

**NOXIOUS WEEDS
STUDY REPORT
DON PEDRO PROJECT
FERC NO. 2299**



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

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Noxious Weeds Study Report

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List of Acronyms

ac	acres
ACEC	Area of Critical Environmental Concern
AF	acre-feet
ACOE	U.S. Army Corps of Engineers
ADA	Americans with Disabilities Act
ALJ	Administrative Law Judge
APE	Area of Potential Effect
ARMR	Archaeological Resource Management Report
BA	Biological Assessment
BDCP	Bay-Delta Conservation Plan
BLM	U.S. Department of the Interior, Bureau of Land Management
BLM-S	Bureau of Land Management – Sensitive Species
BMI	Benthic macroinvertebrates
BMP	Best Management Practices
BO	Biological Opinion
CalEPPC	California Exotic Pest Plant Council
CalSPA	California Sports Fisherman Association
CAS	California Academy of Sciences
CCC	Criterion Continuous Concentrations
CCIC	Central California Information Center
CCSF	City and County of San Francisco
CCVHJV	California Central Valley Habitat Joint Venture
CD	Compact Disc
CDBW	California Department of Boating and Waterways
CDEC	California Data Exchange Center
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game (as of January 2013, Department of Fish and Wildlife)
CDMG	California Division of Mines and Geology
CDOF	California Department of Finance
CDPH	California Department of Public Health

CDPR	California Department of Parks and Recreation
CDSOD	California Division of Safety of Dams
CDWR	California Department of Water Resources
CE	California Endangered Species
CEII	Critical Energy Infrastructure Information
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CMAP	California Monitoring and Assessment Program
CMC	Criterion Maximum Concentrations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CORP	California Outdoor Recreation Plan
CPUE	Catch Per Unit Effort
CRAM	California Rapid Assessment Method
CRLF	California Red-Legged Frog
CRRF	California Rivers Restoration Fund
CSAS	Central Sierra Audubon Society
CSBP	California Stream Bioassessment Procedure
CT	California Threatened Species
CTR	California Toxics Rule
CTS	California Tiger Salamander
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationship
Districts	Turlock Irrigation District and Modesto Irrigation District
DLA	Draft License Application
DPRA	Don Pedro Recreation Agency
DPS	Distinct Population Segment
EA	Environmental Assessment

EC	Electrical Conductivity
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Federal Endangered Species Act
ESRCD	East Stanislaus Resource Conservation District
ESU	Evolutionary Significant Unit
EWUA	Effective Weighted Useable Area
FERC	Federal Energy Regulatory Commission
FFS	Foothills Fault System
FL	Fork length
FMU	Fire Management Unit
FOT	Friends of the Tuolumne
FPC	Federal Power Commission
ft/mi	feet per mile
FWCA	Fish and Wildlife Coordination Act
FYLF	Foothill Yellow-Legged Frog
g	grams
GIS	Geographic Information System
GLO	General Land Office
GPS	Global Positioning System
HCP	Habitat Conservation Plan
HHWP	Hetch Hetchy Water and Power
HORB	Head of Old River Barrier
HPMP	Historic Properties Management Plan
ILP	Integrated Licensing Process
ISR	Initial Study Report
ITA	Indian Trust Assets
kV	kilovolt
m	meters
M&I	Municipal and Industrial

MCL	Maximum Contaminant Level
mg/kg	milligrams/kilogram
mg/L	milligrams per liter
mgd	million gallons per day
mi	miles
mi ²	square miles
MID	Modesto Irrigation District
MOU	Memorandum of Understanding
MSCS	Multi-Species Conservation Strategy
msl	mean sea level
MVA	Megavolt Ampere
MW	megawatt
MWh	megawatt hour
mya	million years ago
NAE	National Academy of Engineering
NAHC	Native American Heritage Commission
NAS	National Academy of Sciences
NAVD 88	North American Vertical Datum of 1988
NAWQA	National Water Quality Assessment
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
ng/g	nanograms per gram
NGOs	Non-Governmental Organizations
NHI	Natural Heritage Institute
NHPA	National Historic Preservation Act
NISC	National Invasive Species Council
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPS	U.S. Department of the Interior, National Park Service
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places

