the dry part of the year, the fish are confined to these permanent pools surviving in warm shallow water until spring when they move upstream to spawn (BLM 2009). The Red Hills variety of California roach has unique morphologic characteristics, which make them noticeably different from other roach populations, notably a chisel lip. The chisel lip is used to scrape algae, a major food source, off submerged rocks (BLM 2009). The Red Hills region is currently listed as an ACEC by the BLM as well as an Aquatic Diversity Management Area (Moyle 1996). The Red Hills roach is specifically found in areas characterized by serpentine soils and stunted vegetation (Moyle 2002).

5.3.3.2 Amphibians

Foothill Yellow-Legged Frog (SSC)

The foothill yellow-legged frog (FYLF) is a stream-adapted species, usually associated with shallow, flowing streams with backwater habitats and coarse cobble-sized substrates (Jennings and Hayes 1994) between approximately 600- to 5,000-foot elevation (Seltenrich and Pool 2002). Populations occur on at least some portions of most drainages with known historical occurrences (NatureServe© 2009).

FYLF populations may require both mainstem and tributary habitats for long-term persistence. Streams too small to provide breeding habitat for this species may be critical as seasonal habitats (e.g., in winter and during the hottest part of the summer) (Seltenrich and Pool 2002), and there is evidence that habitat use by young-of-the-year, sub-adult, and adult frogs differs by age-class and changes seasonally (Randall 1997). Breeding tends to occur in spring or early summer and eggs are laid in areas of shallow, slow-moving waters near the shore. FYLF is less abundant in habitats where introduced fish and bullfrogs are present (Jennings and Hayes 1994).

FYLF occurs in the general vicinity of the Project but is not recorded in the Project Boundary. MYZ (2010) reports two occurrences of FYLF within 10 miles: Turnback Creek (7.6 miles east, 1951) and Woods Creek (8.9 miles east, 1949). CAS (2010) has a 1927 record of two FYLF from 6.26 miles northeast of the Project, in Tuolumne. CDFG (2010b, Appendix A) reports four occurrences of FYLF in the general vicinity of the Project: one occurrence at Hatch Lake (on BLM land); one occurrence at Second Lake (on private land); one occurrence near the confluence of Big Jackass Creek and Moccasin Creek (on BLM land); and one occurrence south of Table Mountain (on private land). In addition, the USFS has found FYLF within the Don Pedro watershed at Hunters Creek, 6.3 miles northeast (S. Holeman, pers. comm., 2010). Also, BLM reports FYLF in an unnamed tributary near Moccasin Peak 0.3 mile east (P. Cranston, pers. comm., 2010).

5.3.3.3 Aquatic Turtles and Reptiles

Western Pond Turtle (SSC)

The western, or Pacific, pond turtle occurs in a wide variety of aquatic habitats up to 6,000 feet elevation, particularly permanent ponds, lakes, side channels, backwaters, and pools of streams, but is uncommon in high-gradient streams (Jennings and Hayes 1994). Western pond turtle has declined due to loss of habitat, introduced species, and historical over-collection (Jennings and Hayes 1994), and has been designated as SSC. Isolated occurrences of western pond turtle in lakes and reservoirs sometimes occur from deliberate releases of pets. Although highly aquatic, western pond turtle often overwinters in forested habitats and eggs are laid in shallow nests in sandy or loamy soil in summer at upland sites as much as 1,200 feet from aquatic habitats (Jennings and Hayes 1994). Hatchlings do not typically emerge from the covered nests until the following spring. Reese and Welsh (1997) documented western pond turtle away from aquatic habitats for as much as seven months a year and suggested that terrestrial habitat use was at least in part a response to seasonal high flows. Basking sites are an important habitat element (Jennings and Hayes 1994) and substrates include mud banks, rocks, logs, and root wads on banks (Ashton et al. 1997). Terrestrial activities include basking, overwintering, nesting, and moving between ephemeral sources of water (Holland 1991). 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. Adult western pond turtles 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). During the terrestrial period, Reese and Welsh (1997) found that radio-tracked western pond turtles were burrowed in leaf litter. Introduced species of turtles (e.g., red-eared sliders) may out-compete western pond turtle for basking sites, and bullfrogs are known to consume hatchling western pond turtles.

WPT occurs in the general vicinity of the Project but is not recorded in the Project Boundary. CDFG (2010b) reports three occurrences of western pond turtle in the general vicinity of the Project: (1) Moccasin Creek (1988); (2) Piney Creek, north of Lake McClure and east of Don Pedro Reservoir (before 1996); and (3) Table Mountain (2003). In addition, the USFS has found WPT within the Don Pedro watershed at Big Creek and Hunters Creek, 7.7 miles east and 6.3 miles northeast, respectively (S. Holdeman, pers. comm., 2010). Furthermore, Germano and Bury (2001) confirm a large presence of this species in the Tuolumne River, which provides good habitat. Also, BLM reports WPT records in First Creek and in an unnamed tributary just west of Moccasin Peak, 0.8 mile east (P. Cranston, pers. comm., 2010).

5.3.4 Aquatic Invasive Species

Aquatic invasive species of concern include four species of mussels: quagga mussels (*Dreissena rostriformis bugensis*), zebra mussels (*Dreissena polymorpha*), golden mussels (*Limnoperna fortune*), and conrad false mussels (*Mytilopsis leucophaeta*). Of these species, quagga and zebra mussels have been a source of significant operational problems and maintenance expenditures for water projects in the eastern U.S. for decades. Quagga mussels were found in four western states in 2007, quickly expanding their geographic reach in the western U.S. In California, quagga mussels have been found in the Colorado River, and in reservoirs in Riverside and San Diego counties that receive Colorado River water. The zebra mussel was found in California for the first time in January 2008 at the San Justo Reservoir in San Benito County. These mussels could threaten water delivery and irrigation systems by clogging intake pipes and other conveyance structures (California Department of Fish and Game (CDFG 2008a).

Mussels are introduced to water bodies from the hulls of boats and through ballast water collected in mussel-invaded waters. The larval mussel life stage is free-floating and microscopic; consequently they can freely enter ballast water as well as bilges, live wells, or other equipment that holds water. Although they range from microscopic to the size of a fingernail, the mussels are prolific breeders and attach themselves to hard and soft surfaces, such as boats and aquatic plants. They can survive out of water for up to a week.

The New Zealand mudsnail, another invasive species, has been found in over 20 California water bodies such 2000, recently in Lake Shasta in December 2007 (CDFG 2008b) and most recently in water bodies in Stanislaus County.

Don Pedro is vulnerable to the introduction of invasive species such as quagga and zebra mussels from the high number of boats that utilize the lake each year. Based on the impacts of these mussels to other water systems and the high cost of controlling the population once it has been introduced, an invasion of quagga mussels could be a significant water quality and operational issue.

A report on the *Potential Distribution of Zebra Mussels (Dreissena polymorpha) and Quagga Mussels (Dreissena bugensis) in California*, prepared for CDFG, assessed the threat of quagga mussels to California water bodies based on the quagga mussel's tolerance for various parameters, namely; temperature, calcium, pH, dissolved oxygen, and salinity (San Francisco Estuary Institute, 2007). Based on the levels of these parameters, Don Pedro Reservoir is not vulnerable to colonization; the Tuolumne River at Modesto is considered vulnerable, but was given a low priority designation.

Since June 2008, MID has been monitoring for mussels at its treatment system using vertical plates, which are inspected every two weeks for any possible mussel infestation. MID has not detected any mussels since monitoring began.

5.4 Wildlife and Botanical Resources

5.4.1 Wildlife

5.4.1.1 Wildlife Habitat

Based on the vegetation patterns in the general vicinity of the Project (see Section 5.4.2 below), wildlife habitats within the Project Boundary and in the area immediately surrounding the Don Pedro Project are classified using CDFG's California Wildlife Habitat Relationship (CWHR) system (de Becker and Sweet 2005; CDFG 2008).

Table 5.4.1-1 presents the CWHR habitat types identified within the Project Boundary, and Table 5.4.1-2 presents the CWHR habitat types identified for the area immediately surrounding the Project. Both tables also show the corresponding USFS CalVeg vegetation type (USFS 2004; de Becker and Sweet 2005). A description of these CalVeg types and the methods used by the Districts for vegetation mapping are presented in Section 5.4.2 (Upland Vegetation) of the Botanical Resources section of the PAD. The dominant CWHR habitat type within the Project Boundary is Lacustrine, while the dominant CWHR habitat type in the area immediately surrounding the Project Boundary is blue oak woodland.

In addition to classifying wildlife habitat, the CWHR model predicts wildlife presence and use based on habitat type, age class, size class, canopy closure or cover, and occurrence of specific habitat elements (e.g., natural or manmade features such as cliffs, springs, or transmission lines) that may influence thermal cover, forage, prey availability, nesting, escape cover, and breeding.

Using the identified habitat types, CDFG's CWHR system (CDFG 2008) was queried in order to identify terrestrial wildlife species with the potential to occur in the area surrounding the Project. The query was performed for Tuolumne County. A total of 339 terrestrial vertebrate species were identified, of which 32 are special-status (CDFG 2008). These species include one reptile, 19 birds, and 12 mammals. Special-status amphibians and aquatic reptiles are discussed in the Fish and Aquatic Resources Section of this PAD (Section 5.3).

Table 5.4.1-1 CWHR wildlife habitat types for the area within the Project Boundary and their equivalent CalVeg community types.

California WHR[1]	CalVeg Community Types[2]	Acres	%
Irrigated Row and Field (CRP)	Agriculture (General)	0.0	0.0
Annual Grasslands (AGS)	Annual Grasses and Forbs	2,280.5	12.4
Barren (BAR)	Barren	549.7	3.0
Blue Oak Woodland (BOW)	Blue Oak, Interior Live Oak	3,504.6	19.1
Montane Hardwood (MHW)	Canyon Live Oak	0.2	0.0
Chamise-Redshank Chaparral (CRC)	Chamise	542.2	3.0
Douglas-Fir (DFR)	Douglas-Fir - Ponderosa Pine	5.2	0.0
Blue Oak - Foothill Pine	Gray Pine	447.5	2.4
Montane Hardwood (MHW)	Interior Mixed Hardwood	0.6	0.0
Mixed Chaparral (MCH)	Lower Montane Mixed Chaparral	277	1.5
Ponderosa Pine (PPN)	Ponderosa Pine	0.0	0.0
Montane Riparian (MRI)	Riparian Mixed hardwood	0.0	0.0
Lacustrine (LAC)	Water (General)	10,762.6	58.6
	Total	**18,370.1**	**100**

1 Source: de Becker and Sweet 2005, Updated 2008.
2 Source: USFS 2004.

Table 5.4.1-2 CWHR wildlife habitat types for the area immediately surrounding the Project Boundary and their equivalent CalVeg community types.

California WHR[1]	CalVeg Community Types[2]	Acres	%
Irrigated Row and Field (CRP)	Agriculture (General)	21.9	0.0
Annual Grasslands (AGS)	Annual Grasses and Forbs	9,830.7	19.8
Barren (BAR)	Barren	571.5	1.2
Blue Oak Woodland (BOW)	Blue Oak, Interior Live Oak	16,842.4	34.00
Montane Hardwood (MHW)	Canyon Live Oak	120.3	0.2
Chamise-Redshank Chaparral (CRC)	Chamise	4,739.7	9.6
Douglas-Fir (DFR)	Douglas-Fir - Ponderosa Pine	29.2	0.1
Blue Oak - Foothill Pine	Gray Pine	3,151.8	6.4
Montane Hardwood (MHW)	Interior Mixed Hardwood	37.1	0.1
Mixed Chaparral (MCH)	Lower Montane Mixed Chaparral	3,193.0	6.4
Ponderosa Pine (PPN)	Ponderosa Pine	137.7	0.3
Montane Riparian (MRI)	Riparian Mixed hardwood	5.5	0.0
Lacustrine (LAC)	Water (General)	10,853.9	21.9
	Total	**49,534.7**	**100**

1 Source: de Becker and Sweet 2005, Updated 2008.
2 Source: USFS 2004.

Although CWHR-generated lists are a useful tool for predicting general species occurrence, they should be interpreted cautiously, because errors of omission (e.g., excluding a species that is present) and commission (e.g., including a species that is absent) are likely when this broad-scale model is used for localized applications.

5.4.1.2 Special-Status Wildlife Species

For the purpose of this PAD, a special-status wildlife species is a species that has a reasonable possibility of occurring in the Project area and meets one or both of the following criteria:

- Found on lands managed by the BLM and listed on the *California - BLM Animal Sensitive Species List, Updated September 2006* (BLM 2006). These species are designated as BLM-S.
- Species designated by CDFG as Species of Special Concern (SSC) (CDFG 2009).

Wildlife species listed or proposed for listing as threatened (FT) or endangered (FE) under the federal Endangered Species Act (ESA), threatened (ST) or endangered (SE) under the California Endangered Species Act (CESA), and species that are considered Fully Protected (FP) by CDFG are not discussed in this section, regardless of any other special-status designations assigned to them. These species are discussed separately in the Threatened and Endangered Species section of this PAD (Section 5.5).

Table 5.4.1-3 presents a list of special-status wildlife species that occur or have the potential to occur in the Project area based on data available from CDFG's CNDDB (CDFG 2010b) (Attachment 5.4.1-1) and other sources located during the gathering of existing, relevant and reasonably available information. Attachment 5.4.1-2 displays the CNDDB special-status wildlife species occurrences in the Project area and in the area surrounding the Project (CDFG 2010b). Temporal and spatial information for special-status wildlife species were derived from the CWHR database (CDFG 2008). Habitat types listed in Table 5.4.1-1 were used as search criteria within CWHR, including all habitats known or likely to occur in the area surrounding the Project. Temporal data provided in this table correspond to the seasonal occurrence of the species in the area surrounding the Project. Spatial data provided in the table correspond to the habitat types typically supporting each species.

Table 5.4.1-3 includes 32 wildlife species: one reptile, 19 birds, and 12 mammals. This list includes:

- Seven species are listed as BLM-S only: black-crowned night heron (*Nycticorax nycticroax*), ferruginous hawk (*Buteo regalis*), Yuma myotis (*Myotis yumanensis*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanodes*), and western small-footed myotis (*Myotis ciliolabrum*) San Joaquin pocket moust (*Perognathus inornatus inornatus*).
- Eight species are listed as both BLM-S and SSC: coast horned lizard (*Phrynosoma coronatum*), California spotted owl (*Strix occidentalis occidentalis*), burrowing owl (*Athene cunicularia*), tricolored blackbird (*Agelaius tricolor*), northern goshawk (*Accipiter gentilis*) spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii*), pallid bat (*Antrozous pallidus*), and western mastiff bat (*Eumops perotis*).
- Fifteen species are listed as SSC only: American white pelican (*Pelecanus erythrothynchos*), northern harrier (*Circus cyaneus*), long-eared owl (*Asio otus*), short-eared owl (*Asio flammeus*), purple martin (*Progne subis*), loggerhead shrike (*Lanius ludovicianus*), olive-sided flycatcher (*Contopus cooperi*) yellow warbler (*Dendroica petechia*), yellow-breasted chat (*Icteria virens*), grasshopper sparrow (*Ammodramus savannarum*) Oregon vesper sparrow (*Pooecetes gramineus affinis*), black swift (*Cypseloides niger*) vaux's swift (*Chaetura vauxi*), western red bat (*Lasiurus blossevillii*), American badger (*Taxidea taxus*), Sierra Nevada mountain beaver (*Aplodontica rufa californica*)

Table 5.4.1-3 Special-status wildlife species occurring or potentially occurring in the area surrounding the Project.

Common Name / Scientific Name	Status[1]	Suitable Habitat Type	Temporal and Spatial Distribution[2]	Occurrence in Project Vicinity	References
REPTILES					
Coast horned lizard *Phrynosoma coronatum*	BLM-S, SSC	Occurs in a variety of habitats, including scrubland, grassland, coniferous woods, and broadleaf woodlands; typically it is found in areas with sandy soil, scattered shrubs, and ant colonies, such as along the edges of arroyo bottoms or dirt roads.	Yearlong - AGS, BOP, BOW, CRC, CRP, MCH, MHC, PPN	One occurrence in Sonora Quad.	CDFG 2008 CDFG 2010b NatureServe 2008
BIRDS					
American white pelican *Pelecanus erythrorhynchos*	SSC	Rivers, lakes, reservoirs, estuaries, bays, marshes; sometimes inshore marine habitats.	Summer - BAR	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Black-crowned night heron *Nycticorax nycticorax*	BLM-S	Marshes, swamps, wooded streams, mangroves, shores of lakes, ponds, lagoons.	Yearlong - BOP, BOW, CRC, LAC, MCH, MHC, MHW, MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Northern harrier *Circus cyaneus*	SSC	Marshes, meadows, grasslands, and cultivated fields.	Yearlong - AGS, BOP, BOW, BAR, LAC Winter - MCH, CRC Summer -MHC,MRI, MHW, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
California spotted owl *Strix occidentalis occidentalis*	BLM-S, SSC	Mixed forests dominated by Black Oak, Lodgepole Pine, Red Fir from 1,200 to 5,500 foot elevation	Yearlong - BOP, MHC, MHW, PPN Summer - MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Burrowing owl *Athene cunicularia*	BLM-S, SSC	Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports.	Yearlong - AGS, BAR, BOP, BOW, CRC, MCH, PPN	One occurrence in Standard Quad,	CDFG 2008 CDFG 2010b NatureServe 2008
Long-eared owl *Asio otus*	SSC	Deciduous and evergreen forests, orchards, wooded parks, farm woodlots, river woods, desert oases. Wooded areas with dense vegetation needed for roosting and nesting, open areas for hunting.	Yearlong - AGS, BOP, BOW, CRC, MCH, MHC, MHW, PPN Summer - MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Short-eared owl *Asio flammeus*	SSC	Broad expanses of open land with low vegetation for nesting and foraging are required.	Yearlong - AGS, CRP Winter - BOP, BOW, CRC, MCH, MHC, PPN, MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Purple martin *Progne subis*	SSC	A wide variety of open and partly open situations, frequently near water or around towns	Summer - AGS, BOP, BOW, LAC, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Loggerhead shrike *Lanius ludovicianus*	SSC	Open country with scattered trees and shrubs, savanna, desert scrub, and, occasionally, open woodland; often perches on poles, wires or fence posts.	Yearlong - AGS, BAR, BOP, BOW, CRC, MCH, MHC, MHW, PPN Summer - MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008

Common Name / Scientific Name	Status[1]	Suitable Habitat Type	Temporal and Spatial Distribution[2]	Occurrence in Project Vicinity	References
Olive-sided flycatcher *Contopus cooperi*	SSC	Late-successional conifer forests with open canopies from sea level to timberline, but usually found between 3,018 and 6,988 feet	Summer - CRC, MCH, MHC, MHW, MRI, PPN Migrant - BOP	Potentially occur within suitable habitat	CDFG 2008 Shuford, and Gardali 2008
Yellow warbler *Dendroica petechia*	SSC	Open scrub, second-growth woodland, thickets, farmlands and gardens, especially near water; riparian woodlands, especially of willows, in the West.	Summer - BOP, BOW, MHC, MHW, MRI, PPN Migrant - CRC, MCH	Potentially occur within suitable habitat,	CDFG 2008 NatureServe 2008
Yellow-breasted chat *Icteria virens*	SSC	Second growth, shrubby old pastures, thickets, bushy areas, scrub, woodland undergrowth, and fence rows, including low wet places near streams, pond edges, or swamps; thickets with few tall trees; early successional stages of forest regeneration; commonly in sites close to human habitation.	Migrant - MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Grasshopper sparrow *Ammodramus savannarum*	SSC	Prefers short to middle-height, moderatly open grasslands with scattered shrubs.	Summer - AGS	Occurrences reported in Don Pedro grassland	CDFG 2008 Shuford, and Gardali 2008 BLM 1978
Oregon vesper sparrow *Pooecetes gramineus affinis*	SSC	Grassland species, wintering habitat consists of open ground with little vegetation or short grass and low annuals, including stubble fields, meadows and road edges	Winter - AGS, BOP, MCH	Potentially occur within suitable habitat.	CDFG 2008 Shuford, and Gardali 2008
Tricolored blackbird *Agelaius tricolor*	BLM-S, SSC	Fresh-water marshes of cattails, tule, bulrushes and sedges. Nests in vegetation of marshes or thickets, sometimes nests on the ground. Historically strongly tied to emergent marshes; in recent decades much nesting has shifted to non-native vegetation.	Yearlong - AGS, CRP	Occurrences reported in La Grange, Cooperstown, and Sonora Quads.	CDFG 2008 CDFG 2010b NatureServe 2008
Northern goshawk *Accipiter gentilis*	BLM-S, SSC	Nests in mature and old-growth forest consisting of conifer and conifer hardwood types between 1,000 and 10,800 feet.	Yearlong - MHC, MHW, MRI, PPN Winter - BOP, BOW, CRC	Potentially occur within suitable habitat.	CDFG 2008 Shuford, and Gardali 2008
Black swift *Cypseloides niger*	SSC	Nests in moist crevices or caves, or on cliffs near waterfalls in deep canyons. Forages widely over many habitats	Summer - AGS, BAR, BOP, BOW, LAC, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Vaux's swift *Chaetura vauxi*	SSC	Found in mature forests but also forages and migrates over open country.	Summer - BOP, CRP, LAC, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Ferruginous hawk *Buteo regalis*	BLM-S	(wintering) Open grasslands, sagebrush flats, desert scrub, low foothills & fringes of pinyon-juniper habitats. Mostly eats lagomorphs, ground squirrels, and mice.	Winter - AGS, BOP, BOW, BAR, CRC	Potentially occur within suitable habitat;	CDFG 2008 NatureServe 2008

Common Name / Scientific Name	Status[1]	Suitable Habitat Type	Temporal and Spatial Distribution[2]	Occurrence in Project Vicinity	References
MAMMALS					
Yuma myotis *Myotis yumanensis*	BLM-S	Found in a wide variety of upland and lowland habitats, including riparian, desert scrub, moist woodlands and forests, but usually found near open water. Flys low. Nursery colonies usually are in buildings, caves and mines, and under bridges.	Yearlong - AGS, BOP, BOW, CRC, CRP, MCH, MHC, MHW, MRI, PPN Summer - LAC	Two occurrences reported in Moccasin Quad	CDFG 2008 NatureServe 2008
Long-eared myotis *Myotis evotis*	BLM-S	Mostly forested areas, especially those with broken rock outcrops; also shrubland, over meadows near tall timber, along wooded streams, over reservoirs. Often roosts in buildings, also in hollow trees, mines, caves, fissures, etc.	Yearlong - BAR, BOP, BOW, CRC, LAC, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Fringed myotis *Myotis thysanodes*	BLM-S	Primarily at middle elevations in desert, grassland, and woodland habitats. Roosts in caves, mines, rock crevices, buildings, and other protected sites. Nursery colonies occur in caves, mines, and sometimes buildings.	Yearlong - AGS, BAR, BOP, BOW, CRC, CRP, MCH, MHC, MHW MRI Summer - LAC, MHW PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Western small-footed myotis *Myotis ciliolabrum*	BLM-S	Generally inhabits desert, badland, and semiarid habitats; more mesic habitats in southern part of range. Maternity colonies often are in abandoned houses, barns, or similar structures.	Yearlong - AGS, BAR, BOP, BOW, CRC, CRP, MCH, MHCMHW, MRI, PPN Summer - LAC	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Spotted bat *Euderma maculatum*	BLM-S, SSC	Possibly occupies coniferous stands in summer and migrates to lower elevations in late summer/early fall.	Yearlong - AGS, BOP, BOW, MHC, MRI, PPN	One occurrence in Standard Quad	CDFG 2008 CDFG 2010b NatureServe 2008
Townsend's big-eared bat *Corynorhinus townsendii*	BLM-S, SSC	Maternity and hibernation colonies typically are in caves and mine tunnels. Prefers relatively cold places for hibernation, often near entrances and in well-ventilated areas.	Yearlong - BAR, BOP, BOW, CRC, CRP, MCH, MHC, MHW, MRI, PPN Summer - AGS	One occurrence in Sonora Quad.	CDFG 2008 CDFG 2010b NatureServe 2008
Pallid bat *Antrozous pallidus*	BLM-S, SSC	Arid deserts and grasslands, often near rocky outcrops and water. Less abundant in evergreen and mixed conifer woodland. Usually roosts in rock crevice or building, less often in cave, tree hollow, mine, etc.	Yearlong - AGS, BAR, BOP, BOW, CRC, CRP, MCH, MHC, MHW, MRI, PPN	Occurrences in Sonora, Standard, and Moccasin Quads	CDFG 2008 CDFG 2010b NatureServe 2008
Western red bat *Lasiurus blossevillii*	SSC	Migratory, roosts singularly in trees adjacent to streams or open fields, orchards, occasionally found in caves	Yearlong - AGS, BOP, BOW, CRC, MHC, MRI Summer - LAC, MCH, MHW, PPN	One occurrence in Moccasin Quad.	CDFG 2008 CDFG 2010b Bolster 1998, updated 2005

Common Name / Scientific Name	Status[1]	Suitable Habitat Type	Temporal and Spatial Distribution[2]	Occurrence in Project Vicinity	References
Western mastiff bat *Eumops perotis*	BLM-S, SSC	Roosts in crevices and shallow caves on the sides of cliffs and rock walls, and occasionally buildings. Roosts usually high above ground with unobstructed approach. Most roosts are not used throughout the year. May alternate between different day roosts.	Yearlong - AGS, BAR, BOP, BOW, CRC, CRP, MCH, MHC, MHW, MRI, PPN	Occurrences in Sonora, Tuolumne, and Moccasin Quads	CDFG 2008 CDFG 2010b NatureServe 2008
San Joaquin pocket mouse *Perognathus inornatus inornatus*	BLM-S,	Dry, open, grassy or weedy ground. Arid annual grasslands, savanna, and desert-shrub associations with sandy washes or finely textured soil. Found in low densities in grassland-blue oak savannas up to 1,500 feet on east side of San Joaquin Valley.	Yearlong - AGS, BAR, BOW, MCH,	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
American badger *Taxidea taxus*	SSC	Prefers open areas and may also frequent brushlands with little groundcover. When inactive, occupies underground burrow.	Yearlong - AGS, BAR, BOP, BOW, CRC, CRP, MCH, MHC, MHW, MRI, PPN	One occurrence in La Grange Quad.	CDFG 2008 CDFG 2010b NatureServe 2008
Sierra Nevada mountain beaver *Aplodontia rufa californica*	SSC	Dense riparian-deciduous and open, brushy stages of most forest types	Yearlong - MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008

[1] Status:

BLM-S =Bureau of Land Management Sensitive Species (BLM 2006)
SSC = CDFG Species of Concern (CDFG 2007)

[2] CWHR Habitat Types:

AGS = Annual Grassland
BAR = Barren
BOP = Blue Oak Foothill Pine
BOW = Blue Oak Woodland
CRC = Chamise-Redshank Chaparral
LAC = Lacustrine
MCH = Mixed Chaparral
MHW = Montane Hardwood
MRI= Montane Riparian
PPN = Ponderosa Pine
URB = Urban

5.4.1.3 Commercially Valuable Wildlife Species

Table 5.4.1-4 includes wildlife species known to occur or with the potential to occur in the area surrounding the Project that are listed as commercially harvested by the CDFG. Temporal and spatial information for these species were derived from the CWHR database (CDFG 2008). Habitat types listed in Table 5.4.1-4 were used as search criteria within the CWHR computer program and include all habitats known or likely to occur within the area surrounding the Project. Temporal data correspond to the seasonal occurrence of the species within the area surrounding the Project. Spatial data provided in the table correspond to the habitat types typically supporting each species; these spatial data can be used in conjunction with vegetation descriptions presented in the Botanical Resources section of the PAD (Section 5.4.2). This list includes 28 birds and 21 mammal species.

5.4.1.4 Wildlife Resources in the Tuolumne River Watershed

Upper Tuolumne River

Two source documents were reviewed related to wildlife resources upstream of the Project area in the upper Tuolumne River. For the purpose of this PAD, the upper Tuolumne River is considered to be that portion of the Tuolumne River watershed above about RM 80.

Tuolumne Wild and Scenic River, Outstandingly Remarkable Values. Draft Report. NPS 2006

This document discusses the review and proposed revision to the outstanding remarkable values (ORVs) for the Tuolumne Wild and Scenic River located within Yosemite National Park. The NPS identified ORVs in ten categories for the Tuolumne River. Three of the categories are corridor wide and include ecologic values, sociocultural values, and scientific values. The remaining seven categories relate to individual river segments (four above Hetch Hetchy Dam Reservoir and two below), and include hydrologic values, geologic values, biologic values, prehistoric and American Indian cultural values, historical values, scenic values and recreational values. According to the NPS (2006), corridor-wide biologic values specific to wildlife resources in the upper Tuolumne River were described as, "Largely intact low-elevation riparian and meadow communities at Poopenaut Valley, which are uncommon in the Sierra Nevada due to impacts from settlement in other low-elevation areas, provide habitat for an exceptionally diverse assemblage of bird species and several special-status bat species." With respect to the two segments below Hetch Hetchy Dam, biologic values were only identified for segment 6, which begins approximately one mile below Hetch Hetchy Dam extending down to the western boundary of Yosemite National Park. The biologic values were described as, "…remarkably undeveloped low-elevation riparian and meadow communities, which provide habitat for a diversity of species. Low-elevation meadow/wetland complexes that have not been heavily impacted by settlement are uncommon in the Sierra Nevada. The riparian communities at Poopenaut Valley, including stands of tule bulrush, willow and woodland habitats, unusual hanging ponds, and seasonal pools, support an exceptionally diverse assemblage of bird species and several special-status bat species."

Table 5.4.1-4 Commercially valuable wildlife species occurring or potentially occurring in the Project vicinity.

Common Name / Scientific Name	Suitable Habitat Type	Temporal and Spatial Distribution[1]	Occurrence in Project Vicinity	References
BIRDS				
Canada goose *Branta canadensis*	Overhead while migrating, marshes with tall grass and sedges near water	Yearlong - AGS, LAC	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Wood duck *Aix sponsa*	Inland waters near woodlands such as swamps and marshes	Yearlong - BOP, BOW, LAC, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Northern pintail *Anas acuta*	Lakes, rivers, marshes and ponds in grasslands, barrens, dry tundra, open boreal forest or cultivated fields. Most breeding associated with seasonal and semi-permanent wetlands.	Yearlong - AGS, LAC	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Gadwall *Anas strepera*	Open water on lakes, ponds, reservoirs and backwaters	Yearlong - AGS, LAC	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
American wigeon *Anas americana*	Open water on lakes, ponds, reservoirs and backwaters	Yearlong - AGS, CRP, LAC	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Eurasian wigeon *Anas penelope*	Winters primarily in freshwater (marshes, lakes) and brackish situations in coastal areas but migrates extensively through inland regions; occurs in shallow water and fields and meadows.	Winter - AGS, LAC	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Mallard *Anas platyrhynchos*	Primarily shallow waters such as ponds, lakes, marshes, and flooded fields.	Yearlong - AGS, LAC, MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Bufflehead *Bucephala albeola*	Lakes, ponds, rivers and seacoasts. Nests in tree cavities in mixed coniferous-deciduous woodland near lakes and ponds.	Summer - LAC, MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Cinnamon teal *Anas cyanoptera*	Shallow open water on lakes, ponds, reservoirs and in marshes	Summer - AGS, LAC	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Northern shoveler *Anas clypeata*	Open water on lakes, ponds and reservoirs	Yearlong - AGS, LAC	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Green-winged teal *Anas crecca*	Open water on lakes, ponds, reservoirs and in marshes	Yearlong - AGS, LAC, MRI	Potentially occur within suitable habitat, especially in Fall	CDFG 2008 NatureServe 2008
Lesser scaup *Aythya affinis*	Open water on lakes, ponds and reservoirs	Summer - AGS, LAC	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008

Common Name / Scientific Name	Suitable Habitat Type	Temporal and Spatial Distribution[1]	Occurrence in Project Vicinity	References
Canvasback *Aythya valisineria*	Estuarine and lacustrine habitats, Nests on small ponds, sloughs or large emergent wetland or lake	Winter - LAC	Potentially occur within suitable habitat.	CDFG 2008 Zeiner et al. 1988, 1990a,b
Ring-necked duck *Aythya collaris*	Freshwater lacustrine habitats. Nests in emergent vegetation, often sedges near open water.	Yearlong - LAC	Potentially occur within suitable habitat.	CDFG 2008 Zeiner et al. 1988, 1990a,b
Common goldeneye *Bucephala clangula*	Estuarine and lacustrine habitat. Does not nest in California	Winter - LAC	Potentially occur within suitable habitat.	CDFG 2008 Zeiner et al. 1988, 1990a,b
Ruddy duck *Oxyura jamaicensis*	Estuarine and lacustrine habitats. Nests above shallow water, among fresh-emergent vegetation, near open water of lakes, ponds or marshes.	Yearlong - LAC	Potentially occur within suitable habitat.	CDFG 2008 Zeiner et al. 1988, 1990a,b
Hooded merganser *Mergus cucullatus*	Open water on lakes, ponds and reservoirs	Winter - LAC	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Chukar *Alectoris chukar*	Rocky hillsides, mountain slopes with grassy vegetation, open and flat desert with sparse grasses, and barren plateaus.	Yearlong - AGS, MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Ring-necked pheasant *Phasianus colchicus*	Open country (especially cultivated areas, scrubby wastes, open woodland and edges of woods), grassy steppe, desert oases, riverside thickets, swamps and open mountain forest.	Yearlong - AGS, BOP, AGS, MCH,	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Wild turkey *Meleagris gallopavo*	Pinyon-Juniper woodlands	Yearlong - AGS, BOP, BOW, CRC, MCH, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Band-tailed pigeon *Columba fasciata*	Lower elevations and transition zone of mixed conifer forest between 1,200- and 55,000-foot elevation	Winter - BOP, BOW, MCH Yearlong -MHC, MHW, PPN Summer - MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Blue grouse *Dendragopus obscures*	Mixed forests dominated by Black Oak, Lodgepole Pine, Red Fir, Mountain Hemlock and White Pine dominated forest from 1,200- to 7,500-foot elevation	Yearlong - AGS, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
California quail *Callipepla californica*	Lower elevations and transition zone of mixed conifer forest between 1,200- and 7,000-foot elevation	Yearlong - AGS, BOP, BOW, CRC, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat	CDFG 2008 NatureServe
Mountain quail *Oreortyx pictus*	Open, brushy stands of conifer and deciduous forest, woodland and chaparral.	Yearlong - AGS, BOP, CRC, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat	CDFG 2008 Zeiner et al. 1988, 1990a,b
Common moorhen *Gallinula chloropus*	Freshwater marshes, canals, quiet rivers, lakes, ponds, mangroves, primarily in areas of emergent vegetation and grassy borders.	Yearlong - LAC	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008

Common Name / Scientific Name	Suitable Habitat Type	Temporal and Spatial Distribution[1]	Occurrence in Project Vicinity	References
American coot *Fulica americana*	Open water areas, along lake shores and stream edges, and in marshes	Winter - AGS, Yearlong - LAC	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2006
Mourning dove *Zenaida macroura*	Lower elevations and transition zone of mixed conifer forest between 1,200- and 5,500-foot elevation	Yearlong - AGS, BOP, BOW, CRC , MCH, MHC Summer - MHW, MRI, PPN	Potentially occur within suitable habitat	CDFG 2008 NatureServe 2008
American crow *Corvus brachyrhynchos*	Open and partly open country: agricultural lands, suburban areas, orchards, and tidal flats.	Yearlong - AGS, BOP, BOW,CRP, LAC, MHW, Migrant -MHC, MR, PPNI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
MAMMALS				
Virginia opossum *Didelphis virginiana*	Very adaptable; may be found in most habitats. Prefers wooded riparian habitats. Also in suburban areas. Abandoned burrows, buildings, hollow logs, and tree cavities are generally used for den sites.	Yearlong - AGS, BOP, BOW, CRP, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Brush rabbit *Sylvilagus bachmani*	Dense scrub and brushy edges of habitats, chaparral, and cactus. Usually near dense vegetative cover.	Yearlong - AGS, BOP, BOW, CRC, CRP, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Desert cottontail *Sylvilagus audubonii*	Various habitats; dry uplands as well as low valleys and canyons. May inhabit open grasslands, brushlands, edges of foothill woodlands, willow thickets, sometimes in cultivated fields or under buildings.	Yearlong - AGS, BOP, BOW, CRC , CRP, MCH,	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Black-tailed jackrabbit *Lepus californicus*	Open plains, fields, and deserts; open country with scattered thickets or patches of shrubs.	Yearlong - AGS, BOP, BOW, CRC, CRP, MCH, MHC, MHW, PPN Summer - MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Douglas' squirrel *Tamiasciurus douglasii*	Coniferous forests, in upper pine belt and in fir, spruce, and hemlock forests.	Yearlong - MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
American beaver *Castor canadensis*	Readily occupy artificial ponds, reservoirs, and canals if food is available.	Yearlong - AGS, BOW, LAC, MHC, MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Common muskrat *Ondatra zibethicus*	Fresh emergent wetland habitat in valley foothill and montane riparian, aspen, lacustrine, riverine and estuarine habitats.	Yearlong - LAC, MRI	Potentially occur within suitable habitat.	CDFG 2008 Zeiner et al. 1988, 1990a,b
Coyote *Canis latrans*	Wide range of habitats in its extensive range, from open prairies of the west to the heavily forested areas of the Northeast; sometimes found in cities.	Yearlong - AGS, BAR, BOP, BOW, CRC, CRP, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008

Common Name / Scientific Name	Suitable Habitat Type	Temporal and Spatial Distribution[1]	Occurrence in Project Vicinity	References
Gray fox *Urocyon cinereoargenteus*	Often found in woodland and shrubland in rough, broken country.	Yearlong - AGS, BOP, BOW, CRC, CRP, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Raccoon *Procyon lotor*	Various habitats; usually in moist situations, often along streams and shorelines.	Yearlong - AGS, BOP, BOW, CRC, CRP, LAC, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Ermine *Mustela erminea*	Prefers wooded areas with thick understory near watercourses. Rarely occurs in heavily forested regions.	Yearlong -MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Long-tailed weasel *Mustela frenata*	Wide variety of habitats, usually near water. Favored habitats include brushland and open woodlands, field edges, riparian grasslands, swamps, and marshes.	Yearlong - AGS, BOP, BOW, CRC, , CRP, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
American mink *Neovision vision*	Forested, permanent or semi-permanent wetlands with abundant cover, marshes and riparian zones.	Yearlong - LAC, MRI	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Western spotted skunk *Spilogale gracilis*	Brushy canyons, rocky outcrops on hillsides and walls of canyons.	Yearlong - AGS, BOP, BOW, CRC, CRP, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Striped skunk *Mephitis mephitis*	Semi-open country with woodland and meadows interspersed, brushy areas, bottomland woods. Frequently found in suburban areas.	Yearlong - AGS, BOP, BOW, CRC, CRP, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Western gray squirrel *Sciurus griseus*	Dependent upon mature stands of mixed conifer and oak habitats, closely associated with oaks.	Yearlong - BOP, BOW, MCH, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Black bear *Ursus americanus*	Occur in fairly dense, mature stands of many forest habitats mostly above 3,000-feet elevation, and feed in a variety of habitats including brushy stands of forest, valley foothill riparian and wet meadows.	Yearlong - AGS, BOP, CRC, CRP, LAC, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
American badger *Taxidea taxus*	Prefers open areas and may also frequent brushlands with little groundcover. When inactive, occupies underground burrow.	Yearlong - AGS, BAR, BOP, BOW, CRC, CRP, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Mule deer *Odocoileus hemionus*	Early to intermediate successional stages of most forest, woodland, and brush habitats interspersed with herbaceous openings, dense brush or tree thickets, riparian areas, and abundant edge	Yearlong - AGS, BOP, BOW, CRC, , CRP, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008
Bobcat *Felis rufus*	Various habitats including deciduous-coniferous woodlands and forest edge, hardwood forests, swamps, forested river bottomlands, brushlands, deserts, mountains, and other areas with thick undergrowth.	Yearlong - AGS, BOP, BOW, CRC, , CRP, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008

Common Name / Scientific Name	Suitable Habitat Type	Temporal and Spatial Distribution[1]	Occurrence in Project Vicinity	References
Wild pig *Sus scrofa*	Densely forested mountainous terrain, brushlands, dry ridges, swamps; sometimes in fields, marshes. Often in mixed hardwood forest with permanent water source. Seasonal changes in habitat use are linked to food availability.	Yearlong - AGS, BOP, BOW, CRC, CRP, MCH, MHC, MHW, MRI, PPN	Potentially occur within suitable habitat.	CDFG 2008 NatureServe 2008

[1] CWHR Habitat Types:

AGS = Annual Grassland
BAR = Barren
BOP = Blue Oak Foothill Pine
BOW = Blue Oak Woodland
CRC = Chamise-Redshank Chaparral
CRP = Irrigated Row and Field Crop
LAC = LacustrineMCH = Mixed Chaparral
MHC = Mixed Hardwood Coastal
MHW = Interior Mixed Hardwood
MRI= Montane Riparian
PPN = Ponderosa Pine
URB = Urban

California Natural Diversity Data Base

A query of the CNDDB for special-status species for quadrangles located immediately upstream of the Project area identified 10 special-status species (CDFG 2010b). Queries were conducted for Standard, Hetch Hetchy Reservoir, Tuolumne, Lake Eleanor, Duckwall Mountain, Cherry Lake South, Groveland, and Jawbone Ridge USGS topographic quadrangles. Special-status species occurrences included 10 mammals: Yuma myotis, long-eared myotis, fringed myotis, long-legged myotis (*Myotis volans*), silver-haired bat (*Lasionycteris noctivagans*), western red bat, spotted bat, Townsend's big-eared bat, pallid bat, and western mastiff bat.

The CNDDB query for special-status species in the upper Tuolumne River above the Project area also provided citations identifying five source documents for reported occurrences. The occurrences presented in these source documents were reported to the CNDDB. The source documents cited by the CNDDB include:

Pierson, E.D. (University of California, Berkeley) - Field survey form for Eumops perotis (Californicus), August 26, 1992.

Pierson, E.D. and W. Rainey - Distribution, habitat associations, status and survey methodologies for three molossid bat species and the vespertilionid. Final Report Cal Fish and Game Wildlife Management Division, April 6, 1998.

Pierson, E.D., W.E. Rainey, and C.J. Corben - Seasonal patters of bat distribution along and altitudinal gradient in the Sierra Nevada. January 2001.

Pierson, E.D. and W. Rainey - Distribution of the spotted bat, Euderma maculatum, in California. Journal of Mammalogy 79(4): 1296-1305. 1998.

Pierson, E.D., W.E. Rainey, and C. Corben - Distribution and status of western red bats (*Lasiurus blossevillii*) in California. April 15, 2004.

Project Area

In addition to the information obtained from the CNDDB and CWHR, five additional source documents were found and reviewed related to wildlife resources within the Project area.

University of California, Berkeley, Museum of Vertebrate Zoology

The Museum of Vertebrate Zoology (MVZ) database was queried for special-status species occurrences along the Tuolumne River. The query revealed 129 species occurrences, of which four occur in the area surrounding the Project. These occurrences included pallid bat (Catalog No. 103893), big brown bat (*Eptesicus fuscus*, Catalog No. 107240), *Yuma myotis* (Catalog No. 103745, 103747, 103754, 103755, 103422, 103743, 103423, 103746, 103748, 103753, 103756, 103424, 103744, 103738, 103740, 103750, 103742, 103752, 105213, 103739, 103741, 103751, 103749), Brazilian free-tailed bat (*Tadarida brasiliensis*, Catalog No. 105216, 103426, 103435, 103433, 103432, 103427, 103434, 103436, 103429, 103431, 103430, 103428, 103425).

1978 Don Pedro Grassland Wildlife Observations (BLM 1978)

The Don Pedro grassland area is located on the eastern side of the reservoir. In February, April, June and December of 1978, the BLM conducted wildlife surveys within the Don Pedro grassland. During the surveys, 37 bird species, eight mammal species and one reptile were observed. Of those, only the grasshopper sparrow is designated as SSC.

Final Red Hills Management Plan and Environmental Assessment (BLM 1985)

In 1985, the Final Red Hills Management Plan and Environmental Assessment was written by BLM to provide direction and actions for managing the use of approximately 7,100 acres of public lands in the Red Hills of Tuolumne County. The document includes the final Management Plan, comments received on the draft Management Plan and draft Environmental Assessment (EA), and revisions to the draft EA.

The management plan lists nine objectives, one of which is specific to wildlife. The objective specific to wildlife states: "improve available habitat for resident wildlife species by providing permanent water sources." In order to achieve this objective, the BLM identified four actions that would (1) cooperate with the CDFG on wildlife releases in Six Bit and Poor Man's Gulch, (2) install two water guzzlers for upland game, (3) issue no new grazing leases and examine grazing impacts on rare plants near Poor Man's gulch, and (4) allow no fuelwood sales within the management area.

2007 Red Hills Bird Report (Turner 2007)

This brief summary report discusses sightings of bird species by John Turner in the Red Hills. Reported observations of special-status species included two sightings of yellow-breasted chat.

Vertebrate Species Known to Occur in the Red Hills (BLM 2010)

In 2010, the BLM Mother Lode Field Office provided a list of vertebrate species known to occur in the Red Hills area. The list includes 91 birds, seven mammals, six reptiles, and five fish species (fish are discussed in Section 5.3 of this PAD). Of the 109 species occurrences known to exist in the Red Hills, six are designated as SSC (American white pelican, olive-sided flycatcher, loggerhead shrike, yellow-breasted chat, vesper sparrow, and western pond turtle), and one is designated as SSC and BLM-S (Burrowing owl).

Lower Tuolumne River

Eight studies were reviewed related to wildlife resources of the lower Tuolumne River area. For the purpose of this PAD, the lower Tuolumne River is considered to be that portion of the Tuolumne River beginning immediately below Don Pedro Dam downstream to the confluence of the Tuolumne and San Joaquin rivers.

SFPUC Water System Improvement Program (WSIP) Final Program Environmental Impact Report

As part of the WSIP, an evaluation was performed on potential effects to terrestrial biological resources and aquatic resources resulting from CCSF's construction and operation of certain improvements to the Hetch Hetchy system. While the evaluation was specific to the Hetch Hetchy Aqueduct between the Oakdale and Telsa Portal, it does provide a general overview of resources within the San Joaquin ecological region, which encompasses the lower Tuolumne River. Section 4.6 of the WSIP focuses on sensitive habitats and key special-status species, which included those that have been formally listed under CESA and ESA, as well as species having special sensitivity in the WSIP program area. For the purpose of this PAD, species included in the WSIP evaluation that have been formally listed under CESA and ESA are discussed in Section 5.5, Threatened and Endangered Species.

According to the WSIP, a total of 68 percent of the habitat in the San Joaquin ecological region has been converted to cropland (34 percent), orchards and vineyards (28 percent), or urban use (six percent). The remaining habitat is comprised of annual grasslands (23 percent), blue oak woodland (six percent), and valley foothill riparian vegetation, freshwater emergent wetlands and aquatic habitats (three percent). Sensitive natural communities have been identified in the eastern foothills of the San Joaquin Valley and near the San Joaquin River and its floodplain. These communities include: valley needlegrass grassland and pine bluegrass grassland; northern hardpan vernal pool; alkali meadow; costal and valley freshwater marsh; and great valley cottonwood riparian forest, great valley mixed riparian forest, Great Valley vallen oak riparian forest, great valley willow scrub and great valley elderberry scrub. The WSIP identified the presence of three birds (Swainson's hawk [*Buteo swainsoni*], western burrowing owl [*Athene cunicularia hypugaea*] and Least Bell's vireo [*Vireo belli pusillus*]) and two mammals (San Joaquin kit fox [*Vulpes macrotis mutica*], riparian or San Joaquin woodrat [*Neotoma fuscipes riparia*]) as occurring or with the potential to occur in the San Joaquin ecological region. Of these, only the western burrowing owl is not listed under the California Endangered Species Act (CESA) or ESA. While specific occurrences of western burrowing owl are not presented in the evaluation, they are described as occurring in agricultural fields, grasslands and along the banks of canals.

Reconnaissance Level Biological Survey for the Hughson Wastewater Treatment Plant (City of Hughson 2007)

This source document discusses a biological survey done along the lower Tuolumne River near the City of Hughson. Their preliminary special-status wildlife species query of available occurrence reports (CNDDB, and Quad Knopf file) determined the presence or potential presence of 17 special-status terrestrial wildlife species. Of these 17 species, only burrowing owl, Tricolored blackbird and western pond turtle were not CESA and/or ESA-listed species. In addition to occurrence reports obtained from the CNDDB and Quad Knopf files, the City of Hughson compiled a list of plants and animals observed during the field surveys. This list included 44 species, of which 26 were animals (22 birds, one amphibian, and three mammals).

Delaney Aggregates Biological Resources Assessment (WRA 2008)

This source document discusses biological surveys done along the Tuolumne River four miles west of the City of La Grange. The preliminary special-status wildlife species search identified seven special-status species within five miles of the Delaney Property. Of those, only American badger, mountain plover and tricolored blackbird were designated as special-status species by the CDFG and or BLM. Additionally, 31 common, non-special-status wildlife species were identified during the course of the site assessment.

The Tuolumne River Restoration Projects: Biological Sciences Technical Background Report (Stillwater 1998)

This study discusses wildlife, plant and wetland/riparian resources along nearly 10 miles of the Tuolumne River between the town of La Grange and Geer Road, as well as sites for source material at La Grange Reservoir.

Stillwater Sciences identified 44 special status wildlife species (three reptiles, 30 birds, and 11 mammals) that occur or have the potential to occur in the restoration area. The list compiled included special-status species considered under this section of the PAD (BLM-S and SSC) as well as CESA- and ESA-listed species. Since this list was compiled in 1998, many of the species' status have changed. According to CDFG's July 2009 Special Animals List, 20 of the 41 species are currently designated as BLM-S or SSC. These include:

- Species designated as BLM-S: Black-crowned night heron, ferruginous hawk, San Joaquin pocket mouse, small-footed myotis, long-eared myotis, and fringed myotis.
- Species designated as SSC: western pond turtle (*Actinemys marmorata* [this species is discussed in Section 5.3 of this PAD]), silvery legless lizard (*Anniella pulchra pulchra*), American white pelican, northern harrier, loggerhead shrike, yellow warbler, and yellow-breasted chat
- Species designated as both BLM-S and SSC: coast (California) horned lizard, tricolored blackbird, mountain plover (*Charadrius montanus*), western burrowing owl, Townsend's big-eared bat, western mastiff bat, and pallid bat

Of the above species only the American white pelican, black-crowned night heron, and northern harrier were documented within the restoration project area.

California Natural Diversity Database

A query of the CNDDB for special-status species for quadrangles located immediately downstream of the Project area identified three special-status species (CDFG 2010b). Queries were conducted for Riverbank, Waterford, Paulsell, Cooperstown, La Grange, Westley, Brush Lake, Ceres, and Denair USGS topographic quadrangles. Special-status species occurrences included three birds: burrowing owl, Suisun song sparrow and tricolored blackbird.

The Grinnell Resurvey Project (Yosemite Report 2004 and Inventory and Monitoring Final Report)

Beginning in 2003 the University of California (UC) Berkeley MVZ began The Grinnell Resurvey Project, which provided updated information on species distributions, habitat and community changes since Joseph Grinnell and Tracy Storer originally published Animal Life in the Yosemite in 1924. Species surveys by the MVZ were conducted along Grinnell's Yosemite Transect, which encompassed Yosemite National Park as well as areas outside of the Park including the Tuolumne and Merced rivers. The Grinnell Resurvey Project survey areas that occur below the Project Boundary include La Grange and Snelling. Survey methods employed by MVZ for mammals included live trapping, and point count and line transects for birds.

Mammal capture data from 2004 were combined for the La Grange and Snelling area. Species captured included ornate shrew (*Sorex ornatus*), desert cottontail (*Sylvilagus audubonii*), California ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), Heermann's kangaroo rat (*Dipodomys heermanni*), San Joaquin pocket mouse (*Perognathus inornatus*), brush mouse (*Peromyscus boylii*), large-eared woodrat (*Neotoma macrotis*), deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomys megalotis*), California vole (*Microtus californicus*), house mouse (*Mus musculus*), and black rat (*Rattus rattus*).

In 2004, bird surveys conducted by the MVZ along the La Grange Transect recorded 71 species. The MVZ compared their bird survey results to those conducted by Grinnell by via a change index. Change index values ranged from +1 to -1, with +1 indicating species gain, -1 indicating species loss, and 0 indicating no change. The MVZ found that 32 of the species documented in 2004 had a value of +1, indicating they were not originally recorded by Grinnell. The MVZ also found that 19 of the species documented by Grinnell had a value of -1, indicating they were not documented by the MVZ. Of the 71 bird species recorded by the MVZ only three are special-status, and they include: white-tailed kite (*Elanus leucurus*), yellow warbler, and yellow-breasted chat.

San Joaquin National Wildlife Refuge Final Comprehensive Conservation Plan (2007)

Established in 1987, the San Joaquin National Wildlife Refuge (NWR) primary goal was the protection and management of wintering habitat for Aleutian Canada geese (*Branta Canadensis leucorpareia*). Since then, the Refuge has expanded its focus to include ESA-listed species, as well as migratory birds, and other wildlife dependent on wetlands and riparian flood plain habitat, and restoration of habitat and ecological process. The main body of the Refuge is located along the San Joaquin River, encompassing the San Joaquin and Tuolumne River confluence and the San Joaquin and Stanislaus River confluence. The Mohler Tract of the Refuge is an unattached parcel located three miles east of the main Refuge along the northern bank of the Stanislaus River. Of the 325 species of wildlife, with the potential to occur in the refuge, 237 species have been documented. Birds make up the majority of species known to occur with 164 species, followed by fish (34), mammals (23), reptiles (seven), amphibians (five), and invertebrates (four).

University of California, Berkeley, Museum of Vertebrate Zoology (MVZ)

The MVZ database was queried for special-status species occurrences along the Tuolumne River. The query revealed 129 species occurrences, of which 11 were documented along the lower Tuolumne River. These occurrences included yellow-breasted chat (Catalog Nos. 147102 and 147103), dusky flycatcher (*Empidonax oberholseri*, Catalog No. 168380), gray flycatcher (*Empidonax wrightii*, Catalog No. 148192), great horned owl (*Bubo virginianus*, Catalog No, 145442), lark sparrow (*Chondestes grammacus*, Catalog No. 147855), black-throated gray warbler (*Dendroica nigrescens*, Catalog No. 146987), northern mockingbird (*Mimus polyglottos*, Catalog No. 146466), savannah sparrow (*Passerculus sandwichensis*, Catalog Nos. 147753, 147754, and 147755), phainopepla (*Phainopepla nitens*, Catalog Nos. 146699 and 146700), Harris's sparrow (*Zonotrichia leucophrys*, Catalog No. 147960), and barn owl (*Tyto alba*, Catalog Nos. 145414 and 145415).

5.4.2 Botanical Resources

5.4.2.1 Special-Status Plants

For the purpose of this PAD, a special-status botanical species is a species that has a reasonable possibility of occurring in the Project area and meets one or more of the following criteria:

- Found on the CDFG's list of California Rare (SR) species listed under the Native Species Plant Protection Act of 1977 (CDFG 2010a).
- Found on CDFG's list of Proposed (SP) or Candidate (SC) species for listing as endangered or threatened under the California Endangered Species Act (CESA) (CDFG 2010b).
- Found on the list of plants proposed for listing under the federal ESA. Plants on the list that are considered special-status for the purpose of the relicensing are those species that are proposed for listing as endangered or threatened under the ESA (FPE and FPT, respectively), candidates for listing under the ESA (FC), or proposed for delisting from the ESA (FPD) (USFWS 2010a,b).
- Found on the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants (CNPS 1A/1B-4) (CNPS 2010).
- Found on BLM List of Sensitive Species. These plants are designated as BLM-S in the PAD. Note that, for the purpose of this listing, these species are afforded special-status consideration where they occur on public land administered by BLM (BLM 2009).

Botanical species that are on the list as state threatened (ST) or endangered (SE) under the CESA are considered separately in the Threatened, Endangered and Fully Protected Species section of this PAD (Section 5.5). Both documented and potentially occurring special-status plants in the Project area are described below based on the results of queries to the CNDDB (CDFG 2010a), the USFWS Endangered Species Program (USFWS 2010a,b), and the CNPS Inventory of Rare and Endangered Plants database (CNPS 2010). Database queries included all USGS 1:24,000 topographic quadrangles that include the existing FERC Project Boundary and the surrounding quadrangles. Quadrangles containing the Project Boundary include Chinese Camp, La Grange, Moccasin, Penon Blanco Peak, Sonora, and Standard.

Table 5.4.2-1 lists the 41 special-status plants known to occur or with the potential to occur in the Project area. Thirteen plants (32 percent) are listed as BLM-S.

Table 5.4.2-1 Special-status plants known or with the potential to occur in the general vicinity of the Project.

Common Name/ Scientific Name	Status[1]	Flowering Period	Elevation Range (ft)	Habitat Requirements	Occurrence in Project Vicinity[2,3]
Henderson's bent grass *Agrostis hendersonii*	CNPS3	Apr-Jun	230-1,001	Valley and foothill grasslands, vernal pools	New Melones Dam
Jepson's onion *Allium jepsonii*	CNPS1B BLM-S	Apr-Aug	984-4,331	Chaparral, cismontane woodland, lower montane coniferous forest	**Sonora,** Tuolumne
three-bracted onion *Allium tribracteatum*	CNPS 1B	Apr-Aug	3,609-9,843	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	984-1,969	Cismontane woodland, serpentine	**Sonora, Chinese Camp, Moccasin**
Nissenan manzanita *Arctostaphylos nissenana*	CNPS 1B, BLM-S	Feb-Mar	1,476-3,609	Closed-cone coniferous forest, chaparral	**Sonora**
big-scale balsamroot *Balsamorhiza macrolepis* var. *macrolepis*	CNPS 1B, BLM-S	Mar-Jun	295-3,461	Chaparral, cismontane woodland valley and foothill grassland, sometimes serpentine	Hornitos
Chinese Camp brodiaea *Brodiaea pallida*	CNPS 1B, FT, SE	May-Jun	1,263	Ultramafic, valley and foothill grassland, cismontane woodland, vernal streambeds, often serpentine	**Chinese Camp**, **Sonora,** New Melones Dam
Hoover's calycadenia *Calycadenia hooveri*	CNPS 1B	Jul-Sep	213-984	Cismontane woodland, valley and foothill grassland	**La Grange,** Snelling, Merced Falls, Cooperstown, Keystone
succulent owl's clover *Castilleja campestris* ssp. *succulenta*	CNPS 1B, FT, SE	Apr-May	164-2,461	Vernal pools	Cooperstown, Snelling, Merced Falls
Hoover's spurge *Chamaesyce hooveri*	CNPS 1B, FT	Jul-Sep (Oct)	82-820	Vernal pools	Cooperstown, Turlock Lake
Red Hills soaproot *Chlorogalum grandiflorum*	CNPS 1B, BLM-S	May-Jun	804-4,068	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	2,625-6,808	Cismontane woodland, lower montane coniferous forest,	Tuolumne, Twain Harte, Coulterville, Hornitos
Mariposa clarkia *Clarkia biloba* ssp. *australis*	CNPS 1B, BLM-S	May-Jul	984-3,232	Chaparral, cismontane woodland, serpentine	**Sonora**, Tuolumne, Twain Harte, Coulterville, Hornitos
beaked clarkia *Clarkia rostrata*	CNPS 1B, BLM-S	Apr-May	197-1,640	Cismontane woodland, valley and foothill grassland	**Penon Blanco Peak, Moccasin,** New Melones Dam, Cooperstown, Snelling, Merced Falls, Coulterville, Hornitos

Common Name/ Scientific Name	Status[1]	Flowering Period	Elevation Range (ft)	Habitat Requirements	Occurrence in Project Vicinity[2,3]
Hoover's cryptantha *Cryptantha hooveri*	CNPS 1A	Apr-May	30-492	Inland dunes, valley and foothill grassland	Cooperstown
Mariposa cryptantha *Cryptantha mariposae*	CNPS 1B, BLM-S	Apr-Jun	656-2,133	Chaparral, serpentine	**La Grange, Chinese Camp Sonora,** Keystone, Coulterville, Hornitos
dwarf downingia *Downingia pusilla*	CNPS 2	Mar-May	3-1,460	Valley and foothill grassland, vernal pools	**La Grange,** Cooperstown, Snelling, Merced Falls
Tuolumne button-celery *Eryngium pinnatisectum*	CNPS 1B	May-Aug	755-9,849	Cismontane woodland, lower montane coniferous forest, vernal pools, mesic	**Standard, Sonora, Chinese Camp, Moccasin,** New Melones Dam, Columbia
Delta button-celery *Eryngium racemosum*	CNPS 1B, SE	Jun-Oct	33-322	Riparian scrub	Turlock Lake
spiny-sepaled button-celery *Eryngium spinosepalum*	CNPS 1B	Apr-May	262-837	Valley and foothill grassland, vernal pools	**La Grange,** New Melones Dam, Snelling, Merced Falls
Tuolumne fawn lily *Erythronium tuolumnense*	CNPS 1B, BLM-S	Mar-Jun	1,673-4,019	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	33-5,102	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	3,609-6,234	Chaparral, cismontane woodland	**Chinese Camp**
Bisbee Peak rush-rose *Helianthemum suffrutescens*	CNPS 3	Apr-Jun	147-2,756	Chaparral, often serpentine, gabbroic or Ione soils	**Sonora**
Parry's horkelia *Horkelia parryi*	CNPS 1B, BLM-S	Apr-Sep	262-3,396	Chaparral, cismontane woodland, Ione formation	Coulterville
Tuolumne iris *Iris hartwegii* ssp. *columbiana*	CNPS 1B	May-Jun	1,394-4,593	Cismontane woodland, lower montane coniferous forest	Columbia, Columbia SE
knotted rush *Juncus nodosus*	CNPS 2	Jul-Sep	98-6,496	Meadows, seeps, marshes, swamps	**La Grange,** Cooperstown
Congdon's lomatium *Lomatium congdonii*	CNPS 1B, BLM-S	Mar-Jun	984-6,890	Chaparral, cismontane woodland, serpentine	**Sonora, Chinese Camp, Moccasin,** New Melones Dam, Keystone
Stebbins' lomatium *Lomatium stebbinsii*	CNPS 1B	Mar-May	4,085-6,430	Chaparral, lower montane coniferous forest, gravelly, volcanic clay	Twain Harte

Common Name/ Scientific Name	Status[1]	Flowering Period	Elevation Range (ft)	Habitat Requirements	Occurrence in Project Vicinity[2,3]
shaggyhair lupine *Lupinus spectabilis*	CNPS 1B, BLM-S	Apr-May	853-2,707	Chaparral, cismontane woodland, serpentine	**Sonora, Moccasin,** New Melones Dam, Groveland, Coulterville, Hornitos
slender-stemmed monkeyflower *Mimulus filicaulis*	CNPS 1B, BLM-S	Apr-Aug	2,953-5,741	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	1,969-6,562	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	197-1,345	Cismontane woodland, valley and foothill grassland, heavy clay	New Melones Dam
Merced monardella *Monardella leucocephala*	CNPS 1A	May-Aug	115-328	Valley and foothill grassland	**La Grange,** Cooperstown
Colusa grass *Neostapfia colusana*	CNPS 1B, FT, SE	May-Aug	16-656	Vernal pools	Cooperstown, Turlock Lake
hairy orcutt grass *Orcuttia pilosa*	CNPS 1B, FE, SE	May-Sep	151-656	Vernal pools	Cooperstown, Turlock Lake
Red Hills ragwort *Packera clevelandii*	CNPS 1B, BLM-S	Jun-Jul	853-1,263	Cismontane woodland, serpentine seeps	**Chinese Camp, Moccasin**
Layne's ragwort *Packera layneae*	CNPS 1B, FT, SR	Apr-Aug	66-3,281	Chaparral, cismontane woodland, serpentine or gabbroic, rocky	**Chinese Camp, Moccasin**
Hartweg's golden sunburst *Pseudobahia bahiifolia*	CNPS 1B, FE, SE	Mar-Apr	49-492	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)	98-3,510	Vernal pools	Cooperstown
Red Hills vervain *Verbena californica*	CNPS 1B, FT, ST	May-Sep	853-1,312	Cismontane woodland, valley and foothill grassland, usually serpentine seeps and creeks	**Sonora, Chinese Camp,** Keystone

[1] Special-status:
BLM-S: Bureau of Land Management Sensitive Plant Species
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

1A: Species presumed extinct in California
1B: Species considered rare or endangered in California and elsewhere (no legal protection)
2: Species considered rare or endangered in California but more common elsewhere (no legal protection)
3: More information needed about this species
4: Limited distribution; watch list

[2] Occurrence in Project vicinity results based on a CNPS quadrangle search.

[3] Bolded quads include the existing FERC Project Boundary, while non-bolded quads are surrounding

5.4.2.2 Noxious Weeds

For the purpose of the PAD, noxious weeds are defined as those plant species listed as such by the California Department of Food and Agriculture (CDFA). State-designated noxious weeds are typically assigned one of three ratings: (1) A-list species are mandated for eradication or control; (2) B-list species are widespread plants that Agricultural Commissioners can nevertheless designate for local control efforts; and (3) C-list species are considered too widespread for funding of control efforts (CDFA 2010).

Known and potential noxious weed occurrences are listed in Table 5.4.2-2 (NRCS 2009; Cal-IPC 2006). A total of 29 noxious weeds are known to occur or have the potential to occur within the Project area.

5.4.2.3 Upper Tuolumne River

Two studies were reviewed related to botanical resources of the upper Tuolumne River.

Exotic Species Threat Assessment in Sequoia, Kings Canyon, and Yosemite National Parks (USGS 2001)

The first source document details results of exotic species surveys at Sequoia-Kings Canyon and Yosemite National Parks. The surveys primarily targeted areas of human disturbance. Exotics were broken into four categories: Category 1 species were restricted to a small number of areas and caused serious impacts to native flora and fauna; Category 2 species were restricted to a few sites, but had little impact on native species; Category 3 species were broadly distributed and had a great impact; and Category 4 species were other exotic species that did not fit into the other three categories. Seventy exotic species were rated as Category 1 species, 13 were placed in Category 2 and two were ranked as Category 3. Category 1 and Category 3 species were the first targeted for management in the parks.

Non-Native Vascular Plant Inventory of Riparian Areas in Yosemite National Park, California (PRBO 2007)

The second source document details monitoring of non-native plant species in riparian areas in Yosemite National Park. A total of 151 riparian plots were monitored and 69 (46 percent) of them were found to have non-native plant species in them. Overall, 59 non-native species were located in the plot. Of these, sheep sorrel (*Rumex acetosella*), cheat grass (*Bromus tectorum*), foxtail fescue (*Vulpia myuros*), ripgut brome (*Bromus diandrus*), red clover (*Trifolium hirtum*) and field hedge parsley (*Torilis arvensis*) were the most commonly found. Four of the plots were done in the Tuolumne River below Hetch Hetchy Reservoir.

5.4.2.4 Project Area

Four studies were reviewed related to botanical resources within the Project area.

Table 5.4.2-2 Noxious weeds known to occur or potentially occurring in the vicinity of the Project.

Common Name/ Scientific Name	CDFA Status*	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

Common Name/ Scientific Name	CDFA Status*	Flowering Period	Elevation (ft)	Habitat
oblong spurge *Euphorbia oblongata*	B	Apr-Aug	Below 3,300	Waste areas, disturbed sites, roadsides, fields
edible fig *Ficus carica*	Not rated	Jun-Sep	Below 3,300	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	Jun-Sep	Below 8,800	Desert dunes and scrub, alkali playa
Chinese tallow tree *Sapium sebiferum*	Not rated	Jun-Sep	Below 8,800	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

*A = Mandated for eradication or control
B = Widespread species; eligible for local control efforts
C = Widespread species; not eligible for funding of local control efforts

CalVeg Mapping (Forest Service 2004)

Upland vegetation was assessed using information from the USFS's CalVeg mapping system, which is publicly available data. The data were mapped using a GIS database and overlaid in layers. The area described includes a half-mile buffer around the existing Project Boundary. CalVeg classifications within this area were quantified using GIS.

The total area mapped was 49,534.7 acres, and the Project Boundary encompasses 18,370 acres. The Project falls within two different CalVeg zones—Central Valley (49,977.5 acres or 98.8 percent) and South Sierran (557.2 acres or 1.2 percent). Four vegetation types represented 83 percent of the total area mapped: Water (22 percent); Blue Oak (31 percent); Annual Grasses and Forbs (20 percent) and Chamise (10 percent). The CalVeg classification acreages within the area mapped are summarized in Table 5.4.2-3, and the corresponding GIS maps are attached to this section (Attachment 5.4.2-1). CalVeg classification descriptions for the Central Valley zone are provided below.

Table 5.4.2-3 Vegetation of the Project area.

CalVeg Zone	Regional Dominance	Total Acres in Project Boundary	Total Acres in ½-mile Buffer
South Sierra	Gray Pine	--	26.5
	Ponderosa Pine	--	9.7
	Canyon Live Oak	0.2	98.7
	Blue Oak	--	2.5
	Interior Live Oak	10.8	35.8
	Chamise	--	6.1
	Lower Montane Mixed Chaparral	--	141.0
	Annual Grasses and Forbs	3.8	220.2
	Barren/Rock	--	7.2
	Water	--	9.4
	Subtotal	14.8	557.2
Central Valley	Douglas Fir-Ponderosa Pine	5.2	29.2
	Gray Pine	447.5	3,125.2
	Ponderosa Pine	--	128.1
	Riparian Mixed Hardwood	--	5.5
	Interior Mixed Hardwood	0.6	37.1
	Canyon Live Oak	--	21.6
	Blue Oak	3,326.9	15,181.1
	Interior Live Oak	166.9	1,623.0
	Chamise	542.2	4,733.5
	Lower Montane Mixed Chaparral	277.0	3,052.1
	Annual Grasses and Forbs	2, 276.7	9,610.5
	Agricultural	--	21.9
	Barren/Rock	549.7	564.3
	Water	10,762.6	10,844.5
	Subtotal	18, 355.3	48,977.5
	Total	**18, 370.1**	**49,534.7**

Source: CALVEG maps.

Tree-Dominated Alliances

Overall, tree-dominated habitats comprised 41 percent of the area mapped (20,324.0 acres). The CalVeg tree-dominated alliances mapped within the Project area were Douglas Fir-Pine, Gray

Pine, Ponderosa Pine, Riparian Mixed Hardwoods, Interior Mixed Hardwoods, Canyon Live Oak, Blue Oak and Interior Live Oak. A discussion of each tree-dominated habitat is provided within this section.

- **Douglas Fir-Pine Alliance (DP).** This Alliance is a mixture of Douglas fir (*Pseudotsuga menziesii*) and ponderosa pine (*Pinus ponderosa*) that usually occur on moderately steep slopes below an elevation of about 5,200 feet. Canyon live oak (*Quercus chrysolepis*), interior live oak (*Quercus wislizeni*), and blue oak (*Quercus douglasii*) are common hardwood associates. Shrubs in low to mid montane environments are also likely to be associated with these stands such as whiteleaf manzanita (*Arctostaphylos viscida*). The Douglas Fir-Pine Alliance makes up 0.06 percent of the total area with 29.2 acres in the Central Valley zone.
- **Gray Pine Alliance (PD).** Gray pine (*Pinus sabiniana*) forms prominent open or sparse stands throughout the foothills east and west of the Sacramento Valley (Central Valley Ecological Province) at the lower elevations. These diverse stands occur mainly with blue oak and interior live oak in the Project. Shrubs associated with this Alliance include chamise (*Adenostoma fasciculatum*), wedgeleaf ceanothus (*Ceanothus cuneatus*), whiteleaf manzanita, and birchleaf mountain mahogany (*Cercocarpos betuloides*). In the south, mixed stands of gray pine and canyon live oak in this Alliance have been mapped in the elevation range of about 4,200 to 4,600 feet, but the pine has been mapped as low as 100 feet. The alliance makes up 6.4 percent of the total area (3,151.7 acres) with 3,125.2 acres in the Central Valley and 26.5 acres in the South Sierran zone.
- **Ponderosa Pine Alliance (PP)**. Ponderosa pine occasionally dominates the vegetation of sites that are less shaded than those occupied by Douglas fir in the same general elevation range. Any of the common oaks may associate with the pine in this alliance, including canyon live oak, interior live oak, black oak (*Quercus kelloggii*), blue oak, or very infrequently, valley oak (*Quercus lobata*). The Ponderosa Pine Alliance has been mapped with abundance in the foothills and infrequently in the valley. It is found on all slopes and aspects, mainly at elevations below about 6,000 feet. Lower montane chaparral shrubs such as scrub oaks (*Quercus* spp.), chamise and ceanothus (*Ceanothus* spp.) are also associated with this alliance. The alliance makes up 0.3 percent of the total area (137.8 acres) with 128.1 acres in the Central Valley and 9.7 acres in the South Sierran zone.
- **Riparian Mixed Hardwoods Alliance (NR).** Riparian areas often are a mixture of hardwoods with some shrubs, rather than areas of monotypic species. Such sites have been mapped sparsely in all sections of the Sierra Nevada foothills at elevations generally below about 5,000 feet. Typical hardwoods species mixtures in the Central Valley include willows (*Salix* spp.), valley oak, Fremont cottonwood (*Populus fremontii*), California sycamore (*Platanus racemosa*), and white alder (*Alnus rhombifolia*). The Alliance makes up 0.01 percent of the total area with 5.5 acres in the Central Valley zone.
- **Interior Mixed Hardwood Alliance (NX).** No single species is dominant in the Interior Mixed Hardwood Alliance. It has been identified in scattered pockets in the valley and more abundantly in the foothills. The density of blue oak and interior live oak usually exceeds that of black oak in this mixture. Minor amounts of California buckeye (*Aesculus californica*), California bay (*Umbellularia californica*), and coast live oak (*Quercus agrifolia*) may also be included. Because this Alliance has been mapped mainly at elevations below about 5,000 feet, it is likely to have inclusions of lower elevation chaparral species such as wedgeleaf ceanothus, scrub oaks, and chamise. The Interior

Mixed Hardwood Alliance makes up 0.07 percent of the total area with 37.1 acres in the Central Valley zone.

- **Canyon Live Oak Alliance (QC).** Canyon live oak as a dominant species has been frequently mapped in scattered stands in the foothills at elevations below about 6,400 feet. Its main conifer associates include Douglas fir, ponderosa pine and gray pine. Interior live oak, wedgeleaf ceanothus and annual grasses are also likely to be found within and adjacent to these stands. The Alliance makes up 0.2 percent of the total area (120.3 acres) with 21.6 acres in the Central Valley and 98.7 acres in the South Sierran zone.
- **Blue Oak Alliance (QD).** This Alliance is dominated by blue oak, which naturally occurs in an oak-grass association on well drained, gentle slopes. Blue oak and gray pine are the major trees in this hillside Alliance. Blue oak may be the only hardwood species, although interior live oak, valley oak and/or California buckeye may also be present. Chaparral shrubs such as wedgeleaf ceanothus, manzanitas (*Arctostaphylos* spp.), coffeeberry (*Rhamnus* spp.), birchleaf mountain mahogany and poison oak (*Toxicodendron diversilobum*) are also part of this Alliance. The understory of the Blue Oak Alliance is dominated by annual grasses such as wild oats (*Avena* spp.) and cheatgrass (*Bromus* spp.). This alliance generally occurs below about 3,900 feet in this area. The Blue Oak Alliance makes up 30.6 percent of the total area (15,183.6 acres) with 15,181.1 acres in the Central Valley and 2.5 acres in the South Sierran zone.
- **Interior Live Oak Alliance (QW).** The Interior Live Oak Alliance occurs throughout the Central Valley on recent alluvial terraces, older terraces and rolling hills. It is in semi-open or closed stands and may associate with the Canyon Live Oak Alliance at higher elevations. Gray pine and bluse oak are associated species. This Alliance is often located above the Blue Oak Alliance, generally below about 4,400 feet. The Alliance makes up 3.3 percent of the total area (1,658.8 acres) with 1,623.0 acres in the Central Valley and 35.8 acres in the South Sierran zone.

Shrub-Dominated Alliances

Overall, shrub-dominated alliances comprised 16.0 percent of the area mapped (7,932.7 acres), with Chamise as the most abundant type. A discussion of each shrub-dominated habitat is provided within this section.

- **Chamise Alliance (CA).** Relatively pure stands of chamise occupy xeric sites at elevations up to about 4,000 feet and often are found in upper ridge slope positions. Chaparral shrubs such as wedgeleaf ceanothus, whiteleaf manzanita and birchleaf mountain mahogany are associated shrubs. Scattered gray pine and interior live oak are found in this Alliance. The Chamise Alliance makes up 9.6 percent of the total area (4,739.6 acres) with 4,733.5 acres in the Central Valley and 6.1 acres in the South Sierran zone.
- **Lower Montane Mixed Chaparral Alliance (CQ).** This Alliance is a mixture of low-elevation chaparral species such as whiteleaf manzanita, wedgeleaf ceanothus, chamise, birchleaf mountain mahogany and other shrub species. No single species is dominant in the mixture. It has been mapped generally within an elevation range of about 1,300 to 5,200 feet. This Alliance makes up 6.4 percent of the total area (3,193.1 acres), with 3,052.1 acres in the Central Valley and 141.0 acres in the South Sierran zone.

Upland Herbaceous Alliances

Overall, upland herb-dominated habitats comprised 19.8 percent of the area mapped (9,830.7 acres), with the Annual Grasses and Forbs Alliance as the only identified type. A discussion of the Annual Grasses and Forbs Alliance is provided within this section.

- **Annual Grasses and Forbs Alliance (HG).** Annual grasslands are the most commonly encountered type of the Central Valley Ecological Province, generally occurring between urban/agricultural developments and the foothill woodlands. Dominant species in this Alliance include ripgut brome (*Bromus diandrus*), Italian ryegrass (*Lolium multiflorum*), soft chess (*Bromus hordeaceus*), wild oats (*Avena barbata*), and silver hairgrass (*Aira carophyllea*). The invasive Bermudagrass (*Cynodon dactylon*) is common in this Alliance. Vernal pools (small depressions often containing hardpan soil layers) occur throughout the Annual Grasses and Forbs Alliance. Species within these vernal pools include downingia (*Downingia* spp.), meadowfoam (*Limnanthes douglasii*), goldfields (*Lasthenia chrysostoma*), water atarwart (*Callitriche marginata*), popcorn flower (*Plagiobothrys* spp.), Johnny-tuck (*Orthocarpus erianthus*), bur medic (*Medicago hispida*), and linanthus (*Linanthus* spp.). The Annual Grasses and Forbs Alliance makes up 19.8 percent of the total area (9,830.7 acres) with 9,610.5 acres in the Central Valley and 220.2 acres in the South Sierran zone.

Developed/Non-vegetated Alliances

Overall, developed/non-vegetated habitats comprised 23.1 percent of the area mapped (11,447.3 acres), with water as the dominant habitat type. A discussion of developed/non-vegetated habitat is provided within this section.

- **Agriculture.** Agricultural land is used primarily for the production of food and fiber. High-altitude imagery indicates agricultural activity by distinctive geometric field and road patterns on the landscape and traces produced by mechanized equipment. Agricultural land uses include forest landscapes such as orchards as well as non-forested land uses such as vineyards and field crops. Land used exclusively for livestock pasture may, however, be mapped as annual grassland in those cases in which land uses are not recognizable.
- **Water.** Water is labeled in CalVeg mapping in those cases in which permanent sources of surface water are identified within a landscape unit of sufficient size to be mapped. The category includes lakes, streams and canals of various size, bays and estuaries and similar water bodies. These areas are considered to have a minimum of vegetation components, except along the edges, which may be mapped as types such as wet meadows, tule-cattail freshwater marshes, or pickleweed-cordgrass saline or mixed marshes. Islands within water bodies may be mapped according to their terrestrial dominant vegetation types.
- **Urban.** This category applies to landscapes that are dominated by urban structures, residential units, or other developed land use elements such as highways, city parks, cemeteries and the like. In those cases in which the managed landscapes may have a considerable vegetation component, other land use categories may be more appropriate, such as ornamental conifer and hardwood mixtures within city parks.
- **Barren.** Landscapes generally devoid of vegetation as seen from a high-altitude image source such as aerial photography are labeled as Barren. This category includes mappable landscape units in which surface lithology is dominant, such as exposed bedrock, cliffs,

interior sandy or gypsum areas, and the like. It does not include areas considered as modified or developed, as in urban areas.

The Sierra Proposed Resource Management Plan and Final EIS (BLM 2008)

This plan outlines a framework for protection of sensitive resources on BLM land throughout the Sierra Nevada and associated foothills. This document gives a topical outline of sensitive plant species and proposed conservation and planning measures.

One of the proposals discussed in the Plan was to expand the Red Hills Area of Environmental Concern (ACEC) by 2,824 acres and continue management in accordance with the Red Hills Management Plan until a new management plan was developed that addresses current issues (i.e., discovery of populations of new listed species, increased recreation, etc.). Relevant and important values in the Red Hills ACEC included: Delpiedra soils derived from dunite and serpentine, two federally listed plant species (Red Hills vervain [*Verbena californica*] and Layne's ragwort [*Packera layneae*]), four BLM sensitive species (Rawhide Hill onion [*Allium tuolumnense*], Red Hills soaproot [*Chlorogalum grandiflorum*], Congdon's lomatium [*Lomatium congdonii*], and Red Hills ragwort [*Packera clevelandii*]), and the serpentine buckbrush chaparral plant community. The plan also included a management strategy for each of the individual special-status species in the Red Hills.

CNDDB Reports (CDFG 2010b)

The third study includes CNDDB records for 40 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, five each of Layne's ragwort and Red Hills vervain, four occurrences each of Congdon's lomatium and Red Hills ragwort, two occurrences each of shaggyhair lupine (*Lupinus spectabilis*), Mariposa cryptantha (*Cryptantha mariposae*) and stinkbells (*Fritillaria agrestis*), and one occurrence of Tuolumne button-celery (*Eryngium pinnatisectum*). Red Hills vervain and Layne's ragwort are federally listed, and 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, with the majority of sites in need of revisit to check the status of the occurrences. A map of CNDDB plant occurrences is included as Attachment 5.4.2-2.

Study of sensitive plant species on the BLM Red Hills Management Area, Tuolumne County, California (Biosystems Analysis 1984)

A botanical survey of the Red Hills Management Area (now the Red Hills ACEC) was completed in 1984. The surveys located Rawhide Hill onion, Congdon's lomatium, Red Hills soaproot, Layne's ragwort, California vervain and Red Hills ragwort.

Sixty-five small, localized occurrences of Rawhide Hill onion were located, well distributed throughout the Delpiedra soils. The occurrences were almost exclusively restricted to steep, rocky, south-facing slopes with a preference for loose rock in active erosion sites. This species did not grow on marginal habitat.

Both Red Hills soaproot and Congdon's lomatium were generally frequent and widespread throughout the area. The Red Hills soaproot preferred ridges, particularly upper south-facing slopes. The lomatium preferred upper and middle north-facing slopes.

Layne's ragwort was found at three small, localized occurrences on serpentine rock in the southeastern part of the area. The preferred habitat was rocky, disturbed roadsides and roadbanks or in rocky ephemeral drainages on north and east-facing slopes.

California vervain was found during the study, but not described. Additionally, Red Hills ragwort was found in intermittent stream habitats on serpentine.

5.4.2.5 Lower Tuolumne River

Three studies were reviewed related to botanical resources of the lower Tuolumne River.

Reconnaissance Level Biological Survey for the Hughson Wastewater Treatment Plant (City of Hughson 2007)

This source document discusses a biological survey done along the lower Tuolumne River near and for the City of Hughson. Their preliminary special-status plant search determined that beaked clarkia (*Clarkia rostrata*), San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*), Colusa grass (*Neostapfia colusana*), and Greene's tuctoria (*Tuctoria greenei*) were potentially present. Vegetation identified at the project site including annual grasslands, Valley Foothill riparian and barren. No special-status plant species were located during surveys.

Delaney Aggregates Biological Resources Assessment (WRA 2008)

This source document also discusses biological surveys done along the Tuolumne River four miles west of the City of La Grange. The preliminary special-status plant search determined Hoover's calycadenia (*Calycadenia hooveri*), Merced monardella (*Monardella leucocephala*), Hartweg's golden sunburst (*Pseudobahia bahiifolia*), succulent owl's clover (*Castilleja campestris* ssp. *succulenta*), Rawhide Hill onion, Chinese Camp brodiaea (*Brodiaea pallida*), beaked clarkia, dwarf downingia (*Downingia pusilla*), spiny-sepaled button celery (*Eryngium spinosepalum*), Red Hills ragwort (*Packera clevelandii*), Layne's ragwort, hairy Orcutt Grass (*Orcuttia pilosa*), California vervain, Hoover's cryptantha (*Cryptantha hooveri*), Delta button-celery (*Eryngium racemosum*), and knotted rush (*Juncus nodosus*) as having the potential to occur. Plant communities identified in the area included Great Valley willow scrub, annual grassland, blue oak woodland, Great Valley cottonwood riparian forest and Great Valley valley oak riparian forest. No special-status plant species were located during surveys.

The Tuolumne River Restoration Projects: Biological Sciences Technical Background Report (Stillwater 1998)

This source document discusses wildlife, plant and wetland/riparian resources at restoration sites and sites for source material on the Tuolumne River starting from La Grange Reservoir and going downstream to Geer Road. The La Grange Reservoir, located in the Sierra foothills overlapping the Stanislaus County-Tuolumne County boundary is a 500 ac-ft reservoir constructed in 1893. Its vicinity was characterized as blue oak woodland. All other sites were characterized as having riparian vegetation and are discussed in Section 5.4.3, Wetland, Riparian, and Littoral Habitat.

Stillwater determined that special-status plant species potentially present at the restoration sites included: Delta button-celery, California hibiscus (*Hibiscus lasiocarpus* var. *occudentalis*), red-flowered lotus (*Acmispon rubriflorus*), Merced monardella, Hartweg's golden sunburst and Sanford's arrowhead (*Sagittaria sanfordii*). Special-status plant species potentially present at the dredge tailings source material sites included: Delta button-celery, California hibiscus, Merced monardella, Hartweg's golden sunburst, and Sanford's arrowhead. Species potentially present at the La Grange Reservoir source material site included: Hoover's calycadenia, beaked clarkia and Hartweg's golden sunburst.

5.4.3 Wetland, Riparian, and Littoral Habitat

5.4.3.1 Wetland, Riparian, and Littoral Communities within the Project Area

Wetlands are commonly understood to be transitional lands that occur between uplands and aquatic systems. However, wetlands include certain shallow aquatic areas, and are more accurately defined according to the following attributes (Cowardin et al. 1979):

1) *at least periodically, the land supports predominantly hydrophytes [i.e., vegetation associated with moist soil conditions];*
2) *the substrate is predominantly un-drained hydric soil [i.e. soils characterized by anaerobic conditions]; and*
3) *the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.*

Areas of deep, permanent water are not included under the definition of wetland. Ponds, swamps, marshes, bogs, springs, fens, and wet meadows are examples of wetlands.

All wetlands discussed in this section are categorized as palustrine or riverine (Cowardin et al. 1979). Nine major classes of palustrine wetlands have been described, five of which are mapped by USFWS National Wetland Inventory (NWI) maps (USFWS 1987). Additionally, four major classes of riverine wetlands have been described and mapped by NWI.

Five classes of palustrine wetlands and three classes of riverine wetlands were mapped at Don Pedro Project area by NWI. These eight wetland types are described below, including their known or likely occurrence within a 0.25-mile buffer of and within the Project, based on mapping of wetland types by NWI for Project reservoirs. The total area encompassed by each of the eight NWI-mapped wetland types surrounding Project reservoirs is reported in Table 5.4.3-1. However, NWI maps are based on aerial imagery, are typically not verified by ground surveys, and provide no information on plant species associated with the mapped areas.

Table 5.4.3-1 Definitions and general patterns of occurrence of NWI palustrine and riverine wetland types and littoral habitats within the Project area.

Type	Definition	Acres in Project Area	Acres in Project Boundary
Palustrine Emergent (PEM)			
PEMAh	Palustrine emergent, temporarily flooded, impounded	8.6	8.6
PEMB	Palustrine emergent, saturated	4.5	2.7
PEMBd	Palustrine emergent, saturated, partially drained/ditched	2.6	--
PEMC	Palustrine emergent, seasonally flooded	0.3	--
PEMCh	Palustrine emergent, seasonally flooded, impounded	11.2	11.1
	Subtotal	27.2	22.4
Palustrine Scrub-Shrub (PSS)			
PSSA	Palustrine scrub-shrub, temporarily flooded	2.5	1.2
PSSAh	Palustrine scrub-shrub, temporarily flooded, impounded	0.3	--
	Subtotal	2.8	1.2
Palustrine Forested (PFO)			
PFOB	Palustrine forested, saturated	0.2	--
	Subtotal	0.2	0.00
Palustrine Unconsolidated Bottom (PUB)			
PUBFh	Palustrine unconsolidated bottom, semi-permanently flooded, impounded	0.9	--
PUBFx	Palustrine unconsolidated bottom, semi-permanently flooded, excavated	0.4	0.4
PUBHh	Palustrine unconsolidated bottom, permanently flooded, impounded	14.7	10.1
PUBHx	Palustrine unconsolidated bottom, permanently flooded, excavated	0.5	--
	Subtotal	16.5	10.5
Palustrine Unconsolidated Shore (PUS)			
PUSA	Palustrine unconsolidated shore, temporarily flooded	0.4	--
PUSAh	Palustrine unconsolidated shore, temporarily flooded, diked/impounded	0.1	--
PUSCh	Palustrine unconsolidated shore, seasonally flooded, diked/impounded	1.2	0.4
	Subtotal	1.6	0.4
Riverine Unconsolidated Bottom (RUB)			
R3UBH	Riverine upper perennial rock, permanently flooded	34.8	30.9
	Subtotal	34.8	30.9
Riverine Unconsolidated Shore (RUS)			
R3USC	Riverine upper perennial unconsolidated shore, seasonally floodes	1.7	1.7
	Subtotal	1.7	1.7
Riverine Streambed (RSB)			
R4SBA	Riverine intermittent streambed, temporary flooded	58.3	9.0
R4SBAx	Riverine intermittent streambed, temporary flooded, excavated	0.8	0.2
R4SBC	Riverine intermittent streambed, seasonally flooded	18.8	6.0
R4SBCx	Riverine intermittent streambed, seasonally flooded, excavated	0.7	0.1
	Subtotal	78.6	15.3
	Total	**163.5**	**82.4**

Source: NWI maps.

Attachment 5.4.3-1 contains a map series showing NWI-mapped palustrine wetland occurrences, as well as NWI-mapped littoral habitat.

Palustrine Emergent (PEM)

Palustrine emergent wetlands are defined by rooted herbaceous species growing in relatively shallow water or saturated soil (Cowardin et al. 1979); the term “emergent” is a reference to plants that emerge above the water surface (in contrast to submerged aquatic plants). Examples of PEM wetlands are meadows, marshes, fens and bogs. Comparable categories in the CWHR classification system are Fresh Emergent Wetland and Wet Meadow. Given the variety of habitats that meet the definition of the emergent wetland class, further description requires information on hydrology, morphology, topographic setting, and plant species composition.

PEM wetlands occupy approximately 16.6 percent of the total acreage of wetlands mapped by NWI in the Project area and 27.2 percent of the total acreage of wetlands in the Project area (Table 5.4.3-1).

Palustrine Scrub-Shrub (PSS)

Palustrine scrub-shrub wetlands are dominated by hydrophytic shrubs, small trees or a combination of these elements growing in temporarily or (rarely) permanently flooded, shallow water; by definition, dominant vegetation is less than 18 feet tall (Cowardin et al. 1979).

This wetland type occupies approximately 1.7 percent of the total acreage of wetlands mapped by NWI in the Project area and 1.4 percent of the total acreage of wetlands in the Project area (Table 5.4.3-1).

Palustrine Forested (PFO)

Palustrine forested wetlands are dominated by hydrophytic trees (18 feet tall or greater) often with other shrub and emergent wetland communities in (or adjacent to) seasonally shallow water. Representative species include those found in riparian communities described below.

NWI maps indicate that within the Project vicinity, PFO wetlands occupy approximately 0.1 percent of total acreage of NWI-mapped wetlands in the Project area (Table 5.4.3-1). There are no PFO wetlands mapped in the Project area.

Palustrine Unconsolidated Bottom (PUB)

Palustrine unconsolidated bottom wetlands are characterized by the occurrence of loose substrate (e.g. gravel, cobble, or boulders), little or no vegetation, and extreme water regimes (e.g., permanently or semi-permanently flooded and relatively deep water) that favor the retention of these characteristics (Cowardin et al. 1979).

PUB wetlands occupy approximately 10.1 percent of total mapped wetland acreage in the Project area and 12.7 percent of total mapped wetlands in the Project area (Table 5.4.3-1).

Palustrine Unconsolidated Shore (PUS)

Palustrine unconsolidated shore wetlands are characterized by substrates lacking vegetation except for pioneering plants that grow at rare times when conditions are favorable. A number of landforms—beaches, bars, and flats—formed by erosion and water deposition are included in this class (Cowardin et al. 1979).

PUS wetlands occupy approximately 1.0 percent of total mapped wetland acreage and 0.5 percent of total mapped wetlands in the Project area (Table 5.4.3-1).

Riverine Unconsolidated Bottom (RUB)

Riverine unconsolidated bottom wetlands are characterized by at least 25 percent cover of particles smaller than stones and vegetation cover less than 30 percent (Cowardin et al. 1979).

RUB wetlands occupy approximately 21.3 percent of the total mapped NWI wetland acreage in the Project area and 37.7 percent of total mapped wetlands in the Project area (Table 5.4.3-1).

Riverine Unconsolidated Shore (RUS)

Riverine unconsolidated shore wetlands share two main characteristics. First, they have unconsolidated substrate with less than 75 percent cover of stones, boulders or bedrock. Second, they have less than 30 percent of vegetation other than pioneering plants (Cowardin et al. 1979).

RUS wetlands make up approximately 1.0 percent of the total mapped wetland acreage and 2.1 percent of total mapped wetlands in the Project area (Table 5.4.3-1).

Riverine Streambed (RSB)

Riverine streambeds vary greatly in substrate and form depending on the gradient of the channel, the velocity of the water, and the sediment load. The substrate material frequently changes abruptly between riffles and pools, and complex patterns of bars may form on the convex side of single channels or be included as islands within the bed of braided. In most cases, streambeds are not vegetated because of the scouring effect of moving water, but they may be colonized by pioneering annuals or perennials during periods of low flow or they may have perennial emergents and shrubs that are scattered (Cowardin et al. 1979).

RSB wetlands make up approximately 48.1 percent of the total mapped wetland acreage and 18.6 percent of total mapped wetlands in the Project area (Table 5.4.3-1).

5.4.3.2 Upper Tuolumne River

Two source documents were reviewed that deal with wetland and riparian resources of the upper Tuolumne River.

Tuolumne Wild and Scenic River Outstandingly Remarkable Values (NPS 2006)

The first source document details the ORVs of the Tuolumne Wild and Scenic River as a whole and in individual river segments. The Tuolumne Wild and Scenic River has been broken into six segments, two of which are below the Hetch Hetchy Reservoir, including the sixth segment. The sixth segment includes "…undeveloped low-elevation riparian and meadow communities, which provide habitat for a diversity of species. Low-elevation meadow/wetland complexes that have not been heavily impacted by settlement are uncommon in the Sierra Nevada. The riparian communities at Poopenaut Valley, including stands of tule bulrush, willow and woodland habitats, unusual hanging ponds, and seasonal pools…"

Non-Native Vascular Plant Inventory of Riparian Areas in Yosemite National Park, California (PRBO 2007)

The second source document details monitoring of non-native plant species in riparian areas of Yosemite National Park. A total of 151 riparian plots were monitored and 69 (46 percent) of them were found to have non-native plant species in them. Overall, 59 non-native species were located in the plot. Of these, sheep sorrel (*Rumex acetosella*), cheat grass (*Bromus tectorum*), foxtail fescue (*Vulpia myuros*), ripgut brome (*Bromus diandrus*), red clover (*Trifolium hirtum*) and field hedge parsley (*Torilis arvensis*) were the most commonly found. Four of the plots were located in the Tuolumne River below Hetch Hetchy Reservoir.

5.4.3.3 Lower Tuolumne River

In 1998, the TRTAC completed an inventory of riparian vegetation in the Tuolumne River corridor downstream of La Grange Dam (McBain & Trush 2000). The riparian inventory had three components: (1) a detailed inventory and mapping of riparian vegetation along the lower 52 miles of the Tuolumne River, (2) an evaluation of the interrelationships of hydrologic and geomorphic factors with riparian vegetation for three different channel morphologies, and (3) an evaluation of the factors limiting natural regeneration of key riparian plant species. The inventory component also included a comparison of current to historical conditions. The following information is summarized from McBain & Trush (2000).

Riparian vegetation in the sand-bedded reaches historically consisted of a multi layered "gallery forest" of Fremont cottonwood, valley oak, Oregon ash, and western sycamore. In mature gallery forest stands, many vines (primarily California grape, poison oak, and clematis) connected the canopy tree layer with a dense underbrush of shrubs, grasses and forbs. Prior to 1900, extensive gallery forests probably extended for a half mile or more on either side of the river between the confluence with the San Joaquin River and RM 10 on the Tuolumne River, with the most extensive forests near the mouth of the Tuolumne River within the bottomland zone influenced by the backwaters of the San Joaquin River during the high-flow season (see Figure 2-27 in McBain & Trush [2000] for comparison of historical versus current widths of the lower Tuolumne River riparian corridor). The natural process of channel meandering in the sand-bedded reaches created a dynamic system which would erode mature riparian vegetation on the outside of bends, and establish new floodplains on the insides of bends which were rapidly colonized by riparian plant seedlings. As meander bends were pinched off, oxbows were created that were seasonally saturated or inundated by groundwater. These oxbows and developing floodplains provided ideal conditions for the initiation and development of riparian vegetation.

These sites were often undisturbed by floods or channel migration for many decades, which allowed the riparian vegetation to develop into mature gallery forest stands that were often several hundred acres in size. The conditions necessary for maintaining these processes have now been largely eliminated, and remaining forest stands are typically only a few acres in size. The only native tree species that are successfully regenerating in the Sand-bedded Reach under contemporary conditions are black willow, narrow-leaf willow, and box elder (McBain & Trush 2000).

In gravel bedded reaches, the riparian forest was relatively patchy, generally persisting only in areas with heavy (silty) soils, adequate soil moisture and protection from harsh flooding conditions. Floodplain vegetation between these patches of riparian forest was largely grassland, with occasional valley oaks (McBain & Trush 2000). Nearly all of the areas in the gravel-bedded zone that historically supported riparian forests have been mined, grazed, or farmed.

The current riparian vegetation along the lower Tuolumne River consists of some 22 vegetation types or “vegetation series” (following the definition of vegetation series used by Sawyer and Keeler-Wolf 1995), with the most common series being valley oak (621 acres), narrow-leaf willow (515 acres), Fremont cottonwood (457 acres), and black willow (321 acres) (Table 5.4.3-2). A variety of other vegetated cover types, including 41 acres of emergent wetland, also occurs along the river corridor. The total area of current riparian vegetation mapped along the 52-mile lower Tuolumne River corridor is about 2,385 acres. This is only about 15 percent of its historical extent (McBain & Trush 2000). Vegetation that once essentially extended from bluff to bluff prior to the gold rush era is now confined to a narrow band along the active channel margins in many areas, or is nonexistent (McBain & Trush 2000). Large scale removal of riparian vegetation was the direct result of mining activities and urban/agricultural encroachment. Clearing of riparian forests has decreased large woody debris recruitment, allowed exotic plants to invade the riparian corridor, reduced shading of the water’s surface, and contributed to increased water and air temperatures in the Tuolumne River corridor (McBain & Trush 2000). Grazing and other land uses have resulted in direct impacts on riparian vegetation such as preventing recruitment of native riparian plants.

McBain & Trush (2000) concluded that flow and sediment regulation have indirectly impacted Tuolumne River riparian vegetation by modifying the hydrologic and fluvial processes that influence the vegetation's establishment, survival, and succession. The near elimination of large floods has allowed riparian stands in some areas to mature into even aged stands. In many stands, the older cottonwoods and oaks have become senescent and there is little or no evidence of recent recruitment of younger cohorts of seedlings and saplings to replace them. Other stands, primarily narrow-leaved willow stands (but also stands with other willows, alder, or box elder), have permanently encroached on the channel and have anchored in place the historically dynamic alluvial features (McBain & Trush 2000). This evolution has contributed to simplification of channel morphology and loss of channel margins.

Table 5.4.3-2 Total surface area of riparian vegetation series and other land cover types mapped within the lower Tuolumne River corridor.

Vegetation Series or Land Cover Type		Total Area (acres)	Maximum Patch Size (acres)	Minimum Patch Size (acres)	Number of Patches
Native Riparian	Arroyo willow	4.1	1.02	0.11	9
	Black willow	230.6	15.67	0.01	210
	Blue elderberry	1.4	0.24	0.02	16
	Box elder	112.8	5.76	0.03	148
	Button bush	3.0	0.46	0.01	18
	California buckeye	10.1	6.47	0.05	6
	California grape*	0.7	0.33	0.14	3
	California walnut*	13.8	12.02	0.03	8
	Dusky willow	4.2	1.22	0.02	17
	Fremont Cottonwood	456.6	21.58	0.00	449
	Mixed willow	148.5	6.64	0.06	142
	Narrow-leaf willow	514.7	10.71	0.02	617
	Oregon Ash	7.0	1.39	0.01	24
	Pacific willow	4.8	1.65	0.02	9
	Valley oak	620.5	44.53	0.02	9
	Western sycamore*	0.1	0.05	0.01	2
	White alder	30.6	3.12	0.01	88
	Total	**2,163.4**	**44.53**	**0.00**	**2,205**
Native Upland	Blue oak	33.9	12.90	0.03	21
	Bush lupine*	6.3	3.72	0.28	5
	Interior live oak	101.2	92.48	0.07	11
	Total	**137.4**	**92.48**	**0.03**	**34**
Emergent Wetland	**Total**	**40.9**	**6.27**	**0.02**	**72**
Exotic	Black locust*	0.1	0.13	0.13	1
	Disturbed/miscellaneous exotics	6.3	3.72	0.28	5
	Edible fig	1.5	0.73	0.06	3
	English walnut*	1.9	1.46	0.08	5
	Eucalyptus	11.7	5.05	0.03	13
	Giant reed	5.2	0.65	0.01	47
	Himalayan berry*	3.6	0.79	0.07	15
	Lamb's quarters	1.0	0.96	0.96	1
	Tamarisk*	0.2	0.14	0.02	2
	Tree of heaven	8.4	2.23	0.03	18
	Tree tobacco*	2.7	0.66	0.15	8
	Weeping willow*	0.7	0.25	0.22	3
	Total	**43.1**	**5.05**	**0.01**	**121**
	TOTAL	**2,384.9**	**92.48**	**0.00**	**2,432**

*Land cover types not defined as a vegetation series by McBain & Trush (2000) because mapped polygons for these types represent individual plants or small monospecific groups (stands) of individuals rather than formally defined vegetation series.
Source: Table 3-10 in McBain & Trush 2000.

Stillwater Sciences and researchers at University of California, Berkeley conducted a field investigation of seed release timing and seedling distribution for cottonwoods and willows and developed a predictive model of recruitment processes for these riparian species in the San Joaquin Basin as part of a study funded by the CALFED Bay-Delta Ecosystem Restoration Program (Stillwater Sciences 2006; Stella et al. 2006). This research effort included study sites along the lower Tuolumne River. Results of their historical analysis suggests that Fremont cottonwood seed release coincided with peak runoff in almost all years, whereas Goodding's black willow and narrow-leaf willow seed dispersal typically occurred during the spring flood recession after peak runoff. Their field and modeling results also indicate that seed release timing of cottonwoods and willows is affected by local weather patterns and that degree-day models can be effective in predicting inter-annual variation in seed timing, and that degree-day models coupled with recruitment models may be a useful tool for restoration planning by predicting when and where natural recruitment of cottonwoods and willows is likely to be successful and for identifying situations where horticultural techniques for revegetation may be required.

Riparian Restoration

Grayson River Ranch

Grayson River Ranch is a perpetual conservation easement on the Tuolumne River on 143 acres (58 hectares) of floodplain located approximately four miles upstream from the San Joaquin River (Friends of the Tuolumne 2010). The Friends of the Tuolumne restored the floodplain with 7,000 trees and creeping wild rye, a native grass. Construction for the restoration project was implemented in 2000. Two sloughs (each connected to the river at the downstream end and extending in an upstream direction into the floodplain for approximately 2,000 feet) were excavated using heavy equipment to provide seasonally inundated floodplain and wetland habitat. Four species of willow, cottonwood, box elder, sycamore, Oregon ash, Valley Oaks, and creeping wild rye grass were planted in 2001 and 2003. Post-Project fish monitoring was conducted in 2005 (Fuller and Simpson 2005). Anecdotal evidence, including a number of site photos, indicates some success in restoration of riparian vegetation on the floodplain and along the newly constructed sloughs, but no quantitative assessments are available.

Big Bend

The Tuolumne River Trust (Trust) and other partners acquired approximately 250 acres (101 hectares) of property on both sides of the Tuolumne River from RM 5.8 to 7.4 ("Big Bend") (described in the Aquatics section). The vegetation-related project goals were to enhance existing native riparian vegetation through (1) planting of native riparian vegetation, (2) improvement of natural recruitment processes through increased flood frequency and duration at the project site, and (3) removal of existing non-native invasive plant species. The objective of vegetation monitoring was to evaluate the effectiveness of achieving these three vegetation-related restoration goals.

The effectiveness of the restoration efforts in meeting these goals was measured through monitoring:

1. Growth and survival of planted native woody vegetation;
2. Natural recruitment and establishment of native woody and/or herbaceous species in experimental areas due to improved connection of the channel to the floodplain (e.g., through increased area for riparian vegetation to recruit, and improved natural processes to sustain establishment and growth of native vegetation); and
3. Control of non-native invasive plants, specifically treatment of *Ailanthus altissima* (tree-of-heaven).

Restoration implementation began in late summer 2004 and riparian vegetation planting was completed by March 2005. Vegetation monitoring was conducted from spring 2005 through fall 2007. The results (reported in Stillwater Sciences 2008) suggest that planting to re-establish native woody riparian species was effective, with >70 percent survival of most species during the monitoring period, and that passive restoration via natural recruitment (especially for cottonwoods and willows) might be an effective supplement, particularly during wet years. Treatment of the invasive tree-of-heaven achieved >60 percent mortality during the monitoring period, but longer-term effectiveness of the implemented control efforts is uncertain.

Special Run-Pool 9

In 2001, restoration of river and floodplain habitat was completed at Special Run Pool (SRP) 9 (RM 25.7 to 25.9). The SRP 9 restoration project was among the first high-priority projects to be selected by the TRTAC for implementation as part of the Tuolumne River Restoration Program. Riparian vegetation monitoring conducted at SRP 9 through 2006 is summarized in TID and MID (2007, Report 2006-8). Riparian vegetation planting at SRP 9 was conducted from November 1 through December 31, 2001; irrigation and maintenance continued through September 2003. Post-Project monitoring of planted vegetation has been limited to quantifying survival of planted vegetation and replacing plants as stipulated in the construction contract. Percent cover and growth of planted vegetation have not been monitored. A brief survey of tree survival was conducted in December 2002: survival typically exceeded 60 percent for most species one year after planting (but before irrigation ended). Beaver damage to some trees was noted during this survey. No monitoring of survival has been conducted since irrigation ended. Natural recruitment of vegetation on the reconstructed floodplain has not been monitored.

7/11 Mining Reach Segment #1

In 2003, restoration of river and floodplain habitat was completed at the 7/11 site. The 7/11 restoration project is the first phase of the Gravel Mining Reach project, which extends from RM 40.3 to 34.4. Along with the SRP 9 project, this restoration project was among the first high-priority projects to be selected by the TRTAC for implementation as part of the Tuolumne River Restoration Program. Riparian vegetation monitoring conducted at the 7/11 site through 2006 is summarized in TID and MID (2007, Report 2006-8). Riparian vegetation planting at 7/11 was conducted from February through April 2003, with some additional follow-up planting in January 2004. Irrigation and plant maintenance continued through September 30, 2004. Post-project monitoring of planted vegetation has been limited to quantifying survival of planted vegetation and replacing plants as stipulated in the construction contract. Percent cover and growth of planted vegetation and natural recruitment of vegetation have not been monitored. No monitoring of survival has been conducted since irrigation ended. Natural recruitment of vegetation on the reconstructed floodplain has not been monitored.

River Mile 43 at Bobcat Flat

The Bobcat Flat restoration site includes 303 acres of riparian and instream habitat owned by Friends of the Tuolumne, Inc., a land trust (Friends of the Tuolumne 2010). Restoration of the west section began in 2005 with the excavation of 44,000 cubic yards of cobble from nine acres of floodplain to create a bypass channel and high water scour channel approximately 2,000 feet long. After excavation, 15,000 cubic yards of cobble was placed in two acres of river to restore spawning habitat for salmon and trout. During 2006, 1,250 cuttings and 1,200 potted plants of native riparian trees and herbs were planted in the reconstructed floodplain. Creeping wild rye grass was also planted. Anecdotal evidence, including some site photos, indicates some success in restoration of riparian vegetation at the site, but no quantitative assessments are available.

5.5 Threatened and Endangered Species

This section discusses plant, aquatic, and wildlife species in the vicinity of the Project and, at the time this PAD is prepared, are listed as threatened or endangered under either the federal ESA, the CESA, or both, or are designated as fully protected[7] under state law. For the purpose of this PAD, the status of each of these species is indicated as FE (endangered under the ESA), FT (threatened under the ESA), SE (endangered under the CESA), ST (threatened under the CESA), SFP (state-listed fully protected), or SR (state-listed rare). Species that may be proposed or candidates for listing under the ESA or CESA as well as species afforded other special protection by a federal or state agency are referred to as "special-status species" in this PAD and are addressed in Sections 5.3 (Aquatic Resources) and 5.4 (Wildlife and Botanical Resources)[8].

This section is divided into five subsections. Section 5.5.1 discusses applicable laws, regulations and guidance for species listed as threatened or endangered under the ESA and CESA. Section 5.5.2 discusses species listed as threatened or endangered under the ESA. Section 5.5.3 discusses species listed as threatened or endangered under the CESA, and rare or fully protected under state law. Section 5.5.4 provides a general life history for each threatened and endangered species. Section 5.5.5 summarizes the information found regarding threatened and endangered species in the upper Tuolumne River, within the Project area, and the lower Tuolumne River.

5.5.1 Applicable Laws, Regulations, and Guidance

5.5.1.1 Federal Endangered Species Act of 1972, as Amended (*16 USC § 1531 et seq.*)

The purpose of the federal ESA, as amended, is to protect and conserve endangered and threatened species and the ecosystems upon which they depend. An "endangered" species under

---

7 In addition to the CESA, CDFG affords special protection to some fish and wildlife species, referring to them as "fully protected" (CFP). Fishes are authorized under the California Fish and Game Code § 5515 and California Code of Regulations, Title 14, Division 1, Chapter 2, Article 4, Section 5.93. CFP designations for amphibians and reptiles are authorized under § 5050 of the Fish and Game Code.

8 The Sacramento USFWS office no longer maintains a list of "species of concern." However, other agencies and organizations may maintain a list of what they consider to be at-risk species. These may include species on the American Fisheries Society's list of Protected Fishes of the U.S. and Canada, state lists of protected species, and species identified as imperiled or vulnerable by state Natural Heritage Programs and various conservation organizations, such as The Nature Conservancy. These species, unless otherwise indicated, have no legal status.

the ESA is one in danger of extinction throughout all or a significant portion of its range. A "threatened" species under the ESA is one that is likely to become endangered within the foreseeable future. In addition, a species may be officially proposed in the Federal Register for listing under the ESA as endangered or threatened (FPE or FPT, respectively), or be a candidate for listing (CE or CT, respectively).

The ESA is administered by the Secretary of the Interior through the USFWS for most species, and by the Secretary of Commerce through NMFS for marine and anadromous species.

Three sections of the ESA are most applicable to the Project. Section 4 establishes a complex process for listing FE and FT species, identifying their critical habitats (as well as evolutionary significant units [ESUs] and Distinct Population Segments [DPSs]), and developing and implementing recovery plans. Section 7 of the ESA requires federal agencies to consult with the USFWS or NMFS to ensure that any action that they authorize, fund, or carry out is not likely to jeopardize the continued existence of any FE or FT species, or result in the destruction or adverse modification of critical habitat for these listed species. Section 9 of the ESA prohibits any person from "taking"[9] a FE or FT species. Finally, Section 10 of the ESA includes exceptions to Section 9 prohibited acts.

FERC is the lead federal agency (or "action agency" under the ESA) for relicensing of the Project and, therefore, must consult with USFWS and NMFS on whether FERC's actions and authorizations would potentially jeopardize the continued existence of any FE or FT species or adversely affect any designated critical habitat. Jeopardy exists when an action would "appreciably reduce the likelihood of both the survival and recovery of a listed species" (50 CFR § 402.02). Consultation typically is initiated by a request to USFWS and NMFS for an inventory of FE and FT species as well as species officially proposed by USFWS or NMFS for listing as endangered or threatened that may be present in the Project Boundary. FERC then prepares a biological assessment (BA), to determine whether these listed species or their critical habitats are likely to be adversely affected by the federal action. Under current regulations, if FERC's Biological Assessment (BA) indicates that the relicensing may have an adverse effect on a listed species or its critical habitat, formal consultation with USFWS and/or NMFS is required. At the end of the consultation process, USFWS or NMFS issues a Biological Opinion (BO), which specifies whether or not the action will place a FE or FT species or critical habitat in jeopardy. If a jeopardy opinion is issued, USFWS or NMFS must include reasonable and prudent alternatives to the action. A non-jeopardy opinion may be accompanied by an "incidental take statement" that specifies impacts of the taking, mitigation measures, and terms and conditions for implementation of the mitigation measures.

5.5.1.2 Magnuson-Stevens Fishery Conservation and Management Act, as Amended *(16 USC § 1801 et seq.)*

The purpose of this Act is to conserve and manage, among other resources, anadromous fishery resources of the U.S. The Act establishes eight Regional Fisheries Management Councils prepare, monitor and revise fishery management plans, which will achieve and maintain the optimum yield from each fishery. In California, the Pacific Fisheries Management Council is

9 The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.

responsible for achieving the objectives of the statute. The Secretary of Commerce has oversight authority. The Act was amended in 1996 to establish a new requirement to describe and identify "essential fish habitat" (EFH) in each fishery management plan. EFH is defined as *"…those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."* EFH has been established by NMFS for waters in California supporting anadromous fish. The Act requires that all federal agencies, including FERC, consult with NMFS on all actions, or proposed actions, permitted, funded or undertaken by the agency, that may adversely affect EFH. Adversely affect means any impact that reduces the quality and/or quantity of EFH. Comments from NMFS following consultation are advisory only; however, a written explanation must be submitted to NMFS if the implementing federal agency does not agree with its recommendations.

5.5.1.3 California Endangered Species Act (*Fish and* Game *Code § 2050 - 2116*)

The CESA, enacted in 1984, is authorized under the Fish and Game Code (Division 3, Chapter 1.5). The CESA is patterned after the ESA and administered by the CDFG. The CESA requires state lead agencies preparing CEQA documents to consult with CDFG regarding potential impacts of projects on state-listed species. Consultation is intended to ensure that any action authorized, funded, or carried out by the lead agency is not likely to jeopardize the continued existence of any species listed under the CESA as endangered or threatened (ST), or destroy or adversely modify "essential habitat" (i.e., habitat necessary to the continued existence of the species). If jeopardy is determined for SE or ST species, the state lead agency must adopt reasonable and prudent alternatives as specified by CDFG to prevent jeopardy. If a project may affect species listed jointly under the ESA and CESA, the CDFG must participate in ESA Section 7 consultation to the maximum extent possible. The federal BO will generally reflect both CDFG and USFWS (or NMFS) findings, and the CDFG is encouraged by CESA to adopt, when possible, the USFWS (or NMFS) BO as its own formal written determination on whether jeopardy exists. However, if the two agencies ultimately fail to agree, they may each issue an independent BO.

5.5.2 Federal ESA-Listed Species

In August 2010, the Districts generated an official list of ESA-listed species for the 7.5-minute USGS topographic quadrangles (Chinese Camp, La Grange, Moccasin, Penon Blanco Peak, Sonora, and Standard), which include the Project Boundary, via the on-line request service available at the USFWS's website at http://www.fws.gov/sacramento/es/spp_list.htm. The list included 18 species (nine plants, three invertebrates, two amphibians, three fishes, and one mammal)[10].

The Districts eliminated from further consideration three fish species (Delta smelt, *Hypomesus transpacificus;* Central Valley spring-run Chinook salmon, *Oncohynchus tschawytscha*; and winter-run Chinook salmon, *O. tschawytscha)* and one invertebrate species (Conservancy fairy shrimp, *Branchinecta conservatio*) because these species do not occur in the general vicinity of the Project.

[10] The USFWS query results do not identify specific Project Boundary quads by species. The results provide an overall species list of all quads searched. (USFWS 2010c)

Following removal of species that do not occur in the vicinity of the Project, 15 species on USFWS's August 2010 list remained. Four of the species are FE and 11 are FT:

- **ESA Endangered**:
  - Hartweg's golden sunburst (*Pseudobahia bahiifolia*)
  - Hairy Orcutt grass (*Orcuttia pilosa*), Critical Habitat
  - Greene's tuctoria (*Tuctoria greenei*), Critical Habitat
  - San Joaquin kit fox (*Vulpes macrotis mutica*)
- **ESA Threatened**:
  - Succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*), Critical Habitat
  - Hoover's spurge (*Chamaesyce hooveri*), Critical Habitat
  - Colusa grass (*Neostapfia colusana*), Critical Habitat
  - Chinese Camp brodiaea (*Brodiaea pallida*)
  - Layne's ragwort (*Packera layneae*)
  - Red Hills vervain (*Verbena californica*)
  - Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)
  - Vernal pool fairy shrimp (*Branchinecta lynchi*), Critical Habitat
  - California tiger salamander, Central Valley DPS (*Ambystoma californiense*), Critical Habitat
  - California red-legged frog (*Rana draytonii*)
  - Steelhead, California Central Valley DPS (*Oncorhynchus mykiss irideus),* Critical Habitat

The Districts then searched a number of sources to compile for each of the ESA-listed species: (1) a description of habitat requirements, (2) any known occurrences of the species within or adjacent the Project Boundary, and (3) references to any recovery plans or status reports pertaining to that ESA-listed species. For plants, the sources were CNDDB and the U.S. Department of Agriculture's (USDA) PLANTS database, which is available at http://plants.usda.gov. The California Native Plant Society (CNPS) database was also used to query the Project Boundary quadrangle maps as well as a one-quadrangle surrounding perimeter. This database is available at http://www.cnps.org/inventory. For fish and wildlife, the information sources included CDFG's CNDDB, USFWS' online database and Recovery Plans.

The result of the search is shown in Table 5.5.2-1.

5.5.3 CESA - Rare and Fully Protected Species

To prepare a formal list of CESA-listed plants and animals and SFP species with a potential to occur in or adjacent to the Project Boundary, the Districts used the CNDDB database for animals and the CNPS database and the CDFG Special Vascular Plants, Bryophytes, and Lichens List (CDFG 2010b). The Districts then referred to the CNDDB and other appropriate sources described above to determine the potential occurrence of these species in or adjacent to the Project Boundary.

Table 5.5.2-1 Federal and State of California threatened or endangered species, and state rare or fully protected species occurring or potentially occurring in the vicinity of the Project.

Common Name / Scientific Name	Status[1]	Suitable Habitat Type	Known Occurrence in Project Boundary	Status Reports, Recovery Plans Relevant to Project Boundary
Plants				
Hartweg's golden sunburst *Pseudobahia bahiifolia*	FE, SE	Cismontane woodland, valley and foothill grassland (CNDDB 2009)	Occurs within La Grange quad (CNPS 2010). Three occurrences found on CNDDB within La Grange quad (CNDDB 2009). Reported on the USFWS species list for Project Boundary quads (USFWS 2010c).	5-Year Review (USFWS 2007d)
hairy orcutt grass *Orcuttia pilosa*	FE, SE	Vernal pools (CNPS 2010)	Reported on the USFWS species list for critical habitat within Project Boundary quads (USFWS 2010c).	Recovery Plan (USFWS 2005) 5-Year Review (USFWS 2009b)
Greene's tuctoria *Tuctoria greenei*	FE, SR	Vernal pools (CNPS 2010)	Reported on the USFWS species list for critical habitat within Project Boundary quads (USFWS 2010c).	Recovery Plan (USFWS 2005) 5-Year Review (USFWS 2007b)
succulent owl's clover *Castilleja campestris* ssp. *succulent*	FT, SE	Vernal pools (CNPS 2010)	Reported on the USFWS species list for critical habitat within Project Boundary quads (USFWS 2010c).	Recovery Plan (USFWS 2005)
Hoover's spurge *Chamaesyce hooveri*	FT	Vernal pools (CNPS 2010)	Reported on the USFWS species list for critical habitat within Project Boundary quads (USFWS 2010c).	Recovery Plan (USFWS 2005) 5-Year Review (USFWS 2009a)
Colusa grass *Neostapfia colusana*	FT, SE	Vernal pools (CNPS 2010)	Reported on the USFWS species list for critical habitat within Project Boundary quads (USFWS 2010c).	Recovery Plan (USFWS 2005) 5-Year Review (USFWS 2008)
Chinese Camp brodiaea *Brodiaea pallid*	FT, SE	Ultramafic, valley and foothill grassland, cismontane woodland, vernal streambeds, often serpentine (CNPS 2010)	Occurs within Chinese Camp and Sonora quads (CNPS 2010). One occurrence found on CNDDB within Chinese Camp quad (CNDDB 2009). Reported on the USFWS species list within Project Boundary quads (USFWS 2010c).	5-Year Review (USFWS 2007a)

Common Name / Scientific Name	Status[1]	Suitable Habitat Type	Known Occurrence in Project Boundary	Status Reports, Recovery Plans Relevant to Project Boundary
Layne's ragwort *Packera layneae*	FT, SR	Chaparral, cismontane woodland, serpentine or gabbroic, rocky (CNPS 2010)	Occurs within Chinese Camp and Moccasin quads (CNPS 2010). Six occurrences found on CNDDB: five occurrences within Chinese Camp quad and one occurrence within Moccasin quad (CNDDB 2009). Reported on the USFWS species list within Project Boundary quads (USFWS 2010c).	Recovery Plan (USFWS 2002)
Red Hills vervain *Verbena californica*	FT, ST	Cismontane woodland, valley and foothill grassland, usually serpentine seeps and creeks (CNPS 2010)	Occurs within Sonora and Chinese Camp quads (CNPS 2010). Twelve occurrences found on CNDDB: 11 within Chinese Camp quad and two within Sonora quad (CNDDB 2009). Reported on the USFWS species list within Project Boundary quads (USFWS 2010c).	5-Year Review (USFWS 2007c)
Delta button-celery *Eryngium racemosum*	SE	Riparian scrub (CNPS 2010)	Occurs in the surrounding Turlock Lake quad (CNPS 2010).	None
Invertebrates				
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	Occurs only in the Central Valley and adjacent foothills up to 3,000 feet elevation in association with Blue elderberry.	Four occurrences found on CNDDB: three occurrences within Sonora quad and two occurrences within Standard quad (CNDDB 2009). Reported on the USFWS species list within Project Boundary quads (USFWS 2010c).	Recovery Plan (USFWS 1984)
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	Occurs mostly in vernal pools although it also inhabits a variety of natural and artificial seasonal wetland habitats, such as alkali pools, ephemeral drainages, stock ponds, roadside ditches, vernal swales, and rock outcrop pools (NatureServe 2009).	One occurrence found on CNDDB within Sonora quad (CNDDB 2009). Reported on the USFWS species list within Project Boundary quads (USFWS 2010c).	Recovery Plan (USFWS 2005)
Amphibians				
California tiger salamander, Central Valley DPS *Ambystoma californiense*	FT, ST	Breeds in seasonal ponds (or permanent ponds where fish are absent) and occasionally in intermittent streams. Occurs terrestrially in vacant or mammal-occupied burrows, occasionally other underground retreats, throughout most of the year; in grassland, savanna, or open woodland habitats (NatureServe 2009).	Five occurrences found on CNDDB within La Grange quad (CNDDB 2009). Reported on the USFWS species list for critical habitat within Project Boundary quads (USFWS 2010c).	None

Common Name / Scientific Name	Status[1]	Suitable Habitat Type	Known Occurrence in Project Boundary	Status Reports, Recovery Plans Relevant to Project Boundary
California red-legged frog *Rana aurora draytonii*	FT	Suitable habitat is located in deep (>2.3 feet), still or slow- moving water within dense, shrubby riparian and upland habitats (Jennings and Hayes, 1994).	Reported on the USFWS species list within Project Boundary quads (USFWS 2010c). The nearest known occurrence is at Piney Creek, where CRLF was last documented in 1984 at locations ranging from 0.96 mi east to 1.06 mi east of the Project Boundary (Basey, pers. comm., 2010, Jennings, pers. comm. 2010),	Recovery Plan (USFWS 2002)
Fish				
Steelhead, California Central Valley DPS *Oncorhynchus mykiss irideus*	FT	Spawning occurs within the Sacramento and San Joaquin rivers and their tributaries; majority of native, natural production occurs in upper Sacramento River tributaries below Red Bluff Diversion Dam (NatureServe 2009).	Reported on the USFWS species list for critical habitat within Project Boundary quads (USFWS 2010c).	Restoration and Management Plan (CDFG 1996)
Birds				
Bald eagle *Haliaeetus leucocephalus*	SE	Breeding habitat usually includes areas close to coastal areas, bays, rivers, lakes, or other bodies of water that reflect the general availability of primary food sources. Preferentially roosts in conifers or other sheltered sites in winter in some areas (NatureServe 2009).	Three occurrences found on CNDDB: one occurrence within Penon Blanco Peak quad, one occurrence within La Grange quad, and one occurrence within Sonora quad (CNDDB 2009). Additional BLM occurrence data are summarized in Section 5.5.5.	Status Report (CDFG 2000, 2001)
Golden eagle *Aquila chrysaetos*	SFP	Generally open country, in prairies, arctic and alpine tundra, open wooded country, and barren areas, especially in hilly or mountainous regions. Nests on rock ledge of cliffs or in large trees (NatureServe 2009).	During the spring and winter BLM wildlife surveys in 1978, golden eagles were observed within the Don Pedro grassland (BLM 1978). Observed during the BLM and Central Sierra Audubon Society (CSAS) mid-winter eagle surveys on Don Pedro Reservoir. They were observed during surveys in 1997 and each year between 1999 and 2009 (BLM and CSAS 1979, 1984, 1994-2010).	None

Common Name / Scientific Name	Status[1]	Suitable Habitat Type	Known Occurrence in Project Boundary	Status Reports, Recovery Plans Relevant to Project Boundary
Mammals				
San Joaquin kit fox *Vulpes macrotis mutica*	FE, ST	Alkali sink, valley grassland, foothill woodland. Hunts in areas with low sparse vegetation that allows good visibility and mobility (NatureServe 2009).	One occurrence found on CNDDB within La Grange quad (CNDDB 2009). Reported on the USFWS species list within Project Boundary quads (USFWS 2010c).	Recovery Plan (USFWS 1998)

1 Status Codes:
FE: - Endangered: Any species that is in danger of extinction throughout all or a significant portion of its range.
FT: - Threatened: Any species likely to become endangered within the near future.
SE: - Endangered: California State listed as Endangered.
ST: - Threatened: California State listed as Threatened.
SFP: - California State listed as Fully Protected.
SR: - California State listed as Rare.

To identify CESA-listed animals, the Districts reviewed the CDFG July 2010 list of *State and Federally Listed Endangered and Threatened Animals of California*. The list includes 157 fish and wildlife species of which 55 are listed under both the ESA and CESA, 71 are listed only under the ESA, and 31 are listed only under the CESA. The Districts also reviewed the State of California, CDFG List of State Fully Protected Animals. The list includes 37 fish and wildlife species.

Based on review of the above information, 10 species (eight plants, one bird, and one amphibian) protected under the CESA, Rare or Fully Protected under state law may potentially occur in the vicinity of the Project. These species are:

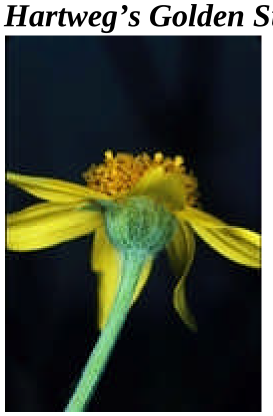
- **CESA Endangered**:
  - Succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*)
  - Hartweg's golden sunburst (*Pseudobahia bahiifolia)*
  - Colusa grass (*Neostapfia colusana*)
  - Hairy orcutt grass (*Orcuttia pilosa*)
  - Chinese Camp brodiaea (*Brodiaea pallida)*
  - Bald eagle (*Haliaeetus leucocephalus*)
- **CESA Threatened**:
  - Red Hills vervain (*Verbena californica*)
  - California tiger salamander, Central Valley DPS (*Ambystoma californiense*)
- **State Rare**:
  - Layne's ragwort (*Packera layneae*)
  - Greene's tuctoria (*Tuctoria greenei*)
- **State Fully Protected:**
  Golden eagle (*Aguila chrysaetos*)

Table 5.5.2-1 described each species' habitat requirements, any known occurrences within or adjacent to the Project Boundary, and references to any recovery plans or status reports pertaining to a CESA-listed species. Attachment 5.5.3-1 displays known occurrences of ESA- and CESA-listed species in the area surrounding the Project that were obtained from the CNDDB (CDFG 2010b).

5.5.4 Life Histories of Threatened, Endangered and Fully Protected Species

5.5.4.1 Plant Species

Hartweg's Golden Sunburst (FE, SE)[11]



Hartweg's golden sunburst occurs in open grasslands and grasslands at the margins of blue oak woodland, primarily on shallow, well-drained, fine-textured soils, nearly always on the north or northeast facing of Mima mounds. These are mounds of earth roughly one to six feet high and 10 to 100 feet in diameter at the base, interspersed with basins that may pond water in the rainy season. The species is found only in the Central Valley of California. Historically, the range of the species may have extended from Yuba County south to Fresno County, a range of 200 miles. Within this range, the species was only locally abundant. Today, there are 16 populations on the eastern edge of the San Joaquin Valley. Remaining

[11] Photo found at: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi/Home.

populations are concentrated in the Friant region of Fresno and Madera counties and the La Grange region in Stanislaus County (USFWS 2001). The results of the USFWS search of Project Boundary quads indicated that this species occurs within Project quads. The results of the CNDDB search and CNPS search of Project Boundary quads both indicated that this species occurs within the La Grange quad.

Hairy Orcutt Grass (FE, SE)[12]

This species is found on high or low stream terraces and alluvial fans (Stone et al. 1988). *Orcuttia pilosa* occurs in Northern Basalt Flow, Northern Claypan, and Northern Hardpan vernal pools (Sawyer and Keeler-Wolf 1995) within annual grasslands (CNDDB 2003). The median size of occupied pools measured in the late 1980s was 4.2 acres, with a range of 0.8 to 617.5 acres (Stone et al. 1988). At the Vina Plains, *O. pilosa* was found growing only in pools that held water until May, June, or July in 1995 and not in those that had dried by April (Alexander and Schlising 1997). This species is known from elevations of 85 feet in Glenn County to 405 feet in Madera County (CNDDB 2003). *O. pilosa* is found on both acidic and saline-alkaline soils, in pools with an iron-silica cemented hardpan or claypan. In the Northeastern Sacramento Valley Vernal Pool Region, pools supporting *O. pilosa* occur on the Anita and Tuscan soil series (Stone et al. 1988, CNDDB 2003). At one pool in the Vina Plains that spans both Anita clay and Tuscan loam soils, *O. pilosa* was found growing primarily on the Anita clay type (Alexander and Schlising 1997). In the Solano-Colusa Vernal Pool Region, *O. pilosa* occurs on the Willows and Riz soil series (J. Silveira. pers. comm. 2000), whereas in the Southern Sierra Foothills Vernal Pool Region, it occurs on the Cometa, Greenfield, Hanford, Meikle, and Whitney soil series (Stone et al. 1988). The results of the USFWS search of Project Boundary quads indicated that this species occurs within Project quads.

Greene's Tuctoria (FE SR)[13]

Tuctoria greenei has been found in three types of vernal pools: Northern Basalt Flow, Northern Claypan, and Northern Hardpan (Sawyer and Keeler-Wolf 1995) on both low and high terraces (Stone et al. 1988). Occupied pools are or were underlain by iron-silica cemented hardpan, tuffaceous alluvium, or claypan (Stone et al. 1988). Of pools where the species was known to be extant in 1987, the median size was 1.5 acres, with a range of 0.01 to 8.4 acres (Stone et al. 1988). Stone et al. (1988) noted that *T. greenei* grew in shallower pools than other members of the tribe or on the shallow margins of deeper pools, but they did not quantify pool depth. At the Vina Plains, *T. greenei* grew in pools of "intermediate" size, which dried in April or early May of 1995 (Alexander and Schlising 1997). The Central Valley pools containing *T. greenei* are (or were) in grasslands; the Shasta County occurrence is surrounded by pine forest (CNDDB 2003). Occupied pools in the Central Valley are or were at elevations of 110 to 440 feet (Stone et al. 1988), whereas the Shasta County occurrence is at 3,500 feet (CNDDB 2003). In the Northeastern Sacramento Valley Vernal Pool Region, *T. greenei* grows mostly on Anita clay and Tuscan loam soils, with one occurrence on

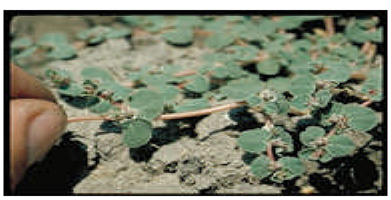
12 Photo found at: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi/Home.
13 Photo found at: http://calphotos.berkeley.edu/.

Tuscan stony clay loam. Soil types are not certain for several other occurrences in this region; one is on either the Rocklin or the San Joaquin series, and the others are unknown. The single occurrence in the Solano-Colusa Vernal Pool Region is on strongly saline-alkaline Willows clay (J. Silveira. pers. comm. 2000). In the Southern Sierra Foothills Vernal Pool Region, *T. greenei* is known to grow on a number of different soil series including Archerdale, Bear Creek, Exeter, Meikle, Ramona, Raynor, Redding, and San Joaquin. Soil types have not been determined for occurrences in the other regions. The results of the USFWS search of Project Boundary quads indicated that this species occurs within Project quads.

Succulent Owl's Clover (FT, SE)[14]

Castilleja campestris ssp. *succulenta* occurs in Northern Claypan and Northern Hardpan vernal pools (Sawyer and Keeler-Wolf 1995) within annual grassland communities (CNDDB 2003). The plant is known from both small and large pools (EIP Associates 1999; J. Stebbins, pers. comm. 2000). Although not all pools occupied by this taxon have been studied in detail, Stebbins et al. (1995) collected data on six occupied pools in Fresno and Madera counties, California. Some were typical "bowl-like" pools, whereas others were more similar to swales. Approximate pool area ranged from 0.07 to 1.61 acres, depth from 11.8 to 15.0 inches, and pH of the soil underlying the pools from 5.00 to 6.24 (Stebbins et al. 1995). This subspecies has been reported from pools with both long and short inundation periods (EIP Associates 1999) and from both shallow and "abnormally deep" vernal pools, but approximate depth of these pools was not given (CNDDB 2003). The results of the USFWS search of Project Boundary quads indicated that this species occurs within Project quads.

Hoover's Spurge (FT)[15]



Chamaesyce hooveri is restricted to vernal pools (Stone et al. 1988; Koutnik 1993; Pavlik 1994). However, the plant appears to be adapted to a wide variety of soils, which range in texture from clay to sandy loam. Specific soil series from which it has been reported include Anita, Laniger, Lewis, Madera, Meikle, Riz, Tuscan, Whitney, and Willows. Natural pools in which the plant occurs are primarily classified as Northern Hardpan and Northern Claypan vernal pools (Sawyer and Keeler-Wolf 1995). In the Northeastern Sacramento Valley Vernal Pool Region, occupied pools are generally on acidic soils over iron-silica cemented hardpan. Most pools supporting *C. hooveri* in the San Joaquin Valley, Solano-Colusa, and Southern Sierra Foothills vernal pool regions are on neutral to saline-alkaline soils over lime-silica cemented hardpan or claypan (Broyles 1987; Stone et al. 1988; Sawyer and Keeler-Wolf 1995; CNDDB 2003). Vernal pools supporting *C. hooveri* typically occur on alluvial fans or terraces of ancient rivers or streams, with a few on the rim of the Central Valley basin. In addition, *C. hooveri* has been reported from several pools that were formed artificially when small ponds were created in appropriate soil types (CNDDB 2003). The pools supporting this species vary in size from 0.47 to 600 acres, with a median area of 1.43 acres (Stone et al. 1988). This species may occur along the margins or in the deepest portions of the dried pool-bed (Stone et al. 1988; Alexander and

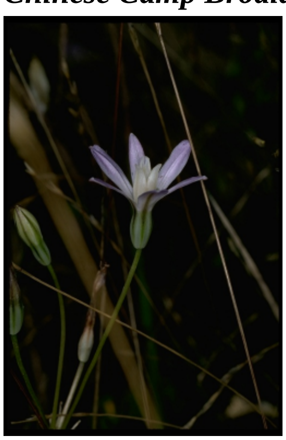
[14] Photo found at: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi/Home.
[15] Photo found at: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi/Home.

Schlising 1997). Deeper pools apparently provide better habitat for this species because the duration of inundation is longer and the deeper portions are nearly devoid of other vegetation, thus limiting competition from other plants (J. Stebbins *in litt.* 2000; Stone et al. 1988). The results of the USFWS search of Project Boundary quads indicated that this species occurs within Project quads.

Colusa Grass (FT, SE)[16]

Neostapfia colusana has the broadest ecological range among the Orcuttieae. It occurs on the rim of alkaline basins in the Sacramento and San Joaquin valleys, as well as on acidic soils of alluvial fans and stream terraces along the eastern margin of the San Joaquin Valley and into the adjacent foothills (Stone et al. 1988). Elevations range from 18 feet to about 350 feet at known sites (CNDDB 2005). *N. colusana* has been found in Northern Claypan and Northern Hardpan vernal pool types (Sawyer and Keeler-Wolf 1995) within rolling grasslands (Crampton 1959). It grows in pools ranging from 0.02 to 617.5 acres, with a median size of 0.5 acres, and occurs in the beds of intermittent streams and in artificial ponds (Stone et al. 1988; K. Fuller pers. comm. 1997; EIP Associates 1999). This species typically grows in the deepest portion of the pool or streambed (Crampton 1959; Stone et al. 1988), but may also occur on the margins (Hoover 1937; Stone et al. 1988). It appears that deeper pools and stock ponds are most likely to provide the long inundation period required for germination (EIP Associates 1999). Several soil series are represented throughout the range of *N. colusana*. In the Solano-Colusa Vernal Pool Region, *N. colusana* grows on clay, silty clay, or silty clay loam soils in the Marvin, Pescadero, and Willows series. In the San Joaquin Valley Vernal Pool Region, soils are clay or silty clay loam in the Landlow and Lewis series (J. Silveira. pers. comm. 2000). *Neostapfia colusana* habitat in the Southern Sierra Foothills Vernal Pool Region includes many soil series with textures ranging from clay to gravelly loam. For sites with known soil series, Bear Creek, Corning, Greenfield, Keyes, Meikle, Pentz, Peters, Raynor, Redding, and Whitney are represented (Stone et al. 1988; EIP Associates 1999; CNDDB 2003). The type and composition of impermeable layers underlying occupied vernal pools also varies, ranging from claypan to lime-silica or iron-silica cemented hardpan and tuffaceous alluvium (Stone et al. 1988). The results of the USFWS search of Project Boundary quads indicated that this species occurs within Project quads.

Chinese Camp Brodiaea (FT, SE)[17]



Brodiaea pallida grows in seeps and springs in volcanic and serpentine soils in the California Sierra foothills. This species is known from only two occurrences near Chinese Camp in Calaveras and Tuolumne counties (CNPS 2010). Both of these occurrences are on private land, which is threatened by development. Chinese Camp brodiaea grows with two other brodiaeas and hybridizes with one of them. It can be differentiated from the other brodiaeas by flower color and length, width, shape and position of male flower parts (USFWS 2008). The results of the USFWS search of Project Boundary quads indicated that this species occurs within Project quads. The results of the CNDDB search and CNPS search of Project Boundary quads both indicated that this species occurs

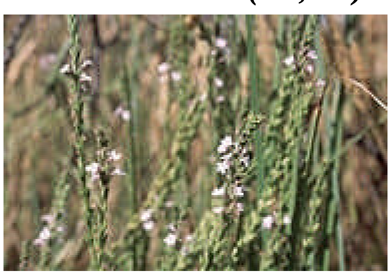
[16] Photo found at: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi/Home.
[17] Photo found at: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi/Home.

within the Chinese Camp quad. The CNPS search indicated that this species also occurs within the Sonora quad.

Layne's Ragwort (FT, SR)[18]

Packera layneae grows in open rocky areas of gabbro and serpentine soils within chaparral plant communities. Most known sites are scattered within a 40,000-acre area in western El Dorado County that includes the Pine Hill intrusion and adjacent serpentine. Gabbro soils originate from volcanic rocks (gabbrodiorite) that are mildly acidic, are rich in iron and magnesium, and often contain other heavy metals such as chromium. Gabbro, a dark large-crystalled rock, is formed when liquid magma cools slowly underground. A red soil is formed when the rock is exposed and weathers at the earth's surface. These soils are well drained and are underlain by gabbrodiorite rocks at a depth of more than 3 feet. Serpentine-derived soils are formed through a process similar to formation of gabbro soils. Serpentine soils are derived from serpentinite, dunite, and peridotite. They tend to have high concentrations of magnesium, chromium, and nickel, and low concentrations of calcium, nitrogen, potassium, and phosphorus. Most plants do not grow well on gabbro or serpentine soils (USFWS 2008). The results of the USFWS search of Project Boundary quads indicated that this species occurs within Project quads. The results of the CNDDB search and CNPS search of Project Boundary quads both indicated that this species occurs within the Chinese Camp and Moccasin quads.

Red Hills Vervain (FT, ST)[19]



Verbena californica only grows at an elevation of 850 to 1,150 feet in the Red Hills and nearby Rawhide Hill in western Tuolumne County. The plants grow in moderately wet (mesic) areas, often in overflow channels, along intermittent and perennial streams underlain by serpentine rocks, often in the blue oak (*Quercus douglasii*) or gray pine (*Pinus sabiniana*) woodland communities. The populations are distributed over about 90 acres within a 24-square-mile area. Fifteen percent of the plants occur on lands administered by the BLM and 85 percent on privately owned lands (Koutnik 1993). Red Hills vervain is threatened by grazing, mining, development, non-native plants, recreation, and vehicles (CNPS 2010). The results of the USFWS search of Project Boundary quads indicated that this species occurs within Project quads. The results of the CNDDB search and CNPS search of Project Boundary quads both indicated that this species occurs within the Chinese Camp and Sonora quads.

---

18 Photo found at: http://www.fws.gov/sacramento/es/plant_spp_accts/laynes_butterweed.htm.
19 Photo found at: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi/Home.

Delta button-celery (SE)[20]

Eryngium racemosum is known from only 28 occurrences, seven of which are historical or potentially extirpated. Historically, this species occurred in Calaveras, Merced, Stanislaus and San Joaquin counties. Habit for the species include clay and silty soils in seasonally flooded plains and swales. Flood-prevention projects, grazing, dredging, prolonged inundation and channel maintenance are all threats to the species (CDFG 2005). The results of the CNPS search of Project Boundary quads indicated that this species occurs within the neighboring Turlock Lake USGS quadrangle (CNPS 2010).

5.5.4.2 Wildlife Species

Valley Elderberry Longhorn Beetle (FT)[21]

The Valley elderberry longhorn beetle ranged historically throughout the Central Valley, extending up 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 beetle's 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 are short-lived. 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 one 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 one-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 one 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 results of the USFWS search of Project Boundary quads indicated that this species occurs within Project quads. The results of the CNDDB search of Project Boundary quads indicated that this species occurs within the Sonora and Standard quads.

Vernal Pool Fairy Shrimp (FT)[22]

The vernal pool fairy shrimp occupies a variety of different vernal pool habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools (Eng et al. 1990; Helm 1998). Although the vernal pool fairy shrimp has been collected from large vernal pools, including one exceeding 25 acres in area (Eriksen and Belk 1999), it tends to occur primarily in smaller pools (Platenkamp1998), and is most frequently found in pools measuring

20 Photo found at: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi/Home.
21 Photo found at: http://essig.berkeley.edu/endins/desmocer.htm.
22 Photo found at: www.fws.gov.

less than 0.05 acres in area (Gallagher 1996; Helm 1998). The vernal pool fairy shrimp typically occurs at elevations from 30 to 4,000 feet (Eng et al. 1990), although two sites in the Los Padres National Forest have been found to contain the species at an elevation of 5,600 feet. The vernal pool fairy shrimp has been collected at water temperatures as low as 4.5°C (Eriksen and Belk 1999), and has not been found in water temperatures above about 23°C (Helm 1998; Eriksen and Belk 1999). The species is typically found in pools with low to moderate amounts of salinity or total dissolved solids (Collie and Lathrop 1976; Keeley 1984; Syrdahl 1993). Vernal pools are mostly rain fed, resulting in low nutrient levels and dramatic daily fluctuations in pH, dissolved oxygen, and carbon dioxide (Keeley and Zedler 1998).

Although there are many observations of the environmental condition where vernal pool fairy shrimp have been found, there have been no experimental studies investigating the specific habitat requirements of this species. Platenkamp (1998) found no significant differences in vernal pool fairy shrimp distribution between four different geomorphic surfaces studied at Beale Air Force Base. Vernal pool fairy shrimp are highly adapted to the environmental conditions of their ephemeral habitats. One adaptation is the ability of the vernal pool fairy shrimp eggs, or cysts, to remain dormant in the soil when their vernal pool habitats are dry. Another important adaptation is that the vernal pool fairy shrimp has a relatively short life span, allowing it to hatch, mature to adulthood, and reproduce during the short time period when vernal pools contain water. The vernal pool fairy shrimp can reach sexual maturity in as few as 18 days at optimal conditions of 20°C , and can complete its life cycle in as little as nine weeks (Gallagher 1996; Helm 1998). The results of the USFWS search of Project Boundary quads indicated that this species may occur within Project quads. The results of the CNDDB search of Project Boundary quads indicated that this species occurs within the Sonora quad.

California Tiger Salamander, Central Valley DPS (FT, ST)[23]

The California tiger salamander lives in vacant or mammal-occupied burrows (e.g., California ground squirrel and valley pocket gopher) (Trenham 2001), or occasionally other underground retreats, throughout most of the year; in grassland, savanna, or open woodland habitats. Sonoma County, California populations are closely associated with the presence of gopher burrows (USFWS 2003). California tiger salamander lays eggs on submerged stems and leaves, in shallow seasonal (continuously flooded for a minimum of 10 to 12 consecutive weeks) or semi-permanent pools and ponds that fill during heavy winter rains or in permanent ponds (Alvarez 2004b); adults spend little time in breeding sites. Populations generally do not persist where fish are present. Breeding occurs from December through February after rains fill pools and ponds. Fertilization is internal. Eggs are laid singly or in small clusters, and hatch in two to four weeks. Larvae transform in about four months (Behler and King 1979) as water recedes in late spring or summer, but larvae may overwinter in permanent ponds (Alvarez 2004a). The salamanders may not breed in drought years when ponds fail to fill. Production of metamorphs tends to be “boom or bust” at a given site (Loredo and Van Vuren 1996). The results of the USFWS search of Project Boundary quads indicated that this species occurs within the Project Boundary quads. The results of the CNDDB search of Project Boundary quads indicated that this species occurs within the La Grange quad.

[23] Photo found at: bss.sfsu.edu.

California Red-Legged Frog (FT)[24]

The historical range of the CRLF extends through Pacific slope drainages from Shasta County, California, to Baja California, Mexico, including the Coast Ranges and the west slope of the Sierra Nevada Range at elevations below 4,000 feet. The current range of this species is greatly reduced, with most remaining populations occurring along the coast from Marin County to Ventura County. The CRLF occurs primarily in perennial ponds or pools and perennial or ephemeral streams where water remains long enough for breeding and development of young to occur (Jennings and Hayes 1994). Habitats with the highest densities of frogs contain dense emergent or shoreline riparian vegetation closely associated with deep (greater than 2.3 feet, though frogs have been known to breed in shallower pools), still or slow-moving water. The types of vegetation that seem to provide the most suitable structure are willows, cattails, and bulrushes. Another key habitat indicator for CRLF is the absence or near-absence of introduced predators such as bullfrogs and predatory fish, particularly centrarchids (i.e., sunfish), which feed on the larvae at higher rates than native predatory species (Hayes and Jennings 1988). Emergent vegetation, undercut banks, and semi-submerged rootballs afford shelter from predators (USFWS 1997). The CRLF lays eggs from late November to late April in ponds or in backwater pools of creeks, attaching them to emergent vegetation such as cattails and bulrushes. Larvae remain in these aquatic habitats until metamorphosis. Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae typically metamorphose between July and September and probably feed on algae (Jennings and Hayes 1994).

The CRLF may disperse upstream, downstream, or upslope of its breeding habitat to forage and seek sheltering habitat. It may take shelter in small-mammal burrows and other refugia up to several dozen feet from the water any time of the year (Jennings and Hayes 1994). During wet periods, the CRLF can move long distances between aquatic habitats, traversing upland habitats or ephemeral drainages up to a mile or more from the nearest known frog populations (Fellers 2007). Seeps and springs in open grasslands can function as foraging habitat or refugia for wandering frogs (USFWS 1997). The results of the USFWS search of Project Boundary quads indicated that this species may occur within Project Boundary quads. The nearest known occurrence is at Piney Creek, where CRLF was last documented in 1984 at locations ranging from 0.96 mi east to 1.06 mi east of the Project Boundary (Basey, pers. comm. 2010; Jennings, pers. comm. 2010).

Steelhead, California Central Valley DPS (FT)

Steelhead is the name commonly applied to the anadromous form of the biological species *Oncorhynchus mykiss*. The present distribution of steelhead extends from Kamchatka in Asia, east to Alaska, and down to southern California (NMFS 1999 *as cited* by Good et al. 2005), although the historical range of *O. mykiss* extended at least to the Mexico border (Busby et al. 1996 *as cited* by Good et al. 2005). *O. mykiss* exhibit perhaps the most complex suite of life-history traits of any species of Pacific salmonid. It can be anadromous or freshwater resident (and under some circumstances, apparently yield offspring of the opposite form). Those that are anadromous can spend up to seven years in fresh water prior to

24 Photo found at: http://animaldiversity.ummz.umich.edu/site/index.html.

smoltification, and then spend up to three years in salt water prior to first spawning. This species can also spawn more than once (iteroparous), whereas all other species of *Oncorhynchus* except *O. clarki* spawn once and then die (semelparous).

Little information on the steelhead life history in the San Joaquin Basin is available. Aside from cutthroat trout (*O. clarki*), steelhead is the only anadromous species of the genus *Oncorhynchus* in which adults can survive spawning and return to fresh water to spawn in subsequent years. Individuals that survive spawning return to sea between April and June (Mills and Fisher 1994). The frequency of repeat spawning is higher for females than for males (Ward and Slaney 1988; Meehan and Bjornn 1991; Behnke 1992). In the Sacramento River, Hallock (1989) reported that 14 percent of steelhead returned to spawn a second time.

Female steelhead construct redds in suitable gravels, primarily in pool tailouts and heads of riffles. Steelhead eggs incubate in the redds for three to 14 weeks, depending on water temperatures (Shapovalov and Taft 1954; Barnhart 1991). Generally, redd construction and subsequent spawning occur from late winter to early spring (Moyle 2002). After hatching, alevins remain in the gravel for an additional two to five weeks while absorbing their yolk sacs and emerge in spring or early summer (Barnhart 1991).

After emergence, steelhead fry move to shallow-water, low-velocity habitats, such as stream margins and low gradient riffles, and will forage in open areas lacking instream cover (Hartman 1965; Everest et al. 1986; Fontaine 1988). As fry increase in size and their swimming abilities improve in late summer and fall, they increasingly use areas with cover and show a preference for higher velocity, deeper mid-channel areas near the thalweg (Hartman 1965; Everest and Chapman 1972; Fontaine 1988).

Juvenile steelhead occupy a wide range of habitats, preferring deep pools as well as higher velocity rapid and cascade habitats (Bisson et al. 1982, 1988). During the winter period of inactivity, steelhead prefer low-velocity pool habitats with large rocky substrate or woody debris for cover (Hartman 1965; Swales et al. 1986; Raleigh et al. 1984; Fontaine 1988). During periods of low temperatures and high flows associated with the winter months, juvenile steelhead seek refuge in interstitial spaces in cobble and boulder substrates (Bustard and Narver 1975; Everest et al. 1986). Juvenile emigration typically occurs from April through June. Emigration appears to be more closely associated with size than age, with 6 to 8 inches being most common for downstream migrants. Juveniles remain in fresh water for two to four years before emigrating to the ocean. Most steelhead south of Alaska and British Columbia smolt after a period of two years in fresh water and spend two years in the ocean before returning to their natal streams to spawn. Populations in Oregon and California, however, have higher frequencies of adults returning after only one year in the ocean (Busby et al. 1996).

Water temperature is an important factor affecting steelhead incubation and juvenile rearing success. Temperature directly affects survival, growth rates, and smoltification. Temperature also indirectly affects vulnerability to disease and predation. Myrick and Cech (2001) provide a review of the effects on water temperature on salmon and steelhead incubation, rearing, and smoltification in the Central Valley. The results of this review are summarized below.

Steelhead eggs can survive at water temperatures between 36 and 59°F, with highest survival rates occurring at temperatures between 45 and 50°F. The chronic upper lethal temperature for

Central Valley steelhead is approximately 77°F, with higher temperatures (up to 85°F) tolerated for short periods of time. In tests of thermal preferences, hatchery-reared Central Valley steelhead consistently selected temperatures of 64 to 66°F, while wild steelhead consistently selected temperatures of 63°F. Juvenile steelhead have been reported to grow at temperatures ranging from 44 to 73°F. Maximum growth rates reported for Central Valley steelhead occurred at 66°F, but higher temperatures have not been tested. While steelhead can rear at temperatures in the range of 66°F, cooler water temperatures are required for successful smoltification. Steelhead can smolt at temperatures ranging from 44 to 52°F and show little adaptation to seawater at temperatures exceeding 59°F.

Bald Eagle (SE)[25]

The bald eagle was listed by the USFWS as an endangered species in 1978, primarily due to population declines related to habitat loss, and contamination of prey species by past use of organochlorine pesticides, such as DDT and dieldrin (USDA 2001). On August 11, 1995, the bald eagle was downgraded to threatened status in the lower 48 states. Since then, all of the recovery goals set forth in the Recovery Plan for the Bald Eagle Pacific Region have been met and the USFWS has de-listed the species and removed protections afforded by the ESA (FR Vol. 64(128):36454). However, several factors still pose risks to the species, including disturbance of nest sites by recreationists, fluctuating fish prey populations, and number of roost trees available as a result of reservoir level fluctuations, wildfire, and habitat fragmentation.

The bald eagle breeds or winters throughout California, except for the desert areas and the statewide populations are increasing (CDFG 2000). Most breeding in the state occurs in the northern Sierra Nevada, Cascades, and north coast range. California's breeding population is resident year-round in most areas, where the climate is relatively mild (Jurek 1988). Between mid-October and December, migratory birds from areas north and northeast of California arrive in the state. Wintering populations remain through March or early April. Based on annual wintering and breeding bird surveys, it is estimated that between 100 and 300 eagles winter on Sierra Nevada National Forests, and at least 151 to 180 pairs remain year-round to breed (USDA 2001). Data from statewide breeding surveys conducted since 1973 indicate that the number of breeding pairs in the state continue to increase on an annual basis (CDFG 2000). The breeding range in California expanded from portions of eight counties in 1981 to 27 of the state's 58 counties in 2000. Breeding generally occurs from February to July, but can be initiated as early as January via courtship, pair bonding, and territory establishment. The breeding season normally ends around August 31, as the fledglings are no longer attached to their nest area.

The bald eagle typically nests in large, old growth or dominant live trees with open branching, and within two miles of a lake, reservoir, or river containing fish. Most nesting territories in California are located in elevations ranging 1,000 to 6,000 feet, but nesting can occur from near sea level to over 7,000 feet (Jurek 1988). Nest trees typically provide an unobstructed view of the associated water body and are often prominently located on the topography. The bald eagle often constructs up to five nests within a territory and alternate between them from year to year.

[25] Photo found at: http://www.birds.cornell.edu/AllAboutBirds/BirdGuide/.

The bald eagle is a generalized and opportunistic scavenger and predator. The most common prey items include fish, waterfowl, rabbits, and carrion of various animals. In general, foraging habitat consists of large bodies of water or free-flowing rivers with abundant fish and adjacent snags and other perches (USDA 2001).

Wintering habitat is associated with open bodies of water, primarily large lakes and reservoirs. Two characteristics that play a significant role in habitat selection during the winter are diurnal feeding perches and communal night roost areas. Most communal roosts are usually located near an abundant food source and have greater protection from the weather than diurnal habitat. The results of the CNDDB search of Project Boundary quads indicated that this species occurs within the Penon Blanco Peak, La Grange and Sonora quads.

Golden Eagle (SFP)[26]

Golden eagles are uncommon permanent residents and migrants throughout California, except in the center of the Central Valley. Golden eagles are perhaps more common in southern California than in northern California. This species ranges from sea level up to 11,500 feet (Grinnell and Miller 1944). Habitat of golden eagles typically consists of rolling foothills, mountain areas, sage-juniper flats, and desert.

The diet of golden eagles primarily consists of lagomorphs and rodents. However, they will also take other mammals, birds, reptiles, and some carrion. Golden eagles need open terrain for hunting; such as grasslands, deserts, savannahs, and early successional stages of forest and shrub habitats. These raptors soar 98 to 297 feet above ground in search of prey, or makes low, quartering flights, 23 to 26 feet above ground. Occasionally, golden eagles will search from a perch and fly directly to prey (Carnie 1954).

Golden eagle nest on cliffs of all heights and in large trees in open areas. Alternative nest sites are maintained, and old nests are reused. They build large platform nests, often 10 feet across and three feet high, of sticks, twigs, and greenery. Rugged, open habitats with canyons and escarpments are used most frequently for nesting.

BLM conducted wildlife surveys within Don Pedro grassland during all four seasons of the year in 1978. During the spring and winter surveys, golden eagles were observed (BLM 1978). Golden eagles were also observed during the BLM and Central Sierra Audubon Society (CSAS) mid-winter eagle surveys on Don Pedro Reservoir. They were observed during surveys in 1997 and each year between 1999 and 2009 (BLM and CSAS 1979, 1984, 1994-2010).

[26] Photo found at: http://www.birds.cornell.edu/AllAboutBirds/BirdGuide/.

San Joaquin Kit Fox (FE, ST)[27]

Despite the lack of a comprehensive survey, local surveys, research projects and incidental sightings indicate that kit foxes currently inhabit some areas of suitable habitat on the San Joaquin Valley floor and in the surrounding foothills of the coastal ranges and Sierra Nevada. Kit foxes also inhabit suitable habitat within the Tehachapi Mountains, and from southern Kern County north to Contra Costa, Alameda, and San Joaquin Counties on the west, and near La Grange, Stanislaus County on the east side of the Valley (R. Schlorf, CDFG, pers. comm. 1989), and some of the larger scattered islands of natural land on the Valley floor in Kern, Tulare, Kings, Fresno, Madera, and Merced counties. Kit foxes also occur westward into the interior coastal ranges in Monterey, San Benito, and Santa Clara counties (Pajaro River watershed), in the Salinas River watershed, Monterey and San Luis Obispo counties, and in the upper Cuyama River watershed in northern Ventura and Santa Barbara counties and southeastern San Luis Obispo County. Kit foxes are also known to live within the city limits of the City of Bakersfield in Kern County (Laughrin 1970; Jensen 1972; Morrell 1975; USFWS 1983; Swick 1973; Waithman 1974; Endangered Species Recovery' Program unpublished data).

San Joaquin kit foxes mate in winter and have between four and seven young in February or March. These foxes do not avoid coyotes and may coexist with them by exploiting certain prey species better than coyotes and maintaining numerous dens throughout their home range to facilitate escape. San Joaquin kit foxes utilize multiple underground dens throughout the year. Sometimes they use pipes or culverts as den sites as well. Their primary food items are usually the most abundant nocturnal rodent or lagomorph in the area. They also feed opportunistically on carrion, birds, reptiles, insects, and fruits (NatureServe 2009).

The results of the USFWS search of Project Boundary quads indicated that this species occurs within Project quads. The results of the CNDDB search of Project Boundary quads indicated that this species occurs within the La Grange quad.

5.5.5 Threatened and Endangered Species in the Tuolumne River

5.5.5.1 Upper Tuolumne River

The Districts found one source document related to rare, threatened and endangered species resources upstream of the Project Boundary.

CNDDB Reports (CDFG 2009)

The Districts conducted a query of upstream project quads using CDFG's CNDDB program. The rare, threatened and endangered species occurrences found upstream of the Project Boundary included four species: California red-legged frog, bald eagle, great gray owl (*Strix nebulosa*), and Sierra Nevada red fox (*Vulpes vulpes necator*). There was one occurrence of California red-legged frog and bald eagle, both in the Cherry Lake South quad. There were seven occurrences of great gray owl (SE): two occurrences in the Jawbone Ridge quad, one occurrence in the Cherry Lake South quad, two occurrences in the Lake Eleanor quad, and two

[27] Photo found at: www.blueplanetbiomes.org.

occurrences in the Groveland quad. There were two occurrences of Sierra Nevada red fox (ST), both in the Jawbone Ridge quad.

5.5.5.2 Project Area

The Districts found six studies related to threatened and endangered species resources within the Project area.

Bald Eagle Winter Habitat on BLM Lands in California (Detrich 1979)

This document described all known bald eagle winter habitats on BLM lands in California during the winter of 1978-79. On January 20, 1979, BLM conducted a combined ground and air mid-winter survey on New Don Pedro Reservoir. This survey counted a minimum of 23 bald eagles on the lake. Additional BLM surveys were conducted during February 6, 7, and 8, 1979. These surveys included a thorough search of the shoreline by boat. Several bald eagle perching locations, as well as night roost locations, were documented during the surveys. The BLM bald eagle data are summarized below in Table 5.5.5-1.

Table 5.5.5-1 Bald eagle perching and night roost locations at Don Pedro Reservoir documented by BLM in 1979.

Location Description	Summary of Bald Eagle Activity
T2S, R15E, Sec. 19	Digger pines on the point in the NW1/4 of the section were regularly used by a bald eagle, and another was found foraging near the head of Willow Creek Cove in the SE1/4.
T2S, R15E, Sec. 7, S1/2	Both adult and immature bald eagles were observed on several occasions perched in digger pines in the cove and on the point in this power site withdrawal.
T1S, R14E, Sec. 25	The cove in the SW1/4 provides a foraging perch location on power site withdrawal lands.
T1S, R14E, Sec. 3	Digger pines on power site withdrawal land on the west side of Woods Creek arm were used by an immature bald eagle. When flushed, this bird indicated a desire to return to this apparently desirable location.
T1S, R15E, Sec. 4, S1/2	A grove of large digger pines on the south side of the Tuolumne River arm was the late afternoon perch for an immature bald eagle. This area appears to be a potential night roost.
T2S, R14E, Sec. 2, W1/2	This site is on private land. At dusk on February 8, 1979, three bald eagles were seen perched in a sheltered gulch. Further field work is necessary to determine the importance of this area as a night roost.

Final Red Hills Management Plan and Environmental Assessment (BLM 1985)

In 1985, the Final Red Hills Management Plan and Environmental Assessment was written by BLM to provide the decisions and actions for managing the use of approximately 7,100 acres of public lands in the Red Hills of Tuolumne County. The document includes the final Management Plan, comments received on the draft Management Plan and Environmental Assessment, and revisions of the draft Environmental Assessment.

The management plan addresses the issues of protection of sensitive plant species and bald eagle habitat. The objectives within the management plan addressing sensitive plant species and bald eagle habitat are: protect the four sensitive plant species and their habitat to ensure that their official listing is unnecessary; and protect and maintain digger (gray) pine roosting habitat as existing in 1984 on public land along the west shoreline of Don Pedro Reservoir. The constraints corresponding to the objectives are: all discretionary proposals that will cause surface disturbance will have sensitive plant clearances, performed in the appropriate flowering season; and winter roosting areas for the southern bald eagle will be protected as required by the Endangered Species Act. Planned Actions are included in the management plan to protect sensitive plant species and bald eagles. There are seven planned actions that were included to ensure the protection of sensitive plant species and their habitat so official listing by USFWS would be unnecessary. An independent sensitive plant study found within the management plan document is summarized below. One planned action is included to ensure the protection and maintenance of winter roosting sites for bald eagles and reduce road damage: lock the gate to Six Bit/Poor Man's Gulch during winter.

Study of Sensitive Plant Species on the BLM Red Hills Management Area, Tuolumne County, California (Biosystems Analysis 1984)

A botanical survey of the Red Hills Management Area (now the Red Hills ACEC) was completed in 1984. The surveys located Rawhide Hill onion, Congdon's lomatium, Red Hills soaproot, Layne's ragwort, California vervain and Red Hills ragwort.

Layne's ragwort was found at three small, localized occurrences on serpentine rock in the southeastern part of the area. The preferred habitat was rocky, disturbed roadsides and roadbanks or in rocky ephermeral drainages on north and east-facing slopes.

California vervain was found during the study, but not described. Additionally, Red Hills ragwort was found in intermittent stream habitats on serpentine.

Mid-Winter Bald Eagle Surveys (BLM and CSAS 1979, 1984, 1994-2010)

BLM and Central Sierra Audubon Society (CSAS) conducted mid-winter eagle surveys on Don Pedro Reservoir during 1979, 1984, and each winter during 1994-2010. During the mid-winter bald eagle surveys, golden eagles (*Aquila chrysaetos*) were also observed during certain years. Golden eagles are listed as SFP. The results of the winter surveys are summarized below in Table 5.5.5-2.

Table 5.5.5-2 Bald eagle and golden eagle BLM and CSAS mid-winter survey results on Don Pedro Reservoir.

Survey Date	Species[1]	Number of Individuals and Age(s)	Activity
1/20/1979	BE	19 total: 13 adults, 6 immatures	Not specified
1984	BE	4 total: 2 adults, 1 immature, 1 unknown	Not specified
1/14/1994	BE	14 total: 8 adults, 2 sub adults, 4 immature	Not specified
2/2/1995	BE	14 total: 7 adults, 2 sub adults, 2 immature, 3 unknown	5 eagles were observed perching, 8 eagles were observed flying, 1 eagle was observed flying and perching

Survey Date	Species[1]	Number of Individuals and Age(s)	Activity
1/12/1996	BE	22 total: 13 adults, 1 near adult, 2 sub adults, 3 immature, 3 unknown	16 eagles were observed perching, 3 eagles were observed flying, 2 eagles were observed perching and flying, one eagle was observed soaring high
1/15/1997	BE	8 total: 5 adults, 2 sub adults, 1 immature	7 eagles were observed perching, 1 eagle was observed flying
1/15/1997	GE	2 total: 1 unknown, 1 immature	Both eagles were observed flying
1/23/1998	BE	5 total: 1 adult, 2 white-belly, 1 sub adult, 1 immature	1 eagle was observed perching, 2 eagles were observed flying, 2 eagles were observed flying and perching
1999	BE	30 total: 14 adults, 16 immature	1 eagle was observed flying, the remaining observations do not specify activity
1999	GE	6 total: 4 adults, 2 immature	1 eagle was observed flying, the remaining observations do not specify activity
1/15/2000	BE	32 total: 14 adults, 15 immature, 3 unknown	17 eagles were observed perching, 11 eagles were observed flying, 3 eagles were observed perching then flying, 1 eagle was observed flying overhead
1/15/2000	GE	7 total: 4 adults, 3 immature	3 eagles were observed flying, 3 eagles were observed perching then flying, 1 eagle was observed flying then perching.
1/20/2001	BE	29 total: 20 adults, 9 immature	17 eagles were observed perching, 12 eagles were observed flying
1/20/2001	GE	2 total: 1 adult, 1 immature	Both eagles were observed flying
1/12/2002	BE	24 total: 12 adults, 12 immature	14 eagles were observed perching, 8 eagles were observed flying, 1 eagle was observed soaring, 1 eagle was observed perching then flying
1/12/2002	GE	6 total: 5 adults, 1 immature	1 eagle was observed flying perch to perch, 1 eagle was observed soaring in circles, 2 eagles were observed perched, 2 eagles were observed flying
2003	BE	20 total: 12 adults, 8 sub adults	10 eagles were observed perching, 9 eagles were observed flying, 1 eagle was observed fishing
2003	GE	10 total: 5 adults, 5 sub adults	2 eagles were observed flying, 1 eagle was observed perching then flying, 5 eagles were observed perching, 1 eagle was observed scavenging, 1 eagle was observed flying then perching
2004	BE	34 total: 17 adults, 17 sub adults	20 eagles were observed perching, 8 eagles were observed flying, 1 eagle was observed landing, 2 eagles were observed on shore, 2 eagles were observed perching then flying, 1 eagle doesn't specify activity
2004	GE	7 total: 6 adults, 1 unknown	3 eagles were observed perching, 4 eagles were observed flying
2/19/2005	BE	7 total: 5 adults, 2 sub adults	4 eagles were observed perching, 1 eagle was observed flying, 2 eagles were observed on a nest
2/19/2005	GE	4 total: 3 adults, 1 sub adult	1 eagle was observed perching, 2 eagles were observed soaring, 1 eagle was observed flying

Survey Date	Species[1]	Number of Individuals and Age(s)	Activity
1/14/2006	BE	29 total: 20 adults, 9 sub adults	6 eagles were observed perching, 20 eagles were observed flying, 1 eagle was observed flying then diving, 2 eagles were observed circling, one with nesting material in talons
1/14/2006	GE	4 total: 3 adults, 1 sub adult	All 4 eagles were observed flying
2007	BE	17 total: 8 adults, 9 sub adults	10 eagles were observed perching, 5 eagles were observed flying, 1 eagle was observed perching then flying, 1 eagle was observed flying then perching
2007	GE	5 total: 3 adults, 2 unknown	3 eagles were observed perching, 2 eagles were observed flying
1/12/2008	BE	18 total: 14 adults, 4 sub adults	14 eagles were observed perching, 1 eagle was observed circling high overhead, 3 eagles were observed flying
1/12/2008	GE	4 total: 4 adults	All 4 eagles were circling in thermal
1/17/2009	BE	18 total: 9 adults, 9 sub adults	10 eagles were observed perching, 3 eagles were observed flying, 5 eagles were observed perching then flying
1/17/2009	GE	3 total: 3 adults	2 eagles were observed flying, 1 eagle was observed perching then flying
1/16/2010	BE	23 total: 13 adults, 10 sub adults	7 eagles were observed perching, 9 eagles were observed flying, 5 eagles were observed perching then flying, 2 eagles were observed flying and fishing

[1] BE = bald eagle; GE = golden eagle

Source: BLM and CSAS 1979 and 1984, 1994-2010.

2007 Red Hills Bird Report (Turner 2007)

This brief summary report discusses sightings of willow flycatchers (*Empidonax traillii*) by Jim Lomax and another person (not named). Willow flycatchers are listed as SE. The sightings were on Don Pedro Reservoir just north of the northern-most concrete apron/bridge that has a permanent stream running underneath it in the willows. John Turner of BLM tried to verify the sightings at this location and was unable to do so. On May 22, 2007, John Turner conducted a bald eagle survey on Don Pedro Reservoir and found one bald eagle nestling almost ready to fledge at a nest near Point Penole. Mr. Turner also reported another bald eagle nest in the Woods Creek arm of the reservoir with two nestlings in it.

1978 Don Pedro Grassland Wildlife Observations (BLM 1978)

BLM conducted wildlife surveys within Don Pedro grassland during all four seasons of the year in 1978. During the spring and winter surveys, golden eagles were observed. Two golden eagles were observed during the spring surveys between April 16 and 18, 1978. Two golden eagles were also observed during the winter surveys between February 16 and 18, 1978. The Don Pedro grassland area is located on the eastern side of the reservoir.

5.5.5.3 Lower Tuolumne River

The Districts found five source documents related to rare, threatened and endangered species resources downstream of the Project in the lower Tuolumne River area.

CNDDB Reports (CDFG 2009)

The Districts conducted a query of downstream project quads using CDFG's CNDDB program. The threatened and endangered species occurrences found downstream of the Project Boundary included five species: California tiger salamander, bald eagle, Swainson's hawk (*Buteo swainsoni*), least Bell's vireo (*Vireo bellii pusillus*), and San Joaquin kit fox. There were four occurrences of California tiger salamander: one occurrence in the Westley quad and three occurrences in the Cooperstown quad. There was one occurrence of bald eagle in the Turlock Lake quad. There were seven occurrences of Swainson's hawk (ST): two occurrences in the Brush Lake quad, one occurrence in the Riverbank quad, two occurrences in the Ceres quad, one occurrence in the Escalon quad, and one occurrence in the Waterford quad. There was one occurrence of least Bell's vireo (FE, SE) and San Joaquin kit fox, both in the Westley quad.

Delaney Aggregates Biological Resources Assessment, Stanislaus County, California (WRA 2007, revised June 2008)

In September 2007, WRA conducted a site visit to assess the current biological constraints at Delaney Aggregates project site in Stanislaus County. In spring 2008, WRA also conducted protocol level surveys and habitat assessments within the restoration project site (WRA 2008). Several proposed aggregate mining locations form the approximately 40-acre site. The five state or federally listed species with a moderate or high potential to occur in the Delaney project site, or those species with USFWS Critical Habitat designations on or within one mile of the site are: San Joaquin kit fox, Swainson's hawk, bald eagle, California tiger salamander, and Valley elderberry longhorn beetle.

The habitat assessment and early evaluation for San Joaquin kit fox conducted in March 2008 concluded only low quality foraging and dispersal habitat was present. Surveys were conducted in March and April 2008 for Swainson's hawk and bald eagle with negative findings in both the Delaney Property and Wildlife Survey Area[28]. The habitat assessment for California tiger salamander conducted in March 2008 determined that aquatic habitat at the site does not provide suitable breeding habitat for CTS due to relatively recent construction of these habitats. During the September 2007 site visit, three clusters of blue elderberry bushes were observed. The project was designed to maintain a 100-foot buffer around these elderberry clusters so no impacts will occur.

WRA also ran a CNDDB query for special status plants within the Delaney Aggregates project site. Hartweg's golden sunburst and succulent owl's clover had documented occurrences within five miles of the site. These two species were determined to be unlikely to occur at the project site due to the cobble substrate and disturbed habitat conditions. A site assessment was conducted by WRA in September 2007, during the blooming period of Hoover's calycadenia, Hoover's spurge, Delta button-celery, knotted rush, San Joaquin Valley Orcutt grass, hairy Orcutt grass, and California vervain. None of these plants were observed within the Delaney Property.

[28] The wildlife survey area as defined in WRA 2007 was the "area that extends within a 0.5-mile radius from the Project Area boundary in which wildlife surveys were conducted."

Draft EIR Appendix E - Reconnaissance Level Biological Survey for the Hughson Wastewater Treatment Plant (Quad Knopf 2007)

The City of Hughson proposed an expansion of their wastewater treatment plant, located in Stanislaus County. The wastewater treatment plant is located approximately two miles north of downtown Hughson. In January 2007, Quad Knopf conducted biological surveys of the proposed project site. The results of the survey concluded that California tiger salamanders occur in the region but are primarily restricted to east and northeast of the project site. Also, approximately 10 elderberry bushes are located along the northern parcel boundaries. A cursory inspection of elderberry shrubs revealed no beetle exit holes. No sign (e.g., tracks, scat, dens, prey remains, etc.) of San Joaquin kit foxes was observed during the field surveys. The site does not lie within the accepted, current range of the San Joaquin kit fox. Steelhead and Chinook salmon seasonally occur in this portion of the Tuolumne River and may use this reach of the river to spawn. The draft EIR concluded that the proposed project will not have a deleterious effect on these fishes, as the proposed improvements to the site are similar to on-going maintenance and brush control regimes already in place and these maintenance activities occur over 200 feet from the river corridor. The wastewater treatment plant does not currently discharge, nor will the proposed project discharge, any wastewater into the Tuolumne River.

San Joaquin River National Wildlife Refuge Final Comprehensive Conservation Plan (USFWS 2006)

This Comprehensive Conservation Plan was written to guide the management of the San Joaquin River NWR for the next 15 years. As part of the NWR system, the San Joaquin River NWR provides a haven for a unique assemblage of both wetland and upland dependent wildlife species of California's Central Valley. Several threatened and endangered species occur or have the potential to occur on the San Joaquin NWR. Federally listed species or species with state and federal listing that occur or have the potential to occur on the refuge include the riparian brush rabbit (*Sylvilagus bachmani ripariu*), San Joaquin Valley woodrat (*Neotoma fuscipes riparia*), San Joaquin kit fox, bald eagle, least Bell's vireo, giant garter snake (*Thamnophis gigas*), steelhead trout, valley elderberry longhorn beetle, vernal pool fairy shrimp, and vernal pool tadpole shrimp (*Lepidurus packardi*).

The riparian brush rabbit (FE, SE) presently occurs in three isolated populations, none of which is considered secure for maintaining the long-term status of the population. Existing riparian vegetation at the refuge, along with restoration of riparian habitat on the refuge, will provide this subspecies the largest area of contiguous habitat in its existing range. The San Joaquin Valley woodrat (FE) uses similar habitat as the riparian brush rabbit. The planned riparian habitat restoration will benefit the woodrat as well as the rabbit. No records exist for the San Joaquin kit fox on the refuge, although there are records within 20 miles. Bald eagles are routine refuge visitors, especially during the winter months, and are usually attracted to the large concentrations of waterfowl. Least Bell's vireo nested in planted riparian habitat at the refuge in 2005. Planned riparian restoration activities will likely produce additional suitable habitat for this species. The giant garter snake (FT, ST) requires permanent water as habitat. Although suitable habitat appears to exist on the refuge, there are no documented records for this species.

Steelhead trout also occur on the refuge. The valley elderberry longhorn beetle may occur on the refuge because little elderberry habitat exists on the refuge but it may support beetle populations.

The vernal pool fairy shrimp and vernal pool tadpole shrimp (FE) have both been documented at some of the refuge's vernal pools. These habitats will be maintained in perpetuity on the refuge.

State-listed species which occur on the refuge include the greater sandhill crane (*Grus Canadensis tabida*), yellow-billed cuckoo (*Coccyzus americanus occidentalis*), Swainson's hawk, willow flycatcher and bank swallow (*Riparia riparia*). The greater sandhill crane (ST, SFP) annually winters on and around the refuge. Existing pastures, agricultural lands, and wetlands are used for foraging and roosting. The yellow-billed cuckoo (SE), which relies upon riparian woodland, and the willow flycatcher, which depends on wet, shrubby habitat, have not recently been documented on the refuge. However, planned habitat restoration activities will likely create additional habitat for these species.

The bank swallow requires large cut banks for its breeding colonies. Although such areas exist at the refuge, there have been no bank swallow colonies during the last decade. The Swainson's hawk is conspicuous at the refuge, which provides habitat for several breeding pairs.

Tuolumne River Restoration Projects: Biological Resources Technical Background Report (Stillwater Ecosystems 1998)

This report summarizes available information and potential project effects at a proposed stream restoration project on the lower Tuolumne River. TID, MID, and the CCSF proposed to reconstruct the Tuolumne River channel and floodplain at two sites—the Special Run Pools (SRPs) 9 and 10 Restoration Site and the Mining Reach Restoration Site. Stillwater Sciences identified threatened, endangered, and special-status plant and wildlife species that could potentially be impacted by the Project. Species lists were narrowed down after analyzing the likelihood of suitable habitat at the site as well as species occurrence in the project area. For plants, delta button-celery (*Eryngium racemosum*) (SE) and Hartweg's golden sunburst were listed as species potentially present at both restoration sites as well as the source material sites. For wildlife, valley elderberry longhorn beetle (VELB), steelhead, California red-legged frog, and San Joaquin kit fox may be impacted directly or their habitats may be impacted at the SRP 9 and 10 and Mining Reach restoration sites. Additionally, the following species may be affected by noise-related disturbances but likely would not experience any direct impacts to their habitats: white-tailed kite (*Elanus leucurus*) (SFP) nesting habitat, Swainson's hawk nesting habitat, and golden eagle.

At the dredge tailings source material sites, the following species or their habitats potentially occur: California red-legged frog, San Joaquin kit fox, VELB, white-tailed kit nesting habitat, bald eagle, Swainson's hawk nesting habitat, golden eagle, and American peregrine falcon (*Falco peregrines anatum*). At the La Grange Reservoir source material site, the following species or their habitats potentially occur: California tiger salamander and San Joaquin kit fox. Additional species or habitats, including white-tailed kite nesting habitat, Swainson's hawk nesting habitat, and golden eagle may be affected by noise and increased human disturbance generated from construction activities. Stillwater Sciences concluded that the Project would also improve habitat quality for steelhead and Chinook salmon.

SFPUC WSIP Final Program Environmental Impact Report

As part of the WSIP an evaluation of potential effects on terrestrial biological resources and aquatic resources resulting from the construction and operation of the proposed facilities was performed. While the evaluation was specific to the Hetch Hetchey Aqueduct between the Oakdale and Telsa Portal it does provide a general overview of resources within the San Joaquin ecological region, which encompasses the lower Tuolumne River. Section 4.6 of the WSIP focuses on sensitive habitats and key special-status species, which included those that have been formally listed under CESA and ESA, as well as species having special sensitivity in the WSIP program area.

According to the WSIP, 68 percent of the habitat San Joaquin ecological region has been converted to cropland (34 percent) orchards and vineyards (28 percent), and urban use (six percent). The remaining habitat is comprised of annual grasslands (23 percent), blue oak woodland (six percent), and valley foothill riparian vegetation, freshwater emergent wetlands and aquatic habitats (three percent). Sensitive natural communities have been identified in the eastern foothills of the San Joaquin Valley and near the San Joaquin River and its floodplain. These communities include: valley needlegrass grassland and pine bluegrass grassland; northern hardpan vernal pool; alkali meadow; costal and valley freshwater marsh; and great valley cottonwood riparian forest, great valley mixed riparian forest, Great Valley vallen oak riparian forest, great valley willow scrub and great valley elderberry scrub.

For CESA- or ESA-listed wildlife species, the WSIP identified the presence of four invertebrates (vernal pool fairy shrimp, conservancy fairy shrimp [*Branchinecta conservatio*], vernal pool tadpole shrimp, and VELB), two fish (steelhead - California Central Valley DPS and green sturgeon [*Acipenser medirostris*] Southern DPS critical habitat), two amphibians (California red-legged frog and California tiger salamander), two birds (Swainson’s hawk and Least Bell’s vireo), and two mammals (San Joaquin kit fox and riparian or San Joaquin woodrat as occurring or with the potential to occur in the San Joaquin ecological region. For CESA- or ESA-listed plant species, the WSIP identified the presence of six vernal pool plants (Succulent owl’s-clover, Hoover’s spurge, Colusa grass, San Joaquin Valley Orcutt grass, hairy Orcutt grass, and Greene’s tuctoria), one grassland plant (large-flowered fiddleneck [*Amsinckia grandiflora*]), and one riparian plant (Delta button-celery) as occurring or with the potential to occur in the San Joaquin ecological region.

5.6 Recreation and Land Use

The Don Pedro Project provides diverse and substantial recreation opportunities, including boating, fishing, swimming, water skiing, picnicking, hiking, and camping. All recreation activities at the Project are managed by the DPRA. Operationally, the DPRA is a department within TID. It is an agency sponsored by the Districts and CCSF. DPRA is managed by a Board of Control. Funding for routine O&M is provided by the recreation fees it charges. Capital funding is provided by the Districts and CCSF.

The Districts maintain, and DPRA implements, a land use policy for all Project lands and waters. Of the approximately 18,400 acres within the Project Boundary, the Districts own in fee title approximately 78 percent and the remaining 22 percent are federal lands. The Project recreation predominantly occurs at the three developed recreation sites on the reservoir: Fleming

Meadows, Blue Oaks, and Moccasin recreation areas. Dispersed recreation (camping) is allowed on most of the remaining Project lands, subject to the DPRA's published Rules and Regulations (see Appendix E). The DPRA is authorized under California statue to issue and enforce regulations related to activities on Project lands and waters. The three developed recreation areas comprise well under 10 percent of the Project shoreline. Consequently, over 90 percent of the Don Pedro shoreline remains undeveloped and in its natural state.

The Districts, through the DPRA, also regulates the uses of the shoreline and Project lands concerning the allowable activities within the Project Boundary. For example, DPRA rules stipulate that "no person shall build, install, leave, tie-up, or secure any kind of developed improvement" on Project lands. Therefore, private docks, moorings, launching of motorized boats, access by motor vehicle, and berthing of any vessel are all prohibited activities on Project shorelines and lands. These and other land use policies have served to protect the natural character and integrity of over 90 percent of the Don Pedro shoreline.

At the same time, under DPRA management, recreation opportunities are plentiful at the Project.

Recreation opportunities also abound in the general vicinity of the Project. Immediately upstream of the Don Pedro Reservoir, the Tuolumne River is designated a National Wild and Scenic River all the way to its source (except for the Hetch Hetchy Reservoir), at total of some 80 miles. Yosemite National Park and Stanislaus National Forest are prominent features of the watershed above Don Pedro. Downstream of the Project, below La Grange Dam, the Tuolumne River provides fishing, swimming, and boating opportunities.

5.6.1 Overview

Tuolumne County was incorporated in 1850 as one of the original 27 counties in the State of California. Extending from the foothills to the crest of the Sierra Nevada Mountains, Tuolumne County is a popular recreation area. The County contains historical gold mining towns, the Emigrant Wilderness area, Yosemite National Park, and numerous lakes and rivers, including the Wild and Scenic Tuolumne River and Don Pedro Reservoir (Tuolumne County 2005).

Since the incorporation of the county, the region has been a prominent area for industry and recreation visitors. The principal industries were originally related to mining and timber. Early recreational visitors to Tuolumne County were primarily focused on Yosemite National Park. As transportation improved, many locations that were once inaccessible became places for various recreation activities such as hiking, camping, gold panning, fishing, swimming, picnicking, climbing, and general river recreation activities.

In February of 1920, the TID and MID voters approved bonds to construct the original Don Pedro Dam, and on June 25, 1921 the construction of the dam began, to be completed in 1923. The dam was constructed to a height of 284 feet, making it the tallest dam in the world in 1923. The end result was a reservoir that would provide water storage, flood control, and power production for the Districts, and serve as a recreational area for Tuolumne County.

The present shoreline of Don Pedro Reservoir was created in 1971 when the new Don Pedro Dam was completed. The old dam is still in place, but now resides 250 feet below water when the new reservoir is full. Since 1971, over 13 million people have visited the reservoir and its associated recreational areas. The reservoir's shoreline runs approximately 160 miles and has a normal maximum surface area of just under 13,000 acres. Approximately 122 miles of shoreline are owned by the Districts and the remaining 38 miles are federal lands that are managed by the Districts consistent with BLM land management policies. There are no private boat docks or lakefront parcels; however, public boat ramps are located at each of the developed recreation facilities.

The developed recreation facilities include Moccasin Point Recreation Area, Blue Oaks Recreation Area, and Fleming Meadows Recreation Area. These are maintained and operated by the DPRA with oversight by the Don Pedro Board of Control. The primary objective of the DPRA is to provide a quality family camping experience and a water sports oriented environment.

Recreation at the Project's undeveloped shoreline is also popular and includes dispersed boat-in camping along the majority of the reservoir, fishing, boating, and camping opportunities.

5.6.2 Recreation Facilities Upstream of the Project

The headwaters of the Tuolumne River are located in Yosemite National Park. The river flows west through meadows and deep canyons before spilling into Don Pedro Reservoir. Cherry and Eleanor Creek, Clavey River, and the North, Middle and South Forks of the Tuolumne all flow into the Upper Tuolumne northeast of the Project area (see Figure 5.6.2-1).

The Tuolumne River starts at the confluence of Lyell and Dana Forks and continues downstream through Yosemite National Park's Tuolumne Meadows and into the Grand Canyon of the Tuolumne. Before leaving Yosemite National Park, the Tuolumne River flows into the Hetch Hetchy Reservoir. Once the Tuolumne leaves Yosemite National Park, it enters into Stanislaus National Forest and is soon joined by Cherry Creek, followed by the South Fork of the Tuolumne, and then the Clavey River. Along the border of Stanislaus National Forest, the Upper Tuolumne is joined by the North Fork of the Tuolumne and from there flows into Don Pedro Reservoir.

The Tuolumne Meadows area within Yosemite National Park provides easily accessible recreational opportunities for people of all ages and abilities, and many individuals, families, and groups establish traditional ties with the area. The NPS and other organizations depend on the river and adjacent meadows as a focus of nature interpretation and education in the Sierra Nevada. The Pacific Crest Trail, one of eight National Scenic Trails, follows the river corridor in this segment. Portions of the Tuolumne starting in Yosemite National Park are classified as Wild and Scenic.

Outside of Yosemite National Park, the remaining segments of the Wild and Scenic Tuolumne River are under the jurisdiction of the USFS and the BLM. The Tuolumne River and its confluences upstream of the Project area are often referred to as the Upper Tuolumne. Camping, fishing, and whitewater boating are the primary recreational activities along the upper Tuolumne River.

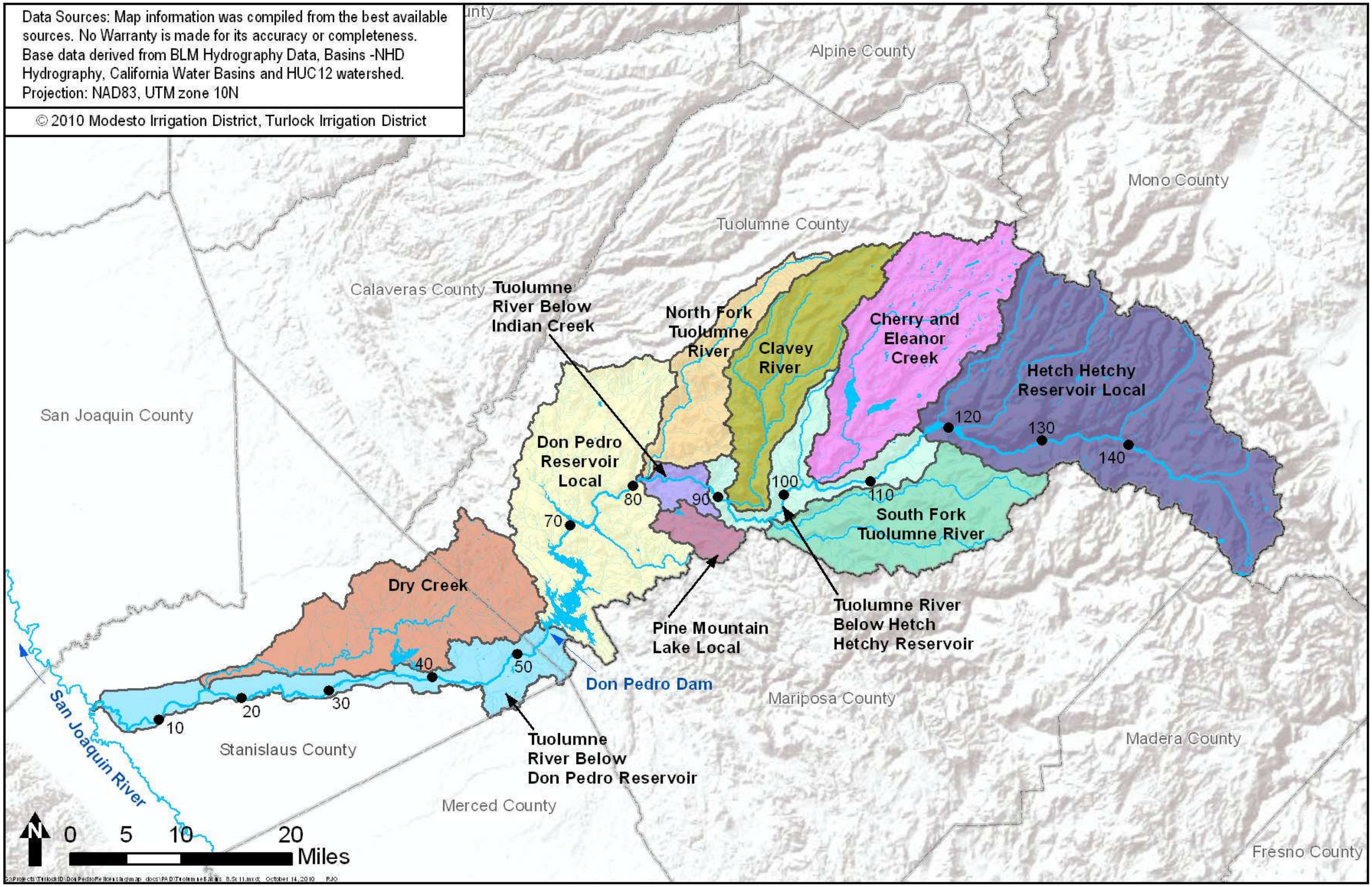


Figure 5.6.2-1 Tuolumne River subbasins.

The Tuolumne River, which was designated one of California's National Wild and Scenic Rivers in September 1984, originates from snowmelt off Mounts Dana and Lyell in Yosemite National Park and runs 54 miles before crossing into Stanislaus National Forest and BLM public land. Below the National Park boundary, the river contains some of the most noted whitewater rafting in the high Sierras (NPS 2010b).

5.6.2.1 Camping Opportunities

There are a variety of developed and undeveloped camping areas along the Tuolumne River upstream of the Project area. Campsites are utilized by hikers, whitewater boaters, anglers, and other recreational users. The most commonly used camping areas along the Upper Tuolumne within the boundaries of Yosemite National Park are Tuolumne Meadows and Hetch Hetchy Reservoir. Camping at Hetch Hetchy is undeveloped camping, and a wilderness permit is required (NPS 2010b).

Within the boundaries of Stanislaus National Forest, there are 12 riverside campsites and three USFS campgrounds. Motor homes and vehicles with trailers are not recommended in many of the campgrounds along the Upper Tuolumne, as the access roads can be steep and rutted and electric and sewer hookups are not available in many of the dispersed camping areas (2009 Great Outdoor Recreation Pages [GORP] - Tuolumne River). A summary of the camping areas and amenities is provided in Table 5.6.2-1.

5.6.2.2 Whitewater Boating Opportunities

In addition to camping along the Tuolumne, whitewater boating/rafting is popular upstream of the Project area. All of the whitewater boating reaches identified in Table 5.6.2-2 provide opportunities for both kayaks and rafts. The upper Tuolumne River whitewater rafting season generally runs from April to August. The area along the upper Tuolumne River from Cherry Creek to Don Pedro Reservoir is commonly referred to as the Main Tuolumne. Most of the Main Tuolumne River is an advanced Class IV-V river and many portions require USDA Forest Service permits (California Whitewater 2010). There are six commercial white water companies that run regularly on the Main Tuolumne (All-Outdoors California Whitewater Rafting, ARTA River Trips, O.A.R.S. California Whitewater Rafting, Sierra Mac River Rafting Trips, Whitewater Voyages, and Zephyr Whitewater Expeditions).

The most popular run is the Main Tuolumne which starts at Meral's Pool, located off Highway 120 approximately seven to eight miles east of Groveland, and flows through to Ward's Ferry, located near the bridge about seven miles down Ward's Ferry Road at the upper end of Don Pedro Reservoir (California Whitewater 2010). The second most popular rafting run is Cherry Creek, which runs from Cherry Creek near Holms powerhouse (approximately 13 miles beyond Meral's Pool along Lumsden Road) and ends at Meral's Pool. The Cherry Creek run is an experts-only run, rated Class V+, with an overall gradient of 110 feet per mile and a "Miracle Mile" dropping at over 200 feet per mile. Cherry Creek is one of the most challenging whitewater rafting runs in the nation, and is a popular draw for experienced rafters (California Whitewater Rafting 2010). Whitewater boating is also available on Clavey River and the South Fork of the Tuolumne. Whitewater boating opportunities available upstream of the Project area are detailed in Table 5.6.2-2.

Table 5.6.2-1 Campgrounds on the Tuolumne River upstream of the Project area.

Developed Campgrounds
Tuolumne Meadows Campground (Yosemite National Park) - located on the Tioga Road, northeast of Yosemite Valley at an elevation of 8,600 feet. Open July through late September, offering 304 tent campsites, seven group campsites, and four horse campsites. Fees for campgrounds are: $20/night for each campsite (maximum six people per site); $40/night for the group campsite (13 to 30 people per site); and $25/night for the horse sites (maximum six horses and six people per site). Additional amenities include a dump station and general store.
Glen Aulin Campground (Yosemite National Park) - located along the Tuolumne River approximately one mile upriver from the Grand Canyon of the Tuolumne at an elevation of approximately 7,800 feet. Open July through September (snowmelt permitting); reservations and National Park Service wilderness permits required; tent cabins and traditional tent campsites available by lottery through High Sierra Camps.
Hetch Hetchy Campground (Yosemite National Park) - located along the Tuolumne River immediately downriver from the Hetch Hetchy Reservoir. Open year round (snowmelt permitting); reservations and National Park Service wilderness permits required; trailers, vehicles over 25 feet long, and RVs and other vehicles over 8 feet wide are not allowed on Hetch Hetchy Road. No boating or swimming permitted at Hetch Hetchy Reservoir.
South Fork Campground (Stanislaus National Forest) - located near the confluence of the South and Main Forks of the Tuolumne River at an elevation of 1,500 feet. approximately 1 mile upstream from the Lumsden Campground. The facility offers eight campsites with two vault toilets, stoves, and tables. Most sites are on the river or have river access. There is no running water, no use fee, and is not recommended for trailers / RV campers.
Lumsden Campground (Stanislaus National Forest) - located on the Tuolumne River one mile from South Fork Campground, within the Tuolumne-Lumsden Recreation Area off of Lumsden Road and Highway 120 at an elevation of 1,500 feet. The facility offers eleven campsites along the river with four vault toilets, stoves, and tables. There is no running water, no use fee, and is not recommended for trailers / RV campers.
Lumsden Bridge Campground (Stanislaus National Forest) - located on the Tuolumne River next to Lumsden Campground, within the Tuolumne-Lumsden Recreation Area off of Lumsden Road and Highway 120 at an elevation of 1,500 feet. The facility offers nine campsites along the river with two vault toilets, stoves, and tables. There is no running water, no use fee, and is not recommended for trailers / RV campers.
Undeveloped Camping*
Tin Can Cabin - located 3.5 miles downriver from Lumsden Campground on the Tuolumne River.
Clavey - located 5.5 miles downriver from Lumsden Campground on the Tuolumne River.
Powerhouse - located 7.6 miles downriver from Lumsden Campground on the Tuolumne River.
Grapevine - located 8.0 miles downriver from Lumsden Campground on the Tuolumne River.
Indian Creek - located 8.3 miles downriver from Lumsden Campground on the Tuolumne River.
Wheelbarrow - located 8.8 miles downriver from Lumsden Campground on the Tuolumne River.
Baseline - located 8.9 miles downriver from Lumsden Campground on the Tuolumne River.
Driftwood Paradise - located 11.4 downriver from Lumsden Campground on the Tuolumne River.
Cabin - located 12.8 miles downriver from Lumsden Campground on the Tuolumne River.
Big Creek - located 13.0 miles downriver from Lumsden Campground on the Tuolumne River.
Mohican - located 14.1 miles downriver from Lumsden Campground on the Tuolumne River.
North Fork - located 15.0 miles downriver from Lumsden Campground on the Tuolumne River.

*All undeveloped camping managed by Stanislaus National Forest.
Source: 2009 GORP - Tuolumne River, 2010 National Park Services.

Table 5.6.2-2 Known whitewater boating runs on the Tuolumne River upstream of the Project area.

Whitewater Run	Length (miles)	Gradient (feet per mile)	Flow Range (cfs)	Optimum Flow Range (cfs)	Whitewater Classification
Upper Tuolumne (Meral's Pool to Ward's Ferry)	18.0	40	600-10,000	3,000	IV-V (600-4000) IV+ (4000-8000) V-V+ (8000+)
Cherry Creek (Cherry Creek just below bridge to Meral's Pool)	9.0	110	600-2,000	1,500	V (600-1500) V+ (1500-2000)
Clavey River (Upper Bridge to Lower Bridge)	8.5	n/a	n/a	n/a	V+
South Fork of Tuolumne (Highway 120 to Rainbow Pool Picnic Area)	7.0	n/a	n/a	n/a	IV-V

Source: 2010 California Whitewater Rafting.

5.6.2.3 Fishing Opportunities

Fishing along the Upper Tuolumne is also popular. There are a variety of areas to access the Tuolumne upstream of Don Pedro Reservoir. The sections listed below outline some of the main fishing areas along the upper Tuolumne River as well as the season, bag limit, and special regulations in accordance with the CDFG (CDFG Fresh Water Sport Fishing Regulations 2010).

- **Lyell Fork of the Tuolumne in Yosemite National Park**
  - Season: Last Saturday in April through November 15.
  - Bag limit: five
  - Special regulations: Brook trout minimum 10 inches. No fishing from piers or bridges. Use of live bait prohibited.
- **Dana Fork of the Tuolumne in Yosemite National Park**
  - Season: Last Saturday in April through November 15.
  - Bag limit: five
  - Special regulations: Brook trout minimum 10 inches. No fishing from piers or bridges. Use of live bait prohibited.
- **Grand Canyon of the Tuolumne in Yosemite National Park**
  - Meadows or from Hetch Hetchy Campgrounds.
  - Season: Last Saturday in April through November 15.
  - Bag limit: five
  - Special regulations: Brook trout minimum 10 inches. Use of live bait prohibited.
- **Hetch Hetchy Reservoir**
  - Season: Year round.
  - Bag limit: five
  - Special regulations: Use of live bait prohibited. No boating or swimming permitted.
- **O'Shaughnessy Dam to Early Intake Diversion Dam (Cherry Creek Confluence) in Yosemite National Park and Stanislaus National Forest**
  - Season: Last Saturday in April through November 15.
  - Bag limit: two
  - Special regulations: Minimum length 12 inches. Only artificial lures with barbless hooks may be used.

- **Early Intake Diversion Dam (Cherry Creek Confluence) to South Fork Tuolumne confluence in Stanislaus National Forest**
  - Season: Last Saturday in April through November 15.
  - Bag limit: five
  - Special regulations: Minimum length 12 inches. Only artificial lures with barbless hooks may be used.
- **South Fork Tuolumne confluence to Clavey River confluence in Stanislaus National Forest**
  - Season: Last Saturday in April through November 15.
  - Bag limit: two
  - Special regulations: Minimum length 12 inches. Only artificial lures with barbless hooks may be used.
- **Clavey River confluence to North Fork Tuolumne confluence in Stanislaus National Forest**
  - Season: Last Saturday in April through November 15.
  - Bag limit: five
  - Special regulations: Minimum length 10 inches. Only artificial lures with barbless hooks may be used.
- **North Fork Tuolumne confluence to Don Pedro Reservoir**
  - Season: Last Saturday in April through November 15.
  - Bag limit: five
  - Special regulations: Minimum length 10 inches. Only artificial lures with barbless hooks may be used.

5.6.3 Recreation Facilities and Opportunities within the Project Area

As a condition of its FERC license, the Districts provide recreational opportunities and facilities within the FERC Project Boundary. Recreation opportunities associated with the Project area are described below.

5.6.3.1 General Description of Project Recreation Opportunities

Don Pedro Reservoir is the sixth largest reservoir in California, and is formed by the Don Pedro Dam on the Tuolumne River. At normal maximum water surface elevation (830 feet), Don Pedro Reservoir extends about 24 miles upstream; has a surface area of 12,960 acres; and a shoreline length of approximately 160 miles. The Districts own approximately 122 miles of the shoreline within the Project Boundary and the remaining 38 miles is federally owned.

Primary access to the reservoir is by County Road J-59 from the southwest; State Highway 120 and 49 and Jacksonville Road from the north; Kelly-Grade, Marshes Flat Road, and Blanchard Road from the east; State Highway 132 from the southeast; and Bonds Flat Road from the south. The public has access to the entire shoreline from the high-water line down; and has vehicle access through a variety of small roads outside the main recreation areas.

The Districts have developed three major recreation areas at Don Pedro Reservoir. Management of these facilities is undertaken by the DPRA. Together, the three areas include 559 campsites of various types, 43 picnic sites within the three designated picnic areas, three boat launch facilities, two full-service marinas, a houseboat dock and repair yard, and one swimming lagoon (DPRA Recreation Facilities and Operations 2010).

Access is controlled to some degree for each of the Project recreation areas through staffed entrance stations. There are also roadways and trails located outside of the Project Boundary that are accessed by DPRA personnel for lakeshore operations and maintenance purposes (Figure 5.6.3-1).

Don Pedro Reservoir has a total of 749 single vehicle parking spaces (20 of which are designated as ADA accessible), 566 vehicle and trailer parking spaces (eight of which are designated as ADA accessible), and 56 boat trailer only parking spaces, all located within the three Recreation Areas (Table 5.6.3-1).

Table 5.6.3-1 Summary of parking areas at Don Pedro Reservoir recreation areas.

Parking Type	Fleming Meadows RA			Blue Oaks RA			Moccasin Point RA		
	ADA	Standard	Total	ADA	Standard	Total	ADA	Standard	Total
Single vehicle	15	503	518	3	147	150	2	79	81
Vehicle and trailer	6	293	299	0	140	140	2	125	127
Boat trailer only	n/a	56	56	0	0	0	0	0	0

Source: Don Pedro Recreation Agency 2010.

Figures 5.6.3-2, 5.6.3-3, and 5.6.3-4 show the exact locations of these parking areas and the total number of spaces for each of the three Recreation Areas, which does not include specific campsite parking pads.

Fishing Opportunities at the Project Area

Don Pedro Reservoir supports year-round fishing and offers abundant populations of rainbow, brown, and brook trout; largemouth, smallmouth, spotted, and black bass; kokanee, silver, and Chinook salmon; black and white crappie; bluegill perch; channel, white, and black bullhead catfish; and green sunfish for anglers. Day use visitors have access to fishing opportunities both along the shoreline and via boating access. The many forks of the reservoir also afford the opportunity for isolated and quiet settings for fishing. DPRA, in conjunction with the Tuolumne County Sheriff's office, enforces a boating five mph no-wake and/or no-ski zones to regulate many of these forks.

CDFG stocks trout annually and the DPRA stocks Florida Strain Largemouth Bass in the reservoir annually (Don Pedro Recreation Agency 2010). The CDFG's Moccasin Creek Fish Hatchery typically stocks the reservoir with a variety of trout species every two to four weeks during the fall and winter months (CDFG 2010c).

Don Pedro Reservoir requires that all individuals fishing on the lake follow all regulations as set forth by the CDFG and all anglers must have a current California fishing license. The CDFG has a special silver (Coho) salmon regulation in California. The regulation prohibits keeping any silver salmon; any silver salmon hooked must be released back into the waters in which it was caught. General fishing regulations and special restrictions for Don Pedro Reservoir are outlined in Table 5.6.3-2.

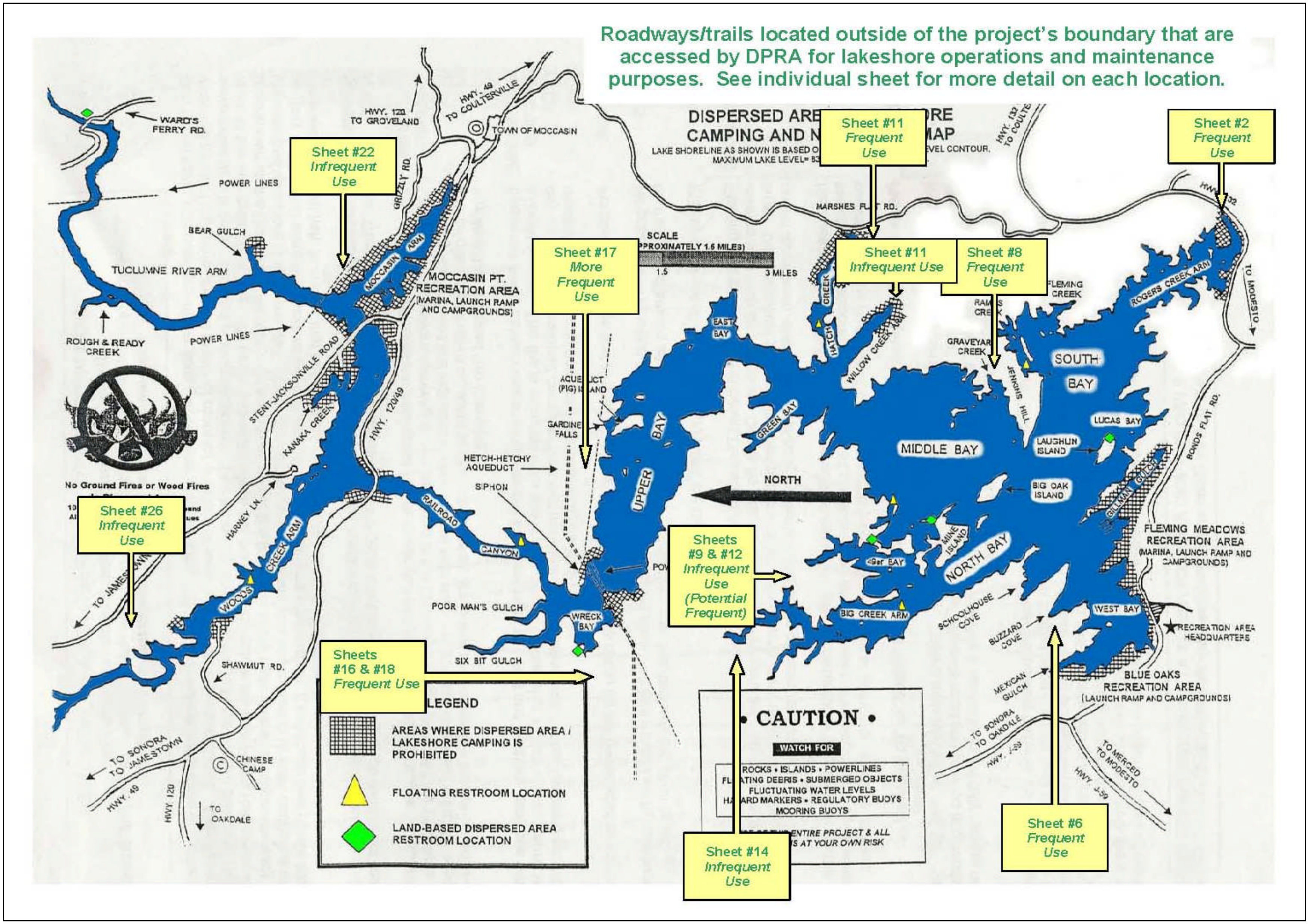


Figure 5.6.3-1 Access road locations.

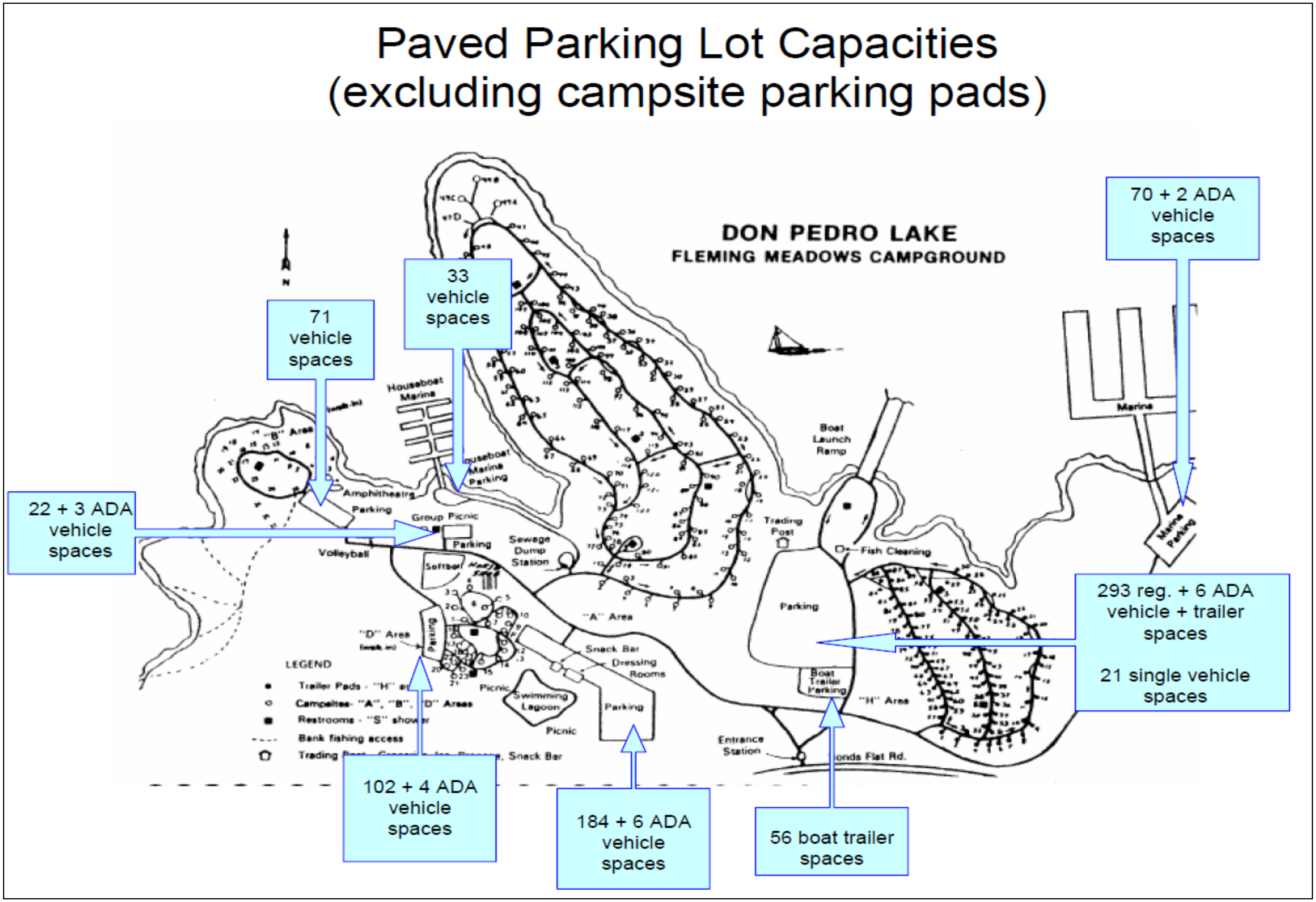


Figure 5.6.3-2 **Paved parking lot capacities for Fleming Meadows Recreation Area.**

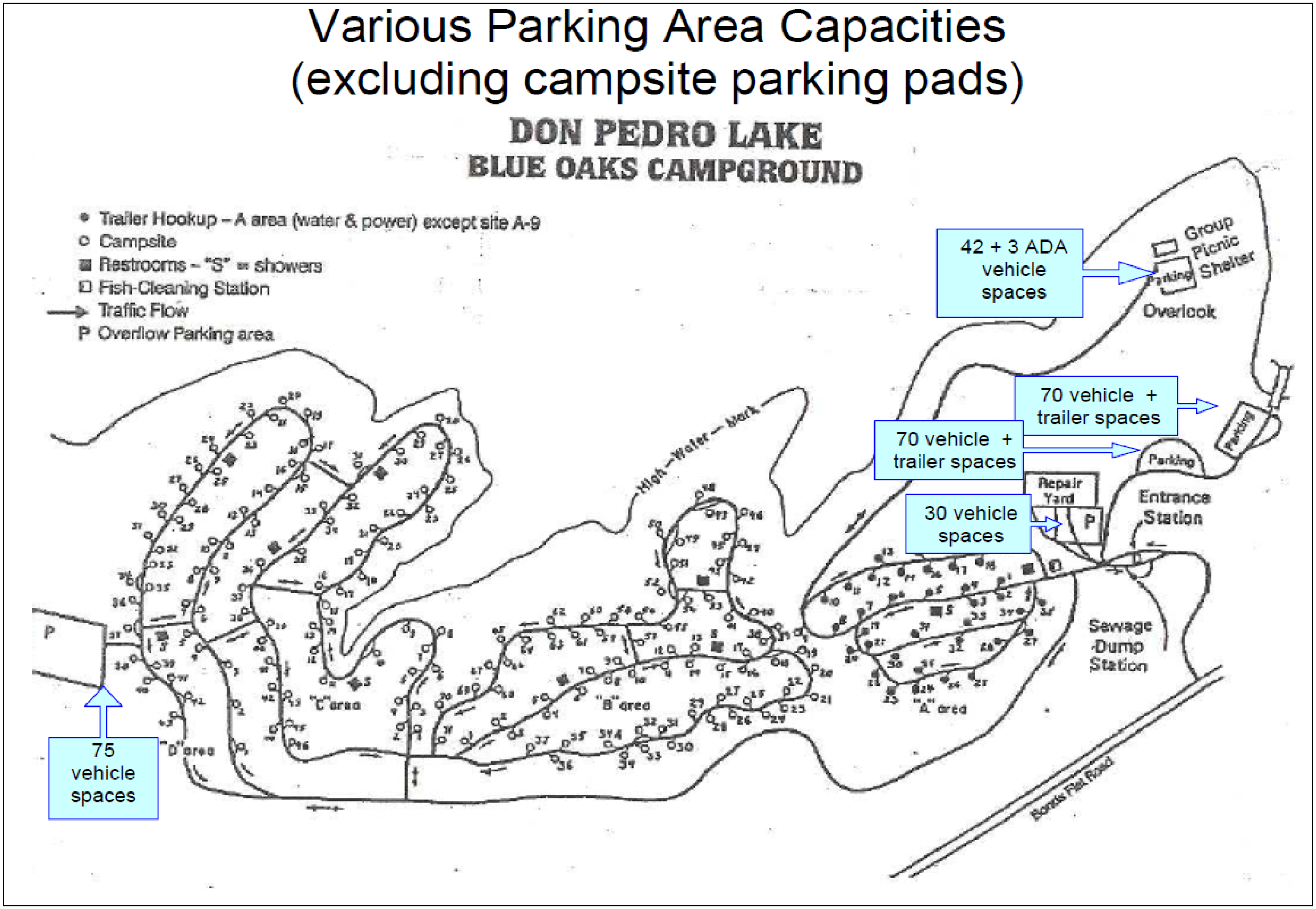


Figure 5.6.3-3 Paved parking lot capacities for Blue Oaks Recreation Area.