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

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

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

1.0 INTRODUCTION

1.1 General Description of the Don Pedro Project

Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, the Districts) are the co-licensees of the 168-megawatt (MW) Don Pedro Project (Project) located on the Tuolumne River in western Tuolumne County in the Central Valley region of California. The Don Pedro Dam is located at river mile (RM) 54.8 and the Don Pedro Reservoir formed by the dam extends 24-miles upstream at the normal maximum water surface elevation of 830 ft above mean sea level (msl; NGVD 29). At elevation 830 ft, the reservoir stores over 2,000,000 acre-feet (AF) of water and has a surface area slightly less than 13,000 acres (ac). The watershed above Don Pedro Dam is approximately 1,533 square miles (mi²).

Both TID and MID are local public agencies authorized under the laws of the State of California to provide water supply for irrigation and municipal and industrial (M&I) uses and to provide retail electric service. The Project serves many purposes including providing water storage for the beneficial use of irrigation of over 200,000 ac of prime Central Valley farmland and for the use of M&I customers in the City of Modesto (population 210,000). Consistent with the requirements of the Raker Act passed by Congress in 1913 and agreements between the Districts and City and County of San Francisco (CCSF), the Project reservoir also includes a “water bank” of up to 570,000 AF of storage. CCSF may use the water bank to more efficiently manage the water supply from its Hetch Hetchy water system while meeting the senior water rights of the Districts. CCSF’s “water bank” within Don Pedro Reservoir provides significant benefits for its 2.6 million customers in the San Francisco Bay Area.

The Project also provides storage for flood management purposes in the Tuolumne and San Joaquin rivers in coordination with the U.S. Army Corps of Engineers (ACOE). Other important uses supported by the Project are recreation, protection of the anadromous fisheries in the lower Tuolumne River, and hydropower generation.

The Project Boundary extends from approximately one mile downstream of the dam to approximately RM 79 upstream of the dam. Upstream of the dam, the Project Boundary runs generally along the 855 ft contour interval which corresponds to the top of the Don Pedro Dam. The Project Boundary encompasses approximately 18,370 ac with 78 percent of the lands owned jointly by the Districts and the remaining 22 percent (approximately 4,000 ac) is owned by the United States and managed as a part of the U.S. Bureau of Land Management (BLM) Sierra Resource Management Area.

The primary Project facilities include the 580-foot-high Don Pedro Dam and Reservoir completed in 1971; a four-unit powerhouse situated at the base of the dam; related facilities including the Project spillway, outlet works, and switchyard; four dikes (Gasburg Creek Dike and Dikes A, B, and C); and three developed recreational facilities (Fleming Meadows, Blue Oaks, and Moccasin Point Recreation Areas). The location of the Project and its primary facilities is shown in Figure 1.1-1.