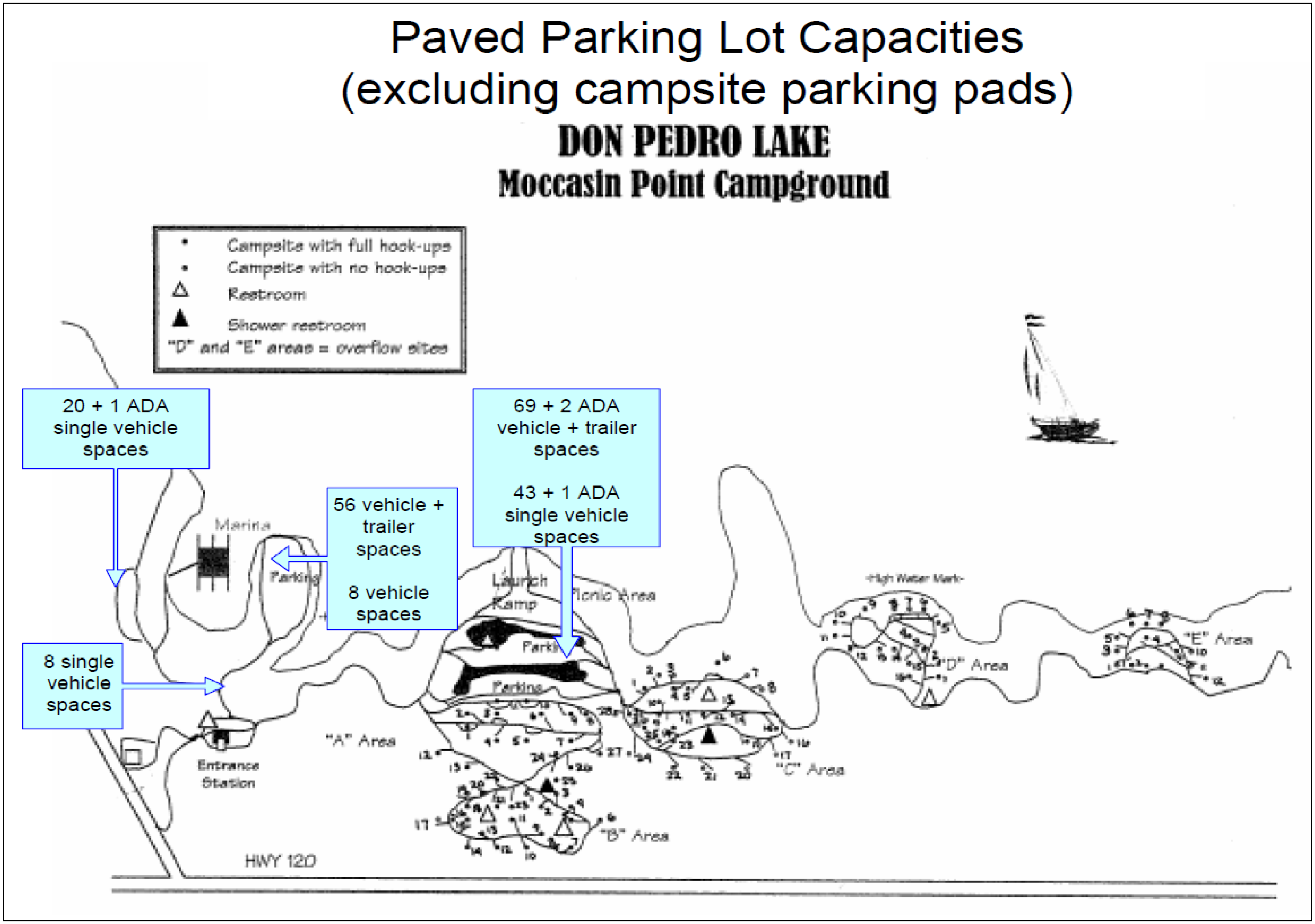


Figure 5.6.3-4 Paved parking lot capacities for Moccasin Point Recreation Area.

Table 5.6.3-2 General and special fishing regulations for Don Pedro Reservoir.

Fish Type	Open Season	Size (in length)	Bag Limit	Special Restrictions
Bass	All year	Minimum 12 inches	5	None
Bluegill Perch	All year	Any	No limit	None
Catfish	All year	Any	20	No limit on bullhead catfish
Crappie	All year	Any	25	None
Salmon	All year	Any	5	Limit 0 for silver salmon.
Sunfish	All year	Any	No limit	None
Trout	All year	Any	5	None

Source: Don Pedro Recreation Agency and CDFG 2010d.

Don Pedro Reservoir is also a site for frequent bass fishing tournaments. In 2010, 30 different organizations held 45 fishing tournaments at Don Pedro Reservoir. Table 5.6.3-3 summarizes the 2010 fishing tournament schedule for Don Pedro Lake which is typical for annual tournaments in Project area.

Boating and Water Based Activities at the Project

The reservoir covers 12,960 acres, and offers a multitude of open water space for motor boating. There are also enough coves and sheltered areas to enjoy boat-tow activities. Don Pedro Reservoir also provides a ski slalom course in the Hatch Creek Arm. Water-based activities within the Project include water skiing and wake boarding, boat fishing, jet skiing, canoeing, flat water kayaking, windsurfing, sailing, and whitewater rafting and kayaking take-out areas. In 2007, 24 percent of the total gate receipts were a result of boating use, and approximately 3,500 rafting take-outs occurred at the Reservoir (DPRA 2008). Licensed concessionares provide 80 small vessel boat rentals and has 378 small vessel moorings for reservoir visitors.

House boating is also a popular activity at Don Pedro Reservoir and many boats anchor in the coves and arms of the lake for overnight camping or day use / swimming activities. Between the two marinas, there are 40 houseboats available for rent from the authorized concessionaires, and there exists 257 total moorings available for privately owned houseboats. Additionally, six floating restroom buildings are anchored on Don Pedro Reservoir for use by boaters and other water-based users.

The California Department of Boating and Waterways (CDBW) Safety Report (2007) summarizes activities based on boating accident analysis, law enforcement, and safety education. Between 2000 and 2004, Don Pedro Reservoir reported 73 boating accidents which resulted in 61 injuries and two mortalities (CDBW 2006). For the period 2005 to 2009, there were 55 reported boating accidents, which resulted in 20 injuries and no mortalities (Carol Russell, pers. comm., 2010) (Table 5.6.3-4). Boating safety education programs are implemented in a variety of ways throughout California, including websites, school / public programs, public service announcements, and law enforcement personnel's verbal warnings and written citations (CDBW 2007).

Table 5.6.3-3 2010 fishing tournament schedule for Don Pedro Lake.

Date	Day of Week	Organization	Launch Location
1/2/10	Saturday	Won Bass	Fleming Meadows
1/30/10	Saturday	LB Bass Club	Blue Oaks
2/6/10	Saturday	Won Bass	Fleming Meadows
2/12/10	Friday	California Bass Champs	Fleming Meadows
3/6/10	Saturday	Sonora Bass Anglers	N/A
3/6/10	Saturday	Diablo Valley Hawg Hunters	N/A
3/6/10	Saturday	American Bass	Fleming Meadows
3/6/10 3/7/10	Saturday Sunday	CA Landscape Contractors Trout Tournament	N/A
3/13/10	Saturday	Future Pro Tour	Fleming Meadows
3/13/10	Saturday	Tri Valley Bassmasters	N/A
3/14/10	Sunday	Fresno Bass	Fleming Meadows
3/20/10	Saturday	Won Bass	Fleming Meadows
3/20/10 3/21/10	Saturday Sunday	Kerman Bass Club	Fleming Meadows
3/21/10	Sunday	CA Bass Federation	Fleming Meadows
3/27/10 3/28/10	Saturday Sunday	Sierra Bass Club	Blue Oaks
3/28/10	Sunday	Kings River Bass Club	Blue Oaks
3/28/10	Sunday	Fresno Bass	Fleming Meadows
4/10/10	Saturday	Angler's Choice	Fleming Meadows
4/10/10	Saturday	Modesto Elk's Lodge #1282	Fleming Meadows
4/10/10	Saturday	Manteca Bassin Cuddies	N/A
4/17/10	Saturday	100% Bass	Fleming Meadows
4/17/10 4/18/10	Saturday Sunday	Wasco Bass Club	Fleming Meadows
4/24/10	Saturday	King Salmon Derby	Blue Oaks
4/24/10	Saturday	Northern California Bass Federation	Fleming Meadows
4/25/10	Sunday	100% Bass	Fleming Meadows
5/1/10	Saturday	American Bass	Fleming Meadows
5/8/10	Saturday	Angler's Choice	Fleming Meadows
5/8/10 5/9/10	Saturday Sunday	Taft Bass	Fleming Meadows
5/15/10	Saturday	Bethel Assembly of God	Fleming Meadows
5/22/10	Saturday	Won Bass	Fleming Meadows
5/22/10	Saturday	Kerman Bass Club	Fleming Meadows
6/6/10	Sunday	Angler's Choice	Fleming Meadows
6/12/10	Saturday	Sacramento Bass Trackers	N/A
6/12/10 6/13/10	Saturday Sunday	Modesto Ambassadors Night Classic	Fleming Meadows
6/26/10 6/27/10	Saturday Sunday	U.S. Angler's Choice Night Tournament	Fleming Meadows
7/17/10	Saturday	Christian Bass League	N/A
7/17/10	Saturday	Riverbank Bass Anglers	N/A
8/7/10	Saturday	Point Seekers Bass Club	N/A
9/11/10	Saturday	Mid Valley Bass Club	N/A
10/9/10	Saturday	Jigs Bait and Tackle	Fleming Meadows
10/9/10	Saturday	Contra Costa Bass Club	N/A
10/16/10	Saturday	Christian Bass League	N/A
11/13/10	Saturday	US Angler's Choice	Fleming Meadows
12/5/10	Sunday	Riverbank Bass Anglers	N/A
12/11/10	Saturday	Won Bass	Fleming Meadows

Source: DPRA 2010.

Table 5.6.3-4 Boating accidents at Don Pedro Reservoir 2005-2009.

	2005	2006	2007	2008	2009	Total Boating Accident by Type
Boating Accident Non-Injury	3	1	0	1	0	5
Boating Accident Injury	4	1	5	0	10	20
Boating Accident Property Damage	0	0	5	3	7	15
Boating Under Influence Drugs/Alcohol	0	0	6	2	5	13
Boating Under Influence Negligent Vessle / Injury to Other Persons	0	0	0	1	0	1
Other	0	0	1	0	0	1
Total Annual Boating Accidents	7	2	17	7	22	
Total Boating Accidents 2005-2009			**55**			

Red Hills Area of Critical Environmental Concern

There are several hiking and biking trails that are within or partially within the Project area. Red Hills is a region of 7,100 acres of public land located just south of the historical town of Chinese Camp and immediately east, west, and northwest of the Railroad Canyon and Woods Creek Arm of Don Pedro Reservoir classified as an ACEC (Figure 5.6.3-5). The purpose of the designation is to protect the rare plant species found there, the unusual serpentine soils that provide habitat for unique flora of the area, habitat for the rare minnow known as the Red Hills roach and to protect bald eagle wintering habitat (BLM 2009). The Red Hills region is noticeably different from the surrounding countryside. The natural serpentine in the area causes the plant assemblage to be limited to those species that are tolerant of such minerals. Included among the buck brush and gray pine is a rich diversity of annual wildflowers that put on a showy display every spring (BLM 2009). The bald eagle is a winter resident of the area. Common visitor activities include hiking, horseback riding, wildflower viewing, birding, mountain biking, and some limited hunting (BLM 2009).

The trail system, with its various loops, totals approximately 17.3 miles. With respect to recreation facilities, there are no developed campsites. There are no fees to enter the Red Hills area. To protect the fragile biological resources of the area, target shooting and off-road vehicle use were prohibited on public land in the Red Hills in 1991 (BLM 2009).

5.6.3.2 Detailed Description of Developed Recreation Opportunities

Three developed recreation areas are located at Don Pedro Reservoir - Moccasin Point, Blue Oaks, and Fleming Meadows Recreation Areas (RAs). In total, these three recreation areas account for 559 camping units, three boat launch facilities with a total of 14 launch lanes, boat rental services, showers, a chlorinated, filtered swimming lagoon, two full service marinas, three picnic areas for a total of 43 picnic sites, and several fish cleaning stations.

All of the recreation facilities within the three recreation areas at Don Pedro Reservoir are owned by the Districts; and day-to-day operations and maintenance are carried out by the DPRA. Table 5.6.3-5 provides a summary of the major recreation facilities and amenities offered at each of the developed recreation areas.

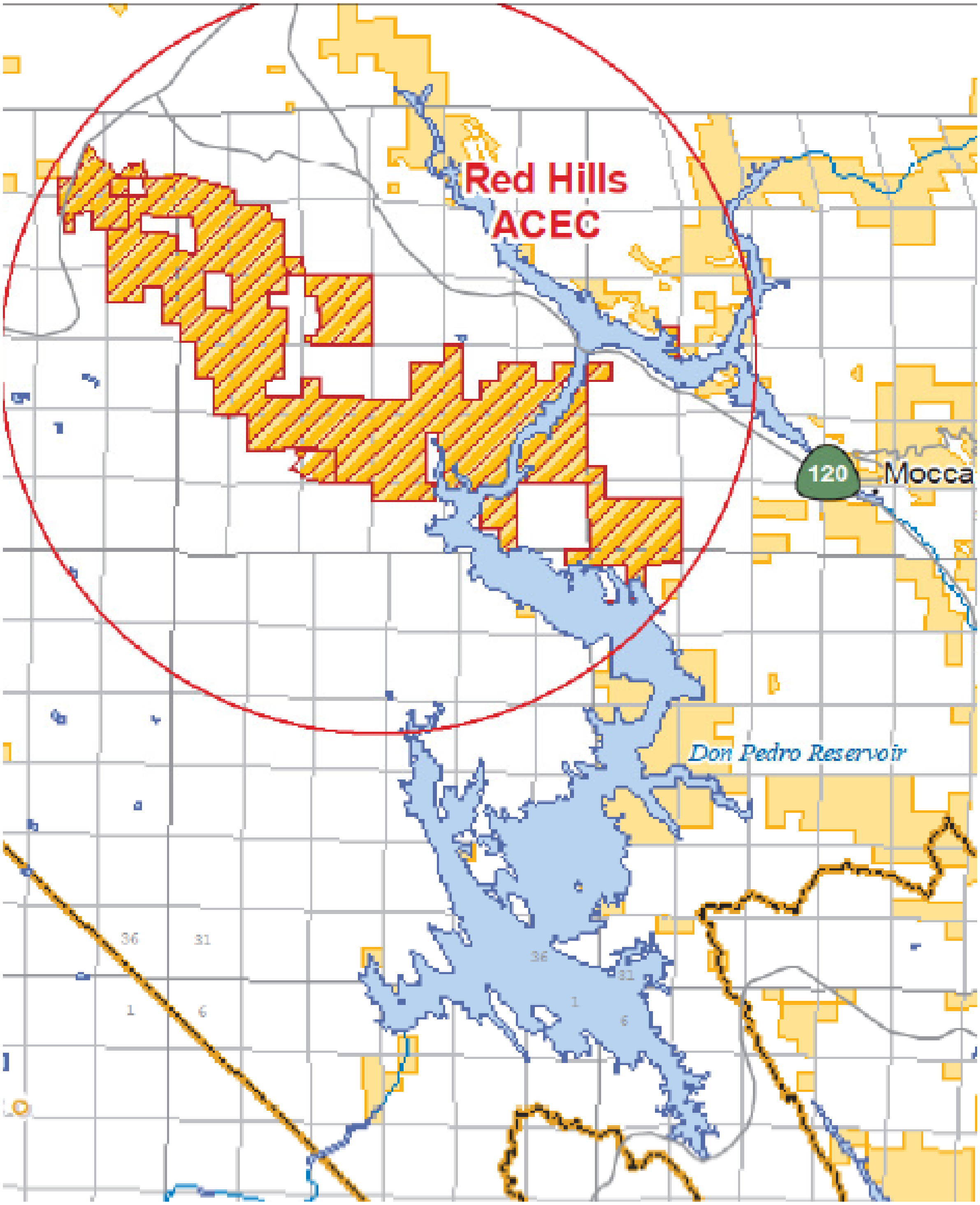


Figure 5.6.3-5 BLM lands near Project area.

Table 5.6.3-5 Summary of recreation facilities and other on-site amenities at Don Pedro Project developed recreation areas.

Amenities	Moccasin Point RA	Blue Oaks RA	Fleming Meadows RA
Project Recreation Facilities			
Camping Units - Total	68	195	263
With water and electric hookups	18	34	91
Picnic Areas -Total	2	1	2
Group Picnic Sites	1	1	1
Boat Launch Ramp	1	1	1
Fish Cleaning Stations	2	1	2
Comfort Stations - Total	6	9	12
With hot showers	1	4	5
Additional On-Site Recreation Amenities			
Concession Store	Yes	No	Yes
Swimming Lagoon	No	No	Yes
Volleyball / Softball Area	No	No	Yes
Marina	Yes	No	Yes
Amphitheatre	No	No	Yes
Houseboat Mooring	Yes	No	Yes
Boat Rentals	Yes	No	Yes
Houseboat Rentals	Yes	No	Yes
Boat Repair Yard	No	Yes	No
Gas and Oil	Yes	No	Yes
Sewage Dump Station	Yes	Yes	Yes

Source: DPRA 2010.

Uses of the Project's developed recreation areas are all fee-based. Fee discounts are available for week-long or month-long recreational users, as well as for annual and off-season use. Table 5.6.3-6 below summarizes the recreational use fees.

Fleming Meadows Recreation Area

The Fleming Meadows Recreation Area is comprised of 176 campsites, 90 RV hookup sites, one boat launching facility, a sewage station, trading post, swimming lagoon, picnic area, amphitheatre, softball and volleyball area, and two marinas—one with full services and one specifically for mooring private houseboats. There are also five designated parking lots located throughout the recreation area as well as a parking lot specific to the marina. Fleming Meadows has the highest use of the three recreation areas.

The Fleming Meadows Recreation Area has ADA accessible restrooms which include enlarged, ADA accessible stalls. At least one sink in each restroom is height adjusted for ADA accessible use. The urinals at the Fleming Meadows Launch Ramp and swimming lagoon are adapted to individual use urinals. The ramp access to ADA accessible restrooms is designed for ADA accessibility and meets ADA accessible grade and surface guidelines. ADA-accessible parking spaces have been designated at the boat launch ramp, main parking lot, and at all ADA accessible restroom facilities.

Table 5.6.3-6 2011 schedule of fees for Don Pedro Reservoir recreation areas.

Day Use	
Vehicle and/or motorcycle	$8.00 per vehicle
Boat	$7.00 per vehicle
Walk-In/Bicycle-In	$1.00 per person
Groups w/8+ people per vehicle	$1.00 per person
Overnight Camping Use In Season (4/1 - 9/30)	
Trailer hookup site with full service	$35.00
Trailer hookup site with electric and water only	$28.00
Tent Camp Site Fee	$22.00
Reservation Fee	$8.00
Reservation Change Fee	$8.00
Cancellation Fee	$8.00
Overnight Camping Use Off Season (10/1 - 3/31)	
Trailer hookup site with full service	$25.00
Trailer hookup site with electric and water only	$20.00
Tent Camp Site Fee	$18.00
Reservation Fee	$8.00
Reservation Change Fee	$8.00
Cancellation Fee	$8.00
Overnight Camping Use - Weekly Rates	
Trailer hookup site with full service	$210.00
Trailer hookup site with electric and water only	$168.00
Tent Camp Site Fee	$132.00
Reservation Fee	$8.00
Reservation Change Fee	$8.00
Cancellation Fee	$8.00
Picnic Facility Fees (Group Reservations)	
Groups up to 200 persons	$50.00
Groups over 200 persons	$100.00
Houseboat Fees (Personally Owned)	
First year permit / New permit	$1000.00
Annual renewal fee (by 1/31)	$350.00
Annual renewal fee (after 1/31)	$450.00
Change of assigned concessionaire fee	$100.00
Change of ownership fee	$350.00
Houseboat inspection fee	$50.00
Annual Permit Fees	
Per vehicle	$80.00
Per vehicle (Senior Citizen, 62+)	$45.00
Per second vehicle (same registered owner)	$25.00
Per boat (early purchase / non-discount)	$70.00 / $90.00
Per boat (Senior Citizen, 62+)(early purchase / non-discount)	$135.00 / $150.00
Personal watercraft (early purchase / non-discount)	$75.00 / $85.00
Lakeshore boat camping	$60.00
Special Fees	
Lakeshore boat camping per night/boat	$8.00
Impoundment / Unit (+expenses)	$50.00
Impound storage per day	$3.00
Returned check fee	$20.00
Weigh-in dock rental per ½ hour	$5.00
Group camping (Blue Oaks RA only - Max 200 persons)	$200.00

Source: DPRA 2008.

Blue Oaks Recreation Area

The Blue Oaks Recreation Area is comprised of 161 campsites, two RV full hookup sites, 34 RV partial hookup sites (four of which are ADA accessible), and one boat launching facility. Additional amenities include a sewage station, houseboat repair yard, and a group picnic shelter. There are also three designated parking lots located throughout the recreation area as well as a parking lot specific to the group picnic shelter.

The Blue Oaks Recreation Area also contains the Shoreline Trail hiking route, which is comprised of 3.5 miles of scenic hiking and mountain biking trails. The trail route starts at the Blue Oaks Group Area vista point and parallels the high water mark of the Reservoir to Buzzard Point. The trail traverses wildflower displays in the spring, pass large quartz outcroppings, offer unique vistas of Don Pedro Reservoir and the Sierra Nevada range, and are popular for viewing wildlife and birds such as bald eagles, ospreys, red-tailed hawks and great blue herons (National Geographic Society 2009).

Restrooms contain ADA accessible stalls, and a sink in each restroom is height adjusted for ADA accessible use. In addition, the shower restroom at the Blue Oaks Recreation Area campground has one ADA accessible shower station in each facility, and ADA accessible parking spaces at all restroom facilities.

Moccasin Point Recreation Area

The Moccasin Point Recreation Area is comprised of 78 campsites, 18 RV hookup sites, and one boat launching facility. Additional amenities include a full service marina and picnic area. There are also two designated parking lots located within the recreation area. Shoreline use in this location is fairly minor with the exception of camping.

ADA compliant restrooms are installed at Moccasin Point Launch Ramp that includes ADA accessible stalls for both the men's and women's areas. One sink in each restroom is height adjusted for ADA accessible use. In addition, ADA accessible parking spaces have been designated at these restrooms as well as at the Launch Ramp area.

5.6.3.3 Project Recreation Use

In 2007, Project recreation use (overnight and day use visitors) was 408,563 Recreation Days (RDs) with day use accounting for 39.5 percent of the total use (Table 5.6.3-7). Since 2001, overall recreation use has been stable; with day use decreasing slightly and overnight use increasing slightly (Table 5.6.3-7). The proportion of overnight use to day use favored day use from 2001 to 2003 with the percentage of day use averaging approximately 58 percent of the total use (overnight use averaged approximately 42 percent). In 2001-2003, average day use was 239,897 and average overnight use was 173,723. However, since 2004, overnight use has been higher than day use, with overnight use averaging approximately 60 percent of the total use (day use average 40 percent). In 2004-2007, average day use declined to 158,169 and average overnight use increased to 242,265. Total average use from 2001-2003 was 413,621 visitors and total average use from 2004-2007 was 400,438 visitors. Figures 5.6.3-6 and 5.6.3-7 illustrate the patterns of total visitor use.

Table 5.6.3-7 Project recreation use in recreation days at Don Pedro Reservoir, 2001-2007.

Year	Day Use	Overnight Use	Total Use
2001	256,353	157,119	413,472
2002	237,785	186,831	424,616
2003	225,554	177,221	402,775
2004	156,352	239,491	395,853
2005	Data Unavailable	Data Unavailable	Data Unavailable
2006	156,775	240,123	396,898
2007	161,382	247,181	408,563
Average	**199,034**	**207,995**	**407,029**

Source: DPRA 2008.

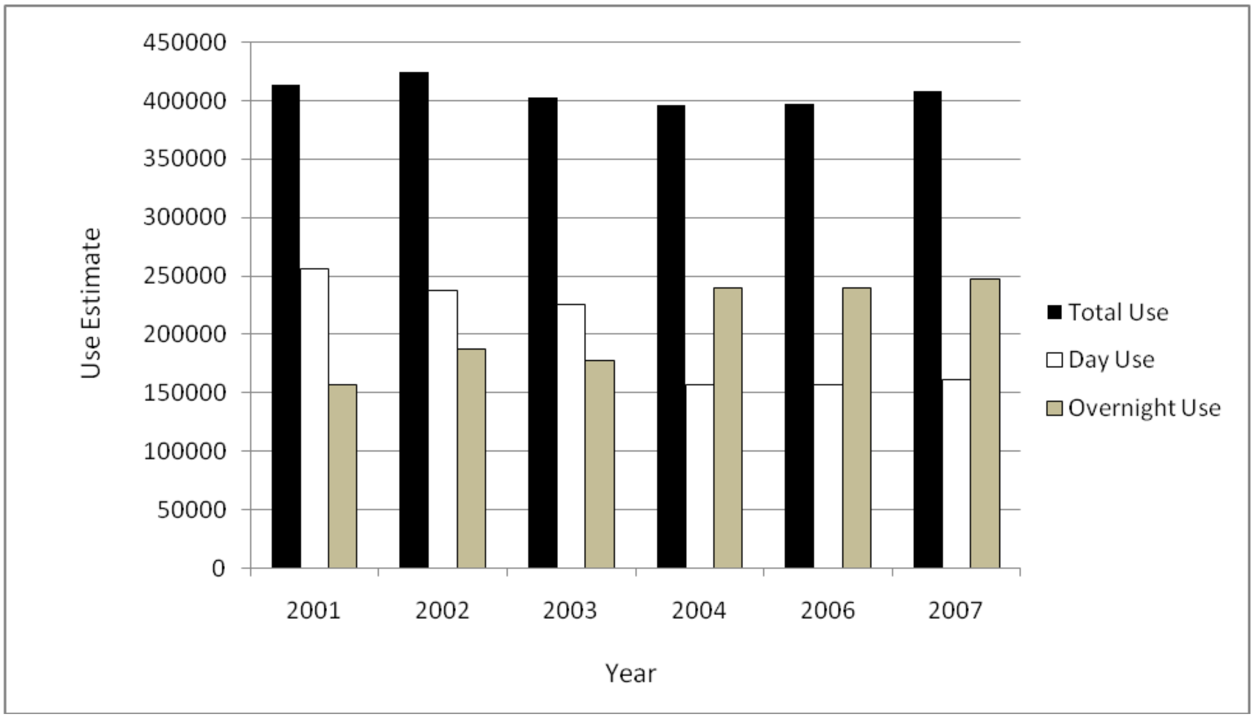


Figure 5.6.3-6 Pattern of Project recreation use in recreation days for 2001-2007.
Note: Data for 2005 is not available.

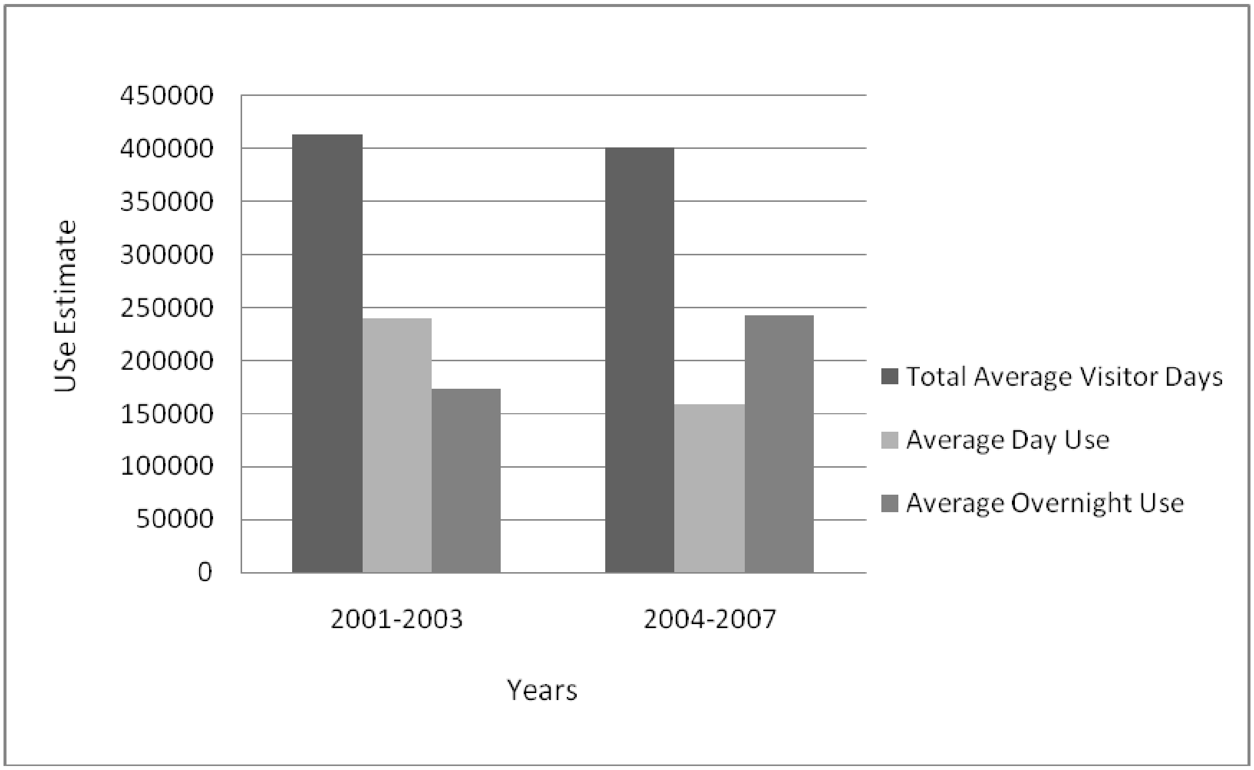


Figure 5.6.3-7 Pattern of Project recreation use in recreation days comparing 2001-2003 use and 2004-2007 use.

Note: Data for 2005 is not available.

Of note, the peak in recreation use between 2001 and 2007 occurred in 2002 with 424,616 recreation days. As would be expected, use throughout the entire calendar year followed a bell-shaped curve with the peak period generally from May through September.

5.6.3.4 Dispersed Recreation Opportunities

A large majority of recreation use at the Project area occurs at the three developed recreation areas on Don Pedro Reservoir; however, with 100 miles of undeveloped shoreline on Project-owned lands, Don Pedro supports a large amount of dispersed recreation. None of the dispersed shoreline areas have any type of developed camping spaces, and there are specific areas along the shoreline that prohibit overnight camping (Figure 5.6.3-8).

There are three islands of notable size located in the southern areas of the reservoir, as well as a handful of smaller islands that are unnamed/unmarked. Boating, fishing, camping and wildlife viewing are popular for those with the ability to boat into these dispersed areas.

The sections listed below outline the main areas of dispersed recreation use, including fishing, boating, undeveloped camping use, and other recreation opportunities. Fishing regulations for Don Pedro Reservoir are enforced in all areas of the lake.

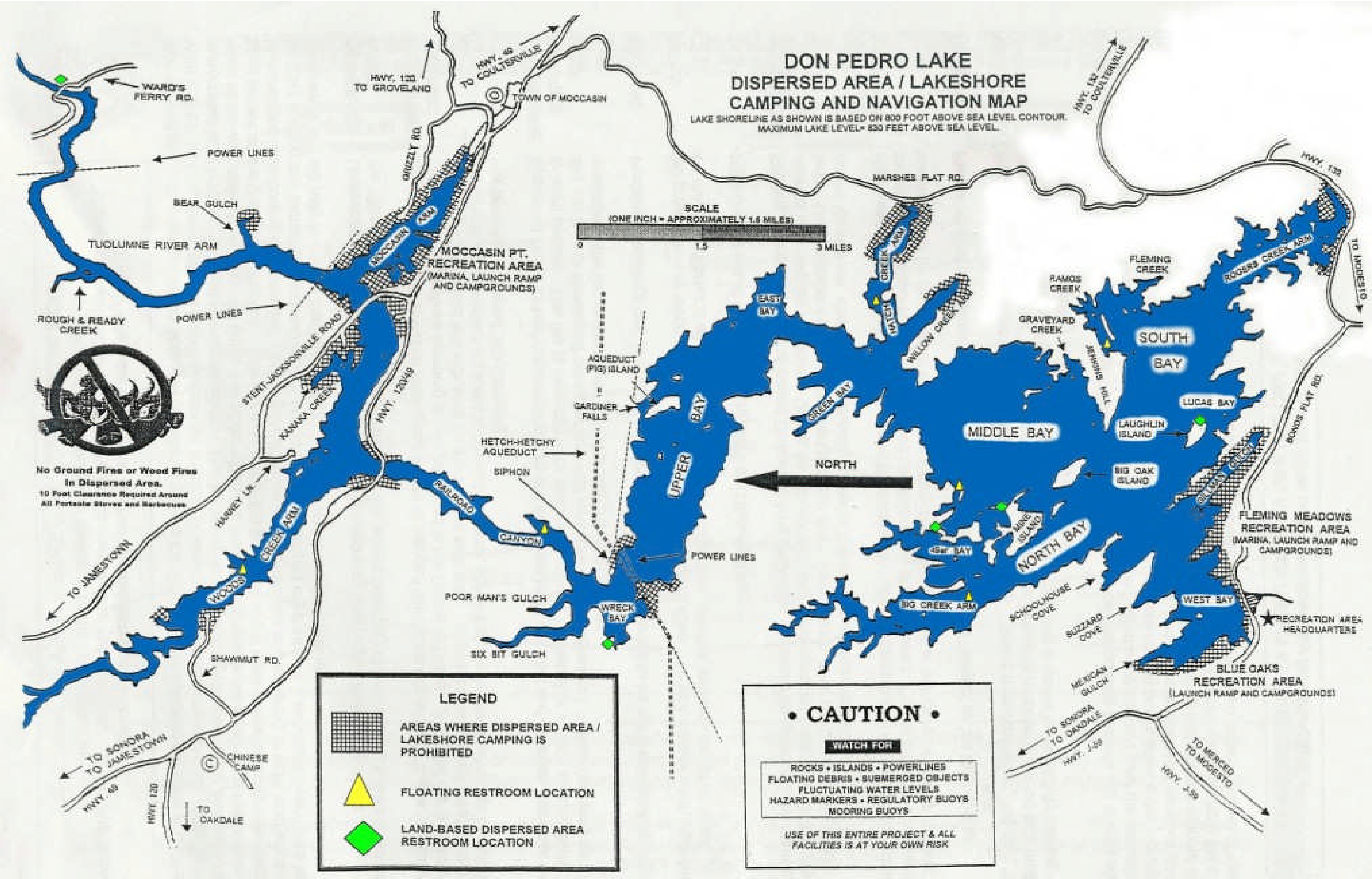


Figure 5.6.3-8 Don Pedro Lake dispersed area / lakeshore camping and navigation map.

South Bay from the Ramos Creek to the Fleming Creek Area

This part of the lake is surrounded by private property and BLM manages lands immediately east of Ramos Creek and north of Fleming Creek. A mining site is also noticeable from the water in this location. Daily law enforcement patrols by the Sheriff take place during the summer months and maintenance crews stop by three times per week to service the floating restrooms. There are also several hazard buoys, boundary markers and fencing in this area (Aukerman, Haas, and Schuster 2008).

South Bay, excluding Rogers Creek Arm and Lucas Bay

South Bay is an open, windy area and the reservoir surface can get very choppy. Due to the rough water, many recreational boaters with skiers and wake boarders usually avoid the area; however, some sailing and a few jet skis and tubers utilize this area. Shoreline use has been noted as minor in this region. Pass-through boat patrols occur twice per day during the summer months, and there are survey markers and buoy lines in the water. Additionally, there is a land-based dispersed area restroom on Laughlin Island, northwest of Lucas Bay (Aukerman, Haas, and Schuster 2008).

Lucas Bay

This relatively small area has been observed as popular among water skiers, personal watercraft users, and wake boarders due to its sheltered location. Some fishermen and tubers enjoy the area as well. During the summer months, houseboats moor here and boat-in camping is also prevalent. Lucas Bay receives daily patrols by the Sheriff, occasional ranger patrols to enforce the dispersed area campground rules, and maintenance crews servicing the Laughlin Island restrooms and picking up garbage due to its proximity to Fleming Meadows Recreation Area. Several hazard buoys are also placed to mark water hazards for boaters and swimmers (Aukerman, Haas, and Schuster 2008).

Rogers Creek Arm

Rogers Creek Arm is not very heavily used for boating. Generally, no more than 10 to 15 fishing and other motorboats plus a couple of houseboats are commonly visible during the summer months. However, Rogers Creek is a popular day use area. There are no established trails, but visitors often park their vehicles next to the nearby highway and walk in. On average, two to three groups of boat-in campers use this part of the lake simultaneously. Lake patrols consist of boat patrols by Park Ranges once a day on weekends, and infrequent boat patrols by the Sheriff and maintenance. A few hazard buoys and a no-wake zone at the south end of the arm for quiet fishing are also in place (Aukerman, Haas, and Schuster 2008).

49er Bay and Big Creek Arm

49er Bay is a popular recreation spot. Due to the calm water of the Bay, this area also serves as a playground for water-skiers, wake boarders, tubers and personal watercraft users. The mouth of Big Creek Arm represents a transition zone with boats going several different directions. This area is also popular among house boaters, with approximately 20 to 30 boats congregating at any one time during the summer. This area has relatively frequent patrols due to the popularity of the location. There is a land-based dispersed area restroom on the shoreline on the east of 49er Bay, immediately north of Mine Island (Aukerman, Haas, and Schuster 2008).

Middle Bay

This wide-open area is a pass-through for boats, and a diversity of boaters, including water skiers, personal watercraft users and tubers use this part of the lake. Shoreline use is popular as well, with about 10 to 15 boat-in campsites occupied during the summer months and additional houseboats moored. The area is a favorite among college students who enjoy camping and socializing. Para-gliders and para-sailors can also be seen occasionally. Middle Bay is maintained and receives trash removal at least two times per day during the summer months. During the peak season, the Sheriff patrols the area twice daily and rangers stop by to enforce dispersed area rules and fire regulations. There are no speed zones in this part of the lake. Middle Bay also includes Mine Island which has a land-based dispersed area restroom (Aukerman, Haas, and Schuster 2008).

Hatch Creek Arm, including the Willow Creek Arm

There is significant recreation activity in this area, mainly due to the wake boarding / water-skiing slalom course. Many of the boats cruise the area waiting in line for a turn at the slalom course. Several rules and regulations are posted in the area due to the ski slalom course. There is a large sign on the hillside advertising the slalom course, along with a special ski-zone buoy, a buoy line and additional boating signs. Boaters using the slalom course need to be registered. Except for the county Sheriff periodically patrolling this location once per day on weekends, no additional ranger patrols or rule enforcement takes place (Aukerman, Haas, and Schuster 2008).

Gardiner Falls in the Upper Bay

This location is covered with grass woodlands, and the Gardiner water fall is in prominent view from the water. Recreation use is very popular, with about 20 to 30 boats moored in the summer season and people socializing. Popular activities are swimming, diving off the rocks, and both boat and shoreline fishing. During peak season, there are boat patrols by the Sheriff twice per day, boat maintenance crews once per day and occasionally emergency response for those injured jumping off the rocks. Gardiner Falls is a five-mph no-wake zone area lined by buoys (Aukerman, Haas, and Schuster 2008).

Railroad Canyon

The area is dominated by steep rocky hillsides covered with brush and a mixture of blue oak and pine trees. Small waterfalls are visible along the steep hills. Other than the water line, no human-made structures alter the natural landscape. Railroad Canyon is a major pass-through area for boaters trying to reach different arms of the reservoir. Frequently, 10 or more boats travel through this area at the same time at high speeds, creating choppy water and noise reverberating from the canyon walls (Aukerman, Haas, and Schuster 2008). Some water-skiing, tubing, and jet-skiing takes place in this area and occasionally fishermen can be seen with their boats tied-off. Due to the steep, rocky shores and lack of recreational access or facilities, shoreline use is sporadic. Maintenance patrol boats and the Sheriff both pass through twice per day during the peak season. Three hazard buoys and the nearby floating restrooms at the east side of Wreck Bay are maintained regularly. There are no speed restrictions in this area, and the closest marina is approximately five miles away (Aukerman, Haas, and Schuster 2008).

Woods Creek Arm

The Woods Creek Arm area is located approximately 7 miles away from Moccasin Point Marina and recreational use is generally noted as limited to fishermen enjoying the serenity of the area with a maximum of about three to four fishing boats at any one time. An occasional houseboat is also seen in this part of the reservoir (Aukerman, Haas, and Schuster 2008). The area is a designated no-wake zone and shoreline use is infrequent. Boat patrols by the Sheriff are infrequent overall, and maintenance crews only stop by about once every other week. This part of the reservoir has a five mph buoy lane around the corner and no public access or recreational facilities are provided (Aukerman, Haas, and Schuster 2008).

Rough and Ready Creek

This part of the reservoir is located within a peaceful canyon, surrounded by steep, vegetated hillside and receives most of its use from fishermen and boats passing through for sightseeing. Only about one or two boats gather in this area simultaneously and shoreline use is non-existent. Rental houseboats and water-skiing are not permitted (Aukerman, Haas, and Schuster 2008). Management presence is sporadic with law enforcement patrols once per week or by emergency request and restroom maintenance once a week. A road above the inventory area provides access for maintenance crews and reduces maintenance traffic on the water. There are no recreational facilities or public access in the majority of this area, with the exception of a land-based, dispersed area restroom at the far northeast area near Wards Ferry Road (Aukerman, Haas, and Schuster 2008).

5.6.3.5 Law Enforcement, Public Safety, and Invasive Mussel Monitoring

Law Enforcement and Public Safety

Law enforcement and public safety at the Don Pedro Reservoir and recreation facilities are provided by the Tuolumne County Sheriff and the DPRA. Campground regulations, occupancy limits, vehicle limits, and noise ordinances are strictly enforced and campgrounds are patrolled by Park Rangers and other DPRA staff. The Tuolumne County Sheriff has the responsibility to enforce state laws and county ordinances.

The Tuolumne County Sheriff boat patrol maintains safety and enforces the State and County regulations both within the developed recreation areas and in the dispersed areas of the Reservoir. Tuolumne County ordinances contain provisions that pertain to Don Pedro Reservoir. These ordinances detail the rules and regulations for all types of use on public land including vehicle traffic, boating, shoreline use, swimming, house boating, and fire prevention.

A summary of the county boating ordinance for Don Pedro Reservoir is provided in Table 5.6.3-8 (Tuolumne County 2009). The sheriff and his/her deputies, public officers and employees shall enforce the provisions any statute, ordinance or regulation relating to boating safety or sanitation.

Table 5.6.3-8 Summary of Tuolumne County boating ordinance at Don Pedro Reservoir.

1.	The board of supervisors, by resolution, may designate and cause to be appropriately marked, as the public welfare and safety may require, boat launching areas, areas designed exclusively for swimming, areas where swimming is prohibited, areas where water skiing is prohibited, areas where boats are prohibited, areas of restricted speed or "slow" areas and other areas wherein certain activities or uses are prohibited or permitted. Such areas shall be marked with appropriate signs or devices indicating such designation, and it is unlawful for any person to fail to comply with such designations. A person violating any provision of this section shall be guilty of an infraction.
2.	The provisions shall not be construed to prohibit or restrict the operation of any boat actually competing in a race or regatta over a marked racing course or the operation of any boat, aquaplane or water skier actually participating in a water show, when such race, regatta or water show is previously authorized in writing and actively supervised by the public agency having jurisdiction over the waters on which the race, regatta or water show is conducted or its duly authorized agent for such purpose.
3.	It is unlawful for any person to dump or place in any public waters any human or other animal waste, garbage, trash, gasoline, oil, sawdust, debris or other foreign matter whether from a boat, the shore or any other place.
4.	It is unlawful for any person after unloading his/her boat to leave any boat trailer in public waters or to leave any boat trailer unattended within 50 feet of the waterline.
5.	All boats shall be in full compliance with California Boating Law, in terms of operation and equipment.
6.	It is unlawful to trailer launch a boat at other sites not designated and posted for launching, pursuant to rules adopted by the county.
7.	It is unlawful to land, moor or dock a boat at sites designated, posted or restricted for other uses.
8.	It is unlawful to operate a boat within two hundred feet of a dam or within a buoy line designating the area as such.
9.	It is unlawful to operate a motorized boat in a non-motorized boat area.
10.	The number of personal floatation devices on board must be equivalent to the number of passengers onboard the watercraft as specified by California Boating Law.
11.	At no point shall the number of passengers or cargo aboard a boat, motorboat, personal watercraft or vessel exceed the listed capacity of the boat, motorboat, personal watercraft or vessel as established by the boat, motorboat, personal watercraft or vessel manufacturer.
12.	It is unlawful for any person, except in an emergency, to swim in any area designated as a "no swimming" area, or more than two hundred feet from the shore, or outside the boundaries of a marked swimming area, or to swim in a location, or in such a manner, as to create a hazardous or dangerous condition to the swimmer or any other person.
13.	It is unlawful for any person to shoot any firearms or guns operated by compressed gases or a spring from any boat or across or over any portion of the waters of any lake or reservoir, provided, however, that nothing in this section shall prohibit the shooting of a shotgun from a boat or across a lake or reservoir waters during the lawful waterfowl hunting season for the purpose of killing waterfowl.

Source: Tuolumne County, Ordinance § 8.24.010-8.08.090 in Title VIII, Chapter 8.24 of Boating and Water Skiing.

A summary of the Tuolumne County Ordinance § 8.50 regarding house boating on Don Pedro Reservoir is provided in Table 5.6.3-9 (Tuolumne County 2009) and specific rules and regulations for house boating laid out by the Don Pedro Recreation Agency is outlined in Table 5.6.3-10 (Don Pedro Recreation Agency 2010).

Table 5.6.3-9 Summary of Tuolumne County house boating ordinance at Don Pedro Reservoir.

1.	Discharge of waste from any source into the public waters of the county is prohibited.
2.	No toilet shall be installed in any houseboat except of an approved type as follows: a. sanitary toilets of the betaine type whereby the waste is heat treated for sterilization and disintegration. b. fixed toilets which discharge into a holding tank and are solidly affixed to the houseboat
3.	Toilets shall have a holding tank of at least fifteen gallons and be so constructed that they can only be emptied by pumping.
4.	Holding tanks shall be vented to an elevation higher than the toilet fixture and the ventilation line shall not exceed one-half inch standard pipe size and shall be pumped when needed and the waste deposited in an approved location.
5.	Authorized agents of the county shall periodically inspect the toilet on each houseboat on the public waters of the county. The board of supervisors shall establish a fee for such inspection and a sticker shall be issued for display on the houseboat showing that inspection has been made and approval given.
6.	A houseboat having a toilet which permits waste to be discharged may be permitted upon the public waters of the county when such toilet has been sealed by an authorized agent of the county to render it inoperable. The board of supervisors shall establish a fee for such sealing, and it is unlawful, and a violation of this chapter for any person to willfully break such seal while such houseboat is situate on the public waters of the county.
7.	The provisions of this chapter shall be enforced by the health department.

Source: Tuolumne County, Ordinance § 8.08.010-8.08.090 in Title VIII, Chapter 8.80 of Health and Safety.

Table 5.6.3-10 Summary of house boating rules and at Don Pedro Reservoir.

	General Rules
1.	Houseboats are for recreation purposes only; houseboats cannot be used as a residence.
2.	Houseboat permit holder shall not rent, lease, or assign houseboat to others.
3.	All houseboats must have valid Houseboat Permit from Agency, and permits may not be transferred without the sale or transfer of ownership.
4.	Houseboat Permit Holders must comply with all approved mooring agreements, and may not change their Assigned Concessionaire without prior Agency Approval.
5.	Houseboat Permit Holders must maintain in good standing the Applicable Fees due the Agency and the Assigned Concessionaire.
6.	Houseboat Permit Holders must procure and maintain general liability insurance with limits of not less than $300,000 and shall name DPRA, TID, and MID as additional insured parties on insurance policy. Certificates of insurance shall be provided and remain on file with the Agency at all time.
	Houseboat Permitting Procedures
1.	Houseboat Permits Holders may not own or operate more than one houseboat at Don Pedro Reservoir at one time; special circumstances may be allowed with Agency approval.
2.	No persons who have had a Houseboat Permit revoked or have been subject to non-renewal of Houseboat Permit shall be eligible to apply for a Houseboat permit again.
3.	The Agency may open or close the Houseboat Permit Waiting List at their discretion.
4.	Applicants for Houseboat Permits must submit a written request to the Agency to be added to the Houseboat Permit Waiting List.
5.	Priority on the Houseboat Permit Waiting List will be ranked in order of the date and time each written request is received by the Agency with the oldest receipt date having the highest priority.
6.	Applicant(s) on the Houseboat Permit Waiting List cannot sell, trade, give, assign or otherwise transfer their position to another person or entity.
7.	The Houseboat Registration at the time the Houseboat Permit is issued must include all applicant names as shown on the waiting list.
	Houseboat Repair, Replacement, Construction, and Maintenance
1.	Houseboat Permit Holders must obtain prior authorization from the Agency to use launch ramps for houseboat removal and launch.
2.	All houseboats must pass an Agency inspection prior to launch.
3.	Permitted houseboats must relaunch within five years of removal from Don Pedro Lake.

4.	Only houseboats with valid permits are authorized to use the Blue Oaks Houseboat Repair Yard and must comply with all Repair Yard regulations.
5.	Damaged, destroyed, or inoperable houseboats must be repaired or replaced or loss of Permit may occur, as well as houseboats removed from the Recreation Area(s).
6.	No work or repairs shall take place on the Lake that involves structural alteration or that may result in the introduction of any materials (hazardous or otherwise) into the waters of Don Pedro Lake.
7.	Houseboat Permit Holders, their agents, employees, or contractors are required, at their sole cost and expense, to promptly take all actions to remediate the release of any substance prohibited and to immediately notify the Agency of violation. If failure to do so occurs, the Agency reserves the right to perform the remediation at Houseboat Permit Holder's expense.
8.	All Houseboat Permit Holders are responsible for the proper disposal of hazardous wastes, hazardous substances, pollutants, or contaminants resulting from operation, repair, or maintenance of their houseboat.
9.	Houseboat Permit Holders are responsible for proper disposal and recycling of their houseboat's batteries.
10.	The hiring of any vendors, contractors, or entities other than approved marina concessionaires by Houseboat Permit Holder(s) to perform any work or service within the Recreation Area shall be subject to all applicable Agency regulations, vendor permits, and insurance requirements.
11.	All houseboats shall be maintained in a good and proper state of repair and shall be aesthetically neat in appearance.
12.	Houseboat propulsion systems must be maintained in a safe and operable condition at all times.
13.	All decking and roofs must be protected from weathering or constructed with a suitable weather proofed material.
14.	All newly constructed houseboats and newly constructed houseboat railings must meet Agency railing requirements.
15.	Houseboats shall be equipped with permanently and properly installed operable navigation and anchor lights.
16.	Houseboats shall display all required numbers, letters, names, and stickers.
17.	All mechanical compartments used for propulsion of the houseboat that extend below the water line shall be equipped with an operable bilge pump and an Agency approved bilge absorbent material or filtration system that prevents pollutants from entering the lake when bilge pump is operated.
18.	Flotation Devices including Monohull design flotation shall be fitted with transverse and/or longitudinal watertight bulkheads that provide compartmentalization sufficient to keep the fully loaded vessel afloat with positive stability, with any one main compartment flooded.
19.	When pontoons are used for flotation, no single compartment in a pontoon shall comprise more than 20% of the total available flotation volume.
20.	Flotation devices shall be constructed of metal, wood that has been covered with fiberglass or other materials as approved by the Agency. Barrels and other containers will not be acceptable as Flotation Devices.
21.	The exterior surfaces of all flotation devices shall be watertight and thoroughly protected from rust, corrosion, solvents, and weather.
22.	Flotation devices shall be structurally sound and securely fastened to the main houseboat structure.
23.	All hatch covers leading to storage or mechanical compartments in a houseboat's flotation devices shall be at least weathertight, preferably watertight and mechanically fastened down.
24.	The minimum lower (main) deck height (excluding swim decks) of all houseboats when fully loaded shall not be less than 12 inches above the water line.
25.	All Wastewater shall be delivered into on-board holding tanks which shall be emptied only by pumping into an Agency approved wastewater system.
26.	No wastewater of any type shall at any time be in any way discharged into the lake.
27.	All houseboats shall be provided with a toilet facility and wastewater holding tank.
28.	The wastewater holding tank and connected plumbing shall be constructed and maintained in such a manner that the tank can be emptied only by pump-out equipment.
29.	No drain plugs shall be installed below the bottom of the toilet level.
30.	Any houseboat having a sink, shower, washbasin or other facility must provide plumbing so that all wastewater from these facilities is piped to the holding tank(s) which are constructed of stainless steel, mild steel, aluminum, reinforced fiberglass or wastewater grade reinforced plastic.
31.	Holding tanks shall have a combined minimum total capacity of 100 gallons.

32.	All houseboats must range in size from a minimum of 10 feet wide and 20 feet long to a maximum of 22 feet wide and 56 feet long (all inclusive) and no enclosed structures shall be permitted to extend beyond 15 feet above the waterline.
33.	Out-drives, motor gear, swim decks and all other parts of the houseboat shall remain within these dimensions whenever the houseboat is left unattended and is moored at its assigned mooring location.
34.	All houseboats shall be equipped with a primary mooring device and a secondary safety mooring device; however, houseboats moored in slips at a marina, need not use these devices while moored there.
Rules Enforcement	
1.	The Agency may inspect any houseboat at any time for the purpose of insuring compliance with rules and regulations and applicable laws.
2.	After any order of the Agency or decision of the Houseboat Appeals Board made pursuant to these rules, no person to whom any such order or decision is directed shall fail, neglect, or refuse to obey any such order.
3.	If, after any order or decision made pursuant to these rules, the person(s) to whoever such order or decision is directed shall fail, neglect or refuse to obey such order or decision, the Agency may institute any appropriate action under applicable laws.
4.	The Agency may issue warnings, assess non-compliance fines, seek restitution, issue notice and orders, red tags and any combination thereof and may also revoke or not renew a houseboat permit for violations of applicable laws. Documented warnings may be used as evidence to support further punitive action against Houseboat Permit Holders.
5.	All non-compliance fines, restitution sought, notice and orders and red tags will be directed to the designated Houseboat Permit Holder contact person(s) listed on the completed application for houseboat permit.
6.	The Agency may issue red tags pursuant to these rules which immediately revoke or prohibit renewal of a houseboat permit or immediately prohibit the operation and use of a houseboat.
7.	When a houseboat permit is revoked all paid permit fees shall be forfeited to the Agency and all paid moorage fees shall be forfeited to the assigned marina concessionaire.
8.	Upon revocation or the non-renewal of a houseboat permit, the houseboat owner(s) shall remove the houseboat at their own expense from the Recreation Area within thirty (30) days of the revocation or non-renewal. If the houseboat is not removed, the Agency may dispose of the houseboat pursuant to the Boaters Lien Law, Harbors and Navigation Code Section 500 et seq.
Appeal of Notice and Orders	
1.	A Houseboat Appeals Board has been established by resolution of the Board of Directors of the Turlock Irrigation District and the Board of Directors of the Modesto Irrigation District.
2.	The Appeals Board shall review the history, evidence, actions and decisions of the Agency regarding houseboat permit holder appeals and determine if the Agency has acted in accordance with applicable laws.
3.	Any houseboat permit holder and any person having any record title or legal interest in the houseboat may appeal notice and orders issued for the purpose of Houseboat Permit Revocation or Houseboat Permit Non-Renewal by filing at the office of the Director a written appeal containing a heading in the words: "Before the Houseboat Appeals Board of the Recreation Area"; a caption reading: "Appeal of ___________________," giving the names of all appellants participating in the appeal; a brief statement setting forth the legal interest of each of the appellants in the Houseboat involved in the appeal; a brief statement in ordinary and concise language of the specific order protested, together with all material facts claimed to support the contentions of the appellant; a brief statement in ordinary and concise language of the relief sought, and the reasons why it is claimed the Agency did not act in accordance with applicable laws; the signatures of all parties names as appellants, and their official mailing address; and the verification (by declaration under penalty of perjury) of at least one appellant as to the truth of the matters stated in the appeal.
4.	The appeal shall be filed within twenty-one (21) calendar days from the date of the service of such order.
5.	Failure of any Person to file an appeal in accordance with the provisions of this Section 5 shall constitute a waiver of his right to a hearing and adjudication of the notice and order, or any portion thereof.
6.	The decision of the Appeals Board shall be in writing and shall contain findings of fact, a determination of the issues presented and the effective date of the decision.
7.	A copy of the decision shall be delivered to the appellant personally or mailed to him, postage prepaid, addressed to the address shown on the appeal.
8.	The decision of the Appeals Board becomes final on the effective date of the decision.

Source: DPRA 2010.

Invasive Mussel Monitoring

The DPRA has been working to monitor and disseminate information about mussel species discovered in the southern California waterways (Quagga mussels) and Northern California's San Justo Reservoir (Zebra mussels) by attending workshops on the biology, threats, and spread prevention to Don Pedro Lake as well as by meeting with water recreation managers to approach the issue. DPRA is taking action regarding the potential dangers of invasive muscles through increased public education, vessel inspections, and monitoring. Table 5.6.3-11 outlines the action steps of the DPRA.

Table 5.6.3-11 Action steps taken toward monitoring invasive muscles.

Action Area	Specific steps taken
Public Education	1. Every camping reservation confirmation generated at DPRA will include the Dept. of Fish and Game's "Don't Move a Mussel" flyer with notation that DPRA will be conducting random and spot vessel inspections on site. 2. Verbal communication provided by Agency staff will confirm that the Agency will be doing spot and random inspections. 3. Concessionaire will include the "Don't Move a Mussel" flyer and random and spot vessel inspection notation with their houseboat rental confirmations / orientation packets. 4. The back of every camper's vehicle receipt will have the US Fish and Wildlife "Stop Aquatic Hitchhikers" sticker attached so it faces the vehicle's occupants. 5. Boaters arriving to launch their boat will be questioned at the entrance station about the boat's previous use and will be given the mussel flyer. 6. The "Don't Move a Mussel" flyer will be added to the DPRA web site with notation about DPRA's planned random boat inspections. The Dept. of Fish and Game's Quagga/Zebra Mussel website page will be linked to the DPRA website. 7. Bass tournament organizers will be contacted in advance to confirm that they will be participating in educating the fishermen and to notify them about the chance for spot and random boat inspections. 8. Staff will take every opportunity to educate the public about the Quagga/Zebra Mussel threat from impromptu settings to organized and formal settings.
Vessel Inspections	1. Every boater arriving to launch will be asked a list of pertinent questions relating to when and where the boat was last in the water, and whether or not it has been completely dried out since last use. a. Answers that trigger no concern will allow the boat to be launched. b. An answer that triggers concern will result in further questioning, inspection and possible turning away from the facility. c. Other launch facilities will be contacted regarding the boat that was turned away. 2. Random days will be selected to conduct inspections of all vessels arriving to launch at all three recreation areas at Don Pedro Reservoir. 3. Inspection days will be coordinated so that sufficient resources are in place to inspect while not depleting staff from other DPRA operations. 4. Resources on inspection days will include regular and seasonal DPRA staff, with requested assistance from Dept. of Fish and Game warden/canine teams, DPRA concessionaires, neighboring agencies and volunteers. 5. Vessels not passing inspection will be turned away with a copy of the instructions on how to clean their boat. Documentation of the failure will be filed for future action and inspection.
Monitoring	1. DPRA staff will build monitoring stations to be placed in appropriate locations around the reservoir to monitor for the presence of mussels in the lake. 2. The monitoring stations will be checked and documented monthly.

Source: DPRA Memorandum regarding Quagga/Zebra Mussel Threat Action Plan, May 16, 2008, p. 1-2

Since June 2008, MID has been monitoring for mussels using vertical plates which are inspected every two weeks for signs of mussel infestation. No mussels have been detected since monitoring began. MID has also begun implementation of solutions for mussel growth prevention at its water treatment plant.

5.6.4 Recreation Facilities Downstream of the Project

Downstream of Don Pedro Reservoir, the Tuolumne River continues through farmland in the Central Valley before finally joining with the San Joaquin River. Running near parallel to the Tuolumne River is Dry Creek. Dry Creek is the largest tributary to the lower sections of the Tuolumne River; it begins in the foothills north of La Grange and enters the Tuolumne River in Modesto (McBain & Trush 2000).

The main focus of recreational activity downstream of the Project area takes place at Turlock Lake and Modesto Reservoir, followed by fishing and rafting on the lower Tuolumne.

5.6.4.1 Camping Opportunities

Turlock Lake State Recreation Area (SRA) is located in eastern Stanislaus County, approximately seven miles from Don Pedro Reservoir and houses the only developed camping facilities along the Tuolumne River downstream of the Project area. It is open year-round and features camping, picnicking, fishing, swimming, boating, and water skiing. Bounded on the north by the Tuolumne River and on the south by Turlock Lake, the recreation area provides an ideal setting for water-oriented outdoor activities. Picnicking, day-use, and boat launch ramps are available as well as overnight camping on the south bank of the Tuolumne River (California State Parks 2010).

Turlock Lake SRA has 63 campsites located along the south bank of the lower Tuolumne River. Each campsite has a stove, table and food locker; piped drinking water is also available within one hundred feet of each campsite. Hot showers and restrooms with flush toilets are also available within the campsite area. Although no trailer hookups are available, trailers up to 27 feet can be accommodated in the campsites.

Modesto Reservoir Regional Park is located a few miles east of the town of Waterford off Highway 132. This regional park offers 3,240 acres of land and 2,800 acres of reservoir for recreation and camping. Facilities include approximately 150 full hook-up campsites, undeveloped camping areas, marina, concessions, restrooms, picnic shelter, barbeques, picnic tables, archery range, and radio-control glider airplane field.

Campsites are available on a “first-come first-serve basis.” Recreation opportunities include swimming, fishing, boating, water/jet skiing, bird watching, waterfowl hunting (with permit during specific times of year), archery, and radio-control airplane flying.

5.6.4.2 Whitewater Boating Opportunities

There are no commercial whitewater boating opportunities directly downstream of the Project area. However, the Tuolumne River from La Grange Dam to the San Joaquin River offers many places for recreation enthusiasts to float in kayaks, rafts, and tubes that are Class I-II.

From La Grange down to the Basso Bridge boat ramp, the Tuolumne is scenic and a beginner run. This approximately two-mile section of river is primarily flat, generally wide with numerous small riffles, and even a small ledge drop. Turns are all fairly gradual. From Basso Bridge to Turlock Lake State Park, which is approximately six miles in length, the river alternates between flat wide slow water, and narrow channels that are fast and twisty (American Whitewater 2010). Most people take out at Turlock Lake, as there is limited river access and parking options further downstream. Table 5.6.4-1 outlines the known whitewater boating runs available on the lower Tuolumne River.

Table 5.6.4-1 Known whitewater boating runs on the Tuolumne River downstream of Project area.

Whitewater Run	Length (miles)	Flow Range (cfs)	Optimum Flow Range (cfs)	Whitewater Classification
La Grange Dam to Basso Bridge	2.1	150-1,000	300	I (150-500) I-II (500+)
Basso Bridge to Turlock Lake State Park	6.0	150-1,000	300	I (150-500) I-II (500+)
Basso Bridge to Roberts Ferry Road	8.0	150-1,000	300	I (150-500) I-II (500+)
Turlock Lake State Park to Fox Grove River Access	15.8	150-1,000	300	I (150-500) I-II (500+)

Source: American Whitewater 2009.

5.6.4.3 Fishing Opportunities

The Tuolumne River downstream of the Project area provides fishing opportunities, with special regulations for trout and salmon fishing. From La Grange Dam to the mouth of the San Joaquin River, no trout or salmon may be taken from the Tuolumne. Turlock Lake is stocked with trout, black bass, crappie, bluegill and catfish. Anglers fish from boats on the reservoir or from the shoreline, as well as along the lower Tuolumne River. Table 5.6.4-2 summarizes the fishing regulations on the lower Tuolumne River from La Grange Dam to the mouth of the San Joaquin River.

Table 5.6.4-2 Summary of fishing regulations for Tuolumne River downstream of Project area.

Fish Type	Open Season	Bag Limit	Special Regulations
Tuolumne River			
Trout	1/1 - 10/31	0	Only artificial lures with barbless hooks may be used.
Black Bass	1/1 - 10/31	5	N/A
Striped Bass	1/1 - 10/31	2	Minimum length 18 inches.
Salmon	1/1 -- 10/31	0	Only artificial lures with barbless hooks may be used.
Turlock Lake			
Trout	All year	5	N/A
Black Bass	All year	5	Minimum length 12 inches.
Striped Bass	All year	2	Minimum length 18 inches.
Crappie	All year	25	N/A
Bluegill	All year	25	N/A
Catfish	All year	No limit	N/A

Source: CDFG 2010d.

There is limited developed river and fishing access along the lower Tuolumne River outside of Turlock Lake SRA. The two most common access points are at Basso Bridge and Fox Grove. Basso Bridge is located off Route 132 west of the town of La Grange. Basso Bridge is part of the La Grange Regional Park, and river access is approximately two acres in size. The Regional Park includes a parking lot, restrooms, informal boat launch, gravel beach area for swimming, trails and pathways, barbecues, picnic tables and handicapped access. Fishing is permitted with only barbless hooks, synthetic baits, and tackles. Trout may not be taken and must be released. Basso Bridge Fishing Access is closed from October 16 through December 31 due to the salmon run (Stanislaus County 2010).

Fox Grove is located on the Tuolumne River at Geer Road. The river access is approximately 64 acres in size on 1 mile of river frontage with parking area, restrooms, boat ramp, swimming, barbecues, picnic tables, and handicapped access. Fishing is only permitted with barbless hooks and with synthetic baits and tackles. Trout may not be taken and must be released. Fox Grove Fishing Access is closed from October 16 through December 31 due to the salmon run (Stanislaus County 2010).

5.6.5 Recreation Needs Identified in Management Plans

Management plans that cover recreation resources within the general vicinity of the Project include the California Department of Parks and Recreation's California Outdoor Recreation Plan (CORP), including the Survey on Public Opinions and Attitudes in Outdoor Recreation; the USDOI USFWS Recreational Fisheries Policy; the Tuolumne County General Plan; the BLM Sierra Resource Management Plan; the Tuolumne Wild and Scenic River Management Plan; and the Stanislaus National Forest, Forest Plan Direction. Below is a summary of the recreation needs identified in the management plans applicable to the Project vicinity.

5.6.5.1 California Outdoor Recreation Plan

The 2008 CORP, among other things, identifies and prioritizes outdoor recreation opportunities and constraints most critical in California. The plan lists the following seven major priority areas that comprise the state's strategy for meeting California's outdoor recreation needs:

- Projects that provide opportunities for the top 15 outdoor recreation activities identified in the latent demand scoring in the survey of Public Opinions and Attitudes on Outdoor Recreation in California (see Table 5.6.5-1 below).
- Projects that provide or improve outdoor recreation opportunities in the geographic region.
- Projects that provide outdoor recreation activities for children.
- Projects that provide outdoor recreation opportunities for those underserved communities.
- Projects that support the wetland priorities being pursued by the state's wetland preservation organizations.
- Projects that support the goals of California's Recreation Policy of (a) adequacy of recreation; (b) opportunities; (c) leadership in recreation management; (d) recreation's role in a healthier California; (e) preservation of natural and cultural resources; and (f) accessible recreation experiences.
- Projects that develop the trail corridors identified in the 2002 California Recreational Trails Plan and its scheduled update.

Table 5.6.5-1 California's recreation activities with high latent demand.

Rank	Activity	Rank	Activity
1	Walking for fitness or pleasure	9	Attending outdoor cultural events
2	Camping in developed sites with facilities such as toilets and tables	10	Off-highway vehicle use
3	Bicycling on paved surfaces	11	Driving for pleasure, sightseeing, driving through natural scenery
4	Day hiking on trails	12	Camping at primitive sites
5	Picnicking in picnic areas	13	Swimming in a pool
6	Beach activities	14	Wildlife viewing, bird watching, viewing natural scenery
7	Visiting outdoor nature museums, zoos, gardens or arboretums	15	Outdoor photography
8	Visiting historical or cultural sites		

Source: California State Parks, POAOR in California 2009, p. 36.

5.6.5.2 Survey on Public Opinions and Attitudes in Outdoor Recreation in California 2009

The 2009 Survey on Public Opinions and Attitudes in Outdoor Recreation in California (POAOR), an element of the CORP, identify the following as the top five recreational activities in California with the highest latent demand (Table 5.6.5-1). These are activities that Californians would participate in, from a statewide perspective, if more facilities and opportunities were provided. The summary provides an overview of the results from the adult and youth surveys and also includes a section on Hispanic and regional differences and overall recommendations.

In addition, the 2009 POAOR identified the following types of park and recreation facilities and services as the most important for Californian adults:

1. Play activity areas for tots and young children.
2. Wilderness type areas where no vehicles or development are allowed.
3. Areas and facilities for environmental and outdoor education programs.
4. Multi-use turf areas for field sports such as softball, baseball, soccer, and/or football.
5. Picnic sites for large groups.
6. Trails for multiple, non-motorized activities such as hiking, mountain biking or horseback riding.
7. Hard surface trails for biking, jogging, and fitness walking.

Other relevant findings from the 2009 POAOR survey include a variety of items influencing the choice of favorite outdoor activities (Table 5.6.5-2) and the level of agreement with statements concerning outdoor recreation lands and facilities in California (Table 5.6.5-3).

Table 5.6.5-2 Items that influence choice of favorite outdoor recreation activities.

Rank	Item Influencing Choice of Favorite Outdoor Recreation Activities
1	To have fun
2	To be with family and friends
3	To relax
4	To view the scenic beauty

Source: California State Parks, POAOR in California 2009, p. 59.

Table 5.6.5-3 Level of agreement with statements concerning outdoor recreation lands / facilities.

Percent Agreement	Statement
70%	Recreation facilities, such as picnic or camping sites, are needed at lakes and reservoirs
55%	Recreation areas for camping or overnight use are needed
88%	Recreation programs help improve people's health
82%	Fees collected at each park, wildlife and recreation area should be spent on that area
83%	Rules and regulations in parks and outdoor recreation areas should be enforced
78%	Recreation programs help reduce crime and juvenile delinquency
81%	The availability of parks and recreation areas and facilities attract tourists to California

Source: California State Parks, POAOR in California 2009, p. 61.

5.6.5.3 USFWS Recreational Fisheries Policy

The USFWS maintains a recreational fishery management program. The following goals are pertinent to the Don Pedro Reservoir and Project area:

- Effect the preservation and/or increased productivity of fishery resources.
- Ensure and enhance the quality, quantity, and diversity of recreational fishing opportunities.
- Develop and enhance partnerships between governments and the private sector for conserving and managing recreational fisheries.
- Cooperate to maintain a healthy recreational fisheries industry.

5.6.5.4 Tuolumne County General Plan

The Tuolumne County General Plan (1996) is made up of two categories - the seven mandated elements and an unlimited number of optional elements. The mandatory elements are: Land Use, Circulation, Housing, Conservation and Open Space, Noise, and Safety. Currently, the General Plan encompasses the following sections under optional elements: Cultural Resource, Economic Development, Agricultural, Recreation, Community Identity, Air Quality, and Public Facilities and Services.

The Recreation Element focuses on the needs associated with its visitors and local residents as well as identifying acquisition funding sources and developing and maintaining parks and recreational facilities. Implementation of the Recreation Element revolves around the following seven key goals:

- Provide an adequate supply and equitable distribution of recreation facilities for residents;
- Cooperate with other public agencies and private enterprise to provide park and recreation facilities;
- Further the goals of other General Plan elements in the acquisition and development of lands for recreation facilities and opportunities;
- Address the impacts of new developments on the County's recreational facilities;
- Acquire, manage, and develop recreational lands according to principles which protest private property rights, maximize cost efficiency, promote accessibilities by all residents, advocate safety, and encourage public participation;

- Develop a broad-based financing program with a wide variety of revenue sources which equitably distributes and/or reduces the cost of providing new recreation facilities; and
- Provide for the ongoing acquisition, construction, and maintenance of Recreation Facilities.

5.6.5.5 BLM Sierra Resource Management Plan

The BLM Sierra Resource Management Plan (SRMP) was implemented in February 2008 and is nearly identical to the Sierra Proposed SRMP and Final EIS published June 8, 2007. Detailed management resolutions (i.e., management activities, mitigations, and project design features) for public lands are outlined in the SRMP, and some goals are specific to recreation. Two recreation goals outlined in the SRMP are as follows: (1) ensure the continued availability of outdoor recreational opportunities while protecting other resources and uses; and (2) ensure adequate river flows for boating, fishing, swimming, etc. Additionally, five recreation objectives are also detailed: (1) develop recreation management strategies for large blocks of BLM land in wild and scenic river corridors; (2) develop recreation sites that meet public health and safety standards; (3) mitigate conflicts between competing uses; (4) maintain existing visitor center, campground, trail, and day-use facilities to accepted BLM standards; (5) manage recreation for a remote experience on the wild segments of the North Fork American, Tuolumne, and Merced rivers pursuant to the Wild and Scenic Rivers Act (BLM 2008, pp. 26-27). One supplementary management action outlined by the SRMP is to work with the USFS to update the Tuolumne Wild and Scenic River Plan (BLM 2008, pp. 36).

5.6.5.6 Tuolumne Wild and Scenic River Management Plan

The Stanislaus National Forest Plan (2010) outlines plans for the management of the Wild and Scenic Tuolumne River. The plan states that:

> *…designated Wild and Scenic Rivers, along with immediate environments, will be managed to preserve their free flowing condition and protect their outstandingly remarkable values. To the extent of Forest Service authority, no development of hydroelectric power facilities or other water resource developments would be permitted. Opportunities for public recreation and other resource uses are based on the classification of each identified river segment… This Management Area generally contains those National Forest lands within 1/4 mile on either side of approximately 40 miles of existing Wild and Scenic Rivers and 160 miles of proposed Wild and Scenic Rivers.* (p. 111)

In accordance with the Wild and Scenic Rivers Act, the NPS is preparing a comprehensive management plan for the segments of the Tuolumne River corridor that lie within the boundaries of Yosemite National Park. When concluded, the management plan will direct "future management to protect and enhance the river's outstanding remarkable values, its water quality and free-flowing condition" (NPS Tuolumne Plan, 2010, p. 2). To meet river protection goals, the management plan hopes to do the following:

- Describe the existing resource conditions;
- Define the goals and objectives for protecting river values;
- Address development of lands and facilities;

- Address user capacities;
- Address water quality issues and instream flow requirements;
- Reflect a collaborative approach with all relicensing participants;
- Identify regulatory authorities of other governmental agencies that assist in protecting river values; and
- Include a monitoring strategy to achieve and maintain management objectives.

5.6.5.7 Stanislaus National Forest, Forest Plan Direction

In April 2010, the Forest Plan Direction was put forth by Stanislaus National Forest which presents the current Forest Plan management direction, based on the original Stanislaus National Forest Land and Resource Management Plan (1991) as modified through the Forest Plan amendment process. The Forest Direction Plan provides long-range direction for managing the Stanislaus National Forest as well as informing the public and cooperating agencies about future programs and activities. Management emphasis in many areas of Stanislaus National Forest is placed on providing a natural appearing landscape in a non-motorized setting; the Tuolumne River within Stanislaus National Forest falls under this near natural management setting. Table 5.6.5-4 summarizes the management regulations specific to recreation activities along the Tuolumne River and surrounding areas.

Table 5.6.5-4 Summary of Stanislaus National Forest management regulations specific to recreation activities along the Tuolumne River.

Practices	General Direction	Standards and Guidelines
Dispersed recreation management	Provide dispersed recreation opportunities that blend with the natural environment. Limit commercial outfitter guide and recreation event special use permits to prevent overcrowding.	Develop maps, brochures and publications for visitor use that list dispersed recreation activities. Stress back country manners and no-trace camping.
Closed motor vehicle travel management	Closed to motor vehicle use.	Conduct surveys, observe conditions, and carry out rehabilitation - as needed - to eliminate evidence of, and access by, unauthorized motor vehicle use.
Restricted mountain bicycle management	Make travel compatible with Near Natural areas.	Use restricted access as a means of protection. Close routes, where impacts are unacceptable, to uses causing the damage.
Interpretive services facilities not on interpretive services sites.	Provide informational and educational material at trailheads outside of Near Natural areas.	Develop maps and brochures for visitor use that stress minimum impact and leave-no-trace ethics.

Source: Stanislaus National Forest, Forest Plan Direction 2010, p. 121.

5.7 Aesthetic Resources

This section discusses aesthetic resources associated with the Don Pedro Project. Views of the Project facilities and features can be found in Section 3.0, Project Description. A detailed description of the land use and ownership can be found in Section 5.11, Land Use.

5.7.1 Regional Context

The Project is located in western Tuolumne County on the Tuolumne River. All facilities and lands within the Project Boundary are owned by TID and MID, with the exception of federal lands administered by the BLM. The Project is located about 40 miles east of the City of Modesto and 26 miles northeast of the City of Turlock, both in Stanislaus County. The northern portion of the Project is located along the California State Highway 120/49 corridor and the southern portion of the Project is located along the California State Highway 132 corridor. Both transportation corridors allow for views of the Project. The Project is located in the Sierra foothills region, an area dominated by rolling hills, rural landscapes, native grasslands, and blue oak woodland. The Red Hills ACEC, managed by BLM, is northeast of the Project. Don Pedro Reservoir is a dominant land form of the area.

5.7.2 Aesthetic Resource Management Plans

There are two resource management plans that address aesthetic resources in the immediate vicinity of the Project area.

5.7.2.1 Tuolumne County General Plan - Scenic Resources

The Project is located completely within Tuolumne County. In the 1996 Tuolumne County General Plan, the following scenic resources goal was described for county lands:

> *Conserve the scenic environment and rural character of the County which contribute to the quality of life of the County's residents and encourage tourism and economic development, while acknowledging the private property rights of the individual.*

Under this goal, several policies are presented, including:

- Conserving the natural scenic quality and rural character along designated transportation routes in the County; and
- Conserving scenic resources, landmarks, and the natural landscape.

In addition, an Implementation Program was identified under the scenic resources goal, as follows:

- **Designate Scenic Routes.** Designate the following sections of State Highways which traverse an area of outstanding scenic quality as Scenic Routes and provide for inclusion of any county maintained roads:
  - State Route 49
  - State Route 108
  - State Route 120

State Routes 49 and 120 overlap in the northern portion of the Project.

5.7.2.2 BLM Sierra Resources Management Plan

In all, there are approximately 4,040 acres of federal lands within the Project Boundary. This represents approximately 22 percent of the total lands within the Project Boundary. These federal lands are part of a larger land unit managed by the BLM in accordance with the Sierra Resource Management Plan (SRMP). BLM has indentified the lands within the Project Boundary as Visual Resource Management (VRM) areas in the SRMP.

In the SRMP, the BLM described the following goals for these lands:

- Protect and enhance the scenic and visual integrity of the characteristic landscapes.
- Maintain the existing visual quality of the Lake Don Pedro/Highway 49 viewshed and the Red Hills ACEC.

The SRMP assigns inventory classes to visual resource areas within the Sierra Resource Management Area (SRMA). Management activities are evaluated in light of the adopted VRM class. The VRM classes within and adjacent to the Project are Class I, Class II, and Class III. Table 5.7.2-1 describes the three classes in detail.

Table 5.7.2-1 Visual Resource Management classes in and adjacent to the Project Boundary.

Visual Resource Management Class	Description	Where Found
Class I	To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.	Tuolumne Wild and Scenic River Corridor
Class II	To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.	Red Hills ACEC
Class III	To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.	Lake Don Pedro/Highway 49 view shed and all other BLM areas not specifically identified as having a particular VRM rating

5.7.3 Aesthetic Character within the Project Area

The following section provides a description of the existing visual resources found within the Project, as well as the applicable BLM VRM policy objectives. Views of Project facilities and features are found in Section 3.0, Project Description.

The Project consists of Don Pedro Reservoir, Don Pedro Dam, and Don Pedro powerhouse. Below and in Table 5.7.3-1 are descriptions of the visual character of each facility.

Table 5.7.3-1 Aesthetic character of Project features within the Don Pedro Project

Existing Project Feature	Elevation (feet)	Form of Access	Relationship to Land Form	Predominant Vegetation	Visibility from Surrounding Areas	Relative Number of Viewers	BLM Visual Objectives
Don Pedro Reservoir	830 ft at Full Pool	Bonds Flat Drive Hwy 49/120 and 132	Inundated stream valley	Annual grassland with forbs, blue oak woodland and mixed chaparral	High - on reservoir area and from recreation areas	High from Hwy. 132, and 49. High in recreation areas and boats	Class III
Don Pedro Dam	580 foot height	Bonds Flat Drive	Inundated stream valley	Annual grassland with forbs and blue oak woodland	High visibility from reservoir side.	High from boaters on reservoir	Class III
Don Pedro Powerhouse	Around 250 feet	Bonds Flat Drive	Adjacent to Tuolumne River and Don Pedro Dam	Annual grassland with forbs and blue oak woodland	Low - limited access	Very Low; Difficult to see from public access points	Class III

Don Pedro Reservoir

Don Pedro Reservoir, a man-made lake on the Tuolumne River, has a normal maximum water surface elevation of 830 feet and extends about 24 miles upstream. At the maximum water surface elevation, Don Pedro Reservoir is 12,960 acres with 160 miles of shoreline. The dominant vegetation types are annual grasslands with forbs, mixed chaparral, blue oak woodlands, and scattered gray pine. The reservoir is located within the Sierra Nevada foothills with rolling hills interrupted by steep river valleys accompanied with riparian vegetation. The Don Pedro Recreation Agency manages on- and off-shore recreation areas and charges the public a fee for access. There are three developed on-shore recreation facilities: Moccasin Point, Fleming Meadows, and Blue Oaks. Each of these facilities provides camping, picnicking, and boating access to the reservoir with a boat ramp. Reservoir surface recreation activities include fishing, water skiing, house boating, non-motorized boating, and general boating. All the boating activities generate views of the shoreline and some Project facilities. Major access roads include State Highway 132, State Highway 49, Bonds Flat Drive, and Jacksonville Drive. There are occasional views from these roads of various sections of Don Pedro Reservoir.

Don Pedro Dam

Don Pedro Dam is an earth and rockfill structure with a reinforced-concrete upstream face approximately 580 feet high with a top elevation of 855 feet. The dominant vegetation types in the area are annual grasslands with forbs and scattered oak woodlands. Access to the dam occurs via Bonds Flat Drive. The public may view the dam from the water and shoreline.

Don Pedro Powerhouse

The Don Pedro powerhouse is located at the base of the Don Pedro Dam. The dominant vegetation types are annual grasslands with forbs and scattered oak woodlands. The powerhouse is a semi-outdoor, above-ground concrete powerhouse. Access to the powerhouse is a Project access road located west of Don Pedro Dam off of Bonds Flat Road (which goes over the dam).

5.8 Cultural Resources

This section presents initial information summarizing available research regarding historical and prehistoric cultural resources in the vicinity of the Don Pedro Project. The relicensing of the Project is considered a federal undertaking (36 CFR 800.16[y]) and therefore must comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. Section 106, and its implementing regulations found in 36 CFR 800, requires federal agencies to take into account the effects of their actions on historical properties. To accomplish this, significant cultural resources within the Project's Area of Potential Effects (APE) must be identified, potential Project effects to these resources must be assessed, and options for treating effects on significant sites must be considered. This section, representing the first step of this process, provides the results of data gathering using existing information to identify potential significant cultural resources currently documented within the Project APE. The results of this section suggest that additional research (field and archival) is needed to complete the Section 106 process, with regards to the identification of historical properties.

5.8.1 Nomenclature and Synonymy

Certain terms and concepts used throughout this section warrant definition as follows:

- **Historical Property.** As defined under 36 CFR 800.16, "historical property" refers to any prehistoric or historical district, site, building, structure, object, or TCP included in or eligible for inclusion in the NRHP [36 CFR 800.16(1)].
- **Traditional Cultural Property.** TCPs are:
  - Locations associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world.
  - A rural community, whose organization, buildings and structures, or patterns of land use reflect the cultural traditions valued by its long-term residents.
  - An urban neighborhood that is the traditional home of a particular cultural group, and that reflects its beliefs and practices.
  - 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.
  - Locations where a community has traditionally carried out economic, artistic or other cultural practices important in maintaining its historical identity.

  TCPs can be considered eligible for inclusion in the NRHP when their "association with cultural practices or beliefs of a living community are (a) rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (National Register Bulletin 38 [Parker and King 1998:1]).
- **Cultural Resource.** For the purpose of this document, the term "cultural resource" is used to discuss any prehistoric or historical district, site, building, structure, or object, regardless of its National Register eligibility. Information specific to TCPs is provided in Section 5.10, Tribal Resources.
- **Area of Potential Effects.** 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." Geographic areas within the APE need not be contiguous, but rather reflect one or more locations where Project-related activities may disturb or affect historical properties. Under 36 CFR 800.4(a)(1), the APE must be delineated and documented during the historic properties

identification stage. The APE is ultimately defined by the lead federal agency of the project undertaking in consultation with the State Historic Preservation Officer (SHPO).

- **Data Gathering Area.** For the purpose of this document, the term "Data Gathering Area" refers to the geographic area included in the cultural literature and records searches, as well as for other pre-field efforts used to obtain all pertinent existing, relevant, and reasonably available information. Data gathering areas are generally larger than the APE to allow for flexibility in Project planning, and are not intended to define or infer the location of project boundaries, the APE, or potential field studies. The data gathering area used for this Project includes all lands within the APE plus an additional 0.25-mile buffer beyond.

5.8.2 Area of Potential Effects

For the Don Pedro Project, the APE, as described above, has been initially defined as all lands within the FERC Project Boundary. The APE may be modified after consultation with interested parties if the consultation results in the identification of additional Project-related activities outside the FERC Project Boundary. The APE includes 18,368 acres (28.7 square miles), surrounding the Don Pedro Reservoir in Tuolumne County. The APE falls on private and public lands. The public lands include 4,040 acres of land under the administration of the BLM. The APE is contained within the following U.S.G.S. 7.5-inch Topographic Quadrangles: Sonora, Standard, Chinese Camp, Moccasin, La Grange, and Penon Blanco Peak.

5.8.3 Cultural Context

5.8.3.1 Prehistory and Archaeology

Early work in the Sierra Nevada foothills, where the Project is located, compiled information and produced general cultural overviews (Elasser 1960; Heizer and Elsasser 1953). Later investigation of areas to be impacted by water projects in the foothills produced several regional cultural chronologies (Fitzwater 1962; Moratto 1972; Johnson 1967; Ritter 1970; Fitting et al. 1979; Moratto and Riley 1980). In particular, archaeological investigations for the New Melones Reservoir, located less than 6 miles northwest of the Project area on the Stanislaus River, took place during the 1960s and 1970s. A 10-volume report series issued in the 1980s provided the results of all work. The final volume (Moratto et al. 1988) provided a summary of the prehistory and history of the New Melones study area. Archaeological investigations in the late 1960s for the New Don Pedro Reservoir were more limited and could not be initiated before many of the archaeological sites had already been inundated or damaged (Moratto 1971). Additional archaeological data has been added by excavations on Clarks Flat, about 20 miles north of the Project, near Vallecito as part of the North Fork Stanislaus River Project (Peak and Crew 1990). The chronology presented below is based primarily on the extensive work conducted around the New Melones Reservoir.

Clark Flat Phase (~7,600 BC to 4,500 BC)

Moratto suggests an initial occupation in the New Melones area sometime before 6,000 BC termed the Clarks Flat Phase, characterized by large-stemmed bifaces, a single Great Basin Transverse point (crescent) and large basalt side scrapers (Moratto et al. 1988: 506-508). The evidence of this phase, collected during the New Melones Project, was vague, but later work at CA-CAL-S275 (Peak 1987) and CA-CAL-S342 (Peak and Crew 1990) on Clarks Flat provided many more artifacts of this time period in stratigraphic context. Enough material was recovered to suggest that the Clarks Flat Phase could be divided into early and late periods. The Early Clarks Flat Phase at CA-CAL-S342, beginning at about 7,600 BC or earlier, is characterized by 13 varieties of the Western Stemmed Series points, five varieties of scrapers, notched tools, beaked gravers, discoidals and retouched flakes (Peak and Crew 1990: 227-228). All of these types are still present in the Late Clarks Flat Phase, beginning at least by 4,800 BC, along with four more point types, five more scraper types, and the first appearance of ground-stone artifacts. The temporal separation of the two phases is established by the occurrence in separate soil strata. The cultural difference may indicate in the increase in the length and intensity of site occupation in the later period, rather than a major cultural change.

Stanislaus Phase (~4,500 BC to 3,500 BC)

At about 4,550 BC, there is an introduction of a series of broad-stemmed, concave based projectile points at CA-CAL-S342 that has been designated as the Stanislaus Broad Stemmed type. The temporally diagnostic form at CA-CAL-S342 is a shouldered, expanding stem point with a concave base. Typologically, they generally conform to the Pinto Series as defined by Campbell and Campbell (1935), Rogers (1939), Harrington (1975), Heizer and Clewlow (1969), and Hester and Heizer (1973), but there is enough variation from the norm to justify assigning a different name. A suite of five radiocarbon age determinations indicate an appearance of these Stanislaus Broad Stemmed points at about 4,550 BC and terminal use can be calculated at about 4,250 BC. Other characteristic traits are an intensive use of ground-stone implements, including subrectangular-shaped manos, atlatl weights, net weights, mesh gauges, and the use of steatite for a variety of objects. The period characterized by the presence of this point series has been termed the “Stanislaus Phase” by Peak and Crew (1990: 229-230). Most of the earlier point types persist, as do all of the other types of lithic tools. Other flaked-stone tool types make there first appearance (denticulates, adze-like tools, etc.) and the ground-stone industry includes a greater variety of milling-stone types and the use of steatite objects.

The period between 6,000 and 3,500 BC is poorly represented at the sites investigated in the New Melones Project, but as Moratto points out:

> *At no time during the [project] did paleoenviromental specialists conduct field surveys to inventory the relict ancient landforms paleosols most likely to harbor early and middle Holocene archaeological remains. All of the known cultural materials of such antiquity in the study area were discovered fortuitously, in so far as they occurred below younger, more visible archaeological deposits.* (Moratto et al. 1988: 509)

Texas Charley Phase (~3,500 BC to 2,500 BC)

The earliest well-defined cultural phase at CA-CAL-S286, the site that provided the bulk of the data for the New Melones cultural sequence, is the Texas Charley Phase, circa 3,500 to 2,500 BC. Characteristic artifacts are choppers, large lanceolate bifaces, a contracting-stem biface fragment, scrapers, and possibly manos. There is a lack of midden and a low incidence of artifacts, which impose minimal site use (Moratto et al. 1984: 195). A high portion of the lithic material in this phase is a high-quality chert available at quarriesin the Vallecito area and Moaning Cave. There is a break in the record at CA-CAL-S286 after the Texas Charley Phase and the succeeding phase is known primarily from the other sites in the New Melones area.

Calaveras Phase (~2,500 to 1,000 BC)

The Calaveras Phase tool kit generally corresponds to the Stanislaus Phase, as defined by Peak and Crew (1990), in everything but date. The Calaveras Phase is dated at about 2,500 to 1,000 BC (Moratto et al. 1984: 103). It is tempting to view this as two different names for the same cultural expression, but both phases are quite reliably dated by multiple radiocarbon dates. In addition, the Texas Charley Phase lies between the Stanislaus and Calaveras Phases in time. The Calaveras Phase is marked by the presence of milling stones, manos, scrapers and a wide range of chipped-stone tools, including Humboldt Concave Base, Sierra Side-notched Pinto Sloping Shoulder, Pinto Square Shoulder and Large Lanceolate projectile points. Obsidian debitage occurs in higher proportions than the earlier phases. Finds of "pestle-like objects," that do not appear to have functioned as pestles, are an interesting feature of this phase. There are low quantities of fire-altered rock, charcoal, and artifacts that, again suggest the site use was limited in intensity.

Sierra Phase (~1,000 BC to 500 AD)

The Sierra Phase was found in stratum B at CA-CAL-S286, a buried midden yielding higher quantities of all types of cultural material than the lower strata. Moratto gives dates of about 1,000 BC to AD 500 for this phase (Moratto et al. 1988: 511-513). Ground stone is abundant, and includes milling stones, manos, cobble mortars, and pestles. There are numerous types of chipped-stone tools, including perforators and "double-sided" scrapers. Projectile points that characterize the phase are: Elko Eared; Elko Corner Notched, Sierra Concave Base, Bipoint, Medium Corner Notched, Triangular Contracting Stem, Medium Triangular Contracting Stem, and Sierra Side Notched forms. The maximum intensity of site use at Texas Charley Gulch occurred during this phase. The discovery of a living floor at CA-CAL-S286, the appearance of mortar and pestle technology suitable for exploiting acorns as a major food source and the density of artifact distribution all imply a "…degree of sedentism not evidenced in the older components…" (Moratto et al. 1988: 273). Stable trade relationships to both the east and west are indicated by the presence of a large amount of obsidian traded in, primarily, form the Bodie Hills source, and the use of Haliotis and Olivella beads and ornaments from the coast.

Redbud Phase (~500 AD to 1,300 AD)

The Redbud Phase, from about AD 500 to 1,300 is poorly defined at CA-CAL-S286. In fact, all of the sites in the New Melones Project area that have Sierra Phase components have little or no evidence of occupation in the Redbud Phase. The modest evidence of habitation in this phase found at a few sites in the New Melones Project area suggest a low intensity of use by small, probably mobile populations with no cultural continuity with the preceding phases. The breakdown of trade relationships (obsidian is relatively rare in components of this phase) also suggests a major cultural break. The appearance of Rosegate Series points and "possible" Gunther Barbed points is a hallmark for the introduction of the bow and arrow during this phase. Peak (1973) saw the diminished use of CA-CAL-S347 in this period as a co-occurrence with the expansion of site us at CA-CAL-S276 on Clarks Flat, perhaps due to a larger area at the latter site to accommodate a growing population. However, this does not explain the minimal evidence of the period at most other sites in the vicinity.

Horseshoe Bend Phase (~1,300 AD to 1848 AD)

The Redbud Phase is followed by a period of intensive occupation representing the Horseshoe Bend Phase of circa AD 1300 to 1848. Of 68 excavated sites in the New Melones Project area, 42 included middens, bedrock mortars and other evidence of long-term or repeated occupation dating to the Horseshoe Bend Phase. The analysis indicates:

> *…that late prehistoric times witnessed larger populations, more sedentism, tighter spatial clustering of settlements, and higher levels of both intra- and inter-site organization than in any earlier period.* (Moratto et al. 1988: 517).

Characteristics of this phase include Desert Side Notched, Cottonwood Triangular, and Gunther Barbed projectile point forms, Olivella, Saxidomus and steatite beads and a wide variety of flake tools. The use of mano and milling-stone technology continues beside the common pestle and bedrock mortar-grinding technology. In all respects this material culture is similar to that known from ethnography for the Central Sierra Miwok.

Peoria Bend Phase (~1848 AD to Present)

The post-contact archaeology of the Central Sierra Miwok is reflected in the 33 components of the Peoria Bend Phase identified in the New Melones area. This material reflects generally ephemeral occupation after AD 1848 and the introduction of many items of European manufacture into the material culture. In some cases traditional tools are made using new materials such as Desert Side Notched and Cottonwood Triangular points made on bottle glass. After the initial Gold Rush forced the Miwok out of most of their original territory, the consolidation of mining into a few of the most projective areas after 1852 allowed the Native Americans to filter back into their traditional areas, albeit in much reduced numbers (Hall 1978).

5.8.3.2 Ethnohistory

Ethnographically, the Project area lies within Central Sierra Miwok territory, located in the Sierra Nevada foothills and mountains spanning the upper drainages of the Stanislaus and Tuolumne Rivers. The Central Sierra Miwok group is considered a member of the Eastern Miwok, one of the two major divisions of the Miwokan subgroup of the Utian language family (Levy 1978). The Eastern Miwok peoples belonged to five separate linguistic and cultural groups each of which had distinct language and cultural characteristics (Levy 1978). Anthropologists have categorized the Eastern Miwok into language areas according to geographical location, which consist of (1) the Bay Miwok that occupied the eastern area of the Contra Costa County extending from Walnut Creek eastward to the Sacramento-San Joaquin delta; (2) the Plains Miwok, which inhabited the lower reaches of the Mokelumne and Calaveras river drainages; (3) the Northern Sierra Miwok that occupied foothills and mountains of the Mokelumne and Calaveras river drainages; (4) the Southern Sierra Miwok, which inhabited the foothill and mountain portions of the Merced and Chowchilla drainages; and (5) the Central Sierra Miwok mentioned above (Levy 1978).

These five groups were further designated as three distinct groups based on their phonological history and structural and lexical similarity (Levy 1978). Plains and Bay Miwok are both members of a distinct group, while the other three groups comprise a Sierra Miwok language group (Levy 1978). It has been suggested that Plains Miwok separated from the Sierra Miwok languages around 2,000 years ago (Levy 1978). Lexicostatistical chronology and language classification suggests that ancestral Miwok occupation of the Sierra Nevada and its foothills is probably a much more recent event compared to the central California delta region, since Sierra Miwok internal time depth is estimated at around 800 years (Levy 1978).

The main political unit of the Miwok was the tribelet, which was an independent and sovereign nation that had a defined and bounded territory designating its zone of control over natural resources. Among the Sierra Miwok, tribelets included political lineage localities that made up the permanent settlements with an average population estimate of around 25 persons, as well as several semi-permanent settlements and numerous seasonally occupied campsites that were used at various times throughout the seasonal round of gathering, hunting, and fishing activities (Levy 1978). Ethnographic literature points to the presence of a chief or an assembly house in the community at the capital or principal settlement (Levy 1978). The dominant form of house was a conical structure of bark slabs, supported by posts or frameworks.

The main foci of subsistence were the gathering of wild plant foods, especially acorn, and the hunting of mammals. The Sierra Miwok traveled to higher or lower elevation levels during various seasons of the year to obtain subsistence resources unavailable in the vicinity of their permanent settlements. The inhabitants occupying the Transition Zone forest moved to higher elevations during the summer months in pursuit of deer. Those in the foothill areas would occasionally visit the plains of the central valley to hunt antelope and tule elk, which are unavailable in the mountains. Gathering of plant foods varied seasonally, as greens were gathered in the spring and were used to supplement the diet of acorns stored since the previous fall. Seeds were gathered from May to August. Pine nuts were collected after August, when the land was burned. In the late fall and early winter, acorns were gathered (Levy 1978). Meat consumption was its greatest in the winter months when plant resources were limited to stored foods (Levy 1978).

Technological skills included basket making and production of ground stone items, such as mortars and pestles used in acorn processing. Lithic technology consisted of projectile points, knives, scrapers, and expedient tools like hammer stones and choppers made from various materials, such as chert and obsidian (Levy 1978).

The Eastern Miwok were first contacted by the Spanish in the second part of the eighteenth century in the Sacramento-San Joaquin Valley by explorers (Levy 1978). Since then, dramatic cultural changes developed, including the transformation of previously independent tribelets into unified militias resisting the violence of forced labor, forced missionization, and displacement that was intensified by virulent epidemics and genocide, which killed many thousands of Miwok persons in the first half of the nineteenth century (Levy 1978).

During the 1840s, fur trappers, gold miners, and settlers arrived in droves, creating hostile relations between miners and Sierra Miwok. For a brief time, Southern Sierra Miwok supplied labor for J.D. Savage's gold mining operations in the Big Oak Flat district, but as the number of miners increased, large mining operations were shut down and Miwok participations decreased (Levy 1978). Records indicate that at least 200 Miwok were killed by the miners during the years 1847 to 1860 (Levy 1978).

A policy of confiscation of Indian lands was implemented with the annexation of California by the U.S. (Levy 1978). Although treaties were signed by several members of the tribelets, they were never ratified by the U.S. Senate (Levy 1978). A few groups of Sierra Miwok were removed to the Fresno area but most of the Sierra Miwok population remained in rancherias scattered throughout the Sierra Nevada foothills (Levy 1978). Reliance on wage labor steadily increased and dependence on gathering and hunting diminished throughout the end of the nineteenth century and early twentieth century. Federally recognized Sierra Miwok tribes in the immediate vicinity of the Project area include Chicken Ranch Rancheria of Jamestown, California and Tuolumne Me-wuk Rancheria of Tuolumne, California.

5.8.3.3 History

The first significant European settlement of California began during the Spanish Period (1769 to 1821) when 21 missions and four presidios were established between San Diego and Sonoma. Although located primarily along the coast, the missions dominated the majority of the California region during this period. The purpose of the missions and presidios was to establish Spanish economic, military, political, and religious control over the Alta California territory. This included the forced conversion of the native population to Spanish colonial society and Catholicism, which often consisted of subjugating Indians into a life of servitude to Spanish citizens (Castillo 1978; Cleland 1941).

The Mexican Period (1821 to 1848) began with the success of the Mexican Revolution in 1821, but changes to the mission system were slow to follow. When secularization of the missions occurred in the 1830s, the vast land holdings of the missions in California were divided into large land grants called ranchos. The Mexican government granted ranchos throughout California to Spanish and Hispanic soldiers and settlers (Castillo 1978).

The first Americans in the region were made up of teams of trappers led in 1827 by Jedediah Smith and followed by a party led by Ewing Young in 1829. The Hudson Bay Company also sent a number of trapping expeditions, including one led by Peter Ogden, to California during this period that were successful in procuring beaver furs and antelope skins. In 1844, General John C. Fremont crossed into the Central Valley and returned the following year with Kit Carson and Joseph Walker.

In 1848, the Treaty of Guadalupe Hidalgo ended the Mexican-American War and marked the beginning of the American Period (1848 to present). The discovery of gold the same year initiated the 1849 California Gold Rush, bringing thousands of miners and settlers to California. The Project environs experienced a large influx of miners after 1849 (Moratto 1971:5-13). The mining communities of Chinese Camp and Jacksonville sprang up quickly in the 1850s and mining activities dotted the shores of the Tuolumne River.

The Gold Rush era resulted in increased population and settlements in the San Joaquin Valley since the region was a natural transportation corridor that provided goods for miners. The 1850s was a period of abundant wheat harvests and the spread of open cattle grazing in the valley. Notable among these cattlemen were Henry Miller and Charles Lux, whose ranch covered more than one million acres in the Los Banos area in the 1860s.

The MID and TID were formed in 1887 and are the oldest irrigation districts in California (MID and TID 2010). The two districts were created to provide water for agricultural purposes. Today their service areas total approximately 200,000 acres of orchards, vines, row and forage crops (TID and MID 2010). The original Don Pedro Reservoir and its associated powerhouse were brought online by the Districts in 1923 to improve water availability for agriculture and to bring electrification to this rural area. Today the Districts service power customers in a 1,000-square-mile area. The current Don Pedro Project, which inundated the original dam and impoundment, was the result of the District's partnering with the CCSF to create additional water availability. The planning for this new project began in the 1940s. The Districts received their current federal license for the Project in 1966 from the FPC. Though the CCSF contributed to the construction of the Project, they have no ownership interest. Don Pedro Reservoir is the sixth largest reservoir in California.

The Southern Pacific Railroad was constructed through the San Joaquin Valley in 1872 (Mullaly and Petty 2002). Construction of the Yosemite Short Line Railroad through the Project vicinity began in 1905-1906, but financial trouble quickly put an end to construction before the line was completed. The line was to carry freight and passengers from Jamestown to Yosemite Park. In 1914 an agreement was made between the Sierra Railway Company and the City and County of San Francisco that the newly formed Hetch Hetchy Railroad would be constructed from the Sierra Railway below Jamestown to Groveland, using part of the uncompleted Yosemite Short Line Railroad grade. Construction of the Hetch Hetchy Railroad was completed in 1918.

5.8.4 Data Gathering Methods

Background research was conducted to identify historical properties within the APE. The records search focused on previously recorded cultural resources and previous cultural studies documented within the APE. The area researched included a 0.25-mile buffer around the Project APE to assure adequate coverage. The record search was conducted during July 2010 at the CCIC of the California Historical Resources Information System at California State University, Stanislaus.

The CCIC record search included a review of cultural resources records and site location maps, previously conducted cultural resources investigations, historical USDOI, BLM General Land Office Maps (GLO), the NRHP, the California Register of Historic Resources, the Office of Historic Preservation Historic Property Directory, California State Historic landmarks (1996), California Inventory of Historic Resources (1976), and the Caltrans Bridge Inventory.

The results of the records search with regards to previous cultural resources investigations, previously recorded cultural resources, and historic features identified on historic maps of the area, can be found below. At least one Tuolumne County Historical Landmark (#2-1971; site number P-55-1913), the Feretti homestead, is within 0.25 mile of the Project APE. As well, one California State Historic Landmark (#419; site number P-55-5092), the former location of the town of Jacksonville, is located within the Project APE.

5.8.5 Data Gathering Results

5.8.5.1 Previous Cultural Resources Investigations

The above-described records search identified 43 previous cultural resource investigations within 0.25 mile of the Project APE, of which 18 are within the APE (Table 5.8.5-1). The investigations occurred between the 1960s and 2009, and were conducted prior to a variety of different undertakings, to include proposed 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.

Table 5.8.5-1 Previous studies within 0.25 mile of the Don Pedro APE.

Author/Year	CCIC Report #	Report Name	Within APE (Yes/No)
Allan, J., 2008	6800	Archaeological Survey and Cultural Resources Assessment for the Moccasin Effluent Pond Project in Moccasin, Tuolumne County, California	No
Allan, J., 2008	6973	Archaeological Survey and Assessment for the Moccasin Effluent Pond Project in Moccasin, Tuolumne County, California	No
Balen, B., 1986	3957	Cultural Resource Inventory Report, Bloss Ranch, La Grange, California	Yes
Balen, B.,1983	960	Archeological Reconnaissance Report and Evaluation, California Gold Project, Tuolumne, California	Yes
Barnes, J., 2004	5660	Section 110/640 Acre Inventory Requirement	No
Barnes, J., 2004	5667	Section 106 Review for the Ritts Grazing Lease Renewal, Tuolumne County	No
Barnes, J., 2007	6812	Section 110/640-acre Inventory Requirement, Tuolumne County	Yes
Barnes, J., 2008	6813	TID Test Trenches Land Use Permit	Yes
Barnes, J., 2008	6824	Engler Grazing Lease Renewal	No
Barnes, J., 2009	7096	Section 106 Compliance for the Hope, Gaiser, and Banks Grazing Lease Renewals, Tuolumne County	Yes
Bevill, R., and Nilsson E., 2000	4027	Cultural Resources Inventory of the South Shore Club Development Project Tuolumne and Mariposa Counties, California	No
Bloomfield, A., 1993	2236	Chinese Camp Cultural Resources Inventory	No
California Department of Transportation	3152	Ce-section 106 Checklist/Memo to File	No
Creighton, W., 2002	4849	Documentation of Monuments and Plaques Representing Estanislao Chapter No. 58 E Clampus Vitus	No
Davis-King, S. et al., 1992	1560	Further Cultural-Resources Investigations for the Proposed Clavey River Project (FERC 10081), Eastside Storage Reservoir Survey, Ethnographic Study, Portions of Transmission Line Survey	No
Decker, D., 1986	3874	Additional R/W for Highway 120	No

Author/Year	CCIC Report #	Report Name	Within APE (Yes/No)
Decker, D., 1992	1423	Wallin Mining Plan of Operations	No
Decker, D., 2000	4050	Filiberti Grazing Lease Renewal	Yes
Decker, D., 2002	4732	Fehr Grazing Lease Renewal	No
Decker, D., 2005	5984	Lackey DG Sale	Yes
Decker, D., 2007	6489	Salambo Mine Vehicle Closure	No
Flemming, E., 1965	5369	William S. Smart, Pioneer (Article from The Quarterly, of the Tuolumne Historical Society, Sonora, CA, Vol.4, No. 4, April-June 1965)	No
Francis, C., 2000	4134	Cultural Resources Survey Report of the Lake Don Pedro Moccasin Point Parking Lot and Access Road (Negative)	Yes
Gilbert, C., 1993	2181	5100 Rural Forest Improvement, 5180 Archeology, Archaeological Review of the Bird CFIP	No
Hibbard, C., 2001	4229	State of California, Department of Transportation, District 10, Negative Archaeological Survey Report	No
Isaacs, P., 1983	1147	Historic Resources Survey & Evaluation, California Gold Project	No
Jensen, P. & Jensen, S., 2003	5261	Archaeological Inventory Survey, Bonds Flat Electrical Transmission Line Upgrade Project, c. 11 Miles of Linear Corridor Along an Existing Transmission Line, Stanislaus and Tuolumne Counties, California	No
Jensen, P.M., 2005	5965	Sierra Foothills Residential Subdivision Project, c. 400 acres at Lake Don Pedro, Tuolumne County	Yes
Jones & Stokes., 1986	965	Draft Environmental Impact Report for the South Shore Club at Lake Done Pedro	No
Knutson, 1968	4505	Bright Memories of a Pioneer Family. The Quarterly of the Tuolumne Historical Society, Sonora, California. Vol.7, No.4, April-June 1968.	No
Leach-Palm et al., 2004	5498	Cultural Resources Inventory of Caltrans District 10, Rural Conventional Highways, Volume I: Summary of Methods and Findings	Yes
Leach-Palm et al., 2004	5505	Cultural Resources Inventory of Caltrans District 10, Rural Conventional Highways, Volume II H: Tuolumne County	Yes
Moratto, M., 1971 (editor)	1176	A Study of Prehistory in the Tuolumne Rive Valley, California, Treganza Anthropology Museum Papers, Number 9	Yes
Moratto, M., 1980	3904	New Don Pedro Recreation Agency	Yes
Napton, 1992	1601	Clavey Rive Project (License Application No. 10081) Cultural Resources Reconnaissance of the Proposed 230 KV Transmission Line Corridor Preferred Route, Stanislaus and Tuolumne Counties, CAlifornia	Yes
Napton, L., 1976	1218	Archaeological Survey of the Moccasin Sewage Treatment Facilities	No
Napton, L., 1989	1236	Cultural Resource Investigation of the Moccasin Spillway Addition, Tuolumne County, California	No
Romano, M., Moratto, M., 1992	3702	Cultural Resources Overview and Management Plan, Sonora Mining Corporation, Jamestown Mine	No

Author/Year	CCIC Report #	Report Name	Within APE (Yes/No)
Rosenthal and Meyer, 2004	5501	Cultural Resources Inventory of Caltrans District 10, Rural Conventional Highways, Volume III: Geoarchaeological Study, Landscape Evolution and the Archaeological Record of Central California	Yes
Slaymaker, C., 1971	1371	The Wards Ferry Site: Anglo-Indian Interaction Along the Tuolumne River	Yes
Varner, D., 2006	1322	A Cultural Resource Study for the Don Pedro View Subdivision in Mariposa County, California	Yes
Varner, D., 2006	6174	A Cultural Resource Study for the Don Pedro View Subdivision in Mariposa County, California	No
Werner, R., 1999	3585	Cultural Resources Investigation of the Proposed Jenkins Hill Estates Subdivision near La Grange, Tuolumne County, California	Yes

The previous investigations covered roughly 20 percent of the Project APE, though many of these studies were not completed to current professional standards. One of the largest studies in the Project APE (Moratto 1971) did not include a map of the area surveyed, thus it is unclear exactly what locations within the APE were included in this study. Additionally, the survey methods are not specified in the report for this study, indicating that this investigation likely does not meet current professional standards.

5.8.5.2 Previously Recorded Cultural Resources

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 (Table 5.8.5-2). 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 contain historic-era resources. The prehistoric components typically include flaked stone with and without bedrock milling stations, with both short term and long term occupation sites represented. The historical 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 Central California Information Center, of the 146 sites recorded in the vicinity of the Project APE, only four have been evaluated as eligible for inclusion on the NRHP. The remaining 142 resources remain unevaluated for the NRHP.

5.8.5.3 Potential Historical Resources Identified on Historical Maps

Historical period USGS topographic quadrangles and Government Land Office (GLO) plats were reviewed during the records search to identify locations of potential historical-era sites and features within the Project APE and within 0.25 mile of the Project APE (Table 5.8.5-3). This resulted in the identification of well over 50 locations where unrecorded historical period sites or features may be present within the Project APE. 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.

Table 5.8.5-2 Previously recorded sites within the Don Pedro study area.

Site Number (Primary No. / Trinomial)	CCIC Project No. or Recorder and Year	Description	NRHP Evaluation
Previously Recorded Sites Outside the APE but Within 0.25-Mile of the APE			
P-55	2236	**Multi-Component.** Bedrock milling station in two locations, 19th century pottery, and possible root cellar.	UE
P-55-0110/ CA-TUO-2007H	4050	**Historic.** Segment of the Don Pedro spur of the Sierra Railroad bed and grade, dating to 1924.	UE
P-55-1343/ CA-TUO-0318	1176	**Prehistoric.** Possible village site with bedrock mortars and a stone cup as the only visible remains.	UE
P-55-1884/ CA-TUO-0874	Jackson & Mannion 1970	**Prehistoric.** Lithic scatter with bedrock milling feature, three quartz crystal fragments, one complete quartz crystal, one chert flake, and two chert and obsidian Desert side-notched points.	UE
P-55-1885/ CA-TUO-0878	Jackson & Mannion 1970	**Historic.** Metamorphic unmortared rock foundations and one large semi-square hole.	UE
P-55-1886/ CA-TUO-0876	Jackson & Mannion 1970	**Prehistoric.** Bedrock milling feature with three cups.	UE
P-55-1887/ CA-TUO-0877H	Jackson & Mannion 1970	**Historic.** Great Eagle Magnesite Mine.	UE
P-55-1889/ CA-TUO-0879	Jackson & Mannion 1970	**Prehistoric.** Bedrock milling feature with 2 cups.	UE
P-55-1890/ CA-TUO-0880/H	Jackson & Mannion 1970	**Historic.** Two structures with unmortared rock foundations, black glass whiskey fragment dating between 1860 and 1900, one square nail, and one obsidian flake.	UE
P-55-1891/ CA-TUO-0881	Jackson & Mannion 1970	**Prehistoric.** Bedrock milling feature with five cups.	UE
P-55-1892/ CA-TUO-0882	Jackson & Mannion 1970	**Prehistoric.** Bedrock milling feature.	UE
P-55-1896/ CA-TUO-0886	R. A. Sills 1970	**Prehistoric.** Bedrock milling features with defaced petroglyphs, flake scraper, pestle, and quartz crystal.	UE
P-55-1897/ CA-TUO-0886	R.A. Sills 1970	**Prehistoric.** Rock formation around tree adjacent to house foundation.	UE
P-55-1898/ CA-TUO-0888	R.A. Sills 1970	**Prehistoric.** Bedrock milling features and pressure flakes.	UE
P-55-1899/ CA-TUO-889	R.A. &L.C Sills 1970	**Prehistoric.** Bedrock milling features with 19 cups and with possible associated house pits.	UE
P-55-1900/ CA-TUO-0890	R.A. &L.C Sills 1970	**Prehistoric.** Bedrock milling feature with six mortars, and one chert flake.	UE
P-55-1901/ CA-TUO-0891	R.A. &L.C Sills 1970	**Prehistoric.** Bedrock milling feature near seasonal creek, with pestle in situ and granite fragment.	UE

Site Number (Primary No. / Trinomial)	CCIC Project No. or Recorder and Year	Description	NRHP Evaluation
P-55-1902/ CA-TUO-0892	R.A. &L.C Sills 1970	**Historic.** Habitation site with remains of six large rock house foundations, a standing chimney, and two crockery pieces.	UE
P-55-1903/ CA-TUO-0893H	R.A. &L.C Sills 1970	**Historic.** Habitation site with house rock foundation and rock fence outline. Also found, pieces of glass, partial wooden yoke for draft animals, and remnants of and iron stove.	UE
P-55-1906/ CA-TUO-0896/H	J.Gray & B. Stone 1970	**Prehistoric and Protohistoric.** Bedrock milling feature with choppers, scrapers, pestle, hammerstone, chert flakes. Historic finds included; partial bead, 3-tined fork, two square nails, and human remains.	UE
P-55-1908/ CA-TUO-0898	Dietz & Williams 1970	**Prehistoric.** Two rock shelters and a bedrock milling feature.	UE
P-55-1909/ CA-TUO-0899	Dietz & Williams 1970	**Prehistoric.** Small habitation site with three bedrock outcroppings and seven mortars.	UE
P-55-1910/ CA-TUO-900H	Dietz & Williams 1970	**Historic.** Remnants of several rock walls against hillside, possible remnants of a powder storage shed, and rock-lined irrigation channel.	UE
P-55-1911/ CA-TUO-0901H	Dietz & Williams 1970	**Historic.** Habitation site with stone house foundation.	UE
P-55-0912/ CA-TUO-0902	Dietz & Williams 1970	**Historic.** Small stone house foundation with a surrounding stone irrigation ditch and a L-shaped stone irrigation ditch.	UE
P-55-1913/ CA-TUO-003H (update to 55-5111)	5505	**Historic.** Tuolumne County Historical Landmark #2-1971. Feretti homestead, shrine and spring box. Spring box most likely constructed by master stone mason, Joseph Cavagnaro who built the original shrine on the property in 1884.	UE
P-55-1913/ CA-TUO-0903H	Dietz & Williams 1970	**Historic.** Stone house foundation, semi-circular stone wall, and a stone reservoir or dredge anchor.	UE
P-55-1914/ CA-TUO-0904H	Dietz & Williams 1970	**Historic.** No description available.	UE
P-55-1915/ CA-TUO-0905	Dietz & Williams 1970	**Prehistoric.** Site is presently the Golden Chain Campgrounds. Artifacts found include an obsidian chip, and on Olivella bead.	UE
P-55-1916/ CA-TUO-0906H	Dietz & Williams 1970	**Historic.** Concrete foundations of the Harriman mine.	UE
P-55-1917/ Ca-TUO-0907H	Dietz & Williams 1970	**Historic.** Planted trees and refuse scatter.	UE
P-55-1919/ CA-TUO-0909	L. Wilson 1970	**Prehistoric.** Bedrock milling feature with small midden deposit.	UE
P-55-1918/ CA-TUO-0908	J. & R. Pe´ron 1970	**Historic.** Artesian well with pipe, stacked stone foundations, artificial channel, bottle glass, and round nails.	UE
P-55-3110/ CA-TUO-2137/H	D. Colston 1975	**Historic.** Habitation site with miner’s cabins, tunnel mine with mining equipment nearby.	UE

Site Number (Primary No. / Trinomial)	CCIC Project No. or Recorder and Year	Description	NRHP Evaluation
P-55-3135/ CA-TUO-2162	1601	**Prehistoric.** Lithic scatter with three bedrock milling features, one pestle, one mano, one mano fragment, chert flakes, and one chert scrapper.	UE
P-55-3140/ CA-TUO-2167	1601	**Prehistoric.** Lithic scatter with six bedrock milling stations, two house pit depressions, two pestles, and pestle fragment.	UE
P-55-3141/ CA-TUO-2168H	1601	**Historic.** Habitation site with remnants of three dry-laid rock wall foundations, brown glaze crockery fragments, white china cup fragment, oxidized glass bottle fragments, green glass fragments, square nails, metal stripping, flattened tin cans.	UE
P-55-3142/ CA-TUO-2169	1601	**Prehistoric.** Lithic scatter with on bedrock milling station, and associated pestle.	UE
P-55-3144/ CA-TUO-2171	1601	**Prehistoric.** Bedrock milling station with 11 cups.	UE
P-55-3179/ CA-TUO-2205H	1322	**Historic.** One collapsed adit and associated waste rock containing copper ore suggesting association with a regional copper mining boom between 1863 and 1865.	UE
P-55-3182/ CA-TUO-2208H	1322	**Historic.** Dry laid greenstone rock wall that may have served as a hunting blind.	UE
P-55-3227/ CA-TUO-2253H	1601	**Historic.** Brown Adit: Hetch Hetchy Water and Power tunnel adit sealed with iron doors and cement foundations. Rusted metal pieces of equipment and ceramic insulator part pieces and a metal spindle or reel.	UE
P-55-3299/ CA-TUO-2325	C. Bayer 1980	**Prehistoric.** Bedrock milling station with two cups. Evidence of mining includes rock piles and a grizzley fragment.	UE
P-55-3357/ CA-TUO2383H	960	**Historic.** Concrete and rock foundations, stamp mill foundation, collapsed adit and refuse scatter.	UE
P-55-3358/ CA-TUO-2384H	960	**Historic.** Remnants of the Mazeppa Mine first recorded in 1857. Remnants of a small hydroelectric powerhouse built for the Jumper Mine in 1897.	UE
P-55-3874/ CA-TUO-2890H	1601	**Historic.** Remnants of the Freelance Quartz Mine Patent of April 7, 1910. Twenty-one features noted include; prospect sand pads, roads, trails, banks, adits, and rock retaining walls. Also noted are numerous mine associated artifacts and refuse items.	UE
P-55-3876/ CA-TUO-2892H	1601	**Historic.** Trail that serviced Wards Ferry between 1851 and 1878. Features noted include eight rock walls, in which two are utility pole stubs and one a trail spur. Artifacts noted include remnants of a model “T” Ford truck and iron tire (tread) for a horse-drawn buggy.	UE
P-55-3877/ CA-TUO-2893H	1601	**Historic.** Part of the first mile of the Wards Ferry Roadbed constructed by the Ah Gun Co. in 1875. Features noted include; a stone, concrete, and vehicle bridge, rock retaining walls, and steel culverts.	UE
P-55-5222	3585	**Historic.** Trash scatter, and mining prospect and tailings.	UE
P-55-5226	3585	**Historic.** Placer mining area.	UE
P-55-5227	3585	**Historic.** Prospect pit.	UE
P-55-5228	3585	**Historic.** Rock pile.	UE

Site Number (Primary No. / Trinomial)	CCIC Project No. or Recorder and Year	Description	NRHP Evaluation
P-55-5231	3585	**Historic.** Ranch road that may coincide with the Salambo-French Bar Road depicted on the GLO plat.	UE
P-55-5232	3585	**Historic.** Prospect pit.	UE
P-55-5233	3585	**Historic.** Prospect pit.	UE
P-55-5234	3585	**Historic.** Tow prospect pits.	UE
P-55-5235	3585	**Historic.** Prospect pit.	UE
P-55-5236	3585	**Historic.** Prospect pit.	UE
P-55-5237	3585	**Historic.** Prospect pit.	UE
P-55-5238	3585	**Historic.** Prospect pit.	UE
P-55-5239	3585	**Historic.** Prospect pit.	UE
P-55-5969/ CA-TUO-4291	3957 /965	**Prehistoric.** Lithic scatter with bedrock milling station with 10 cups, pestle, a basalt core fragment , and two basalt flakes.	UE
	4027	**Prehistoric.** ***Update.*** Lithic scatter with bedrock milling station with 10 cups, 3 basalt flakes, two cores, and basalt tool stone.	UE
P-55-5972	3957 / 965	**Historic.** Collapsed stone structure, cast-iron stove piece, and two bedsprings.	UE
P-55-6001/ CA-TUO-4284H	4027	**Historic.** Rock wall segment.	UE
P-55-6004/ CA-TUO-4289H	4027	**Multi-component.** Lithic scatter with bedrock milling station with two cups. Historical excavated mining test pit or "glory hole" and associated rock stack.	UE
P-55-6017	4732	**Historic.** Tow habitation sites with refuse scatter, and an area of placer mine diggings.	UE
P-55-6021	4732/4050	**Multi-component.** Cabin site dating to 1930's with concrete walled basement, concrete troughs, well, and footings. Cabin site associated with owners John and Freda Turner who operated "Turner's Taco House" from approx 1954-1970. Prehistoric lithic scatter of greenstone interior flakes.	UE
P-55-6026	4732	**Historic.** Remnants of rock-fill dam and spillway.	UE
P-55-6941	5505	**Prehistoric.** *Isolate*. CCS core tool grey-green in color.	UE
P-55-6947	5505	**Historic.** Mining remains with tailings, rock wall, and rectangular stone enclosure	UE
P-55-6948	5505	**Prehistoric.** Bedrock milling area with two stations and 5 cups.	UE
P-55-6976	5505	**Historic.** Square pit surrounded on one side by a stone retaining wall. Artifacts include; square oil cans, and a metal trough.	UE
P-55-6977	5505	**Historic.** Refuse scatter, and ditch.	UE
P-55-6978	5505	**Historic.** Rock structure, pad, and refuse scatter.	UE
P-55-7293	C. Bayer 1979	**Historic.** Large rock pile containing broken glass and Chinese pottery, possibly a Chinese burial.	UE
	D.Decker 1990	**Historic.** Site revisited in 1990, with updated location map. Also observed; sherds of non-Chinese ceramic, and one white quartz flake and one white chalcedony flake.	UE

Site Number (Primary No. / Trinomial)	CCIC Project No. or Recorder and Year	Description	NRHP Evaluation
P-55-7353/ CA-TUO-4795H	C.M. Francis & J. Vittands, 2005	**Historic.** Segment of Don Pedro Spur, Sierra Railway railbed dating from 1921-1923.	UE
	C.M. Francis & J. Vittands, 2007	**Historic.** Northern end of segment recorded in 2007.	UE
P-55-7490/ CA-TUO-4872	K.Jones &L. Holm & K.Killackey 2006	**Prehistoric.** Dense lithic scatter with green chert quarry near green chert rock outcrop.	UE
P-55-7491/ CA	K.Jones &L. Holm & K.Killackey 2006	**Historic.** *Isolate.* Rusted metal can.	UE
P-55-7492	K.Jones &L. Holm & K.Killackey 2006	**Prehistoric.** *Isolate.* Dark gray-brown basalt flake.	UE
P-55-7535	Barnes J. 2005	**Historic.** Mining site and cabin.	UE
P-55-7553	L.Thorpe & M. Darcangelo 2006	**Historic.** Placer mine with retaining walls.	UE
P-55-7708	6489	**Historic.** Salambo (Washington) Copper Mine.	UE
P-55-7709	6489	**Historic.** Town of Salambo or Salambo Flat. Dating to 1800's.	UE
P-55-7861	6812	**Historic.** 1930's era mining site with tailings, possible adits, trails, and refuse scatter.	UE
P-55-7880/ CA-TUO-5058H	D.Decker 1990	**Historic.** Refuse scatter with historic bottle glass and Chinese ceramic sherds.	UE
Previously Recorded Sites Within the APE			
P-55-1329/ CA-TUO-0304H	1176	**Historic.** Remains of natural stone and cement mortared wall in creek bed.	UE
P-55-1330/ CA-TUO-0305H	1176	**Historic.** Unmortared cobblestone wall, ruined.	UE
P-55-1331/ CA-TUO-0306	1176	**Prehistoric.** Bedrock mortar site with 11 BRM's near edge of creek.	UE
P-55-1345/ CA-TUO-0320	1176	**Prehistoric.** Two kilns constructed of stacked flat sedimentary rock.	UE
P-55-1344/ CA-TUO-0319	1176	**Prehistoric.** Two groups of mortars on each side of seasonal creek. One group consists of seven cups, and the other contains one.	UE
P-55-1346/ CA-TUO-0321H	1176	**Historic.** Small building made of stacked stone.	UE
P-55-1347/ CA-TUO-0322H	1176	**Historic.** Historic mine shaft and associated foundations.	UE

Site Number (Primary No. / Trinomial)	CCIC Project No. or Recorder and Year	Description	NRHP Evaluation
P-55-1348/ CA-TUO-323	W. Henn 1970	**Prehistoric.** Bedrock milling station.	UE
P-55-1349/ CA-TUO-324H	W. Henn 1970	**Historic.** Rock foundation.	UE
P-55-1350/ CA-TUO-325H	W. Henn 1970	**Historic.** House foundation, mine shaft and associated rock foundation.	UE
P-55-1351/ CA-TUO-0326	1176	**Prehistoric.** Small campsite with two bedrock mortar outcrops containing 3 BRM's.	UE
P-55-1352/ CA-TUO-0327	1176	**Multi-component.** Lithic scatter with stone foundation, one projectile point and several flakes.	UE
P-55-1353/ CA-TUO-0328	1176	**Prehistoric.** Lithic scatter with one obsidian point fragment and several pressure flakes.	E
P-55-1354/ CA-TUO-0329	1176	**Prehistoric.** Lithic scatter with bedrock milling station containing 14 cups.	E
P-55-1355/ CA-TUO-0330	1176	**Prehistoric.** Bedrock milling feature with two stations and 10 cups.	E
P-55-1356/ CA-TUO-0331	1176	**Prehistoric.** Lithic scatter with bedrock milling feature, chert and quartzite flakes, several core tools, and human remains.	UE
P-55-1357/ CA-TUO-0332	1176	**Prehistoric.** Bedrock milling feature with two stations, one containing seventeen cups.	UE
P-55-1358/ CA-TUO-334H	1176	**Historic.** Remains of historic cabin and stacked stone structure.	UE
P-55-1359/ CA-TUO-335H	1176	**Historic.** Remains of stacked stone foundation and mine shaft with wooden door.	UE
P-55-1360 / CA-TUO-336H	1176	**Historic.** Gravestone of Hannah G. Connor. 1861	UE
P-55-1361/ CA-TUO-338/H	L.Scott 1970	**Prehistoric.** Remains of midden site.	UE
P-55-1362 / CA-TUO-0339	F.A. Ridell 1970	**Prehistoric.** Lithic scatter including, bedrock mortar stations with 24 cups, one tivella tube 2 spire-ground bead, one rectangular olivella, two lipped olivella beads, a small bifacial mano, a small pestle, and human remains.	UE
P-55-1363/ CA-TUO-0340	F.A. Ridell 1970	**Prehistoric.** Lithic scatter with scraper tools, mortars, and evidence of fire and cave dwellings.	UE
P-55-1364/ CA-TUO-0341	F.A. Ridell 1970	**Prehistoric.** Lithic scatter with four bedrock milling features, a cobble pestle, and an obsidian projectile point fragment.	UE
P-55-1365/ CA-TUO-0342	F.A. Ridell 1970	**Prehistoric.** Village site with possible burial ground**.** Lithic scatter with one obsidian point fragment, one Desert side-notched obsidian point, two Olivella disc beads, obsidian flakes, and human remains.	E

Site Number (Primary No. / Trinomial)	CCIC Project No. or Recorder and Year	Description	NRHP Evaluation
P-55-1366/ CA-TUO-0343	F.A. Ridell 1970	**Prehistoric.** Possible village site. Lithic scatter with leaf-shaped obsidian points with basal notch, and mano fragments.	UE
P-55-1368/ CA-Tuo-0345	F.A. Ridell 1970	**Prehistoric.** Lithic scatter with two bedrock milling stations, cobble pestles, pressure flakes, and a hammerstone fragment.	UE
P-55-1384/ CA-TUO-0361	F.A. Ridell 1970	**Prehistoric.** Bedrock mortar station with 17 cups noted.	UE
P-55-1879/ CA-TUO-0869H	Mannion & Jackson 1970	**Historic.** Eagle-Shawmut Mill, gold ore mille active (?) dating to ca. 1942.	UE
P-55-1880/ CA-TUO-870/H	Jackson & Mannion 1970	**Prehistoric.** Bedrock milling station with one bedrock mortar.	UE
P-55-1881/ CA-TUO-0871	Jackson & Mannion 1970	**Historic.** Refuse scatter / historic dump. 875 meters to the SSE of the Eagle-Shawmut Mill.	UE
P-155-1882/ CA-TUO-0872	Jackson & Mannion 1970	**Prehistoric.** Remains of a small midden deposit.	UE
P-55-1883/ CA-TUO-0873	Jackson & Mannion 1970	**Prehistoric.** Large midden site with chert and obsidian debitage.	UE
P-55-1920/ CA-TUO-1910	L. Wilson 1970	**Prehistoric.** Habitation site on mound with two probable house pits, midden and basalt flakes.	UE
P-55-1921/ CA-TUO-0911	S. Wilson 1970	**Multi-Component.** Lithic scatter with small amount of midden, chert flakes, obsidian point fragment. Historic dump consisting of; coffee pot, barbed wire and fence posts, springs, boards, broken glass, and possible buggy riggings.	UE
P-55-1922 CA-TUO-0912H	L. Wilson 1970	**Historic.** Remnants of stone and mortar foundation and refuse scatter.	UE
P-55-1923/ CA-TUO-0913	L. & S. Wilson 1970	**Historic.** Habitation site with one and maybe two house pits.	UE
P-55-1924 / CA-TUO-0914	F.A. Ridell 1970	**Prehistoric.** Small village site with bedrock milling features, cobble pestle, ten mortar pits, and a human tooth.	UE
P-55-1926/ CA-TUO-1916	F.A. Ridell 1970	**Prehistoric.** Small village site with bedrock milling feature with five pits.	UE
P-55-1925/ CA-TUO-0915	L. Wilson 1970	**Prehistoric.** Bedrock milling station with 14 mortars	UE
P-55-1927/ CA-TUO-0917	F.A. Ridell 1970	**Prehistoric.** Small village site with bedrock mortars, and elongated cobble pestle, and pressure flakes.	UE
P-55-1928/ CA-TUOU-0918H	F.A. Ridell 1970	**Prehistoric.** Small village site near P-55-1927 with broken mortar bowls.	UE
P-55-1929/ CA-TUO-0919	C. Waltz 1970	**Prehistoric.** Bedrock milling station with nine cups, now inundated.	UE

Site Number (Primary No. / Trinomial)	CCIC Project No. or Recorder and Year	Description	NRHP Evaluation
P-55-1930/ CA-TUO-0920	H. Waltz 1970	**Prehistoric.** Bedrock milling station with six cups, inundated.	UE
P-55-1931/ CA-TUO-0921	Jackson & Mannion 1970	**Prehistoric.** Single bedrock mortar.	UE
P-55-2994/ P-39-4860	E. Schultz & A. Vanderslice, Carey&Co. 2007	**Historic.** San Joaquin pipelines No. 1&2.Water conveyance system. Part of San Francisco Water System Development dating between 1932 and 1953 and the Hetch Hetchy system.	UE
P-55-3175/ CA-TUO-2201H	1322	**Historic.** Small mortared rock dam across Hatch Creek most likely dating to before 1876.	UE
P-55-3176/ CA-TUO-2202H	1322	**Historic.** Roadbed with one section of dry laid native rock wall, sanitary cans, an iron pail fragment, and other unidentified iron container fragments.	UE
P-55-3913/ CA-TUO-2928H	1601	**Historic.** Portion of the Red Mountain Bar Siphon dating to 1923 built in conjunction with the City and County of San Francisco and the Hetch Hetchy water supply project.	UE
P-55-5092	Unknown	**Historic.** Survey of Jacksonville SHL #419.	UE
P-55-5223	3585	**Historic.** Placer mining area.	UE
P-55-5225	3585	**Historic.** Unknown trench extending from and intermittent drainage.	UE
P-55-6946	5505	**Historic.** Chinese Camp to Jacksonville road segment with associated retaining walls dating to the late 1840's.	UE
	5505	**Historic.** ***Update*** Site revisited in 2004. Prospect pit identified.	UE
P-55-7975/ CA-5128	7096	**Prehistoric.** Bedrock milling station with multiple mortar cups, and pestles/handstones.	UE
CA-TUO-16	1176	**No site form.**	UE
CA-TUO-258(?)	1176	**Prehistoric - No site form.** Only information available is that the site includes midden deposits and a bedrock milling station.	UE
CA-TUO-260(?)	1176	**No site form.**	UE
CA-TUO-261(?)	1176	**No site form.**	UE
CA-TUO-333(?)	Unknown	**No site form.**	UE
CA-TUO-346(?)	Unknown	**No site form.**	UE
CA-TUO-347(?)	Unknown	**No site form.**	UE

Table 5.8.5-3 Potential historic resources identified within the APE and 0.25-mile Project study area.

Map Date	Legal Description/ Map Source	Potential Historic-Era Cultural Resources		No. of Potential Features within the APE[1]
		Within the APE	Within 0.25 Mile of the APE	
1867	T2S/R14E GLO plat	“Road from Knight’s Ferry to Don Pedro’s Bar.”	“Road from Knight’s Ferry to Don Pedro’s Bar” and one unnamed road.	1
1867	T3S/R14E GLO plat	Agricultural field.	“Road to Knight’s Ferry” and one agricultural field.	1
1870	T1S/R14E GLO plat	“Eagle Quartz Mill;” “Vineyard;” town of “Jacksonville;” two unnamed roads; one “Trail; one “House;” one “Vineyard;” and three mineral claims.	“Jacksonville and Sonora Road;” three mineral claims; “Shaft of Eagle Mine;” “Tunnel;” “Shaw mill;” “Barn [or ranch; illegible];” “Eagle Quartz Mill;” “Vineyard;” the town of “Jacksonville;” three unnamed roads; “Village of Salvada;” “trail;” “local attraction;” six “ditches;” a “house;” a “barn;” and “garden.”	11
1875	T2S/R14E GLO plat	Two unnamed roads; “Donahu’s field;” “Finch’s field;” “Lagrange Ditch;” “Road to Coulterville;” three or four illegible features; “Road from Crawford’s Ranch;” two unnamed roads; one “House.”	“Morgan’s Bar Road;” “Middleton’s Field;” “Donahu’s field;” “Finch’s field;” “Lagrange Ditch;” “Road to Coulterville;” three or four illegible features; “Road from Crawford’s Ranch;” two unnamed roads; a “House;” “Shaffer Chrome Iron Mine;” three unnamed roads.	13 to 14
1877	T2S/R15E GLO plat	One unnamed road and the “Lagrange Ditch.”	“Morgan’s Bar Road;” “Lagrange Ditch;” “Orchard, Vineyard, Scholfield’s barn, house;” “Greanfield;” two unnamed roads; “Balambo and French Bar Road;” “Town of Salambo (deserted);” and “old mining shaft”.	2
1877	T3S/R15E GLO plat	“Mrs. Young’s House” and “Coulterville & Mercede City Road.”	“Mrs. Young’s House” and “Coulterville & Mercede City Road”	2
1880	T1S/R15E GLO plat	“Road from Sonora to Big Oak Flat;” “Road to Big Oak Flat;” two mining claims; “Orchard;” and “field.”	“Road from Sonora to Big Oak Flat;” “Road to Big Oak Flat;” two mining claims; an “Orchard;” and a “field.”	6
1897	Sonora, CA 1:125,000 Topographic Quad.	11-12 unnamed roads; 3-4 unnamed buildings; the “Ward Ferry;” “Jacksonville[5 buildings];” “Moffat Bridge;” “Red Mountain Bar;” and “Don Pedro Bar.”	11-12 unnamed roads; 3-4 unnamed buildings; the “Ward Ferry;” “Jacksonville[5 buildings];” “Moffat Bridge;” “Red Mountain Bar;” and “Don Pedro Bar”.	19 to 21
1907	T1N/R14E GLO plat	No features.	No features.	0
1907	T1N/R15E GLO plat	No features.	No features.	0
1907	T1N/R15E GLO plat	No features.	No features.	0
1907	T1N/R15E GLO plat	No features.	No features.	0
1907	T1N/R16E GLO plat	No features.	One mining claim.	0
1907	T1N/R16E GLO plat	No features.	“Lot 37, Pine Nut Quartz Claim.”	0
1907	T1N/R16E GLO plat	No features.	“Lot 37 [a mining claim].”	0

Map Date	Legal Description/ Map Source	Potential Historic-Era Cultural Resources		No. of Potential Features within the APE[1]
		Within the APE	Within 0.25 Mile of the APE	
1907	Official Map of Tuolumne County, 1 inch = 1 mile	Town of "Shawmut;" 30-40 mineral claims; "Yosemite Short Line Railroad[the portion east of Jacksonville says under construction];" the town of "Jacksonville;" "Moffat Bridge (disused);" "Ward Ferry;" "Red Mountain Bar;" "Indian Bar;" "Don Pedro Bar;" "Stephen Bar Bridge;" and a "Hydraulic Ditch." (this map also appears to note land ownership)	Town of "Shawmut;" 30-40 mineral claims; "Yosemite Short Line Railroad[the portion east of Jacksonville says under construction];" the town of "Jacksonville;" "Moffat Bridge (disused);" "Ward Ferry;" "Red Mountain Bar;" "Indian Bar;" "Don Pedro Bar;" "Stephen Bar Bridge;" the town of "Solambo;" and a "Hydraulic Ditch." (this map also appears to note land ownership)	
	40 to 50			
1908	T1N/R16E GLO plat	No features.	"Lot 37 [a mining claim]."	0
1908	T1N/R16E GLO plat	No features.	"Lot 37 [a mining claim]."	0
1913	T1S/R15E GLO plat	No features.	"4528 [Mineral Survey 4528, the Free Lance Extension No. 4 Lode]."	0
1928	T1S/R15E GLO plat	Four fence lines and a "County Road."	Seven fencelines; a "County Road;" the "Hetch - Hetchy RR[railroad];" and four mining claims - the "Rough and Ready Q. M. [quartz mine?] Sur. No. 4112A;" the "Union Q. M. Sur. No. 4255A;" the "Union M. S. [mineral survey?] Sur. No. 4255B;" and the "Rough and Ready [illegible] Sur. No. 4112B 9.57."	5
1948	Chinese Camp, CA 7.5' Topographic Quad.	Mine "Tailings;" 11 unnamed roads; 12 unnamed buildings; one adit; seven prospects; the "Mammoth Mine [one prospect];" "Orcutt Mine[two prospects];" "Republican Mine[one prospect, two adits, and one building];" the town of "Jacksonville[17 buildings];" "Hetch Hetchy Railroad;" "Hetch Hetchy Aqueduct;" one utility line; "Red Mountain Bar Siphon;" the "Eagle Shawmut Mill;" and State Routes 49/120.	13 unnamed roads; "Tarantula Mine[one adit];" 12 unnamed buildings; one adit; "Eagle-Shawmut Mill;" "Eagle-Shawmut Mine[one shaft];" one shaft; State Routes 49 and 120; eight prospects; mine "tailings;" "Mammoth Mine[one prospect];" "Orcutt Mine[two prospects];" "Republican Mine[one prospect, two adits, one building];" "Jacksonville[17 buildings];" "Hetch Hetchy Railroad;" "Hetch Hetchy Aqueduct;" one utility line; and "Red Mountain Bar Siphon."	42
1948	Sonora, CA 15' Topographic Quad.	A "Mill;" 31 unnamed buildings; 13 unnamed roads; eight prospects; "Mammoth Mine[one prospect];" "Orcutt Mine[two prospects];" "Republican Mine[one adit];" 11 adits; the town of "Jacksonville[19 buildings];" "Clio Mine[two shafts, three adits, one prospect, one building];" one "Gaging Station;" the "Hetch Hetchy Railroad;" "Harriman Mine[two shafts];" "Ponderosa Way;" "Wards Ferry Bridge;" "Red Mountain Bar Siphon;" one utility line; and the "Hetch Hetchy Aqueduct."	13 adits; four prospects; State Routes 49 and 120; 41 unnamed buildings; 18 unnamed roads; "Eagle Shawmut Mine[two shafts];" one "Mill;" "Mammoth Mine[one prospect];" "Orcutt Mine[two prospects];" "Republican Mine[one adit];" six prospects; two adits; "Jacksonville[19 buildings];" "Clio Mine[two shafts, three adits, one prospect, one building];" one "Gaging Station;" "Hetch Hetchy Railroad;" "Ponderosa Way;" "Wards Ferry Bridge;" "Harriman Mine[two shafts];" "Red Mountain Bar Siphon;" one utility line; "Hetch Hetchy Aqueduct;" and "Brown Adit."	77

Map Date	Legal Description/ Map Source	Potential Historic-Era Cultural Resources		No. of Potential Features within the APE[1]
		Within the APE	Within 0.25 Mile of the APE	
1948	Standard, CA 7.5' Topographic Quad.	"Ponderosa Way" and "Wards Ferry Bridge."	"Ponderosa Way" and "Wards Ferry Bridge."	2
1949	Sonora, CA 7.5' Topographic Quad.	No features.	One unnamed road; three unnamed buildings; one prospect; two adits; State Route 49.	0
1959	Moccasin, CA 1:25,000 Topographic Quad.	Nine unnamed roads; 23 unnamed buildings; eight adits; State Routes 49 and 120; a "Gaging Station;" "Hetch Hetchy Railroad;" the town of "Jacksonville[includes two of the unnamed buildings];" "Harriman Mine[two shafts];" and one utility line.	15 unnamed roads; 10 adits; 27 unnamed buildings; the town of "Jacksonville[includes two of the unnamed buildings];" State Routes 49 and 120; "Gaging Station;" "Hetch Hetchy Railroad;" one prospect; "Clio Mine[two shafts, one prospect, four adits];" "Harriman Mine[two shafts];" "Brown Adit;" and one utility line.	46
1959	Standard, CA 1:25,000 Topographic Quad.	"Ponderosa Way" and "Wards Ferry Bridge."	"Ponderosa Way" and "Wards Ferry Bridge."	2
1962	La Grange, CA 7.5' Topographic Quad.	Nine unnamed roads; "Graves;" "Fourtynine Mine[one shaft];" "Don Pedro Dam;" "Corner School;" two "Gaging Stations;" a "Powerhouse;" a "Substation;" three utility lines; "Don Pedro Camp[21 buildings];" a "Radio Station;" "Don Pedro Road;" and one unnamed building,	Eleven unnamed roads; "Graves;" "Fourtynine Mine[one shaft];" "Don Pedro Dam;" "Corner School;" two "Gaging Stations;" a "Powerhouse;" a "Substation;" three utility lines; "Don Pedro Camp[21 buildings];" a "Radio Station;" "Don Pedro Road;" and one unnamed building.	24
1962	Merced Falls, CA 15' Topographic Quad.	State Route 132; 16 unnamed roads; two "Graves"; two unnamed buildings; "Don Pedro Road;" three utility lines; two "Gaging Stations;" a "Substation;" a "Radio Facility;" "Don Pedro Dam;" "Corner School;" and "Don Pedro Camp[16 buildings]."	State Route 132; 26 unnamed roads; "Solambo Mine[two shafts, one prospect];" two "Graves;" one prospect; three unnamed buildings; "Fourtynine Mine[one shaft];" two "Radio Facilities;" "Don Pedro Road;" three utility lines; two "Gaging Stations;" a "Substation;" the "Don Pedro Dam;" "Corners School;" and "Don Pedro Camp[16 buildings]."	32
1962	Penon Blanco Peak, CA 7.5' Topographic Quad.	Six unnamed roads; two unnamed buildings; a grave; and State Route 132.	Nine unnamed roads; three unnamed buildings; three mineral prospects; one "Grave;" the "Solambo Mine [three shafts];" and State Route 132.	10

[1] Please note that many of the maps identify the same features, such as the Hetch Hetchy Railroad, which is identified on four of the maps.

Historical 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 always translatable to the past and plots cannot be taken as exact. Because of the disparity between historical-period maps and modern maps, it is not known if physical attributes associated with the potential sites and features are accessible, or if the remains are actually within the APE. As well, the presence of cultural features on an historical map does not confirm that the features still exist. Many historical features, such as town sites, mines, roads, etc., often have continued use into present times that may obliterate any historical remains. As well, historical features can also disappear over time through natural erosion or other weathering processes. Based on the inventory of previously recorded cultural resources in the APE and the 0.25-mile study area, it appears that many of the historical features identified on the historical maps of the Project area have not been formally recorded as archaeological sites.

5.9 Socioeconomic Resources of the Project Area

This section discusses the socioeconomic resources associated with the Don Pedro Project. Socioeconomic benefits of the Project extend to water users in the immediate Project area, in the respective areas served by each of the irrigation districts, and to the water users in the Bay Area served by the CCSF. TID provides water services to portions of Stanislaus and Merced counties and retail electric service to portions of Stanislaus, Merced, and Tuolumne counties (Figure 5.9-1). MID provides water services to portions of Stanislaus County and retail electric services to portions of Stanislaus and San Joaquin counties (Figure 5.9-2).

The Project is located at the southern end of California's famed Mother Lode region, which shaped the region's economy in the mid- to late-1800s. Since the end of the California gold rush, the economic base has grown to include agriculture, timber and tourism with mining playing a greatly reduced role in the region's economic health.

The Don Pedro Reservoir is the single most prominent surface water feature in western Tuolumne County and attracts visitors to engage in diverse recreation opportunities. In addition, the water resources are essential to the local agricultural economy and the communities dependent on this economy. The Project also provides a substantial amount of renewable energy to the Districts' service areas. The Project area may be accessed by California State Highways 49, 120 and 132 as described below:

- **State Highway 49** - is located along the Project's northernmost arms (Woody Creek and Moccasin) and is a principal northerly/southerly route across the Sierra Nevada. State Highway 49 converges with State Highway120 at the southerly end of the Moccasin Creek arm.
- **State Highway 120** - intersects Jacksonville Road north and east of Moccasin (where it converges with State Route 49). Jacksonville Road provides access to the Moccasin Point Recreation Area before crossing the easternmost portion of the Project, the Tuolumne River Arm, and continuing in a northerly direction toward Jamestown.

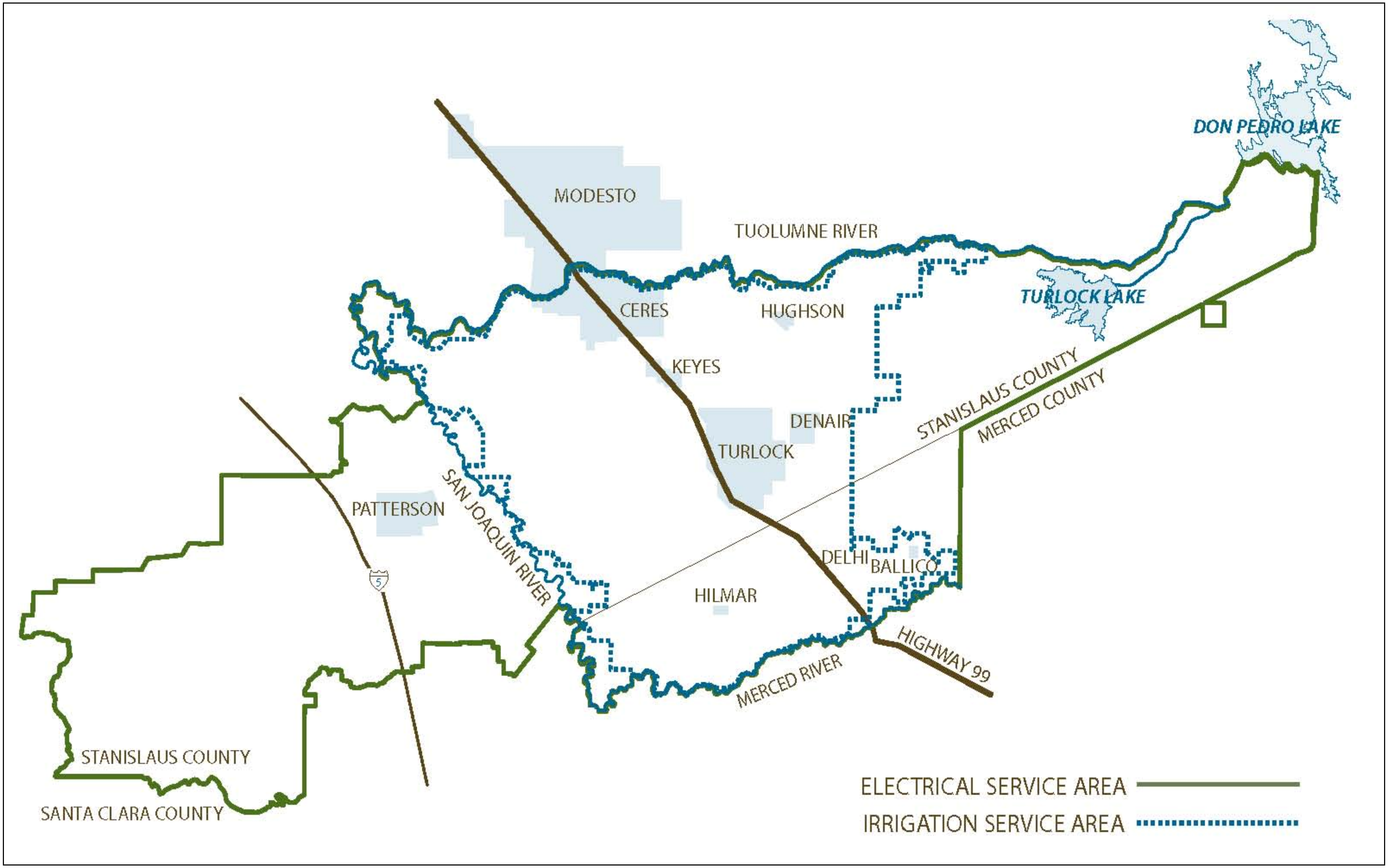


Figure 5.9-1 TID service area map.

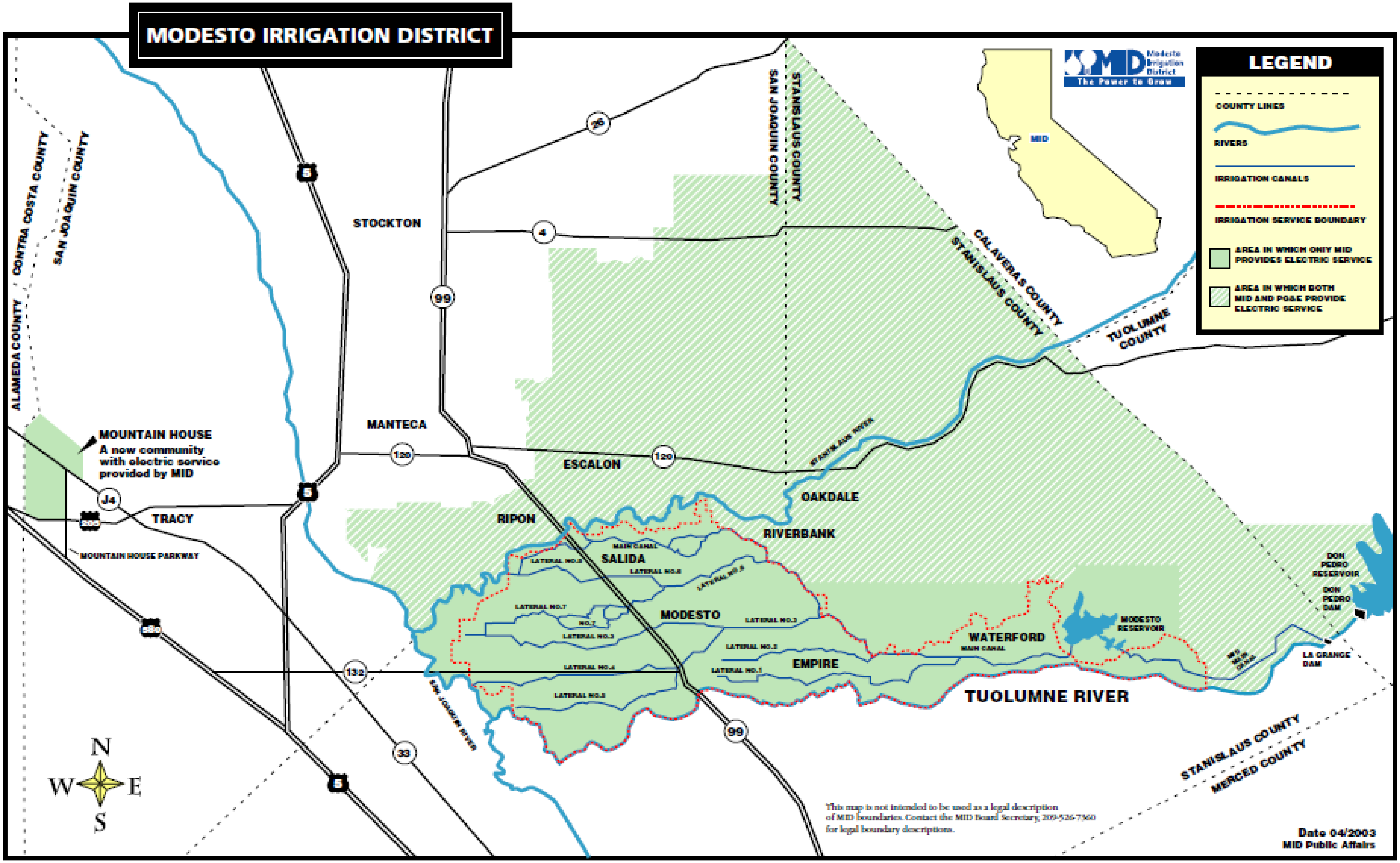


Figure 5.9-2 MID service area map.

- **State Highway 132** - is an easterly/westerly route located south of the Project. The communities of Coulterville and La Grange are respectively located at the intersections of State Route 49 to the east and County Road J59 to the west. Bonds Flat Road intersects with State Highway 132 at the Project's southernmost arm, Rogers Creek Arm in the reservoir's South Bay. Bonds Flat Road provides access to the Fleming Meadow and Blue Oaks Recreation Areas which are respectively located on the eastern and western sides of the Don Pedro Dam before continuing in a northerly direction to intersect with County Road J59 west of the reservoir. The County Road J59 as it continues north to State Route 120 is referred to as La Grange Road.

5.9.1 Population Patterns in Tuolumne, Stanislaus, and Merced Counties

5.9.1.1 Tuolumne County

The Project area is located in western Tuolumne County, southwest of the City of Sonora. Only the northernmost recreation area, Moccasin, is easily accessed from Sonora via the CA-49/CA-120 corridor and is approximately 20 miles from the city. Of 18,367 acres within the FERC Project Boundary, 22 percent is federally owned land within BLM's Sierra Resource Management Unit, but managed by the Districts as Project lands. The remaining 78 percent is owned and managed by the Districts, or the DPRA acting on their behalf.

Population Size

The U.S. Census Bureau for year 2000 estimated the population of Tuolumne County at 54,501 people. The California Department of Finance (CDOF) has estimated the county's 2010 population to be 58,721, an increase of 7.7 percent since year 2000. This growth rate is approximately 30 percent less that the county's growth between 1990 and 2000, which was 12.5 percent; the county's population in 1990 was 48,456 according to the U.S. Census Bureau. The CDOF has forecasted the county's 2020 population to be 64,161 residents which represents an increase of 9.2 percent.

Towns and Cities

Sonora is the only incorporated city in, and is the county seat of, Tuolumne County with a population of 4,673 (year 2008). The City of Sonora is 20 miles northeast of Don Pedro Dam and is the largest community in the county. The towns of Columbia, Jamestown, Groveland, and Twain Harte are located along the CA-120 corridor and are popular visitor destinations. The nearest major population center outside the county is Modesto (2008 population estimated at 206,721), located about 40 miles west of the Project.

Population Density and Housing Distribution

With a population of 58,721 residents, 30,575 housing units, and a land area of 2,274 square miles, Tuolumne County has 25.8 residents per square mile and 13.5 housing units per square mile (U.S. Census Bureau 2003). As summarized in Table 5.9.1-1 between 1980 and 1990 and between 1990 and 2000, the population of Tuolumne County increased by 42.8 and 12.5 percent, respectively. During these two same periods, the number of housing units also increased at 26.1 and 12.6 percent, respectively. From 1960 to 2010, Tuolumne County has experienced population and housing unit increases, respectively, of approximately 307.7 and 274.8 percent.

Table 5.9.1-1 Summary of Tuolumne County population and housing units, 1960-2010.

County	2010	2000	1990	1980	1970	1960
Population	58,721	54,501	48,456	33,928	22,169	14,404
Housing Units	30,575	28,336	25,175	19,970	11,248	8,157

Source: U.S. Census Bureau 2003.

The greatest number of individuals in Tuolumne County, 62.9 percent, falls between the age of 18 and 65 (Table 5.9.1-2). These age groups within the county have a somewhat different distribution than the State of California as a whole.

Table 5.9.1-2 Summary of Tuolumne County by age group, 2009.

Population: Age	Tuolumne County	California
Population under 5 years old	2,466	2,486,981
Persons under 5 years old, percent	4.5	7.3
Persons 18 years old or under	10,130	9,249,829
Persons 18 years old or under, percent	18.6	27.3
Persons 65 years old and over	10,067	3,595,658
Persons 65 years old and over, percent	18.5	10.6

Source: U.S. Census Bureau 2009.

Households/Family Distribution and Income

Table 5.9.1-3 summarizes household units (number of units, net change for a given period of time), homeownership rate, median home value, income and poverty for Tuolumne County. County data are also compared to the same data available for the State of California.

Table 5.9.1-3 Summary of household units and income - Tuolumne County/state comparison.

Household Information	Tuolumne County	California
Housing units, 2006	30,071	13,140,388
Housing units, net change, 04/01/00 to 01/01/06	1,735	590,153
Housing units, percent change, 04/01/00 to 01/01/06	6.12	4.83
Homeownership rate, 2000	52.9	56.9
Median value of owner-occupied housing units, 2000	$149,800	$211,500
Households, 2000	21,004	11,502,870
Persons per household, 2000	2.36	2.87
County, Median household income, 2000	$38,275	$47,493
Per capita income, 2005	$21,015	$22,711
Persons below poverty, 2000	1,160	4,706,130
Persons below poverty, percent, 2000	11.4	14.2

Source: U.S. Census Bureau 2000; CDOF 2007.

Ethnicity

When compared to the State of California, Tuolumne County is relatively homogeneous with respect to ethnic diversity. The county's population is predominantly White with persons of Hispanic or Latino origin being the second largest group of persons. Table 5.9.1-4 provides a summary of population by race for Tuolumne County and the State of California.

Table 5.9.1-4 Summary of population by gender and race - county/state comparison.

Population: Gender/Race	Tuolumne County	California
American Indian and Alaska Native persons, 2000[1]	992	333,346
American Indian and Alaska Native persons, percent, 2000(a)	1.8	1.0
Asian persons, 2000[1]	395	3,697,513
Asian persons, percent, 2000[1]	0.7	10.9
Black or African American persons, 2000[1]	1,146	2,263,882
Black or African American persons, percent, 2000[1]	2.1	6.7
Native Hawaiian and Other Pacific Islander persons, 2000[1]	91	116,961
Native Hawaiian and Other Pacific Islander, percent, 2000[1]	0.2	0.3
Persons of Hispanic or Latino origin, 2000[2]	4,445	10,966,556
Persons of Hispanic or Latino origin, percent, 2000[2]	8.2	32.4
Persons reporting some other race, 2000[1]	1,577	5,682,241
Persons reporting some other race, percent, 2000[1]	2.9	16.8
Persons reporting two or more races, 2000	1,550	1,607,646
Persons reporting two or more races, percent, 2000	2.8	4.7
White persons, 2000[1]	48,750	20,170,059
White persons, percent, 2000[1]	89.5	59.5
Female persons, percent, 2000	47.3	50.2
Language other than English spoken at home, percent age 5+, 2000	5.2	39.5

1 Includes persons reporting only one race.
2 Hispanics may be of any race, so also are included in applicable race categories.
Source: U.S. Census Bureau 2000.

Education

A total of 84.3 percent of Tuolumne County's population is educated through high school with 16.1 percent of the population having obtained a Bachelor's degree or higher. When compared to the State of California, Tuolumne County has a higher percentage of high school graduates and individuals who have received a Bachelor's degree or higher (U.S. Census Bureau 2000).

5.9.1.2 Stanislaus County

Population Size

The U.S. Census Bureau for year 2000 indicates the population of Stanislaus County was 444,997 people. The CDOF has estimated the county's 2010 population to be 530,584, an increase of 18.7 percent since year 2000. This growth rate approximates that of the growth rate between 1990 and 2000, which was 20.6 percent; the county's population in 1990 was 370,522 per the U.S. Census Bureau. The CDOF has forecasted the year county's 2020 population to be 699,144 residents which represents an increase of 31.8 percent over the county's 2010 estimated population.

Towns and Cities

The incorporated City of Modesto is the county seat located in northern Stanislaus County and has a population of 209,936 (year 2008). There are eight other incorporated cities in the county, the largest of which is Turlock, which had a population of 69,321 in 2008 and is located west of the Project.

Population Density and Housing Distribution

With a population of 530,584 residents, 178,337 housing units, and a land area of 1,494 square miles, Stanislaus County has 355 residents per square mile and 119.4 housing units per square mile (U.S. Census Bureau 2003). As summarized in Table 5.9.1-5 between 1980 and 1990 and between 1990 and 2000, the population of Stanislaus County increased by 39.4 and 20.6 percent, respectively. During these two same periods, the number of housing units also increased at 28.8 and 14.2 percent, respectively. From 1960 to 2010, Stanislaus County has experienced population and housing unit increases, respectively, of approximately 237.3 percent and 244.1 percent.

Table 5.9.1-5 Summary of Stanislaus County population and housing units, 1960-2010.

County	2010	2000	1990	1980	1970	1960
Population	530,584	446,997	370,522	265,900	194,506	157,294
Housing Units	178,337	150,807	132,027	102,472	65,414	51,834

Source: U.S. Census Bureau 2003.

While not directly stated in Table 5.9.1-6, the greatest number of individuals in Stanislaus County, 60.3 percent, falls between the age of 18 and 65. These age groups within the county have a somewhat different distribution than the State of California.

Table 5.9.1-6 Summary of Stanislaus County by age group, 2009.

Population: Age	Stanislaus County	California
Population under 5 years old	510,385	2,486,981
Persons under 5 years old, percent	8.3	7.3
Persons 18 years old or under	149,032	9,249,829
Persons 18 years old or under, percent	29.2	27.3
Persons 65 years old and over	53,590	3,595,658
Persons 65 years old and over, percent	10.5	10.6

Source: U.S. Census Bureau 2009.

Households/Family Distribution and Income

Table 5.9.1-7 summarizes household units (number of units, net change for a given period of time) homeownership rate, median home value, income and poverty for Stanislaus County. County data are also compared to the same data available for the State of California.

Table 5.9.1-7 Summary of household units and income - Stanislaus County/state comparison.

Household Information	Stanislaus County	California
Housing units, 2006	171,719	13,140,388
Housing units, net change, 04/01/00 to 01/01/06	20,912	590,153
Housing units, percent change, 04/01/00 to 01/01/06	13.9	4.83
Homeownership rate, 2000	61.9	56.9
Median value of owner-occupied housing units, 2000	$125,300	$211,500
Households, 2000	175,223	11,502,870
Persons per household, 2000	3.03	2.87
County, Median household income, 2000	$40,101	$47,493
Per capita income, 2005	$26,810	$22,711
Persons below poverty, 2000	73,495	4,706,130
Persons below poverty, percent, 2000	14.4	14.2

Source: U.S. Census Bureau 2000; CDOF 2007.

Ethnicity

When compared to the State of California, Stanislaus County is relatively diverse with respect to ethnic diversity. However, the county's population is predominantly White with persons of Hispanic or Latino origin being the second largest group of persons. Table 5.9.1-8 provides a summary of population by race for Stanislaus County and the State of California.

Table 5.9.1-8 Summary of population by gender and race - Stanislaus County/state comparison.

Population: Gender/Race	Stanislaus County	California
American Indian and Alaska Native persons, 2000[1]	5,676	333,346
American Indian and Alaska Native persons, percent, 2000 (a)	1.3	1.0
Asian persons, 2000[1]	18,848	3,697,513
Asian persons, percent, 2000[1]	4.2	10.9
Black or African American persons, 2000[1]	11,521	2,263,882
Black or African American persons, percent, 2000[1]	2.6	6.7
Native Hawaiian and Other Pacific Islander persons, 2000[1]	1,529	116,961
Native Hawaiian and Other Pacific Islander, percent, 2000[1]	0.3	0.3
Persons of Hispanic or Latino origin, 2000[2]	141,871	10,966,556
Persons of Hispanic or Latino origin, percent, 2000[2]	31.7	32.4
Persons reporting some other race, 2000[1]	75,187	5,682,241
Persons reporting some other race, percent, 2000[1]	16.8	16.8
Persons reporting two or more races, 2000	24,335	1,607,646
Persons reporting two or more races, percent, 2000	5.4	4.7
White persons, 2000[1]	309,901	20,170,059
White persons, percent, 2000[1]	69.3	59.5
Female persons, percent, 2000	50.8	50.2
Language other than English spoken at home, percent age 5+, 2000	32.4	39.5

[1] Includes persons reporting only one race.
[2] Hispanics may be of any race, so also are included in applicable race categories.
Source: U.S. Census Bureau 2000.

Education

A total of 70.4 percent of Stanislaus County's population is educated through high school with 14.1 percent of the population having obtained a Bachelor's degree or higher. When compared to the State of California, Stanislaus County has a higher percentage of high school graduates and individuals who have received a Bachelor's degree or higher (U.S. Census Bureau 2000).

5.9.1.3 Merced County

Population Size

The U.S. Census Bureau for year 2000 indicates the population of Merced County was 210,554 people. The CDOF has estimated the county's 2010 population to be 239,836, an increase of 14.0 percent since year 2000. This growth rate approximates that of the growth rate between 1990 and 2000, which was 18.0 percent (the county's population in 1990 was 178,403 per the U.S. Census Bureau). The CDOF has forecasted the county's 2020 population to be 348,690 residents, which represents an increase of 45.3 percent over the county's 2010 estimated population.

Towns and Cities

The incorporated City of Merced is the county seat located in southern Merced County and had a population of 80,985 (year 2008). There are four other incorporated cities in the county.

Population Density and Housing Distribution

With a population of 239,936 residents, 85,259 housing units, and a land area of 1,928.69 square miles, Merced County has 124.4 residents per square mile and 44.2 housing units per square mile (U.S. Census Bureau 2003). As summarized in Table 5.9.1-9, between 1980 and 1990 and between 1990 and 2000, the population of Merced County increased by 32.6 and 18.0 percent, respectively. During these two same periods, the number of housing units also increased at 16.7 and 17.1 percent, respectively. From 1960 to 2010, Merced County has experienced population and housing unit increases, respectively, of approximately 165.5 percent and 542.2 percent.

Table 5.9.1-9 Summary of Merced County population and housing units, 1960-2010.

County	2010	2000	1990	1980	1970	1960
Population	239,936	210,554	178,403	134,560	104,629	90,446
Housing Units	85,259	68,373	58,410	50,050	32,708	13,276

Source: U.S. Census Bureau 2003.

While not directly stated in Table 5.9.1-10, the greatest number of individuals in Merced County, 58.1 percent, falls between the age of 18 and 65. These age groups within the county have a somewhat different distribution than the State of California.

Table 5.9.1-10 Summary of Merced County by age group, 2009.

Population: Age	Merced County	California
Population under 5 years old	22,815	2,486,981
Persons under 5 years old, percent	9.3	7.3
Persons 18 years old or under	78,503	9,249,829
Persons 18 years old or under, percent	32.0	27.3
Persons 65 years old and over	24,287	3,595,658
Persons 65 years old and over, percent	9.9	10.6

Source: U.S. Census Bureau 2009.

Households/Family Distribution and Income

Table 5.9.1-11 summarizes household units (number of units, net change for a given period of time) homeownership rate, median home value, income and poverty for Merced County. County data are also compared to the same data available for the State of California.

Table 5.9.1-11 Summary of household units and income - Merced County/state comparison.

Household Information	Merced County	California
Housing units, 2009	84,032	13,140,388
Housing units, net change, 04/01/00 to 01/01/06	15,659	590,153
Housing units, percent change, 04/01/00 to 01/01/06	22.9	4.83
Homeownership rate, 2000	58.9	56.9
Median value of owner-occupied housing units, 2000	$111,100	$211,500
Households, 2000	63,815	11,502,870
Persons per household, 2000	3.25	2.87
County, Median household income, 2000	$42,629	$47,493
Per capita income, 2005	$14,257	$22,711
Persons below poverty, 2008	52,744	4,706,130
Persons below poverty, percent, 2008	21.5	14.2

Source: U.S. Census Bureau 2000; CDOF 2009.

Ethnicity

When compared to the State of California, Merced County is relatively diverse with respect to ethnic diversity. However, the county's population is predominantly White with persons of Hispanic or Latino origin being the second largest group of persons. Table 5.9.1-12 provides a summary of population by race for Merced County and the State of California.

Table 5.9.1-12 Summary of population by gender and race - Merced County/state comparison.

Population: Gender/Race	Merced County	California
American Indian and Alaska Native persons, 2000[1]	2,510	333,346
American Indian and Alaska Native persons, percent, 2000 (a)	1.2	1.0
Asian persons, 2000[1]	14,321	3,697,513
Asian persons, percent, 2000[1]	6.8	10.9
Black or African American persons, 2000[1]	8,064	2,263,882
Black or African American persons, percent, 2000[1]	3.8	6.7
Native Hawaiian and Other Pacific Islander persons, 2000[1]	396	116,961
Native Hawaiian and Other Pacific Islander, percent, 2000[1]	0.2	0.3
Persons of Hispanic or Latino origin, 2000[2]	95,456	10,966,556
Persons of Hispanic or Latino origin, percent, 2000[2]	45.3	32.4
Persons reporting some other race, 2000[1]	55,013	5,682,241
Persons reporting some other race, percent, 2000[1]	26.1	16.8
Persons reporting two or more races, 2000	11,900	1,607,646
Persons reporting two or more races, percent, 2000	5.7	4.7
White persons, 2000[1]	118,350	20,170,059
White persons, percent, 2000[1]	56.2	59.5
Female persons, percent, 2000	50.2	50.2
Language other than English spoken at home, percent age 5+, 2000	45.2	39.5

1 Includes persons reporting only one race.
2 Hispanics may be of any race, so also are included in applicable race categories.
Source: U.S. Census Bureau 2000.

Education

A total of 63.8 percent of Merced County's population is educated through high school with 11.0 percent of the population having obtained a Bachelor's degree or higher. When compared to the State of California, Merced County has a lower percentage of high school graduates and individuals who have received a Bachelor's degree or higher (U.S. Census Bureau 2000).

5.9.2 Economic Patterns in Tuolumne, Stanislaus, and Merced Counties

5.9.2.1 Tuolumne County

Labor Force

As summarized in Table 5.9.2-1, the annual average unemployment rate in Tuolumne County was 5.9 percent during 2000 (California Employment Development Department 2010), which was higher than the State of California's average of 5.3 percent (U.S. Census Bureau 2000). The current reported unemployment rate in 2009 for Tuolumne County is 12.6 percent which is above the state's unemployment rate of 12.2 percent.

Table 5.9.2-1 Civilian labor force, employment and unemployment for Tuolumne County, 2000-2009.

Year	Labor Force	Employment	Unemployment	
			Number	Rate (%)
2009	26,010	22,750	3,270	12.6
2005	26,000	24,300	1,700	6.5
2000	22,880	21,530	1,350	5.9

Source: California Employment Development Department 2010.

Industry

Initially, Tuolumne County's settlements and their economies were based on the discovery of gold in the middle 1800s. Today, Tuolumne County has a diverse economic base and labor force (Table 5.9.2-2) that has 19 industrial sectors including construction, mining, manufacturing, transportation, utilities, trade, finance, insurance, real estate services, and government.

Table 5.9.2-2 Summary of industry statistics for Tuolumne County, 2005.

Industry	Number of Employees	Earnings ($1000)
Farm	378	1,991
Utilities	97	8,092
Construction	2,519	49,321
Manufacturing	1,056	48,749
Wholesale Trade	311	9,493
Retail Trade	3,456	78,225
Transportation and warehousing	405	7,142
Information	385	19,275
Finance and insurance	690	18,852
Real Estate, rental and leasing	1,596	9,038
Professional, scientific and technical services	1,482	35,476
Management of companies and enterprises	56	3,131
Administrative and waste services	953	14,262
Educational services	247	2,969
Health care and social assistance	2,748	111,988
Arts, entertainment and recreation	846	10,033
Accommodation and Food Services	2,055	29,822
Other services, except for public administration	2,048	30,439
Government and Public Administration	5,918	301,247

Source: Bureau of Economic Analysis 2005.

In 2005, the largest employment sectors in Tuolumne County were (1) Government; (2) Retail Trade; (3) Health Care and Social Assistance; and (4) Construction (Bureau of Economic Analysis 2005). The Government and Public Administration sector had the greatest earnings for the county and was followed by Health Care and Social Services (Table 5.9.2-2).

5.9.2.2 Stanislaus County

Labor Force

As summarized in Table 5.9.2-3, the annual average unemployment rate in Stanislaus County was 7.8 percent during 2000 (California Employment Development Department 2010), which was higher than the State of California's average of 5.3 percent (U.S. Census Bureau 2000). The current reported unemployment rate in 2009 for Stanislaus County is 16.0 percent which is above the state's unemployment rate of 12.2 percent. The Brookings Institution study of the Northern San Joaquin Region, published in the September 15, 2010 Modesto Bee, found that "…Stanislaus County is dead last - 100th - in employment and real estate rankings. The county's 17.2 percent jobless rate in June [2010] was the worst among the nation's 100 largest metropolitan areas."

Table 5.9.2-3 Civilian labor force, employment and unemployment for Stanislaus County, 2000-2009.

Year	Labor Force	Employment	Unemployment	
			Number	Rate (%)
2009	236,100	198,300	37,900	16.0
2005	227,100	207,900	19,200	8.5
2000	207,800	191,600	16,200	7.8

Source: California Employment Development Department 2010.

Industry

Initially, Stanislaus County's settlements and their economies were based on the discovery of gold in the middle 1800s. Today, Stanislaus County has a diverse economic base and labor force (Table 5.9.2-4) that includes 19 industrial sectors including construction, mining, manufacturing, transportation, utilities, trade, finance, insurance, real estate services, and government.

In 2005, the largest employment sectors in Stanislaus County were: (1) Government; (2) Retail Trade; (3) Health Care and Social Assistance; and (4) Manufacturing (Bureau of Economic Analysis 2005). The Government and Public Administration sector had the greatest earnings for the county and was followed by Manufacturing and Health Care and Social Assistance (Table 5.9.2-4).

Table 5.9.2-4 Summary of industry statistics for Stanislaus County, 2005.

Industry	Number of Employees	Earnings ($1000)
Farm	9,324	204,588
Utilities	(D)	(D)
Construction	13,272	524,190
Manufacturing	22,928	1,456,298
Wholesale Trade	7,171	369,697
Retail Trade	26,928	720,688
Transportation and warehousing	(D)	(D)
Information	2,364	99,204
Finance and insurance	7,339	263,524
Real Estate, rental and leasing	10.393	95,604
Professional, scientific and technical services	9,136	268,266
Management of companies and enterprises	2,105	145,701
Administrative and waste services	11,215	281,978
Educational services	1,836	32,684
Health care and social assistance	24,251	1,280,583
Arts, entertainment and recreation	2,798	37,329
Accommodation and Food Services	15,323	258,780
Other services, except for public administration	12,879	281,582
Government and Public Administration	29,269	1,876,377

Note: (D) Cannot be disclosed.
Source: Bureau of Economic Analysis 2005.

5.9.2.3 Merced County

Labor Force

As summarized in Table 5.9.2-5, the annual average unemployment rate in Merced County was 19.6 percent during 2000 (California Employment Development Department 2010), which was higher than the State of California's average of 5.3 percent (U.S. Census Bureau 2000). The current reported unemployment rate in 2009 for Merced County is 17.2 percent which is above the state's unemployment rate of 12.2 percent.

Table 5.9.2-5 Civilian labor force, employment and unemployment for Merced County, 2000-2009.

Year	Labor Force	Employment	Unemployment	
			Number	Rate (%)
2009	105,700	87,500	18,200	17.2
2005	99,000	89,000	9,900	10.0
2000	90,300	81,600	8,700	9.6

Source: California Employment Development Department 2010.

Industry

Initially, Merced County's settlements and their economies were based on the discovery of gold in the middle 1800s. Today, Merced County has a diverse economic base and labor force (Table 5.9.2-6) that includes 19 industrial sectors including construction, mining, manufacturing, transportation, utilities, trade, finance, insurance, real estate services, and government.

Table 5.9.2-6 Summary of industry statistics for Merced County, 2005.

Industry	Number of Employees	Earnings ($1000)
Farm	8,260	204,524
Utilities	(D)	(D)
Construction	5,266	162,263
Manufacturing	10,088	450,922
Wholesale Trade	(D)	(D)
Retail Trade	9,877	238,089
Transportation and warehousing	2,849	77,674
Information	1,779	65,789
Finance and insurance	2,040	71,211
Real Estate, rental and leasing	2,588	21,411
Professional, scientific and technical services	2,342	47,481
Management of companies and enterprises	951	63,502
Administrative and waste services	2,771	34,867
Educational services	309	1,296
Health care and social assistance	7,224	247,378
Arts, entertainment and recreation	930	8,689
Accommodation and Food Services	4,797	69,446
Other services, except for public administration	5,161	95,681
Government and Public Administration	14,515	755,955

Note: (D) Cannot be disclosed.
Source: Bureau of Economic Analysis 2005.

In 2005, the largest employment sectors in Merced County were: (1) Government; (2) Manufacturing; (3) Retail Trade; and (4) Farming (Bureau of Economic Analysis 2005). The Government and Public Administration sector had the greatest earnings for the county and was followed by Manufacturing and Health Care and Social Assistance (Table 5.9.2-6).

5.9.3 Irrigation Water Supply and Retail Electric Service

Irrigation water supplies managed by MID and TID support population and industries in Stanislaus and Merced counties. TID annually diverts about 600,000 ac-ft of Tuolumne River water to provide irrigation water to over 4,400 individual water users that represent about 150,000 irrigated acres. MID annually diverts about 300,000 ac-ft of water from the Tuolumne River to provide irrigation water to more than 3,000 water users that irrigate 60,000 acres (Testimony of Walter P. Ward, FERC 2008).

The importance of the irrigation water for agricultural industries is exemplified in the data presented in Table 5.9.2-7. Merced, Stanislaus, and San Joaquin counties rank, respectively, 4, 6, and 7 within California in regard to their respective market value of agricultural product. The main crops are fruit, tree nut, and orchards. Livestock products include cattle, milk, and dairy products. Merced County production was valued in excess of $2 billion in 2007. Stanislaus County produced almost $2 billion of total revenue in agricultural products in 2007.

As recorded in the 2007 Census of Agriculture and as summarized in Table 5.9.2-8, Merced and Stanislaus counties were ranked, respectively, fourth and sixth in the state and the U.S. for a total value of agricultural products sold. In Merced County, the Livestock, Poultry, and related products was the largest of the two sectors comprising 62 percent of the total value and that sector ranked second in the state and the U.S. The same sector accounted for 60 percent of the total agricultural products sold in Stanislaus County.

Table 5.9.2-7 Agricultural products value and product characteristics, 2007

County	Market Value of Agriculture Products							Largest Crops and Livestock and Products (Disclosable)			
	Total ($1,000s)	State Rank Value	Ave. per Farm (Dollars)	Crops ($1,000s)	State Rank Crops	Livestock and Related Products ($1,000s)	State Rank Livestock	Largest Crop	Percent of Total Value	Largest Livestock and Product Inventory	Percent of Total Value (%)
Mariposa	11,464	48	37,960	485	57	10,978	42	Fruit, Tree Nuts, Berries	3%	Cattle / Calves	70
Merced	2,330,408	4	893,904	879,332	9	1,451,075	2	Fruit, Tree Nuts, Berries	18%	Milk, Dairy Products	42
San Joaquin	1,564,354	7	431,665	991,671	6	572,683	9	Fruit, Tree Nuts, Berries	34%	Milk, Dairy Products	26
Stanislaus	1,820,564	6	442,529	736,045	10	1,084,519	4	Fruit, Tree Nuts, Berries	27%	Milk, Dairy Products	38
Tuolumne	18,653	48	50,965	1,557	52	17,096	32	Fruit, Tree Nuts, Berries	6%	Nursery / Sod	2
California	33,885,064		418,164	22,903,021		10,982,043		Fruit, Tree Nuts, Berries	33%	Milk, Dairy Products	19

Source: USDA 2007.

Table 5.9.2-8 Summary of agricultural industry ranking in California and U.S. for Merced, Stanislaus, and Tuolumne counties.

Total Values by Category	Merced			Stanislaus			Tuolumne		
	Value ($1,000)	State Ranking	U.S. Ranking	Value ($1,000)	State Ranking	U.S. Ranking	Value ($1,000)	State Ranking	U.S. Ranking
Total Value of Agricultural Products Sold	2,330,408	4	4	1,820,564	6	6	18,653	48	2,304
Total Value of Crops, including Nursery and Greenhouse	879,332	9	10	736,045	10	14	1,557	52	2,674
Total Value of Livestock, Poultry and Their Products	1,451,075	2	2	1,084,519	4	6	17,096	32	1,645

Source: USDA 2007.

The Districts also provide retail electric service to portions of Stanislaus County (both TID and MID), Merced County (TID), Tuolumne County (TID), and San Joaquin County (MID). In Stanislaus County, electric service is provided to over 200,000 customer accounts by the Districts (TID-94,000; MID-108,000), with much fewer customers served in Merced County (10,700 accounts), San Joaquin County (5,000 accounts), and Tuolumne County (345 accounts). The largest commercial/industrial customers of MID are Gallo, Foster Farms, City of Modesto, Memorial Medical Center, and the Modesto City Schools. TID's largest customers are Hilmar Cheese, California State University-Stanislaus, Foster Farms, and Patterson Vegetable Co.

5.10 Tribal Resources

This section provides information regarding traditional cultural properties (TCP) in the vicinity of the Don Pedro Project, located on the Tuolumne River in Tuolumne County, California. As described in Section 5.8 of this PAD, the Project relicensing is a federal undertaking and therefore, must comply with Section 106 of the NHPA. As such the Project relicensing process must take into account the effects of the Project on historical properties, which could include TCPs. One of the first steps in the Section 106 process is to identify historical properties within the Project APE. This initial identification process for TCPs is presented here, represented by the results and findings of the Districts' records search regarding known TCPs in the data gathering areas.

Certain terms and concepts used throughout the section require definition as follows:

- **Historical Property.** As defined under 36 CFR 800.16, "historical property" refers to any prehistoric or historic, district, site, building, structure, object, or traditional cultural property included in or eligible for inclusion in the National Register of Historic Places (NRHP) [36 CFR 800.16(1)].
- **Cultural Resource.** For the purpose of this document, the term "cultural resource" is used to discuss any prehistoric or historical district, site, building, structure, or object, regardless of its National Register eligibility. Information specific to cultural resources other than traditional cultural properties is provided in Section 5.8, above.
- **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." Geographic areas within the APE need not be contiguous, but rather reflect one or more locations where Project-related activities may disturb or affect historical properties. The APE, as shown in Appendix C of this PAD, includes all lands within the FERC Project Boundary.
- **Traditional Cultural Properties.** TCPs represent many various types of traditional practices important to various communities. TCPs must be evaluated for listing on the National Register of Historic Places (NRHP) the same way other cultural resources are evaluated. NRHP-eligible 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" (National Register Bulletin 38 [Parker and King 199 8:1]).

In general, TCPs are defined as (National Register Bulletin 38 [Parker and King 1998:1]):

1. Locations associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world.
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 historical identity.

5.10.1 Background Research

To gather the necessary information to identify known or potential TCPs within the Project vicinity, the Districts completed a records search and archival research at federal, State of California, and local repositories in California, as appropriate. In addition to identifying potentially-affected Indian Tribes and TCPs, this research also served to obtain background information pertinent to understanding the history and ethnohistory of the Project area and to identify potential gaps in information that may potentially be addressed through additional studies.

5.10.1.1 Identification of Potentially-Affected Indian Tribes

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. To date, a recommended contact list has not yet been received from the NAHC. To initiate the tribal consultation process, the Districts have identified a number of Indian Tribes that may have an interest in relicensing based on the proximity of these groups' traditional territories to the Project APE. The list compiled by the Districts is provided in Table 5.10.1-1 below. Additional groups that might be identified by the NAHC, subsequent to this PAD, that are not included on this list will be added and contacted by the Districts.

Prior to the mid-September 2010 public meetings for the Project relicensing, the Licensees sent letters to the Tribal contacts below inviting them to participate in the meetings to receive an initial introduction to the Project relicensing. Included in these letters was a request for information that may be relevant to the Project relicensing. The Tribal contacts were also referred to the public relicensing website and given the names and contact information for the Districts.

5.10.1.2 Identification of Known Indian Trusts and Traditional Cultural Properties

The Districts performed a record search in July 2010 at the Central California Information Center (CCIC) of the California Historical Resources Information System at California State University, Stanislaus (CSU, Stanislaus). The CCIC record search included a review of cultural resources records and site location maps, historic General Land Office (GLO) plats, historic topographic maps, NRHP listings, California Register of Historic Resources listings, Office of Historic Preservation Historic Property Directory, 1996 California State Historic landmarks, 1976 California Inventory of Historic Resources, and Caltrans Bridge Inventory.

Table 5.10.1-1 Tribal contacts 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	

The records search included all lands within the Project APE and a 0.25-mile buffer beyond to allow adequate coverage and flexibility for Project planning. 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 other resource types previously identified within the APE and vicinity that may help in the preparation of an ethnographic context for the area and/or any potential TCP documentation.

The records search was also employed in part to identify Indian Trusts within the APE. Indian Trust Assets (ITA) 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.

No ITAs were discovered in the course of the record search. The APE does not include Indian reservations, lands designated under Tribal ownership, or any other ITAs.

Additionally, the information gathered to date has not identified any known or documented TCPs or other significant Indian tribal resources within the APE.

5.10.2 Ethnohistory

The Project vicinity is considered the homeland of the Miwok, occupied primarily by the Central Sierra Miwok. A detailed account of the prehistory and ethnographic occupation within the Project APE are provided in Section 5.8 (Cultural Resources) of the PAD.

5.11 Land Use

5.11.1 Upper Tuolumne River

Lands within the upper Tuolumne River basin (above RM 79) are predominantly federal lands under the administration of the NPS (Yosemite National Park), USFS (Stanislaus National Forest), and BLM (portions of the Sierra Mountains Resource Area). The Tuolumne River Wild and Scenic River corridor falls under the management of the respective federal agency that administers the lands through which it flows. It is estimated that over 80 percent of the lands in the upper Tuolumne River are federal lands. Land use on these federal lands is managed under resource management plans prepared by each federal agency as follows:

- NPS - 95 percent of park is designated wilderness
- USFS - Stanislaus Land and Resource Management Plan (1990)
- BLM - Sierra Resource Management Plan (2008)

Private lands make up the bulk of the remaining lands in the upper Tuolumne watershed (Table 5.11.1-1). Land use of private lands are subject to the zoning ordinances of Tuolumne County and the guidelines established in the 1996 Tuolumne County General Plan.

Table 5.11.1-1 Distribution of public and private lands in Tuolumne County.

Public Agency or Private Ownership	Number of Parcels	Average Acreage of Parcels	Total Acreage per Agency / Owner	Ownership as a Percentage of County
Bureau of Land Management	NA	NA	47,352	3.5
U.S. Army Corps of Engineers	NA	NA	9,906	1.0
National Park Service	NA	NA	435,847	30.0
Forest Service	NA	NA	605,803	42.0
State of California	NA	NA	3,270	0.2
Modesto and Turlock Irrigation Districts	NA	NA	8,460	1.0
Tuolumne County	NA	NA	676	0.15
City and County of San Francisco	NA	NA	4,051	1.0
City of Sonora	NA	NA	377	0.15
Private (or other)	38,152	8	301,496	21.0
		Total	**1,458,121**	**100.0**

Source: Tuolumne County Profile 2005.

Federal lands are primarily managed as Wilderness, resource conservation, and public recreation. USFS and BLM lands also permit limited grazing and timber extraction. Wilderness areas include the Emigrant Wilderness and the Yosemite Wilderness.

Three existing Wild and Scenic Rivers/Wilderness Areas are located in or near the Project vicinity: (1) Wild and Scenic Tuolumne River (upstream of the Project area); (2) Emigrant Wilderness; and (3) Yosemite Wilderness.

Upstream of the Don Pedro Reservoir, the Tuolumne River, from its headwaters to approximately the normal maximum water level (RM 79), is designated as a Wild and Scenic River. There are 47.0 miles designated as Wild and Scenic, 23.0 miles of river designated as Scenic, and 13.0 miles designated as Recreational for a total of 83.0 RM protected under the Wild and Scenic Rivers Act. A total of 54 miles of the Wild and Scenic river reach runs through Yosemite National Park. Approximately 29.5 miles of the river runs through the Stanislaus National Forest and 1 mile through the BLM. There is an 8-mile break in the Wild and Scenic reach, which is occupied by the Hetch Hetchy Reservoir formed by O'Shaughnessy Dam (NPS 2008 - Tuolumne River Plan summary).

The Nationwide Rivers Inventory (NRI) is a listing of more than 3,400 river segments in the U.S. that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance (NPS 2004b). The NRI is a source of information for statewide river assessments and federal agencies involved with stream-related projects. Two rivers in the Project vicinity that join with the Tuolumne River upstream of Don Pedro are included in the NRI: the Clavey and Cherry Creek rivers. Cherry Creek has potential classification as a wild river with two Outstandingly Remarkable Values (ORVs), scenery and Geology. The Clavey River has potential classification as wild and scenic with six ORVs: cultural, fish, scenery, recreation wildlife and other (e.g., botanical resources).

5.11.2 Project Area

The Project area watershed extends from RM 54 to 80 and encompasses about 230 square miles of area. The Don Pedro Reservoir and Project Boundary are the most dominant features of this area and encompass 12,960 and 18,400 acres, respectively. The BLM manages public lands within this area including the Red Hills ACEC. BLM lands within the Project Boundary are estimated at 4,040 acres, and the Districts own the remainder of these Project lands.

Lands outside BLM lands and Project lands are within Tuolumne County and are subject to the Tuolumne County General Plan and zoning ordinances. Primary land uses on private lands are single-family residential, non-irrigated farmland, and irrigated (by groundwater) farmland.

The primary land uses in the Project Boundary are resource conservation and recreation. The Districts maintain, and the DPRA implements, a strict Land Use Policy for all Project lands. The rules and regulations of the Land Use Policy control the use of Project lands and shorelines to protect and preserve the natural character and integrity of the Project area. The DPRA Rules and Regulations are provided in Appendix E.

The Districts' DPRA staff is trained in wildland fire suppression and is required to fight fires within the Project. They notify the appropriate emergency response agencies in the event of such an emergency. DPRA adheres to local, state, and federal rules and regulations regarding such work. DPRA has access to a water tender, axes, saws, shovels, and radios. DPRA obtains all necessary permits and approvals prior to engaging in work that requires the burning of debris.

5.11.3 Lower Tuolumne River Area

Land use downstream of the Project is predominately irrigated agriculture and related uses, urban/suburban, and rural residential. All of these land uses depend on water from the Don Pedro Project. TID and MID serve over 200,000 acres of high value farmland in the Central Valley. Crop percentages vary year to year, but representative averages are:

- Fruit and Nut Orchards - 35 percent
- Grains - 43 percent
- Pasture - 7 percent
- Alfalfa - 7 percent
- Other - 8 percent

The Project provides municipal and industrial water to the City of Modesto (population 210,000). The Districts also provide retail electric service to over 200,000 customers, much of this generated by the Project.

5.12 Consistency with Comprehensive Plans

This section is divided into two parts. Section 5.1.2.1 describes plans that Section 10(a) of the Federal Power Act (FPA) requires FERC to consider in the relicensing. These plans are referred to as Qualifying Comprehensive Plans. Section 5.12.2 describes Non-Qualifying Comprehensive Plans or agreements that may be relevant to the relicensing.

5.12.1 Qualifying Comprehensive Plans

As described above, 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 or waterways affected by the Project. On April 27, 1988, FERC issued Order No. 481-A which revised Order No. 481, issued October 26, 1987, establishing that FERC will accord FPA Section 10(a)(2)(A) comprehensive plan status to any federal or state plan that meets the following three criteria:

- Is a comprehensive study of one or more of the beneficial uses of a waterway or waterways
- Specifies the standards, the data, and the methodology used to develop the plan
- Is filed with FERC

A review of FERC's Revised List of Comprehensive Plans shows that 61 comprehensive plans have been filed with FERC specifically for the State of California and six plans that apply to multiple states have been filed by U.S. governmental agencies (FERC 2010). Licensee believes that 17 of these qualifying comprehensive plans have a potential to be related to the Project relicensing. Each of these plans is discussed below by resource area. It is important to note that all of the qualifying comprehensive plans that may apply to the Project relicensing were developed after the Project was constructed and began operating. Consequently, the Project was an existing condition during each qualifying comprehensive plan's development.

5.12.1.1 Water Resources

California Water Plan (CDWR 1983) and California Water Plan Update (CDWR 1994)

The CDWR first published the California Water Plan in 1957. The plan focused on the quantity and quality of water available to meet the State of California's water needs, and management actions that could be implemented to improve the state's water supply reliability. Since then, CDWR has updated the plan numerous times including in 1983 (the reference used in FERC's July 2010 List of Comprehensive Plans for the California Water Plan) and 1994 (the reference used in FERC's July 2010 List of Comprehensive Plans for the California Water Plan Update). The most recent update was in March 2009. The Project is located in what the Water Plan calls the "San Joaquin River Hydrologic Region."

Water Quality Control Plan Report (SWRCB 1995)

This reference is to the first edition of the water quality control plans adopted by the California SWRCB pursuant to the CWA. The nine plans, which apply to different areas of California, formally designate existing and potential beneficial uses and water quality objectives. The water quality control plan applicable to the Project area is the CVRWQCB Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (referred to as the Basin Plan in this document). The SWRCB has updated the water quality control plans a number of times since 1995.

For a discussion of the Basin Plan as it applies to the Tuolumne River in the Project area and downstream refer to Section 5.2 of this PAD.

Water Quality Control Plans and Policies (SWRCB 1999)

This reference refers to an April 1999 submittal by the SWRCB to FERC of a listing of all SWRCB plans and policies. This submittal stated that all of the listed plans and policies are part of the "State Comprehensive Plan," even though it does not exist as a single plan.

The main plan and policies listed in that submittal to FERC included the most recent edition of the Basin Plan, which is described in Section 5.2.

Final Programmatic Environmental Impact Statement/Environmental Impact Report for the CALFED Bay-Delta Program (CALFED 2000)

The California Water Policy Council and the Federal Ecosystem Directorate united in June 1994 to form CALFED. In June 1995, CALFED established its Bay-Delta Program (Program) to develop a long-term, comprehensive solution to environmental issues in the Sacramento-San Joaquin Delta and San Francisco Bay. The Program is a cooperative, interagency effort involving 15 state and federal agencies with management and regulatory responsibilities in the San Francisco Bay-San Joaquin Delta Estuary (Bay-Delta).

The Program was divided into three phases. In Phase I, completed in September 1996, the Program identified the problems confronting the Bay-Delta, developed a mission statement, and developed guiding principles. Following scoping, public comment, and agency review, the

Program identified three preliminary alternatives to be further analyzed in Phase II. The three Phase II preliminary alternatives each included Program elements for levee system integrity, water quality improvements, ecosystem restoration, water use efficiency, and three differing approaches to conveying water through the Bay-Delta.

In Phase II, completed in July 2000, the Program refined the preliminary alternatives, conducted a comprehensive programmatic environmental review, and developed implementation strategies. The Program added greater detail to each of the Program elements and crafted frameworks for two Program elements: water transfers and watershed management. The Phase II report contains a general summary of the Program plans. More fundamentally, the report also describes the Program process, the fundamental Program concepts that have guided their development, and analyses that have contributed to Program development. Further, this report describes how this large, complex Program may be implemented, funded, and governed in the future. The following plans outline Program actions:

- Ecosystem Restoration Program Plan (Volumes 1, 2, and 3)
- Water Quality Program Plan
- Water Use Efficiency Program Plan
- Water Transfer Program Plan
- Levee System Integrity Program Plan
- Watershed Program Plan

The goals of the Water Quality and Watershed programs under CALFED include improving overall water quality by reducing the loadings of many constituents of concern that enter Bay-Delta tributaries from point and non-point sources. Principal targeted constituents include heavy metals (such as mercury), pesticide residues, salts, selenium, pathogens, suspended sediments, adverse temperatures, and disinfection byproduct precursors such as bromide and total organic carbon. The remaining Program plans include the:

- Implementation Plan
- Multi-species Conservation Strategy (MSCS)
- Comprehensive Monitoring, Assessment, and Research Program (CMARP)

Phase II was completed, with publication of the final programmatic EIS/EIR in July 2000.

Phase III is on-going and consists of implementation of the Preferred Program Alternative over 20-30 years. Information from the final programmatic EIS/EIR will be incorporated by reference into subsequent tiered environmental documents for specific projects in accordance with National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) guidelines. Even though water from the Don Pedro Reservoir does not flow directly into the Bay-Delta, the Tuolumne River is a main tributary to the San Joaquin River which is one of the main rivers flowing into the Sacramento-San Joaquin Bay-Delta Estuary. It is anticipated that resource agencies that participate in the Program will also participate in the relicensing to the extent necessary to assure consistency between the Program and the relicensing.

5.12.1.2 Aquatic Resources

The FERC 2010 list of comprehensive plans does not include plans for aquatic resources that are not also Threatened, Endangered, or Fully Protected, which are listed in Section 5.5.

5.12.1.3 Wildlife Resources

Central Valley Habitat Joint Venture Implementation Plan (USFWS et al. 1990) and North American Waterfowl Management Plan (USFWS 1986)

The California Central Valley Habitat Joint Venture (CCVHJV) is one of 12 current joint ventures charged with implementation of the North American Waterfowl Management Plan, an agreement between Canada, Mexico, and the U.S. to restore waterfowl populations through habitat protection, restoration, and enhancement (USFWS 1986). The CCVHJV was formally established by a working agreement signed in July 1988 and is guided by an Implementation Board comprised of representatives from the California Waterfowl Association, Defenders of Wildlife, Ducks Unlimited, National Audubon Society, Waterfowl Habitat Owners Alliance, and The Nature Conservancy. Technical Assistance is provided to the Board by the U.S. Department of Interior (USDOI), USFWS, CDFG, California Department of Food and Agriculture (CDFA), and other organizations and agencies.

The Central Valley of California is the most important wintering area for waterfowl in the Pacific Flyway, supporting 60 percent of the total population. Historically, the Central Valley contained more than four million acres of wetlands; however, only 291,555 acres remained in 1990 when the CCVHJV was first implemented. The primary cause of this wetland loss was conversion to agriculture, flood control, and navigation projects, and urban expansion.

When completed, the CCVHJV will (1) protect 80,000 acres of existing wetlands through the fee acquisition or conservation easement; (2) restore 120,000 acres of former wetlands; (3) enhance 291,555 acres of existing wetlands; (4) enhance waterfowl habitat on 443,000 acres of private agricultural land; and (5) secure 402,450 ac-ft of water for existing State Wildlife Areas, National Wildlife Refuges, and the Grasslands Resource Conservation District. These habitat conservation efforts are intended to result in a fall flight of one million ducks and 4.7 million wintering ducks. The wintering bird totals will include 2.8 million pintails, a species whose wintering population is vitally dependent on the Central Valley.

The CCVHJV is a regional approach to conservation and management of waterfowl populations in the Central Valley, but has no specific relevance to operation and management of the Project.

5.12.1.4 Threatened, Endangered, and Fully Protected Species

Restoring the Balance (California Advisory Committee on Salmon and Steelhead Trout 1988)

The California Advisory Committee on Salmon and Steelhead Trout was established by California legislation in 1983 to develop a strategy for the conservation and restoration of salmon and steelhead resources in California. To streamline its process, the committee divided California's steelhead and salmon resources into 11 groups—the Project is located in the San Joaquin River System. The report focuses mostly on the Central Valley: the Project area was not identified specifically. The committee recommended among other things that California should seek to double its steelhead and salmon populations, and recommended strategies to do so. Many of the recommendations were advanced and discussed in subsequent related publications described below.

Central Valley Salmon and Steelhead Restoration and Enhancement Plan (CDFG 1990)

This plan was released by CDFG in April 1990. This plan is intended to outline CDFG's restoration and enhancement goals for salmon and steelhead resources of the Sacramento and San Joaquin river systems and to provide direction for various CDFG programs and activities. This plan is also intended to provide the basis for the restoration and enhancement of the state's salmon and steelhead resources.

Restoring Central Valley Streams (CDFG 1993)

This plan was released by CDFG in November 1993. The goals of the plan, all targeted toward anadromous fish, are to restore and protect California's aquatic ecosystems that support fish and wildlife, to protect threatened and endangered species, and to incorporate the state legislature mandate and policy to double populations of anadromous fish in California. The plan encompasses only Central Valley waters accessible to anadromous fish, excluding the Sacramento-San Joaquin Delta.

Steelhead Restoration and Management Plan for California (CDFG 1996)

This plan was released by CDFG in February 1996. This plan focuses on restoration of native and naturally produced (wild) stocks because these stocks have the greatest value for maintaining genetic and biological diversity. Goals for steelhead restoration and management are: (1) increase natural production, as mandated by The Salmon, Steelhead Trout, and Anadromous Fisheries Program Act of 1988, so that steelhead populations are self-sustaining and maintained in good condition and (2) enhance angling opportunities and non-consumptive uses.

Final Restoration Plan for Anadromous Fish Restoration Program (USFWS 2001)

This plan was released by USFWS as a revised draft on May 30, 1997 and adopted as final on January 9, 2001. This plan identifies restoration actions that may increase natural production of anadromous fish in the Central Valley of California. This plan is split up into watersheds within the Central Valley and restoration actions are identified for each watershed. It also lists the involved parties, tools, priority rating, and evaluation of each restoration action. The plan encompasses only Central Valley waters accessible to anadromous fish, including the Sacramento-San Joaquin Delta.

5.12.1.5 Recreation Resources

California Outdoor Recreation Plan (CDPR 1994)

The objectives of California Department of Parks and Recreation (CDPR) California Outdoor Recreation Plan (CORP), the most recent version of which is 2002, are to determine outdoor recreation issues that are currently the problems and opportunities most critical in California, and to explore the most appropriate actions by which State of California, federal and local agencies might address these issues. The CORP also provides valuable information on the state's recreation policy, code of ethics, and statewide recreation demand, demographic, economic, political, and environmental conditions. The plan lists the following major issues: (1) improving resource stewardship; (2) serving a changing population; (3) responding to limited funding; (4) building strong leadership; (5) improving recreation opportunities through planning and research; (6) responding to the demand for trails; and (7) halting the loss of wetlands. The CORP applies to state and local parks and recreation agencies, and does not apply to federal and private-sector recreational providers.

Because none of the recreation facilities in the Project area are state or local parks, the CORP has little direct application to the Project other than general guidance.

Public Opinions and Attitudes in Outdoor Recreation (CDPR 1998)

CDPR's Public Opinions and Attitudes in Outdoor Recreation survey (POAOR), the most recent version of which is 2002, provides information used in the development of the CDPR's CORP. The POAOR identifies: (1) California's attitudes, opinions, and values with respect to outdoor recreation; and (2) demand for and participation in 42 selected outdoor recreation activities.

As with the CORP, this document applies to state and local parks and recreation agencies, and has little direct application to the Project other than general guidance.

Recreation Needs in California (The Resources Agencies 1983)

In response to the Roberti-Z'berg Urban Open Space and Recreation Program Act of 1976, the CDPR conducted a statewide recreational needs assessment. The report consisted of two major elements: (1) the Recreation Patterns Study that surveyed current participation and projected recreation demand; and (2) the Urban Recreation Case Studies that examined the leisure behavior and needs of seven underserved populations. The purpose of the needs analysis was to: (1) develop statewide recreation planning data; (2) analyze the recreation needs of California's urban residents; and (3) modify project selection criteria used in the administration of grants to local agencies under the Roberti-Z'berg Act.

In general, this report is a wide-ranging, programmatic document providing guidance for statewide planning. The urban-specific study has little relevance to the Project area, which is mostly remote.

The Recreational Fisheries Policy of the USFWS (USFWS 1989)

This is a 12-page policy signed by John F. Turner, then Director of the USFWS, on December 5, 1989. Its purpose is to unite all of the USFWS' recreational fisheries capabilities under a single policy to enhance the nation's recreational fisheries. Regional and Assistant directors are responsible for implementing the policy by incorporating its goals and strategies into planning and day-to-day management efforts. The USFWS carries out this policy relative to FERC-licensed hydroelectric projects through such federal laws as the Fish and Wildlife Coordination Act (FWCA), the CWA, the ESA, NEPA, and the FPA, among others.

5.12.1.6 Land Use

The Nationwide Rivers Inventory (NPS 1982)

The Nationwide Rivers Inventory (NRI) is a listing by the USDOI, NPS of more than 2,400 free-flowing river segments in the U.S. that are believed to possess one or more "outstandingly remarkable" natural or cultural values (ORV) judged to be of more than local or regional significance. In addition to these eligibility criteria, river segments are divided into three classifications: Wild, Scenic, and Recreational river areas. Under a 1979 Presidential Directive and related Council on Environmental Quality procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect one or more NRI segments. Such adverse impacts could alter the river segment's eligibility for listing and/or alter their classification.

5.12.2 Non-Qualifying Comprehensive Plans and Agreements

SWRCB 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary

The Bay-Delta is important to the natural environment and economy of California. The watershed of the San Francisco Bay-Delta provides drinking water to two-thirds of the State's population and water for a multitude of other urban uses, and it supplies some of the State's most productive agricultural areas, both inside and outside of the Bay-Delta. The Bay-Delta itself is one of the largest ecosystems for fish and wildlife habitat and production in the U.S.

The SWRCB adopted a new water quality control plan for the San Francisco Bay-Delta in May 1995. The 1995 Bay-Delta Plan identified 17 beneficial uses, both within the Delta and throughout the State, to be served by the waters of the Delta. These uses fell into three broad categories: (1) municipal and industrial; (2) agricultural; and (3) and fish and wildlife. The 1995 Bay-Delta Plan then identified water quality objectives with respect to each of these categories of uses to attain the highest water quality that is reasonable, considering all demands being made on the waters of the San Francisco Estuary. The SWRCB established various salinity objectives for the reasonable protection of agriculture as a beneficial use from the effects of salinity intrusion and agricultural drainage in the western, interior, and southern Bay-Delta. To protect fish and wildlife uses, the SWRCB's plan established objectives for six parameters: (1) dissolved oxygen; (2) salinity; (3) amounts of Delta outflow; (4) river flows; (5) export limits; and (6) Delta cross-channel gate operation. The plan also included a narrative objective for salmon protection.

In addressing implementation of the objectives in the 1995 Bay-Delta Plan, the SWRCB divided the program of implementation into four general components: (1) measures within the SWRCB's authority over water diversion and use which implement the water quality objectives; (2) measures requiring a combination of the SWRCB's water quality and water rights authorities and actions by other agencies to implement the objectives; (3) recommendations to other agencies to improve fish and wildlife habitat conditions; and (4) a monitoring and special studies program.

In November 1997, the SWRCB issued a draft environmental impact report for implementation of the 1995 Bay-Delta Plan. The following month, the SWRCB issued a notice of public hearing, setting hearing dates for the water rights proceeding in which the SWRCB would allocate responsibility for implementing the flow-dependent objectives of the 1995 Bay-Delta Plan.

Ultimately, the SWRCB divided the public hearing into eight phases. The hearing convened on July 1, 1998, and continued off and on until July 6, 1999. On December 29, 1999, the SWRCB certified the final EIR and issued Decision 1641. On March 15, 2000, following the filing of various petitions for reconsideration, the SWRCB issued its order denying petitions for reconsideration and amending Decision 1641.

The SWRCB commenced a new proceeding to amend the 1995 Bay-Delta Plan on September 29, 2006 by issuing a notice of public hearing. The draft amended Bay-Delta Plan and accompanying appendices, including environmental documentation, accompanied the Notice of Public Hearing. Prior to commencing this proceeding, the SWRCB conducted a series of workshops in 2004 and 2005 to receive information on specific topics addressed in the Bay-Delta Plan. The SWRCB sent notice of all workshops to all parties who indicated an interest in receiving notice.

The SWRCB adopted the revised Plan (2006 Plan) on December 13, 2006. The 2006 Plan supersedes the 1995 Bay-Delta Plan as well as the plans that preceded 1995 Bay-Delta Plan. The 2006 Plan made only minor changes to the 1995 Plan and the program of implementation. No changes were made to the beneficial uses.

In August 2008, the SWRCB announced plans to review and possibly amend the 2006 Plan pursuant to Water Code Section 13240 to ensure that it continues to provide reasonable protection for the designated beneficial uses. The amendment will include the preparation of environmental documentation as required by CEQA. The SWRCB anticipates considering adoption of the changes to the 2006 Plan by December 2011.

San Joaquin River Agreement

The San Joaquin River Group Authority (SJRGA), BLM, USFWS, CDWR, CDFG, and others executed the San Joaquin River Agreement (SJRA) to implement a program to acquire water to be used to provide protective measures for fall-run Chinook salmon in the San Joaquin River system and to support the San Joaquin River flow objectives of the 1995 Water Quality Control Plan for the Bay-Delta. The water would be used to provide: (1) a pulse flow for a 31-day period at Vernalis during April and May in support of the VAMP; and (2) other flows to facilitate migration and attraction of anadromous fish, including fall attraction flows. Parties to the SJRGA include the Oakdale, South San Joaquin, Modesto, Turlock, and Merced irrigation districts; the City and County of San Francisco; the San Joaquin River Exchange Contractors Water Authority; and the Friant Water Users Authority. The SJRA is discussed in Section 3.0 of this PAD.

Bay-Delta Conservation Plan

The Bay-Delta Conservation Plan (BDCP) is anticipated to provide for water supply reliability and the recovery of listed species through a Habitat Conservation Plan (HCP) under federal law and a Natural Community Conservation Plan (NCCP) under state law. The BDCP process is intended to provide incidental take authorizations pursuant to Section 10 of the ESA and California Fish and Game Code Section 2835 and/or 2081 to allow the incidental take of threatened and endangered species resulting from covered activities and conservation measures identified through the planning process, including those associated with water operations of the State Water Project and the federal Central Valley Project. The BDCP will include a wide range of conservation actions including: habitat restoration, protection, and enhancement; conveyance facilities; water operations and management; monitoring, assessment, and adaptive management; cost and funding; and governance structure and decision making.

The BDCP is being prepared by a coalition that includes Bureau of Reclamation (BOR), CDWR, Mirant Delta LLC, and the water supply contractors of the Central Valley Project and the State Water Project. Also participating in its preparation are USFWS, NMFS, the California Resources Agency, CDFG, SWRCB, and various relicensing participants, including the Nature Conservancy, Environmental Defense, Defenders of Wildlife, the California Farm Bureau, the Natural Heritage Institute (NHI), American Rivers, Contra Costa Water District, and the Bay Institute. These organizations are members of the Steering Committee that is helping to guide preparation of the BDCP. The regulatory agencies, USFWS, NMFS, CDFG and SWRCB are participating in the Steering Committee to provide technical input and guidance in support of the Steering Committee's efforts to complete the BDCP.

CDWR is currently evaluating the environmental impacts of the BDCP. A joint EIR/EIS for the BDCP is being prepared. CDWR will serve as the lead agency under CEQA, and will work in cooperation with the federal lead and co-lead agencies: BOR, NMFS, and FWS.

The draft EIR/EIS was expected to be ready for public review and comment by the end of 2010.

Delta Vision

Delta Vision was created by Executive Order S-17-06 of Governor Arnold Schwarzenegger on September 17, 2006, to find a durable vision for sustainable management of the Sacramento-San Joaquin Delta, so it could continue to support environmental and economic functions critical to the people of California.

In February 2007, the Governor appointed an independent seven-member Delta Vision "Blue Ribbon" Task Force responsible for recommending future actions to achieve a sustainable Delta.

The Task Force was to evaluate the existing and proposed land and water uses, ecosystem functions and processes, and management practices in the Delta. Alternative Delta management scenarios were to be identified and evaluated. The Task Force was to recommend natural values and functions, services, and management practices to be considered priorities for future management as part of a sustainable Delta.

In December 2007, the Task Force issued its Delta Vision, which includes 12 linked recommendations and several proposed near-term actions to protect the Delta ecosystem and the state's water supply.

These implementation recommendations involved considering changes in the use of land and water resources, services to be provided within the Delta, governance, funding mechanisms and ecosystem management practices. The final Task Force Strategic Plan recommendations were issued in October 2008.

BLM Sierra Resources Management Plan

BLM's Sierra Resource Management Plan (SRMP) was developed to address necessary administrative changes in resource uses, and the need for BLM to coordinate resource protection protocols between Nevada and California agencies.

The BLM manages areas within the Tuolumne River basin for specific purposes. Three areas are managed as ACEC: Limestone Salamander, Merced River, and Bagby Serpentine. Two areas along the mainstem Merced River below the Merced River Gorge are managed as the Merced River Wilderness Study Area (WSA) and Merced River Special Recreation Management Area (SRMA). Additionally, the BLM designates two Fire Management Units (FMU) in the basin: the larger Merced FMU covers most of the upper watershed, while the smaller Merced River FMU focuses on the area near the Merced River WSA and SRMA.

Draft Salmon and Steelhead Recovery Plan (NMFS 2009)

On November 7, 2009, NMFS announced that its draft Central Valley Salmon and Steelhead Recovery Plan was available for public review and comment. On November 24, 2009, NMFS extended the deadline for public comments on this draft plan to February 3, 2010.

ESA recovery plans are authorized by section 4(f) of the ESA. Recovery plans are guidance documents, not regulatory documents. NMFS's November 7, 2009 notice states that the ESA envisions that recovery plans are the central organizing tools for guiding the recoveries of listed species, that recovery plans guide federal agencies in fulfilling their obligations under section 7(a)(1) of the ESA, and that recovery plans provide a context and framework for implementing other provisions of the ESA with respect to a particular species, including consultations under section 7(a)(2) of the ESA and the development of habitat conservation plans under section 10(a)(1(B) of the ESA.

The draft Central Valley Salmon and Steelhead Recovery Plan addresses the Sacramento River winter-run Chinook salmon ESU, the Central Valley spring-run Chinook salmon ESU and the DPS of Central Valley steelhead. The draft plan describes recovery strategies, lists recovery goals, objectives and criteria, and proposes recovery scenarios and numerous recovery actions throughout the Central Valley.

7.0 LITERATURE CITED

Abrahamson, N.A. and W.J. Silva. 1997. Empirical response spectral attenuation relations for shallow crustal earthquakes: Seismological Research Letters, v. 68, no. 1, p. 94-127.

Alvarez, J.A. 2004a. Overwintering California tiger salamander (*Ambystoma californiense*) larvae. Herpetological Review.

——. 2004b. Use of artificial egg laying substrate to detect California tiger salamanders (*Ambystoma californiense*). Herpetological Review.

AmphibiaWeb. 2010. Information on Amphibian Biology and Conservation. Web application. [Online] URL: http://amphibiaweb.org. (Accessed August 2, 2010.)

Ashton, D.T., A.J. Lind, and K.E. Schlick. 1997. Western Pond Turtle (*Clemmys marmorata*). Natural History. UCDA Forest Service, Pacific Southwest Research Station, Arcata, California. [Online] URL: http://www.krisweb.com/biblio/gen_usfs_ashtonetal_ 1997_turtle.pdf. (accessed July 30, 2010.)

Aukerman, R., G, Haas, and E. Scheuster. 2008. Water Recreation Opportunity Spectrum. U.S. Department of the Interior Bureau of Relcamation and California Department of Parks and Recreation.

Avendian, C. 1978. Yosemite Nature Notes: Article on website created by Dan Anderson. [Online] URL: http://www.yosemite.ca.us/library/yosemite_nature_notes/47/3/plate_ tectonics.html. (Accessed September 2010.)

Barnhart, R.A. 1991. Steelhead (*Oncorhynchus mykiss*). Stackpole Books.

Bechtel Corporation. 1972. Operations and Maintenance Manual, Volumes 1 and 2. Prepared for Modesto Irrigation District and Turlock Irrigation District.

Behler, J.L., F.W. King. 1979. The Audubon Society field guide to North American reptiles and amphibians. Alfred A. Knopf, New York, New York.

Behnke, R.J. 1992. Native trout of western North America. American Fisheries Society.

Bisson, P.A., J.L. Nielsen, R.A. Palmason, and L.E. Gore. 1988. Summer production of coho salmon stocked in Mount St. Helens streams from three to six years posteruption. Western Division American Fisheries Society.

Bolster, B.C. 1998. Species accounts, western red bat. Developed for the 1998 Reno biennial meeting, updated at the 2005 Portland biennial meeting. Western Bat Working Group. [Online] URL: http://www.wbwg.org/speciesinfo/species_accounts/vespertilonidae/ labl.pdf. (Accessed August 27, 2010.)

Bogen, N.L. 1985. Stratigraphic and sedimentologic evidence of a submarine island-arc volcano in the lower Mesozoic Penon Blanco and Jasper Point Formations: Geological Society of America Bulletin, v. 96, p. 1322-1331.

Brown, L.R., and P.B. Moyle. 1993. Distribution, Ecology, and Status of the Fishes of the San Joaquin River Drainage. California Fish and Game: Conservation of Wildlife through Education, Volume 79, summer1993, Number 3, Page 96.

Broyles, P. 1987. A flora of the Vina Plains Preserve, Tehama County, California. Madroño.

Burchfiel, B.C. and G.A. Davis. 1982. Structural framework and evolution of the southern part of the Cordilleran orogen, western United States: American Journal of Science, v. 272, p. 97-118.