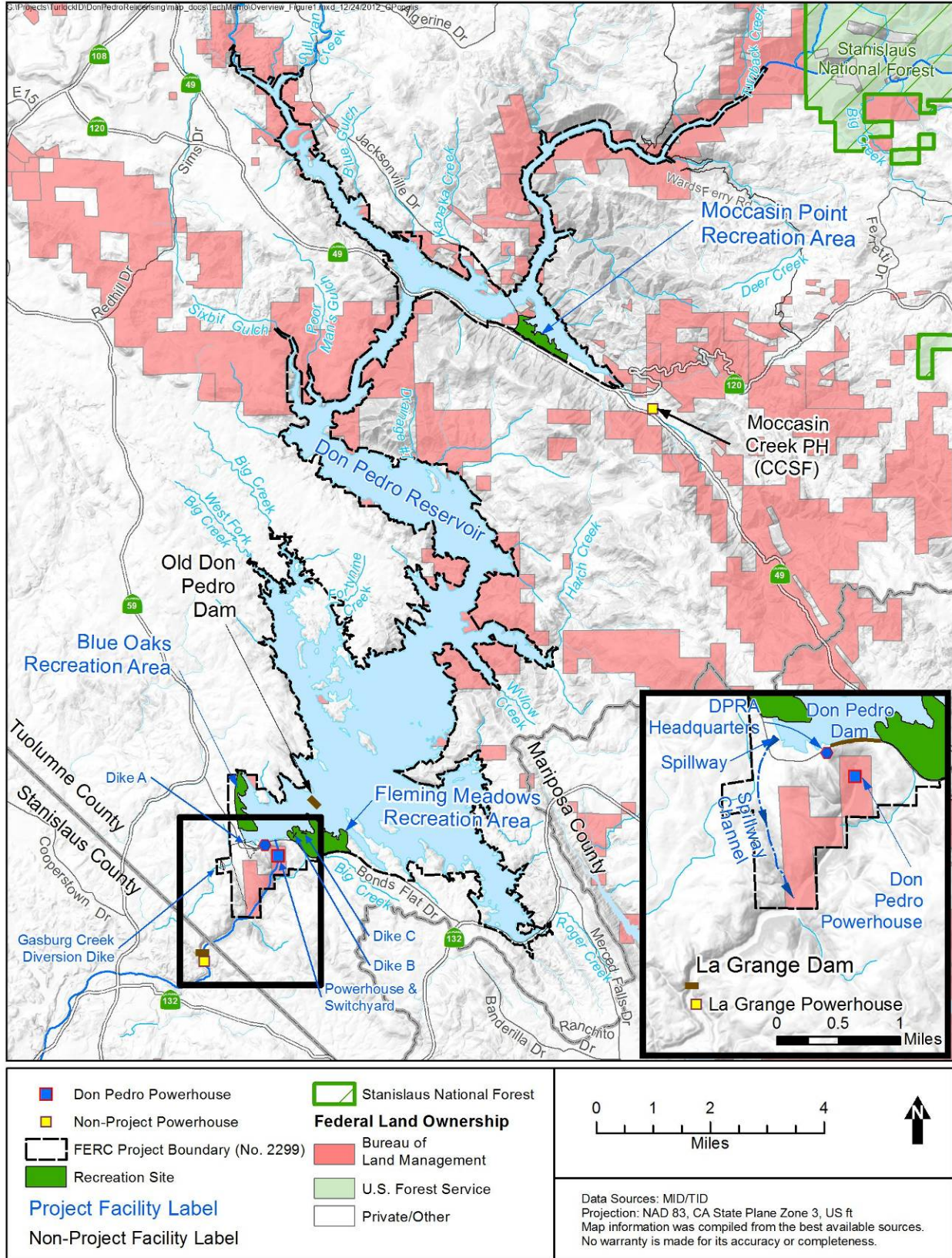


Figure 1.1-1. Don Pedro Project location.

1.2 Relicensing Process

The current FERC license for the Project expires on April 30, 2016, and the Districts will apply for a new license no later than April 30, 2014. The Districts began the relicensing process by filing a Notice of Intent and Pre-Application Document (PAD) with FERC on February 10, 2011, following the regulations governing the Integrated Licensing Process (ILP). The Districts' PAD included descriptions of the Project facilities, operations, license requirements, and Project lands as well as a summary of the extensive existing information available on Project area resources. The PAD also included ten draft study plans describing a subset of the Districts' proposed relicensing studies. The Districts then convened a series of Resource Work Group meetings, engaging agencies and other relicensing participants in a collaborative study plan development process culminating in the Districts' Proposed Study Plan (PSP) and Revised Study Plan (RSP) filings to FERC on July 25, 2011 and November 22, 2011, respectively.

On December 22, 2011, FERC issued its Study Plan Determination (SPD) for the Project, approving, or approving with modifications, 34 studies proposed in the RSP that addressed Cultural and Historical Resources, Recreational Resources, Terrestrial Resources, and Water and Aquatic Resources. In addition, as required by the SPD, the Districts filed three new study plans (W&AR-18, W&AR-19, and W&AR-20) on February 28, 2012 and one modified study plan (W&AR-12) on April 6, 2012. Prior to filing these plans with FERC, the Districts consulted with relicensing participants on drafts of the plans. FERC approved or approved with modifications these four studies on July 25, 2012.