Bureau of Land Management. 1978. Species observations from the Don Pedro Grasslands. Unpublished Field Data Report. Mother Lode Field office, El Dorado Hills, California.

——. 1980. Fisheries Inventory of Sierra Foothill Streams on Public Land in 1979 and 1980. U.S. Department of Interior, Bureau of Land Management Mother Lode Field Office, El Dorado Hills, California.

——. 1985. Final Red Hills Management Plan and Environmental Assessment. Bureau of Land Management Bakersfield District, Bakersfield, California.

——. 2006. California-BLM sensitive species list, updated September 2006. U.S. Department of the Interior, Bureau of Land Management Mother Lode Field office, El Dorado Hills, California. [Online] URL: http://www.blm.gov/. (Accessed July 9 and 16, 2010.)

——. 2008. Sierra Resource Management Plan and Record of Decision. U.S. Department of the Interior, Bureau of Land Management Mother Lode Field office, El Dorado Hills, California.

——. 2009. The Red Hills of Tuolumne County. [Online] URL: http://www.blm.gov/ca/st/en/fo/folsom/redhillshomepg1.html/. (Accessed September 2010.)

——. 2010. The Red Hills Management Area: informational website. Available online at: http://www.blm.gov/ca/st/en/fo/folsom/redhills.html.

Busby, P.J., T.C. Wainwright, and G.J. Bryant. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, NOAA Technical Memorandum, NMFS-NWFSC.

Bustard, D.R., and D.W. Narver. 1975. Aspects of the winter ecology of juvenile coho salmon and steelhead trout. Journal of Fisheries Research Board of Canada.

CALFED Bay Delta Program. 2000. Ecosystem restoration program plan, strategic plan for ecosystem restoration. Final Programmatic EIS/EIR Technical Appendix. Available online at: http:/calfed.ca.gov/Programs/EcosystemRestoration/EcosystemVol3 RestorationPlan.shtml.

California Academy of Sciences. 2010. Online Data Request, July 26, 2010. California Academy of Sciences San Francisco, California. Queried Herpetology Collection

Database. California Academy of Sciences, San Francisco, California. [Online] URL: http://research.calacademy.org/redirect?url=http://researcharchive.calacademy.org/research/herpetology/catalog/index.asp. (Accessed July 26, 2010.)

California Data Exchange Center. 2010. California Data Exchange Center. California Department of Water Resources website. [Online] URL: http://cdec.water.ca.gov/. (Accessed July 2010.)

California Depatment of Boating and Waterways. 2006. California Department of Boating and Waterways Report. [Online] URL: http://www.dbw.ca.gov/Reports/BSRs/5year SummaryWaterBodies.pdf. (Accessed September 2010.)

——. 2007. Executive Summary. [Online] URL: http://www.dbw.ca.gov/Reports/BSRs/2007/PDF/ExecSum.pdf. (Accessed September 2010.)

California Department of Finance. 2007. E-1 Populations Estimates for Cities, Counties and the State with annual Percent Change. California Department of Finance, Sacramento, California. [Online] URL: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1_2006-07/documents/E-1table.xls. (Accessed June 2010.)

——. 2009. E-1 Populations Estimates for Cities, Counties, and the State with annual Percent Change. California Department of Finance, Sacramento, California. [Online] URL: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/2009-10/documents/E-1_2010.xls. (Accessed June 2010.)

——. 2010. California Census Data, Demographic Surveys and Population Projections. California Department of Finance, Sacramento, California. [Online] URL: http://www.dof.ca.gov/research/demographic/reports/view.php. (Accessed September 2010.)

California Department of Fish and Game. 1946. Division of Fish and Game thirty-ninth biennial report for 1944-1946. California Department of Fish and Game.

——. 1990. Central Valley Salmon and Steelhead Restoration and Enhancement Plan. Sacramento, California. April 1990. 115 pp.

——. 1993. Restoring Central Valley Streams: A Plan for Action. Sacramento, California. November 1993. 129 pp.

——. 1996. Steelhead restoration and management plan for California. California Department of Fish and Game, Sacramento, California.

——. 2000. The Status of Rare, Threatened, and Endangered Animals and Plants of California 2000. California Department of Fish and Game, Sacramento, California.

——. 2008. California Wildlife Habitat Relationship system. Version 8.2 personal computer. California Interagency Wildlife Task Group. CDFG Sacramento, California.

——. 2009. List of Special Animals (883 Taxa). State of California, Resources Agency, Department of Fish and Game, Biogeographic Data Branch, California Natural Diversity Database, Sacramento, California. [Online] URL: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPAnimals.pdf. (Accessed July 28, 2010.)

——. 2010a. List of State and Federally Listed Endangered and Threatened Plants and Animals of California. State of California, Resources Agency, Department of Fish and Game, Biogeographic Data Branch, California Natural Diversity Database, Sacramento, California. [Online] URL: http://www.dfg.ca.gov/biogeodata/cnddb/plants_and_animals.asp. (Accessed July 28, 2010.)

——. 2010b. California Natural Diversity Database: A Program that Inventories the Status and Locations of Rare Plants and Animals in California. State of California, Resources Agency, Department of Fish and Game, Biogeographic Data Branch, California Natural Diversity Database, Sacramento, California. [Online] URL: http://www.dfg.ca.gov/biogeodata/cnddb/. (Accessed July 15, 2010.)

——. 2010c. Schedule for fish stocking. California Department of Fish and Game website. [Online] URL: http://www.dfg.ca.gov/fish/Hatcheries/FishPlanting/Central.asp. (Accessed September 2010.)

——. 2010d. California Freshwater Sport Fishing Regulations. [Online] URL: http://www.dfg.ca.gov/regulations/FreshFish/. (Accessed September 2010.)

California Department of Fish and Game and U. S. Fish and Wildlife Service. 2010. Hatchery and stocking program Environmental Impact Report/Environmental Impact Statement. Prepared for agencies by Jones and Stokes, Sacramento, California. [Online] URL: http://www.dfg.ca.gov/news/pubnotice/hatchery/. (Accessed July 26, 2010.

California Department of Water Resources. 1994. California Water Plan Update 1993. Bulletin 160-93. October. Available online at: http://www.waterplan.water.ca.gov/previous/b160-93/TOC.cfm.

——. 2001. Draft Memorandum Report on the Application of CALSIM II Model st 2020 Level-of-Development. California Department of Water Resources, Sacramento, California.

——. 2004. California's Groundwater Bulleting 118: San Joaquin Valley Groundwater Basin, Modesto Subbasin. Sacramento, California.

——. 2010a. Water Quality Report of Tuolumne River at Shiloh, 1998 and 1999. [Online] URL: http://www.water.ca.gov/waterdatalibrary/waterquality/index.cfm. (Accessed August 2010.)

——. 2010b. Hourly and Daily Data for Tuolumne River at Modesto. California Department of Water Resources. [Online] URL: http://cdec.water.ca.gov/wquality/MOD. (Accessed August 2010.)

California Employment Development Department. 2010. Quarterly Census for Employment and Wages. Available online at: http://www.labormarketinfo.edd.ca.gov/cgi/dataanalysis/AreaSelection.asp?tableName=labforce

California Herps. 2010. *Thamnophis couchii* - Sierra Gartersnake. California Herps Website. [Online] URL: http://www.californiaherps.com/snakes/pages/t.couchii.html. (Accessed August 2, 2010.)

California Native Plant Society. 2010. Inventory of Rare and Endangered Plants. California Native Plant Society, Sacramento, California. [Online] URL: cnps.site.aplus.net/cgi-bin/inv/inventory.cgi. (Accessed July 6, 2010.)

California River Restoration Fund. 2004. California Rivers Restoration Fund. Adult *O. mykiss* habitat in the lower Tuolumne River. Prepared for the Tuolumne River Technical Advisory Committee, Modesto, California.

California Whitewater. 2010. Guide to Rafting and Kayaking. [Online] URL: http://www.californiawhitewater.com/. (Accessed September 2010.)

California Whitewater Rafting. 2010. A Guide to Whitewater Rafting on the Tuolumne River. [Online] URL: http://www.tuolumne-river.com/. (Accessed September 2010.)

Campbell, E.W.C. and W.H. Campbell. 1935. The Pinto Basin Site. Southwest Museum Papers 9. Los Angeles, California.

Carlson, D.H., T.N. Manley, and J. Vervoort. 2005. Cretaceous deformation along the Shoo Fly - Feather River Belt Fault - evidence from U-Pb dating of folded dikes along the middle fork of the American River, California: Geological Society of America, Abstracts with Program, v. 37, no. 4, p. 74.

Carlson, D.H., P.N. Wilson, and M. Heizler. 1997. Structural analysis and preliminary Ar/Ar dating results from the Shoo Fly Complex along the Middle Fork of the American River, CA: Geological Society of America, Abstracts with Program, v. 29, no. 6, p. 234.

Central Valley Regional Water Quality Control Board. 1998. The Water Quality Control Plan (Basin Plan) for the Sacramento River Basin and the San Joaquin River Basin. 4th ed. California Regional Water Quality Control Board, Central Valley Region, Sacramento, Calfornia. [Online] URL: http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans. (Accessed August 2010.)

——. 2009a. 2008 Clean Water Act Sections 305(b) and 303(d) Integrated Report for the Central Valley Region. California Regional Water Quality Control Board, Central Valley Region. [Online] URL: http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/impaired_waters_list/303d_list.shtml. (Accessed August 2010.)

——. 2009b. San Joaquin River Basin: Main Stem and Drainage Basin Sites. October 2000-2005. California Regional Water Quality Control Board, Central Valley Region. [Online] URL: http://www.swrcb.ca.gov/rwqcb5/water_issues/water_quality_ studies/surface_water_ambient_monitoring/swamp_water_quality_reports/index.shtml#sjrivbasin. (Accessed August 2010.)

——. 2010. San Joaquin River Basin Rotational Sub-basin Monitoring: Eastside Basin: January 2003-April 2004. (Stanislaus, Tuolumne, and Merced River Watersheds and Farmington and Valley Floor Drainage Areas). California Regional Water Quality Control Board, Central Valley Region, Sacramento, Calfornia. [Online] URL: http://www.swrcb.ca.gov/rwqcb5/water_issues/water_quality_studies/surface_water_ambient_monitoring/swamp_water_quality_reports/index.shtml#sjrivbasin. (Accessed August 2010.)

City and County of San Francisco. 2006. Tuolumne River System and HHWP Fast sheet. San Francisco, California

City of Hughson. 2007. Reconnaissance Level Biological Survey for Highson Wastewater Treatment Plant. Quad Knopf, Visalia, California.

Clark, D.H. 1995. Extent, Timing and Climatic Significance of the Latest Pleistocene and Holocene Glaciation in the Sierra Nevada, California. A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy. Department of Geological Sciences, University of Washington.

Clark, L.D. 1960. Foothills Fault System, western Sierra Nevada, California: Geological Society of America Bulletin, v. 71, p. 483-496.

——. 1964. Stratigraphy and structure of a part of the western Sierran Nevada metamorphic belt: U.S. Geological Survey, Professional Paper 410, 70p.

Clark, L.D. and N.K. Huber. 1975. Geologic observations and sections along selected stream traverses, northern Sierra Nevada metamorphic belt, California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-690, scale 1:62,500.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior Fish and Wildlife Service, Office of Biological Services, Washington, D.C.

Crampton, B. 1959. The grass genera Orcuttia and Neostapfia: a study in habitat and morphological specialization. Madroño.

Davis, J.A., A.R. Melwani, S.N. Bezalel, J.A. Hunt, G. Ichikawa, A. Bonnema, W.A. Heim, D. Crane, S. Swenson, C. Lamerdin, and M. Stephenson. 2009. Contaminants in Fish from California Lakes and Reservoirs: Technical Report on Year One of a Two-Year Screening Survey. A Report of the Surface Water Ambient Monitoring Program (SWAMP). California State Water Resources Control Board, Sacramento, California. March 10, 2009. [Online] URL: http://www.swrcb.ca.gov/water_issues/programs/swamp/docs/lakes_study/lakes_report_y1.pdf. (Accessed July 28, 2010.)

——. 2010. Contaminants in Fish from California Lakes and Reservoirs, 2007-2008: Summary Report on Two-Year Screening Survey. Surface Water Ambient Monitoring Program

(SWAMP). California State Water Resources Control Board, Sacramento, California. May 14, 2010. [Online] URL: http://www.swrcb.ca.gov/water_issues/programs/swamp/docs/lakes_study/lake_survey_yr2_full_rpt.pdf, September 2010.

Day, H.W., E.M. Moores, and A.C. Tuminas. 1985. Structure and tectonics of the northern Sierra Nevada: Geological Society of America Bulletin, v. 96, p. 436-450.

deBecker, S. and A. Sweet. 2005. Crosswalk between WHR and California vegetation classifications. Pages 21-39 *in*: K.E. Mayer and W.F. Laudenslayer, eds. 1988. A Guide to Wildlife Habitats of California. Update from 1988. The Resources Agency, Department of Forestry and Fire Protection, Sacramento, California. [Online] URL: http://www.dfg.ca.gov/biogeodata/cwhr/pdfs/XCalVeg.pdf. (Accessed August 27, 2010.)

de Vlaming, V. 2008. Organochlorine Pesticides and Polychlorinated Biphenyls (PCB) Concentrations in Muscle Tissue of Fish Collected from the San Joaquin River and Sacramento River Watersheds and Delta During 2005. California Regional Water Quality Control Board, Central Valley Region. [Online] URL: http://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_studies/surface_water_ambient_monitoring/devlaming_rpt.pdf. (Accessed September 2010.)

DeLorme. 2003. Northern California Atlas and Gazetteer. Sixth Edition. DeLorme, Yarmouth, Maine.

Detrich, P.J. 1979. Bald Eagle Winter Habitat on BLM Lands in California. Bureau of Land Management.

Devine, Tarbell & Associates, Inc. 2008. Geological, Seismological, and Geotechnical Investigation Report; in Red Mountain Bar Pumped Storage Project Feasibility Study, Volume 4: unpublished consulting report, 55 pp.

Dickinson, W.R. 1981. Plate tectonics and the continental margin of California, *in*, W.G. Ernst, ed., The Geotectonic Development of California: Engelwood Cliffs, N.J., Prentice Hall, Inc., p. 1-28.

Dill, W.A, and A.J. Cordone. 1997. History and status of introduced fishes in California, 1871-1996. California Department of Fish and Game Fish Bulletin 178. [Online] URL: http://www.escholarship.org/uc/item/5rm0h8qg#page-1. (Accessed August 2, 2010.)

Don Pedro Recreation Agency. 2008. 2008 Davis-Grunsky Recreation Data. Unpublished data summary from Don Pedro Recreation Agency.

——. 2009. Recreation Facilities and Operations. Unpublished presentation from Don Pedro Recreation Agency.

——. 2010. Don Pedro Lake Website, fish stocking information. [Online] URL: http://donpedrolake.com/RecreationArea/Fishing/index.htm. (Accessed September 2010.)

Drost, C.A., and G.M. Fellers. 1996. Collapse of a Regional Frog Fauna in the Yosemite Area of the California Sierra Nevada, USA. Conservation Biology 10(2):414-425. [Online] URL: http://www.fort.usgs.gov/Products/Publications/2963/2963.pdf. (Accessed July 30, 2010.)

Dubrovsky, N.M., C.R. Kratzer, L.R. Brown, J.M. Gronberg, and K.R. Burow. 1998. Water Quality in the San Joaquin-Tulare Basins, California, 1992-95. U.S. Geological Survey, Sacramento, California. [Online] URL: http://pubs.usgs.gov/circ/circ1159/circ1159.pdf. (Accessed August 2010.)

EES Consulting. 2006. Compliance Audit Report: Don Pedro Hydroelectric Project, FERC No. 2299 Report and Source Documents. Prepared for Modesto Irrigation District and Turlock Irrigation District.

EIP Associates. 1999. UC Merced/UC community planning area 1999 specialstatus plant survey report. Unpblished report to the University of California and Merced County, Sacramento, California.

Elasser, A.B. 1960. The Archaeology of the Sierra Nevada in California and Nevada. University of California Archaeological Survey Reports 51:1-93. Berkeley, California.

Eng, L., D. Belk, and C.H. Eriksen. 1990. Californian Anostraca: distribution, habitat, and status. Journal of Crustacean Biology.

Eriksen, C.H. and D. Belk. 1999. Fairy shrimps of California's puddles, pools, and playas. Mad River Press, Eureka, California.

ESA. 2007. Tuolumne County Water Quality Plan. Tuolumne County, Tuolumne, California. [Online] URL: http://www.tcrcd.org/attachments/010_Final%20Tuolumne%20County%20Water%20Quality%20Plan.pdf. (Accessed August 2010.)

Everest, F.H., G.H. Reeves, J.R. Sedell, J. Wolfe, D. Hohler, and D.A. Heller. 1986. Abundance, behavior, and habitat utilization by coho salmon and steelhead trout in Fish Creek, Oregon, as influenced by habitat enhancement. U.S. Forest Service.

Federal Energy Regulatory Commission. 1961. Before Federal Power Commission Application for License for New Don Pedro Project, Tuolumne River, California. TID and MID, Stanislaus and Merced Counties, California.

——. 1995. Order Amending License and Revising Annual Charges. Federal Energy Regulatory Commission. Issued September 20, 1995.

Federal Power Commission. 1964. Turlock Irrigation District and Modesto Irrigation District Project No. 2299, Opinion No. 420, Opinion and Order Issuing License, March 10, 1964. 31 FPC 510; 1964 FPC Lexis 150.

Fields, W.C. 1984. The Benthos of the Tuolumne River and Selected Tributaries, July 1984. Hydrozoology.

Fitting, J.E., J. Costello, and H. Crew (compilers). 1979. Cultural Resources Mitigation Program, New Melones Lake Project, Phase 1 (draft report).

Fitzwater, R.J. 1962. Final Report on Two Seasons Excavations at El Portal, Mariposa County, California. University of California Archaeological Survey Annual Report 1961-1962:235-282. Los Angeles.

Ford, D., L. Grober, T. Harmon, J. Lunch, and D. McKinney. 2006. Review Panel Report San Joaquin Valley CalSim II Model Review. CALFED Science Program - California Water and Environment Modeling Forum.

Ford, T. and L.R. Brown. 2001. Distribution and Abundance of Chinook Salmon and Resident Fishes of the Lower Tuolumne River, California. Fish Bulletin.

——. 2002. Effects of flow on the fish communities of a regulated California river: implications for manageing native fishes. River Research and Applications 18: 331-342.

Ford, T and S. Kirihara. 2010. Tuolumne River *Oncorhynchus mykiss* monitoring report. Prepared by Turlock Irrigation District/Modesto Irrigation District, California and Stillwater Sciences, Berkeley, California for Federal Energy Regulatory Commision, Washington, D.C. January.

Fraser, W.A. 1996. Seismic source characterization for dam site analysis in California, in Earthquake Engineering for Dams: Proceedings of 1996 Western Regional Technical Seminar, Association of State Dam Safety officials, Sacramento, California, Aprill11-12, cited in HDR Engineering and Geomatrix Consultants, 2000, Review of seismic sources and ground motions for Don Pedro Dam: Memorandum to Turlock Irrigation District, July 24, 2000, 8p, 2 figures.

Frost, D.R., T. Grant, J. Faivovich, R.H. Bain, A. Haas, C.F.B. Haddad, R.O. De Sa, A. Channing, M. Wilkinson, S.C. Donnellan, C.J. Raxworthy, J.A. Campbell, B.L. Blotto, P. Moler, R.C. Drewes, R.A. Nussbaum, J.D. Lynch, D.M. Green, W.C. Wheeler. 2006. The Amphibian Tree of Life. Bulletin of The American Muesum of Natural History 297, 370 p., 71 figures, five tables, seven appendices.

Fry, D.H. 1961. King salmon spawning stocks of California Central Valley, 1940-1959. Calif. Fish and Game, 47(1):55-71.

Fry, D.H. and A. Petrovich, Jr. 1970. King salmon, *Oncorhynchus tshawytscha*, spawning stocks of the California Central Valley, 1953-1969. Calif. Dept. Fish and Game, Anad. Fish. Admin. Rep. No. 70-11, 21p.

Fuller, A.N. and M. Simpson. 2005. Presence, relative abundance, and distribution of fishes at Grayson River Ranch. Draft Report. Submitted to East Stanislaus Resource Conservation District by S. P. Cramer & Associates, Gresham, Oregon.

Gallagher, S.P. 1996. Seasonal occurrence and habitat characteristics of some vernal pool branchiopoda in northern California, U.S.A. Journal of Crustacean Biology.

Gefell, M.J., R.J. Twiss, and E.M. Moores. 1989. Ductile and brittle shear sense for the "Melones Fault zone", northern Sierra Nevada, California: Geological Society of America, Abstracts with Program, v. 21, p.83.

Germano, D.J. and R.B. Bury. 2001. Western Pond Turtles (*Clemmys marmot*) in the Central Valley of Californai: Status and Populations Structure. The Wildlife Society 37: 22-36

Glazner, A.F. 1991. Plutonism, oblique subduction, and continental growth: an example from the Mesozoic of California: Geology, v. 19, p. 784-786.

Good, T.P., R.S. Waples, and P. Adams (editors). 2005. Updated status of federally listed ESUs of west coast salmon and steelhead. U.S. Department of Commerce, NOAA Technical Memorandum, NMFS-NWFSC.

Great Outdoor Recreation Pages. 2009. Tuolumne River. [Online] URL: http://www.gorp.com/parks-guide/travel-ta-tuolumne-river-california-sidwcmdev_068904.html. (Accessed September 2010.)

Hetch Hetchy Water and Power. 2006. Hetch Hetchy Restoration Study. Department of Water Resources, Department of Parks and Recreation.

Hall, A.L. 1978. Ethnohistorical Studies of the Central Sierra Miwok, 1800-1900. Unpublished M.A. thesis, Department of Anthropology, San Francisco State University, San Francisco, California.

Hallock, R.J. 1989. Sacramento River steelhead (*Oncorhynchus mykiss*), 1952-1988. U.S. Fish and Wildlife Service.

Hankin, D.G. and M.S. Mohr. 2001. Two-phase survey designs for estimation of fish abundance in small streams. National Marine Fisheries Service, Southwest Fisheries Science Center, Fisheries Ecology Division, Santa Cruz, California.

Hannah, J.L. and E.M. Moores. 1986. Age relations and depositional environment of Paleozoic strata, northern Sierra Nevada, California: Geological Society of America Bulletin, v. 97, p. 787-797.

Harden, D.R. 2004. California Geology: Pearson Education, Inc., Upper Saddle River, New Jersey 07458, 2nd Edition, 552p.

Harrington, M.R. 1975. A Pinto Site at Little Lake, California. Southwest Museum Papers 17. Los Angeles, California.

Hartman, G.F. 1965. The role of behavior in the ecology and interaction of underyearling coho salmon (*Oncorhynchus kisutch*) and steelhead trout (*Salmo gairdneri*). Journal of Fisheries Research Board of Canada.

Harwood, D.S. 1988. Tectonism and metamorphism in the Northern Sierra Terrane, northern California, *in*, Ernst, W. G., ed., Metamorphism and Crustal Evolution of the Western United States: Englewood Cliffs, New Jersey, Prentice Hall, Inc., p. 764-788.

Hayes, M. and M. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylii*): implications for management. U.S. Department of Agriculture.

Harza Engineering. 1996. Part 12 Consultant Saftey Inspection Reports. Prepared for Turlock Irrigation District/Modesto Irriagation District. Submitted to Federal Energy Regulatory Commission, June 1993.

HDR Engineering and Geomatrix Consultants. 2000. Review of seismic sources and ground motions for the Don Pedro Dam: Memorandum to Turlock Irrigation District, July 24, 2000, 8p, two figures.

Heizer, R.F. and A.B. Elsasser. 1953. Some Archaeological Sites and Cultures of the Central Sierra Nevada. University of California Archaeological Survey Reports 21: 1-42, Berkeley, California.

Heizer, R.F. and C.W. Clewlow, Jr. 1969. Projectile Points from Hidden Cave (NV-CH-15). Churchill County, Nevada. In Papers on Great Basin Prehistory, pp.59-88. University of California Archaeological Survey Reports 71. Berkeley, California.

Helm, B.P. 1998. Biogeography of eight large branchiopods endemic to California. California Native Plant Society.

Hester, T.R. and R.F. Heizer. 1973. Review and Discussion of Great Basin Projectile Points: Forms and Chronology. University of California, Berkeley, California.

Higgins, C.T. and D.L. Dupras. 1993. Mineral Land Classification of Stanislaus County, California. California Department of Conservation, Division of Mines and Geology, Sacramento, California.

Holland, D.C. 1991. A Synopsis of the ecology and status of the Western Pond Turtle (*Clemmys marmota*) in 1991. U.S. Fish and Wildlife Service National Ecological Research Center San Simein Field Station.

Holmquist, J. and J. Schmidt-Gengenbach. 2009. Interim Report - The Tuolumne River below Hetch Hetchy Reservoir: Characterization of the benthic macroinvertebrate assemblage and response to an experimental spring flood event. University of California White Mountain Research Station. Submitted to Yosemite National Park. In partial fulfillment of: Cooperative Agreement H8R07060001, Task Agreement J8R07070007. March 20, 2009. [Online] URL: http://www.nps.gov/yose/naturescience/upload/inverts-Hetch. 2009.pdf. (Accessed July 19, 2010.)

Hoover, R.F. 1937. Endemism in the flora of the Great Valley of California. University of California, Berkeley, California.

Jennings, C.W. 1994. Fault activity map of California and adjacent Areas with locations and ages of recent volcanic eruptions: California Division of Mines and Geology, Geologic Data Map, No. 6, scale 1:750,000.

Jennings, M.R. 1996. Status of Amphibians. In Sierra Nevada Ecosystem Project: Final Report to Congress, vol. II, chap. 31. Davis: University of California, Centers for Water and Wildland Resources. [Online] URL: http://pubs.usgs.gov/dds/dds-43/VOL_II/VII_C31.PDF. (Accessed July 30, 2010.)

Jennings, M.R. and M.P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. Final Report Submitted to CDFG, Inland Fisheries Division, Rancho Cordova, California under contract number 8023. [Online] URL: http://www.dfg.ca.gov/wildlife/nongame/publications/docs/herp_ssc.pdf. (Accessed July 19, 2010.)

Jensen, C.C. 1972. San Joaquin kit fox distribution. Unpublished Report for U.S. Fish and Wildlife Service, Sacramento, California.

Johnson, J.J. 1967. The Archaeology of the Comanche Reservoir Locality, California. Sacramento Anthropological Society. Sacramento, California.

Jones, W.J., B.D. Quelvog, and G. Bernardi. 2002. Morphological and genetic analysis of the Red Hills roach (Cyprinidae: *Lavinia symmetricus*). Conservation Genetics 3:262-276. [Online] URL: http://bio.research.ucsc.edu/people/bernardi/Bernardi/Publications/2002RedHills.pdf. (Accessed July 21, 2010.)

Jurek, R.M. 1988. Five-year status report, bald eagle. California Department of Fish and Game.

Keeley, J.E. 1984. Photosynthetic characteristics of certain vernal pool species. Institute of Ecology University of California, Davis; Davis, California.

Keeley, J.E. and P.H. Zedler. 1998. Characterization and global distribution of vernal pools. California Native Plant Society.

Kinsey, W.B., M.V. Johnson, and J.M. Gronberg. 2005. Data on Dissolved Pesticides and Volatile Organic Compounds in Surface and Ground Waters in the San Joaquin-Tulare Basins, California, Water Years 1992-1995. Data Series 107. U.S. Geologiccal Survey, Reston, Virginia. [Online] URL: http://pubs.usgs.gov/ds/2005/107/ds107.pdf. (Accessed September 2010.)

Knapp, R.A. and K.R. Matthews. 2000. Non-native fish introductions and the decline of the mountain yellow-legged frog from within protected areas. Conservation Biology 14:428-438. [Online] URL: http://www.sierraforestlegacy.org/Resources/Conservation/SierraNevadaWildlife/SierraNevadaMountainYellowLeggedFrog/YLF-Knapp00.pdf. (Accessed July 23, 2010.)

Kondolf, G.M. 1995. Geomorphological stream channel classification in aquatic habitat restoration: Uses and limitations. Aquatic Conservation: Marine and Freshwater Ecosystems 5: 127-141. Doi: 10.1002/aqc.3270050205.

Koschmann, A.H., and M.H. Bergendahl. 1968. Principal Gold-Producing Districts of the United States, USGS Professional Paper 610.

Koutnikm, D.L. 1993. Chamaesyce. University of California Press, Berkeley, California.

Kratzer, C.R. 1998. Pesticides in Storm Runoff from Agricultural and Urban Areas in the Tuolumne River Basin in the Vicinity of Modesto, California. USGS Water-Resources Investigations Report 98-4017. U.S. Geological Survey, Sacramento, California. [Online] URL: http://ca.water.usgs.gov/sanj/pub/usgs/wrir98-4017/wrir98-4017.pdf. (Accessed September 2010.)

Kratzer, C.R., and J.L. Shelton. 1998. Water Quality Assessment of the San Joaquin-Tulare Basins, California: Analysis of Available Data on Nutrients and Suspended Sediment in Surface Water, 1972-1990. Professional Paper 1587. National Water-Quality Assessment Program, U.S. Geological Survey, Sacramento, California. [Online] URL: http://ca.water.usgs.gov/sanj/pub/usgs/pp1587/pp1587.pdf. (Accessed September 2010.)

Kratzer, C.R., P.D. Dileanis, C. Zamora, S.R. Silva, C. Kendall, B.A. Bergamaschi, and R.A. Dahlgren. 2004. Sources and Transport of Nutrients, Organic Carbon, and Chlorophyll-a in the San Joaquin River Upstream of Vernalis, California, during Summer and Fall, 2000 and 2001. Water-Resources Investigations Report 03-4127. U.S. Geological Survey, prepared in cooperation with the CALFED Bay-Delta Program and the California Department of Water Resources, Sacramento, California. [Online] URL: http://pubs.usgs.gov/wri/wri034127/wri034127rev.pdf. (Accessed September 2010.)

Laughrin, L. 1970. San Joaquin kit fox: its distribution and abundance. California Department of Fish and Game.

Leitritz, E. 1969. A History of California's Fish Hatcheries, 1870-1960. State of California Resource Agency Department of Fish and Game Fish Bulleting 150.

Levy, R.C. 1978. In Handbook of North American Indians, Vol. 8: California, edited by Robert F. Heizer. Washington, D.C.: Smithsonian.

Loredo, I. and D. Van Vuren. 1996. Reproductive ecology of a population of the California tiger salamander. Copeia.

Matthews, K.R. and K.L. Pope. 1999. A Telemetric Study of the Movement Patterns and Habitat Use of *Rana muscos*, the Mountain Yellow-legged Frof, in a High-elevation Basin in Kings Canyon National Park, California. Journal of Herpetology, Vol 33(4):615-624.

McBain & Trush, Inc. 2000. Habitat Restoration Plan for the Lower Tuolumne River Corridor. Arcata, California. Prepared for The Tuolumne River Technical Advisory Committee. March 2000.

——. 2004. Coarse sediment management plan for the lower Tuolumne River. Revised Final Report. Prepared by McBain & Trust, Arcata, California for Tuolumne River Technical Advisory Committee, Turluck and Modesto Irrigation Districts, USFWS Anadromous Fish Restoration Program, and California Bay-Delta Authority.

Meehan, W.R. and T.C. Bjornn. 1991. Salmonid distribution and life histories. American Fisheries Society.

Merritt Smith Consulting. 2008. Upper Tuolumne River Ecosystem Project: Preliminary Analysis of Available Data for Modeling Temperature in the Hetch Hetchy Reach (O'Shaughnessy Dam to Cherry Creek). Prepared for San Francisco Public Utilites Commission, San Francisco, California.

Mills, T.J. and F. Fisher. 1994. Central Valley Anadromous Sport Fish Annual Run-size, Harvest, and Population Estimates. California Department of Fish and Game.

Modesto Irrigation District. 2009. MID Fingertip Facts. Modesto Irrigation District, Modesto, California.

——. 2010a. Irrigation District statistics and history. Modesto Irrigation District. [Online] URL: http://www.mid.org. (Accessed July 2010.)

——. 2010b. Modesto Irrigation District Fast Facts. Modesto Irrigation District, Modesto, California. [Online] URL: http://www.mid.org/about/fastfacts.htm. (Accessed July 2010.)

Modesto Irrigation District and Turlock Irrigation District. 2010. Background. Electronic Document. Available online at: http://www.donpedro-relicensing.com/default.aspx.

Moratto, M.J. 1971. A Study of Prehistory in the Tuolumne River Valley, California. Treganza Anthropology Museum Papers, Number 9. San Francisco State University.

——. 1972. Study of Prehistory on the Southern Sierra Foothills, California. Unpublished Ph.D dissertation, Department of Anthropology, University of Oregon.

Moratto, M.J., M.R. Arguelles, S.K. Goldberg, S. O'Brien, L.M. Riley, and W.L. Singleton. 1984. New Melones Archaeological Project, California: Indian Sites 04-Cal-s-286, 04-Cal-S-347, and 04-Cal-S-461. Final Report of the New Melones Archaeological Project 4(1-3):1-1600. U.S. National Park Service and National Technical Information Service, Washington D.C. (Also available on CD from Coyote Press, Salinas, California.)

Moratto, M.J. and L.M. Riley. 1980. Balsam Meadow: Archaeological Testing at Six Sites in Eastern Fresno, County. Ms. On file, Southern California Edison Company, Rosemead, California.

Moratto, M.J., L.H. Shoup, and J.D. Tordoff. 1988. Culture Change in the Central Sierra Nevada, 8000 B.C.-A.D. 1950. Final Report of the New Melones Archaeological Project, edited by M.J. Moratto, 9:1-626. U.S. National Park Service and National Technical Information Service, Washington, D.C. (Also available from Coyote Press.)

Morgan, B.A. 1977. Geologic map of the Chinese Camp and Moccasin quadrangles, Tuolumne County, California: U.S. Geological Survey, Miscellaneous Field Studies, Map MF-840, scale 1:24,000.

Morrell, S.H. 1975. San Joaquin kit fox distribution and abundance in 1975. California Department of Fish and Game.

Moyle, P.B. 1996. Potential Aquatic Diversity Management Areas. Ch. 57 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, Davis, California.

——. 2002. Inland Fishes of California. University of California Press, Berkeley and Los Angeles, California.

Moyle, P.B., R.D. Baxter, T. Sommer, T.C. Foin, S.A. Matern. 2004. Biology and Population Dynamics of Sacramento Splittail (*Pogonichthys macrolepidotus*) in the San Francisco Estuary: A Review. San Francisco Estuary and Watershed Science 2:2 (May 2004), Article 3. [Online] URL: http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1011&context=jmie/sfews. (Accessed July 16, 2010.)

Moyle, P.B. and M. Marchetti. 1992. Temperature Requirements of Rainbow Trout and Brown Trout in Relation to Flows between O'Shaughnessy Dam and Early Intake on the Tuolumne River, California.

Moyle P. B., R.M. Yoshiyama, and R.A. Knapp. 1996. Status of fish and fisheries. In Sierra Nevada Ecosystem Project: Final report to Congress, Vol II, Chap 33. Davis: University of California, Centers for Water and Wildland Resources.

Murphy, K. 2009. Summary Report of Black Bass Fishing Contests held in California during 2008. CDFG, Flatwater Reservoir Research and Management Project, 21 pp. June 2009. [Online] URL: http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=15057. (Accessed July 29, 2010.)

——. 2010. Summary Report of Black Bass Fishing Contests held in California during 2009. California Department of Fish and Game, Flatwater Reservoir Research and Management Project, 23 pp. June 2010. [Online] URL: http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=22191. (Accessed July 29, 2010.)

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grand, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-NWFSC-35, 443 pp., February 1998. [Online] URL: http://www.nwfsc.noaa.gov/publications/techmemos/tm35/index.htm. (Accessed August 10, 2010.)

Myrick, C.A. and J.J. Cech. 2001. Temperature Effects on Chinook Salmon and Steelhead: A Review Focusing on California's Central Valley Populations. Bay-Delta Modeling Forum.

National Geographic Society. 2009. Shoreline Trail, Don Pedro Lake. [Online] URL: http://www.sierranevadageotourism.org/content/shoreline-trail,-don-pedro-lake-/sie174E88C8707B7D03B. (Accessed September 2010.)

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. National Marine Fisheries Service Southwest Regional Office Sacramento, California. [Online] URL: http://swr.nmfs.noaa.gov/recovery/cent_val/Public_Draft_Recovery_Plan.pdf. (Accessed August 10, 2010.)

——. 2010. Central Valley Chinook Salmon - Historic Stream Habitat Distribution. National Marine Fisheries Service Southwest Regional Office Sacramento, California. [Online] URL: http://www.swr.noaa.gov/hcd/cvschshd.htm. (Accessed July 27, 2010.) (Original publication date unknown.)

National Parks Service. 1982. The Nationwide Rivers Inventory. Available online at: A-M: http://www.nps.gov/ncrc/programs/rtca/nri/states/ca.html; N-Z: http://www.nps.gov/ncrc/programs/rtca/nri/states/ca2.html.

——. 1994. Baseline Water Quality Data - Inventory Analysis, Yosemite Park. Technical Report NPS/NRWRD/NRTR-94/30 Water Resources Division and Servicewide Inventory and Monitoring Program. National Park Service, Water Resources Division and Servicewide Inventory and Monitoring Program, Fort Collins, Colorado. [Online] URL: http://sfwater.org/custom/RiverResource/docFiles/Baseline_Water_Quality_Data_Inventory_and_Analysis.pdf. (Accessed September 2010.)

——. 2004a. Yosemite National Park Fire Management Plan. National Park Service. [Online] URL: http://www.nps.gov/yose/parkmgmt/fireplan.htm. (Accessed July 23, 2010.)

——. 2004b. Yosemite National Park, Water - Hydrology and Watershed. National Park Service. [Online] URL: http://www.nps.gov/archive/yose/nature/wtr_hydrology.htm. (Accessed July 16, 2010.)

——. 2006. Tuolumne Wild and Scenic River Oustandingly Remarkable Values Draft Report. National Park Service. Available online at: http://www.nps.gov/yose/parkmgmt/upload/2006%20DRAFT%20ORV%20REPORT_Final-2.pdf.

——. 2008. Yosemite National Park Tuolumne Wild and Scenic River information. U.S. Department of the Interior, National Park Service, Yosemite, California.

——. 2009. The National Parks. Index 2009-2011. [Online] URL: http://www.nps.gov/history/history/online_books/nps/nps/part3.htm. (Accessed September 2010.)

——. 2010a. Yosemite National Park Tuolumne River Plan. National Park Service. [Online] URL: http://www.nps.gov/yose/parkmgmt/trp.htm. (Accessed July 16, 2010.)

——. 2010b. Yosemite National Park Tuolumne River Plan / Tuolumne Meadows Plan Legislative Parameters. Original publication date unknown. U.S. Department of the Interior, National Park Service, Yosemite, California.

National Park Service and U.S. Department of the Interior. 2010. Tuolumne Wild and Scenic River Comprehensive Management Plan.

National Resource Conservation Service. 2009. California State-Listed Noxious Weeds. California Department of Food and Agriculture. [Online] URL: plants.usda. gov/java/noxious?rptType=state&statefips=6. (Accessed July 7, 2010.)

NatureServe. 2008. NatureServed Explorer: An online encyclopedia of life. Version 6.1. Nature Serve, Arlington Virgina. [Online] URL: http://www.natureserve.org/explorer. (Accessed August 27, 2010.)

——. 2010. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe. Arlington, Virginia. [Online] URL: http://www.natureserve. org/explorer. (Accessed August 23, 2010.)

Newton, M.C., III. 1986. Late Jurassic left-lateral transpression along the western North America margin, with structural evidence from the southern Foothills Terrane, Sierra Nevada, California: Geological Society of America, Abstracts with Program, v. 18, p. 706.

Nielson, J.L., S.A. Pavey. T. Wiacek, and I. Williams. 2005. Genetics of Central Valley O. mykiss populations: drainage and watershed scale analysis. San Francisco Estuary and Watershed Science [online serial] 3.

Office of Environmental Health Hazard Assessment. 2009. 2009 Update of California Sport Fish Advisories. California Environmental Protection Agency, Sacramento, California. [Online] URL: http://www.oehha.ca.gov/fish/so_cal/index.html. (Accessed August 2010.)

Oldow, J.S. 2003. Active transtensional boundary zone between the western Great Basin and Sierra Nevada block, western U. S. Cordillera: Geology, v. 31, p. 1033-1036.

Orr, B.K. 1997. Ecosystem health and salmon restoration: a broader perspective. Pages 575-580 *in* S.S.Y. Wang, editor. Environmental and coastal hydraulics: protecting the aquatic habitat. Volume 1: Proceedings of Theme B. Water for a changing global community. The 27th Congress of the International Association for Hydraulic Research. American Society of Civil Engineers, New York. [Online] URL: http://www. stillwatersci.com/resources/1997orrsalmon.pdf. (Accessed July 27, 2010.)

Parker, P. and T. 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. Available online at: http://www.nps.gov/history/nr/publications/bulletins/nrb38/.

Paterson, S.R., O.T. Tobisch, and J.K. Radloff. 1987. Post-Nevadan deformation along the Bear Mountains fault zone: Implications for the Foothills terrane, central Sierra Nevada, California: Geology, v. 15, p. 513-516.

Pavlik, B.M. 1994. Demographic monitoring and the recovery of endangered plants. Cambridge University Press.

Peak, A.S. 1987. Cultural Resources Studies, North Fork Stanislaus River Hydroelectric Development Project: Archaeological Data Recovery of CA-Cal-S275, Clarks Flat, Calaveras County, California, Vol. III. Northern California Power Agency, Roseville, California.

Peak, A.S. and H. Crew. 1990. Cultural Resource Studies North Fork Stanislaus River Hydroelectric Development Project, Vol. II: An Archaeological Data Recovery Project at CA-Cal-S342, Clarks Flat, Calaveras County, California. Northern California Power Agency, Roseville, California.

Platenkamp, G.A. 1998. Patterns of vernal pool biodiversity at Beale Air Force Base. California Native Plant Society.

Pope, K.L. and K.R. Matthews. 2001. Movement ecology and seasonal distribution of mountain yellow-legged frogs, Rana muscosa, in a high-elevation Sierra Nevada basin. Copeia 2001(3) 787-793. [Online] URL: http://www.sierraforestlegacy.org/Resources/Conservation/SierraNevadaWildlife/SierraNevadaMountainYellowLeggedFrog/YLF-Pope01.pdf. (Accessed July 27, 2010.)

Quad Knopf. 2007. Draft Environmental Impact Report (EIR) Appendix E - Reconnaissance Level Biological Survey for the Hughson Wastewater Treatment Plant. Quad Knopf, Visalia, California.

Raleigh, R.F., T. Hickman, R.C. Solomon, and P.C. Nelson. 1984. Habitat Suitability Information: Rainbow Trout. U.S. Fish and Wildlife Service.

Randall, P.J. 1997. Distribution and Ecology of Fish and Frogs in Tributaries to the South Fork Yuba River. Masters thesis. Shields Library Microcopy Collection LD781.D5j 1997 R368 MASTERS.

Rathbun, G.B., N.J. Scott, and T.G. Murphey. 2002. Terrestrial Habitat Use by Pacific Pond Turtles in a Mediterranean Climate. The Southwestern Naturalist 47:225-235. [Online] URL: http://www.elkhornsloughctp.org/uploads/1217635103RathbunPondTurtlesSWN02%20(1).pdf. (Accessed July 30, 2010.)

Recuero, E., I. Martinez-Solano, G. Parra-Olea, and M. Garcia-Paris. 2006a. Phylogeography of *Pseudacris regilla* (Anura: Hylidae) in western North America, with a proposal for a new taxonomic rearrangement. Molecular Phylogenetics and Evolution 39:293-304.

——. 2006b. Corrigendum to "Phylogeography of *Pseudacris regilla* (Anura: Hylidae) in western North America, with a proposal for a new taxonomic rearrangement" (Molecular Phylogenetics and Evolution 39 [2006] 293-304). Molecular Phylogenetics and Evolution 41:511.

Reese, D.A. and H.H. Welsh. 1997. Use of Terrestrial Habitat, Clemmys marmorata: Implications for management, pp. 352-357. In: Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles, New York Turtle and Tortoise Society.

Resource Management Associates, Inc. 2008. SJR basin-wide water temperature model. [Online] URL: http://www.rmanet.com/CalFed_Nov2008/. (Accessed August 21, 2009).

Reynolds, F.L., T.J. Mills, R. Benthin, and A. Low. 1993. Restoring Central Valley streams; A Plan for Action. Sacramento (CA): California Department of Fish and Game. 129 pp. [Online] URL: http://www.dfg.ca.gov/fish/documents/Resources/RestoringCentralVallyStreams.pdf. (Accessed July 27, 2010.)

Ritter, E.W. 1970. Northern Sierra Foothill Archaeology. In Papers on California and Great Basin Prehistory, edited by E.W. Ritter, P.D. Schulz, and R. Kautz, pp. 171-184. University of California, Center for Archaeological Research Publications 2. Davis, California.

Rogers, M.J. 1939. Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Desert Areas. San Diego Museum of Man Papers 3. San Diego, California.

Rosekrans, S., N.E. Ryan, A H. Hayden, T.J. Graff, and J.M. Balbus. 2004. Paradise Regained: Solutions for Restoring Yosemite's Hetch Hetchy Valley. Environmental Defense Fund, New York, New York. [Online] URL: http://www.edf.org. (Accessed August 2010.)

Sadigh, K., C.Y. Chang, J.A. Egan, F. Makdisi, and R.R. Youngs. 1997. Attenuation Relationships for shallow crustal earthquakes based on California strong motion data: Seismological Research Letters, v. 68, no. 1, p. 180-189.

Saleeby, J.B. 1982. Polygenetic ophiolite belt of the California Sierra Nevada: Geochronological and Tectonostratigraphic Development. Journal of Geophysical Research, Vol 87, p. 1803-1824.

San Francisco Estuary Institute. 2008. Potential distribution of Zebra Mussels (*Dreissena polymorpha*) and Quagga Mussels (*Dreissena bugensis*) in California Phase 1 Report. A Report of the California Department of Fish and Game. Revised 2008.

San Francisco Planning Department. 2008. Final Program Environmental Impact Report for San Francisco Public Utilities Commission's Water System Improvement Program. Section 5.3, Tuolumne River System and Downstream Water Bodies. San Franciso Planning Department, San Franciso, California. [Online] URL: http://www.sf-planning.org/Modules/ShowDocument.aspx?documentid=7941. (Accessed September 2010.)

San Francisco Public Utilites Commission. 2006. Upper Tuolumne River: Available Data Sources, Field Work Plan, and Initial Hydrology Analysis. San Francisco Public Utilities Commission, Land and Natural Resources Division. [Online] URL: http://sfwater.org/detail.cfm/MC_ID/20/MSC_ID/418/MTO_ID/692/C_ID/3308. (Accessed July 19, 2010.)

——. 2007. Program Environmental Impact Report for the SFPUC Water System Improvement Program. San Francisco Public Utilites Commission, San Francisco, California.

San Joaquin River Restoration Program. 1999. Meeting Flow Objectives for the San Joaquin River Agreement 1999 - 2010 Environmental Impact Statement and Environmental Impact Report - FINAL. San Joaquin River Group Authority, California. [Online] URL: http://www.sjrg.org/EIR/eiseir.htm. (Accessed July 26, 2010.)

Sawyer, J.O. and T. Keeler-Wolf. 1995. A manual of California vegetation. California Native Plant Society, Sacramento, California.

Schaefer, M.B. 1951. A study of the spawning populations of sockeye salmon in the Harrison River system, with special reference to the problem of enumeration by means of marked members. Bulletin IV. International Pacific Salmon Fisheries Commission, New Westminster, British Columbia.

Schweickert, R.A. 1981. Tectonic evolution of the Sierra Nevada range, in Ernst, W. G., ed., The Geotectonic Development of California: Englewood Cliffs, N.J., Prentice-Hall, Inc., p. 87-131.

Schweickert, R.A., N.L. Bogen, G.H. Girty, R.E. Hanson, and C. Merguerian. 1984. Timing and structural expression of the Nevadan orogeny, Sierra Nevada, California: Geological Society of America Bulletin, v. 95, p. 967-979.

Schweickert, R.A. and D.S. Cowan. 1975. Early Mesozoic tectonic evolution of the western Sierra Nevada, California: Geological Society of America Bulletin, v. 86, p. 1329-1336.

Schweickert, R.A., C. Merguerian, and N.L. Bogen. 1988. Deformational and metamorphic history of Paleozoic and Mesozoic basement terranes in the western Sierra Nevada metamorphic belt, in Ernst, W. G., ed., Metamorphism and Crustal Evolution of the Western United States: Englewood Cliffs, N.J., Prentice Hall, Inc., p. 789-822.

Seltenrich, C. and A. Pool. 2002. A Standardized Approach for Habitat Assessments and Visual Encounter Surveys for the Foothill Yellow-Legged Frog (*Rana boylii*). Pacific Gas and Electric Company. [Online] URL: http://www.canvamphibs.com/pdf/FYLFMethods052002.pdf. (Accessed July 29, 2010.)

Shapovalov, L. and A.C. 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. California Department of Fish and Game Bulletin.

Shaul, E.A. 2007. Freshwater Mussels in Western North America. Unpublished.

Shuford, W.D. and T. Gardali, editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento. [Online] URL: http://www.dfg.ca.gov/wildlife/nongame/ssc/birds.html. (Accessed September 28, 2010.)

Stanislaus County. 2006. Stanislaus County General Plan. Stanislaus County Board of Supervisors, Modesto, California.

——. 2010. River and Fishing Accesses. [Online] URL: http://www.co.stanislaus.ca.us/ER/Parks/pdf/RiverFishingAccesses.pdf. (Accessed September 2010.)

State of California v. Federal Power Commission. 1965. 345 F2d 917. U.S. Court of Appeals Ninth Circuit.

State Water Resources Control Board. 1980a. License 11057, for Diversion and Use of Water. State Water Resources Control Board, Sacramento, California.

——. 1980b. License 11058, for Diversion and Use of Water. State Water Resources Control Board, Sacramento, California.

——. 1995. Water quality control plan report. Sacramento, California. Nine volumes.

——. 1999. Water quality control plans and policies adopted as part of the State comprehensive plan. April 1999.

——. 2006. 303(d) Listings for California Waterways. State Water Resources Control Board, Sacramento, California. [Online] URL: http://www.swrcb.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml. (Accessed July 2010.)

——. 2007. California Department of Fish and Game - Moccasin Creek Fish Hatchery Plant - Consideration of NPDES Permit Renewal. State Water Resources Control Board, Sacramento, California. [Online] URL: http://www.swrcb.ca.gov/centralvalley/board_decisions/tentative_orders/0706/moccasin_crk/cdfg-moccasin-crk-buff.pdf. (Accessed July 29, 2010.)

Stebbins, J.C., W.O. Trayler, and R. Kokx. 1995. Habitat characterization study of San Joaquin Valley vernal pools. Unpublished report to the California Department of Fish and Game and the U.S. Fish and Wildlife Service, Sacramento, California.

Stewart, R. 2002. Resistance board weir panel construction manual. Regional Information Report No. 3A02-21. Alaska Department of Fish and Game, Division of Commerical Fisheries, Artic-Yukon-Kuskokwin Region, Fairbank, Alaska.

——. 2003. Techniques for installing a resistance board fish weir. Regional Information Rep[ort No. 3A02-21. Alaska Department of Fish and Game, Division of Commercial Fisheries, Artic-Yukon-Kuskokwin Region, Fairbanks, Alaska.

Stillwater Ecosystems. 1998. Tuolumne River Restoration Projects: Biological Resources Technical Background Report. Prepaired by Stillwater Ecosystems for EDAW, San Francisco, California. Available online at: http://www.stillwatersci.com/resources/1998stillwatersciencesTRPP.pdf

Stillwater Sciences. 2003. Subject: Preliminary assessment of physical habitat and temperature suitability for steelhead based on 1995 IFIM Study Results for the lower Tuolumne River. Memorandum from N. Hume and P. Baker, Stillwater Sciences, Berkeley, California to T. Ford, Turlock and Modesto Irrigation Districts, September 24.

——. 2004. Lower Tuolumne River Water Quality Monitoring Results May/June 2004. Draft Technical Memorandum. July 1, 2004. Stillwater Sciences, Berkeley, California. [Online] URL: http://www.tuolumnerivertac.com/Documents/TuolumneWQ_070104.pdf. (Accessed August 2010.)

——. 2006. Restoring recruitment processes for riparian cottonwoods and willows: a field-calibrated predictive model for the lower San Joaquin Basin. Brochure and final report. Prepared by Stillwater Sciences, Berkeley, California in conjunction with Department of Environmental Science, Policy, and Management, University of California, Berkeley for CALFED Bay-Delta Ecosystem Restoration Program, Sacramento, California.

——. 2008. Big Bend restoration project: results of post-project monitoring, 2005–2007. Final technical memorandum. Prepared by Stillwater Sciences, Berkeley, California for Tuolumne River Trust, Modesto, California.

——. 2009. Don Pedro Reservoir Fish Mercury Study. Final Report for Turlock Irrigation District and Modesto Irrigation District.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton, and J.C. Stebbins. 1988. Status survey of the grass tribe Orcuttieae and Chamaesyce hooveri (Euphorbiaceae) in the Central Valley of California. U.S. Fish and Wildlife Service.

Swales, S., R.B. Lauzier, and C.D. Levings. 1986. Winter habitat preferences of juvenile salmonids in two interior rivers in British Columbia. Canadian Journal of Zoology.

Swick, C.D. 1973. Determination of San Joaquin kit fox range in Contra Costa, Alameda, San Joaquin, and Tulare Counties. Unpublished Report to California Department of Fish and Game, Sacramento, California.

Syrdahl, R.L. 1993. Distribution patterns of some key macro-invertebrates in a series of vernal pools at Vina Plains Preserve in Tehama County, California. University of California, Chico, California.

Taft, A.C. and G.I. Murphy. 1950. The life history of the Sacramento squawfish (*Ptychocheilus grandis*). California Fish and Game Vol. 36(2):147-164. San Francisco, California.

Taylor, T.L., P.B. Moyle, and D.G. Price. 1982. Fishes of Clear Lake Basin. Univ. Calif. Publ. Zool. 115: 171-224.

Theurer, F.D., K.A. Voos, and W.J. Miller. 1984. Instream water temperature model. Instream Flow Information Paper No. 16, FWS/OBS-84/15; U.S. Fish and Wildlife Service, Western Energy and Land Use Team, Washington, D.C.

Tobin, J.H. 1994. Construction and performance of a portable resistance board weir for counting migrating adult salmon in rivers. Alaska Fisheries Technical Report No. 22 U.S. Fish and Wildlife Service, Deanai Fishery Resurce Office, Jenai, Alaska.

Tobisch, O.T., S.R. Paterson, S. Longiaru, and T. Bhattacharyya. 1987. Extent of the Nevadan orogeny, central Sierra Nevada, California: Geology, V. 15, p.132-135.

Trenham, P.C. 2001. Terrestrial habitat use by adult California tiger salamander. Journal of Herpetology.

Tuolumne County. 1996. Tuolumne County General Plan. Tuolumne County Board of Supervisors, Tuolumne, California.

——. 2004. Tuolumne County Multi-Jurisdiction Hazard Mitigation Plan. Tuolumne County Board of Supervisors, Tuolumne, California.

——. 2005. Brief History and Demographics. [Online] URL: http://www.tuolumne county.ca.gov/. (Accessed September 2010.)

——. 2009. Tuolumne County Ordinance Code. [Online] URL: http://portal.co. tuolumne.ca.us/psp/ps/TUP_COUNTY_COUNSEL/ENTP/s/WEBLIB_PTPP_SC.HOMEPAGE.FieldFormula.IScript_AppHP?scname=ADMN_TUOLUMNE_COUNTY_ORDINANCE&FolderPath=PORTAL_ROOT_OBJECT.ADMN_SC_SP_TUOLUMNE_COUNTY_ORD. (Accessed September 2010.)

Tuolumne County Resource Conservation District. 2008. Tuolumne County Stream Team Water Quality Monitoring Report 2007-08. Tuolumne County Resource Conservation District, Sonora, California. [Online] URL: http://www.tcrcd.org. (Accessed August 2010.)

——. 2009. Tuolumne County Stream Team Water Quality Monitoring Report 2008-09. Tuolumne County Resource Conservation District, Sonora, California. [Online] URL: http://www.tcrcd.org. (Accessed August 2010.)

Tuolumne River Technical Advisory Committee. 2000. Habitat Restoration Plan for the Lower Tuolumne River. McBain and Trush, Inc. Available online at: http://Tuolumne rivertac.com/documents.htm.

Tuolumne River Trust. 2009. General information concerning the Tuolumne River recreation. Tuolumne River Trust. [Online] URL: http://www.tuolumne.org. (Accessed July 2010.)

Turlock Irrigation District. 1991. Turlock Irrigation District Injury and Illness Prevention Program. Turlock Irrigation District, Turlock, California.

——. 2010. Irrigation district statistics and history. Turlock Irrigation District. [Online] URL: http://www.tid.org. (Accessed August 2010.)

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. Don Pedro Project; FERC Project No. 2299-024. Turlock Irrigation District and Modesto Irrigation District. [Online] URL: http://www.tuolumnerivertac.com/Documents/20050324-5063(8116357).pdf. (Accessed July 26, 2010.)

——. 2005. Potential Failure Modes Analysis Report.

——. 2006. 2005 Lower Tuolumne River Annual Report. Report 2005-1. 2005 Spawning Survey Report. Turlock Irrigation District and Modesto Irrigation District. [Online] URL: http://tuolumnerivertac.com/Documents/20060330-5125(14999182).pdf. (Accessed July 25, 2010.)

——. 2007. Independent Consultant Safety Inspection Report (Part 12).

——. 2010. Report 2009-7: 2010 Lower Tuolumne River Annual Report. Report filed with FERC March 2010, for FERC Project 2299.

Turner, J. 2007. Red Hills Bird Report. Unpubl. Field Observation Report. U.S. Department of Interior, Bureau of Land Management Mother Lode Field Office, El Dorado Hills, California.

U.S. Army Corps of Engineers. 1972. Don Pedro Lake, Tuolumne River, California: Reservoir Regulation for Flood Control. Department of the Army, Sacramento, California.

U.S. Census Bureau. 1990. 1990 Census of Population and Housing Unit Counts, United States.

——. 2000. State and County Quick Facts. [Online] URL: http://quickfacts.census.gov/qfd/states/06000.html. (Accessed September 2010.)

——. 2003. Time Series of California Intercensal Population Estimates by County, April 1, 1990 to April 1, 2000.

——. 2009. State and County Quick Facts. [Online] URL: http://quickfacts.census.gov/qfd/states/06000.html. (Accessed September 2010.)

U.S. Department of Agriculture. 2007. 2007 Census of Agriculture County. [Online] URL: http://www.agcensus.usda.gov/. (Accessed September 2010.)

U.S. Department of Agriculture, Forest Service, Pacific Southwest Region. 2001. Sensitive Animal Species by Forest. U.S. Department of Agriculture and Forest Service, Pacific Southwest Region. [Online] URL: http://www.fs.fed.us/r5/projects/sensitive-species/sensitive-animals.html. (Accessed April 25, 2007.)

U.S. Department of Agriculture, Forest Service. 2004. Vegetation Classification: CALVEG Zones and Alliances - Vegetation Descriptions. U.S. Department of Agriculture, Forest Service. [Online] URL: http://www.fs.fed.us/r5/rsl/projects/classification/zone-map.shtml. (Accessed August 4, 2010.)

——. 2006. Stanislaus National Forest Clavey River Watershed Existing Condition Stream, Aquatic and Riparian Project Study Report. U.S. Department of Agriculture, Forest Service. [Online] URL: http://www.claveyriver.net/images/library/file/watershed_assessment/Clavey%20River%20Watershed%20Assessment%20vol%202%20Apdx%20C%20-USFS%20Field%20Study.pdf. (Accessed July 27, 2010.)

——. 2010. Stanislaus National Forest: Forest Plan Direction. U.S. Department of Agriculture, Forest Service, Pacific Southwest Region.

U.S. Department of Agriculture, Forest Service, Pacific Southwest Region, Stanislaus National Forest. 2010. Forest Plan Direction - Alpine, Calaveras, Mariposa and Tuolumne Counties, California.

U.S Department of Commerce, Bureau of Economic Analysis. 2005. Regional Economic Accounts, Total full-time and part-time employment by NAICS industry. Available online at: http://www.bea.gov/regional/reis/action.cfm.

U.S. Department of the Interior, Bureau of Reclamation and California Department of Water Resources. 2007. CalSim II San Joaquin River Peer Review Response Report. U.S. Department of the Interior, Bureau of Reclamation and California Department of Water Resources, Sacramento, California.

U.S. Department of the Interior, Bureau of Land Management and Central Sierra Audubon Society. 1979 and 1984, 1994-2010. Annual Mid-Winter Bald Eagle Surveys of Don Pedro Reservoir. Unpublished Field Data Reports. Mother Lode Field Office, El Dorado Hills, California.

U.S. Environmental Protection Agency. 1978. Report on Don Pedro Reservoir, Tuolumne County, California. Working Paper No. 744. U.S. Environmental Protection Agency, EPA Region IX, San Francisco, California. [Online] URL: http://nepis.epa.gov. (Accessed August 2010.)

——. 1998. Water Quality Criterion for the Protection of Human Health: Methylmercury. Final. EPA-823-R-01-001. U.S. Environmental Protection Agency, Washington, D.C. [Online] URL: http://water.epa.gov/scitech/swguidance/waterquality/standards/criteria/aqlife/pollutants/methylmercury/upload/2009_01_15_criteria_methylmercury_mercury-criterion.pdf. (Accessed August 2010.)

——. 2000. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Rule. 40 CFR Part 131, pages 31682-31711. Federal Register. [Online] URL: http://www.epa.gov/fedrgstr/EPA-WATER/2000/May/Day-18/w11106.pdf. (Accessed August 2010.)

——. 2003. Bacterial Water Quality Standards for Recreational Waters (Freshwater and Marine Waters). EPA-823-R-03-008. U.S. Environmental Protection Agency, Washington, D.C. [Online] URL: http://www.epa.gov/waterscience/beaches/local/sum2.html. (Accessed August 2010.)

——. 2010. STORET database. U.S. Environmental Protection Agency, Washington, D.C. [Online] URL: http://www.epa.gov/storet/. (Accessed August 2010.)

U.S. Fish and Wildlife Service. 1983. San Joaquin kit fox recovery plan. U.S. Fish and Wildlife Service.

——. 1984. Valley Elderberry Longhorn Beetle Recovery Plan. U.S. Fish and Wildlife Service. Portland, Oregon. [Online] URL: http://ecos.fws.gov/docs/recovery_plan/840628.pdf. (Accessed August 23, 2010).

——. 1997. Guidance on Site Assessment and Field Surveys for the California Red-legged Frogs. U.S. Fish and Wildlife Service.

——. 1998. Recovery Plan for Upland Species of the San Joaquin Valley, California. U.S. Fish and Wildlife Service. [Online] URL: http://ecos.fws.gov/docs/recovery_plan/980930a.pdf. (Accessed June 16, 2008.

——. 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle. U.S. Fish and Wildlife Service.

——. 2001. Sacramento Fish and Wildlife Office Species Account: Hartweg's golden sunburst (*Pseudobahia bahiifolia*). U.S. Fish and Wildlife Service.

——. 2002. Recovery Plan for Gabbro Soil Plants of the Central Sierra Nevada Foothills. Region 1 U.S. Fish and Wildlife Service. Portland, Oregon. [Online] URL: http://ecos.fws.gov/docs/recovery_plan/020830b.pdf. (Accessed August 23, 2010.)

——. 2003. Determination of endangered status for the Sonoma County distinct population segment of the California tiger salamander. U.S. Fish and Wildlife Service.

——. 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Region 1 U.S. Fish and Wildlife Service. Portland, Oregon. [Online] URL: http://ecos.fws.gov/docs/recovery_plan/060614.pdf. (Accessed August 20, 2010.)

——. 2007a. Chinese Camp Brodiaea (*Brodiaea pallida*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service.

——. 2007b. Greene's tuctoria (*Tuctoria greenei*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service.

——. 2007c. Red Hills Vervain (*Verbena californica*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service.

——. 2007d. *Pseudobahia bahiifolia* (Hartweg's golden sunburst) and *Pseudobahia peirsonii* (San Joaquin adobe sunburst) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service.

——. 2008. Colusa Grass (*Neostapfia colusana*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service.

——. 2009a. Chamaesyce hooveri (*Hoove''s spurge*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service.

——. 2009b. Hairy Orcutt Grass (*Orcuttia pilosa*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service.

——. 2010a. Federal Endangered and Threatened Species Included in USGS Topographic Quads. U.S. Fish and Wildlife Service. [Online] URL: http://www.fws.gov/sacramento/es/spp_lists/auto_list_form.cfm. (Accessed July 7, 2010.)

——. 2010b. Federal Endangered and Threatened Species Included in USGS Topographic Quads. U.S. Fish and Wildlife Service. [Online] URL: http://www.fws.gov/sacramento/es/spp_lists/auto_list_form.cfm. (Accessed July 7, 2010.)

——. 2010c. Sacramento Fish and Wildlife Office. Endangered Species Lists. Query ran for the following quads: Chinese Camp (458C), La Grange (440B), Moccasin (458D), Penon Blanco Peak (440A), Sonora (458B), and Standard (458A). [Online] URL: http://www.fws.gov/sacramento/es/spp_lists/auto_list_form.cfm. (Accessed July 16, 2010.)

U.S. Geological Survey. 1999. Water Resources Data – California, Water Year 1999: Volume 3 – Southern Central Valley Basins and the Great Basin from Walker River to Truckee River. Available online at: http://ca.water.usgs.gov/waterdata/.

——. 2001. Exotic Species Threat Assessment and Management Prioritization for Sequoia-Kings Canyon and Yosemite National Park. U.S. Geological Survey. [Online] URL: http://www.nps.gov/archive/seki/snrm/nnp/documents/seki_weeds_assessment.pdf. (Accessed August 26, 2010.)

——. 2008. Water Resources Data - California, Water Year 2008: Volume 3 - Southern Central Valley Basins and the Great Basin from Walker River to Truckee River. Available online at: http://ca.water.usgs.gov/waterdata/.

——. 2010. 1993-1995 San Joaquin- Tulare National Water-Quality Assessment Program. Basic-Fixed Site Assessment. U.S. Geological Survey, Sacramento, California. [Online] URL: http://ca.water.usgs.gov/sanj/. (Accessed September 2010.)

Unruh, J., J. Humphrey, and A. Barron. 2003. Transtensional model for the Sierra Nevada frontal fault system, eastern California: Geology, v. 31, p.327-330.

Varga, R.J. and E.M. Moores. 1981. Age, origin, and significance of an unconformity that predates island-arc volcanism in the northern Sierra Nevada: Geology, v. 9, p. 512-518.

Vredenburg, V.T., R. Bingham, R. Knapp, J.A.T. Morgan, C. Moritz, and D. Wake. 2007. Concordant molecular and phenotypic data delineate new taxonomy and conservation priorities for the endangered mountain yellow-legged frog. J. Zoology 271(361-374). [Online] URL: http://www.sierraforestlegacy.org/Resources/Conservation/Sierra

NevadaWildlife/SierraNevadaMountainYellowLeggedFrog/YLF-Vredenburg07.pdf. (Accessed July 16, 2010.)

Wagner, D.L., E.J. Bortugno, and R.D. McJunkin. 1991 Geologic map of the San Francisco-San Jose quadrangle, California: California Division of Mines and Geology, Regional Geologic Map Series, No. 5A, scale 1:250,000.

Waithman, J.D. 1974. San Joaquin kit fox distribution in the California counties of Santa Barbara, Kings, Tulare, and Kern. Unpublished Report to U.S. Fish and Wildlife Service. Sacramento, California.

Wakabayashi, J. and T.L. Sawyer. 2001. Stream incision, tectonics, uplift, and evolution of topography of the Dierra Nevada, California. Journal of Geology 109: 539-562.

Ward, B.R. and P.A. Slaney. 1988. Life history and smolt-to-adult survival of Keogh River steelhead trout (*Salmo gairdneri*) and the relationship to smolt size. Canadian Journal of Fisheries and Aquatic Sciences.

Wentworth, C.M. and M.D. Zoback. 1989. The style of later Cenozoic deformation at the eastern front of the California Coast Ranges: Tectonics, v. 8, p. 237-246.

Western Regional Climate Center. 2006. Historical Climatological data for Northern California. Western Regional Climate Center, Reno, Nevada. [Online] URL: http://www.wrcc.dri.edu/summary/climsmnca.html. (Accessed September 2010.)

——. 2010. Historical Climatological data for Northern California. Western Regional Climate Center, Reno, Nevada. [Online] URL: http://www.wrcc.dri.edu/summary/climsmnca.html. (Accessed August 2010.)

WRA Environmental Consultants. 2008. Delaney Aggregates Biological Resources Assessment. WRA Environmental Consultants, San Rafael, California. Prepared for Jim Brisco Enterprises, Inc., Merced, California. [Online] URL: http://www.co.stanislaus.ca.us/planning/pl/agenda/2009/02-19-09/Exhibit%20D.pdf. (Accessed August 2010.)

Yoshiyama, R.M., E.R. Gerstung, F.W. Fisher, and P.B. Moyle. 1996. Historical and present distribution of Chinook salmon in the Central Valley drainage of California. Sierra Nevada Ecosystem Project: final report to Congress. *In*: University of California, Center for Water and Wildlife Resources, Davis. Assessments, commissioned reports, and background information. p 309-362. [Online] URL: http://www.sierraforestlegacy.org/Resources/Conservation/SierraNevadaWildlife/Chinook/CH-Yoshiyama-etal1996.pdf. (Accessed August 10, 2010.)

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White. 1988. California's wildlife Vol. 1. Amphibians and reptiles. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, California. [Online] URL: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx. (Accessed August 2010.)

——. 1990a. California's Wildlife. Volume III, Mammals. California Statewide Wildlife Habitat Relationships System. State of California, The Resources Agency, Department of Fish and Game. Sacramento, California. April. [Online] URL: http://www.dfg.ca.gov/biogeodata/cwhr/ cawildlife.aspx. (Accessed August 2010.)

——. 1990b. California's Wildlife, Volume II, Birds. California Statewide Wildlife Habitat Relationships System. State of California, The Resources Agency, Department of Fish and Game. Sacramento, California. November. [Online] URL: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx. (Accessed August 2010.)

Zimmerman, C.E., G.W. Edwards, and K. Perry. 2008. Maternal Origin and Migratory History of *Oncorhynchus mykiss* captured on rivers of the Central Valley, California. California Department of Fish and Game.

\\Dtavm1\proj\MID-TID\115783_T1_Relicensing\WordProcessing\PAD\DPedro_PAD Vol II-110209.doc
JD/
Dept 390/#133742
February 9, 2011

ATTACHMENTS

ATTACHMENT 5.2.1-1

RESERVOIR AND RIVER TEMERATURE DATA

(*DUE TO FILE SIZE, THESE DATA*

***ARE AVAILABLE, UPON REQUEST, IN CD FORMAT ONLY*)**

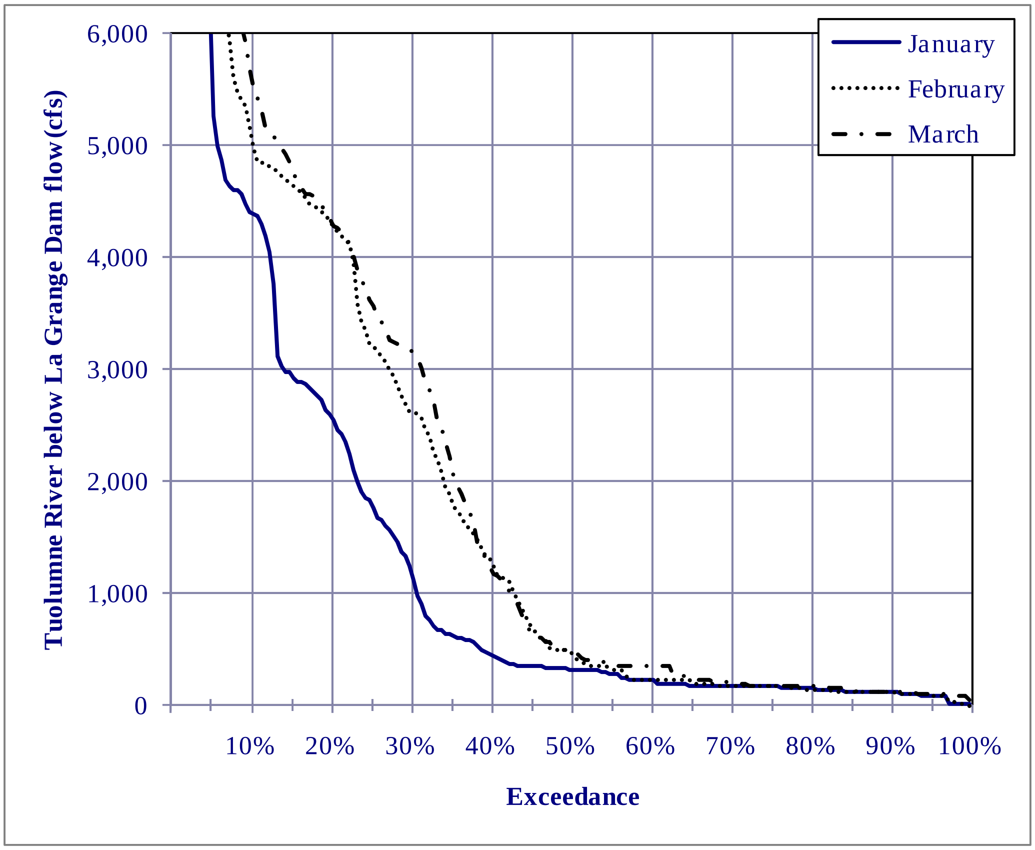
ATTACHMENT 5.2.2-1

FLOW DURATION CURVES

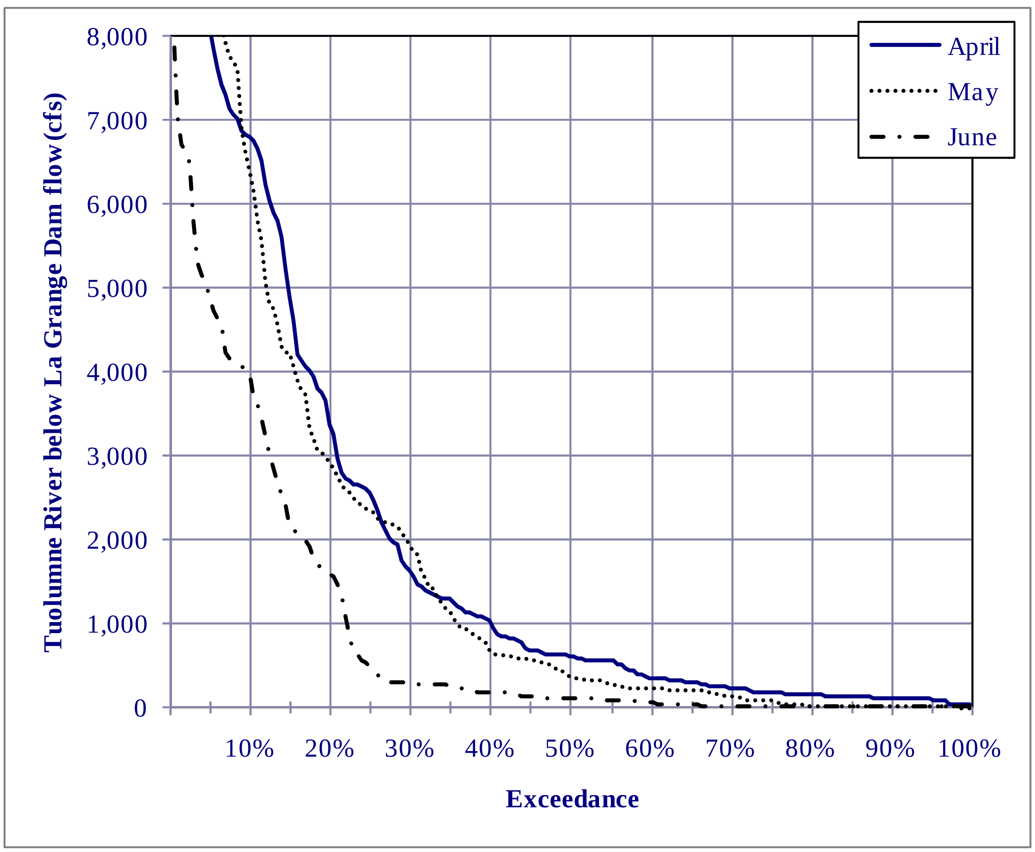
Monthly flow duration data are provided herein for the following locations:

- Tuolumne River below La Grange Dam
- Turlock Canal at La Grange Dam
- Modesto Canal at La Grange Dam
- Don Pedro Project releases

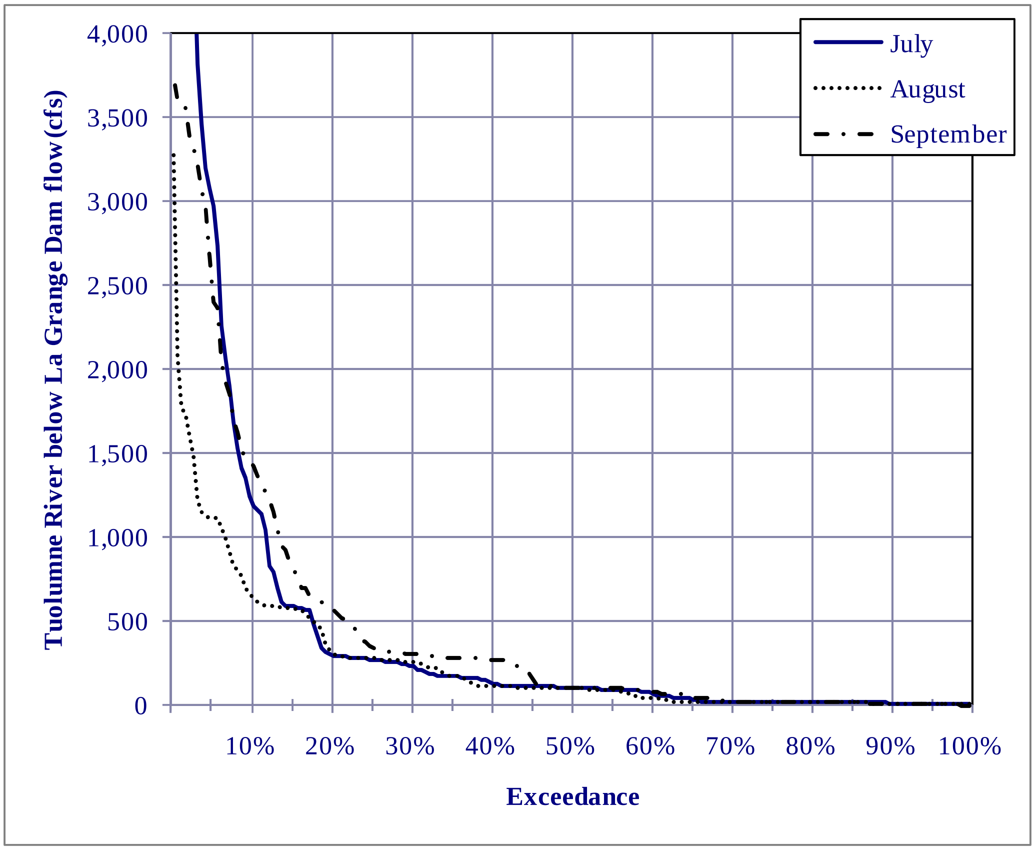
Curves are based on mean daily flows for the period: Water Year 1975 to 2009.



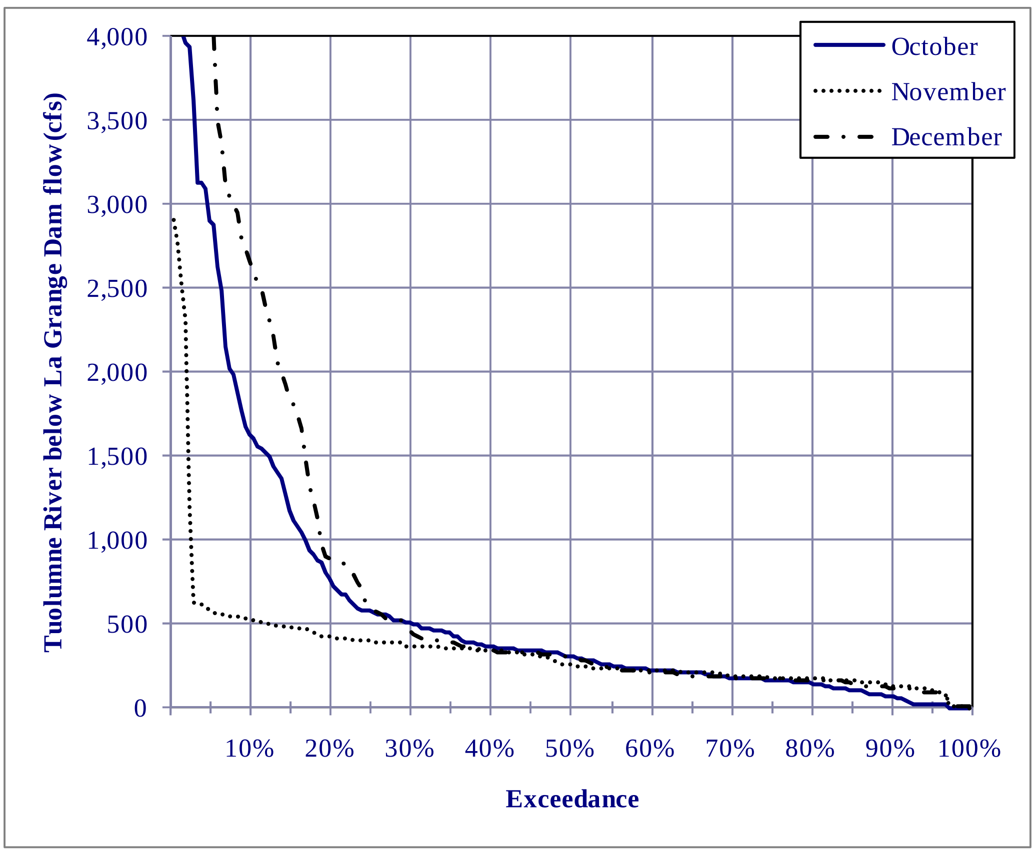
6,000
5,000
4,000
3,000
2,000
1,000
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance
Tuolumne River below La Grange Dam flow (cfs)
January
February
March



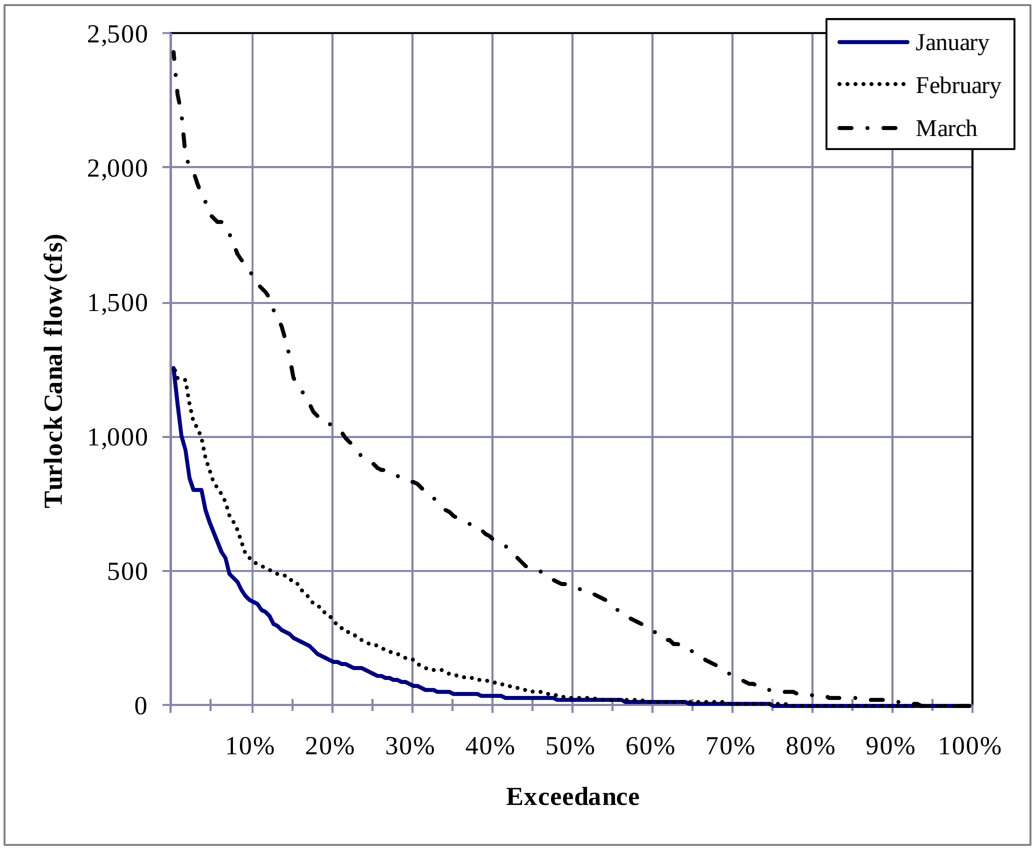
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance
Tuolumne River below La Grange Dam flow (cfs)
April
May
June

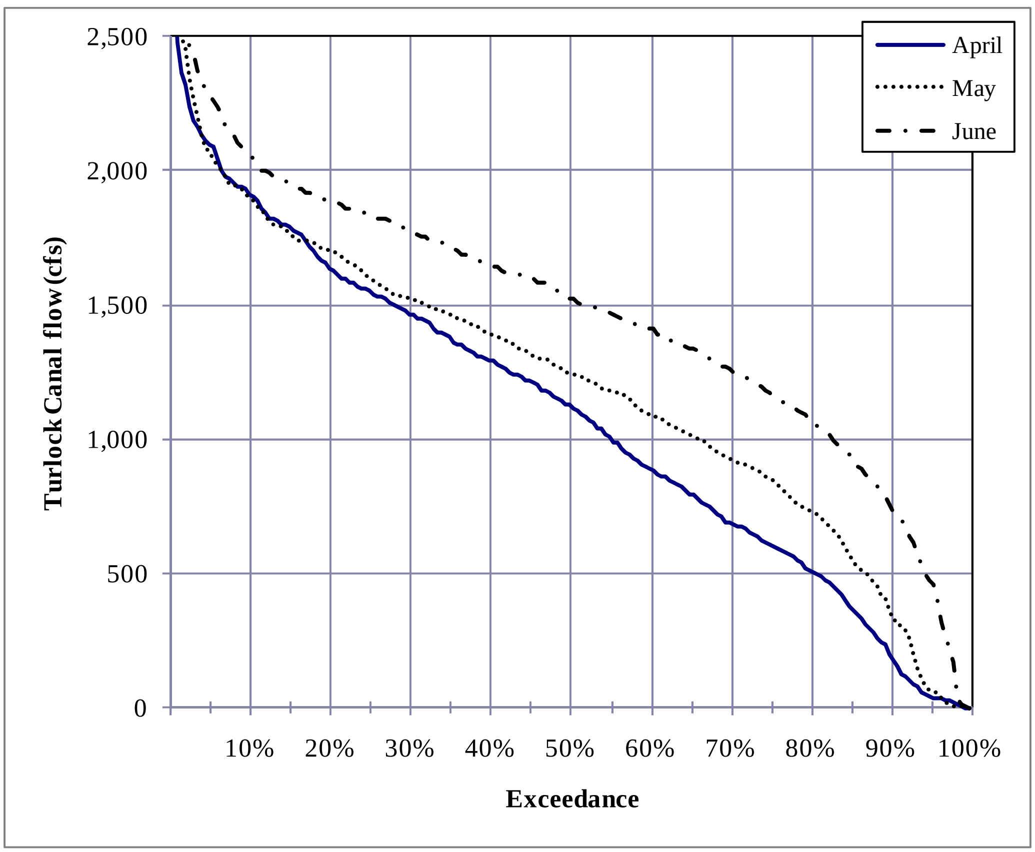


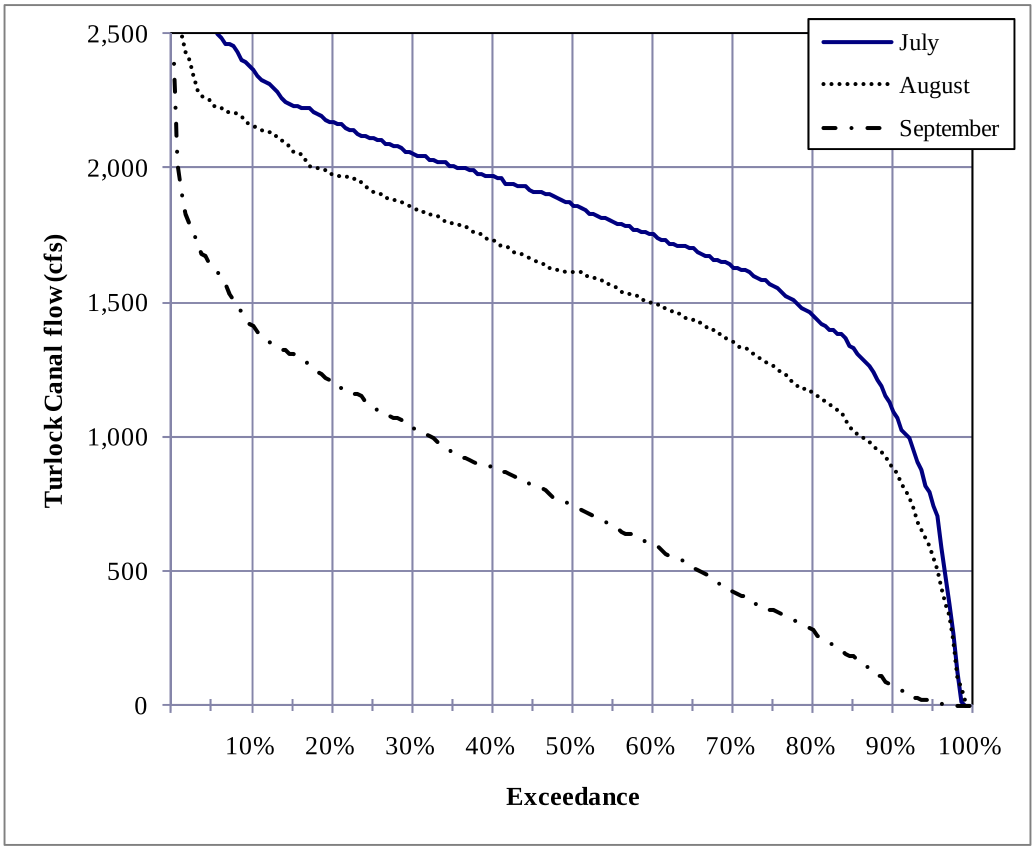
Tuolumne River below La Grange Dam flow (cfs)
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance
July
August
September

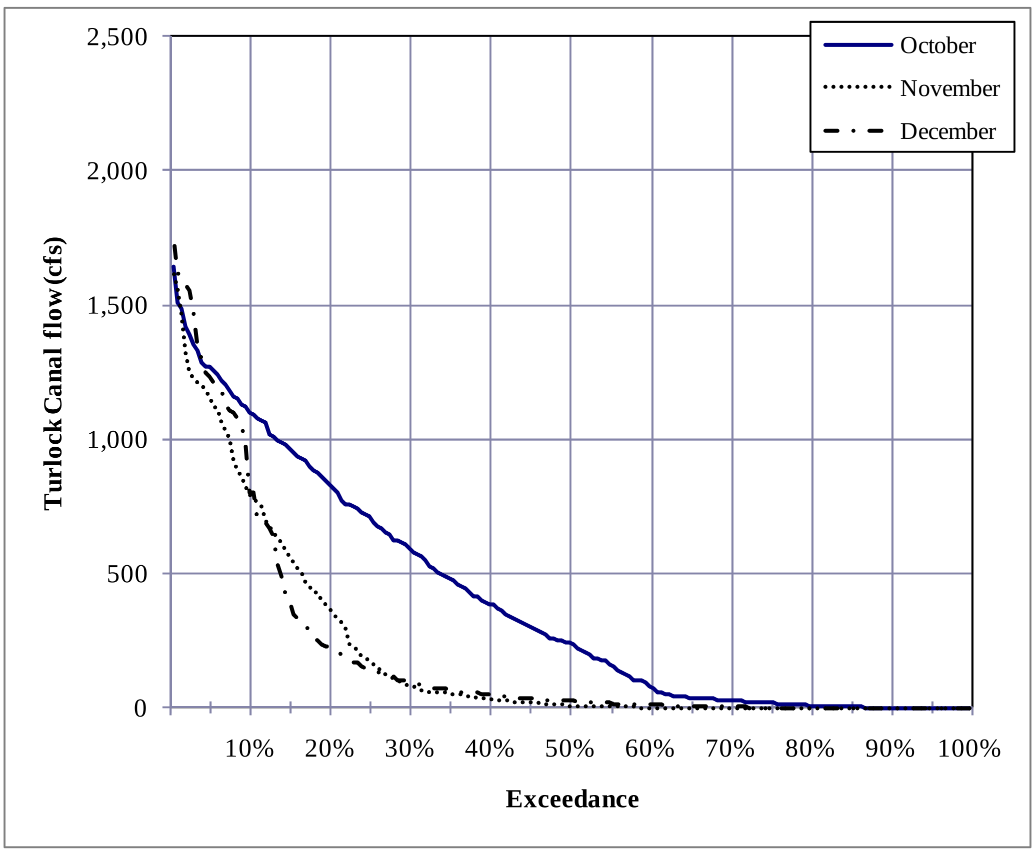


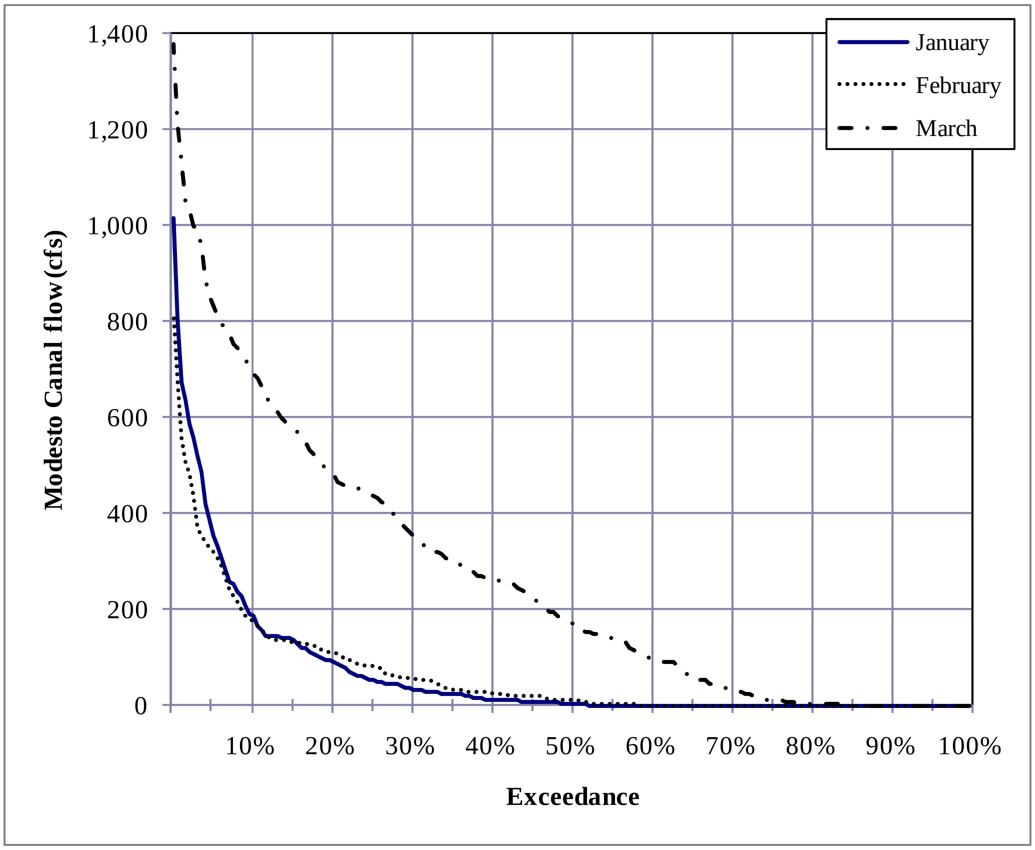
Tuolumne River below La Grange Dam flow (cfs)
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance
October
November
December

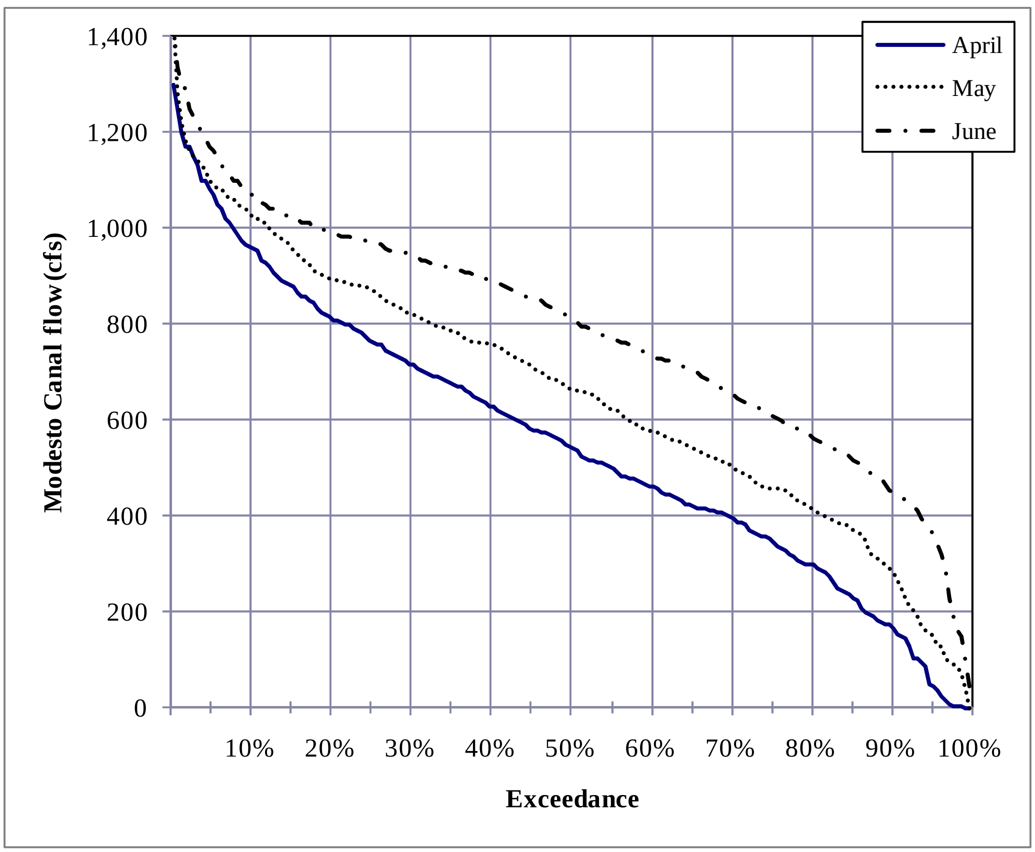

2,500
2,000
1,500
1,000
500
0
Turlock Canal flow (cfs)
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance
January
February
March

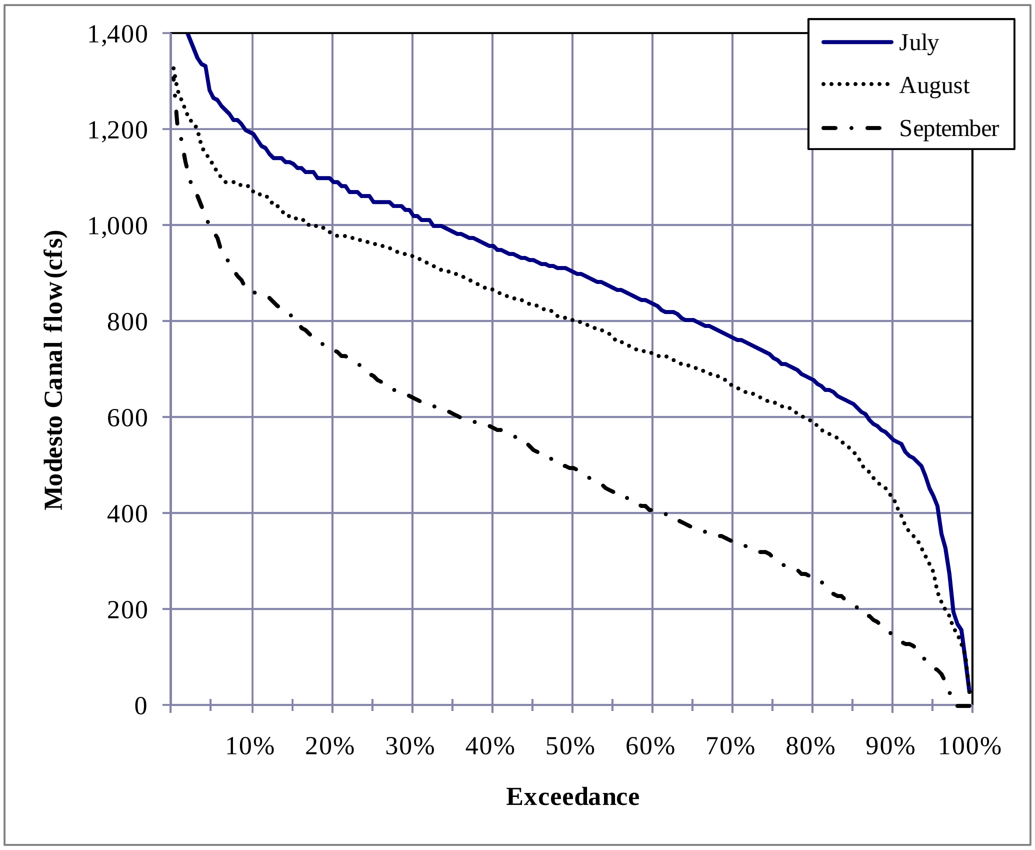

2,500
2,000
1,500
1,000
500
0
Turlock Canal flow (cfs)
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance
April
May
June


July
August
September
Turlock Canal flow (cfs)
2,500
2,000
1,500
1,000
500
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance

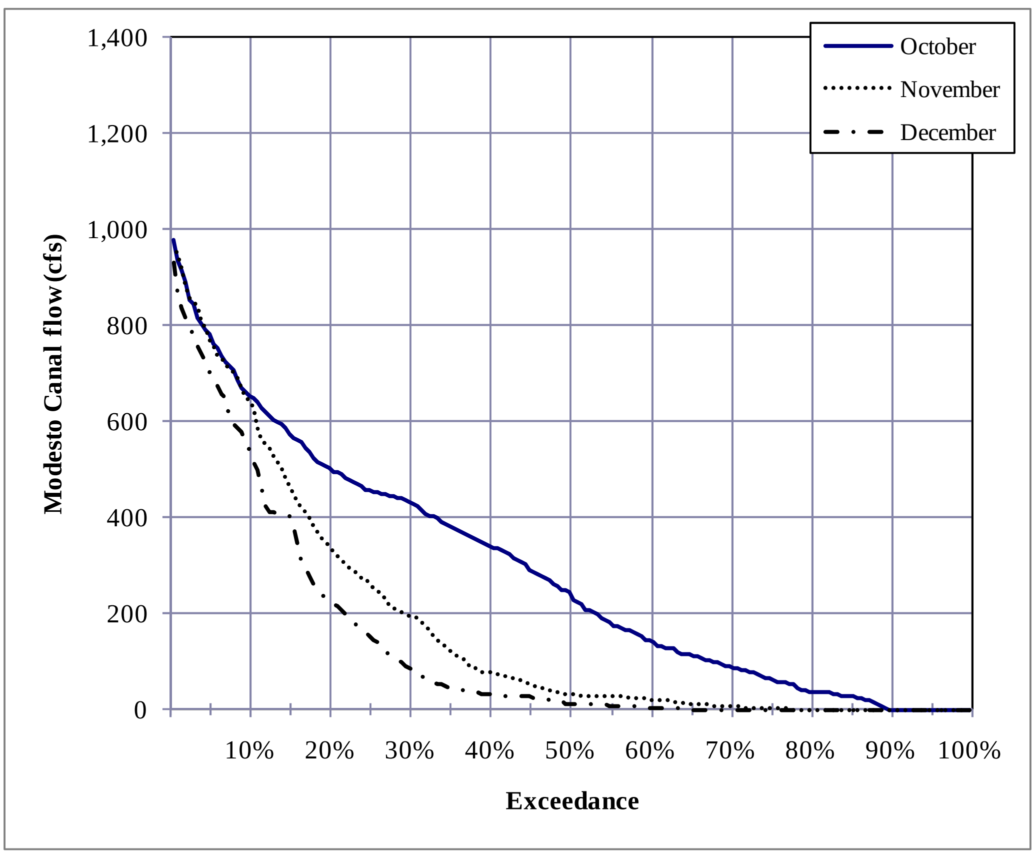

October
November
December
Turlock Canal flow (cfs)
2,500
2,000
1,500
1,000
500
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance


January
February
March
Modesto Canal flow (cfs)
1,400
1,200
1,000
800
600
400
200
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance

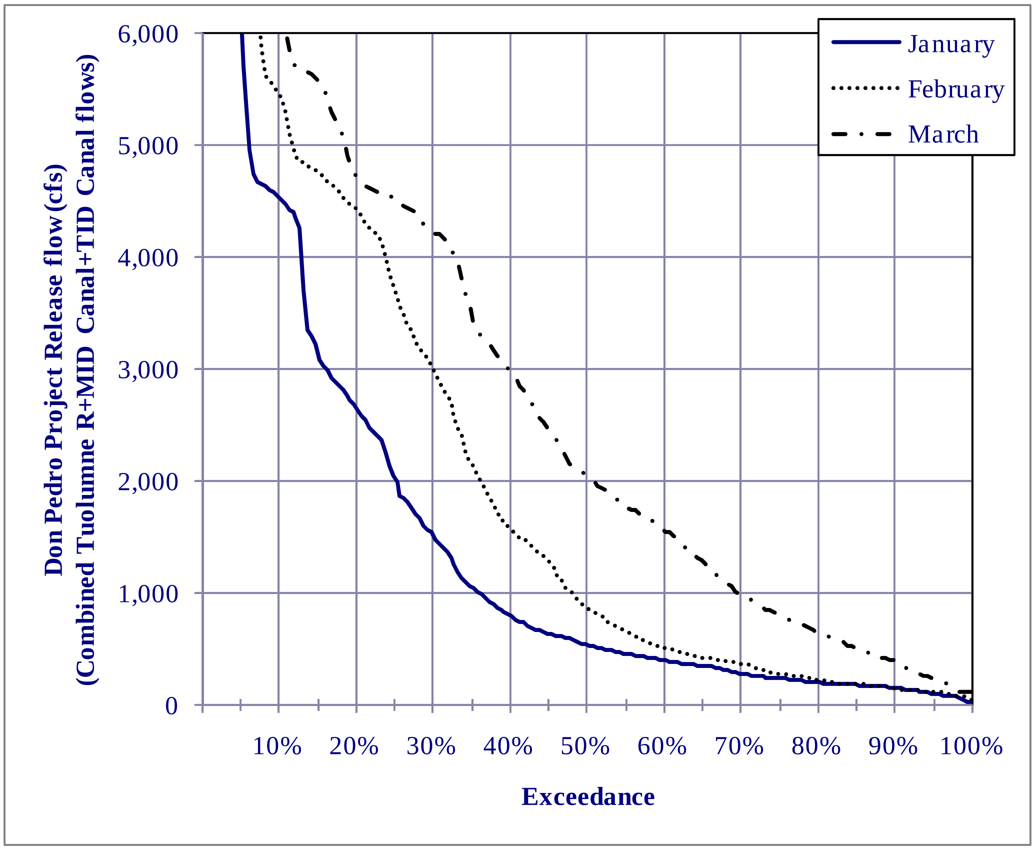

April
May
June
Modesto Canal flow (cfs)
1,400
1,200
1,000
800
600
400
200
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance

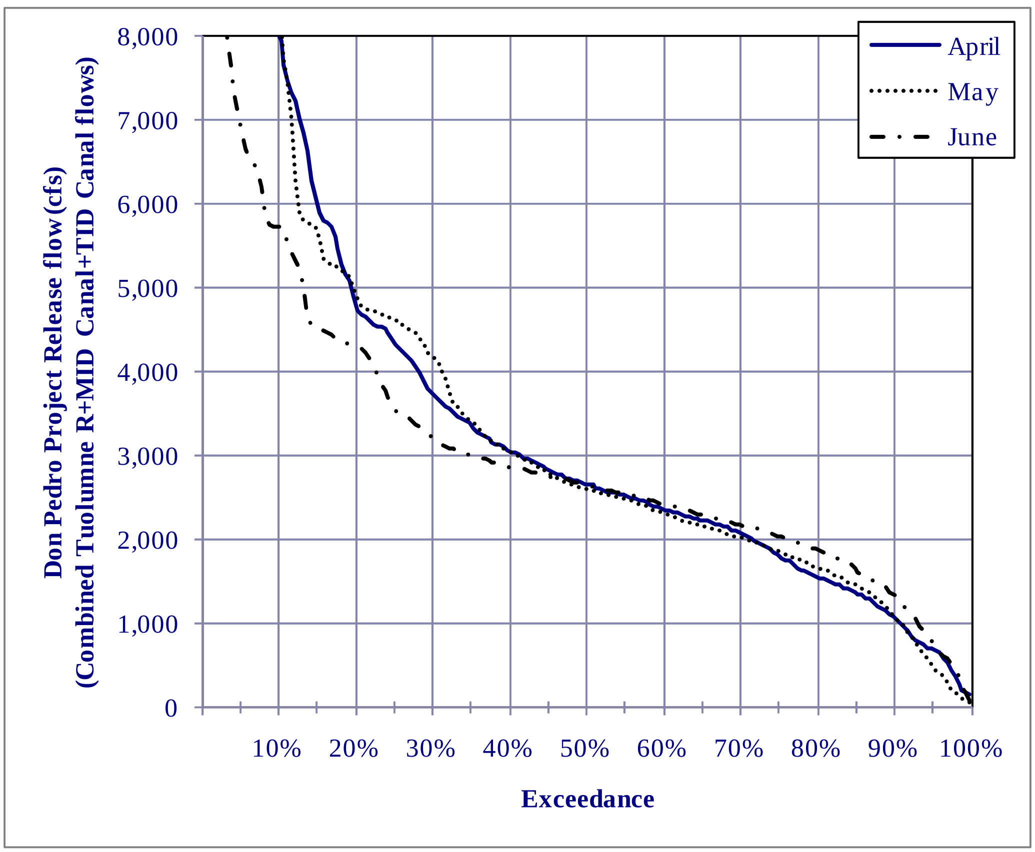


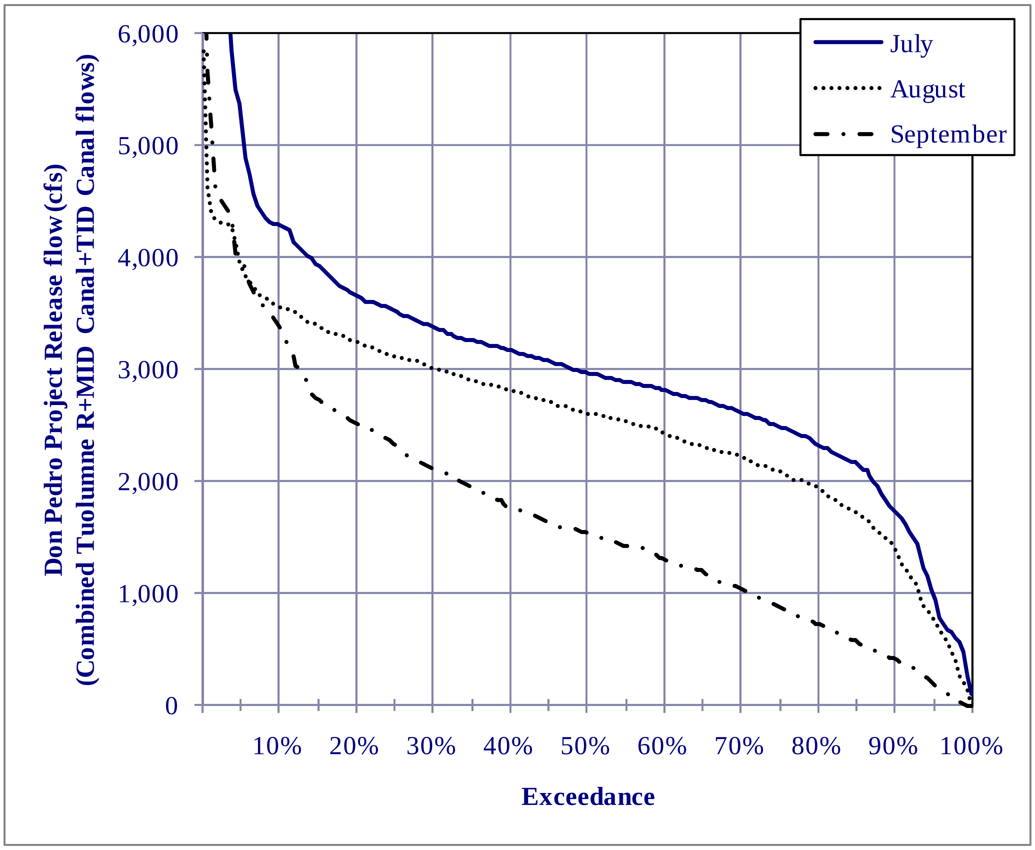
July
August
September
1,400
1,200
1,000
800
600
400
200
0
Modesto Canal flow (cfs)
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance

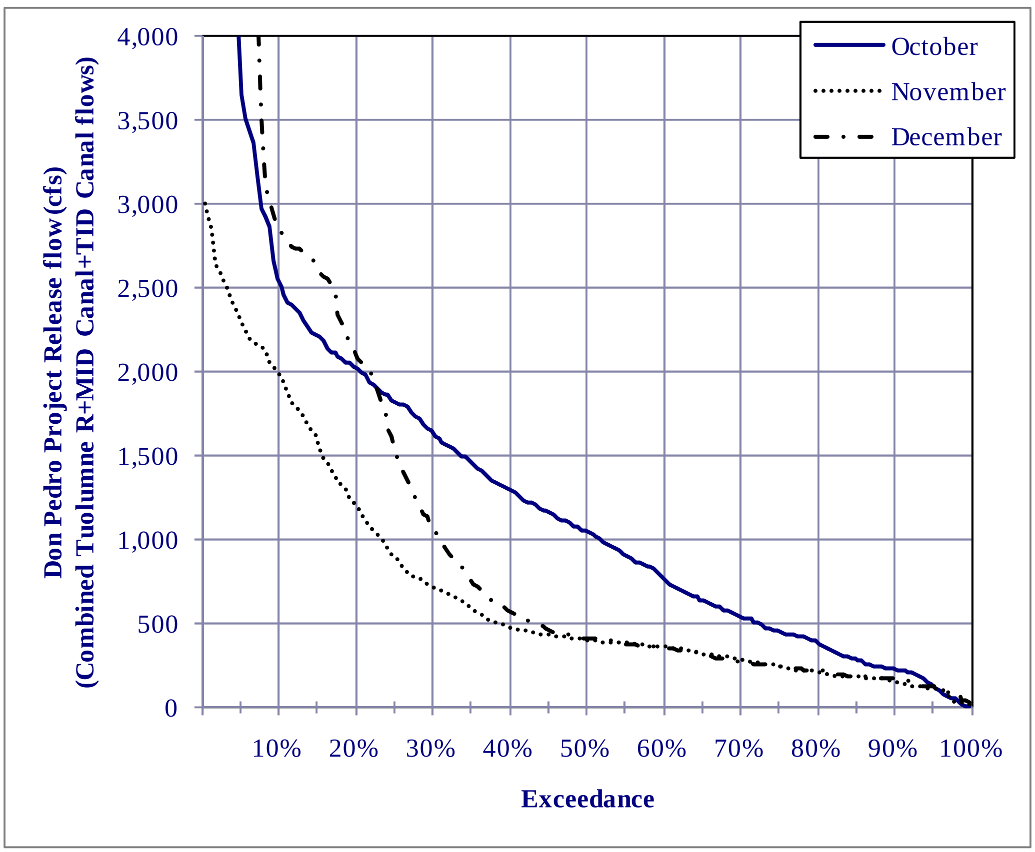


October
November
December
1,400
1,200
1,000
800
600
400
200
0
Modesto Canal flow (cfs)
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance


January
February
March
Don Pedro Project Release flow (cfs)
(Combined Tuolumne R+MID Canal+TID Canal flows)
6,000
5,000
4,000
3,000
2,000
1,000
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance


April
May
June
Don Pedro Project Release flow (cfs)
(Combined Tuolumne R+MID Canal+TID Canal flows)
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance


Don Pedro Project Release flow (cfs)
(Combined Tuolumne R+MID Canal+TID Canal flows)
6,000
5,000
4,000
3,000
2,000
1,000
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance
July
August
September


Don Pedro Project Release flow (cfs)
(Combined Tuolumne R+MID Canal+TID Canal flows)
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Exceedance
October
November
December

ATTACHMENT 5.3.2-1

NUMBER OF FISH STOCKED IN DON PEDRO RESERVOIR

FROM 1953 TO 2009

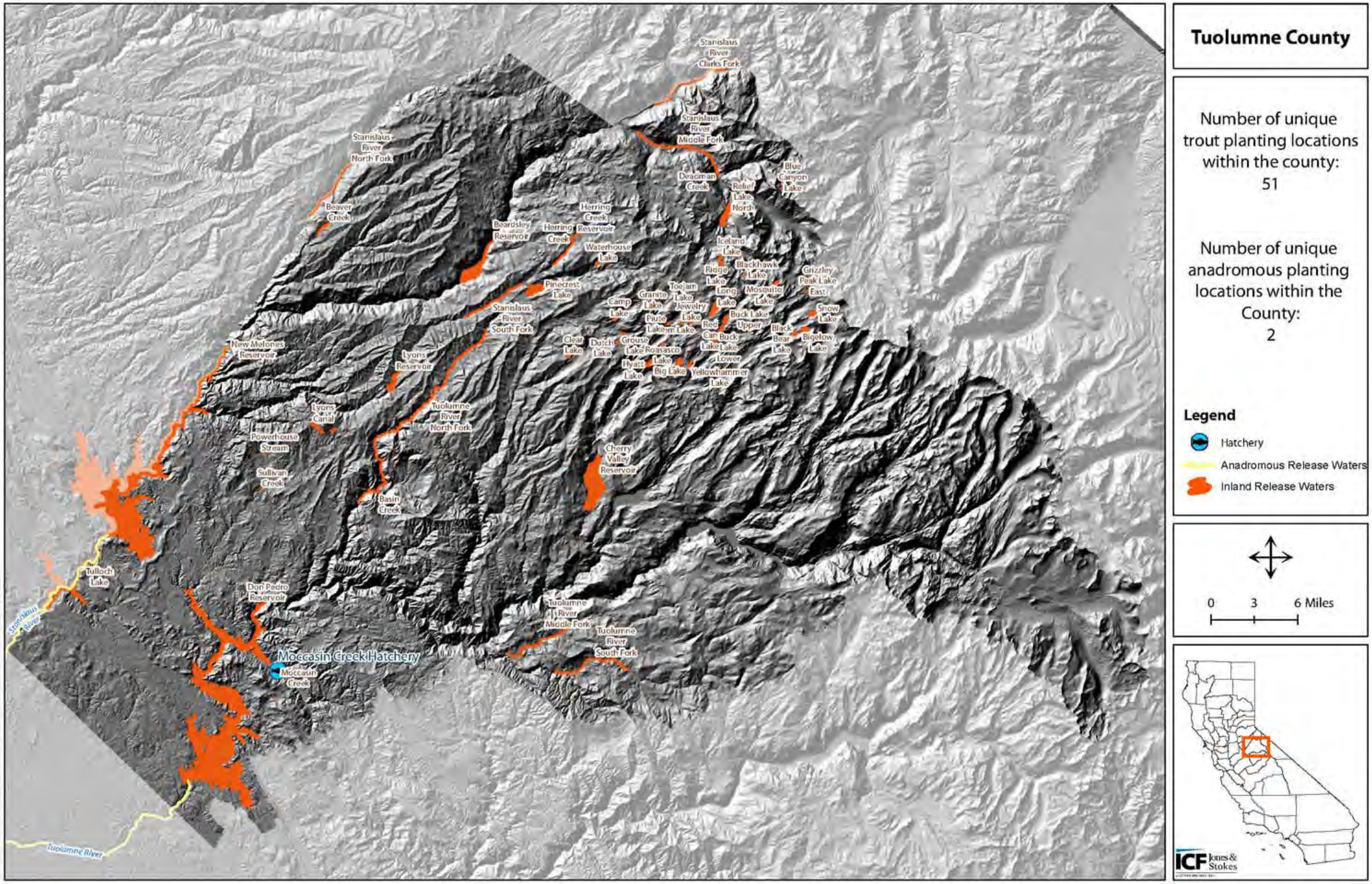


Figure 1 **Number of unique trout planting and anadromous planting lcations in the county.**

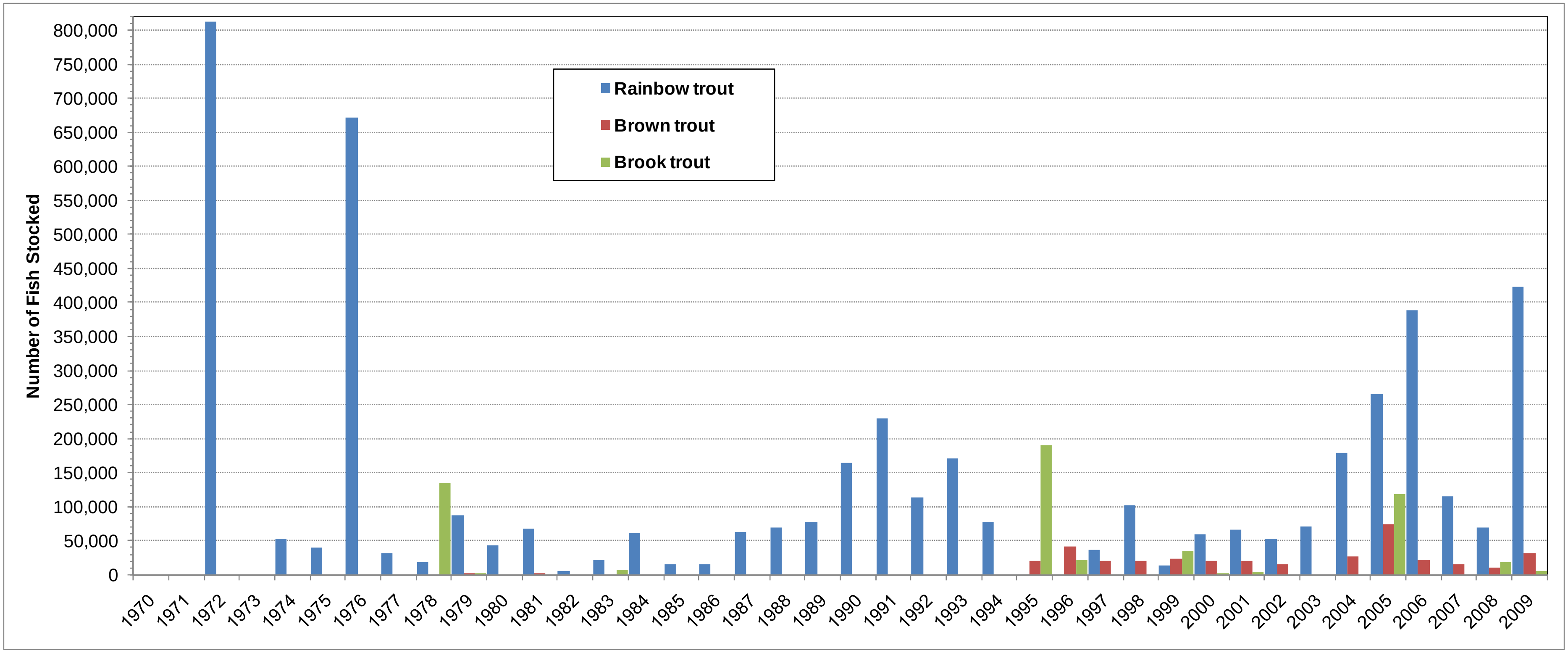


Figure 2 **Number of rainbow trout, brown trout, and brook trout stocked in Don Pedro Reservoir from 1953 to 2009.**

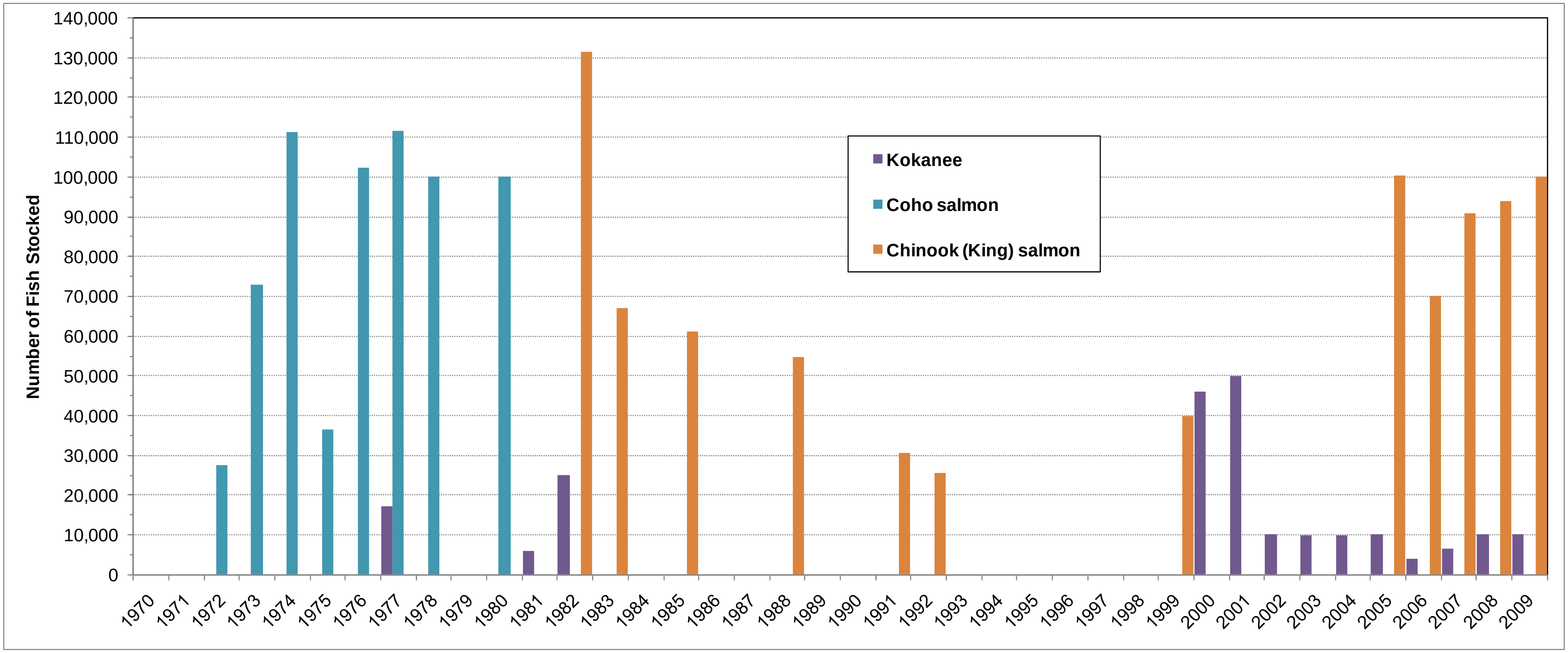


Figure 3 **Number of Kokanee, Coho salmon, and Chinook (king) salmon stocked in Don Pedro Reservoir from 1953 to 2009.**

Table 1 Annual releases of Black Bass (*Micropterus* spp.) in Don Pedro Reservoir from 1953 to 2009. All release (in number of fish of all sizes) are by DPRA.

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Black bass	*Micropterus spp*	Don Pedro Reservoir	1953	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1954	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1955	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1956	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1957	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1958	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1959	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1960	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1961	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1962	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1963	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1964	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1965	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1966	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1967	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1968	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1969	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1970	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1971	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1972	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1973	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1974	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1975	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1976	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1977	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1978	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1979	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1980	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1981	0
Largemouth bass	*Micropterus salmoides*	Don Pedro Reservoir	1982	7,500
Black bass	*Micropterus spp*	Don Pedro Reservoir	1983	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1984	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1985	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1986	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1987	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1988	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1989	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1990	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1991	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1992	0
Black bass	*Micropterus spp*	Don Pedro Reservoir	1993	15,000
Black bass	*Micropterus spp*	Don Pedro Reservoir	1994	2,222
Black bass	*Micropterus spp*	Don Pedro Reservoir	1995	2,711
Black bass	*Micropterus spp*	Don Pedro Reservoir	1996	2,222
Black bass	*Micropterus spp*	Don Pedro Reservoir	1997	2,222
Black bass	*Micropterus spp*	Don Pedro Reservoir	1998	2,222

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Black bass	*Micropterus spp*	Don Pedro Reservoir	1999	1,682
Black bass	*Micropterus spp*	Don Pedro Reservoir	2000	1,980
Black bass	*Micropterus spp*	Don Pedro Reservoir	2001	2,758
Black bass	*Micropterus spp*	Don Pedro Reservoir	2002	1,719
Black bass	*Micropterus spp*	Don Pedro Reservoir	2003	1,825
Black bass	*Micropterus spp*	Don Pedro Reservoir	2004	3,621
Black bass	*Micropterus spp*	Don Pedro Reservoir	2005	2,000
Black bass	*Micropterus spp*	Don Pedro Reservoir	2006	1,062
Black bass	*Micropterus spp*	Don Pedro Reservoir	2007	1,667
Black bass	*Micropterus spp*	Don Pedro Reservoir	2008	1,680
Black bass	*Micropterus spp*	Don Pedro Reservoir	2009	1,367

Table 2 Annual releases of Coho salmon (*Oncorhynchus kisutch*) in Don Pedro Reservoir from 1953 to 2009. All release (in number of fish of all sizes) are by CDFG.

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1953	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1954	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1955	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1956	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1957	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1958	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1959	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1960	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1961	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1962	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1963	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1964	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1965	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1966	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1967	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1968	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1969	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1970	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1971	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1972	27,584
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1973	72,800
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1974	111,241
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1975	36,480
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1976	102,295
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1977	111,600
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1978	100,208
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1979	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1980	100,000
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1981	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1982	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1983	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1984	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1985	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1986	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1987	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1988	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1989	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1990	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1991	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1992	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1993	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1994	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1995	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1996	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1997	0

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1998	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	1999	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	2000	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	2001	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	2002	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	2003	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	2004	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	2005	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	2006	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	2007	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	2008	0
Coho salmon	*Oncorhynchus kisutch*	Don Pedro Reservoir	2009	0

Table 3 Annual releases of Kokanee (*Oncorhynchus nerka*) in Don Pedro Reservoir from 1953 to 2009. All release (in number of fish of all sizes) are by CDFG.

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1953	10,440
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1954	48,825
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1955	57,240
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1956	57,020
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1957	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1958	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1959	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1960	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1961	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1962	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1963	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1964	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1965	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1966	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1967	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1968	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1969	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1970	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1971	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1972	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1973	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1974	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1975	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1976	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1977	17,184
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1978	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1979	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1980	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1981	6,000
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1982	25,155
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1983	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1984	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1985	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1986	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1987	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1988	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1989	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1990	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1991	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1992	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1993	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1994	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1995	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1996	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1997	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1998	0

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	1999	0
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	2000	45,982
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	2001	50,103
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	2002	10,080
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	2003	10,043
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	2004	9,984
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	2005	10,143
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	2006	4,061
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	2007	6,517
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	2008	10,080
Kokanee	*Oncorhynchus nerka*	Don Pedro Reservoir	2009	10,050

Table 4 Annual releases of Chinook (king) salmon (*Oncorhynchus tshawytscha*) in Don Pedro Reservoir from 1953 to 2009. All release (in number of fish of all sizes) are by CDFG.

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1953	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1954	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1955	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1956	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1957	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1958	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1959	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1960	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1961	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1962	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1963	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1964	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1965	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1966	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1967	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1968	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1969	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1970	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1971	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1972	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1973	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1974	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1975	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1976	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1977	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1978	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1979	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1980	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1981	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1982	131,510
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1983	66,920
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1984	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1985	61,130
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1986	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1987	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1988	54,800
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1989	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1990	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1991	30,600
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1992	25,500
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1993	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1994	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1995	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1996	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1997	0

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1998	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	1999	40,000
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	2000	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	2001	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	2002	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	2003	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	2004	0
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	2005	100,440
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	2006	70,015
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	2007	91,000
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	2008	93,885
Chinook (King) salmon	*Oncorhynchus tshawytscha*	Don Pedro Reservoir	2009	100,006

Table 5 Annual releases of Eagle Lake trout (*Oncorhynchus mykiss aquilarum*) in Don Pedro Reservoir from 1953 to 2009. All release (in number of fish of all sizes) are by CDFG.

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1953	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1954	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1955	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1956	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1957	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1958	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1959	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1960	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1961	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1962	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1963	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1964	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1965	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1966	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1967	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1968	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1969	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1970	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1971	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1972	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1973	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1974	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1975	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1976	10,320
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1977	15,660
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1978	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1979	22,000
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1980	18,150
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1981	31,260
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1982	3,600
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1983	20,010
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1984	10,000
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1985	10,075
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1986	10,105
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1987	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1988	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1989	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1990	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1991	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1992	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1993	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1994	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1995	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1996	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1997	0

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1998	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	1999	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	2000	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	2001	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	2002	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	2003	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	2004	0
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	2005	3,600
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	2006	405
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	2007	72,680
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	2008	31,600
Eagle Lake trout	*Oncorhynchus mykiss aquilarum*	Don Pedro Reservoir	2009	93,790

Table 6 Annual releases of rainbow trout (*Oncorhynchus mykiss*) in Don Pedro Reservoir from 1953 to 2009. All release (in number of fish of all sizes) are by CDFG.

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1953	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1954	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1955	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1956	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1957	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1958	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1959	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1960	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1961	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1962	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1963	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1964	388,800
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1965	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1966	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1967	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1968	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1969	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1970	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1971	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1972	813,012
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1973	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1974	52,500
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1975	40,150
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1976	660,810
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1977	16,036
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1978	18,080
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1979	64,800
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1980	25,530
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1981	36,160
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1982	1,200
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1983	1,900
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1984	50,500
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1985	5,780
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1986	5,029
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1987	62,485
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1988	70,150
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1989	77,705
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1990	164,635
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1991	228,905
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1992	112,760
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1993	170,340
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1994	77,920
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1995	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1996	0
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1997	36,980

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1998	101,736
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	1999	13,055
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	2000	59,100
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	2001	65,600
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	2002	52,450
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	2003	71,675
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	2004	179,263
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	2005	262,585
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	2006	388,720
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	2007	41,720
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	2008	37,617
Rainbow trout	*Oncorhynchus mykiss*	Don Pedro Reservoir	2009	329,495

Table 7 Annual releases of brown trout (*Salmo trutta*) in Don Pedro Reservoir from 1953 to 2009. All release (in number of fish of all sizes) are by CDFG.

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1953	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1954	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1955	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1956	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1957	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1958	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1959	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1960	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1961	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1962	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1963	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1964	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1965	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1966	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1967	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1968	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1969	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1970	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1971	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1972	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1973	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1974	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1975	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1976	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1977	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1978	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1979	200
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1980	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1981	600
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1982	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1983	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1984	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1985	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1986	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1987	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1988	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1989	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1990	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1991	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1992	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1993	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1994	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1995	20,124
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1996	40,912
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1997	20,400
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1998	20,000

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Brown trout	*Salmo trutta*	Don Pedro Reservoir	1999	22,925
Brown trout	*Salmo trutta*	Don Pedro Reservoir	2000	20,070
Brown trout	*Salmo trutta*	Don Pedro Reservoir	2001	19,800
Brown trout	*Salmo trutta*	Don Pedro Reservoir	2002	14,600
Brown trout	*Salmo trutta*	Don Pedro Reservoir	2003	0
Brown trout	*Salmo trutta*	Don Pedro Reservoir	2004	26,400
Brown trout	*Salmo trutta*	Don Pedro Reservoir	2005	73,687
Brown trout	*Salmo trutta*	Don Pedro Reservoir	2006	22,100
Brown trout	*Salmo trutta*	Don Pedro Reservoir	2007	15,860
Brown trout	*Salmo trutta*	Don Pedro Reservoir	2008	10,050
Brown trout	*Salmo trutta*	Don Pedro Reservoir	2009	31,320

Table 8 Annual releases of brook trout (*Salvelinus fontinalis*) in Don Pedro Reservoir from 1953 to 2009. All release (in number of fish of all sizes) are by CDFG.

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1953	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1954	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1955	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1956	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1957	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1958	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1959	222,200
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1960	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1961	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1962	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1963	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1964	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1965	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1966	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1967	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1968	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1969	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1970	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1971	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1972	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1973	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1974	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1975	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1976	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1977	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1978	135,500
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1979	228
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1980	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1981	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1982	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1983	7,600
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1984	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1985	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1986	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1987	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1988	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1989	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1990	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1991	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1992	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1993	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1994	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1995	190,405
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1996	22,450
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1997	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1998	0

Species		Release Water	Year	Number Released
Common Name	Scientific Name			
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	1999	35,341
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	2000	2,000
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	2001	3,520
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	2002	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	2003	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	2004	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	2005	118,400
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	2006	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	2007	0
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	2008	18,222
Brook trout	*Salvelinus fontinalis*	Don Pedro Reservoir	2009	5,610

ATTACHMENT 5.4.1-1

CNDDB OCCURRENCE REPORTS

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number: 13410
Key Quad: La Grange (3712064)
Occurrence Number: 19

EO Index: 28430
Element Code: AAAAA01180
Occurrence Last Updated: 1998-03-17

Scientific Name: *Ambystoma californiense*

Common Name: California tiger salamander

Listing Status: **Federal:** Threatened
State: Threatened

Rare Plant Rank:

Other Lists: DFG_SSC-Species of Special Concern
IUCN_VU-Vulnerable

CNDDB Element Ranks: **Global:** G2G3
State: S2S3

General Habitat:

CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.

Micro Habitat:

NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING

Last Date Observed: 1986-03-26
Last Survey Date: 1986-03-26
Owner/Manager: UNKNOWN
Presence: Presumed Extant

Occurrence Type: Natural/Native occurrence
Occurrence Rank: Unknown
Trend: Unknown

Location:

CARDOZA LAKE, EAST SIDE OF HWY J-59, ABOUT 1.25 MILES SOUTH OF LA GRANGE.

Detailed Location:

Ecological:

Threats:

General:

J. BRODE FIELD NOTE #169 COLLECTED 26 MAR 1973. CAS #187402 (1 ADULT) COLLECTED 22 MAR 1986 BY J. BOUNDY & A.W. FORD.

PLSS: T03S, R14E, Sec. 29 (M)
Accuracy: 80 meters
Area (acres): 0

UTM: Zone-10 N4169567 E724419
Latitude/Longitude: 37.64586 / -120.45629
Elevation (feet): 350

County Summary:

Stanislaus

Quad Summary:

La Grange (3712064)

Sources:

BRO86U0003	BRODE, JOHN (CALIFORNIA DEPARTMENT OF FISH AND GAME) - GEOGRAPHIC REFERENCE CARDS OF LOCATIONS FOR AMBYSTOMA CALIFORNIENSE 1986-XX-XX
CAS01S0004	CALIFORNIA ACADEMY OF SCIENCES - 1951-1989 CAS HERPETOLOGY HOLDINGS (INCLUDES STANFORD UNIVERSITY COLLECTIONS) FOR AMBYSTOMA CALIFORNIENSE 2001-08-15

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number:	13383	**EO Index:**	28387
Key Quad:	La Grange (3712064)	**Element Code:**	AAAAA01180
Occurrence Number:	84	**Occurrence Last Updated:**	2009-06-17

Scientific Name: *Ambystoma californiense*

Common Name: California tiger salamander

Listing Status: **Federal:** Threatened

State: Threatened

CNDDB Element Ranks: **Global:** G2G3

State: S2S3

Rare Plant Rank:

Other Lists: DFG_SSC-Species of Special Concern
IUCN_VU-Vulnerable

General Habitat:

CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.

Micro Habitat:

NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING

Last Date Observed:	1973-XX-XX	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1973-XX-XX	**Occurrence Rank:**	Unknown
Owner/Manager:	STA COUNTY	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

LA GRANGE REGIONAL PARK. NEAR BASSO BRIDGE ON THE TUOLUMNE RIVER.

Detailed Location:

Ecological:

SALAMANDER POPULATIONS IN EASTERN STANISLAUS COUNTY ARE DECLINING ACCORDING TO BRODE & BASEY. 2008 AERIAL PHOTO SHOWS THAT THIS AREA IS STILL MOSTLY NATURAL HABITAT WITH SOME AGRICULTURE ON THE SE BORDER OF THE PARK.

Threats:

GRASSLAND HABITAT BEING CONVERTED TO ORCHARDS AND VINEYARDS.

General:

UNKNOWN NUMBER FOUND AT THE PARK SITE.

PLSS:	T03S, R13E, Sec. 25 (M)	**Accuracy:**	2/5 mile	**Area (acres):**	0
UTM:	Zone-10 N4169496 E721116	**Latitude/Longitude:**	37.64602 / -120.49371	**Elevation (feet):**	300

County Summary:	**Quad Summary:**
Stanislaus	La Grange (3712064)

Sources:

GRA73A0001 GRAY, T. - TIGER SALAMANDER MAY MAKE LAST STAND IN NEW PARK AT LA GRANGE. ARTICLE IN THE MODESTO BEE, INTERVIEW WITH BRODE AND BASEY OF MODESTO JUNIOR COLLEGE. 1973-03-18

STA72A0001 STANISLAUS COUNTY HISTORICAL SOCIETY ET AL. - LA GRANGE PARK, LA GRANGE, CALIFORNIA (PARK BROCHURE) 1972-XX-XX

Map Index Number:	38393	**EO Index:**	33400
Key Quad:	La Grange (3712064)	**Element Code:**	AAAAA01180
Occurrence Number:	420	**Occurrence Last Updated:**	2009-06-17

Scientific Name: *Ambystoma californiense*

Common Name: California tiger salamander

Listing Status:	**Federal:**	Threatened	**Rare Plant Rank:**	
	State:	Threatened	**Other Lists:**	DFG_SSC-Species of Special Concern IUCN_VU-Vulnerable
CNDDB Element Ranks:	**Global:**	G2G3		
	State:	S2S3		

General Habitat:

CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.

Micro Habitat:

NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING

Last Date Observed:	1973-02-13	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1973-02-13	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

ABOUT 2 MILES SOUTH OF LA GRANGE.

Detailed Location:

Ecological:

2008 AERIAL PHOTO SHOWS THAT THIS AREA IS STILL NATURAL HABITAT.

Threats:

General:

JOHN BRODE FIELD NOTE #165.

PLSS:	T03S, R14E, Sec. 32 (M)	**Accuracy:**	3/5 mile	**Area (acres):**	0
UTM:	Zone-10 N4167786 E724709	**Latitude/Longitude:**	37.62975 / -120.45355	**Elevation (feet):**	400

County Summary:	**Quad Summary:**
Stanislaus	Snelling (3712054), La Grange (3712064)

Sources:

BRO86U0003 BRODE, JOHN (CALIFORNIA DEPARTMENT OF FISH AND GAME) - GEOGRAPHIC REFERENCE CARDS OF LOCATIONS FOR AMBYSTOMA CALIFORNIENSE 1986-XX-XX

Map Index Number:	38394	**EO Index:**	33401
Key Quad:	La Grange (3712064)	**Element Code:**	AAAAA01180
Occurrence Number:	421	**Occurrence Last Updated:**	2009-06-18

Scientific Name: *Ambystoma californiense*

Common Name: California tiger salamander

Listing Status: **Federal:** Threatened **State:** Threatened

Rare Plant Rank:

Other Lists: DFG_SSC-Species of Special Concern
IUCN_VU-Vulnerable

CNDDB Element Ranks: **Global:** G2G3 **State:** S2S3

General Habitat:

CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.

Micro Habitat:

NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING

Last Date Observed:	1973-02-13	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1973-02-13	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

ABOUT 0.5 MILE EAST OF LA GRANGE.

Detailed Location:

Ecological:

2008 AERIAL PHOTO SHOWS THAT THIS AREA IS STILL MOSTLY NATURAL HABITAT WITH ONLY LIGHT DISTURBANCES. HOWEVER, DEVELOPMENT AND AGRICULTURE ARE CLOSING IN FROM THE WEST AND NORTHWEST.

Threats:

General:

JOHN BRODE FIELD NOTE #166.

PLSS:	T03S, R14E, Sec. 20 (M)	**Accuracy:**	2/5 mile	**Area (acres):**	0
UTM:	Zone-10 N4171023 E724485	**Latitude/Longitude:**	37.65895 / -120.45510	**Elevation (feet):**	300

County Summary:	**Quad Summary:**
Stanislaus	La Grange (3712064)

Sources:

BRO86U0003 BRODE, JOHN (CALIFORNIA DEPARTMENT OF FISH AND GAME) - GEOGRAPHIC REFERENCE CARDS OF LOCATIONS FOR AMBYSTOMA CALIFORNIENSE 1986-XX-XX

Map Index Number: 69531 **EO Index:** 70309
Key Quad: La Grange (3712064) **Element Code:** AAAAA01180
Occurrence Number: 982 **Occurrence Last Updated:** 2007-06-13

Scientific Name: *Ambystoma californiense* **Common Name:** California tiger salamander

Listing Status: **Federal:** Threatened **Rare Plant Rank:**
State: Threatened **Other Lists:** DFG_SSC-Species of Special Concern
IUCN_VU-Vulnerable
CNDDB Element Ranks: **Global:** G2G3
State: S2S3

General Habitat:

CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.

Micro Habitat:

NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING

Last Date Observed: 2007-05-15 **Occurrence Type:** Natural/Native occurrence
Last Survey Date: 2007-05-15 **Occurrence Rank:** Good
Owner/Manager: PVT **Trend:** Unknown
Presence: Presumed Extant

Location:

ALONG BIG CREEK, BETWEEN MCNULTY RIDGE AND BONDS FLAT ROAD, SOUTH OF DON PEDRO RESERVOIR.

Detailed Location:

Ecological:

HABITAT CONSISTS OF A STOCKPOND SURROUNDED BY GRAZED FOOTHILL GRASSLAND.

Threats:

THREATENED BY DEVELOPMENT.

General:

3 LARVAE OBSERVED ON 15 MAY 2007.

PLSS: T03S, R14E, Sec. 12 (M) **Accuracy:** 80 meters **Area (acres):** 0
UTM: Zone-10 N4174324 E730508 **Latitude/Longitude:** 37.68718 / -120.38583 **Elevation (feet):** 1,004

County Summary: Tuolumne

Quad Summary: La Grange (3712064)

Sources:

THO07F0001 THOMAS, GEOFF & KIMBERLY DEBRIANSKY (MONK AND ASSOCIATES, INC.) - FIELD SURVEY FORM FOR AMBYSTOMA CALIFORNIENSE 2007-05-15

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number:	13694	**EO Index:**	28457
Key Quad:	Moccasin (3712073)	**Element Code:**	AAABH01050
Occurrence Number:	23	**Occurrence Last Updated:**	1989-08-10

Scientific Name: *Rana boylii*

Common Name: foothill yellow-legged frog

Listing Status: **Federal:** None; **State:** None

Rare Plant Rank:

CNDDB Element Ranks: **Global:** G3; **State:** S2S3

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_NT-Near Threatened
USFS_S-Sensitive

General Habitat:

PARTLY-SHADED, SHALLOW STREAMS & RIFFLES WITH A ROCKY SUBSTRATE IN A VARIETY OF HABITATS.

Micro Habitat:

NEED AT LEAST SOME COBBLE-SIZED SUBSTRATE FOR EGG-LAYING. NEED AT LEAST 15 WEEKS TO ATTAIN METAMORPHOSIS.

Last Date Observed:	1970-XX-XX	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1970-XX-XX	**Occurrence Rank:**	Unknown
Owner/Manager:	BLM, PVT	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

HATCH LAKE.

Detailed Location:

FOUND MOSTLY IN SMALL PERMANENT FOOTHILL STREAMS HIGHER THAN 200 M ELEV, IN AREAS NOT OCCUPIED BY BULLFROGS.

Ecological:

Threats:

General:

COLL. BTWN JULY & SEPT.

PLSS:	T02S, R15E, Sec. 09 (M)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-10 N4184243 E735626	**Latitude/Longitude:**	37.77519 / -120.32464	**Elevation (feet):**	1,600

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

MOY72R0001 MOYLE, PETER B. - "EFFECTS OF BULLFROG (RANA CATESBIANA) INTRODUCTIONS ON POPULATIONS OF THE RED-LEGGED FROG (R. AURORA) AND THE YELLOW-LEGGED FROG (R. BOYLII) IN THE SAN JOAQUIN VALLEY, CA" 1972-XX-XX

Map Index Number:	13688	**EO Index:**	28456
Key Quad:	Moccasin (3712073)	**Element Code:**	AAABH01050
Occurrence Number:	24	**Occurrence Last Updated:**	1989-08-10

Scientific Name: *Rana boylii*

Common Name: foothill yellow-legged frog

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

CNDDB Element Ranks: **Global:** G3 **State:** S2S3

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_NT-Near Threatened
USFS_S-Sensitive

General Habitat:

PARTLY-SHADED, SHALLOW STREAMS & RIFFLES WITH A ROCKY SUBSTRATE IN A VARIETY OF HABITATS.

Micro Habitat:

NEED AT LEAST SOME COBBLE-SIZED SUBSTRATE FOR EGG-LAYING. NEED AT LEAST 15 WEEKS TO ATTAIN METAMORPHOSIS.

Last Date Observed:	1970-XX-XX	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1970-XX-XX	**Occurrence Rank:**	Unknown
Owner/Manager:	PVT	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

SECOND LAKE.

Detailed Location:

FOUND MOSTLY IN SMALL PERMANENT FOOTHILL STREAMS HIGHER THAN 200 M ELEV, IN AREAS NOT OCCUPIED BY BULLFROGS.

Ecological:

Threats:

General:

COLL BTWN JULY & SEPT.

PLSS:	T02S, R15E, Sec. 16 (M)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-10 N4182122 E735818	**Latitude/Longitude:**	37.75604 / -120.32315	**Elevation (feet):**	1,200

County Summary:	**Quad Summary:**
Tuolumne	Penon Blanco Peak (3712063), Moccasin (3712073)

Sources:

MOY72R0001 MOYLE, PETER B. - "EFFECTS OF BULLFROG (RANA CATESBIANA) INTRODUCTIONS ON POPULATIONS OF THE RED-LEGGED FROG (R. AURORA) AND THE YELLOW-LEGGED FROG (R. BOYLII) IN THE SAN JOAQUIN VALLEY, CA" 1972-XX-XX

Map Index Number:	45425	**EO Index:**	45425
Key Quad:	Moccasin (3712073)	**Element Code:**	AAABH01050
Occurrence Number:	300	**Occurrence Last Updated:**	2001-08-07

Scientific Name: *Rana boylii*

Common Name: foothill yellow-legged frog

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_NT-Near Threatened
USFS_S-Sensitive

CNDDB Element Ranks: **Global:** G3 **State:** S2S3

General Habitat:

PARTLY-SHADED, SHALLOW STREAMS & RIFFLES WITH A ROCKY SUBSTRATE IN A VARIETY OF HABITATS.

Micro Habitat:

NEED AT LEAST SOME COBBLE-SIZED SUBSTRATE FOR EGG-LAYING. NEED AT LEAST 15 WEEKS TO ATTAIN METAMORPHOSIS.

Last Date Observed:	2001-04-05	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2001-04-05	**Occurrence Rank:**	Good
Owner/Manager:	BLM	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

NEAR THE CONFLUENCE OF BIG JACKASS CREEK AND MOCCASIN CREEK, SOUTH OF HIGHWAY 49, 4 MILES EAST OF DON PEDRO RESERVOIR

Detailed Location:

Ecological:

HABITAT CONSISTS OF CREEKS SURROUNDED BY RIPARIAN, DOMINATED BY WILLOWS AND ALDERS.

Threats:

THREATENED BY SUCTION DREDGING.

General:

HISTORIC RECORD OF FYLF AT THIS SAME LOCATION IN 1978. 2 ADULTS AND 4 EGG MASSES OBSERVED ON 4 MAY 2001.

PLSS:	T02S, R15E, Sec. 12 (M)	**Accuracy:**	1/10 mile	**Area (acres):**	0
UTM:	Zone-10 N4184739 E740211	**Latitude/Longitude:**	37.77846 / -120.27247	**Elevation (feet):**	1,200

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

CRA01F0001 CRANSTON, PEGGY (U.S. BUREAU OF LAND MANAGEMENT) - FIELD SURVEY FORM FOR RANA BOYLII 2001-05-04

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number: 59807
Key Quad: Sonora (3712084)
Occurrence Number: 421
EO Index: 59843
Element Code: AAABH01050
Occurrence Last Updated: 2005-02-02

Scientific Name: *Rana boylii*
Common Name: foothill yellow-legged frog

Listing Status: **Federal:** None
State: None
CNDDB Element Ranks: **Global:** G3
State: S2S3
Rare Plant Rank:
Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_NT-Near Threatened
USFS_S-Sensitive

General Habitat:

PARTLY-SHADED, SHALLOW STREAMS & RIFFLES WITH A ROCKY SUBSTRATE IN A VARIETY OF HABITATS.

Micro Habitat:

NEED AT LEAST SOME COBBLE-SIZED SUBSTRATE FOR EGG-LAYING. NEED AT LEAST 15 WEEKS TO ATTAIN METAMORPHOSIS.

Last Date Observed: 1997-05-15
Last Survey Date: 1997-05-15
Owner/Manager: PVT
Presence: Presumed Extant
Occurrence Type: Natural/Native occurrence
Occurrence Rank: Good
Trend: Unknown

Location:

SOUTH OF TABLE MOUNTAIN, ABOUT 1 MILE SOUTH OF YOSEMITE JUNCTION.

Detailed Location:

Ecological:

HABITAT CONSISTS OF POOLS IN A SERPENTINE CREEK, ABOVE A RESERVOIR ON THE MESA.

Threats:

BULLFROGS IN RESERVOIR

General:

SEVERAL LARGE TADPOLES UNDERGOING METAMORPHOSIS OBSERVED ON 15 MAY 1997.

PLSS: T01S, R13E, Sec. 01 (M)
Accuracy: nonspecific area
Area (acres): 48
UTM: Zone-10 N4195179 E720510
Latitude/Longitude: 37.87743 / -120.49278
Elevation (feet): 1,250

County Summary: Tuolumne

Quad Summary: Sonora (3712084)

Sources:

WOO97F0009 WOOD, ROBIN (TUOLUMNE COUNTY) - FIELD SURVEY FORM FOR RANA BOYLII 1997-05-15

Map Index Number:	44594	**EO Index:**	44594
Key Quad:	Tuolumne (3712082)	**Element Code:**	AAABH01340
Occurrence Number:	73	**Occurrence Last Updated:**	2000-12-19

Scientific Name: *Rana sierrae*

Common Name: Sierra Nevada yellow-legged frog

Listing Status: **Federal:** Candidate

State: None

Rare Plant Rank:

Other Lists: DFG_SSC-Species of Special Concern
IUCN_EN-Endangered
USFS_S-Sensitive

CNDDB Element Ranks: **Global:** G1

State: S1

General Habitat:

ALWAYS ENCOUNTERED WITHIN A FEW FEET OF WATER. TADPOLES MAY REQUIRE 2 - 4 YRS TO COMPLETE THEIR AQUATIC DEVELOPMENT.

Micro Habitat:

Last Date Observed:	1927-10-23	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1927-10-23	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

TUOLUMNE, TUOLUMNE COUNTY

Detailed Location:

MAPPED TO CITY OF TUOLUMNE. 1927 OBS COORDS GIVEN AS: LAT 37 57'39", LONG 120 15'25" WHICH MAPS TO APPROXIMATELY THE CENTER OF TOWN.

Ecological:

Threats:

General:

2 COLLECTED BY B. EVERMAN, 23 OCT 1927. DEPOSITED IN CAS #'S: 65004 & 65005. ALSO BUFO CANORUS FOUND IN THIS AREA DIFFERENT DATE AND COLLECTOR.

PLSS:	T01N, R16E, Sec. 08 (M)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-10 N4205046 E742701	**Latitude/Longitude:**	37.96062 / -120.23740	**Elevation (feet):**	2,700

County Summary:	**Quad Summary:**
Tuolumne	Tuolumne (3712082), Standard (3712083)

Sources:

CAS49S0001 CALIFORNIA ACADEMY OF SCIENCES - CAS HERPETOLOGY HOLDINGS (INCLUDES STANFORD UNIVERSITY COLLECTIONS) FOR RANA MUSCOSA, 1900-1949. 1949-XX-XX

Map Index Number:	30172	**EO Index:**	4982
Key Quad:	Sonora (3712084)	**Element Code:**	ABNKC01010
Occurrence Number:	138	**Occurrence Last Updated:**	1994-10-06

Scientific Name: *Pandion haliaetus* **Common Name:** osprey

Listing Status: **Federal:** None **Rare Plant Rank:**

State: None **Other Lists:** CDF_S-Sensitive, DFG_WL-Watch List, IUCN_LC-Least Concern

CNDDB Element Ranks: **Global:** G5

State: S3

General Habitat:

OCEAN SHORE, BAYS, FRESH-WATER LAKES, AND LARGER STREAMS.

Micro Habitat:

LARGE NESTS BUILT IN TREE-TOPS WITHIN 15 MILES OF A GOOD FISH-PRODUCING BODY OF WATER.

Last Date Observed:	1983-06-16	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1983-06-16	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

LONG GULCH (SE) ARM OF NEW MELONES LAKE, 5 MILES SW OF SONORA.

Detailed Location:

Ecological:

STICK NEST IS LOCATED ON TOP OF A 25-50 FOOT SNAG.

Threats:

General:

POSSIBLY THE FIRST KNOWN NESTING OCCURRENCE OF OSPREY IN TUOLUMNE CO. 1 ADULT SITTING ON NEST & A SECOND ADULT WAS PERCHED IN A SNAG 50-100 FEET AWAY, THEN FLEW TOWARDS THE NEST WITH A FISH; PRESENCE OF YOUNG IN NEST COULD NOT BE VERIFIED.

PLSS:	T01N, R14E, Sec. 18 (M)	**Accuracy:**	1/5 mile	**Area (acres):**	0
UTM:	Zone-10 N4201701 E721528	**Latitude/Longitude:**	37.93591 / -120.47922	**Elevation (feet):**	1,100

County Summary:	**Quad Summary:**
Tuolumne	Sonora (3712084)

Sources:

HUR83F0001 HURLEY, JANET F. (U.S. FOREST SERVICE-STANISLAUS NATIONAL FOREST) - FIELD SURVEY FORM FOR PANDION HALIAETUS (NEST SITE) 1983-06-16

Map Index Number:	43477	**EO Index:**	43477
Key Quad:	Penon Blanco Peak (3712063)	**Element Code:**	ABNKC10010
Occurrence Number:	228	**Occurrence Last Updated:**	2007-08-27

Scientific Name: *Haliaeetus leucocephalus*

Common Name: bald eagle

Listing Status: **Federal:** Delisted; **State:** Endangered

Rare Plant Rank:

Other Lists: CDF_S-Sensitive
DFG_FP-Fully Protected
IUCN_LC-Least Concern
USFS_S-Sensitive
USFWS_BCC-Birds of Conservation Concern

CNDDB Element Ranks: **Global:** G5; **State:** S2

General Habitat:

OCEAN SHORE, LAKE MARGINS, & RIVERS FOR BOTH NESTING & WINTERING. MOST NESTS WITHIN 1 MI OF WATER.

Micro Habitat:

NESTS IN LARGE, OLD-GROWTH, OR DOMINANT LIVE TREE W/OPEN BRANCHES, ESPECIALLY PONDEROSA PINE. ROOSTS COMMUNALLY IN WINTER.

Last Date Observed:	2007-05-22	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2007-05-22	**Occurrence Rank:**	Excellent
Owner/Manager:	DON PEDRO RECREATION AGENCY	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

SW END OF DON PEDRO RESERVOIR, NEAR BLANK PEAK.

Detailed Location:

NEST IS LOCATED IN A BULL PINE (PINUS SABINIANA) NEAR THE WATER'S EDGE.

Ecological:

NEST TREE IS A BULL PINE (PINUS SABINIANA) WITHIN OAK/BULL PINE HABITAT; WHITEWASH AND FISH BONES FOUND UNDER THE NEST.

Threats:

POSSIBLE THREAT OF RECREATIONAL DISTURBANCE BY BOATERS ON THE RESERVOIR.

General:

1 ADULT AND 1 JUVENILE OBSERVED IN THE NEST TOGETHER ON 5 AUG 2000. 2 YOUNG FLEDGED IN 2002. 2 ADULTS AND 1 CHICK OBSERVED ON 22 MAY 2007; 1 YOUNG FLEDGED.

PLSS:	T03S, R15E, Sec. 06 (M)	**Accuracy:**	1/10 mile	**Area (acres):**	0
UTM:	Zone-10 N4175415 E731898	**Latitude/Longitude:**	37.69666 / -120.36974	**Elevation (feet):**	700

County Summary:	Quad Summary:
Tuolumne	Penon Blanco Peak (3712063)

Sources:

CRA00F0001 CRANSTON, PEGGY (U.S. BUREAU OF LAND MANAGEMENT) - FIELD SURVEY FORM FOR HALIAEETUS LEUCOCEPHALUS (NEST SITE) 2000-08-10

CRA07F0003 CRANSTON, PEGGY & JAMIE MULLIN (U.S. BUREAU OF LAND MANAGEMENT) - FIELD SURVEY FORM FOR HALIAEETUS LEUCOCEPHALUS (NEST SITE) 2007-05-27

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number:	66672	**EO Index:**	66820
Key Quad:	La Grange (3712064)	**Element Code:**	ABNKC10010
Occurrence Number:	254	**Occurrence Last Updated:**	2006-10-10

Scientific Name: *Haliaeetus leucocephalus*

Common Name: bald eagle

Listing Status: **Federal:** Delisted

State: Endangered

Rare Plant Rank:

Other Lists: CDF_S-Sensitive
DFG_FP-Fully Protected
IUCN_LC-Least Concern
USFS_S-Sensitive
USFWS_BCC-Birds of Conservation Concern

CNDDB Element Ranks: **Global:** G5

State: S2

General Habitat:

OCEAN SHORE, LAKE MARGINS, & RIVERS FOR BOTH NESTING & WINTERING. MOST NESTS WITHIN 1 MI OF WATER.

Micro Habitat:

NESTS IN LARGE, OLD-GROWTH, OR DOMINANT LIVE TREE W/OPEN BRANCHES, ESPECIALLY PONDEROSA PINE. ROOSTS COMMUNALLY IN WINTER.

Last Date Observed:	1992-01-19	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1992-01-19	**Occurrence Rank:**	Fair
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

COOPERSTOWN ROAD NEAR LA GRANGE.

Detailed Location:

SOURCE STATES "300 FT FROM HWY 132."

Ecological:

OAK WOODLAND, RANGE LAND.

Threats:

General:

1 ADULT OBSERVED ROOSTING ON 19 JAN 1992.

PLSS: T03S, R14E, Sec. 07 (M)		**Accuracy:**	nonspecific area	**Area (acres):**	35
UTM: Zone-10 N4173613 E722814		**Latitude/Longitude:**	37.68268 / -120.47322	**Elevation (feet):**	420

County Summary:	**Quad Summary:**
Stanislaus	La Grange (3712064)

Sources:

ZEE92F0001 ZEEK, JOANNE - FIELD SURVEY FORM FOR HALIAEETUS LEUCOCEPHALUS 1992-01-19

Map Index Number:	69808	**EO Index:**	70630
Key Quad:	Sonora (3712084)	**Element Code:**	ABNKC10010
Occurrence Number:	270	**Occurrence Last Updated:**	2007-08-27

Scientific Name: *Haliaeetus leucocephalus* **Common Name:** bald eagle

Listing Status: **Federal:** Delisted **Rare Plant Rank:**

State: Endangered **Other Lists:** CDF_S-Sensitive
DFG_FP-Fully Protected
IUCN_LC-Least Concern
USFS_S-Sensitive
USFWS_BCC-Birds of Conservation Concern

CNDDB Element Ranks: **Global:** G5

State: S2

General Habitat:

OCEAN SHORE, LAKE MARGINS, & RIVERS FOR BOTH NESTING & WINTERING. MOST NESTS WITHIN 1 MI OF WATER.

Micro Habitat:

NESTS IN LARGE, OLD-GROWTH, OR DOMINANT LIVE TREE W/OPEN BRANCHES, ESPECIALLY PONDEROSA PINE. ROOSTS COMMUNALLY IN WINTER.

Last Date Observed:	2007-07-XX	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2007-07-XX	**Occurrence Rank:**	Excellent
Owner/Manager:	BLM	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

WOODS CREEK ARM OF DON PEDRO RESERVOIR, ~ 1.5 MILES NNE OF CHINESE CAMP.

Detailed Location:

Ecological:

NEST TREE WAS A PONDEROSA OR BULL PINE.

Threats:

General:

THIS PAIR FLEDGED 1 IN 2006, ALTHOUGH THE NEST WAS NEVER FOUND. 2 ADULTS, 1 JUVENILE, AND 2 NEW FLEDGLINGS WERE OBSERVED FROM MID-JUNE THROUGH MID-JULY 2007.

PLSS:	T01N, R14E, Sec. 34 (M)	**Accuracy:**	nonspecific area	**Area (acres):**	334
UTM:	Zone-10 N4197139 E726590	**Latitude/Longitude:**	37.89358 / -120.42309	**Elevation (feet):**	860

County Summary:	**Quad Summary:**
Tuolumne	Sonora (3712084)

Sources:

CRA07F0002 CRANSTON, PEGGY & JAMIE MULLIN (U.S. BUREAU OF LAND MANAGEMENT) - FIELD SURVEY FORM FOR HALIAEETUS LEUCOCEPHALUS (NEST SITE) 2007-07-XX

Map Index Number:	34754	**EO Index:**	325
Key Quad:	Sonora (3712084)	**Element Code:**	ABNKD06090
Occurrence Number:	449	**Occurrence Last Updated:**	1996-03-12

Scientific Name: *Falco mexicanus*

Common Name: prairie falcon

Listing Status:	**Federal:**	None	**Rare Plant Rank:**	
*** SENSITIVE ***	**State:**	None	**Other Lists:**	DFG_WL-Watch List IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern
CNDDB Element Ranks:	**Global:**	G5		
	State:	S3		

General Habitat:

INHABITS DRY, OPEN TERRAIN, EITHER LEVEL OR HILLY.

Micro Habitat:

BREEDING SITES LOCATED ON CLIFFS. FORAGES FAR AFIELD, EVEN TO MARSHLANDS AND OCEAN SHORES.

Last Date Observed:	1995-05-30	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1995-05-30	**Occurrence Rank:**	Unknown
Owner/Manager:		**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

SENSITIVE LOCATION INFORMATION SUPPRESSED.

Detailed Location:

PLEASE CONTACT THE CALIFORNIA NATURAL DIVERSITY DATABASE, CALIFORNIA DEPARTMENT OF FISH AND GAME, FOR MORE INFORMATION: (916) 322-2493

Ecological:

HABITAT CONSISTS OF BLUE OAK, FOOTHILL PINE AND ANNUAL GRASSLAND.

Threats:

POSSIBLE THREAT: DISTURBANCE FROM ROCK CLIMBERS, SHOOTING.

General:

PLSS:		**Accuracy:**	80 meters	**Area (acres):**	0
UTM:		**Latitude/Longitude:**		**Elevation (feet):**	1,650

County Summary:	**Quad Summary:**
Tuolumne	Sonora (3712084)

Sources:

RIC95F0010 RICKMAN, T. - FIELD SURVEY FORM FOR FALCO MEXICANUS 1995-05-30

Map Index Number:	68627	**EO Index:**	69020
Key Quad:	Standard (3712083)	**Element Code:**	ABNSB10010
Occurrence Number:	887	**Occurrence Last Updated:**	2007-03-21

Scientific Name: *Athene cunicularia*

Common Name: burrowing owl

Listing Status: **Federal:** None

State: None

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_LC-Least Concern
USFWS_BCC-Birds of Conservation Concern

CNDDB Element Ranks: **Global:** G4

State: S2

General Habitat:

OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.

Micro Habitat:

SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Last Date Observed:	2007-03-16	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2007-03-16	**Occurrence Rank:**	Poor
Owner/Manager:	PVT	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

0.25 MILE WEST OF ALGERINE CREEK, BETWEEN PAGE MOUNTAIN AND HOG MOUNTAIN, 8.5 MILES SW OF TUOLUMNE.

Detailed Location:

TWO OWLS WERE FIRST NOTICED BY LOCALS WHEN THE ADJACENT FIELD WAS BEING DEEP-RIPPED AND GRADED IN PREPARATION FOR PLANTING AN OLIVE OCHARD.

Ecological:

HABITAT SURROUNDING BURROW CONSISTS OF NON-NATIVE ANNUAL GRASSLAND INTERSPERSED WITH VERNAL POOLS AND SWALES.

Threats:

THREATENED BY CONVERSION TO INTENSIVE AGRICULTURE, AND RESULTING INCREASED HOUSING, DOMESTIC ANIMALS, AND TRAFFIC.

General:

1 OWL WAS FLUSHED FROM AN 8' DIAMETER ROADSIDE CULVERT PIPE ON 16 MAR 2007; CULVERT ENTRANCE CONTAINED PELLETS AND WASTE INDICATING PROLONGED OCCUPATION BY BUOW.

PLSS:	T01S, R15E, Sec. 06 (M)	**Accuracy:**	80 meters	**Area (acres):**	0
UTM:	Zone-10 N4196820 E731074	**Latitude/Longitude:**	37.88959 / -120.37225	**Elevation (feet):**	1,700

County Summary:	**Quad Summary:**
Tuolumne	Standard (3712083)

Sources:

APP07F0001 APPLEBEE, DANIEL (CALIFORNIA DEPARTMENT OF FISH AND GAME) - FIELD SURVEY FORM FOR ATHENE CUNICULARIA 2007-03-16

Map Index Number:	13346	**EO Index:**	24738
Key Quad:	La Grange (3712064)	**Element Code:**	ABPBXB0020
Occurrence Number:	81	**Occurrence Last Updated:**	1991-07-25

Scientific Name: *Agelaius tricolor*

Common Name: tricolored blackbird

Listing Status: **Federal:** None **State:** None

CNDDB Element Ranks: **Global:** G2G3 **State:** S2

Rare Plant Rank:

Other Lists: ABC_WLBCC-Watch List of Birds of Conservation Concern
BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_EN-Endangered
USFWS_BCC-Birds of Conservation Concern

General Habitat:

HIGHLY COLONIAL SPECIES, MOST NUMBEROUS IN CENTRAL VALLEY & VICINITY. LARGELY ENDEMIC TO CALIFORNIA.

Micro Habitat:

REQUIRES OPEN WATER, PROTECTED NESTING SUBSTRATE, & FORAGING AREA WITH INSECT PREY WITHIN A FEW KM OF THE COLONY.

Last Date Observed:	1936-06-04	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1936-06-04	**Occurrence Rank:**	None
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Possibly Extirpated		

Location:

DREDGER PITS, JUST W OF LA GRANGE.

Detailed Location:

COLONY OF APPROX 4500 OBS BY NEFF NESTING IN CATTAILS.

Ecological:

Threats:

General:

PRESUMED EXTIRPATED ACC TO BEEDY 1991.

PLSS: T03S, R13E, Sec. 24 (M)		**Accuracy:**	1 mile	**Area (acres):**	0
UTM: Zone-10 N4171496 E722011		**Latitude/Longitude:**	37.66381 / -120.48297	**Elevation (feet):**	200

County Summary:

Stanislaus

Quad Summary:

La Grange (3712064), Cooperstown (3712065)

Sources:

BEE91R0001 BEEDY, E.C., S.D. SANDERS & D. BLOOM - BREEDING STATUS, DISTRIBURTION, AND HABITAT ASSOCIATIONS OF THE TRICOLORED BLACKBIRD (AGELAIUS TRICOLOR), 1850-1989. 1991-06-XX

HOS86U0002 HOSEA, ROBERT (CALIFORNIA DEPARTMENT OF FISH AND GAME) - COMPILATION, COUNTY BY COUNTY, OF TRICOLORED BLACKBIRD NESTING OBSERVATIONS 1986-XX-XX

Map Index Number:	13293	**EO Index:**	11812
Key Quad:	Cooperstown (3712065)	**Element Code:**	ABPBXB0020
Occurrence Number:	82	**Occurrence Last Updated:**	1991-07-25

Scientific Name: *Agelaius tricolor*

Common Name: tricolored blackbird

Listing Status: **Federal:** None; **State:** None

Rare Plant Rank:

CNDDB Element Ranks: **Global:** G2G3; **State:** S2

Other Lists:
ABC_WLBCC-Watch List of Birds of Conservation Concern
BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_EN-Endangered
USFWS_BCC-Birds of Conservation Concern

General Habitat:

HIGHLY COLONIAL SPECIES, MOST NUMBEROUS IN CENTRAL VALLEY & VICINITY. LARGELY ENDEMIC TO CALIFORNIA.

Micro Habitat:

REQUIRES OPEN WATER, PROTECTED NESTING SUBSTRATE, & FORAGING AREA WITH INSECT PREY WITHIN A FEW KM OF THE COLONY.

Last Date Observed:	1971-05-09	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1971-05-09	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

3.5 MI SW OF LA GRANGE.

Detailed Location:

COLONY OF APPROX 2500 OBS BY DE HAVEN NESTING IN CATTAILS. SOME NEST-BUILDING. COLONY SIZE 0.5 ACRE.

Ecological:

CATTAIL MARSH SURROUNDED BY IRRIGATED AND NONIRRIGATED PASTURES IN ROLLING HILLS.

Threats:

General:

PLSS:	T03S, R13E, Sec. 35 (M)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-10 N4168162 E719622	**Latitude/Longitude:**	37.63437 / -120.51103	**Elevation (feet):**	150

County Summary: Stanislaus

Quad Summary: Snelling (3712054), Turlock Lake (3712055), La Grange (3712064), Cooperstown (3712065)

Sources:

BEE91R0001 BEEDY, E.C., S.D. SANDERS & D. BLOOM - BREEDING STATUS, DISTRIBURTION, AND HABITAT ASSOCIATIONS OF THE TRICOLORED BLACKBIRD (AGELAIUS TRICOLOR), 1850-1989. 1991-06-XX

HOS86U0002 HOSEA, ROBERT (CALIFORNIA DEPARTMENT OF FISH AND GAME) - COMPILATION, COUNTY BY COUNTY, OF TRICOLORED BLACKBIRD NESTING OBSERVATIONS 1986-XX-XX

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number:	21508	**EO Index:**	17757
Key Quad:	Sonora (3712084)	**Element Code:**	ABPBXB0020
Occurrence Number:	193	**Occurrence Last Updated:**	1992-06-02

Scientific Name: *Agelaius tricolor*

Common Name: tricolored blackbird

Listing Status: **Federal:** None **State:** None

CNDDB Element Ranks: **Global:** G2G3 **State:** S2

Rare Plant Rank:

Other Lists: ABC_WLBCC-Watch List of Birds of Conservation Concern
BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_EN-Endangered
USFWS_BCC-Birds of Conservation Concern

General Habitat:

HIGHLY COLONIAL SPECIES, MOST NUMBEROUS IN CENTRAL VALLEY & VICINITY. LARGELY ENDEMIC TO CALIFORNIA.

Micro Habitat:

REQUIRES OPEN WATER, PROTECTED NESTING SUBSTRATE, & FORAGING AREA WITH INSECT PREY WITHIN A FEW KM OF THE COLONY.

Last Date Observed:	1992-01-17	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1992-01-17	**Occurrence Rank:**	Fair
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

ALONG FAGUERO ROAD, JUST WEST OF TABLE MOUNTAIN, 3 MI WEST OF SONORA.

Detailed Location:

NESTING IN THE VICINITY OF A SMALL CREEK AND LIVESTOCK POND.

Ecological:

NEST SITE IS IN A SMALL CREEK/STOCK POND; SURROUNDING HABITAT IS OAK SAVANNAH.

Threats:

POSSIBLE THREAT FROM CATTLE GRAZING.

General:

16 ADULT TRICOLOREDS OBSERVED IN NESTING AREA AND SITTING ON NEARBY WIRES. RED-WINGED BLACKBIRDS ALSO PRESENT AND COMPETING FOR NESTING SPACE. TRICOLOREDS ALSO WINTERED HERE IN NOVEMBER 1991.

PLSS:	T02N, R14E, Sec. 28 (M)	**Accuracy:**	1/5 mile	**Area (acres):**	0
UTM:	Zone-10 N4208673 E724642	**Latitude/Longitude:**	37.99792 / -120.44163	**Elevation (feet):**	1,700

County Summary:	**Quad Summary:**
Tuolumne	Sonora (3712084), Columbia (3812014)

Sources:

BER92F0002 BERGERON, ALBERT T. - FIELD SURVEY FORM FOR AGELAIUS TRICOLOR (NESTING COLONY) 1992-01-17

Map Index Number:	41046	**EO Index:**	41046
Key Quad:	Sonora (3712084)	**Element Code:**	AFCJB19021
Occurrence Number:	2	**Occurrence Last Updated:**	1999-05-13

Scientific Name: *Lavinia symmetricus ssp. 1* **Common Name:** San Joaquin roach

Listing Status:	**Federal:**	None	**Rare Plant Rank:**	
	State:	None	**Other Lists:**	DFG_SSC-Species of Special Concern
CNDDB Element Ranks:	**Global:**	G5T3Q		
	State:	S3		

General Habitat:

TRIBUTARIES TO THE SAN JOAQUIN RIVER FROM THE COSUMNES RIVER SOUTH.

Micro Habitat:

Last Date Observed:	1998-11-20	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1998-11-20	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

SULLIVAN CREEK, 1.5 MILES EAST OF CAMPO SECO, 3 MILES SOUTH OF SONORA FROM THE HIGHWAY 108 AND 49 INTERSECTION.

Detailed Location:

Ecological:

MODERATE FLOW, LARGE COBBLES

Threats:

EROSION, RUNOFF

General:

3 ADULTS COLLECTED AND STORED AT UCSC, #WJJLS9.

PLSS:	T01N, R14E, Sec. 13 (M)	**Accuracy:**	specific area	**Area (acres):**	60
UTM:	Zone-10 N4202135 E729663	**Latitude/Longitude:**	37.93780 / -120.38660	**Elevation (feet):**	1,400

County Summary:	**Quad Summary:**
Tuolumne	Sonora (3712084)

Sources:

JON98F0002 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 1 (SAN JOAQUIN ROACH) 1998-11-20

Map Index Number:	41048	**EO Index:**	41048
Key Quad:	Sonora (3712084)	**Element Code:**	AFCJB19021
Occurrence Number:	3	**Occurrence Last Updated:**	1999-05-13

Scientific Name: *Lavinia symmetricus ssp. 1* **Common Name:** San Joaquin roach

Listing Status:	**Federal:**	None	**Rare Plant Rank:**	
	State:	None	**Other Lists:**	DFG_SSC-Species of Special Concern
CNDDB Element Ranks:	**Global:**	G5T3Q		
	State:	S3		

General Habitat:

TRIBUTARIES TO THE SAN JOAQUIN RIVER FROM THE COSUMNES RIVER SOUTH.

Micro Habitat:

Last Date Observed:	1998-11-20	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1998-11-20	**Occurrence Rank:**	Good
Owner/Manager:	TUO COUNTY	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

WOODS CREEK, 0.5 MILE SW OF JAMESTOWN, ADJACENT TO HIGHWAY 108/49, 0.8 MILE NW OF CAMPO SECO.

Detailed Location:

Ecological:

Threats:

RUNOFF

General:

5 ADULTS COLLECTED AND STORED AT UCSC #WJJLS10.

PLSS:	T01N, R14E, Sec. 15 (M)	**Accuracy:**	specific area	**Area (acres):**	54
UTM:	Zone-10 N4203046 E725997	**Latitude/Longitude:**	37.94692 / -120.42798	**Elevation (feet):**	1,350

County Summary:	**Quad Summary:**
Tuolumne	Sonora (3712084)

Sources:

JON98F0003 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 1 (SAN JOAQUIN ROACH) 1998-11-20

Map Index Number:	42628	**EO Index:**	42628
Key Quad:	Penon Blanco Peak (3712063)	**Element Code:**	AFCJB19021
Occurrence Number:	4	**Occurrence Last Updated:**	2000-03-27

Scientific Name: *Lavinia symmetricus ssp. 1* **Common Name:** San Joaquin roach

Listing Status: **Federal:** None **Rare Plant Rank:**

State: None **Other Lists:** DFG_SSC-Species of Special Concern

CNDDB Element Ranks: **Global:** G5T3Q

State: S3

General Habitat:

TRIBUTARIES TO THE SAN JOAQUIN RIVER FROM THE COSUMNES RIVER SOUTH.

Micro Habitat:

Last Date Observed:	1999-06-17	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-06-17	**Occurrence Rank:**	Fair
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

FIRST CREEK, UPSTREAM OF THE MARSH FLAT ROAD CROSSING, 1.2 MILES NORTH OF BLANCHARD, EAST OF DON PEDRO RESERVOIR.

Detailed Location:

SURROUNDING LAND USE IS PASTURE.

Ecological:

MEDIUM COBBLES, LARGE POOLS BUT LOW WATER FLOWS, POOLS 1 TO 3 FEET DEEP.

Threats:

COW DAMAGE, RUNOFF

General:

5 ADULTS CAPTURED, FIN CLIPPED, AND RELEASED; FIN CLIPS AT UCSC, #WJJLS44.

PLSS:	T02S, R15E, Sec. 21 (M)	**Accuracy:**	specific area	**Area (acres):**	15
UTM:	Zone-10 N4181370 E735510	**Latitude/Longitude:**	37.74935 / -120.32688	**Elevation (feet):**	900

County Summary:	**Quad Summary:**
Tuolumne	Penon Blanco Peak (3712063), Moccasin (3712073)

Sources:

JON99F0010 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 1 (SAN JOAQUIN ROACH) 1999-06-17

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number:	42629	**EO Index:**	42629
Key Quad:	Moccasin (3712073)	**Element Code:**	AFCJB19021
Occurrence Number:	5	**Occurrence Last Updated:**	2000-03-27

Scientific Name: *Lavinia symmetricus ssp. 1* **Common Name:** San Joaquin roach

Listing Status:	**Federal:**	None	**Rare Plant Rank:**	
	State:	None	**Other Lists:**	DFG_SSC-Species of Special Concern
CNDDB Element Ranks:	**Global:**	G5T3Q		
	State:	S3		

General Habitat:

TRIBUTARIES TO THE SAN JOAQUIN RIVER FROM THE COSUMNES RIVER SOUTH.

Micro Habitat:

□

Last Date Observed:	1999-06-17	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-06-17	**Occurrence Rank:**	Poor
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

HATCH & SECOND CREEKS, UPSTREAM OF CONFLUENCE NEAR MARSH FLAT RD, 2 MILES SOUTH OF DOMINGO PEAK, 4 MILES SSW OF MOCCASIN

Detailed Location:

SURROUNDING LAND USE IS PASTURE (SECOND CREEK) AND HORSE FARM (HATCH CREEK).

Ecological:

SECOND CREEK: POOL ABOVE CULVERT, MEDIUM COBBLES, LARGE POOL, WATER 1-4 FEET DEEP. HATCH CREEK: MEDIUM COBBLE, ISOLATED POOLS, WATER 1-2 FEET DEEP.

Threats:

EUTROPHICATION FROM RUNOFF, COW DAMAGE

General:

10 ADULTS CAPTURED, FIN CLIPPED, AND RELEASED, 5 FROM EACH CREEK; FIN CLIPS AT UCSC, #WJJLS42 (HATCH CR), #WJJLS43 (SECOND CR).

PLSS:	T02S, R15E, Sec. 16 (M)	**Accuracy:**	specific area	**Area (acres):**	29
UTM:	Zone-10 N4182234 E735568	**Latitude/Longitude:**	37.75712 / -120.32595	**Elevation (feet):**	1,100

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

JON99F0011 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 1 (SAN JOAQUIN ROACH) 1999-06-17

JON99F0012 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 1 (SAN JOAQUIN ROACH) 1999-06-17

Map Index Number:	42631	**EO Index:**	42631
Key Quad:	Moccasin (3712073)	**Element Code:**	AFCJB19021
Occurrence Number:	6	**Occurrence Last Updated:**	2000-03-27

Scientific Name: *Lavinia symmetricus ssp. 1* **Common Name:** San Joaquin roach

Listing Status:	**Federal:**	None	**Rare Plant Rank:**	
	State:	None	**Other Lists:**	DFG_SSC-Species of Special Concern
CNDDB Element Ranks:	**Global:**	G5T3Q		
	State:	S3		

General Habitat:

TRIBUTARIES TO THE SAN JOAQUIN RIVER FROM THE COSUMNES RIVER SOUTH.

Micro Habitat:

Last Date Observed:	1999-06-17	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-06-17	**Occurrence Rank:**	Good
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

BIG JACKASS CREEK, AT HIGHWAY 49 CROSSING, ~3 MILES SE OF MOCCASIN.

Detailed Location:

Ecological:

LARGE COBBLES, ISOLATED POOLS, GOOD WATER FLOW, WATER 1 TO 3 FEET DEEP

Threats:

MINING, RUNOFF FROM ROAD

General:

5 BREEDING ADULTS CAPTURED, FIN CLIPPED, AND RELEASED; FIN CLIPS AT UCSC MUSEUM, #WJJLS41.

PLSS:	T02S, R15E, Sec. 12 (M)	**Accuracy:**	specific area	**Area (acres):**	11
UTM:	Zone-10 N4184757 E740266	**Latitude/Longitude:**	37.77861 / -120.27184	**Elevation (feet):**	1,200

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

JON99F0013 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 1 (SAN JOAQUIN ROACH) 1999-06-17

Map Index Number:	42635	**EO Index:**	42635
Key Quad:	Standard (3712083)	**Element Code:**	AFCJB19021
Occurrence Number:	7	**Occurrence Last Updated:**	2000-03-28

Scientific Name: *Lavinia symmetricus ssp. 1*

Common Name: San Joaquin roach

Listing Status: **Federal:** None; **State:** None

Rare Plant Rank:

Other Lists: DFG_SSC-Species of Special Concern

CNDDB Element Ranks: **Global:** G5T3Q; **State:** S3

General Habitat:

TRIBUTARIES TO THE SAN JOAQUIN RIVER FROM THE COSUMNES RIVER SOUTH.

Micro Habitat:

Last Date Observed:	1999-06-17	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-06-17	**Occurrence Rank:**	Good
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

ROUGH AND READY CREEK, WARDS FERRY ROAD, 0.15 MILE NW OF MORGAN CHAPEL, ~3 MILES SOUTH OF STANDARD.

Detailed Location:

CREEK, IN AREA AROUND ROAD CROSSING. SURROUNDING LAND USE IS FARMLAND.

Ecological:

LARGE COBBLES, ISOLATED POOLS, STRONG WATER FLOW, WATER 1 TO 3 FEET DEEP.

Threats:

ROAD, RUNOFF

General:

5 BREEDING ADULTS CAPTURED, FIN CLIPPED, AND RELEASED; FIN CLIPS AT UCSC MUSEUM, #WJJLS40.

PLSS:	T01N, R15E, Sec. 22 (M)	**Accuracy:**	specific area	**Area (acres):**	17
UTM:	Zone-10 N4201186 E735844	**Latitude/Longitude:**	37.92767 / -120.31664	**Elevation (feet):**	1,825

County Summary:	**Quad Summary:**
Tuolumne	Standard (3712083)

Sources:

JON99F0014 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 1 (SAN JOAQUIN ROACH) 1999-06-17

Map Index Number:	42637	**EO Index:**	42637
Key Quad:	Standard (3712083)	**Element Code:**	AFCJB19021
Occurrence Number:	8	**Occurrence Last Updated:**	2000-03-28

Scientific Name: *Lavinia symmetricus ssp. 1*

Common Name: San Joaquin roach

Listing Status:	**Federal:**	None	**Rare Plant Rank:**	
	State:	None	**Other Lists:**	DFG_SSC-Species of Special Concern
CNDDB Element Ranks:	**Global:**	G5T3Q		
	State:	S3		

General Habitat:

TRIBUTARIES TO THE SAN JOAQUIN RIVER FROM THE COSUMNES RIVER SOUTH.

Micro Habitat:

Last Date Observed:	1999-06-16	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-06-16	**Occurrence Rank:**	Fair
Owner/Manager:	PVT	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

CURTIS CREEK, JUST SOUTH OF BLACK OAK MINE, 1.3 MILES NORTH OF BUCKHORN MTN, 2 MILES ENE OF STANDARD.

Detailed Location:

Ecological:

LARGE COBBLES, SMALL POOLS, WATER 1 TO 3 FEET DEEP. CREEK RUNS THROUGH BACKYARD OF RESIDENCE.

Threats:

RUNOFF FROM NEARBY ROADS; INTRODUCTION OF NONNATIVE FISH BY RESIDENT.

General:

5 BREEDING ADULTS CAPTURED, FIN CLIPPED, AND RELEASED; FIN CLIPS AT UCSC MUSEUM, #WJJLS39.

PLSS:	T01N, R15E, Sec. 01 (M)	**Accuracy:**	nonspecific area	**Area (acres):**	18
UTM:	Zone-10 N4206687 E739136	**Latitude/Longitude:**	37.97634 / -120.27739	**Elevation (feet):**	2,750

County Summary:	**Quad Summary:**
Tuolumne	Standard (3712083)

Sources:

JON99F0015 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 1 (SAN JOAQUIN ROACH) 1999-06-16

Map Index Number:	41331	**EO Index:**	41331
Key Quad:	Chinese Camp (3712074)	**Element Code:**	AFCJB19028
Occurrence Number:	1	**Occurrence Last Updated:**	2000-03-23

Scientific Name: *Lavinia symmetricus ssp. 3*

Common Name: Red Hills roach

Listing Status:	**Federal:**	None	**Rare Plant Rank:**	
	State:	None	**Other Lists:**	AFS_VU-Vulnerable BLM_S-Sensitive DFG_SSC-Species of Special Concern
CNDDB Element Ranks:	**Global:**	G5T1		
	State:	S1		

General Habitat:

SMALL STREAMS NEAR SONORA.

Micro Habitat:

FOUND IN AREAS WITH SERPENTINE SOIL.

Last Date Observed:	1999-06-17	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-06-17	**Occurrence Rank:**	Fair
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

HORTON CREEK, 2.2 MILES SW OF CHINESE CAMP AND 1.4 MILES NNE OF CRIMEA HOUSE, RED HILLS.

Detailed Location:

SURROUNDING LAND USE IS A RANCH, BLM LAND. SITE QUALITY GOOD IN THE MIDDLE SECTION, ABOVE AND BELOW IS FAIR.

Ecological:

LARGE COBBLES, ISOLATED POOLS, WATER 1 TO 2 FEET DEEP.

Threats:

SMALL NUMBERS, SMALL POOLS, DESSICATION OF SPRING, LITTER, DOGS IN POOL, CAMPFIRE NEXT OT POOL, HIGHWAY, EROSION

General:

5 ADULTS CAPTURED IN 1998 & 10 CAPTURED IN 1999, ALL WERE FIN CLIPPED & RELEASED. FIN CLIPS SENT TO UCSC (#'S: WJJLS12, WJJLS36, WJJLS45)

PLSS:	T01S, R14E, Sec. 17 (M)	**Accuracy:**	specific area	**Area (acres):**	60
UTM:	Zone-10 N4192308 E723033	**Latitude/Longitude:**	37.85097 / -120.46501	**Elevation (feet):**	1,200

County Summary:	**Quad Summary:**
Tuolumne	Chinese Camp (3712074)

Sources:

JON98F0004	JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 3 (RED HILLS ROACH) 1998-11-20
JON99F0005	JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 3 (RED HILLS ROACH) 1999-06-17
JON99F0006	JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 3 (RED HILLS ROACH) 1999-06-17

Map Index Number:	41336	**EO Index:**	41336
Key Quad:	Chinese Camp (3712074)	**Element Code:**	AFCJB19028
Occurrence Number:	2	**Occurrence Last Updated:**	1999-07-01

Scientific Name: *Lavinia symmetricus ssp. 3*

Common Name: Red Hills roach

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

Other Lists: AFS_VU-Vulnerable
BLM_S-Sensitive
DFG_SSC-Species of Special Concern

CNDDB Element Ranks: **Global:** G5T1 **State:** S1

General Habitat:

SMALL STREAMS NEAR SONORA.

Micro Habitat:

FOUND IN AREAS WITH SERPENTINE SOIL.

Last Date Observed:	1998-11-20	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1998-11-20	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

ROACH CREEK (CREEK IS ACTUALLY UNNAMED), ~3 MILES SW OF CHINESE CAMP AND ~1 MILE NNE OF CRIMEA HOUSE, RED HILLS.

Detailed Location:

SURROUNDING LAND USE IS A RANCH.

Ecological:

Threats:

SMALL NUMBERS, SMALL POOLS.

General:

5 ADULTS CAPTURED, FIN CLIPPED, AND RELEASED. FIN CLIPS SENT TO UCSC.

PLSS:	T01S, R14E, Sec. 18 (M)	**Accuracy:**	specific area	**Area (acres):**	19
UTM:	Zone-10 N4191603 E722526	**Latitude/Longitude:**	37.84474 / -120.47098	**Elevation (feet):**	1,200

County Summary:	**Quad Summary:**
Tuolumne	Chinese Camp (3712074)

Sources:

JON98F0005 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 3 (RED HILLS ROACH) 1998-11-20

Map Index Number:	41337	**EO Index:**	41337
Key Quad:	Chinese Camp (3712074)	**Element Code:**	AFCJB19028
Occurrence Number:	3	**Occurrence Last Updated:**	2003-06-13

Scientific Name: *Lavinia symmetricus ssp. 3*

Common Name: Red Hills roach

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

Other Lists: AFS_VU-Vulnerable
BLM_S-Sensitive
DFG_SSC-Species of Special Concern

CNDDB Element Ranks: **Global:** G5T1 **State:** S1

General Habitat:

SMALL STREAMS NEAR SONORA.

Micro Habitat:

FOUND IN AREAS WITH SERPENTINE SOIL.

Last Date Observed:	2000-07-10	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2000-07-10	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

AMBER CREEK, ~3.5 MILES SW OF CHINESE CAMP AND 0.7 MILE NNW OF CRIMEA HOUSE, RED HILLS.

Detailed Location:

2000 FIELD SURVEY FORM CALLS THIS CREEK "ROACH CR", BUT THE MAP ATTACHED TO THE FORM SHOWS THIS AS THE SAME LOCATION AS THE 1998 RECORD WHICH CALLS THIS AMBER CREEK.

Ecological:

SMALL STREAM WITH FEW PLANTS/SHRUBS. FEW, ISOLATED POOLS WITH RED HILLS ROACH. SURROUNDING LAND USE IS A RANCH, PASTURE & MINING.

Threats:

SMALL NUMBERS, SMALL POOLS.

General:

10 JUL 2000: 5 ADULTS CAPTURED, FIN CLIPPED & RELEASED. 20 NOV 1998: 5 ADULTS CAPTURED, FIN CLIPPED, AND RELEASED. FIN CLIPS SENT TO UCSC.

PLSS:	T01S, R13E, Sec. 24 (M)	**Accuracy:**	specific area	**Area (acres):**	19
UTM:	Zone-10 N4191187 E721438	**Latitude/Longitude:**	37.84126 / -120.48346	**Elevation (feet):**	1,300

County Summary:	**Quad Summary:**
Tuolumne	Chinese Camp (3712074)

Sources:

JON00F0003	JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 3 (RED HILLS ROACH) 2000-07-10
JON98F0006	JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 3 (RED HILLS ROACH) 1998-11-20

Map Index Number:	42611	**EO Index:**	42611
Key Quad:	Chinese Camp (3712074)	**Element Code:**	AFCJB19028
Occurrence Number:	4	**Occurrence Last Updated:**	2000-03-23

Scientific Name: *Lavinia symmetricus ssp. 3*

Common Name: Red Hills roach

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

Other Lists: AFS_VU-Vulnerable
BLM_S-Sensitive
DFG_SSC-Species of Special Concern

CNDDB Element Ranks: **Global:** G5T1 **State:** S1

General Habitat:

SMALL STREAMS NEAR SONORA.

Micro Habitat:

FOUND IN AREAS WITH SERPENTINE SOIL.

Last Date Observed:	1999-06-15	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-06-15	**Occurrence Rank:**	Good
Owner/Manager:	BLM	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

POOR MANS GULCH, ~1 MILE SOUTH OF HUNGRY HILL, 4 MILES ESE OF CRIMEA HOUSE, 2 MILES SW HWY 120 CROSSING OF DON PEDRO RES

Detailed Location:

POOR MANS GULCH, RED HILLS.

Ecological:

LARGE COBBLES, CONNECTED POOLS; WATER 1 TO 3 FEET DEEP.

Threats:

RUNOFF FROM PASTURES

General:

5 JUVENILES, BUT NO ADULTS OBSERVED, 1999 (FIN CLIP ONLY, #WJJLS38 SENT TO UCSC).

PLSS: T01S, R14E, Sec. 26 (M)		**Accuracy:**	specific area	**Area (acres):**	21
UTM: Zone-10 N4189464 E727960		**Latitude/Longitude:**	37.82414 / -120.40995	**Elevation (feet):**	880

County Summary:	**Quad Summary:**
Tuolumne	Chinese Camp (3712074)

Sources:

JON99F0004 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 3 (RED HILLS ROACH) 1999-06-15

Map Index Number:	42613	**EO Index:**	42613
Key Quad:	Chinese Camp (3712074)	**Element Code:**	AFCJB19028
Occurrence Number:	5	**Occurrence Last Updated:**	2000-03-23

Scientific Name: *Lavinia symmetricus ssp. 3*

Common Name: Red Hills roach

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

Other Lists: AFS_VU-Vulnerable
BLM_S-Sensitive
DFG_SSC-Species of Special Concern

CNDDB Element Ranks: **Global:** G5T1 **State:** S1

General Habitat:

SMALL STREAMS NEAR SONORA.

Micro Habitat:

FOUND IN AREAS WITH SERPENTINE SOIL.

Last Date Observed:	1999-06-15	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-06-15	**Occurrence Rank:**	Excellent
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

MINNOW AND SIX BIT GULCHES, 1 MILE WSW OF HUNGRY HILL, 2.5 MILES SOUTH OF CHINESE CAMP, RED HILLS.

Detailed Location:

LOWER END OF MINNOW GULCH CREEK AND DOWNSTREAM OF CONFULENCE WITH SIX BIT GULCH CREEK. ONCORYHNCHUS MYKISS, CATOSTOMUS OCCIDENTALIS OBSERVED IN SIX BIT.

Ecological:

MINNOW: LARGE COBBLE, ISOLATED POOLS IN INTERMITENT STREAM. SIX BIT: LARGE COBBLES, ISOLATED POOLS, WATER 1 TO 3 FEET DEEP.

Threats:

FARMLAND

General:

8 FISH COLLECTED AND FIN CLIPPED, 4 ADULTS & 4 JUVENILE; THE 3 JUVENILES FROM MINNOW GULCH WERE KEPT (INCIDENTAL DEATH), 1999. FIN CLPIS #WJJLS34 & 35 SENT TO UCSC.

PLSS:	T01S, R14E, Sec. 21 (M)	**Accuracy:**	specific area	**Area (acres):**	31
UTM:	Zone-10 N4190619 E725856	**Latitude/Longitude:**	37.83506 / -120.43347	**Elevation (feet):**	920

County Summary:	**Quad Summary:**
Tuolumne	Chinese Camp (3712074)

Sources:

JON99F0007 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 3 (RED HILLS ROACH) 1999-06-15

JON99F0008 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 3 (RED HILLS ROACH) 1999-06-15

Map Index Number:	51536	**EO Index:**	51536
Key Quad:	Chinese Camp (3712074)	**Element Code:**	AFCJB19028
Occurrence Number:	8	**Occurrence Last Updated:**	2003-06-13

Scientific Name: *Lavinia symmetricus ssp. 3*

Common Name: Red Hills roach

Listing Status: **Federal:** None **State:** None

CNDDB Element Ranks: **Global:** G5T1 **State:** S1

Rare Plant Rank:

Other Lists: AFS_VU-Vulnerable
BLM_S-Sensitive
DFG_SSC-Species of Special Concern

General Habitat:

SMALL STREAMS NEAR SONORA.

Micro Habitat:

FOUND IN AREAS WITH SERPENTINE SOIL.

Last Date Observed:	2000-07-10	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2000-07-10	**Occurrence Rank:**	Fair
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

AMBER CREEK. NORTH OF RED HILL SIMS ROAD. ABOUT 0.25 MI NE OF CRIMEA HOUSE.

Detailed Location:

Ecological:

HEAVY UNDERBRUSH NEXT TO SMALL CREEK, FEW ISOLATED POOLS CONTAINING RED HILLS ROACH. SURROUNDING AREA IS PASTURE AND MINING.

Threats:

General:

4 COLLECTED, FIN CLIPPED AND RELEASED.

PLSS:	T01S, R14E, Sec. 19 (M)	**Accuracy:**	specific area	**Area (acres):**	21
UTM:	Zone-10 N4190659 E722263	**Latitude/Longitude:**	37.83631 / -120.47426	**Elevation (feet):**	1,250

County Summary:	**Quad Summary:**
Tuolumne	Chinese Camp (3712074)

Sources:

JON00F0002 JONES, W.J. - FIELD SURVEY FORM FOR LAVINIA SYMMETRICUS SSP. 3 (RED HILLS ROACH) 2000-07-10

Map Index Number:	68798	**EO Index:**	69309
Key Quad:	Moccasin (3712073)	**Element Code:**	AMACC01020
Occurrence Number:	140	**Occurrence Last Updated:**	2007-04-23

Scientific Name: *Myotis yumanensis*

Common Name: Yuma myotis

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
IUCN_LC-Least Concern
WBWG_LM-Low-Medium Priority

CNDDB Element Ranks: **Global:** G5 **State:** S4?

General Habitat:

OPTIMAL HABITATS ARE OPEN FORESTS AND WOODLANDS WITH SOURCES OF WATER OVER WHICH TO FEED.

Micro Habitat:

DISTRIBUTION IS CLOSELY TIED TO BODIES OF WATER. MATERNITY COLONIES IN CAVES, MINES, BUILDINGS OR CREVICES.

Last Date Observed:	1999-09-16	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-09-16	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

SE OF MOCCASIN, ADJACENT TO HWY 49, MOCCASIN CREEK.

Detailed Location:

BRIDGE NIGHT ROOST. MAPPED ACCORDING TO LAT/LONG COORDINATES PROVIDED BY 2004 REPORT ON LASIURUS BLOSSEVILLII. LOCALITY GIVEN AS "MOCCASIN CREEK, HWY 120."

Ecological:

Threats:

General:

BATS DETECTED ACOUSTICALLY AND ABOUT 100 BATS OBSERVED AND/OR CAPTURED ON 17 JUN, ABOUT 300 BATS ON 14 JUL, 300+ BATS ON 15 AUG AND ABOUT 50 BATS ON 16 SEP, 1999. BAT(S) DETECTED ACOUSTICALLY ON 22 OCT 1999.

PLSS:	T01S, R15E, Sec. 34 (M)	**Accuracy:**	1/10 mile	**Area (acres):**	0
UTM:	Zone-10 N4188162 E737733	**Latitude/Longitude:**	37.80993 / -120.29944	**Elevation (feet):**	850

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

PIE01R0001 PIERSON, ELIZABETH, WILLIAM E. RAINEY & CHRIS J. CORBEN - SEASONAL PATTERNS OF BAT DISTRIBUTION ALONG AN ALTITUDINAL GRADIENT IN THE SIERRA NEVADA. 2001-01-XX

PIE04R0001 PIERSON, ELIZABETH D., WILLIAM E. RAINEY & CHRIS CORBEN - DISTRIBUTION AND STATUS OF WESTERN RED BATS (LASIURUS BLOSSEVILLII) IN CALIFORNIA 2004-04-15

Map Index Number: 68800
Key Quad: Moccasin (3712073)
Occurrence Number: 141
EO Index: 69311
Element Code: AMACC01020
Occurrence Last Updated: 2007-04-03

Scientific Name: *Myotis yumanensis*
Common Name: Yuma myotis

Listing Status: **Federal:** None
State: None
CNDDB Element Ranks: **Global:** G5
State: S4?

Rare Plant Rank:
Other Lists: BLM_S-Sensitive
IUCN_LC-Least Concern
WBWG_LM-Low-Medium Priority

General Habitat:

OPTIMAL HABITATS ARE OPEN FORESTS AND WOODLANDS WITH SOURCES OF WATER OVER WHICH TO FEED.

Micro Habitat:

DISTRIBUTION IS CLOSELY TIED TO BODIES OF WATER. MATERNITY COLONIES IN CAVES, MINES, BUILDINGS OR CREVICES.

Last Date Observed: 1999-09-15
Last Survey Date: 1999-09-15
Owner/Manager: UNKNOWN
Presence: Presumed Extant
Occurrence Type: Natural/Native occurrence
Occurrence Rank: Unknown
Trend: Unknown

Location:

VICINITY OF DON PEDRO RESERVOIR, NEAR INTERSECTION OF HWY 120 AND JACKSONVILLE RD.

Detailed Location:

BRIDGE ROOST. EXACT LOCATION UNKNOWN, AS SOURCE GIVES LOCATION ONLY AS "JACKSONVILLE RD." MAPPED IN THE GENERAL VICINITY OF HIGHWAY 120 AND JACKSONVILLE RD. INCLUDES LOCALITY "DON PEDRO."

Ecological:

Threats:

General:

NIGHT ROOST. BAT(S) DETECTED ACOUSTICALLY 4 JUN 1998. 1 BAT CAPTURED OR OBS 17 JUN & 15 AUG 1999 AT "DON PEDRO." ABOUT 200 BATS CAPTURED AND/OR OBSERVED ON 15 AUG & ABOUT 25 BATS CAPTURED AND/OR OBSERVED ON 16 SEP 1999 AT "JACKSONVILLE RD."

PLSS: T01S, R15E, Sec. 20 (M)
Accuracy: 1 mile
Area (acres): 0
UTM: Zone-10 N4190750 E733829
Latitude/Longitude: 37.83423 / -120.34292
Elevation (feet): 850

County Summary:	Quad Summary:
Tuolumne	Moccasin (3712073)

Sources:

PIE01R0001 PIERSON, ELIZABETH, WILLIAM E. RAINEY & CHRIS J. CORBEN - SEASONAL PATTERNS OF BAT DISTRIBUTION ALONG AN ALTITUDINAL GRADIENT IN THE SIERRA NEVADA. 2001-01-XX

Map Index Number: 68800
Key Quad: Moccasin (3712073)
Occurrence Number: 101

EO Index: 69356
Element Code: AMACC01110
Occurrence Last Updated: 2007-04-04

Scientific Name: *Myotis volans*

Common Name: long-legged myotis

Listing Status: **Federal:** None
State: None

CNDDB Element Ranks: **Global:** G5
State: S4?

Rare Plant Rank:

Other Lists: IUCN_LC-Least Concern
WBWG_H-High Priority

General Habitat:

MOST COMMON IN WOODLAND & FOREST HABITATS ABOVE 4000 FT. TREES ARE IMPORTANT DAY ROOSTS; CAVES & MINES ARE NIGHT ROOSTS.

Micro Habitat:

NURSERY COLONIES USUALLY UNDER BARK OR IN HOLLOW TREES, BUT OCCASIONALLY IN CREVICES OR BUILDINGS.

Last Date Observed: 1998-06-04
Last Survey Date: 1998-06-04
Owner/Manager: UNKNOWN
Presence: Presumed Extant

Occurrence Type: Natural/Native occurrence
Occurrence Rank: Unknown
Trend: Unknown

Location:

VICINITY OF DON PEDRO RESERVOIR, NEAR INTERSECTION OF HWY 120 AND JACKSONVILLE RD.

Detailed Location:

EXACT LOCATION UNKNOWN, AS SOURCE GIVES LOCATION ONLY AS "HWY 120, MOCCASIN CREEK, LAKE DON PEDRO." MAPPED AS BEST ESTIMATE.

Ecological:

Threats:

General:

INDIVIDUAL(S) DETECTED IN AN ACOUSTIC SURVEY ON 4 JUN 1998.

PLSS: T01S, R15E, Sec. 20 (M) **Accuracy:** 1 mile **Area (acres):** 0
UTM: Zone-10 N4190750 E733829 **Latitude/Longitude:** 37.83423 / -120.34292 **Elevation (feet):**

County Summary:	Quad Summary:
Tuolumne	Moccasin (3712073)

Sources:

PIE01R0001 PIERSON, ELIZABETH, WILLIAM E. RAINEY & CHRIS J. CORBEN - SEASONAL PATTERNS OF BAT DISTRIBUTION ALONG AN ALTITUDINAL GRADIENT IN THE SIERRA NEVADA. 2001-01-XX

Map Index Number: 44594
Key Quad: Tuolumne (3712082)
Occurrence Number: 133

EO Index: 68896
Element Code: AMACC05030
Occurrence Last Updated: 2007-03-19

Scientific Name: *Lasiurus cinereus*

Common Name: hoary bat

Listing Status: **Federal:** None
State: None

CNDDB Element Ranks: **Global:** G5
State: S4?

Rare Plant Rank:

Other Lists: IUCN_LC-Least Concern
WBWG_M-Medium Priority

General Habitat:

PREFERS OPEN HABITATS OR HABITAT MOSAICS, WITH ACCESS TO TREES FOR COVER & OPEN AREAS OR HABITAT EDGES FOR FEEDING.

Micro Habitat:

ROOSTS IN DENSE FOLIAGE OF MEDIUM TO LARGE TREES. FEEDS PRIMARILY ON MOTHS. REQUIRES WATER.

Last Date Observed: 1930-06-15
Last Survey Date: 1930-06-15
Owner/Manager: UNKNOWN
Presence: Presumed Extant

Occurrence Type: Natural/Native occurrence
Occurrence Rank: Unknown
Trend: Unknown

Location:

TUOLUMNE.

Detailed Location:

MAPPED ACCORDING TO LAT/LONG COORDINATES PROVIDED BY MANIS, WITH UNCERTAINTY OF 30M.

Ecological:

Threats:

General:

MVZ #44180 COLLECTED BY HENRY GRENIER ON 15 JUN 1930.

PLSS: T01N, R16E, Sec. 08 (M)
Accuracy: 1 mile
Area (acres): 0

UTM: Zone-10 N4205046 E742701
Latitude/Longitude: 37.96062 / -120.23740
Elevation (feet):

County Summary:

Tuolumne

Quad Summary:

Tuolumne (3712082), Standard (3712083)

Sources:

MAN04S0029	MAMMAL NETWORKED INFORMATION SYSTEM (MANIS) - PRINTOUT OF LASIURUS CINEREUS SPECIMENS FOR CALIFORNIA FROM MANIS. INCLUDES RECORDS FROM MVZ, CAS, MSB, LSU, KU, LACM, UWBM, FMNH AND TTU. 2004-12-10

Map Index Number:	68800	**EO Index:**	69354
Key Quad:	Moccasin (3712073)	**Element Code:**	AMACC05030
Occurrence Number:	159	**Occurrence Last Updated:**	2007-04-04

Scientific Name: *Lasiurus cinereus*

Common Name: hoary bat

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

Other Lists: IUCN_LC-Least Concern
WBWG_M-Medium Priority

CNDDB Element Ranks: **Global:** G5 **State:** S4?

General Habitat:

PREFERS OPEN HABITATS OR HABITAT MOSAICS, WITH ACCESS TO TREES FOR COVER & OPEN AREAS OR HABITAT EDGES FOR FEEDING.

Micro Habitat:

ROOSTS IN DENSE FOLIAGE OF MEDIUM TO LARGE TREES. FEEDS PRIMARILY ON MOTHS. REQUIRES WATER.

Last Date Observed:	1998-06-04	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1998-06-04	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

VICINITY OF DON PEDRO RESERVOIR, NEAR INTERSECTION OF HWY 120 AND JACKSONVILLE RD.

Detailed Location:

EXACT LOCATION UNKNOWN, AS SOURCE GIVES LOCATION ONLY AS "HWY 120, MOCCASIN CREEK, LAKE DON PEDRO." MAPPED AS BEST ESTIMATE.

Ecological:

Threats:

General:

INDIVIDUAL(S) DETECTED IN AN ACOUSTIC SURVEY ON 4 JUN 1998.

PLSS:	T01S, R15E, Sec. 20 (M)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-10 N4190750 E733829	**Latitude/Longitude:**	37.83423 / -120.34292	**Elevation (feet):**	

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

PIE01R0001 PIERSON, ELIZABETH, WILLIAM E. RAINEY & CHRIS J. CORBEN - SEASONAL PATTERNS OF BAT DISTRIBUTION ALONG AN ALTITUDINAL GRADIENT IN THE SIERRA NEVADA. 2001-01-XX

Map Index Number:	68798	**EO Index:**	69355
Key Quad:	Moccasin (3712073)	**Element Code:**	AMACC05030
Occurrence Number:	160	**Occurrence Last Updated:**	2007-04-23

Scientific Name: *Lasiurus cinereus*

Common Name: hoary bat

Listing Status: **Federal:** None

State: None

Rare Plant Rank:

Other Lists: IUCN_LC-Least Concern
WBWG_M-Medium Priority

CNDDB Element Ranks: **Global:** G5

State: S4?

General Habitat:

PREFERS OPEN HABITATS OR HABITAT MOSAICS, WITH ACCESS TO TREES FOR COVER & OPEN AREAS OR HABITAT EDGES FOR FEEDING.

Micro Habitat:

ROOSTS IN DENSE FOLIAGE OF MEDIUM TO LARGE TREES. FEEDS PRIMARILY ON MOTHS. REQUIRES WATER.

Last Date Observed:	1999-10-22	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-10-22	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

SE OF MOCCASIN, ADJACENT TO HWY 49, MOCCASIN CREEK.

Detailed Location:

MAPPED ACCORDING TO LAT/LONG COORDINATES PROVIDED BY 2004 REPORT ON LASIURUS BLOSSEVILLII. LOCALITY GIVEN AS "MOCCASIN CREEK, HWY 120."

Ecological:

Threats:

General:

INDIVIDUAL(S) DETECTED ACOUSTICALLY ON 17 JUN, AND 22 OCT 1999.

PLSS: T01S, R15E, Sec. 34 (M)		**Accuracy:**	1/10 mile	**Area (acres):**	0
UTM: Zone-10 N4188162 E737733		**Latitude/Longitude:**	37.80993 / -120.29944	**Elevation (feet):**	850

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

PIE01R0001 PIERSON, ELIZABETH, WILLIAM E. RAINEY & CHRIS J. CORBEN - SEASONAL PATTERNS OF BAT DISTRIBUTION ALONG AN ALTITUDINAL GRADIENT IN THE SIERRA NEVADA. 2001-01-XX

PIE04R0001 PIERSON, ELIZABETH D., WILLIAM E. RAINEY & CHRIS CORBEN - DISTRIBUTION AND STATUS OF WESTERN RED BATS (LASIURUS BLOSSEVILLII) IN CALIFORNIA 2004-04-15

Map Index Number: 68798 **EO Index:** 69353
Key Quad: Moccasin (3712073) **Element Code:** AMACC05060
Occurrence Number: 21 **Occurrence Last Updated:** 2007-04-23

Scientific Name: *Lasiurus blossevillii* **Common Name:** western red bat

Listing Status: **Federal:** None **Rare Plant Rank:**
State: None **Other Lists:** DFG_SSC-Species of Special Concern
IUCN_LC-Least Concern
USFS_S-Sensitive
WBWG_H-High Priority
CNDDB Element Ranks: **Global:** G5
State: S3?

General Habitat:

ROOSTS PRIMARILY IN TREES, 2-40 FT ABOVE GROUND, FROM SEA LEVEL UP THROUGH MIXED CONIFER FORESTS.

Micro Habitat:

PREFERS HABITAT EDGES & MOSAICS WITH TREES THAT ARE PROTECTED FROM ABOVE & OPEN BELOW WITH OPEN AREAS FOR FORAGING.

Last Date Observed: 1999-09-16 **Occurrence Type:** Natural/Native occurrence
Last Survey Date: 1999-09-16 **Occurrence Rank:** Unknown
Owner/Manager: UNKNOWN **Trend:** Unknown
Presence: Presumed Extant

Location:

SE OF MOCCASIN, ADJACENT TO HWY 49, MOCCASIN CREEK.

Detailed Location:

MAPPED ACCORDING TO LAT/LONG COORDINATES PROVIDED BY 2004 REPORT. LOCALITY GIVEN AS "MOCCASIN CREEK, HWY 120."

Ecological:

Threats:

General:

INDIVIDUAL(S) DETECTED ACOUSTICALLY ON 17 JUN (MAXIMUM # OF DETECTIOND OBTAINED BY A SINGLE DETECTOR WAS 1) AND 16 SEP (MAXIMUM 5) 1999.

PLSS: T01S, R15E, Sec. 34 (M) **Accuracy:** 1/10 mile **Area (acres):** 0
UTM: Zone-10 N4188162 E737733 **Latitude/Longitude:** 37.80993 / -120.29944 **Elevation (feet):** 850

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

PIE01R0001 PIERSON, ELIZABETH, WILLIAM E. RAINEY & CHRIS J. CORBEN - SEASONAL PATTERNS OF BAT DISTRIBUTION ALONG AN ALTITUDINAL GRADIENT IN THE SIERRA NEVADA. 2001-01-XX

PIE04R0001 PIERSON, ELIZABETH D., WILLIAM E. RAINEY & CHRIS CORBEN - DISTRIBUTION AND STATUS OF WESTERN RED BATS (LASIURUS BLOSSEVILLII) IN CALIFORNIA 2004-04-15

Map Index Number:	34755	**EO Index:**	324
Key Quad:	Standard (3712083)	**Element Code:**	AMACC07010
Occurrence Number:	3	**Occurrence Last Updated:**	2006-09-19

Scientific Name: *Euderma maculatum*

Common Name: spotted bat

Listing Status: **Federal:** None **State:** None

CNDDB Element Ranks: **Global:** G4 **State:** S2S3

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_LC-Least Concern
WBWG_H-High Priority

General Habitat:

OCCUPIES A WIDE VARIETY OF HABITATS FROM ARID DESERTS AND GRASSLANDS THROUGH MIXED CONIFER FORESTS.

Micro Habitat:

FEEDS OVER WATER AND ALONG WASHES. FEEDS ALMOST ENTIRELY ON MOTHS. NEEDS ROCK CREVICES IN CLIFFS OR CAVES FOR ROOSTING.

Last Date Observed:	1995-07-11	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1995-07-11	**Occurrence Rank:**	Unknown
Owner/Manager:	PVT	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

2.2 MILES SOUTHEAST OF STANDARD; INTERSECTION OF WOODHAM-CARNE ROAD AND YOSEMITE ROAD (PONDEROSA WAY).

Detailed Location:

CLUSTER OF LOCATIONS SOUTH OF BUCKHORN MOUNTAIN. GENERAL LOCATION "TUOLUMNE" INCLUDED HERE.

Ecological:

ANNUAL GRASSLAND OPENINGS WITH SOME RIPARIAN VEGETATION WITHIN BLUE OAK WOODLAND.

Threats:

General:

5 INDIVIDUALS OBSERVED FORAGING WITHIN 1 MILE RADIUS OF INTERSECTION 10 JUL 1995. CALLS RECORDED 11 JUL 1995.

PLSS:	T01N, R15E, Sec. 13 (M)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-10 N4203284 E739480	**Latitude/Longitude:**	37.94561 / -120.27461	**Elevation (feet):**	2,700

County Summary:	**Quad Summary:**
Tuolumne	Standard (3712083)

Sources:

PIE98A0001 PIERSON, ELIZABETH & WILLIAM RAINEY - DISTRIBUTION OF THE SPOTTED BAT, EUDERMA MACULATUM, IN CALIFORNIA. JOURNAL OF MAMMALOGY 79(4):1296-1305. 1998-XX-XX

RIC95F0009 RICKMAN, T. - FIELD SURVEY FORM FOR EUDERMA MACULATUM 1995-07-10

Map Index Number: 37013
Key Quad: Sonora (3712084)
Occurrence Number: 91

EO Index: 32010
Element Code: AMACC08010
Occurrence Last Updated: 1997-10-02

Scientific Name: *Corynorhinus townsendii*

Common Name: Townsend's big-eared bat

Listing Status: **Federal:** None
State: None

CNDDB Element Ranks: **Global:** G4
State: S2S3

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_LC-Least Concern
USFS_S-Sensitive
WBWG_H-High Priority

General Habitat:

THROUGHOUT CALIFORNIA IN A WIDE VARIETY OF HABITATS. MOST COMMON IN MESIC SITES.

Micro Habitat:

ROOSTS IN THE OPEN, HANGING FROM WALLS & CEILINGS. ROOSTING SITES LIMITING. EXTREMELY SENSITIVE TO HUMAN DISTURBANCE.

Last Date Observed: 1992-07-03
Last Survey Date: 1992-07-03
Owner/Manager: PVT-SONORA GOLD
Presence: Presumed Extant

Occurrence Type: Natural/Native occurrence
Occurrence Rank: Fair
Trend: Unknown

Location:

MINE, QUARTZ MOUNTAIN, 2.1 MILES SOUTH OF JAMESTOWN AND APPROX. 4.8 MILES SW OF SONORA.

Detailed Location:

SONORA GOLD PROPERTY MINE.

Ecological:

OAK WOODLAND, GRASSLAND

Threats:

MINING-ROOST AT RISK OF BEING DESTROYED BY MINING OPERATION. MITIGATION MEASURES AGREED TO.

General:

BREEDING SITE (OBSERVED EXISTING ROOST). 52 INDIVIDUALS OBSERVED (1992).

PLSS: T01N, R14E, Sec. 22 (M) **Accuracy:** 1/5 mile **Area (acres):** 0
UTM: Zone-10 N4200449 E726687 **Latitude/Longitude:** 37.92337 / -120.42095 **Elevation (feet):** 1,650

County Summary: Tuolumne

Quad Summary: Sonora (3712084)

Sources:

PIE92F0012 PIERSON, ELIZABETH D. - FIELD SURVEY FORM FOR CORYNORHINUS TOWNSENDII (=PLECOTUS TOWNSENDII PALLESCENS) 1992-07-03

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number: 30520
Key Quad: Sonora (3712084)
Occurrence Number: 5

EO Index: 13694
Element Code: AMACC10010
Occurrence Last Updated: 1995-01-03

Scientific Name: *Antrozous pallidus*

Common Name: pallid bat

Listing Status: **Federal:** None
State: None

CNDDB Element Ranks: **Global:** G5
State: S3

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_LC-Least Concern
USFS_S-Sensitive
WBWG_H-High Priority

General Habitat:

DESERTS, GRASSLANDS, SHRUBLANDS, WOODLANDS & FORESTS. MOST COMMON IN OPEN, DRY HABITATS WITH ROCKY AREAS FOR ROOSTING.

Micro Habitat:

ROOSTS MUST PROTECT BATS FROM HIGH TEMPERATURES. VERY SENSITIVE TO DISTURBANCE OF ROOSTING SITES.

Last Date Observed: 1992-07-03
Last Survey Date: 1992-07-03
Owner/Manager: PVT-SONORA GOLD
Presence: Presumed Extant

Occurrence Type: Natural/Native occurrence
Occurrence Rank: Excellent
Trend: Unknown

Location:

WEST OF SULLIVAN CREEK, 0.5 MILE NORTHEAST OF DON PEDRO RESERVOIR.

Detailed Location:

MATERNITY ROOST LOCATED IN AN OLD CISTERN.

Ecological:

HABITAT SURROUNDING ROOST SITE CONSISTS OF MATURE BLUE OAK WOODLAND.

Threats:

CISTERN UNDER THREAT FROM MINING OPERATION.

General:

~100 ADULTS OBSERVED ON 3 JULY 1992.

PLSS: T01N, R14E, Sec. 35 (M)
Accuracy: 1/5 mile
Area (acres): 0
UTM: Zone-10 N4198054 E727704
Latitude/Longitude: 37.90155 / -120.41015
Elevation (feet): 1,350

County Summary:

Tuolumne

Quad Summary:

Sonora (3712084)

Sources:

PIE92F0003 PIERSON, ELIZABETH D. (UNIVERSITY OF CALIFORNIA, BERKELEY) - FIELD SURVEY FORM FOR ANTROZOUS PALLIDUS (ROOST SITE) 1992-07-03

Map Index Number:	66636	**EO Index:**	66780
Key Quad:	Sonora (3712084)	**Element Code:**	AMACC10010
Occurrence Number:	306	**Occurrence Last Updated:**	2006-10-23

Scientific Name: *Antrozous pallidus*

Common Name: pallid bat

Listing Status: **Federal:** None
State: None

Rare Plant Rank:

Other Lists:
BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_LC-Least Concern
USFS_S-Sensitive
WBWG_H-High Priority

CNDDB Element Ranks: **Global:** G5
State: S3

General Habitat:

DESERTS, GRASSLANDS, SHRUBLANDS, WOODLANDS & FORESTS. MOST COMMON IN OPEN, DRY HABITATS WITH ROCKY AREAS FOR ROOSTING.

Micro Habitat:

ROOSTS MUST PROTECT BATS FROM HIGH TEMPERATURES. VERY SENSITIVE TO DISTURBANCE OF ROOSTING SITES.

Last Date Observed:	1991-05-17	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1991-05-17	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

JAMESTOWN MINE SITE NEAR SONORA.

Detailed Location:

MAPPED SW OF JAMESTOWN NEAR OLD MINE SITES.

Ecological:

Threats:

General:

1 FEMALE SPECIMEN COLLECTED BY WILLIAM E. RAINEY ON 17 MAY 1991, MVZ #182548.

PLSS:	T01N, R14E, Sec. 16 (M)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-10 N4202457 E725402	**Latitude/Longitude:**	37.94176 / -120.43493	**Elevation (feet):**	

County Summary:	**Quad Summary:**
Tuolumne	Sonora (3712084)

Sources:

MAN04S0028 MAMMAL NETWORKED INFORMATION SYSTEM (MANIS) - PRINTOUT OF ANTROZOUS PALLIDUS SPECIMEN RECORDS FROM MANIS. INCLUDES RECORDS FROM MVZ, CAS, KU, UWBM, UMNH, LACM, MSB, FMNH, TTU, MSU. 2004-12-09

Map Index Number:	66639	**EO Index:**	66783
Key Quad:	Standard (3712083)	**Element Code:**	AMACC10010
Occurrence Number:	308	**Occurrence Last Updated:**	2006-10-05

Scientific Name: *Antrozous pallidus*

Common Name: pallid bat

Listing Status:	**Federal:**	None	**Rare Plant Rank:**	
	State:	None	**Other Lists:**	BLM_S-Sensitive DFG_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority
CNDDB Element Ranks:	**Global:**	G5		
	State:	S3		

General Habitat:

DESERTS, GRASSLANDS, SHRUBLANDS, WOODLANDS & FORESTS. MOST COMMON IN OPEN, DRY HABITATS WITH ROCKY AREAS FOR ROOSTING.

Micro Habitat:

ROOSTS MUST PROTECT BATS FROM HIGH TEMPERATURES. VERY SENSITIVE TO DISTURBANCE OF ROOSTING SITES.

Last Date Observed:	1945-09-18	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1945-09-18	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

2.5 MI ESE JACKSONVILLE, TOULUMNE RIVER.

Detailed Location:

MAPPED ACCORDING TO LAT/LONG COORDINATES GIVEN IN MANIS, WITH UNCERTAINTY OF 30M. COORDINATES PUT SITE AT WARDS FERRY BRIDGE. THERE IS NO PLACE CALLED "JACKSONVILLE" IN CALIFORNIA.

Ecological:

Threats:

General:

1 MALE SPECIMEN COLLECTED BY MARY C. RAMAGE ON 18 SEP 1945, MVZ #103893.

PLSS:	T01S, R15E, Sec. 02 (M)	**Accuracy:**	1/10 mile	**Area (acres):**	0
UTM:	Zone-10 N4195717 E737967	**Latitude/Longitude:**	37.87788 / -120.29431	**Elevation (feet):**	810

County Summary:	**Quad Summary:**
Tuolumne	Standard (3712083)

Sources:

MAN04S0028 MAMMAL NETWORKED INFORMATION SYSTEM (MANIS) - PRINTOUT OF ANTROZOUS PALLIDUS SPECIMEN RECORDS FROM MANIS. INCLUDES RECORDS FROM MVZ, CAS, KU, UWBM, UMNH, LACM, MSB, FMNH, TTU, MSU. 2004-12-09

Map Index Number:	68800	**EO Index:**	69314
Key Quad:	Moccasin (3712073)	**Element Code:**	AMACC10010
Occurrence Number:	356	**Occurrence Last Updated:**	2007-04-03

Scientific Name: *Antrozous pallidus* **Common Name:** pallid bat

Listing Status:	**Federal:**	None	**Rare Plant Rank:**	
	State:	None	**Other Lists:**	BLM_S-Sensitive DFG_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority
CNDDB Element Ranks:	**Global:**	G5		
	State:	S3		

General Habitat:

DESERTS, GRASSLANDS, SHRUBLANDS, WOODLANDS & FORESTS. MOST COMMON IN OPEN, DRY HABITATS WITH ROCKY AREAS FOR ROOSTING.

Micro Habitat:

ROOSTS MUST PROTECT BATS FROM HIGH TEMPERATURES. VERY SENSITIVE TO DISTURBANCE OF ROOSTING SITES.

Last Date Observed:	1999-09-15	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-09-15	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

VICINITY OF DON PEDRO RESERVOIR, NEAR INTERSECTION OF HWY 120 AND JACKSONVILLE RD.

Detailed Location:

BRIDGE ROOST. EXACT LOCATION UNKNOWN, AS SOURCE GIVES LOCATION ONLY AS "JACKSONVILLE RD." MAPPED IN THE GENERAL VICINITY OF HIGHWAY 120 AND JACKSONVILLE RD. INCLUDES LOCALITIES "DON PEDRO" & "MOCCASIN CREEK, LAKE DON PEDRO."

Ecological:

Threats:

General:

NIGHT ROOST. BAT(S) DETECTED ACOUSTICALLY AT "MOCCASIN CREEK, LAKE DON PEDRO" ON 4 JUN 1998. 1 CAPTURED OR OBSERVED AT "DON PEDRO" AND BATS PRESENT AT "JACKSONVILLE RD" ON 15 AUG 1999.

PLSS:	T01S, R15E, Sec. 20 (M)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-10 N4190750 E733829	**Latitude/Longitude:**	37.83423 / -120.34292	**Elevation (feet):**	

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

PIE01R0001 PIERSON, ELIZABETH, WILLIAM E. RAINEY & CHRIS J. CORBEN - SEASONAL PATTERNS OF BAT DISTRIBUTION ALONG AN ALTITUDINAL GRADIENT IN THE SIERRA NEVADA. 2001-01-XX

Map Index Number:	68798	**EO Index:**	69350
Key Quad:	Moccasin (3712073)	**Element Code:**	AMACC10010
Occurrence Number:	363	**Occurrence Last Updated:**	2007-04-23

Scientific Name: *Antrozous pallidus*

Common Name: pallid bat

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

CNDDB Element Ranks: **Global:** G5 **State:** S3

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_LC-Least Concern
USFS_S-Sensitive
WBWG_H-High Priority

General Habitat:

DESERTS, GRASSLANDS, SHRUBLANDS, WOODLANDS & FORESTS. MOST COMMON IN OPEN, DRY HABITATS WITH ROCKY AREAS FOR ROOSTING.

Micro Habitat:

ROOSTS MUST PROTECT BATS FROM HIGH TEMPERATURES. VERY SENSITIVE TO DISTURBANCE OF ROOSTING SITES.

Last Date Observed:	1999-07-14	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-07-14	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

SE OF MOCCASIN, ADJACENT TO HWY 49, MOCCASIN CREEK.

Detailed Location:

MAPPED ACCORDING TO LAT/LONG COORDINATES PROVIDED BY 2004 REPORT ON LASIURUS BLOSSEVILLII. LOCALITY GIVEN AS "MOCCASIN CREEK, HWY 120."

Ecological:

Threats:

General:

INDIVIDUAL(S) DETECTED ACOUSTICALLY ON 14 JUL 1999.

PLSS:	T01S, R15E, Sec. 34 (M)	**Accuracy:**	1/10 mile	**Area (acres):**	0
UTM:	Zone-10 N4188162 E737733	**Latitude/Longitude:**	37.80993 / -120.29944	**Elevation (feet):**	850

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

PIE01R0001	PIERSON, ELIZABETH, WILLIAM E. RAINEY & CHRIS J. CORBEN - SEASONAL PATTERNS OF BAT DISTRIBUTION ALONG AN ALTITUDINAL GRADIENT IN THE SIERRA NEVADA. 2001-01-XX
PIE04R0001	PIERSON, ELIZABETH D., WILLIAM E. RAINEY & CHRIS CORBEN - DISTRIBUTION AND STATUS OF WESTERN RED BATS (LASIURUS BLOSSEVILLII) IN CALIFORNIA 2004-04-15

Map Index Number:	31658	**EO Index:**	22296
Key Quad:	Sonora (3712084)	**Element Code:**	AMACD02011
Occurrence Number:	19	**Occurrence Last Updated:**	2005-06-22

Scientific Name: *Eumops perotis californicus*

Common Name: western mastiff bat

Listing Status: **Federal:** None; **State:** None

Rare Plant Rank:

CNDDB Element Ranks: **Global:** G5T4; **State:** S3?

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
WBWG_H-High Priority

General Habitat:

MANY OPEN, SEMI-ARID TO ARID HABITATS, INCLUDING CONIFER & DECIDUOUS WOODLANDS, COASTAL SCRUB, GRASSLANDS, CHAPARRAL ETC

Micro Habitat:

ROOSTS IN CREVICES IN CLIFF FACES, HIGH BUILDINGS, TREES & TUNNELS.

Last Date Observed:	1995-03-01	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1995-03-01	**Occurrence Rank:**	Good
Owner/Manager:	PVT	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

1 MILE SW OF YOSEMITE JUNCTION, SOUTH OF HWY 120, ~4 MILES SOUTH OF NEW MELONES LAKE.

Detailed Location:

LOCATED ON THE WEST ASPECT OF TABLE MOUNTAIN, SOUTH OF HWY 120/108.

Ecological:

HABITAT CONSISTS OF THE BASALT CLIFFS OF TABLE MOUNTAIN; BLUE OAK WOODLAND FOUND BELOW.

Threats:

GRAFFITI OBSERVED ON CLIFF FACE IN 1994.

General:

ALTHOUGH USED BY A NUMBER OF INDIVIDUALS DURING THE SUMMER, THIS IS APPARENTLY NOT A MATERNITY ROOST. SERVAL ADULTS OBSERVED IN AREA 25 OCT 1994.

PLSS:	T01S, R13E, Sec. 02 (M)	**Accuracy:**	1/5 mile	**Area (acres):**	0
UTM:	Zone-10 N4195296 E719808	**Latitude/Longitude:**	37.87865 / -120.50072	**Elevation (feet):**	1,250

County Summary:	**Quad Summary:**
Tuolumne	Sonora (3712084), New Melones Dam (3712085)

Sources:

RIC94F0007	RICKMAN, T. (U.S. FOREST SERVICE) - FIELD SURVEY FORM FOR EUMOPS PEROTIS CALIFORNICUS 1994-10-25
RIC95F0002	RICKMAN, TOM (U.S. FOREST SERVICE-STANISLAUS NATIONAL FOREST) - FIELD SURVEY FORM FOR EUMOPS PEROTIS (ROOST SITE) 1995-03-01

Map Index Number:	31657	**EO Index:**	2306
Key Quad:	Sonora (3712084)	**Element Code:**	AMACD02011
Occurrence Number:	20	**Occurrence Last Updated:**	1995-08-01

Scientific Name: *Eumops perotis californicus*

Common Name: western mastiff bat

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
WBWG_H-High Priority

CNDDB Element Ranks: **Global:** G5T4 **State:** S3?

General Habitat:

MANY OPEN, SEMI-ARID TO ARID HABITATS, INCLUDING CONIFER & DECIDUOUS WOODLANDS, COASTAL SCRUB, GRASSLANDS, CHAPARRAL ETC

Micro Habitat:

ROOSTS IN CREVICES IN CLIFF FACES, HIGH BUILDINGS, TREES & TUNNELS.

Last Date Observed:	1994-10-25	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1994-10-25	**Occurrence Rank:**	Unknown
Owner/Manager:	PVT	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

"YOSEMITE JUNCTION ROOST," 0.25 MILE NE OF YOSEMITE JUNCTION (HWY 120 AND HWY 108), VICINITY OF TABLE MOUNTAIN.

Detailed Location:

LOCATED ON THE SE ASPECT OF TABLE MOUNTAIN.

Ecological:

HABITAT CONSISTS OF BASALT CLIFFS ABOVE BLUE OAK WOODLAND.

Threats:

POSSIBLE THREAT FROM RESIDENTIAL DEVELOPMENT WITHIN 0.5 MILE.

General:

3 INDIVIDUALS OBSERVED WINTER ROOSTING.

PLSS:	T01N, R14E, Sec. 31 (M)	**Accuracy:**	1/5 mile	**Area (acres):**	0
UTM:	Zone-10 N4197071 E721049	**Latitude/Longitude:**	37.89434 / -120.48608	**Elevation (feet):**	1,500

County Summary:	**Quad Summary:**
Tuolumne	Sonora (3712084)

Sources:

RIC94F0004 RICKMAN, TOM (U.S. FOREST SERVICE-STANISLAUS NATIONAL FOREST) - FIELD SURVEY FORM FOR EUMOPS PEROTIS (ROOST SITE) 1994-10-25

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number:	33268	**EO Index:**	2307
Key Quad:	Sonora (3712084)	**Element Code:**	AMACD02011
Occurrence Number:	21	**Occurrence Last Updated:**	1995-08-01

Scientific Name: *Eumops perotis californicus*

Common Name: western mastiff bat

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
WBWG_H-High Priority

CNDDB Element Ranks: **Global:** G5T4 **State:** S3?

General Habitat:

MANY OPEN, SEMI-ARID TO ARID HABITATS, INCLUDING CONIFER & DECIDUOUS WOODLANDS, COASTAL SCRUB, GRASSLANDS, CHAPARRAL ETC

Micro Habitat:

ROOSTS IN CREVICES IN CLIFF FACES, HIGH BUILDINGS, TREES & TUNNELS.

Last Date Observed:	1995-07-11	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1995-07-11	**Occurrence Rank:**	Unknown
Owner/Manager:	BOR	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

"THE GROTTO ROOST," 0.5 MILE SE OF NEW MELONES LAKE.

Detailed Location:

AT LEAST TWO ROOSTS FOUND ALONG THE BASALTS CLIFFS OF TABLE MOUNTAIN.

Ecological:

HABITAT CONSISTS OF BASALT CLIFFS, WITH ADJACENT BLUE OAK WOODLAND AND CHAMISE OVERLOOKING NEW MELONES RESERVOIR.

Threats:

POSSIBLE THREATS INCLUDE ROCK CLIMBING, RECREATIONAL DISTURBANCE, & SHOOTING.

General:

72 ADULTS OBSERVED AT THIS MATERNITY ROOST ON 11 JULY 1995.

PLSS:	T01N, R14E, Sec. 20 (M)	**Accuracy:**	1/5 mile	**Area (acres):**	0
UTM:	Zone-10 N4200893 E723027	**Latitude/Longitude:**	37.92827 / -120.46242	**Elevation (feet):**	1,500

County Summary:	**Quad Summary:**
Tuolumne	Sonora (3712084)

Sources:

RIC95F0003	RICKMAN, TOM (U.S. FOREST SERVICE-STANISLAUS NATIONAL FOREST) - FIELD SURVEY FORM FOR EUMOPS PEROTIS (ROOST SITE) 1995-07-11

Map Index Number: 44594
Key Quad: Tuolumne (3712082)
Occurrence Number: 156
EO Index: 66512
Element Code: AMACD02011
Occurrence Last Updated: 2006-09-26

Scientific Name: *Eumops perotis californicus*
Common Name: western mastiff bat

Listing Status: **Federal:** None **State:** None
Rare Plant Rank:
Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
WBWG_H-High Priority

CNDDB Element Ranks: **Global:** G5T4 **State:** S3?

General Habitat:

MANY OPEN, SEMI-ARID TO ARID HABITATS, INCLUDING CONIFER & DECIDUOUS WOODLANDS, COASTAL SCRUB, GRASSLANDS, CHAPARRAL ETC

Micro Habitat:

ROOSTS IN CREVICES IN CLIFF FACES, HIGH BUILDINGS, TREES & TUNNELS.

Last Date Observed: 1995-07-11
Last Survey Date: 1995-07-11
Owner/Manager: UNKNOWN
Presence: Presumed Extant
Occurrence Type: Natural/Native occurrence
Occurrence Rank: Unknown
Trend: Unknown

Location:

TUOLUMNE.

Detailed Location:

MAPPED AT TUOLUMNE (TOWN); NEED MORE INFORMATION.

Ecological:

Threats:

General:

MULTIPLE INDIVIDUALS DETECTED 11 JUL 1995.

PLSS: T01N, R16E, Sec. 08 (M)
Accuracy: 1 mile
Area (acres): 0
UTM: Zone-10 N4205046 E742701
Latitude/Longitude: 37.96062 / -120.23740
Elevation (feet):

County Summary:	Quad Summary:
Tuolumne	Tuolumne (3712082), Standard (3712083)

Sources:

PIE98R0001 PIERSON, E. & W. RAINEY - DISTRIBUTION, HABITAT ASSOCIATIONS, STATUS AND SURVEY METHODOLOGIES FOR THREE MOLOSSID BAT SPECIES AND THE VESPERTILIONID. FINAL REPORT CAL FISH & GAME WILDLIFE MANAGEMENT DIVISION 1998-04-06

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number:	68798	**EO Index:**	69351
Key Quad:	Moccasin (3712073)	**Element Code:**	AMACD02011
Occurrence Number:	217	**Occurrence Last Updated:**	2007-04-23

Scientific Name: *Eumops perotis californicus*

Common Name: western mastiff bat

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
WBWG_H-High Priority

CNDDB Element Ranks: **Global:** G5T4 **State:** S3?

General Habitat:

MANY OPEN, SEMI-ARID TO ARID HABITATS, INCLUDING CONIFER & DECIDUOUS WOODLANDS, COASTAL SCRUB, GRASSLANDS, CHAPARRAL ETC

Micro Habitat:

ROOSTS IN CREVICES IN CLIFF FACES, HIGH BUILDINGS, TREES & TUNNELS.

Last Date Observed:	1999-09-16	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1999-09-16	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

SE OF MOCCASIN, ADJACENT TO HWY 49, MOCCASIN CREEK.

Detailed Location:

MAPPED ACCORDING TO LAT/LONG COORDINATES PROVIDED BY 2004 REPORT ON LASIURUS BLOSSEVILLII. LOCALITY GIVEN AS "MOCCASIN CREEK, HWY 120."

Ecological:

Threats:

General:

INDIVIDUAL(S) DETECTED ACOUSTICALLY ON 14 JUL, 14 AUG AND 16 SEP 1999.

PLSS:	T01S, R15E, Sec. 34 (M)	**Accuracy:**	1/10 mile	**Area (acres):**	0
UTM:	Zone-10 N4188162 E737733	**Latitude/Longitude:**	37.80993 / -120.29944	**Elevation (feet):**	850

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

PIE01R0001 PIERSON, ELIZABETH, WILLIAM E. RAINEY & CHRIS J. CORBEN - SEASONAL PATTERNS OF BAT DISTRIBUTION ALONG AN ALTITUDINAL GRADIENT IN THE SIERRA NEVADA. 2001-01-XX

PIE04R0001 PIERSON, ELIZABETH D., WILLIAM E. RAINEY & CHRIS CORBEN - DISTRIBUTION AND STATUS OF WESTERN RED BATS (LASIURUS BLOSSEVILLII) IN CALIFORNIA 2004-04-15

Map Index Number:	68800	**EO Index:**	69352
Key Quad:	Moccasin (3712073)	**Element Code:**	AMACD02011
Occurrence Number:	218	**Occurrence Last Updated:**	2007-04-04

Scientific Name: *Eumops perotis californicus*

Common Name: western mastiff bat

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
WBWG_H-High Priority

CNDDB Element Ranks: **Global:** G5T4 **State:** S3?

General Habitat:

MANY OPEN, SEMI-ARID TO ARID HABITATS, INCLUDING CONIFER & DECIDUOUS WOODLANDS, COASTAL SCRUB, GRASSLANDS, CHAPARRAL ETC

Micro Habitat:

ROOSTS IN CREVICES IN CLIFF FACES, HIGH BUILDINGS, TREES & TUNNELS.

Last Date Observed:	1998-06-04	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1998-06-04	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

VICINITY OF DON PEDRO RESERVOIR, NEAR INTERSECTION OF HWY 120 AND JACKSONVILLE RD.

Detailed Location:

EXACT LOCATION UNKNOWN, AS SOURCE GIVES LOCATION ONLY AS "HWY 120, MOCCASIN CREEK, LAKE DON PEDRO." MAPPED AS BEST ESTIMATE.

Ecological:

Threats:

General:

INDIVIDUAL(S) DETECTED IN AN ACOUSTIC SURVEY ON 4 JUN 1998.

PLSS:	T01S, R15E, Sec. 20 (M)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-10 N4190750 E733829	**Latitude/Longitude:**	37.83423 / -120.34292	**Elevation (feet):**	

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

PIE01R0001 PIERSON, ELIZABETH, WILLIAM E. RAINEY & CHRIS J. CORBEN - SEASONAL PATTERNS OF BAT DISTRIBUTION ALONG AN ALTITUDINAL GRADIENT IN THE SIERRA NEVADA. 2001-01-XX

Map Index Number:	13392	**EO Index:**	5627
Key Quad:	La Grange (3712064)	**Element Code:**	AMAFD03062
Occurrence Number:	6	**Occurrence Last Updated:**	2007-05-09

Scientific Name: *Dipodomys heermanni dixoni*

Common Name: Merced kangaroo rat

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

Other Lists:

CNDDB Element Ranks: **Global:** G3G4T2T3 **State:** S2S3

General Habitat:

GRASSLAND AND SAVANNA COMMUNITIES IN EASTERN MERCED & STANISLAUS COUNTIES.

Micro Habitat:

NEEDS FINE, DEEP, WELL-DRAINED SOIL FOR BURROWING. GRANIVOROUS, BUT ALSO EATS FORBS & GREEN GRASSES.

Last Date Observed:	1915-12-19	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1915-12-19	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

LA GRANGE.

Detailed Location:

Ecological:

Threats:

General:

2 MALE SPECIMENS (MVZ #23611-23612) COLLECTED BY JOSEPH S. DIXON ON 16 & 19 DEC 1915. 1 MALE SPECIMEN (MVZ #23613) COLLECTED BY F.H. HOLDEN AND JOSEPH S. DIXON ON 18 DEC 1915.

PLSS:	T03S, R14E, Sec. 20 (M)	**Accuracy:**	1 mile	**Area (acres):**	0
UTM:	Zone-10 N4171637 E723797	**Latitude/Longitude:**	37.66465 / -120.46270	**Elevation (feet):**	350

County Summary:	**Quad Summary:**
Stanislaus	La Grange (3712064)

Sources:

MAN04S0030 MAMMAL NETWORKED INFORMATION SYSTEM (MANIS) - PRINTOUT OF DIPODOMYS HEERMANNI DIXONI SPECIMENS FOR CALIFORNIA FROM MANIS. RECORDS FROM MVZ. 2004-12-10

MVZ81S0001 MUSEUM OF VERTEBRATE ZOOLOGY (UNIVERSITY OF CALIFORNIA, BERKELEY) - LIST OF MUSEUM SPECIMENS (MAMMALS) 1981. 1981-XX-XX

Map Index Number: 69702
Key Quad: La Grange (3712064)
Occurrence Number: 22
EO Index: 68268
Element Code: AMAFD03062
Occurrence Last Updated: 2007-02-14

Scientific Name: *Dipodomys heermanni dixoni*
Common Name: Merced kangaroo rat

Listing Status: **Federal:** None **State:** None
Rare Plant Rank:
Other Lists:
CNDDB Element Ranks: **Global:** G3G4T2T3 **State:** S2S3

General Habitat:

GRASSLAND AND SAVANNA COMMUNITIES IN EASTERN MERCED & STANISLAUS COUNTIES.

Micro Habitat:

NEEDS FINE, DEEP, WELL-DRAINED SOIL FOR BURROWING. GRANIVOROUS, BUT ALSO EATS FORBS & GREEN GRASSES.

Last Date Observed: 2006-03-31
Last Survey Date: 2006-03-31
Owner/Manager: UNKNOWN
Presence: Presumed Extant
Occurrence Type: Natural/Native occurrence
Occurrence Rank: Good
Trend: Unknown

Location:

GASBURG CREEK BANK. ALONG DUNN CREEK, 3 MILES DIRECTLY EAST OF LA GRANGE.

Detailed Location:

LOCATION MAPPED USING GPS COORDINATES GIVEN.

Ecological:

HABITAT CONSISTS OF A RIPARIAN PLANT COMMUNITY.

Threats:

General:

IDENTIFIED BY SCAT, TRACKS, AND BURROW ON 31 MAR 2006. SWAINSON'S HAWK ALSO SEEN ON SITE.

PLSS: T03S, R14E, Sec. 14 (M)
Accuracy: 80 meters
Area (acres): 0
UTM: Zone-10 N4172157 E728829
Latitude/Longitude: 37.66809 / -120.40554
Elevation (feet): 600

County Summary:

Tuolumne

Quad Summary:

La Grange (3712064)

Sources:

THO06F0036 THOMAS, KEELEY - FIELD SURVEY FORM FOR DIPODOMYS HEERMANNI DIXONI (BURROW/SCAT/TRACKS) 2006-03-31

Map Index Number:	55676	**EO Index:**	55676
Key Quad:	La Grange (3712064)	**Element Code:**	AMAJA03041
Occurrence Number:	192	**Occurrence Last Updated:**	2007-08-22

Scientific Name: *Vulpes macrotis mutica* **Common Name:** San Joaquin kit fox

Listing Status:	**Federal:**	Endangered	**Rare Plant Rank:**	
	State:	Threatened	**Other Lists:**	
CNDDB Element Ranks:	**Global:**	G4T2T3		
	State:	S2S3		

General Habitat:

ANNUAL GRASSLANDS OR GRASSY OPEN STAGES WITH SCATTERED SHRUBBY VEGETATION.

Micro Habitat:

NEED LOOSE-TEXTURED SANDY SOILS FOR BURROWING, AND SUITABLE PREY BASE.

Last Date Observed:	1973-XX-XX	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1973-XX-XX	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

ABOUT 0.75 MI SOUTH OF LA GRANGE. SOUTH OF SR 132. NORTHEAST OF DAWSON LAKE. COUNTY OHV RECREATION SITE.

Detailed Location:

THIS SIGHTING WAS PUBLISHED IN AN APPENDIX LETTER FOR COUNTY TRANSPORTATION PLAN - EIR IN 1974 OR 1975

Ecological:

MOSTLY ANNUAL GRASSES AND FORBS, SITE WAS DREDGED IN PAST AND BOULDERS AND GRAVEL WERE HAULED OFF TO CONSTRUCTION SITES. THE SITE WAS USED FOR CATTLE GRAZING WHEN THE SIGHTING OCCURRED IN 1972, NOW AN OHV SITE.

Threats:

OHV RECREATION DEVELOPMENT

General:

8/9/1972: ONE INDIVIDUAL OF UNKNOWN AGE SIGHTED. TWO SIGHTED IN 1973 BY DAN WILLIAMS.

PLSS:	T03S, R14E, Sec. 19 (M)	**Accuracy:**	nonspecific area	**Area (acres):**	161
UTM:	Zone-10 N4170670 E723430	**Latitude/Longitude:**	37.65603 / -120.46715	**Elevation (feet):**	300

County Summary:	**Quad Summary:**
Stanislaus	La Grange (3712064)

Sources:

BEL94R0001 BELL, H.M. ET AL. - DISTRIBUTION AND ABUNDANCE OF SAN JOAQUIN KIT FOX. DRAFT FINAL REPORT TO THE DEPARTMENT OF FISH AND GAME. 1994-03-31

WIL72F0001 WILLIAMS, DANIEL (CALIFORNIA STATE UNIVERSITY, STANISLAUS) - FIELD SURVEY FORM FOR VULPES MACROTIS MUTICA 1972-08-09

Map Index Number: 57690
Key Quad: La Grange (3712064)
Occurrence Number: 324
EO Index: 57706
Element Code: AMAJF04010
Occurrence Last Updated: 2004-10-26

Scientific Name: *Taxidea taxus*
Common Name: American badger

Listing Status: **Federal:** None
State: None
CNDDB Element Ranks: **Global:** G5
State: S4
Rare Plant Rank:
Other Lists: DFG_SSC-Species of Special Concern
IUCN_LC-Least Concern

General Habitat:

MOST ABUNDANT IN DRIER OPEN STAGES OF MOST SHRUB, FOREST, AND HERBACEOUS HABITATS, WITH FRIABLE SOILS.

Micro Habitat:

NEEDS SUFFICIENT FOOD, FRIABLE SOILS & OPEN, UNCULTIVATED GROUND. PREYS ON BURROWING RODENTS. DIGS BURROWS.

Last Date Observed: XXXX-XX-XX
Last Survey Date: XXXX-XX-XX
Owner/Manager: UNKNOWN
Presence: Presumed Extant
Occurrence Type: Natural/Native occurrence
Occurrence Rank: Unknown
Trend: Unknown

Location:

2 MILES SOUTH OF LA GRANGE.

Detailed Location:

LOCATION MAPPED IN VICINITY OF EVANS CREEK, SE OF DAWSON LAKE.

Ecological:

Threats:

General:

1 COLLECTED, CSCS (CALIF STATE UNIV, STANISLAUS).

PLSS: T03S, R14E, Sec. 32 (M)
Accuracy: 1 mile
Area (acres): 0
UTM: Zone-10 N4168325 E723933
Latitude/Longitude: 37.63479 / -120.46217
Elevation (feet): 400

County Summary:

Stanislaus

Quad Summary:

Snelling (3712054), La Grange (3712064)

Sources:

DFG86R0004 CALIFORNIA DEPARTMENT OF FISH & GAME - MAMMALIAN SPECIES OF SPECIAL CONCERN IN CALIFORNIA, AMERICAN BADGER ACCOUNT. 1986-XX-XX

Map Index Number:	32808	**EO Index:**	12429
Key Quad:	Moccasin (3712073)	**Element Code:**	ARAAD02030
Occurrence Number:	52	**Occurrence Last Updated:**	1996-02-22

Scientific Name: *Emys marmorata*

Common Name: western pond turtle

Listing Status: **Federal:** None

State: None

Rare Plant Rank:

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_VU-Vulnerable
USFS_S-Sensitive

CNDDB Element Ranks: **Global:** G3G4

State: S3

General Habitat:

A THOROUGHLY AQUATIC TURTLE OF PONDS, MARSHES, RIVERS, STREAMS & IRRIGATION DITCHES WITH AQUATIC VEGETATION BELOW 6000 FT ELEVATION.

Micro Habitat:

NEED BASKING SITES AND SUITABLE (SANDY BANKS OR GRASSY OPEN FIELDS) UPLAND HABITAT UP TO 0.5 KM FROM WATER FOR EGG-LAYING.

Last Date Observed:	1988-08-14	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	1988-08-14	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

MOCCASIN CREEK, 2.5 MILES SOUTH OF HIGHWAY 120 ON HIGHWAY 49.

Detailed Location:

Ecological:

Threats:

General:

14 CAPTURED, 11 RELEASED & 3 RETAINED BY D.C. HOLLAND ON 14 AUGUST 1988.

PLSS:	T02S, R15E, Sec. 02 (M)	**Accuracy:**	1/5 mile	**Area (acres):**	0
UTM:	Zone-10 N4185990 E739544	**Latitude/Longitude:**	37.78990 / -120.27962	**Elevation (feet):**	1,060

County Summary:	**Quad Summary:**
Tuolumne	Moccasin (3712073)

Sources:

HOL88U0003 HOLLAND, D.C. - ANNUAL REPORT OF SPECIMENS TAKEN UNDER SCIENTIFIC COLLECTING PERMITS #2169 AND 2169A. 1988-XX-XX

Map Index Number:	32810	**EO Index:**	1894
Key Quad:	Penon Blanco Peak (3712063)	**Element Code:**	ARAAD02030
Occurrence Number:	54	**Occurrence Last Updated:**	1996-02-23

Scientific Name: *Emys marmorata*

Common Name: western pond turtle

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

CNDDB Element Ranks: **Global:** G3G4 **State:** S3

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_VU-Vulnerable
USFS_S-Sensitive

General Habitat:

A THOROUGHLY AQUATIC TURTLE OF PONDS, MARSHES, RIVERS, STREAMS & IRRIGATION DITCHES WITH AQUATIC VEGETATION BELOW 6000 FT ELEVATION.

Micro Habitat:

NEED BASKING SITES AND SUITABLE (SANDY BANKS OR GRASSY OPEN FIELDS) UPLAND HABITAT UP TO 0.5 KM FROM WATER FOR EGG-LAYING.

Last Date Observed:	XXXX-XX-XX	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	XXXX-XX-XX	**Occurrence Rank:**	Unknown
Owner/Manager:	UNKNOWN	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

PINEY CREEK, NORTH OF LAKE MCCLURE AND EAST OF DON PEDRO RESERVOIR.

Detailed Location:

Ecological:

Threats:

General:

DFG COLLECTED TURTLES NORTH AND SOUTH OF HIGHWAY 132 ON PINEY CREEK. DATE UNKNOWN.

PLSS:	T02S, R15E, Sec. 4 (M)	**Accuracy:**	specific area	**Area (acres):**	338
UTM:	Zone-10 N4177015 E735075	**Latitude/Longitude:**	37.71025 / -120.33322	**Elevation (feet):**	1,110

County Summary:	**Quad Summary:**
Mariposa	Penon Blanco Peak (3712063)

Sources:

BRA88R0001 BRATTSTROM, B.H. & D.F. MESSER - CURRENT STATUS OF THE SOUTHWESTERN POND TURTLE (CLEMMYS MARMORATA PALLIDA), IN SOUTHERN CALLIFORNIA 1988-XX-XX

HOL88U0002 HOLLAND, D.C. - MUSEUM RECORDS COLLECTED AND COMPILED BY HOLLAND. 1988-03-23

Map Index Number:	59805	**EO Index:**	59841
Key Quad:	Sonora (3712084)	**Element Code:**	ARAAD02030
Occurrence Number:	286	**Occurrence Last Updated:**	2005-02-02

Scientific Name: *Emys marmorata*

Common Name: western pond turtle

Listing Status:	**Federal:**	None	**Rare Plant Rank:**	
	State:	None	**Other Lists:**	BLM_S-Sensitive DFG_SSC-Species of Special Concern IUCN_VU-Vulnerable USFS_S-Sensitive
CNDDB Element Ranks:	**Global:**	G3G4		
	State:	S3		

General Habitat:

A THOROUGHLY AQUATIC TURTLE OF PONDS, MARSHES, RIVERS, STREAMS & IRRIGATION DITCHES WITH AQUATIC VEGETATION BELOW 6000 FT ELEVATION.

Micro Habitat:

NEED BASKING SITES AND SUITABLE (SANDY BANKS OR GRASSY OPEN FIELDS) UPLAND HABITAT UP TO 0.5 KM FROM WATER FOR EGG-LAYING.

Last Date Observed:	2003-04-24	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2003-04-24	**Occurrence Rank:**	Excellent
Owner/Manager:	PVT	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

TABLE MOUNTAIN, 0.7 MILE EAST OF HIGHWAY 120/108, SE OF NEW MELONES RESERVOIR

Detailed Location:

LOCATED WITHIN YOSEMITE ESTATES SUBDIVISION.

Ecological:

HABITAT CONSISTS OF A LARGE, PERENNIAL STOCK POND, WITH MATURE WILLOWS.

Threats:

General:

3 ADULTS, PLUS AN EMPTY CARAPACE WITH FANG MARKS, OBSERVED ON 17 APR 1999. 3 ADULTS OBSERVED ON 24 APR 2003.

PLSS:	T01S, R13E, Sec. 01 (M)	**Accuracy:**	80 meters	**Area (acres):**	0
UTM:	Zone-10 N4195209 E720390	**Latitude/Longitude:**	37.87773 / -120.49413	**Elevation (feet):**	1,250

County Summary:	**Quad Summary:**
Tuolumne	Sonora (3712084)

Sources:

WOO03F0008 WOOD, R. (TUOLUMNE COUNTY) - FIELD SURVEY FORM FOR CLEMMYS MARMORATA 2003-04-24

WOO99F0004 WOOD, ROBIN (TUOLUMNE COUNTY) - FIELD SURVEY FORM FOR CLEMMYS MARMORATA 1999-04-17

Occurrence Report

California Department of Fish and Game

California Natural Diversity Database

Map Index Number:	59807	**EO Index:**	66140
Key Quad:	Sonora (3712084)	**Element Code:**	ARACF12100
Occurrence Number:	647	**Occurrence Last Updated:**	2006-08-24

Scientific Name: *Phrynosoma blainvillii*

Common Name: coast horned lizard

Listing Status: **Federal:** None **State:** None

Rare Plant Rank:

CNDDB Element Ranks: **Global:** G4G5 **State:** S3S4

Other Lists: BLM_S-Sensitive
DFG_SSC-Species of Special Concern
IUCN_LC-Least Concern
USFS_S-Sensitive

General Habitat:

FREQUENTS A WIDE VARIETY OF HABITATS, MOST COMMON IN LOWLANDS ALONG SANDY WASHES WITH SCATTERED LOW BUSHES.

Micro Habitat:

OPEN AREAS FOR SUNNING, BUSHES FOR COVER, PATCHES OF LOOSE SOIL FOR BURIAL, & ABUNDANT SUPPLY OF ANTS & OTHER INSECTS.

Last Date Observed:	2001-04-16	**Occurrence Type:**	Natural/Native occurrence
Last Survey Date:	2001-04-16	**Occurrence Rank:**	Good
Owner/Manager:	PVT	**Trend:**	Unknown
Presence:	Presumed Extant		

Location:

SOUTH OF TABLE MOUNTAIN, ABOUT 1 MILE SOUTH OF YOSEMITE JUNCTION.

Detailed Location:

MAPPED IN NE 1/4 OF SW 1/4 OF SEC 1 AS PER SOURCE. NORTH SIDE OF RESERVOIR ON LOT 19 OF YOSEMITE ESTATES SUBDIVISION.

Ecological:

GRASSLAND.

Threats:

GRAZING, SUBDIVISION.

General:

1 ADULT OBSERVED ON 16 APR 2001.

PLSS:	T01S, R13E, Sec. 01 (M)	**Accuracy:**	nonspecific area	**Area (acres):**	48
UTM:	Zone-10 N4195179 E720510	**Latitude/Longitude:**	37.87743 / -120.49278	**Elevation (feet):**	1,320

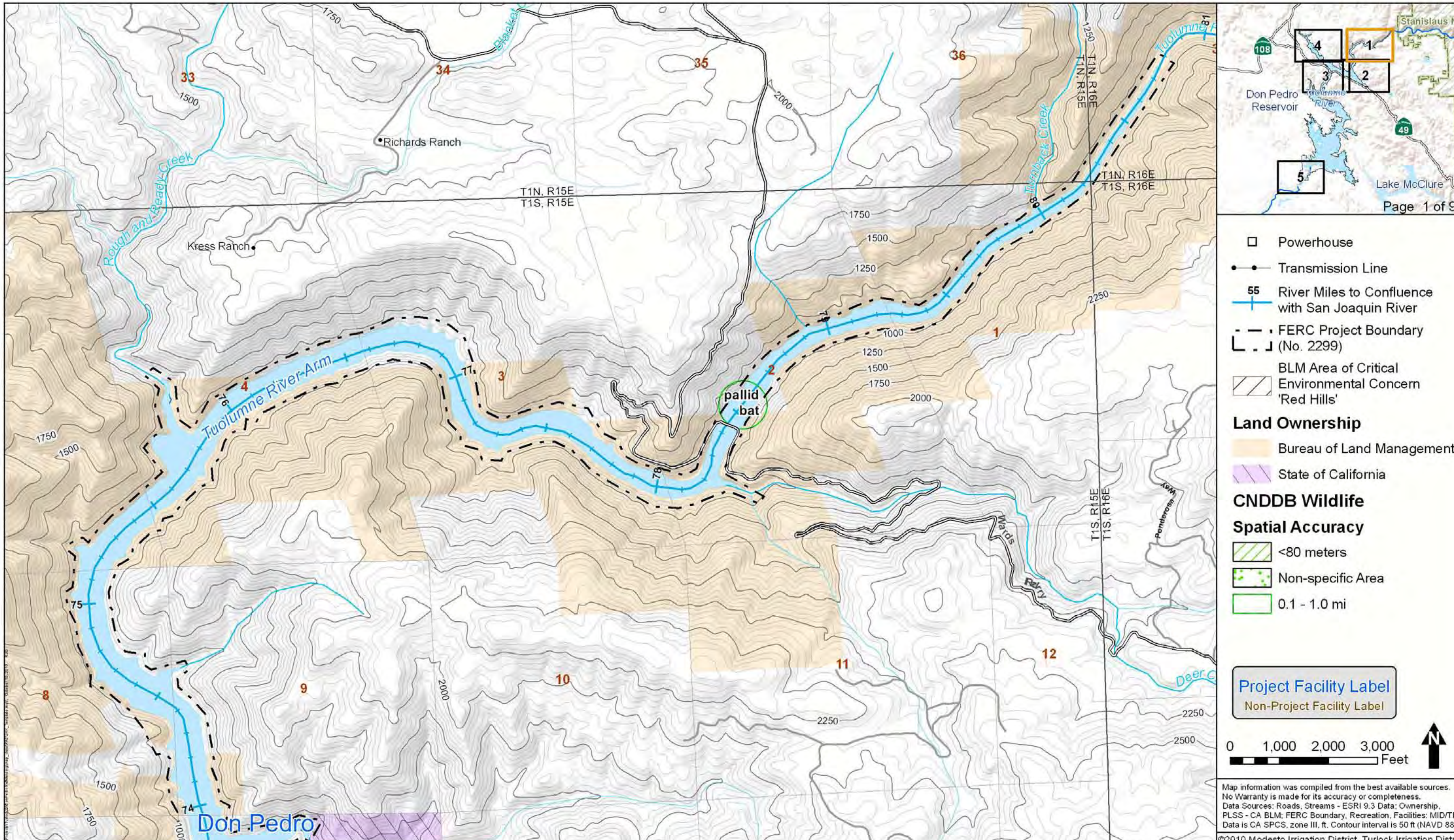
County Summary:	**Quad Summary:**
Tuolumne	Sonora (3712084)

Sources:

WOO01F0001 WOOD, R. - FIELD SURVEY FORM FOR PHRYNOSOMA CORONATUM (FRONTALE POPULATION) 2001-04-16

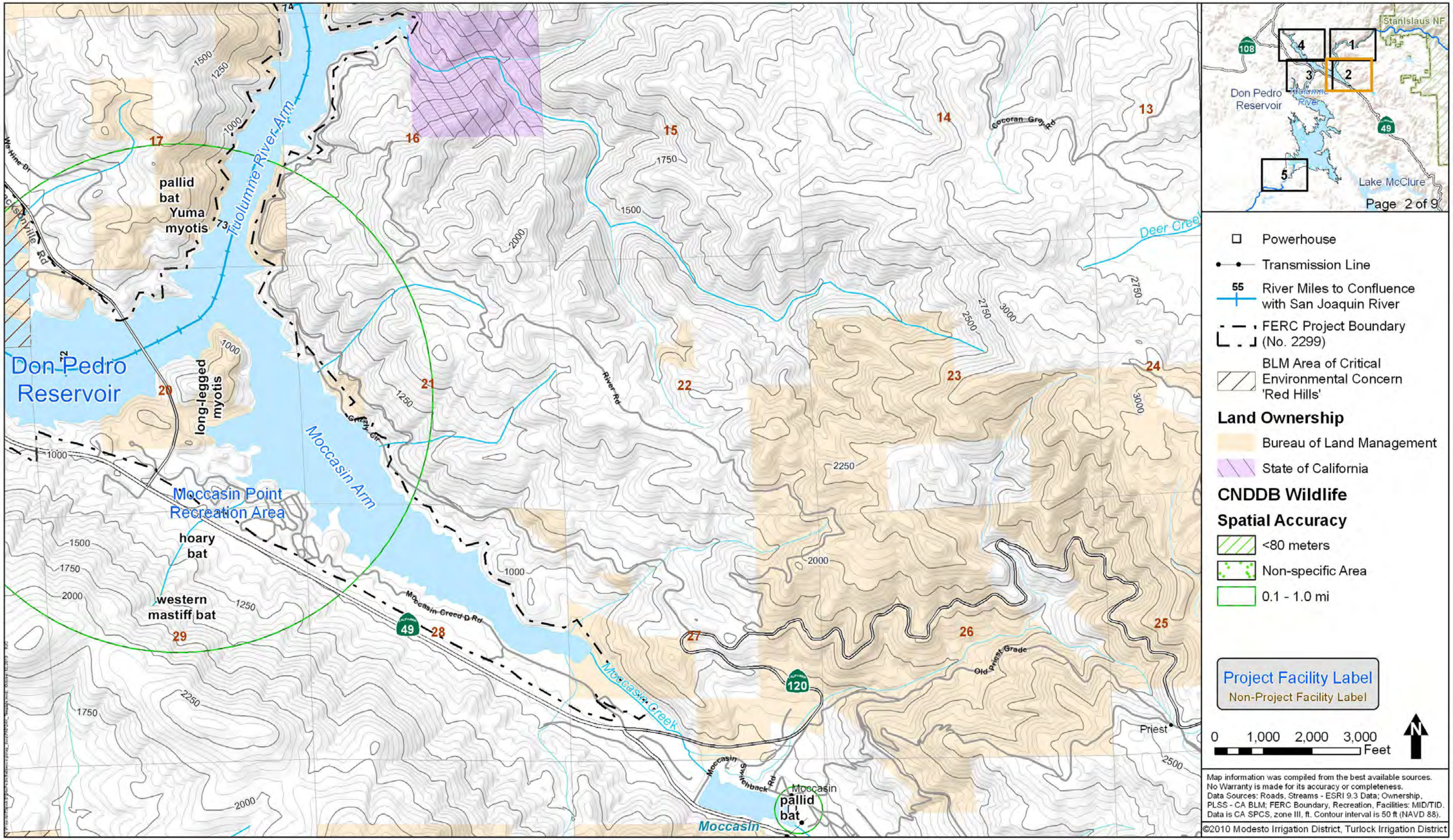
ATTACHMENT 5.4.1-2

CNDDB WILDLIFE MAPS

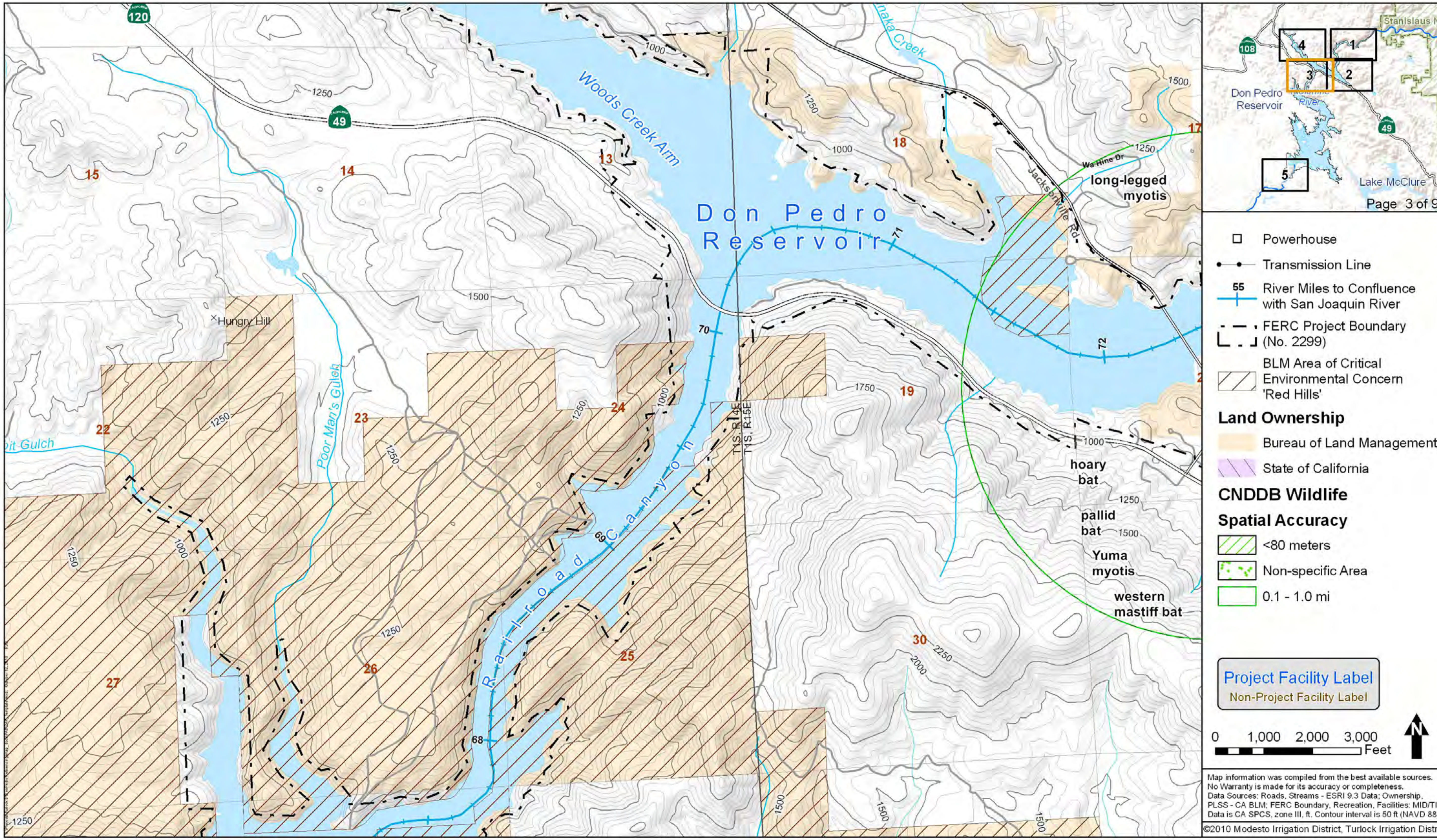


Tuolumne River Arm
Don Pedro
pallid bat
Richards Ranch
Kress Ranch
Rough and Ready Creek
Tuolumne River
Deer Creek
Wards Ferry
Ponderosa Way
T1N, R15E
T1S, R15E
T1N, R16E
T1S, R16E
T1N, R15E
T1N, R16E
T1S, R15E
T1S, R16E
Stanislaus NF
Don Pedro Reservoir
Lake McClure
Page 1 of 9
Powerhouse
Transmission Line
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
BLM Area of Critical Environmental Concern 'Red Hills'
Land Ownership
Bureau of Land Management
State of California
CNDDB Wildlife
Spatial Accuracy
<80 meters
Non-specific Area
0.1 - 1.0 mi
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID. Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

Page 1 of 5

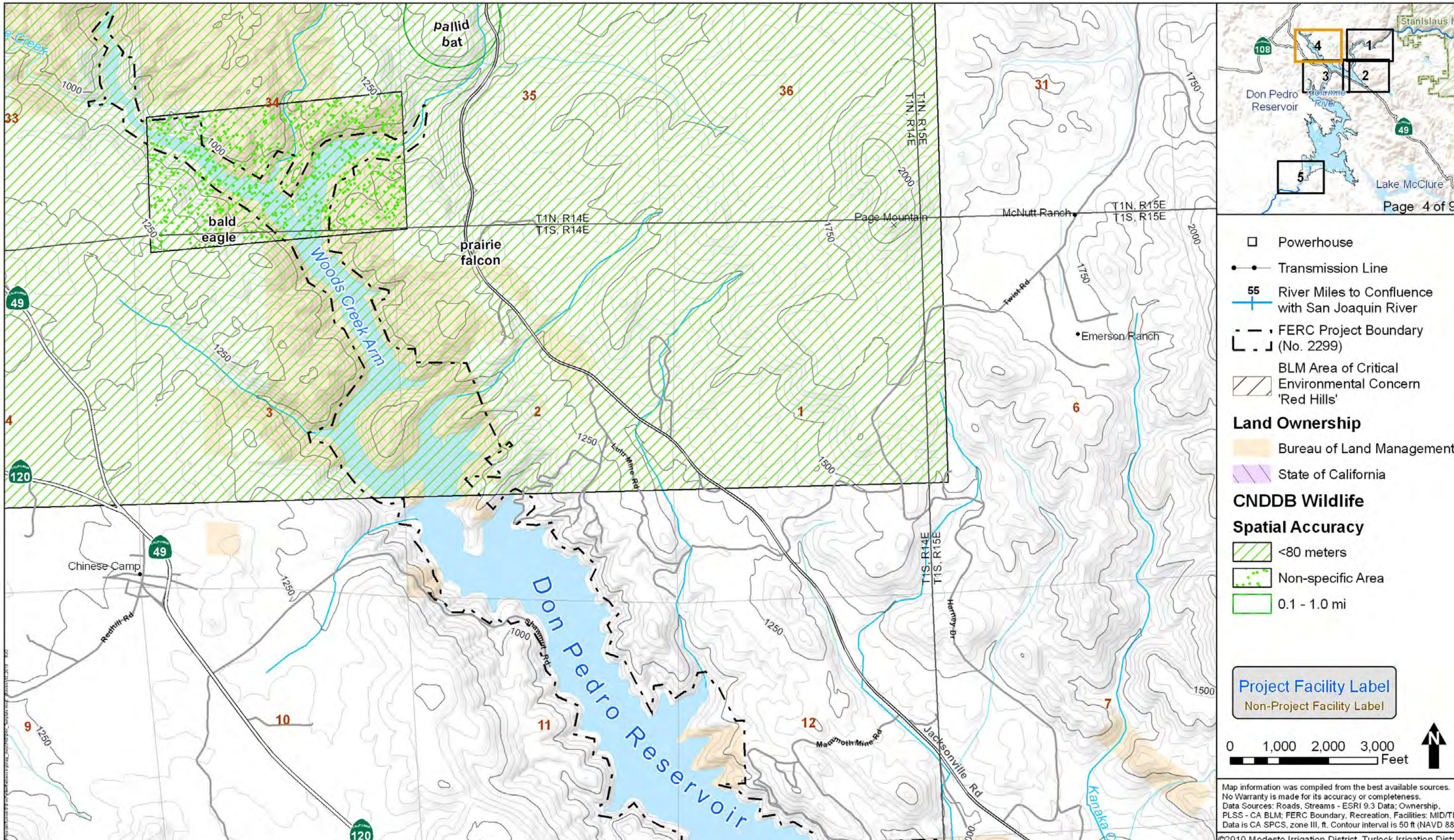

Don Pedro Reservoir
Tuolumne River Arm
Moccasin Arm
Moccasin Point Recreation Area
pallid bat
Yuma myotis
long-legged myotis
hoary bat
western mastiff bat
pallid bat
Moccasin Creek
Moccasin
Deer Creek
River Rd
Cocoran Grey Rd
Old Priest Grade
Moccasin Creek D Rd
Priest
Stanislaus NF
Don Pedro Reservoir
Lake McClure
Page 2 of 9
Powerhouse
Transmission Line
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
BLM Area of Critical Environmental Concern 'Red Hills'
Land Ownership
Bureau of Land Management
State of California
CNDDB Wildlife
Spatial Accuracy
<80 meters
Non-specific Area
0.1 - 1.0 mi
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID. Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

Page 2 of 5

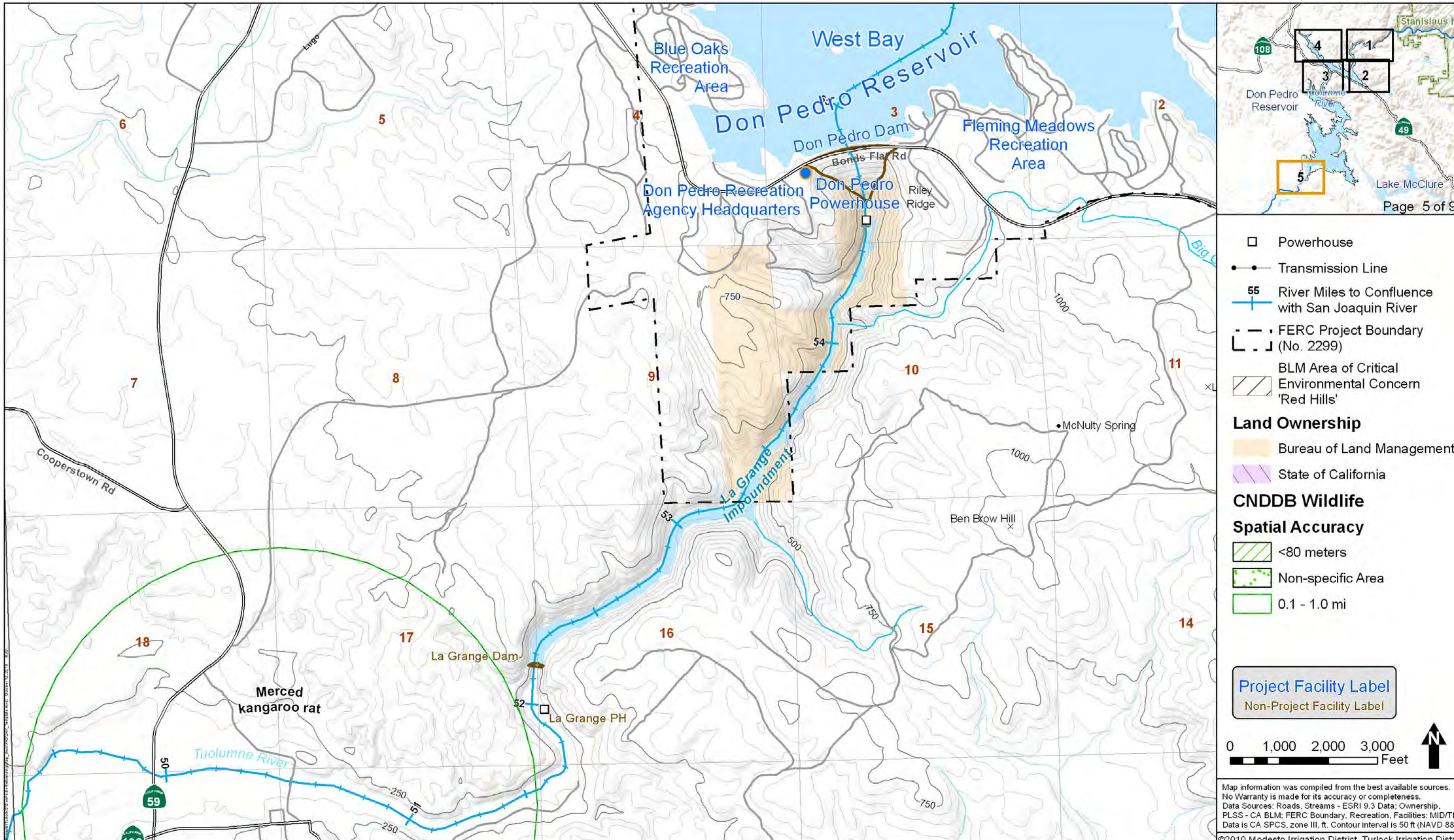


Don Pedro Reservoir
Woods Creek Arm
Railroad Canyon
Poor Man's Gulch
Hungry Hill
Jacksonville Rd
Wa Hine Dr
long-legged myotis
hoary bat
pallid bat
Yuma myotis
western mastiff bat
Don Pedro Reservoir
Lake McClure
Stanislaus NF
Page 3 of 9
Powerhouse
Transmission Line
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
BLM Area of Critical Environmental Concern 'Red Hills'
Land Ownership
Bureau of Land Management
State of California
CNDDB Wildlife
Spatial Accuracy
<80 meters
Non-specific Area
0.1 - 1.0 mi
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

Page 3 of 5

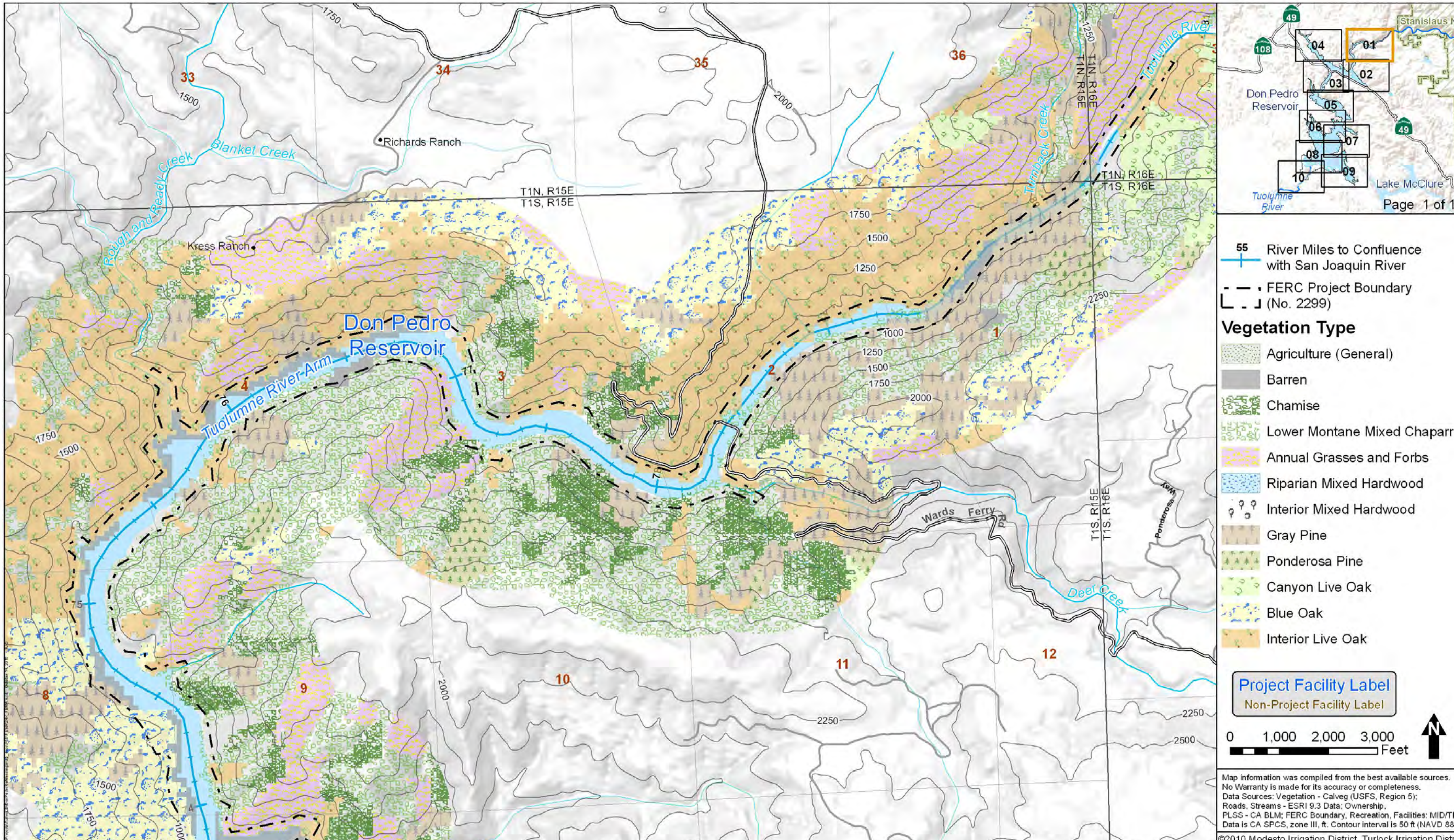


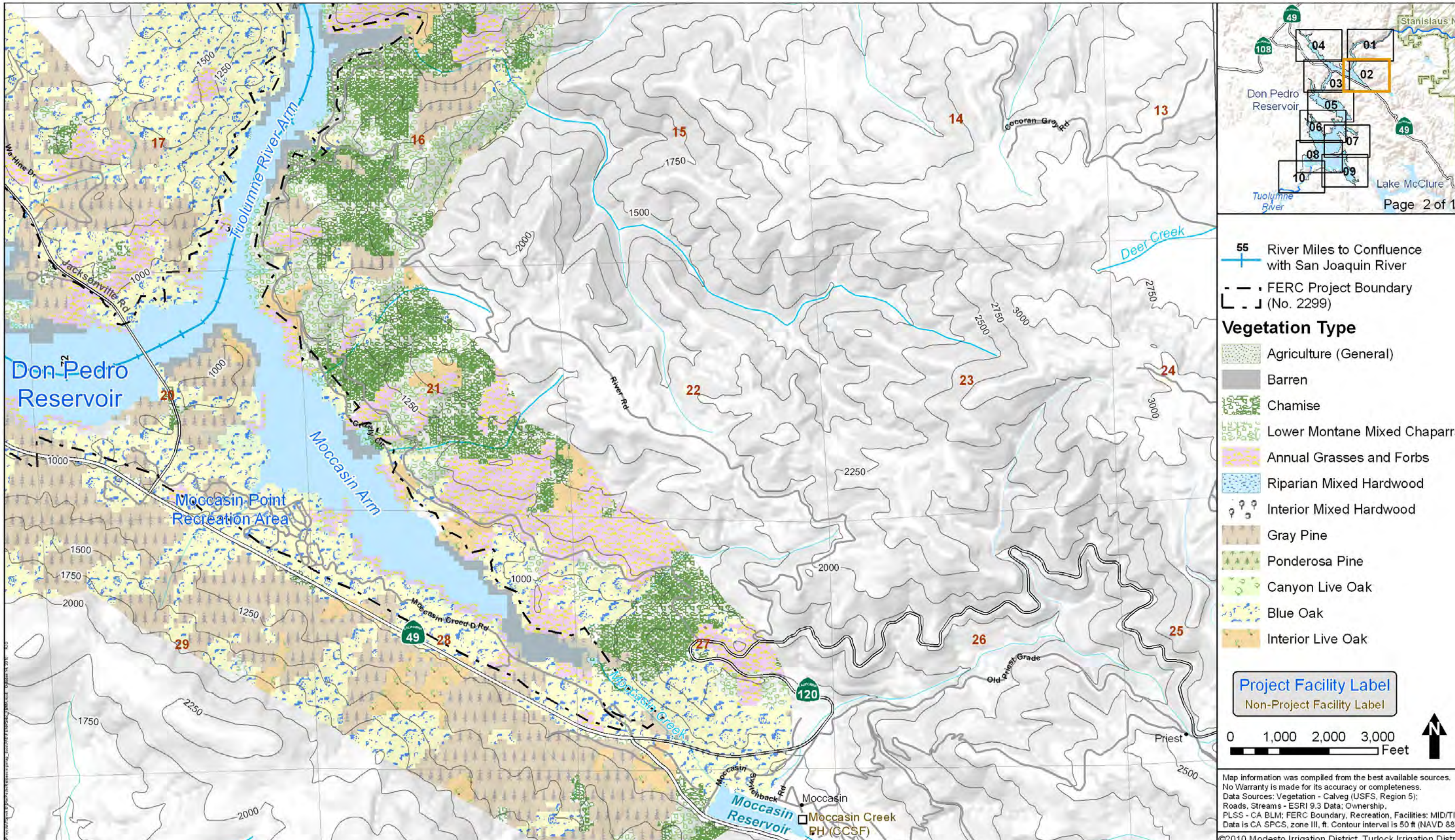
pallid bat
bald eagle
prairie falcon
Woods Creek Arm
Don Pedro Reservoir
Chinese Camp
McNutt Ranch
Emerson Ranch
Page Mountain
T1N, R14E
T1S, R14E
T1N, R15E
T1S, R15E
Stanislaus NF
Don Pedro Reservoir
Lake McClure
Page 4 of 9
Powerhouse
Transmission Line
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
BLM Area of Critical Environmental Concern 'Red Hills'
Land Ownership
Bureau of Land Management
State of California
CNDDB Wildlife
Spatial Accuracy
<80 meters
Non-specific Area
0.1 - 1.0 mi
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID. Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

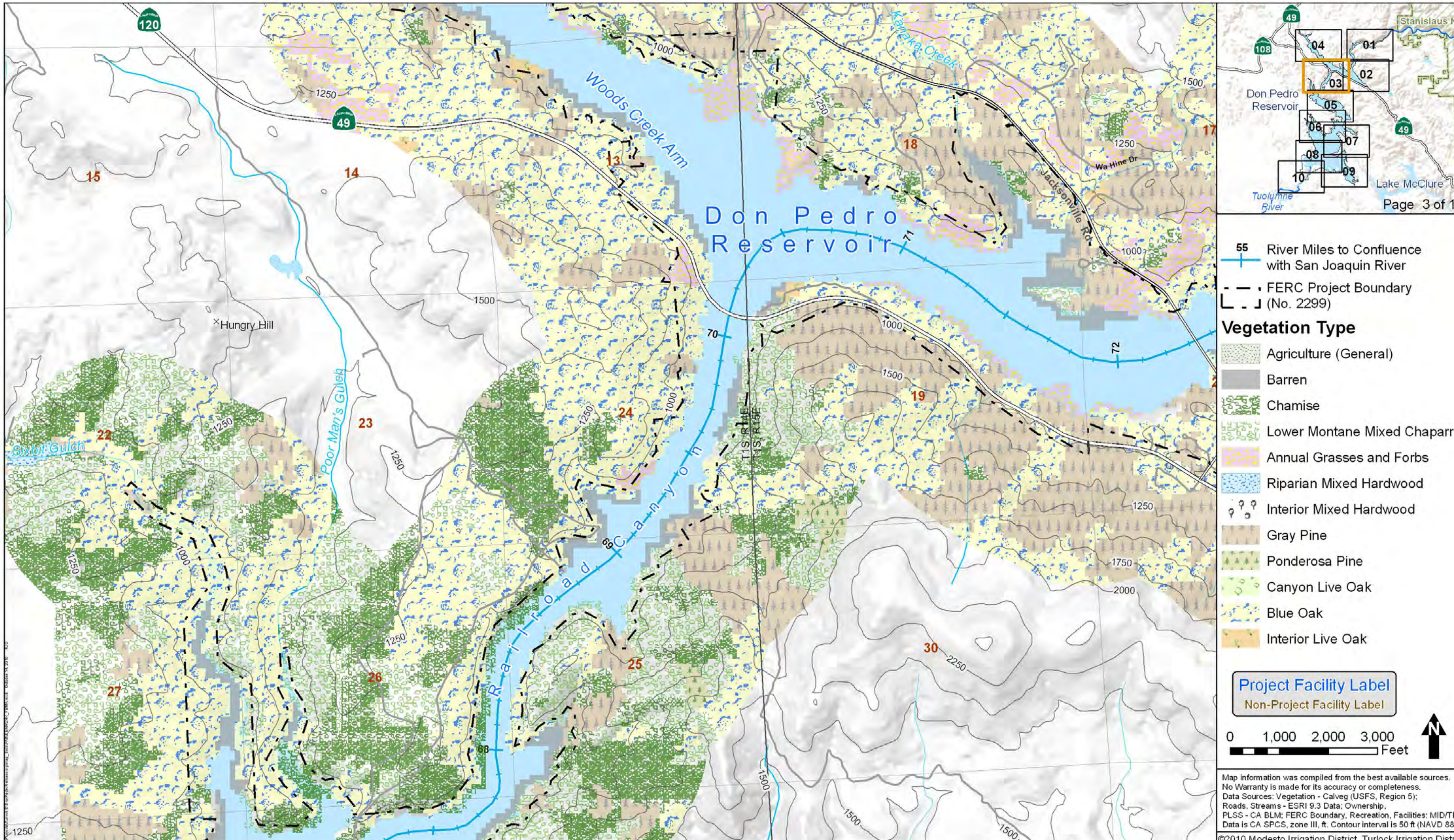

West Bay
Don Pedro Reservoir
Blue Oaks Recreation Area
Don Pedro Dam
Bonds Flat Rd
Fleming Meadows Recreation Area
Don Pedro Recreation Agency Headquarters
Don Pedro Powerhouse
Riley Ridge
La Grange Impoundment
McNulty Spring
Ben Brow Hill
Cooperstown Rd
La Grange Dam
La Grange PH
Merced kangaroo rat
Tuolumne River
Stanislaus NF
Don Pedro Reservoir
Lake McClure
Page 5 of 9
Powerhouse
Transmission Line
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
BLM Area of Critical Environmental Concern 'Red Hills'
Land Ownership
Bureau of Land Management
State of California
CNDDB Wildlife
Spatial Accuracy
<80 meters
Non-specific Area
0.1 - 1.0 mi
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID. Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

ATTACHMENT 5.4.2-1

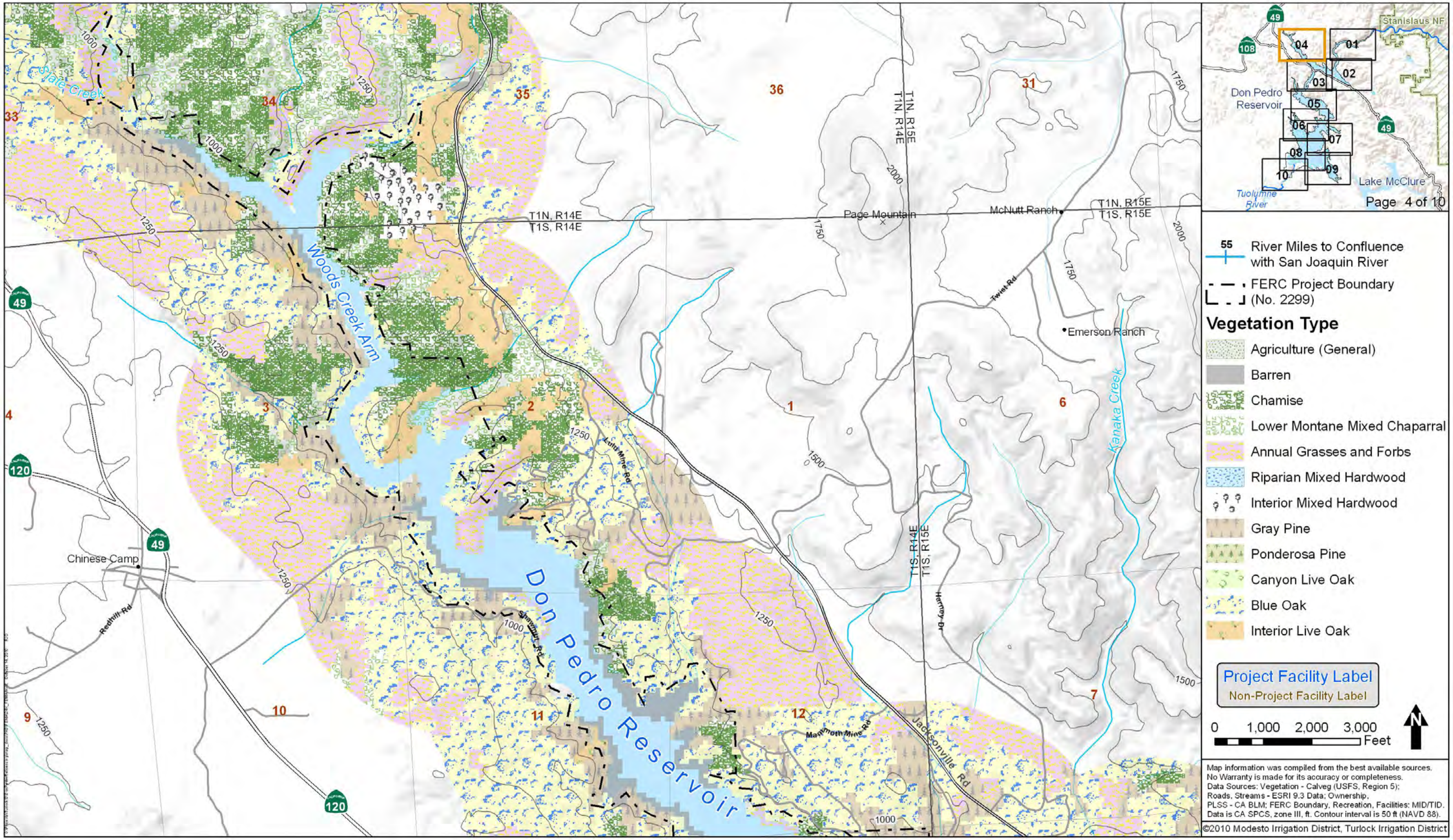
CALVEG MAPS

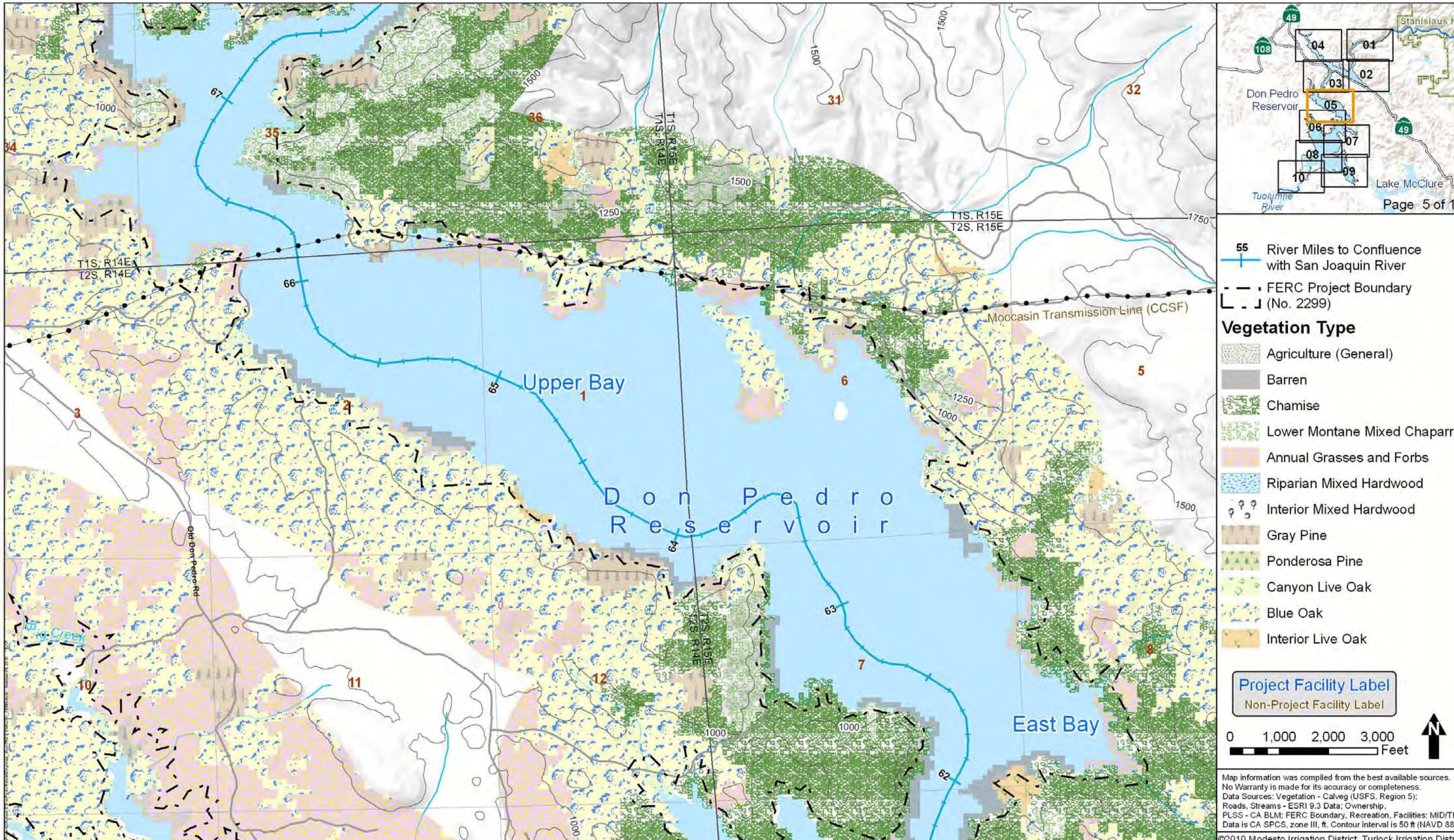

Don Pedro Reservoir
Tuolumne River Arm
Tuolumne River
Blanket Creek
Rough and Ready Creek
Turnback Creek
Deer Creek
Wards Ferry Rd
Richards Ranch
Kress Ranch
T1N, R15E
T1S, R15E
T1N, R16E
T1S, R16E
Don Pedro Reservoir
Lake McClure
Stanislaus NF
Page 1 of 10
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
Vegetation Type
Agriculture (General)
Barren
Chamise
Lower Montane Mixed Chaparral
Annual Grasses and Forbs
Riparian Mixed Hardwood
Interior Mixed Hardwood
Gray Pine
Ponderosa Pine
Canyon Live Oak
Blue Oak
Interior Live Oak
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Vegetation - Calveg (USFS, Region 5);
Roads, Streams - ESRI 9.3 Data; Ownership,
PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

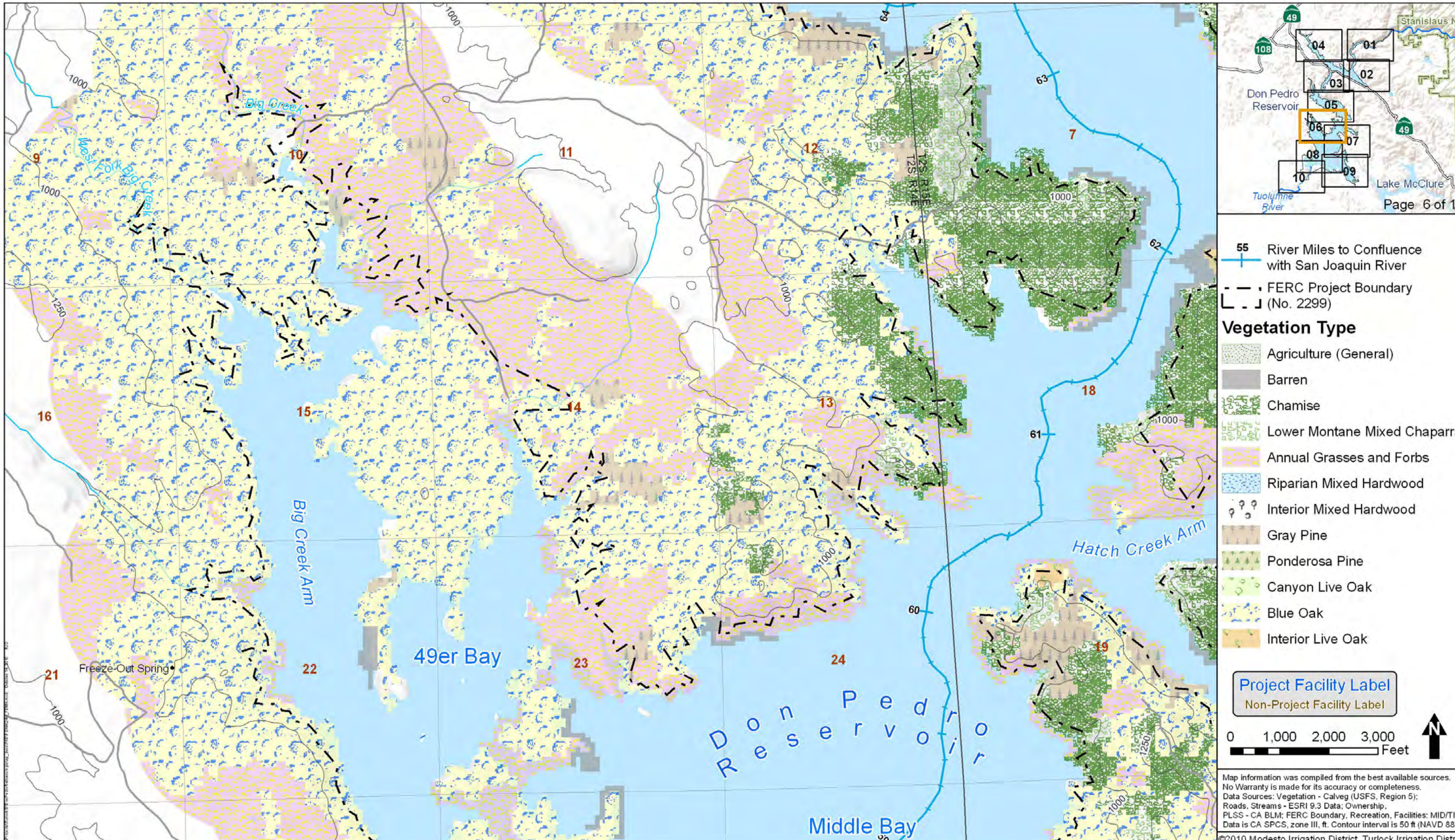

Don Pedro Reservoir
Tuolumne River Arm
Moccasin Arm
Moccasin Point Recreation Area
Moccasin Creek
Moccasin Reservoir
Moccasin Creek PH (CCSF)
Moccasin
Priest
Deer Creek
Jacksonville Rd
River Rd
Old Priest Grade
Moccasin Creek D Rd
49
120
Stanislaus NF
Don Pedro Reservoir
Lake McClure
Tuolumne River
Page 2 of 10
55 River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
Vegetation Type
Agriculture (General)
Barren
Chamise
Lower Montane Mixed Chaparral
Annual Grasses and Forbs
Riparian Mixed Hardwood
Interior Mixed Hardwood
Gray Pine
Ponderosa Pine
Canyon Live Oak
Blue Oak
Interior Live Oak
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Vegetation - Calveg (USFS, Region 5);
Roads, Streams - ESRI 9.3 Data; Ownership,
PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

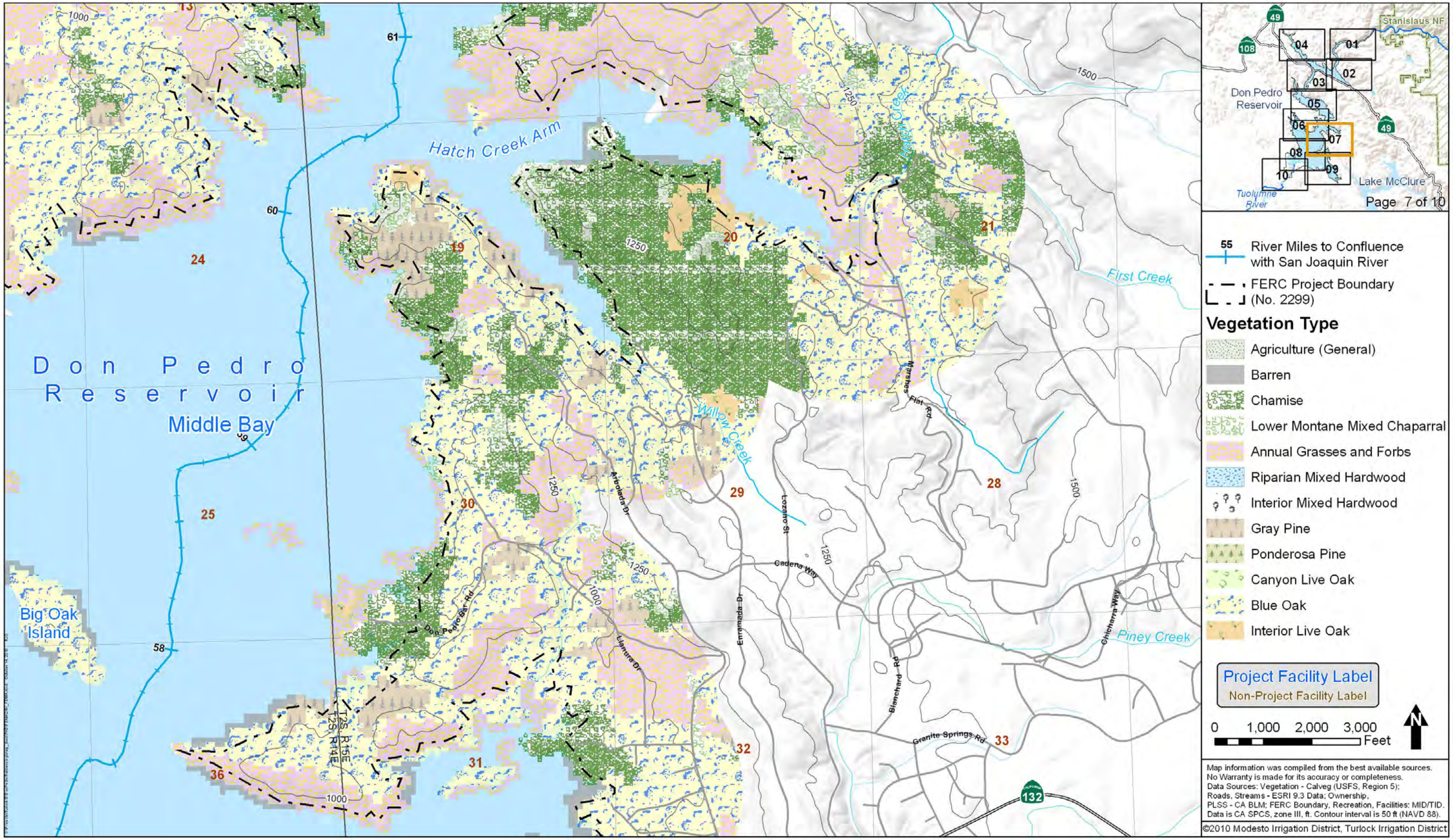


Don Pedro Reservoir
Woods Creek Arm
Kanaka Creek
Railroad Canyon
Jacksonville Rd
Wa Hine Dr
Hungry Hill
Poor Man's Gulch
Sixbit Gulch
Stanislaus NF
Don Pedro Reservoir
Lake McClure
Tuolumne River
Page 3 of 10
55 River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
Vegetation Type
Agriculture (General)
Barren
Chamise
Lower Montane Mixed Chaparral
Annual Grasses and Forbs
Riparian Mixed Hardwood
Interior Mixed Hardwood
Gray Pine
Ponderosa Pine
Canyon Live Oak
Blue Oak
Interior Live Oak
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Vegetation - Calveg (USFS, Region 5);
Roads, Streams - ESRI 9.3 Data; Ownership,
PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District


Stanislaus NF
Don Pedro Reservoir
Lake McClure
Tuolumne River
Page 4 of 10
55 River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
Vegetation Type
Agriculture (General)
Barren
Chamise
Lower Montane Mixed Chaparral
Annual Grasses and Forbs
Riparian Mixed Hardwood
Interior Mixed Hardwood
Gray Pine
Ponderosa Pine
Canyon Live Oak
Blue Oak
Interior Live Oak
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Vegetation - Calveg (USFS, Region 5);
Roads, Streams - ESRI 9.3 Data; Ownership,
PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District
Woods Creek Arm
Don Pedro Reservoir
Page Mountain
McNutt Ranch
Emerson Ranch
Chinese Camp
Kanaka Creek
T1N, R14E
T1S, R14E
T1N, R15E
T1S, R15E
Jacksonville Rd
Redhill Rd
Twist Rd
Mammoth Mine Rd

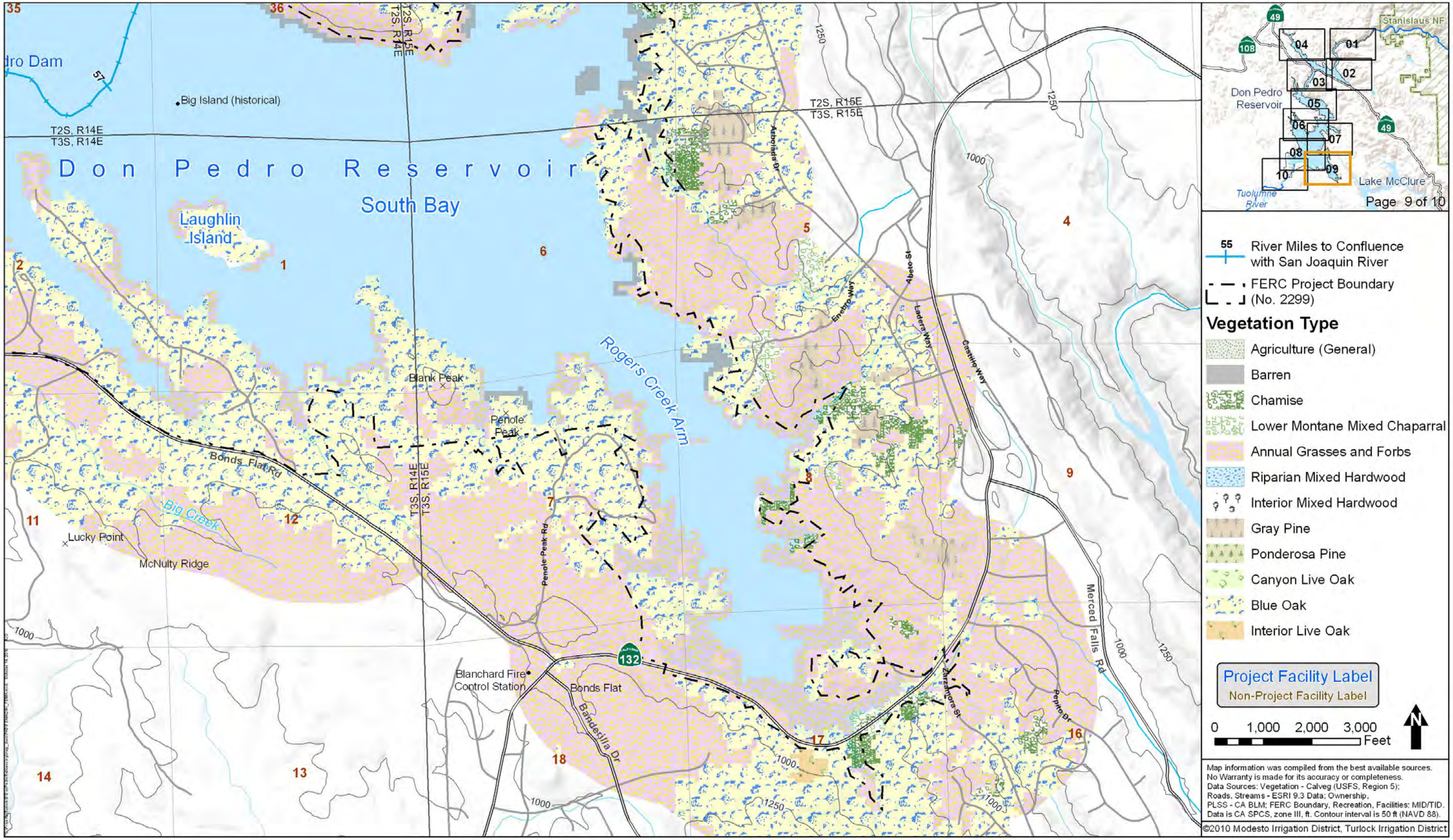

Upper Bay
Don Pedro Reservoir
East Bay
Moccasin Transmission Line (CCSF)
Old Don Pedro Rd
T1S, R14E
T2S, R14E
T1S, R15E
T2S, R15E
Don Pedro Reservoir
Lake McClure
Tuolumne River
Stanislaus NF
Page 5 of 10
55 River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
Vegetation Type
Agriculture (General)
Barren
Chamise
Lower Montane Mixed Chaparral
Annual Grasses and Forbs
Riparian Mixed Hardwood
Interior Mixed Hardwood
Gray Pine
Ponderosa Pine
Canyon Live Oak
Blue Oak
Interior Live Oak
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Vegetation - Calveg (USFS, Region 5);
Roads, Streams - ESRI 9.3 Data; Ownership,
PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

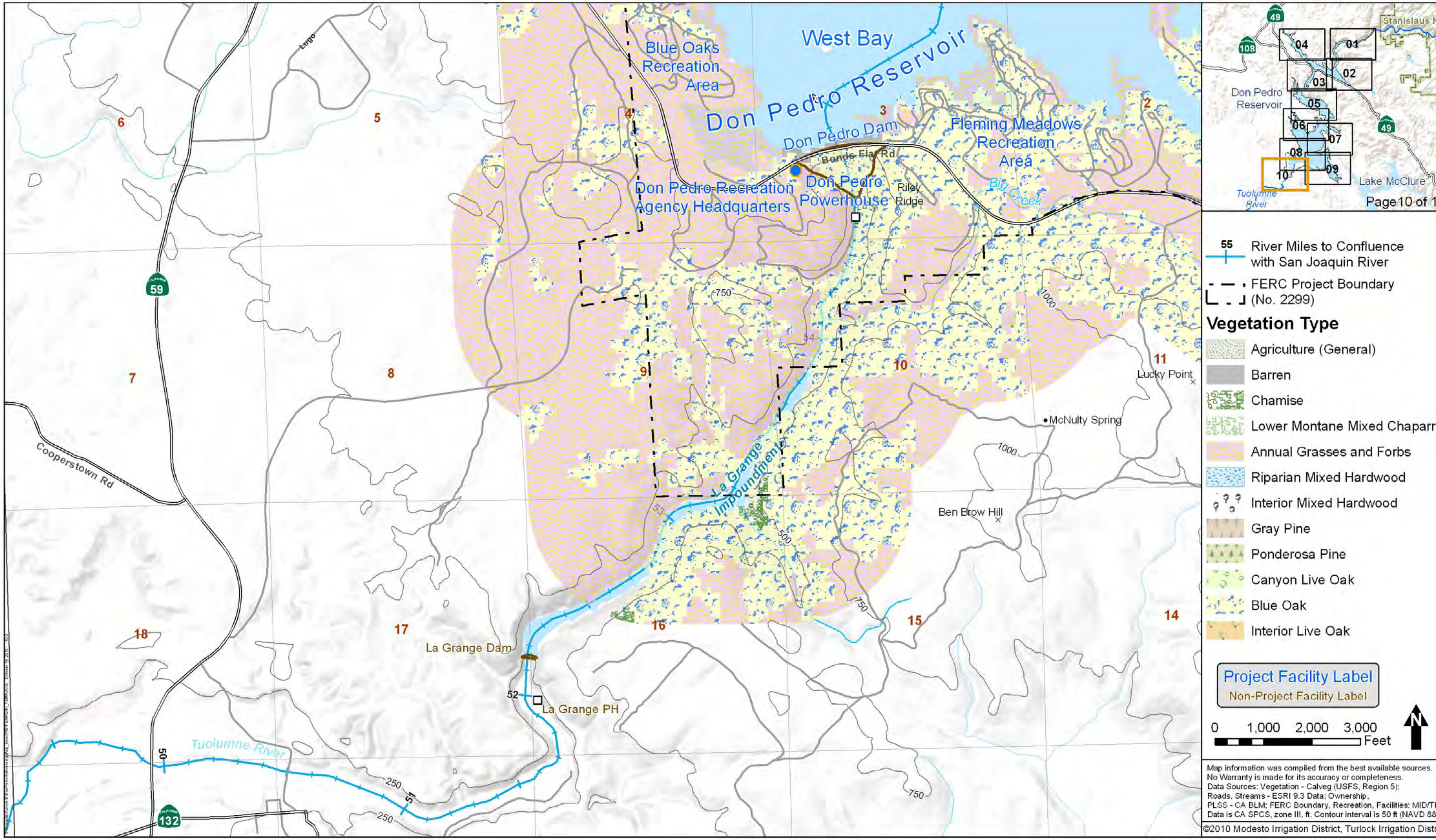

Big Creek
West Fork Big Creek
Big Creek Arm
49er Bay
Freeze-Out Spring
Don Pedro Reservoir
Middle Bay
Hatch Creek Arm
T2S R15E
T2S R14E
9
10
11
12
7
13
14
15
16
18
19
21
22
23
24
63
62
61
60
59
64
1000
1250
Stanislaus NF
Don Pedro Reservoir
Lake McClure
Tuolumne River
108
49
04
01
02
03
05
06
07
08
09
10
Page 6 of 10
55
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
Vegetation Type
Agriculture (General)
Barren
Chamise
Lower Montane Mixed Chaparral
Annual Grasses and Forbs
Riparian Mixed Hardwood
Interior Mixed Hardwood
Gray Pine
Ponderosa Pine
Canyon Live Oak
Blue Oak
Interior Live Oak
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000
Feet
N
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Vegetation - Calveg (USFS, Region 5);
Roads, Streams - ESRI 9.3 Data; Ownership,
PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District



Hatch Creek Arm
Don Pedro Reservoir
Middle Bay
Big Oak Island
Hatch Creek
First Creek
Willow Creek
Piney Creek
Don Pedro Reservoir
Stanislaus NF
Lake McClure
Tuolumne River
Page 7 of 10
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
Vegetation Type
Agriculture (General)
Barren
Chamise
Lower Montane Mixed Chaparral
Annual Grasses and Forbs
Riparian Mixed Hardwood
Interior Mixed Hardwood
Gray Pine
Ponderosa Pine
Canyon Live Oak
Blue Oak
Interior Live Oak
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Vegetation - Calveg (USFS, Region 5);
Roads, Streams - ESRI 9.3 Data; Ownership,
PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

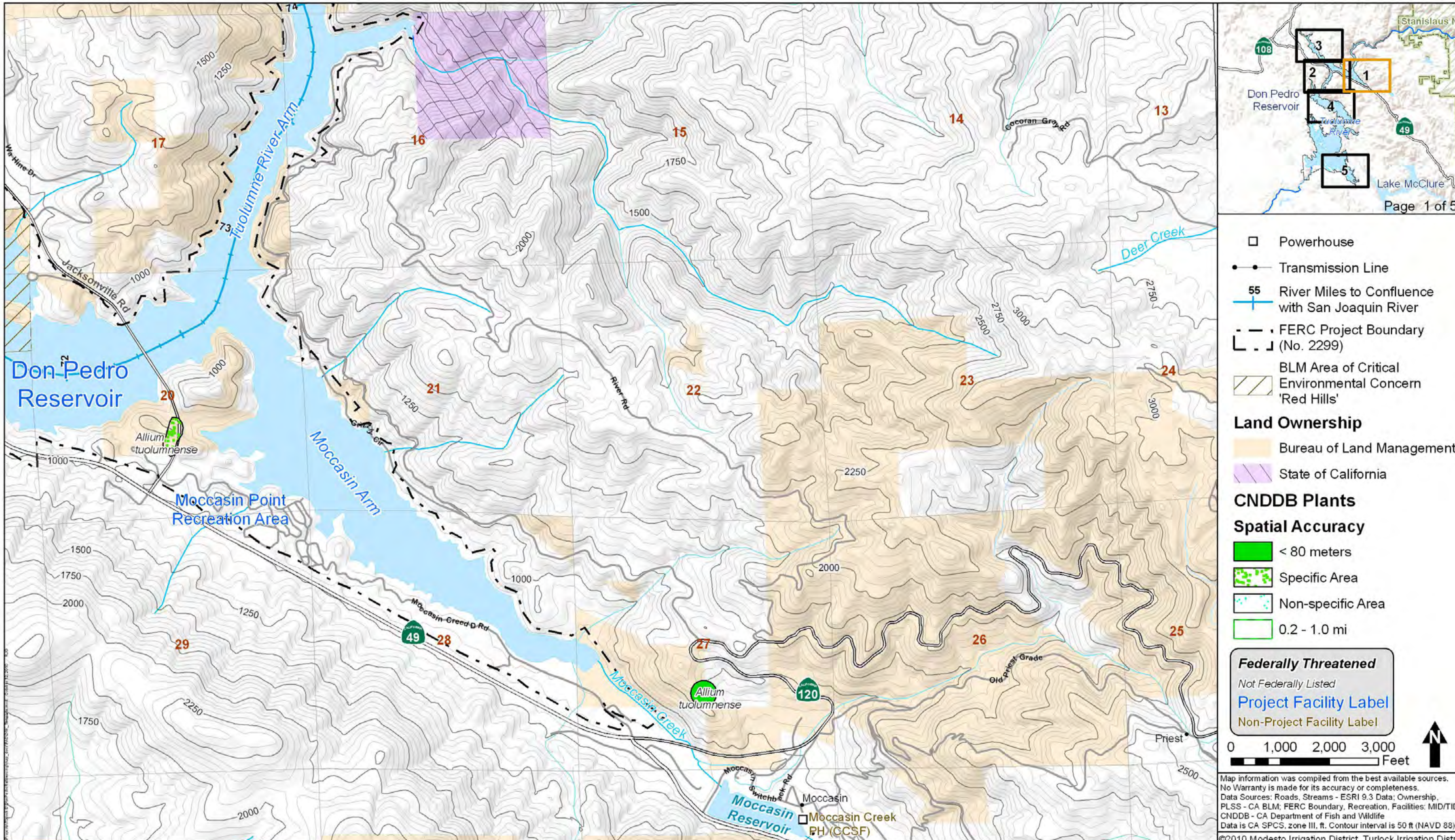
Middle Bay
Mine Island
North Bay
Eagle Island (historical)
Big Oak Island
Don Pedro Rd
Don Pedro Camp (historical)
Buzzard Point
Old Don Pedro Dam
Big Island (historical)
Don Pedro Reservoir
West Bay
South Bay
Laughlin Island
Blue Oaks Recreation Area
Fleming Meadows Recreation Area
Don Pedro Dam
Bonds Flat Rd
Riley Ridge
Don Pedro Recreation Agency Headquarters
Don Pedro Powerhouse
La Grange Impoundment
Big Creek
Blank Peak
Penole Peak
T2S, R14E
T3S, R14E
T2S, R15E
T3S, R15E
Don Pedro Reservoir
Stanislaus NF
Lake McClure
Tuolumne River
Page 8 of 10
55 River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
Vegetation Type
Agriculture (General)
Barren
Chamise
Lower Montane Mixed Chaparral
Annual Grasses and Forbs
Riparian Mixed Hardwood
Interior Mixed Hardwood
Gray Pine
Ponderosa Pine
Canyon Live Oak
Blue Oak
Interior Live Oak
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Vegetation - Calveg (USFS, Region 5);
Roads, Streams - ESRI 9.3 Data; Ownership,
PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

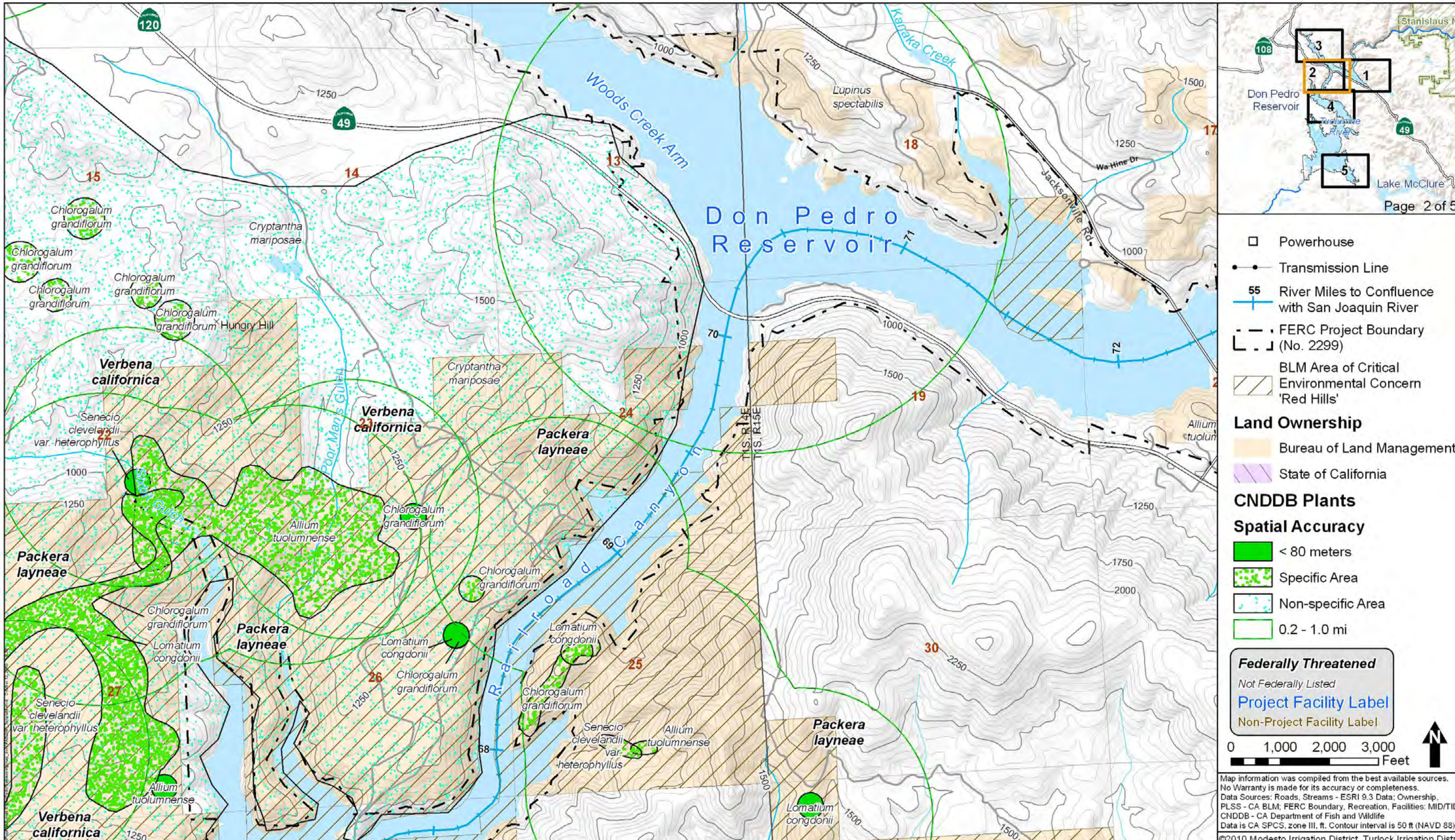

Don Pedro Reservoir
South Bay
Laughlin Island
Big Island (historical)
Rogers Creek Arm
Blank Peak
Penole Peak
Bonds Flat Rd
Big Creek
Lucky Point
McNulty Ridge
Blanchard Fire Control Station
Bonds Flat
Merced Falls Rd
T2S, R14E
T3S, R14E
T2S, R15E
T3S, R15E
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
Vegetation Type
Agriculture (General)
Barren
Chamise
Lower Montane Mixed Chaparral
Annual Grasses and Forbs
Riparian Mixed Hardwood
Interior Mixed Hardwood
Gray Pine
Ponderosa Pine
Canyon Live Oak
Blue Oak
Interior Live Oak
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
Page 9 of 10
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Vegetation - Calveg (USFS, Region 5);
Roads, Streams - ESRI 9.3 Data; Ownership,
PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

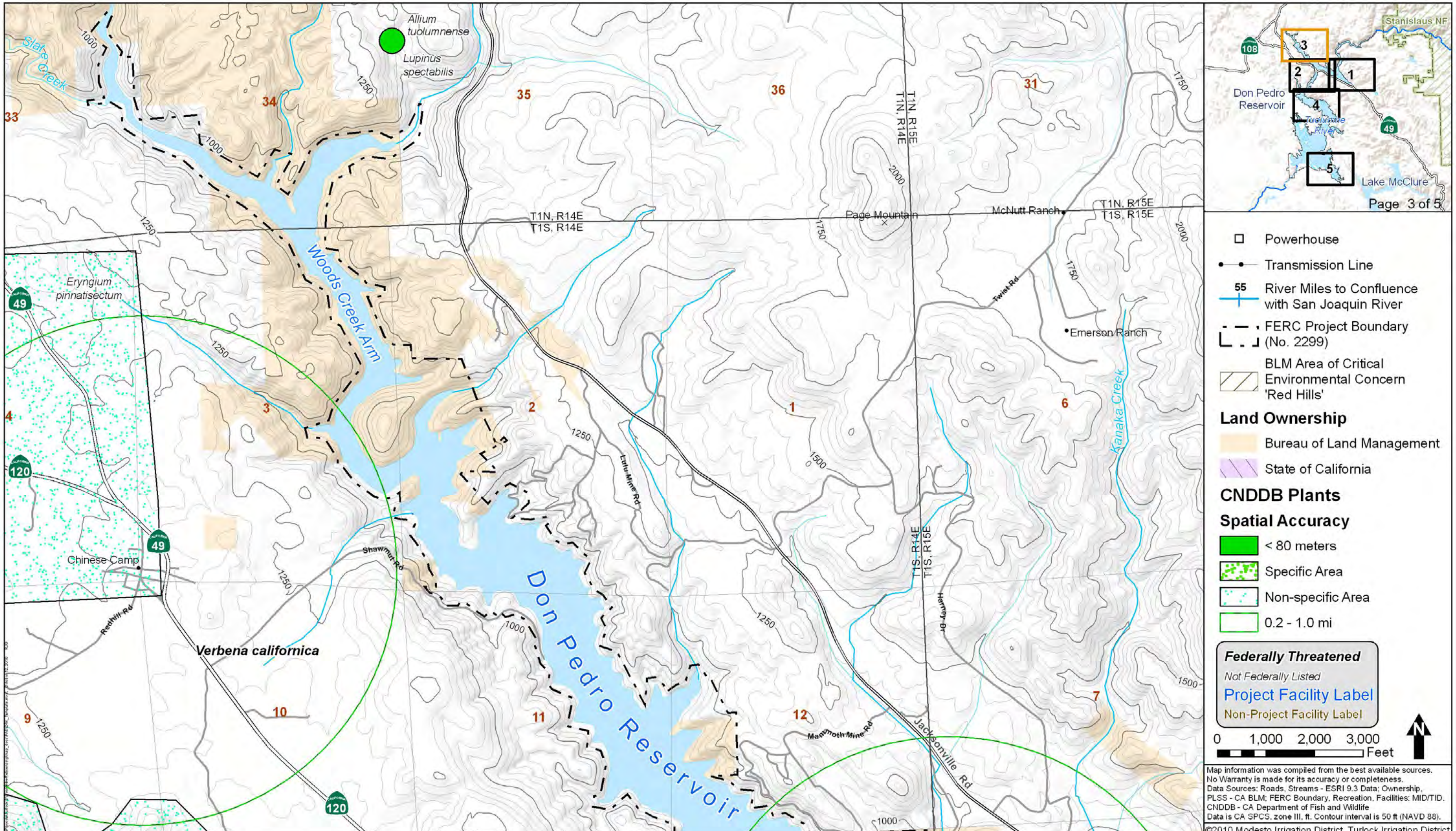

West Bay
Don Pedro Reservoir
Blue Oaks Recreation Area
Don Pedro Dam
Bonds Flat Rd
Fleming Meadows Recreation Area
Don Pedro Recreation Agency Headquarters
Don Pedro Powerhouse
Riley Ridge
Big Creek
La Grange Impoundment
La Grange Dam
La Grange PH
Tuolumne River
Cooperstown Rd
Lucky Point
McNulty Spring
Ben Brow Hill
Stanislaus NF
Don Pedro Reservoir
Lake McClure
Tuolumne River
Page 10 of 10
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
Vegetation Type
Agriculture (General)
Barren
Chamise
Lower Montane Mixed Chaparral
Annual Grasses and Forbs
Riparian Mixed Hardwood
Interior Mixed Hardwood
Gray Pine
Ponderosa Pine
Canyon Live Oak
Blue Oak
Interior Live Oak
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness.
Data Sources: Vegetation - Calveg (USFS, Region 5); Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

ATTACHMENT 5.4.2-2

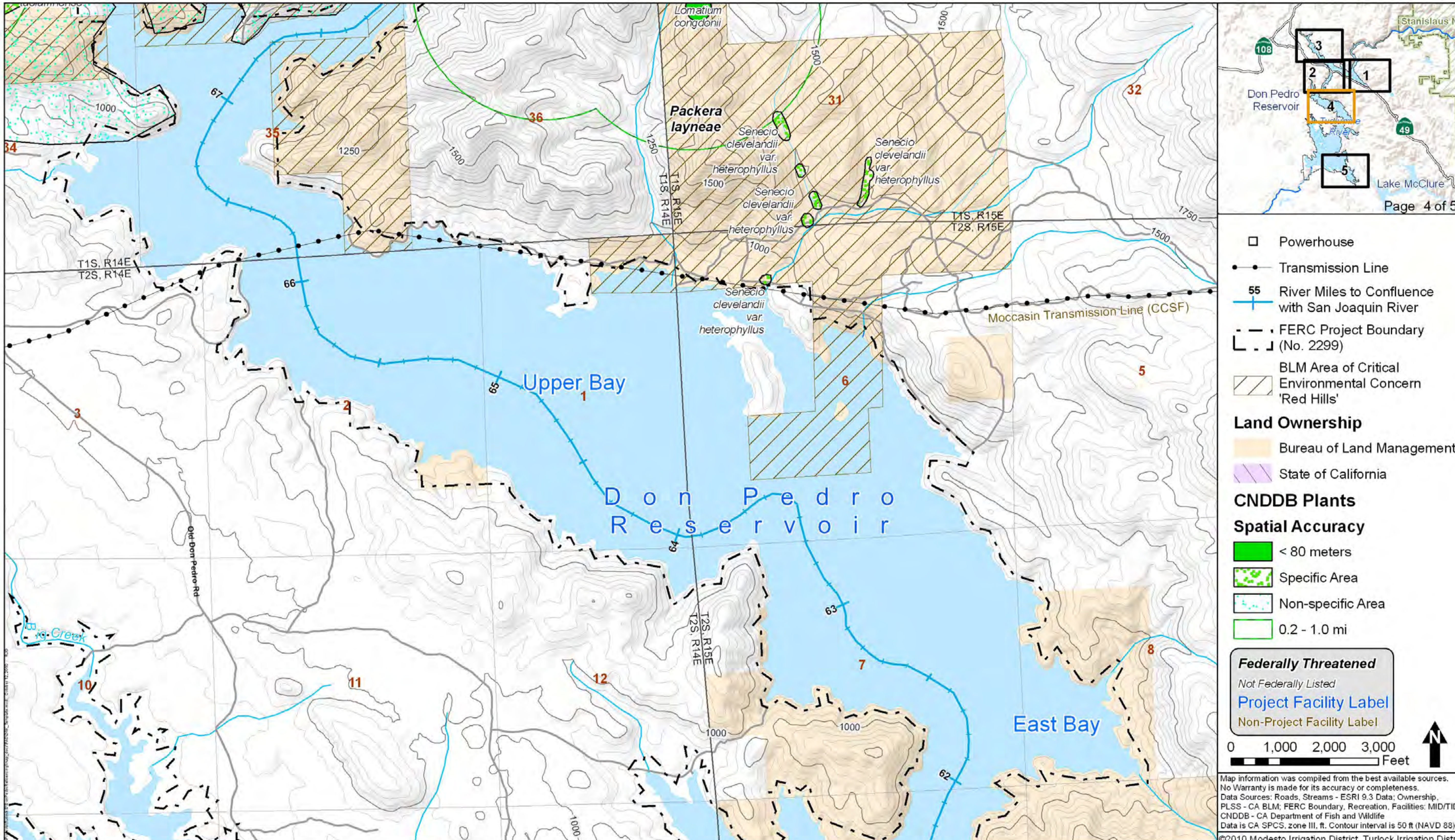
CNDDB PLANT OCCURRENCE MAPS

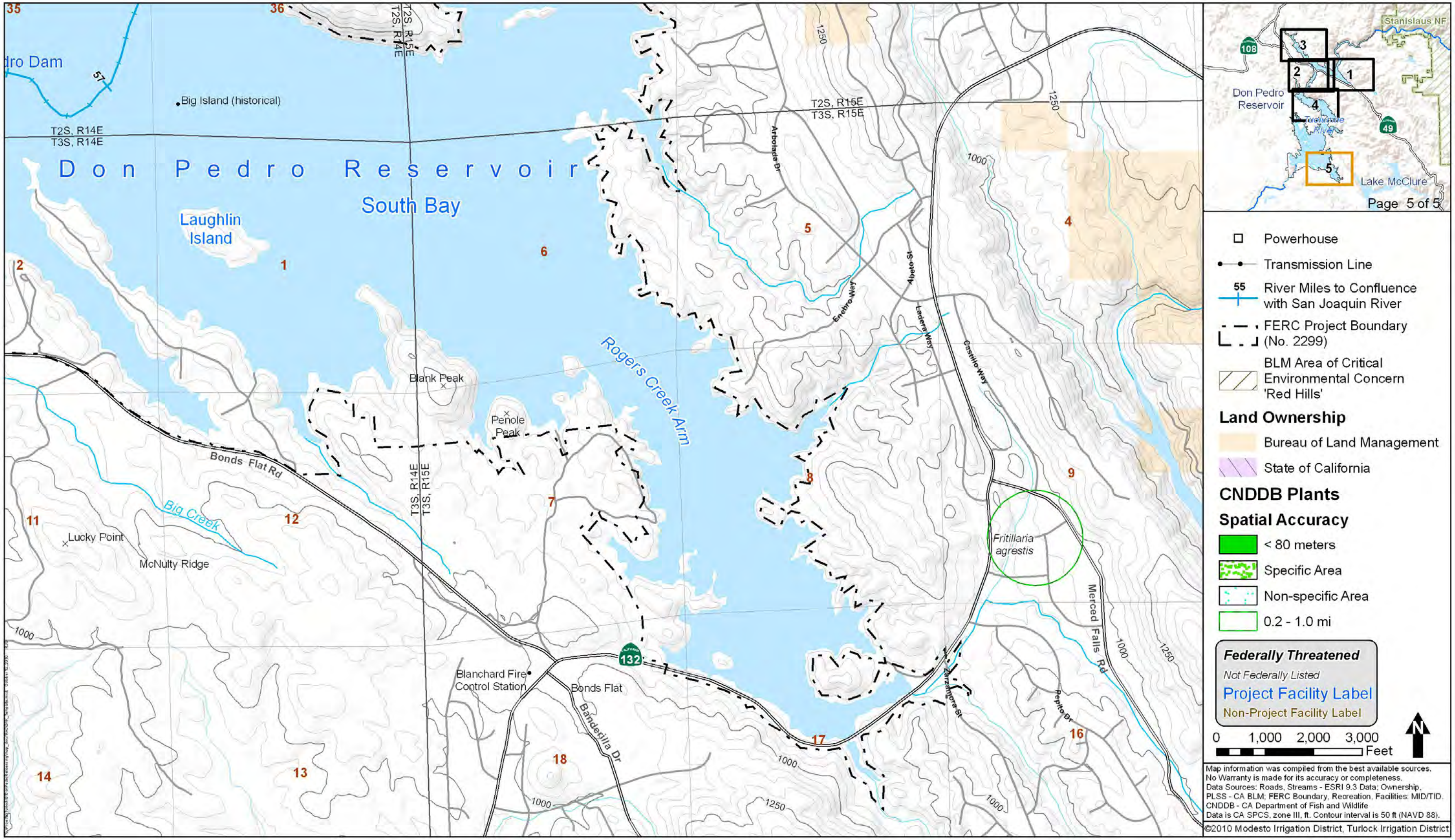

Don Pedro Reservoir
Tuolumne River Arm
Moccasin Arm
Moccasin Point Recreation Area
Moccasin Reservoir
Moccasin Creek
Moccasin Creek PH (CCSF)
Moccasin
Deer Creek
Allium tuolumnense
Jacksonville Rd
River Rd
Old Priest Grade
Moccasin Switchback Rd
Priest
49
120
108
Stanislaus NF
Lake McClure
Tuolumne River
Page 1 of 5
Powerhouse
Transmission Line
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
BLM Area of Critical Environmental Concern 'Red Hills'
Land Ownership
Bureau of Land Management
State of California
CNDDB Plants
Spatial Accuracy
< 80 meters
Specific Area
Non-specific Area
0.2 - 1.0 mi
Federally Threatened
Not Federally Listed
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
CNDDB - CA Department of Fish and Wildlife
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District


Don Pedro Reservoir
Woods Creek Arm
Kanaka Creek
Railroad Canyon
Poor Man's Gulch
Hungry Hill
Jacksonville Rd.
Wa Hine Dr
120
49
Lupinus spectabilis
Chlorogalum grandiflorum
Cryptantha mariposae
Verbena californica
Senecio clevelandii var. heterophyllus
Packera layneae
Allium tuolumnense
Lomatium congdonii
15
14
13
18
17
19
22
23
24
25
26
27
30
70
71
72
69
68
T1S, R14E
T1S, R15E
1000
1250
1500
1750
2000
2250
Stanislaus NF
108
Don Pedro Reservoir
Tuolumne River
Lake McClure
1
2
3
4
5
Page 2 of 5
Powerhouse
Transmission Line
55
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
BLM Area of Critical Environmental Concern 'Red Hills'
Land Ownership
Bureau of Land Management
State of California
CNDDB Plants
Spatial Accuracy
< 80 meters
Specific Area
Non-specific Area
0.2 - 1.0 mi
Federally Threatened
Not Federally Listed
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
CNDDB - CA Department of Fish and Wildlife
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District



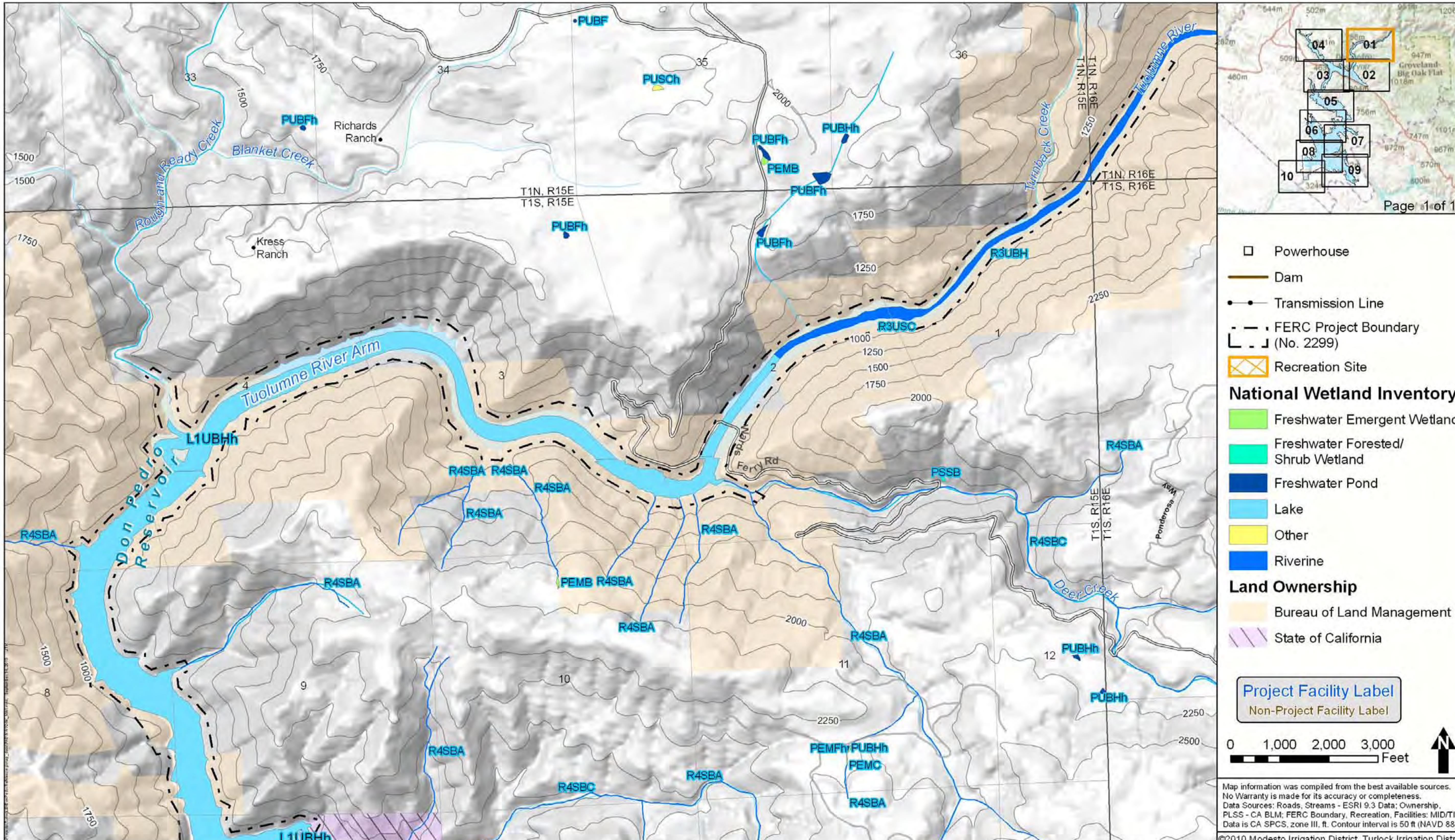
Allium tuolumnense
Lupinus spectabilis
Eryngium pinnatisectum
Verbena californica
Woods Creek Arm
Don Pedro Reservoir
Slate Creek
Kanaka Creek
Chinese Camp
Page Mountain
McNutt Ranch
Emerson Ranch
T1N, R14E
T1S, R14E
T1N, R15E
T1S, R15E
Twist Rd
Shawmut Rd
Redhill Rd
Mammoth Mine Rd
Jacksonville Rd
Harvey Dr
Don Pedro Reservoir
Tuolumne River
Lake McClure
Stanislaus NF
Page 3 of 5
Powerhouse
Transmission Line
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
BLM Area of Critical Environmental Concern 'Red Hills'
Land Ownership
Bureau of Land Management
State of California
CNDDB Plants
Spatial Accuracy
< 80 meters
Specific Area
Non-specific Area
0.2 - 1.0 mi
Federally Threatened
Not Federally Listed
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
CNDDB - CA Department of Fish and Wildlife
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

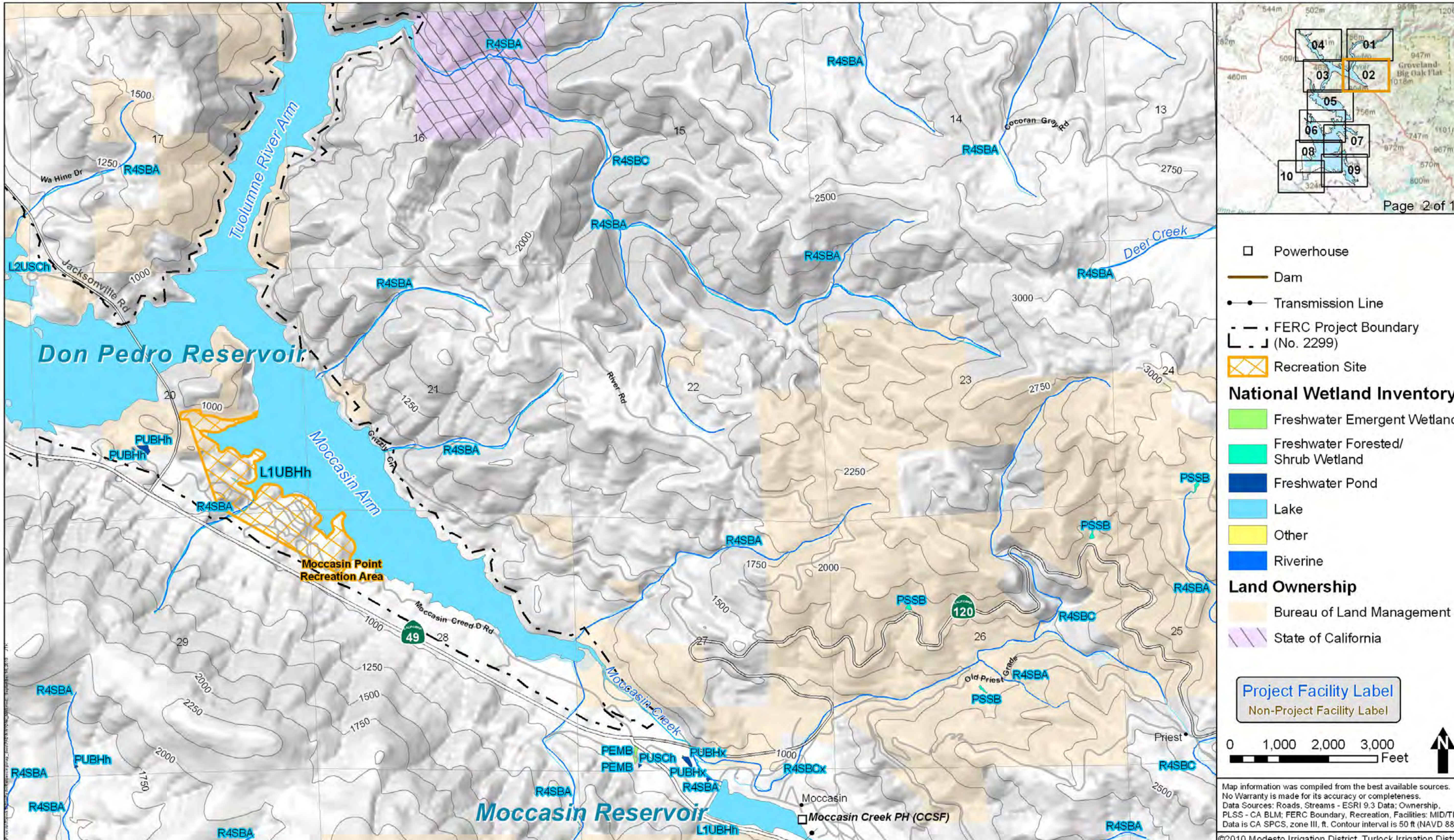

Lomatium congdonii
Packera layneae
Senecio clevelandii var. heterophyllus
Senecio clevelandii var. heterophyllus
Senecio clevelandii var. heterophyllus
Senecio clevelandii var. heterophyllus
T1S, R14E
T2S, R14E
T1S, R15E
T2S, R15E
Moccasin Transmission Line (CCSF)
Upper Bay
Don Pedro Reservoir
East Bay
Old Don Pedro Rd
Stanislaus NF
Don Pedro Reservoir
Lake McClure
Page 4 of 5
Powerhouse
Transmission Line
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
BLM Area of Critical Environmental Concern 'Red Hills'
Land Ownership
Bureau of Land Management
State of California
CNDDB Plants
Spatial Accuracy
< 80 meters
Specific Area
Non-specific Area
0.2 - 1.0 mi
Federally Threatened
Not Federally Listed
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources.
No Warranty is made for its accuracy or completeness.
Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
CNDDB - CA Department of Fish and Wildlife
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

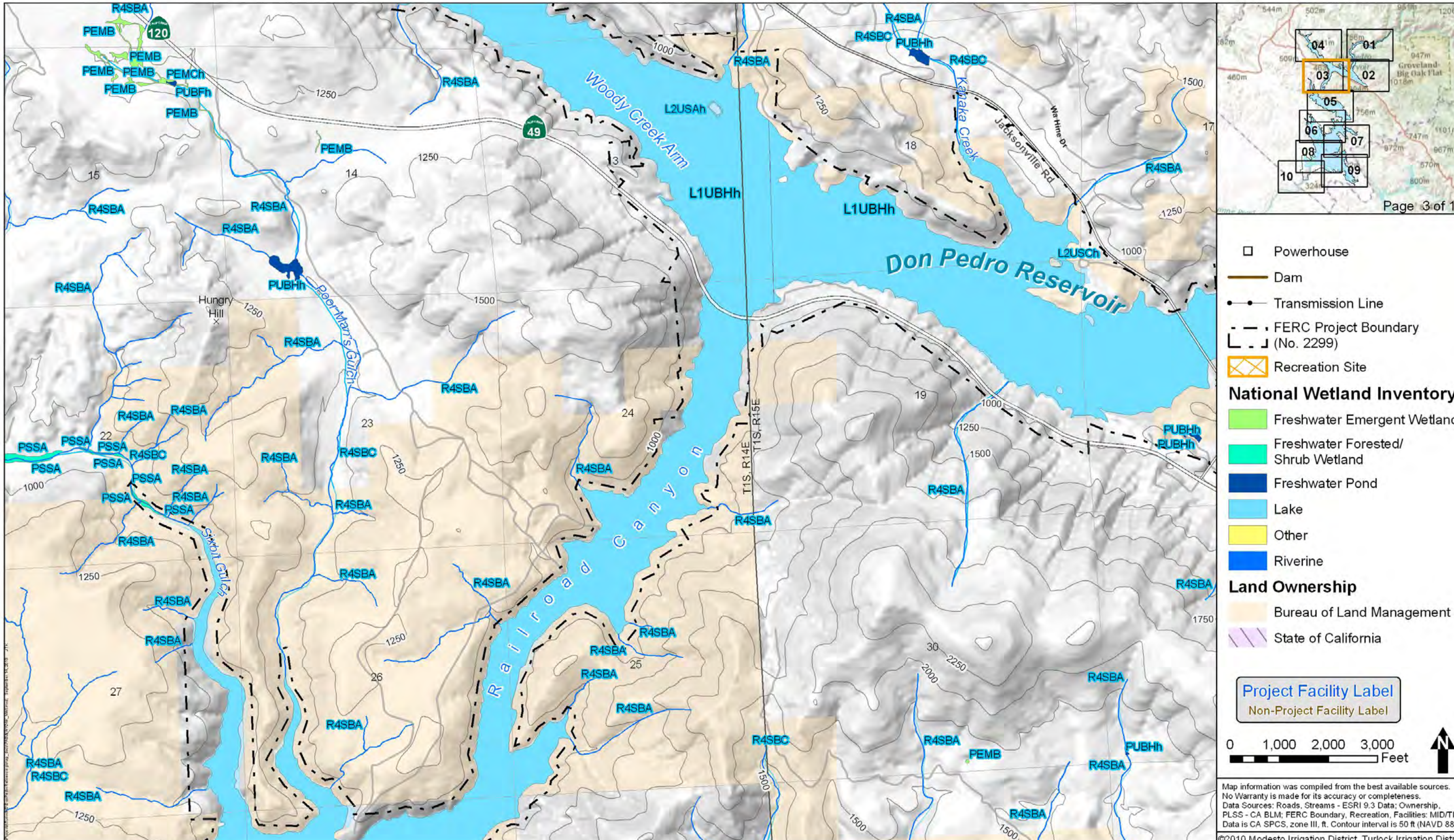

Don Pedro Reservoir
South Bay
Laughlin Island
Big Island (historical)
Rogers Creek Arm
Blank Peak
Penole Peak
Bonds Flat Rd
Big Creek
Lucky Point
McNulty Ridge
Blanchard Fire Control Station
Bonds Flat
Banderilla Dr
Merced Falls Rd
Fritillaria agrestis
T2S, R14E
T3S, R14E
T2S, R15E
T3S, R15E
Powerhouse
Transmission Line
River Miles to Confluence with San Joaquin River
FERC Project Boundary (No. 2299)
BLM Area of Critical Environmental Concern 'Red Hills'
Land Ownership
Bureau of Land Management
State of California
CNDDB Plants
Spatial Accuracy
< 80 meters
Specific Area
Non-specific Area
0.2 - 1.0 mi
Federally Threatened
Not Federally Listed
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
Don Pedro Reservoir
Lake McClure
Stanislaus NF
Page 5 of 5
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness.
Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID.
CNDDB - CA Department of Fish and Wildlife
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

ATTACHMENT 5.4.3-1

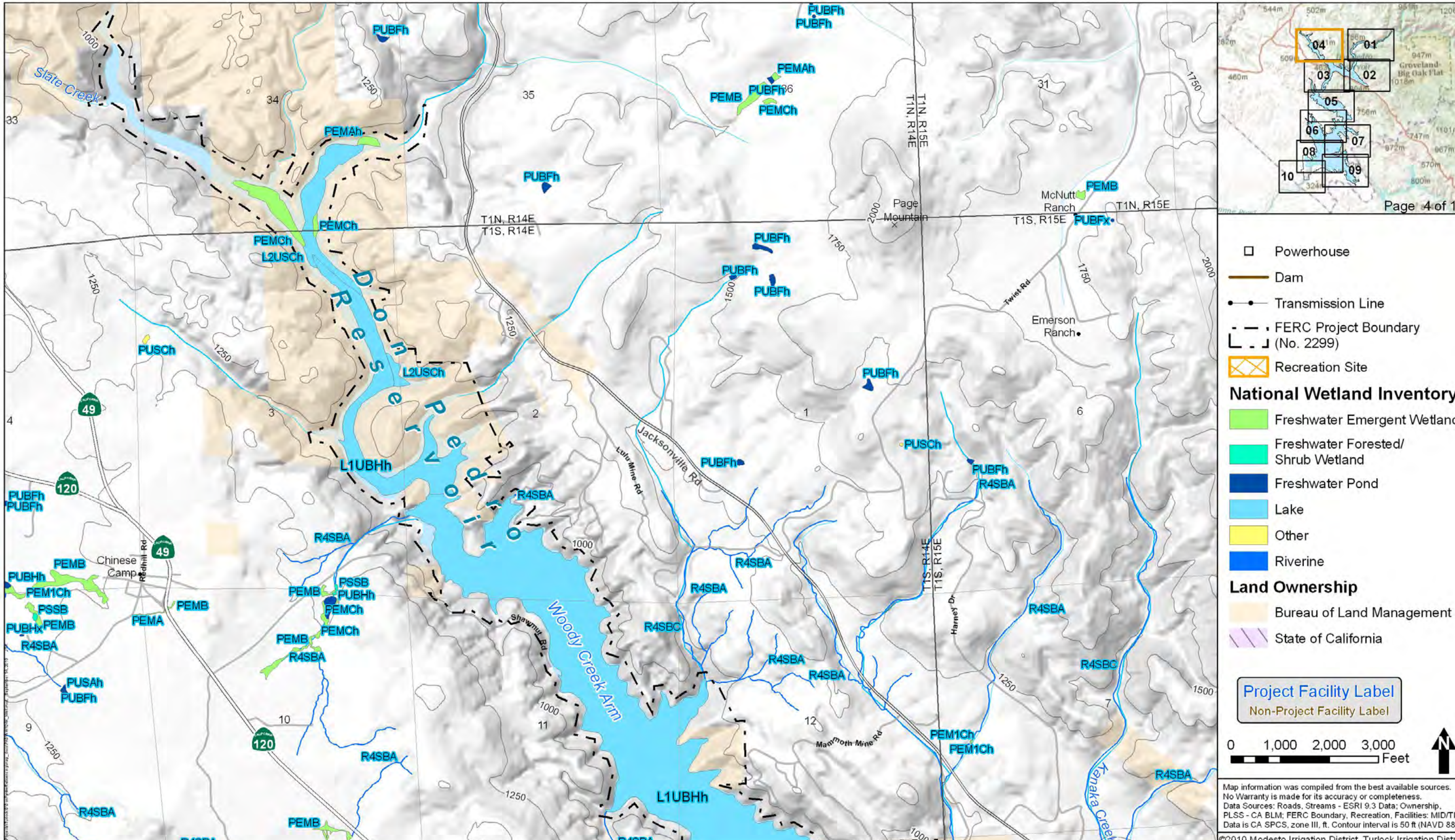
NWI MAPS


Powerhouse
Dam
Transmission Line
FERC Project Boundary (No. 2299)
Recreation Site
National Wetland Inventory
Freshwater Emergent Wetland
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
Land Ownership
Bureau of Land Management
State of California
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Page 1 of 10
Tuolumne River Arm
Don Pedro Reservoir
Tuolumne River
Turnback Creek
Blanket Creek
Rough and Ready Creek
Deer Creek
Richards Ranch
Kress Ranch
Ferry Rd
T1N, R15E
T1S, R15E
T1N, R16E
T1S, R16E
L1UBHh
R3UBH
R3USC
R4SBA
R4SBC
PSSB
PUBF
PUBFh
PUBHh
PUSCh
PEMB
PEMC
PEMFh
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District


Don Pedro Reservoir
Moccasin Reservoir
Tuolumne River Arm
Moccasin Arm
Moccasin Creek
Deer Creek
Moccasin Point Recreation Area
L1UBHh
Moccasin Creek PH (CCSF)
Moccasin
Priest
Page 2 of 10
Powerhouse
Dam
Transmission Line
FERC Project Boundary (No. 2299)
Recreation Site
National Wetland Inventory
Freshwater Emergent Wetland
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
Land Ownership
Bureau of Land Management
State of California
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District



Don Pedro Reservoir
Woody Creek Arm
Railroad Canyon
L1UBHh
L2USAh
L2USCh
Hungry Hill
Poor Man's Gulch
Kanaka Creek
Jacksonville Rd
T1S, R14E
T1S, R15E
Page 3 of 10
Powerhouse
Dam
Transmission Line
FERC Project Boundary (No. 2299)
Recreation Site
National Wetland Inventory
Freshwater Emergent Wetland
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
Land Ownership
Bureau of Land Management
State of California
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness.
Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID
Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District


Don Pedro Reservoir
Woody Creek Arm
Slate Creek
Kanaka Creek
L1UBHh
L2USCh
PEMAh
PEMCh
PEMB
PUBFh
PUSCh
R4SBA
R4SBC
PEM1Ch
PSSB
PUBHh
PUBHx
PUSAh
PEMA
PUBFx
T1N, R14E
T1S, R14E
T1N, R15E
T1S, R15E
Page Mountain
McNutt Ranch
Emerson Ranch
Chinese Camp
Jacksonville Rd
Lulu Mine Rd
Shawmut Rd
Mammoth Mine Rd
Twist Rd
Harvey Dr
Redhill Rd
49
120
Page 4 of 10
Powerhouse
Dam
Transmission Line
FERC Project Boundary (No. 2299)
Recreation Site
National Wetland Inventory
Freshwater Emergent Wetland
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
Land Ownership
Bureau of Land Management
State of California
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

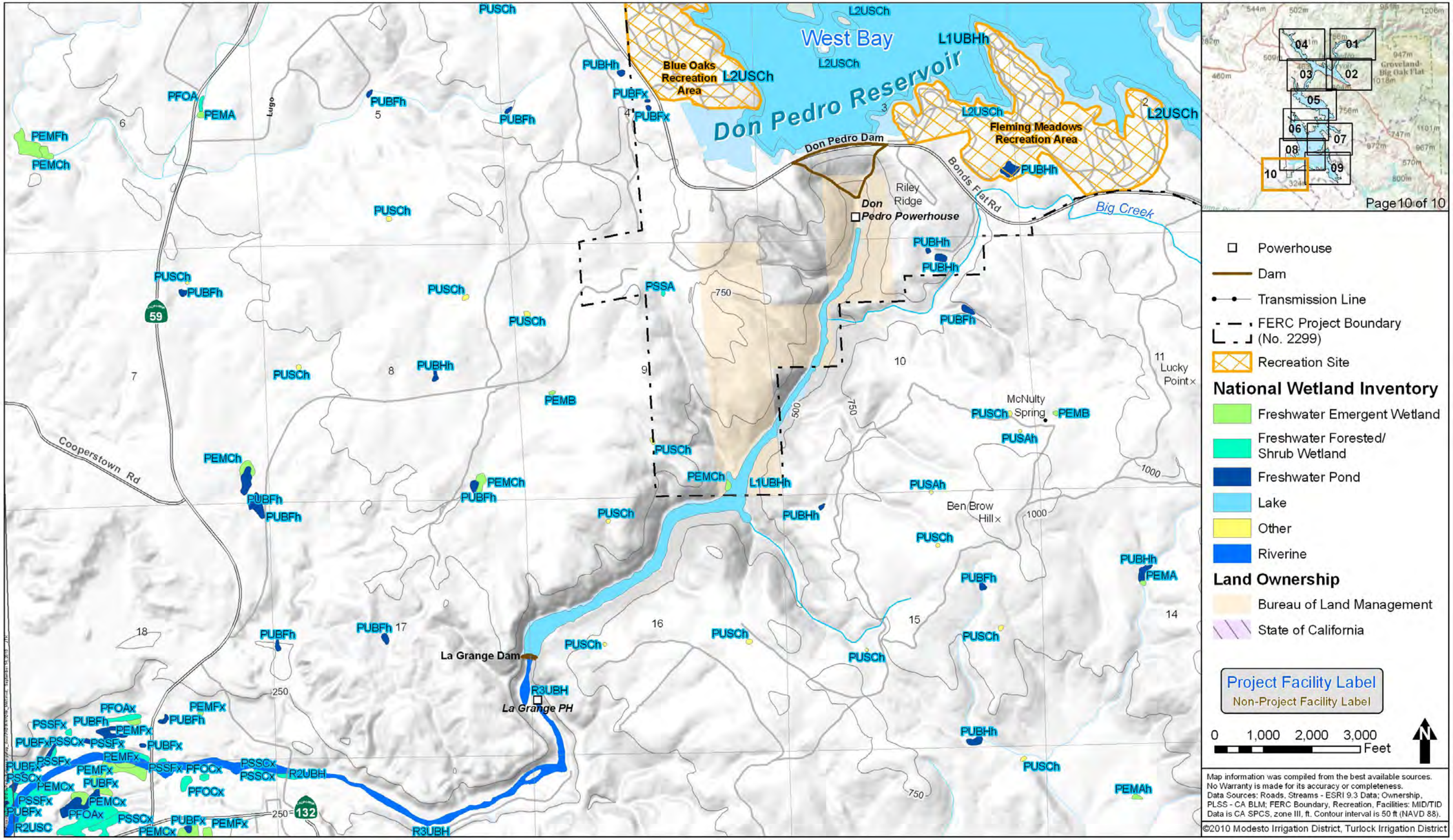
Don Pedro Reservoir
Upper Bay
East Bay
L1UBHh
CCSF Moccasin Transmission Line
Old Don Pedro Rd
Big Creek
Page 5 of 10
Powerhouse
Dam
Transmission Line
FERC Project Boundary (No. 2299)
Recreation Site
National Wetland Inventory
Freshwater Emergent Wetland
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
Land Ownership
Bureau of Land Management
State of California
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District


Don Pedro Reservoir
Page 6 of 10
Powerhouse
Dam
Transmission Line
FERC Project Boundary (No. 2299)
Recreation Site
National Wetland Inventory
Freshwater Emergent Wetland
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
Land Ownership
Bureau of Land Management
State of California
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District
49er Bay
Middle Bay
Hatch Creek Arm
Big Creek Arm
West Fork Big Creek
Big Creek
Freeze-Out Spring
T2S, R15E
T2S, R14E
L1UBHh
L2USCh
L2USAh
R4SBA
R4SBC
PUBHh
PEMCh
PUSAh
PEMB
PUSA
PFOB
PUBFh


Don Pedro Reservoir
Middle Bay
Hatch Creek Arm
Big Oak Island
Willow Creek
First Creek
Piney Creek
Hatch Creek
Page 7 of 10
Powerhouse
Dam
Transmission Line
FERC Project Boundary (No. 2299)
Recreation Site
National Wetland Inventory
Freshwater Emergent Wetland
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
Land Ownership
Bureau of Land Management
State of California
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District


Middle Bay
Mine Island
North Bay
Eagle Island (historical)
Big Oak Island
Don Pedro Camp (historical)
Buzzard Point
Old Don Pedro Dam
Big Island (historical)
Don Pedro Reservoir
West Bay
South Bay
Laughlin Island
Blue Oaks Recreation Area
Fleming Meadows Recreation Area
Don Pedro Dam
Don Pedro Powerhouse
Bonds Flat Rd
Don Pedro Rd
Riley Ridge
Big Creek
Blank Peak
Penole Peak
T2S, R14E
T3S, R14E
T2S, R15E
T3S, R15E
Page 8 of 10
Powerhouse
Dam
Transmission Line
FERC Project Boundary (No. 2299)
Recreation Site
National Wetland Inventory
Freshwater Emergent Wetland
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
Land Ownership
Bureau of Land Management
State of California
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District


Don Pedro Reservoir
L1UBHh
Big Island (historical)
South Bay
Laughlin Island
Rogers Creek Arm
Blank Peak
Penole Peak
Bonds Flat Rd
Big Creek
Lucky Point
McNulty Ridge
Blanchard Fire Control Station
Bonds Flat
Banderilla Dr
Merced Falls Rd
Penole Peak Rd
T2S, R14E
T3S, R14E
T2S, R15E
T3S, R15E
Page 9 of 10
Powerhouse
Dam
Transmission Line
FERC Project Boundary (No. 2299)
Recreation Site
National Wetland Inventory
Freshwater Emergent Wetland
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
Land Ownership
Bureau of Land Management
State of California
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District


West Bay
Don Pedro Reservoir
Blue Oaks Recreation Area
Fleming Meadows Recreation Area
Don Pedro Dam
Don Pedro Powerhouse
Riley Ridge
Bonds Flat Rd
Big Creek
Cooperstown Rd
Lucky Point
McNulty Spring
Ben Brow Hill
La Grange Dam
La Grange PH
Powerhouse
Dam
Transmission Line
FERC Project Boundary (No. 2299)
Recreation Site
National Wetland Inventory
Freshwater Emergent Wetland
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
Land Ownership
Bureau of Land Management
State of California
Project Facility Label
Non-Project Facility Label
0 1,000 2,000 3,000 Feet
N
Page 10 of 10
Map information was compiled from the best available sources. No Warranty is made for its accuracy or completeness. Data Sources: Roads, Streams - ESRI 9.3 Data; Ownership, PLSS - CA BLM; FERC Boundary, Recreation, Facilities: MID/TID Data is CA SPCS, zone III, ft. Contour interval is 50 ft (NAVD 88).
©2010 Modesto Irrigation District, Turlock Irrigation District

ATTACHMENT 5.5.3-1

CNDDB RTE OCCURRENCE REPORTS

Ambystoma californiense

California tiger salamander

Element Code: AAAAA01180

Status

Federal: Threatened
State: unknown code...

NDDB Element Ranks

Global: G2G3
State: S2S3

Other Lists

CDFG Status: SC

Habitat Associations

General: CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.

Micro: NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING

Occurrence No. 19 **Map Index:** 13410 **EO Index:** 28430

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 1986-03-26
Site: 1986-03-26

Record Last Updated: 1998-03-17

Quad Summary: La Grange (3712064/440B)

County Summary: Stanislaus

Lat/Long: 37.64586º / -120.45629º
UTM: Zone-10 N4169567 E724419
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 03S
Range: 14E
Section: 29 **Qtr:** NW
Meridian: M
Elevation: 350 ft

Location: CARDOZA LAKE, EAST SIDE OF HWY J-59, ABOUT 1.25 MILES SOUTH OF LA GRANGE.
Location Detail:
Ecological:
Threat:
General: J. BRODE FIELD NOTE #169 COLLECTED 26 MAR 1973. CAS #187402 (1 ADULT) COLLECTED 22 MAR 1986 BY J. BOUNDY & A.W. FORD.
Owner/Manager: UNKNOWN

Ambystoma californiense

California tiger salamander

Element Code: AAAAA01180

Status

Federal: Threatened
State: unknown code...

NDDB Element Ranks

Global: G2G3
State: S2S3

Other Lists

CDFG Status: SC

Habitat Associations

General: CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.

Micro: NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING

Occurrence No. 84 **Map Index:** 13383 **EO Index:** 28387

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 1973-XX-XX
Site: 1973-XX-XX

Record Last Updated: 2009-06-17

Quad Summary: La Grange (3712064/440B)

County Summary: Stanislaus

Lat/Long: 37.64602º / -120.49371º
UTM: Zone-10 N4169496 E721116
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 2/5 mile

Township: 03S
Range: 13E
Section: 25 **Qtr:** NW
Meridian: M
Elevation: 300 ft

Location: LA GRANGE REGIONAL PARK. NEAR BASSO BRIDGE ON THE TUOLUMNE RIVER.

Location Detail:

Ecological: SALAMANDER POPULATIONS IN EASTERN STANISLAUS COUNTY ARE DECLINING ACCORDING TO BRODE & BASEY. 2008 AERIAL PHOTO SHOWS THAT THIS AREA IS STILL MOSTLY NATURAL HABITAT WITH SOME AGRICULTURE ON THE SE BORDER OF THE PARK.

Threat: GRASSLAND HABITAT BEING CONVERTED TO ORCHARDS AND VINEYARDS.

General: UNKNOWN NUMBER FOUND AT THE PARK SITE.

Owner/Manager: STA COUNTY

Ambystoma californiense

California tiger salamander

Element Code: AAAAA01180

Status

Federal: Threatened
State: unknown code...

NDDB Element Ranks

Global: G2G3
State: S2S3

Other Lists

CDFG Status: SC

Habitat Associations

General: CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.

Micro: NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING

Occurrence No. 420 **Map Index:** 38393 **EO Index:** 33400

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 1973-02-13
Site: 1973-02-13

Record Last Updated: 2009-06-17

Quad Summary: La Grange (3712064/440B), Snelling (3712054/440C)

County Summary: Stanislaus

Lat/Long: 37.62975º / -120.45355º
UTM: Zone-10 N4167786 E724709
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 3/5 mile

Township: 03S
Range: 14E
Section: 32 **Qtr:** XX
Meridian: M
Elevation: 400 ft

Location: ABOUT 2 MILES SOUTH OF LA GRANGE.
Location Detail:
Ecological: 2008 AERIAL PHOTO SHOWS THAT THIS AREA IS STILL NATURAL HABITAT.
Threat:
General: JOHN BRODE FIELD NOTE #165.
Owner/Manager: UNKNOWN

Ambystoma californiense

California tiger salamander

Element Code: AAAAA01180

Status

Federal: Threatened
State: unknown code...

NDDB Element Ranks

Global: G2G3
State: S2S3

Other Lists

CDFG Status: SC

Habitat Associations

General: CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.

Micro: NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING

Occurrence No. 421 **Map Index:** 38394 **EO Index:** 33401

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 1973-02-13
Site: 1973-02-13

Record Last Updated: 2009-06-18

Quad Summary: La Grange (3712064/440B)

County Summary: Stanislaus

Lat/Long: 37.65895º / -120.45510º
UTM: Zone-10 N4171023 E724485
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 2/5 mile

Township: 03S
Range: 14E
Section: 20 **Qtr:** XX
Meridian: M
Elevation: 300 ft

Location: ABOUT 0.5 MILE EAST OF LA GRANGE.

Location Detail:

Ecological: 2008 AERIAL PHOTO SHOWS THAT THIS AREA IS STILL MOSTLY NATURAL HABITAT WITH ONLY LIGHT DISTURBANCES. HOWEVER, DEVELOPMENT AND AGRICULTURE ARE CLOSING IN FROM THE WEST AND NORTHWEST.

Threat:

General: JOHN BRODE FIELD NOTE #166.

Owner/Manager: UNKNOWN

Ambystoma californiense

California tiger salamander

Element Code: AAAAA01180

Status

Federal: Threatened
State: unknown code...

NDDB Element Ranks

Global: G2G3
State: S2S3

Other Lists

CDFG Status: SC

Habitat Associations

General: CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.

Micro: NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING

Occurrence No. 982 **Map Index:** 69531 **EO Index:** 70309

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 2007-05-15
Site: 2007-05-15

Record Last Updated: 2007-06-13

Quad Summary: La Grange (3712064/440B)

County Summary: Tuolumne

Lat/Long: 37.68718º / -120.38583º
UTM: Zone-10 N4174324 E730508
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 03S
Range: 14E
Section: 12 **Qtr:** SW
Meridian: M
Elevation: 1,004 ft

Location: ALONG BIG CREEK, BETWEEN MCNULTY RIDGE AND BONDS FLAT ROAD, SOUTH OF DON PEDRO RESERVOIR.

Location Detail:

Ecological: HABITAT CONSISTS OF A STOCKPOND SURROUNDED BY GRAZED FOOTHILL GRASSLAND.

Threat: THREATENED BY DEVELOPMENT.

General: 3 LARVAE OBSERVED ON 15 MAY 2007.

Owner/Manager: PVT

Branchinecta lynchi

vernal pool fairy shrimp

Element Code: ICBRA03030

Status

Federal: Threatened
State: None

NDDB Element Ranks

Global: G3
State: S2S3

Other Lists

CDFG Status:

Habitat Associations

General: ENDEMIC TO THE GRASSLANDS OF THE CENTRAL VALLEY, CENTRAL COAST MTNS, AND SOUTH COAST MTNS, IN ASTATIC RAIN-FILLED POOLS.

Micro: INHABIT SMALL, CLEAR-WATER SANDSTONE-DEPRESSION POOLS AND GRASSED SWALE, EARTH SLUMP, OR BASALT-FLOW DEPRESSION POOLS.

Occurrence No. 583 **Map Index:** 70773 **EO Index:** 71685

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 2008-01-23
Site: 2008-01-23

Record Last Updated: 2008-02-01

Quad Summary: Sonora (3712084/458B)

County Summary: Tuolumne

Lat/Long: 37.88390º / -120.48809º
UTM: Zone-10 N4195908 E720903
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 1/10 mile

Township: 01S
Range: 13E
Section: 01 **Qtr:** NE
Meridian: M
Elevation: 1,425 ft

Location: 0.5 MILE DIRECTLY SOUTH OF THE JUNCTION OF HWY 120 AND HWY 108, SOUTH OF YOSEMITE JUNCTION.

Location Detail:

Ecological: HABITAT CONSISTS OF SHALLOW ISOLATED VERNAL POOL ALONG NORTHERN EDGE OF TABLE MOUNTAIN BUTTE FORMATION. BEDROCK AND SHALLOW SOILS CONSISTS OF WEATHERED LAVA CAP MATERIAL.

Threat: THREATENED BY DEVELOPMENT (GOLF COURSE, COMMERCIAL, RESIDENTIAL).

General: 4 ADULTS OBSERVED ON 23 JAN 2008. AREA IS LCOATED WITHIN THE GRAND YOSEMITE GOLF AND WETLAND PRESERVE. DEVELOPMENT PROJECT MUST PROTECT HYDROLOGIC INTEGRITY OF SITE TO ELIMINATE IMPACTS.

Owner/Manager: PVT

Brodiaea pallida

Chinese Camp brodiaea

Element Code: PMLIL0C0C0

Status
Federal: Threatened
State: Endangered

NDDB Element Ranks
Global: G1
State: S1.1

Other Lists
CNPS List: 1B.1

Habitat Associations
General: VALLEY AND FOOTHILL GRASSLAND.
Micro: IN FLAT, ROCKY, INTERMITTENT STREAMBED ON SERPENTINE. 385M.

Occurrence No. 1 **Map Index:** 13457 **EO Index:** 9187

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Increasing

Dates Last Seen
Element: 1991-06-15
Site: 1991-06-15

Record Last Updated: 2007-12-19

Quad Summary: Chinese Camp (3712074/458C)
County Summary: Tuolumne

Lat/Long: 37.86519º / -120.43833º
UTM: Zone-10 N4193950 E725337
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 64.8 acres

Township: 01S
Range: 14E
Section: 09 **Qtr:** NE
Meridian: M
Elevation: 1,260 ft

Location: 0.5 KM WSW OF CHINESE CAMP SCHOOL ON RED HILLS RD. MAJORITY OF PLANTS ON THE SINCLAIR RANCH.

Location Detail: PLANTS ON BOTH SIDES OF ROAD. IN 1990, NEW SUBPOPULATIONS WITHIN MAIN POPULATION LOCATED.

Ecological: IN FLAT ROCKY INTERMITTENT STREAM BED IN RED CLAY SOIL (SERPENTINE DERIVED). ASSOCIATES INCLUDE CHLOROGALUM ANGUSTIFOLIUM, BRODIAEA ELEGANS, TRITELEIA HYACINTHA, CALOCHORTUS LUTEUS, FRITILLARIA AGRESTIS AND NAVARRETIA INTERTEXTA.

Threat: SUBDIVISION PLANNED (1990). RD CONSTRUCTION, CATTLE AND GOAT GRAZING, FIRE BREAKS ARE THREATS.

General: ONLY KNOWN LOCATION. 1600 PLANTS IN 1982, OVER 1600 IN 1990, 5000 IN 1991. SOME PLANTS ON S SIDE OF RD DESTROYED BY DEVELOPMENT IN 1982. SOME PLANTS MAY BE IN COUNTY RD RIGHT-OF-WAY. TNC HAS VOLUNTARY PROTECTION AGREEMENT W/1 OWNER.

Owner/Manager: PVT

Desmocerus californicus dimorphus

valley elderberry longhorn beetle — **Element Code:** IICOL48011

Status		NDDB Element Ranks		Other Lists	
Federal:	Threatened	**Global:**	G3T2	**CDFG Status:**	
State:	None	**State:**	S2		

Habitat Associations

General: OCCURS ONLY IN THE CENTRAL VALLEY OF CALIFORNIA, IN ASSOCIATION WITH BLUE ELDERBERRY (SAMBUCUS MEXICANA).

Micro: PREFERS TO LAY EGGS IN ELDERBERRRIES 2-8 INCHES IN DIAMETER; SOME PREFERENCE SHOWN FOR "STRESSED" ELDERBERRIES.

Occurrence No. 205 **Map Index:** 51514 **EO Index:** 51514

Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2002-05-26
Site: 2002-05-26

Record Last Updated: 2003-06-11

Quad Summary: Sonora (3712084/458B)

County Summary: Tuolumne

Lat/Long: 37.96123º / -120.45108º
UTM: Zone-10 N4204578 E723924
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 01N
Range: 14E
Section: 09 **Qtr:** NW
Meridian: M
Elevation: 1,550 ft

Location: WEST SIDE OF RAWHIDE FLAT, 1.5 MILES WNW OF JAMESTOWN

Location Detail:

Ecological: HABITAT CONSISTS OF OPEN, NON-NATIVE GRASSLAND, CONTAINING A LONE ELDERBERRY SHRUB; ELDERBERRY WAS ~15' TALL, W/ NUMEROUS STEMS, INCLUDING SEVERAL 4-6" IN DIAMETER. CEANOTHUS/SCATTERED GREY PINES ADJACENT, AND VOLCANIC TABLE MOUNTAIN NEARBY

Threat: THREATENED BY DEVELOPMENT AND GRAZING.

General: ON 26 MAY 2002, 1 FEMALE BLACK-MORPH BEETLE OBSERVED INSIDE ELDERBERRY ON LEAVES; NO EXIT HOLES OBSERVED.

Owner/Manager: PVT, BLM?

Desmocerus californicus dimorphus

valley elderberry longhorn beetle — **Element Code:** IICOL48011

Status
Federal: Threatened
State: None

NDDB Element Ranks
Global: G3T2
State: S2

Other Lists
CDFG Status:

Habitat Associations

General: OCCURS ONLY IN THE CENTRAL VALLEY OF CALIFORNIA, IN ASSOCIATION WITH BLUE ELDERBERRY (SAMBUCUS MEXICANA).

Micro: PREFERS TO LAY EGGS IN ELDERBERRRIES 2-8 INCHES IN DIAMETER; SOME PREFERENCE SHOWN FOR "STRESSED" ELDERBERRIES.

Occurrence No. 206 **Map Index:** 53209 **EO Index:** 53209

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2000-03-19
Site: 2000-03-19

Record Last Updated: 2003-11-06

Quad Summary: Standard (3712083/458A)

County Summary: Tuolumne

Lat/Long: 37.98045º / -120.28502º
UTM: Zone-10 N4207124 E738452
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 02N
Range: 15E
Section: 36 **Qtr:** XX
Meridian: M
Elevation: 2,850 ft

Location: WHITTO MINE ROAD, 1 MILE WSW OF SOULSBYVILLE

Location Detail:

Ecological: HABITAT CONSISTS OF FOOTHILL OAK WOODLAND/RIPARIAN; DOMINATED BY MIXED OAKS, CHAPARRAL PLANTS, CALIFORNIA GRAPE, AND BOTH NATIVE AND NON-NATIVE GRASSES.

Threat: THREATENED BY FUTURE DEVELOPMENT.

General: OLD EXIT HOLES OBSERVED ON 19 MAR 2000; BEETLES MAY STILL BE ACTIVE ON ELDERBERRY.

Owner/Manager: PVT

Desmocerus californicus dimorphus

valley elderberry longhorn beetle

Element Code: IICOL48011

Status
Federal: Threatened
State: None

NDDB Element Ranks
Global: G3T2
State: S2

Other Lists
CDFG Status:

Habitat Associations

General: OCCURS ONLY IN THE CENTRAL VALLEY OF CALIFORNIA, IN ASSOCIATION WITH BLUE ELDERBERRY (SAMBUCUS MEXICANA).

Micro: PREFERS TO LAY EGGS IN ELDERBERRRIES 2-8 INCHES IN DIAMETER; SOME PREFERENCE SHOWN FOR "STRESSED" ELDERBERRIES.

Occurrence No. 214 **Map Index:** 72709 **EO Index:** 73537

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2007-04-30
Site: 2007-04-30

Record Last Updated: 2008-10-28

Quad Summary: Sonora (3712084/458B)

County Summary: Tuolumne

Lat/Long: 37.88501º / -120.48961º
UTM: Zone-10 N4196028 E720766
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 01S
Range: 13E
Section: 01 **Qtr:** NE
Meridian: M
Elevation: 1,250 ft

Location: 0.4 MILES SSW OF YOSEMITE JUNCTION BENCH MARK 1166 (HWY 120-49 INTERSECTION), JAMESTOWN ZIP CODE.

Location Detail: MAPPED TO PROVIDED COORDINATES.

Ecological: INDIVIDUAL WAS FOUND ON A 5 INCH DBH ELDERBERRY SHRUB APPROX 6 FEET ABOVE THE GROUND. SHRUB WAS INTERSPERSED W/ TREES WITHIN LIVE OAK WOODLAND AND FOOTHILL PINES.

Threat: THREATENED BY LAND DEVELOPMENT INCLUDING COMMERCIAL AND MULTI-FAMILY STRUCTURES.

General: 1 ADULT FEMALE WAS OBSERVED AND PHOTOGRAPHED ON 30 APRIL 2007.

Owner/Manager: PVT

Desmocerus californicus dimorphus

valley elderberry longhorn beetle **Element Code:** IICOL48011

Status — **Federal:** Threatened; **State:** None

NDDB Element Ranks — **Global:** G3T2; **State:** S2

Other Lists — **CDFG Status:**

Habitat Associations

General: OCCURS ONLY IN THE CENTRAL VALLEY OF CALIFORNIA, IN ASSOCIATION WITH BLUE ELDERBERRY (SAMBUCUS MEXICANA).

Micro: PREFERS TO LAY EGGS IN ELDERBERRRIES 2-8 INCHES IN DIAMETER; SOME PREFERENCE SHOWN FOR "STRESSED" ELDERBERRIES.

Occurrence No. 215 **Map Index:** 72710 **EO Index:** 73538

Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen — **Element:** 2007-09-06; **Site:** 2007-09-06

Record Last Updated: 2008-10-28

Quad Summary: Standard (3712083/458A), Sonora (3712084/458B)

County Summary: Tuolumne

Lat/Long: 37.90628º / -120.37526º
UTM: Zone-10 N4198665 E730757
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 01N
Range: 15E
Section: 30 **Qtr:** SW
Meridian: M
Elevation: 1,650 ft

Location: 0.4 MILES WEST OF ALGERINE SCHOOL (HISTORIC?) JUST SOUTH OF ALGERINE ROAD, ALGERINE.

Location Detail: MAPPED TO PROVIDED COORDINATES.

Ecological: ELDERBERRY W/ 2 VELB EXIT HOLES. SHRUB WAS IN TRADITIONAL BLUE OAK WOODLAND, HOWEVER CATTLE RANCHING ACTIVITIES & STRUCTURES NEARBY MAY CLASSIFY AS RUDERAL HABITAT. A HISTORIC (1860'S) DITCH RUNS W/IN 80' TO N & IS FILLED W/ BLACKBERRY.

Threat:

General: 2 EXIT HOLES OBSERVED ON ELDERBERRY SHRUB ON 6 SEP 2007.

Owner/Manager: PVT

Haliaeetus leucocephalus

bald eagle

Element Code: ABNKC10010

Status

Federal: Delisted
State: Endangered

NDDB Element Ranks

Global: G5
State: S2

Other Lists

CDFG Status:

Habitat Associations

General: OCEAN SHORE, LAKE MARGINS, & RIVERS FOR BOTH NESTING & WINTERING. MOST NESTS WITHIN 1 MI OF WATER.

Micro: NESTS IN LARGE, OLD-GROWTH, OR DOMINANT LIVE TREE W/OPEN BRANCHES, ESPECIALLY PONDEROSA PINE. ROOSTS COMMUNALLY IN WINTE

Occurrence No. 228 **Map Index:** 43477 **EO Index:** 43477

Occ Rank: Excellent
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 2007-05-22
Site: 2007-05-22

Record Last Updated: 2007-08-27

Quad Summary: Penon Blanco Peak (3712063/440A)

County Summary: Tuolumne

Lat/Long: 37.69666º / -120.36974º
UTM: Zone-10 N4175415 E731898
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 1/10 mile

Township: 03S
Range: 15E
Section: 06 **Qtr:** SW
Meridian: M
Elevation: 700 ft

Location: SW END OF DON PEDRO RESERVOIR, NEAR BLANK PEAK.

Location Detail: NEST IS LOCATED IN A BULL PINE (PINUS SABINIANA) NEAR THE WATER'S EDGE.

Ecological: NEST TREE IS A BULL PINE (PINUS SABINIANA) WITHIN OAK/BULL PINE HABITAT; WHITEWASH AND FISH BONES FOUND UNDER THE NEST.

Threat: POSSIBLE THREAT OF RECREATIONAL DISTURBANCE BY BOATERS ON THE RESERVOIR.

General: 1 ADULT AND 1 JUVENILE OBSERVED IN THE NEST TOGETHER ON 5 AUG 2000. 2 YOUNG FLEDGED IN 2002. 2 ADULTS AND 1 CHICK OBSERVED ON 22 MAY 2007; 1 YOUNG FLEDGED.

Owner/Manager: DON PEDRO RECREATION AGENCY

Haliaeetus leucocephalus

bald eagle

Element Code: ABNKC10010

Status

Federal: Delisted
State: Endangered

NDDB Element Ranks

Global: G5
State: S2

Other Lists

CDFG Status:

Habitat Associations

General: OCEAN SHORE, LAKE MARGINS, & RIVERS FOR BOTH NESTING & WINTERING. MOST NESTS WITHIN 1 MI OF WATER.

Micro: NESTS IN LARGE, OLD-GROWTH, OR DOMINANT LIVE TREE W/OPEN BRANCHES, ESPECIALLY PONDEROSA PINE. ROOSTS COMMUNALLY IN WINTE

Occurrence No. 254 **Map Index:** 66672 **EO Index:** 66820

Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 1992-01-19
Site: 1992-01-19

Record Last Updated: 2006-10-10

Quad Summary: La Grange (3712064/440B)

County Summary: Stanislaus

Lat/Long: 37.68268º / -120.47322º
UTM: Zone-10 N4173613 E722814
Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON
Area:

Township: 03S
Range: 14E
Section: 07 **Qtr:** XX
Meridian: M
Elevation: 420 ft

Location: COOPERSTOWN ROAD NEAR LA GRANGE.

Location Detail: SOURCE STATES "300 FT FROM HWY 132."

Ecological: OAK WOODLAND, RANGE LAND.

Threat:

General: 1 ADULT OBSERVED ROOSTING ON 19 JAN 1992.

Owner/Manager: UNKNOWN

Haliaeetus leucocephalus

bald eagle

Element Code: ABNKC10010

Status

Federal: Delisted
State: Endangered

NDDB Element Ranks

Global: G5
State: S2

Other Lists

CDFG Status:

Habitat Associations

General: OCEAN SHORE, LAKE MARGINS, & RIVERS FOR BOTH NESTING & WINTERING. MOST NESTS WITHIN 1 MI OF WATER.

Micro: NESTS IN LARGE, OLD-GROWTH, OR DOMINANT LIVE TREE W/OPEN BRANCHES, ESPECIALLY PONDEROSA PINE. ROOSTS COMMUNALLY IN WINTE

Occurrence No. 270 **Map Index:** 69808 **EO Index:** 70630

Occ Rank: Excellent
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2007-07-XX
Site: 2007-07-XX

Record Last Updated: 2007-08-27

Quad Summary: Sonora (3712084/458B)

County Summary: Tuolumne

Lat/Long: 37.89358º / -120.42309º
UTM: Zone-10 N4197139 E726590
Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON
Area:

Township: 01N
Range: 14E
Section: 34 **Qtr:** S
Meridian: M
Elevation: 860 ft

Location: WOODS CREEK ARM OF DON PEDRO RESERVOIR, ~ 1.5 MILES NNE OF CHINESE CAMP.

Location Detail:

Ecological: NEST TREE WAS A PONDEROSA OR BULL PINE.

Threat:

General: THIS PAIR FLEDGED 1 IN 2006, ALTHOUGH THE NEST WAS NEVER FOUND. 2 ADULTS, 1 JUVENILE, AND 2 NEW FLEDGLINGS WERE OBSERVED FROM MID-JUNE THROUGH MID-JULY 2007.

Owner/Manager: BLM

Packera layneae

Layne's ragwort — **Element Code:** PDAST8H1V0

Status		NDDB Element Ranks		Other Lists	
Federal:	Threatened	**Global:**	G2	**CNPS List:**	1B.2
State:	Rare	**State:**	S2.1		

Habitat Associations

General: CHAPARRAL, CISMONTANE WOODLAND.

Micro: ULTRAMAFIC SOIL; OCCASIONALLY ALONG STREAMS. 200-1000M.

Occurrence No. 24 **Map Index:** 13566 **EO Index:** 16858

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1984-05-10
Site: 1984-05-10

Record Last Updated: 2001-02-20

Quad Summary: Chinese Camp (3712074/458C)

County Summary: Tuolumne

Lat/Long: 37.82653º / -120.39068º
UTM: Zone-10 N4189776 E729649
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 2.3 acres

Township: 01S
Range: 14E
Section: 25 **Qtr:** NW
Meridian: M
Elevation: 850 ft

Location: WEST EDGE OF DON PEDRO RESERVOIR NEAR 1030 ELEVATION MARKER, 1.6 AIRMILES SOUTHEAST OF HUNGRY HILL, RED HILLS.

Location Detail: MAPPED WITHIN THE SW 1/4 SW 1/4 OF SECTION 24 AND THE NW 1/4 NW 1/4 OF SECTION 25.

Ecological: IN ROCKY DISTURBED AREA NEAR ROAD ON SERPENTINE.

Threat: POSSIBLY DISTURBED BY GRAZING.

General: SMALL POPULATION. SITE IS WITHIN THE RED HILLS MANAGEMENT AREA.

Owner/Manager: BLM-FOLSOM RA

Packera layneae

Layne's ragwort

Element Code: PDAST8H1V0

Status

Federal: Threatened
State: Rare

NDDB Element Ranks

Global: G2
State: S2.1

Other Lists

CNPS List: 1B.2

Habitat Associations

General: CHAPARRAL, CISMONTANE WOODLAND.
Micro: ULTRAMAFIC SOIL; OCCASIONALLY ALONG STREAMS. 200-1000M.

Occurrence No. 25 **Map Index:** 13529 **EO Index:** 16856

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1984-05-10
Site: 1984-05-10

Record Last Updated: 2001-02-20

Quad Summary: Chinese Camp (3712074/458C)

County Summary: Tuolumne

Lat/Long: 37.82764º / -120.40953º
UTM: Zone-10 N4189853 E727987
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 2.1 acres

Township: 01S
Range: 14E
Section: 23 **Qtr:** SW
Meridian: M
Elevation: 1,100 ft

Location: WEST EDGE OF POOR MANS GULCH, 0.85 AIRMILE SSE OF HUNGRY HILL, EASTERN RED HILLS.
Location Detail: MAPPED WITHIN THE SW 1/4 OF THE SW 1/4 OF SECTION 23.
Ecological: ON SERPENTINE IN ROCKY DISTURBED AREA NEAR ROAD.
Threat:
General: SMALL POPULATION. SITE IS WITHIN THE RED HILLS MANAGEMENT AREA.
Owner/Manager: BLM-FOLSOM RA

Packera layneae

Layne's ragwort

Element Code: PDAST8H1V0

Status

Federal: Threatened
State: Rare

NDDB Element Ranks

Global: G2
State: S2.1

Other Lists

CNPS List: 1B.2

Habitat Associations

General: CHAPARRAL, CISMONTANE WOODLAND.
Micro: ULTRAMAFIC SOIL; OCCASIONALLY ALONG STREAMS. 200-1000M.

Occurrence No. 26 **Map Index:** 13505 **EO Index:** 16855

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 2000-07-19
Site: 2000-07-19

Record Last Updated: 2001-02-20

Quad Summary: Chinese Camp (3712074/458C)

County Summary: Tuolumne

Lat/Long: 37.82769º / -120.41854º
UTM: Zone-10 N4189837 E727193
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 7.3 acres

Township: 01S
Range: 14E
Section: 22 **Qtr:** SE
Meridian: M
Elevation: 1,000 ft

Location: NORTH FACING SLOPE OF SIX-BIT GULCH, 0.8 AIRMILE SSW OF HUNGRY HILL, EASTERN RED HILLS.

Location Detail: 3 COLONIES ON NORTH FACING CANYON WALLS ON SOUTH SIDE OF SIX-BIT GULCH. ACCESS VIA MITIGATION ROAD OFF OF OLD DON PEDRO ROAD OFF OF STATE ROUTE J59. MITIGATION ROAD IS LOCKED; EITHER ACCESS SITE ON FOOT OR OBTAIN KEY FROM BLM.

Ecological: IN ROCKY DISTURBED AREA ON SERPENTINE. VEGETATION IS TYPICAL OF RED HILLS SERPENTINE WITH CEANOTHUS CUNEATUS DOMINANT. ASSOCIATES: PINUS SABINIANA, HETEROMELES ARBUTIFOLIA, ELYMUS MULTISETUS, MELICA CALIFORNICA, AND ERIOPHYLLUM LANATUM.

Threat: PORTION OF SITE RECEIVED AERIAL FIRE RETARDANT DROPS IN THE COURSE OF FIRE FIGHTING; IMPACT ON SPECIES BEING ASSESSED.

General: SMALL POP AT E COLONY IN 1984; ABOUT 150 PLANTS AT 2 W COLONIES IN 2000. SITE IS WITHIN RED HILLS AREA OF CRITICAL ENVIRONMENTAL CONCERN. A 1984 COLLECTION BY TAYLOR FROM "RED HILLS, DIRT RD INTO SIX BIT GULCH" ATTRIBUTED TO THIS SITE.

Owner/Manager: BLM-FOLSOM RA

Packera layneae

Layne's ragwort

Element Code: PDAST8H1V0

Status

Federal: Threatened
State: Rare

NDDB Element Ranks

Global: G2
State: S2.1

Other Lists

CNPS List: 1B.2

Habitat Associations

General: CHAPARRAL, CISMONTANE WOODLAND.
Micro: ULTRAMAFIC SOIL; OCCASIONALLY ALONG STREAMS. 200-1000M.

Occurrence No. 40 **Map Index:** 13416 **EO Index:** 7997

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 1987-05-16
Site: 1987-05-16

Record Last Updated: 1998-04-24

Quad Summary: Chinese Camp (3712074/458C)

County Summary: Tuolumne

Lat/Long: 37.85834º / -120.46096º
UTM: Zone-10 N4193136 E723367
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 27.2 acres

Township: 01S
Range: 14E
Section: 08 **Qtr:** S
Meridian: M
Elevation: 1,050 ft

Location: 2.5 KM (1.5 MI) SOUTHWEST OF CHINESE CAMP, ALONG DIRT ROAD 0.8-2 KM (0.5-1.2 MI) ENE OF TAYLOR HILL.

Location Detail: ROAD ALONG STREAM COURSE WHICH LEADS TO OLD SIERRA RAILROAD.

Ecological: STREAMSIDE PLANT COMMUNITY ASSOCIATION ON RED SERPENTINE SOILS. ASSOCIATES INCLUDE CEANOTHUS CUNEATUS, PINUS SABINIANA, AND VERBENA CALIFORNICA.

Threat: ORV USE, SMALL SCALE GOLD MINING, AND LITTER ARE THREATS TO THIS POPULATION. AREA IS SLIGHTLY TO VERY DEGRADED BY ORVS.

General: 100+ PLANTS IN 1987. ACC TO FRANKLIN (1997), PLANTS HERE MAY ACTUALLY BE S. CLEVELANDII VAR. HETEROPHYLLUS BASED ON PLANTS HE'S SEEN IN THIS DRAINAGE & ASSOCIATES/HABITAT LISTED BY YORK & MEDIEROS IN 1987. MORE INFO NEEDED.

Owner/Manager: BLM

Packera layneae

Layne's ragwort

Element Code: PDAST8H1V0

Status
Federal: Threatened
State: Rare

NDDB Element Ranks
Global: G2
State: S2.1

Other Lists
CNPS List: 1B.2

Habitat Associations
General: CHAPARRAL, CISMONTANE WOODLAND.
Micro: ULTRAMAFIC SOIL; OCCASIONALLY ALONG STREAMS. 200-1000M.

Occurrence No. 45 **Map Index:** 44946 **EO Index:** 44946

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2000-06-16
Site: 2000-06-16

Record Last Updated: 2001-02-16

Quad Summary: Moccasin (3712073/458D)
County Summary: Tuolumne

Lat/Long: 37.81104º / -120.37401º
UTM: Zone-10 N4188098 E731165
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 2.7 acres

Township: 01S
Range: 15E
Section: 31 **Qtr:** NW
Meridian: M
Elevation: 1,650 ft

Location: 4 AIRMILES WEST OF MOCCASIN, 2.9 AIRMILES NORTHWEST OF SUMMIT OF DOMINGO PEAK, HILLS EAST OF DON PEDRO RESERVOIR.

Location Detail: AT TOP OF RIDGE ACROSS THE RESERVOIR FROM THE CONFLUENCE OF THE TUOLUMNE RIVER WITH SIX-BIT AND POOR MANS GULCH. MAPPED WITHIN THE NW 1/4 NW 1/4 OF SECTION 31.

Ecological: ON N-FACING SLOPE ON RED HILLS SERPENTINE, WITH CEANOTHUS CUNEATUS DOMINANT. ASSOCIATES: PINUS SABINIANA, RHAMNUS ILICIFOLIA, HETEROMELES ARBUTIFOLIA, ADENOSTEMA FASCICULATUM, ARCTOSTAPHYLOS MANZANITA, ERIODICTYON CALIFORNICUM, ET AL.

Threat: WITHIN AN ACTIVE GRAZING LEASE; LITTLE EVIDENCE OF GRAZING NEARBY. HUMAN ACTIVITY MINIMAL DUE TO DIFFICULT ACCESS.

General: IN 2000, OVER 300 ROSETTES OBSERVED. AREA WILL BE CONSIDERED FOR ADDITION TO THE AREA OF CRITICAL ENVIRONMENTAL CONCERN FOR THE RED HILLS.

Owner/Manager: BLM

Packera layneae

Layne's ragwort

Element Code: PDAST8H1V0

Status

Federal: Threatened
State: Rare

NDDB Element Ranks

Global: G2
State: S2.1

Other Lists

CNPS List: 1B.2

Habitat Associations

General: CHAPARRAL, CISMONTANE WOODLAND.

Micro: ULTRAMAFIC SOIL; OCCASIONALLY ALONG STREAMS. 200-1000M.

Occurrence No. 46 **Map Index:** 44947 **EO Index:** 44947

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 2000-06-16
Site: 2000-06-16

Record Last Updated: 2001-02-20

Quad Summary: Chinese Camp (3712074/458C)

County Summary: Tuolumne

Lat/Long: 37.81822º / -120.38448º
UTM: Zone-10 N4188869 E730221
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 11.6 acres

Township: 01S
Range: 14E
Section: 25 **Qtr:** SE
Meridian: M
Elevation: 1,400 ft

Location: HILLS JUST EAST OF DON PEDRO RESERVOIR, 1.7 MILES JUST SSW OF HWY 49 CROSSING OF RESERVOIR, SOUTHEAST OF CHINESE CAMP.

Location Detail: PLANTS FOUND IN 5 PATCHES ON NORTH AND WEST FACING SLOPE OF HILL JUST ABOVE RESERVOIR. MAPPED MOSTLY WITHIN THE NE 1/4 SW 1/4 AND THE W 1/2 SE 1/4 OF SECTION 25.

Ecological: ON N & W FACING SLOPES ON RED HILLS SERPENTINE, WITH CEANOTHUS CUNEATUS DOMINANT. ASSOCIATES: PINUS SABINIANA, RHAMNUS ILICIFOLIA, HETEROMELES ARBUTIFOLIA, ADENOSTEMA FASCICULATUM, ARCTOSTAPHYLOS MANZANITA, ERIODICTYON CALIFORNICUM, ET AL.

Threat: HUMAN ACTIVITY MINIMAL DUE TO DIFFICULT ACCESS.

General: IN 2000, OVER 1200 ROSETTES OBSERVED IN 5 PATCHES. AREA WILL BE CONSIDERED FOR ADDITION TO THE AREA OF CRITICAL ENVIRONMENTAL CONCERN FOR THE RED HILLS. ONLY PUBLIC ACCESS IS BY BOAT.

Owner/Manager: BLM

Pseudobahia bahiifolia

Hartweg's golden sunburst

Element Code: PDAST7P010

Status
Federal: Endangered
State: Endangered

NDDB Element Ranks
Global: G2
State: S2.1

Other Lists
CNPS List: 1B.1

Habitat Associations
General: VALLEY AND FOOTHILL GRASSLAND, CISMONTANE WOODLAND.
Micro: CLAY SOILS, PREDOMINANTLY ON THE NORTHERN SLOPES OF KNOLLS, BUT ALSO ALONG SHADY CREEKS OR NEAR VERNAL POOLS. 15-150M.

Occurrence No. 5 **Map Index:** 13331 **EO Index:** 12604

Occ Rank: None
Origin: Natural/Native occurrence
Presence: Possibly Extirpated
Trend: Decreasing

Dates Last Seen
Element: 1975-03-09
Site: 1997-04-05

Record Last Updated: 1998-03-01

Quad Summary: La Grange (3712064/440B)
County Summary: Stanislaus

Lat/Long: 37.69331º / -120.48984º
UTM: Zone-10 N4174753 E721318
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 03S
Range: 13E
Section: 12 **Qtr:** NW
Meridian: M
Elevation: 320 ft

Location: 4 KM (2.5 MI) NORTHWEST OF LA GRANGE; BETWEEN COOPERSTOWN ROAD AND DRY CREEK.
Location Detail: 2OO METERS SOUTH OF INTERSECTION WITH TRAIL TO DOMINICI CREEK; LOCATED IN NW 1/4 OF THE NE 1/4 OF SECTION 12.
Ecological:
Threat: MUCH OF AREA PRESENTLY SUBDIVIDED WITH ADDITIONAL FUTURE DEVELOPMENT LIKELY.
General: ABOUT 100 PLANTS IN AN AREA LESS THAN 100 SQ METERS IN 1975. NO PLANTS SEEN IN 1986, 1990, OR 1997. BY 1990, AREA ALTERED BY CONSTRUCTION RELATED TO HOUSING TRACTS ALONG COOPERSTOWN RD AND ALONG THE TRAIL.
Owner/Manager: PVT

Pseudobahia bahiifolia

Hartweg's golden sunburst — **Element Code:** PDAST7P010

Status
Federal: Endangered
State: Endangered

NDDB Element Ranks
Global: G2
State: S2.1

Other Lists
CNPS List: 1B.1

Habitat Associations
General: VALLEY AND FOOTHILL GRASSLAND, CISMONTANE WOODLAND.
Micro: CLAY SOILS, PREDOMINANTLY ON THE NORTHERN SLOPES OF KNOLLS, BUT ALSO ALONG SHADY CREEKS OR NEAR VERNAL POOLS. 15-150M.

Occurrence No. 6 **Map Index:** 13329 **EO Index:** 12152

Occ Rank: Excellent
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Stable

Dates Last Seen
Element: 2006-03-22
Site: 2006-03-22
Record Last Updated: 2006-11-09

Quad Summary: La Grange (3712064/440B)
County Summary: Stanislaus

Lat/Long: 37.66981º / -120.49206º
UTM: Zone-10 N4172140 E721191
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 3.0 acres

Township: 03S
Range: 13E
Section: 13 **Qtr:** SW
Meridian: M
Elevation: 300 ft

Location: WEST OF LA GRANGE, 0.5 MI NNE OF JUNCTION BETWEEN UPPER MAIN CANAL AND MODESTO MAIN CANAL.

Location Detail: MANY COLONIES MAPPED ALONG WESTERN TRIBUTARY OF DOMINICI CREEK IN E1/2 OF SW1/4 SECTION 13.

Ecological: CLAY SOIL, W AND N-FACING ON TOP OF ROCKY, THIN-SOIL KNOLL IN THE NORTH; N, W, AND E-FACING SLOPES IN ANNUAL GRASSLAND ON SMALL HILL; ALONG CANYON, BANKS AND TERRACES OF CREEK; SCATTERED VALLEY OAK RIPARIAN WOODLAND AT S END OF OCCURRENCE.

Threat: EXTENSIVE GRAZING IN THE PAST. PROPERTY IS CURRENTLY BEING PARCELLED OUT FOR DEVELOPMENT OF ESTATES.

General: 46 PLANTS SEEN IN 1990; APPROXIMATELY 10,580 IN 2006. TOTAL ACREAGE OF OCCURRENCES #6 AND #7 IS 4.85 ACRES.

Owner/Manager: PVT

Pseudobahia bahiifolia

Hartweg's golden sunburst — **Element Code:** PDAST7P010

Status
Federal: Endangered
State: Endangered

NDDB Element Ranks
Global: G2
State: S2.1

Other Lists
CNPS List: 1B.1

Habitat Associations
General: VALLEY AND FOOTHILL GRASSLAND, CISMONTANE WOODLAND.
Micro: CLAY SOILS, PREDOMINANTLY ON THE NORTHERN SLOPES OF KNOLLS, BUT ALSO ALONG SHADY CREEKS OR NEAR VERNAL POOLS. 15-150M.

Occurrence No. 7 **Map Index:** 13325 **EO Index:** 20008

Occ Rank: Excellent
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Stable

Dates Last Seen
Element: 2006-03-22
Site: 2006-03-22
Record Last Updated: 2006-11-09

Quad Summary: La Grange (3712064/440B)
County Summary: Stanislaus

Lat/Long: 37.67938º / -120.49247º
UTM: Zone-10 N4173201 E721127
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 3.0 acres

Township: 03S
Range: 13E
Section: 13 **Qtr:** NW
Meridian: M
Elevation: 250 ft

Location: 2 MI WNW OF LA GRANGE, APPROXIMATELY 1.2 MI N OF JUNCTION OF UPPER MAIN CANAL AND MODESTO MAIN CANAL.
Location Detail: HEADWATERS OF FORK OF UPPER DOMINICI CREEK, EAST SIDE OF CREEK. LOCATED WITHIN THE NE 1/4 OF THE NW 1/4 OF SECTION 13.
Ecological: ANNUAL GRASSLAND ON TERRACED ROCK LEDGES, RIDGELINE, AND SHELVES ON MOSTLY W-FACING SLOPES IN TYPICALLY THIN, ROCKY SOILS; CLAY SOILS.
Threat: CURRENT USE IS GRAZING; DEVELOPMENT OF 21 30-40 ACRE RANCHES IS PROPOSED AT THIS SITE.
General: 120 PLANTS OBSERVED IN 1990. 3500 PLANTS OBSERVED IN 2006.
Owner/Manager: PVT

Verbena californica

Red Hills vervain

Element Code: PDVER0N050

Status		NDDB Element Ranks		Other Lists	
Federal:	Threatened	**Global:**	G2	**CNPS List:**	1B.1
State:	Threatened	**State:**	S2.1		

Habitat Associations

General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.

Micro: MESIC SITES ON SERPENTINE; USUALLY SERPENTINE SEEPS OR CREEKS. 255-400M.

Occurrence No. 1 **Map Index:** 13502 **EO Index:** 20711

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1992-06-10
Site: 1992-06-10

Record Last Updated: 1995-10-30

Quad Summary: Chinese Camp (3712074/458C)

County Summary: Tuolumne

Lat/Long: 37.83223º / -120.42096º
UTM: Zone-10 N4190335 E726966
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 01S
Range: 14E
Section: 22 **Qtr:** SE
Meridian: M
Elevation: 850 ft

Location: RED HILLS; SIX-BIT GULCH.

Location Detail:

Ecological: NEAR STREAM MARGIN ON SERPENTINE SOIL IN FOOTHILL PINE WOODLAND. ASSOCIATED WITH RHAMNUS, SALIX, CALYCANTHUS, CAREX, AND ANOTHER RARE PLANT, SENECIO CLEVELANDII HETEROPHYLLUS.

Threat: PLANTS TRAMPLED, GRAZED BY CATTLE.

General: 4 PLANTS IN 1981. APPROXIMATELY 200 PLANTS SEEN IN 1992.

Owner/Manager: PVT IN BLM-RED HILLS RA

Verbena californica

Red Hills vervain

Element Code: PDVER0N050

Status

Federal: Threatened
State: Threatened

NDDB Element Ranks

Global: G2
State: S2.1

Other Lists

CNPS List: 1B.1

Habitat Associations

General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.
Micro: MESIC SITES ON SERPENTINE; USUALLY SERPENTINE SEEPS OR CREEKS. 255-400M.

Occurrence No. 2 **Map Index:** 13416 **EO Index:** 7998

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 1998-08-03
Site: 1998-08-03

Record Last Updated: 2009-05-06

Quad Summary: Chinese Camp (3712074/458C)
County Summary: Tuolumne

Lat/Long: 37.85834º / -120.46096º
UTM: Zone-10 N4193136 E723367
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 27.2 acres

Township: 01S
Range: 14E
Section: 08 **Qtr:** S
Meridian: M
Elevation: 1,050 ft

Location: RED HILLS; POPULATION EXTENDS FROM 0.5-1.0 MI WNW OF TAYLOR HILL.
Location Detail: ALONG ROAD LEADING TO OLD SIERRA RR TRACKS.
Ecological: AT MARGIN OF STREAM ON SERPENTINE SOIL IN FOOTHILL PINE WOODLAND. ASSOCIATED WITH SENECIO LAYNEAE, PINUS SABINIANA, CEANOTHUS CUNEATUS.
Threat: SMALL AMOUNT OF MINING IN CREEK WHERE IT MEETS RED HILLS RD. TRASH EVIDENT NEARBY.
General: ABOUT 440 PLANTS IN 1981, NOT COUNTED IN 1987. INCLUDES FORMER OCCURRENCE #3. 1936 & 1937 COLLECTIONS BY BELSHAW, 1938 COLLECTION BY HOOVER AND 1982 & 1998 COLLECTION BY TAYLOR FROM "...ALONG HEAD SIX BIT GULCH" ATTRIBUTED TO THIS SITE.
Owner/Manager: BLM

Verbena californica

Red Hills vervain

Element Code: PDVER0N050

Status		NDDB Element Ranks		Other Lists	
Federal:	Threatened	**Global:**	G2	**CNPS List:**	1B.1
State:	Threatened	**State:**	S2.1		

Habitat Associations

General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.

Micro: MESIC SITES ON SERPENTINE; USUALLY SERPENTINE SEEPS OR CREEKS. 255-400M.

Occurrence No. 4 **Map Index:** 13391 **EO Index:** 3863

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1981-07-14
Site: 1981-07-14

Record Last Updated: 1992-06-26

Quad Summary: Chinese Camp (3712074/458C)

County Summary: Tuolumne

Lat/Long: 37.85292º / -120.46684º
UTM: Zone-10 N4192520 E722866
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 4.2 acres

Township: 01S
Range: 14E
Section: 17 **Qtr:** NW
Meridian: M
Elevation: 1,100 ft

Location: RED HILLS, 0.5 MI NORTHWEST ON DIRT ROAD LOCATED 1 MI SOUTH OF RED HILLS ROAD & SIMS ROAD JUNCTION.

Location Detail:

Ecological: ALONG STREAM ON SERPENTINE IN FOOTHILL PINE WOODLAND. ASSOCIATED WITH CAREX AND MIMULUS.

Threat:

General: 25 PLANTS IN 1981.

Owner/Manager: BLM

Verbena californica

Red Hills vervain

Element Code: PDVER0N050

Status

Federal: Threatened
State: Threatened

NDDB Element Ranks

Global: G2
State: S2.1

Other Lists

CNPS List: 1B.1

Habitat Associations

General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.

Micro: MESIC SITES ON SERPENTINE; USUALLY SERPENTINE SEEPS OR CREEKS. 255-400M.

Occurrence No. 5 **Map Index:** 13479 **EO Index:** 18149

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 1981-07-15
Site: 1981-07-15

Record Last Updated: 1994-12-12

Quad Summary: Chinese Camp (3712074/458C)

County Summary: Tuolumne

Lat/Long: 37.81595º / -120.42930º
UTM: Zone-10 N4188508 E726282
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 39.5 acres

Township: 01S
Range: 14E
Section: 27 **Qtr:** SW
Meridian: M
Elevation: 1,100 ft

Location: RED HILLS, APPROX 3 AIR MILES SOUTHEAST OF CRIMEA HOUSE, NORTHEAST OF OLD DON PEDRO ROAD.

Location Detail:

Ecological: ALONG MOIST BANKS AND POOLS OF INTERMITTENT STREAM. ON SERPENTINE SOIL IN FOOTHILL PINE WOODLAND. ASSOCIATED WITH CAREX AND MIMULUS.

Threat:

General: MORE THAN 310 PLANTS IN 6 POPULATIONS.

Owner/Manager: PVT, BLM

Verbena californica

Red Hills vervain

Element Code: PDVER0N050

Status

Federal: Threatened
State: Threatened

NDDB Element Ranks

Global: G2
State: S2.1

Other Lists

CNPS List: 1B.1

Habitat Associations

General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.
Micro: MESIC SITES ON SERPENTINE; USUALLY SERPENTINE SEEPS OR CREEKS. 255-400M.

Occurrence No. 8 **Map Index:** 13534 **EO Index:** 17733

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 1981-07-15
Site: 1981-07-15

Record Last Updated: 1992-06-26

Quad Summary: Chinese Camp (3712074/458C)
County Summary: Tuolumne

Lat/Long: 37.82897º / -120.40534º
UTM: Zone-10 N4190011 E728351
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 01S
Range: 14E
Section: 23 **Qtr:** SW
Meridian: M
Elevation: 950 ft

Location: RED HILLS. ON DIRT RD 0.1 MI EAST OF POOR MANS GULCH & 3.4 MI FROM OLD DON PEDRO ROAD.
Location Detail:
Ecological: ALONG STAGNANT POOL ON SERPENTINE SOIL IN FOOTHILL PINE WOODLAND. ASSOCIATED WITH MIMULUS AND RHAMNUS.
Threat:
General: 6 PLANTS IN 1981.
Owner/Manager: BLM

Verbena californica

Red Hills vervain

Element Code: PDVER0N050

Status

Federal: Threatened
State: Threatened

NDDB Element Ranks

Global: G2
State: S2.1

Other Lists

CNPS List: 1B.1

Habitat Associations

General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.

Micro: MESIC SITES ON SERPENTINE; USUALLY SERPENTINE SEEPS OR CREEKS. 255-400M.

Occurrence No. 9 **Map Index:** 13472 **EO Index:** 3860

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 1981-07-16
Site: 1981-07-16

Record Last Updated: 2001-10-03

Quad Summary: Chinese Camp (3712074/458C)

County Summary: Tuolumne

Lat/Long: 37.84440º / -120.43443º
UTM: Zone-10 N4191653 E725743
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 01S
Range: 14E
Section: 16 **Qtr:** SE
Meridian: M
Elevation: 1,000 ft

Location: RED HILLS. SOUTHEAST OF TAYLOR HILL, ABOUT 0.25 MI NORTH OF CONFLUENCE W/ STREAM IN MINNOW GULCH.

Location Detail:

Ecological: ALONG STREAM ON SERPENTINE SOIL IN FOOTHILL PINE WOODLAND. ASSOCIATED WITH MIMULUS AND RHAMNUS.

Threat:

General: 70 PLANTS IN 1981. 1937 COLLECTION BY HOOVER ATTRIBUTED TO THIS SITE.

Owner/Manager: BLM

Verbena californica

Red Hills vervain

Element Code: PDVER0N050

Status

Federal: Threatened
State: Threatened

NDDB Element Ranks

Global: G2
State: S2.1

Other Lists

CNPS List: 1B.1

Habitat Associations

General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.
Micro: MESIC SITES ON SERPENTINE; USUALLY SERPENTINE SEEPS OR CREEKS. 255-400M.

Occurrence No. 10 **Map Index:** 13407 **EO Index:** 16604

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 1981-07-16
Site: 1981-07-16

Record Last Updated: 1992-06-26

Quad Summary: Chinese Camp (3712074/458C)
County Summary: Tuolumne

Lat/Long: 37.82808º / -120.46053º
UTM: Zone-10 N4189779 E723496
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 01S
Range: 14E
Section: 20 **Qtr:** SW
Meridian: M
Elevation: 1,050 ft

Location: RED HILLS. ALONG DIRT ROAD 0.5 MI SOUTHEST OF LA GRANGE ROAD ON OLD DON PEDRO ROAD.
Location Detail:
Ecological: ALONG STREAM ON SERPENTINE SOIL IN FOOTHILL PINE WOODLAND. ASSOCIATED WITH CAREX AND RHAMNUS.
Threat: LIGHT GRAZING IN THE AREA.
General: 55 PLANTS IN 1981.
Owner/Manager: PVT

Verbena californica

Red Hills vervain

Element Code: PDVER0N050

Status
Federal: Threatened
State: Threatened

NDDB Element Ranks
Global: G2
State: S2.1

Other Lists
CNPS List: 1B.1

Habitat Associations
General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.
Micro: MESIC SITES ON SERPENTINE; USUALLY SERPENTINE SEEPS OR CREEKS. 255-400M.

Occurrence No. 11 **Map Index:** 13443 **EO Index:** 13695

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2001-08-30
Site: 2001-08-30

Record Last Updated: 2009-05-06

Quad Summary: Chinese Camp (3712074/458C)
County Summary: Tuolumne

Lat/Long: 37.81502º / -120.44564º
UTM: Zone-10 N4188365 E724846
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 11.1 acres

Township: 01S
Range: 14E
Section: 28 **Qtr:** SW
Meridian: M
Elevation: 1,150 ft

Location: RED HILLS. ALONG OLD DON PEDRO ROAD, ABOUT 2 MI EAST OF LA GRANGE ROAD.
Location Detail: ALONG DRAINAGE THAT CROSSES ROAD IN SW1/4 SEC 28.
Ecological: ALONG STREAM ON SERPENTINE SOIL IN FOOTHILL PINE WOODLAND. ASSOCIATED WITH QUERCUS DOUGLASII AND CAREX.
Threat: HEAVILY GRAZED; SOME TRAMPLING BY CATTLE.
General: 3000-4000 PLANTS IN 1981, SEVERAL THOUSAND IN 1992. 1984 TAYLOR COLLECTION FROM "RED HILLS" AND TWO 2001 HRUSA COLLECTIONS FROM "IMMED. N OF OLD SAN PEDRO RD." ATTRIBUTED TO THIS OCCURRENCE.
Owner/Manager: PVT

Verbena californica

Red Hills vervain

Element Code: PDVER0N050

Status
Federal: Threatened
State: Threatened

NDDB Element Ranks
Global: G2
State: S2.1

Other Lists
CNPS List: 1B.1

Habitat Associations
General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.
Micro: MESIC SITES ON SERPENTINE; USUALLY SERPENTINE SEEPS OR CREEKS. 255-400M.

Occurrence No. 12 **Map Index:** 21577 **EO Index:** 9007

Occ Rank: Excellent
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1997-XX-XX
Site: 1997-XX-XX

Record Last Updated: 2001-10-03

Quad Summary: Chinese Camp (3712074/458C), Keystone (3712075/459D)
County Summary: Tuolumne

Lat/Long: 37.86749º / -120.50161º
UTM: Zone-10 N4194055 E719763
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 39.7 acres

Township: 01S
Range: 13E
Section: 11 **Qtr:** NE
Meridian: M
Elevation: 1,100 ft

Location: ANDREW CREEK, EAST OF HWY 108/120. NORTH OF AND ALONG SIERRA RAILROAD.

Location Detail: MAPPED AS 6 SMALL POLYGONS PER THESIS BY A. KNOX. SHE APPARENTLY MAINLY VISITED BLM LOC 28; AL FRANKLIN VISITED THE REMAINDER.

Ecological: ON SHALLOW, OPEN/ROCKY SOIL IN WET DRAINAGE ON SERPENTINE WITHIN RIPARIAN AND GRASSLAND COMMUNITIES. WITH MIMULUS GUTTATUS, RHAMNUS, EPILOBIUM GLANDULOSUM, AND ANOTHER RARE PLANT, SENECIO CLEVELANDII HETEROPHYLLUS, ON HIGHER GROUND.

Threat: PLANNED DEVELOPMENT (YOSEMITE ESTATES) WOULD IMPACT PLANTS HERE.

General: LESS THAN 50 PLANTS SEEN IN 1991, SEVERAL THOUSAND REPORTED IN 1992. AT LEAST 530 PLANTS IN 1996, FEWER IN 1997. 1938 & 1939 COLLECTIONS BY HOOVER ATTRIBUTED TO THIS SITE.

Owner/Manager: PVT, BLM

Verbena californica

Red Hills vervain

Element Code: PDVER0N050

Status		NDDB Element Ranks		Other Lists	
Federal:	Threatened	**Global:**	G2	**CNPS List:**	1B.1
State:	Threatened	**State:**	S2.1		

Habitat Associations

General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.

Micro: MESIC SITES ON SERPENTINE; USUALLY SERPENTINE SEEPS OR CREEKS. 255-400M.

Occurrence No. 13 **Map Index:** 40460 **EO Index:** 35467

Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1995-05-17
Site: 1995-05-17

Record Last Updated: 1998-12-31

Quad Summary: Chinese Camp (3712074/458C)

County Summary: Tuolumne

Lat/Long: 37.84937º / -120.44580º
UTM: Zone-10 N4192177 E724728
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 01S
Range: 14E
Section: 16 **Qtr:** NW
Meridian: M
Elevation: 1,100 ft

Location: ABOUT 1.5 MI SSW OF CHINESE CAMP, 0.4 MI SOUTH OF SUMMIT OF TAYLOR HILL.

Location Detail: PLANTS ARE MOSTLY ON THE TRIBUTARY DRAINAGE THAT ENTERS FROM THE NORTH (FROM TAYLOR HILL). AREA INCLUDED AS PART OF BLM ACEC IN 1993.

Ecological: INTERMITTENT DRAINAGE, SERPENTINE/DELPIEDRA SOIL SERIES. RED HILLS RIPARIAN HABITAT WITH RHAMNUS CALIFORNICA TOMENTELLA.

Threat: MANY NONNATIVE PLANTS IN THIS AREA (ESPECIALLY MEDITERRANEAN GRASSES).

General: 100 PLANTS IN 1995.

Owner/Manager: BLM

Verbena californica

Red Hills vervain

Element Code: PDVER0N050

Status

Federal: Threatened
State: Threatened

NDDB Element Ranks

Global: G2
State: S2.1

Other Lists

CNPS List: 1B.1

Habitat Associations

General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.

Micro: MESIC SITES ON SERPENTINE; USUALLY SERPENTINE SEEPS OR CREEKS. 255-400M.

Occurrence No. 14 **Map Index:** 46047 **EO Index:** 46047

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen

Element: 1972-06-19
Site: 1972-06-19

Record Last Updated: 2001-10-04

Quad Summary: Chinese Camp (3712074/458C), Sonora (3712084/458B)

County Summary: Tuolumne

Lat/Long: 37.87088º / -120.43305º
UTM: Zone-10 N4194595 E725784
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 1 mile

Township: 01S
Range: 14E
Section: 04 **Qtr:** XX
Meridian: M
Elevation:

Location: CHINESE CAMP.

Location Detail:

Ecological: ALONG SMALL BROOK.

Threat:

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1972 COLLECTION BY MOLDENKE & MOLDENKE. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Verbena californica

Red Hills vervain

Element Code: PDVER0N050

Status
Federal: Threatened
State: Threatened

NDDB Element Ranks
Global: G2
State: S2.1

Other Lists
CNPS List: 1B.1

Habitat Associations
General: CISMONTANE WOODLAND, VALLEY AND FOOTHILL GRASSLAND.
Micro: MESIC SITES ON SERPENTINE; USUALLY SERPENTINE SEEPS OR CREEKS. 255-400M.

Occurrence No. 15 **Map Index:** 74978 **EO Index:** 75987

Occ Rank: Fair
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2007-07-23
Site: 2007-07-23

Record Last Updated: 2009-05-06

Quad Summary: Sonora (3712084/458B)
County Summary: Tuolumne

Lat/Long: 37.88039º / -120.49199º
UTM: Zone-10 N4195510 E720570
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 01S
Range: 13E
Section: 01 **Qtr:** SW
Meridian: M
Elevation: 1,000 ft

Location: UNNAMED ROAD 0.76 AIR MILE SSW OF YOSEMITE JUNCTION, WEST OF CHINESE CAMP.
Location Detail: MAPPED IN NE1/4 OF SW1/4 SEC 1.
Ecological: WETLAND/SEEP WITHIN A CHANNEL TRAVERSING NON-NATIVE GRASSLAND. DOMINANT SPECIES: POLYPOGON MONSPELIENSIS, PASPALUM DISTICHUM, P. DILATATUM, JUNCUS SP., ELEOCHARIS MACROSTACHYA, EPILOBIUM SP., STACHYS ALBENS, MIMULUS GUTTATUS, ET AL.
Threat: PROPOSED GOLF COURSE AND RESIDENTIAL DEVELOPMENT; NON-NATIVE SPECIES.
General: APPROX. 10 PLANTS OBSERVED IN 2007. POPULATION LIKELY LARGER IN THE PAST; DUE TO SOIL MOISTURE AT THIS SITE, THERE IS VERY DENSE GROWTH OF NATIVE AND NON-NATIVE GRASSES.
Owner/Manager: PVT

Vulpes macrotis mutica

San Joaquin kit fox

Element Code: AMAJA03041

Status
Federal: Endangered
State: Threatened

NDDB Element Ranks
Global: G4T2T3
State: S2S3

Other Lists
CDFG Status:

Habitat Associations
General: ANNUAL GRASSLANDS OR GRASSY OPEN STAGES WITH SCATTERED SHRUBBY VEGETATION.
Micro: NEED LOOSE-TEXTURED SANDY SOILS FOR BURROWING, AND SUITABLE PREY BASE.

Occurrence No. 192 **Map Index:** 55676 **EO Index:** 55676

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1973-XX-XX
Site: 1973-XX-XX

Record Last Updated: 2007-08-22

Quad Summary: La Grange (3712064/440B)
County Summary: Stanislaus

Lat/Long: 37.65603º / -120.46715º
UTM: Zone-10 N4170670 E723430
Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON
Area:

Township: 03S
Range: 14E
Section: 19 **Qtr:** SE
Meridian: M
Elevation: 300 ft

Location: ABOUT 0.75 MI SOUTH OF LA GRANGE. SOUTH OF SR 132. NORTHEAST OF DAWSON LAKE. COUNTY OHV RECREATION SITE.

Location Detail: THIS SIGHTING WAS PUBLISHED IN AN APPENDIX LETTER FOR COUNTY TRANSPORTATION PLAN - EIR IN 1974 OR 1975

Ecological: MOSTLY ANNUAL GRASSES AND FORBS, SITE WAS DREDGED IN PAST AND BOULDERS AND GRAVEL WERE HAULED OFF TO CONSTRUCTION SITES. THE SITE WAS USED FOR CATTLE GRAZING WHEN THE SIGHTING OCCURRED IN 1972, NOW AN OHV SITE.

Threat: OHV RECREATION DEVELOPMENT

General: 8/9/1972: ONE INDIVIDUAL OF UNKNOWN AGE SIGHTED. TWO SIGHTED IN 1973 BY DAN WILLIAMS.

Owner/Manager: UNKNOWN