Following the SPD, a total of seven studies (and associated study elements) that were either not adopted in the SPD, or were adopted with modifications, formed the basis of Study Dispute proceedings. In accordance with the ILP, FERC convened a Dispute Resolution Panel on April 17, 2012 and the Panel issued its findings on May 4, 2012. On May 24, 2012, the Director of FERC issued his Formal Study Dispute Determination, with additional clarifications related to the Formal Study Dispute Determination issued on August 17, 2012.

This study report describes the objectives, methods, and results of the Noxious Weeds Study (TR-04) as implemented by the Districts in accordance with FERC's SPD and subsequent study modifications and clarifications. Documents relating to the Project relicensing are publicly available on the Districts' relicensing website at www.donpedro-relicensing.com.

1.3 Study Plan

The Districts' continued operation and maintenance (O&M) of the Project may result in the spread of noxious weeds. The spread may be the result of direct actions (e.g., result of ground disturbing activities such as construction), or cumulative actions (e.g., caused by a Project activity in association with a non-Project activity such as introduction of noxious weeds from a non-Project vector).

FERC's SPD approved with modifications the Districts' Noxious Weeds study plan as provided in the Districts' RSP filing dated November 22, 2011. In its SPD, FERC ordered that the Districts include in their study area lands up to 300 feet outside the Project Boundary within

high-use recreation areas or the BLM's Red Hills ACEC, and to document the full extent of each noxious weed occurrence, up to one quarter mile outside the Project Boundary.

The Districts carried out the Noxious Weeds study consistent with each of these directives.

2.0 STUDY GOALS AND OBJECTIVES

The goal of this study was to determine the presence and distribution of existing noxious weeds within the Project study area and determine whether continued Project O&M or recreational use of Project facilities have a measurable, adverse effect (i.e., the facilitation or spread of) on noxious weeds.

The objective of the study was to collect information adequate to meet the study goals.

3.0 STUDY AREA

As specified in the FERC-approved study plan, the study area consisted of lands within the Project Boundary that are subject to Project-related O&M or recreation activities, including high-use dispersed recreation areas. The study area is shown in Figure 3.0-1 and included the following specific areas:

- The Blue Oaks, Fleming Meadows, and Moccasin Point Recreation areas and related facilities, including the 3.5-mile Don Pedro Shoreline Trail;
- High-use dispersed recreation areas, as identified by District staff;
- Lands within the Project Boundary designated as part of the BLM's Red Hills Area of Critical Environmental Concern (ACEC);
- Don Pedro Dam, Powerhouse, and Switchyard, including related maintenance and storage facilities and the powerhouse access road;
- The Don Pedro Spillway channel and related access roads;
- The Gasburg Creek diversion dike and related access roads;
- Employee housing near Don Pedro Dam;
- Don Pedro Recreation Agency headquarters and visitor center;
- Dikes A, B, and C in the vicinity of Don Pedro Dam; and
- The Ward's Ferry take-out.

The study area also included the following habitats adjacent to the lands specified above:

- Out to 300 feet (ft) or the Project Boundary, whichever is greater, within the high-use dispersed recreation areas and facilities;
- Out to 300 ft from the high water mark of the Project reservoir, or the Project Boundary, whichever is greater, within BLM lands in the Red Hills ACEC; and
- For noxious weed occurrences found within the study area, the study area was expanded to the full extent of the occurrence, or to one quarter mile outside the Project Boundary, whichever was less.¹

Per the study plan, areas with unsafe terrain, as identified in the field, were not surveyed.² These areas included dangerously steep slopes, areas of thick poison oak (*Toxicodendron diversilobum*) and other areas that were unsafe for field crews to enter. This included some of the steep slopes below the dam; a steep slope, composed of thick chaparral at Moccasin Point Recreation Area; a piece of the Willow Creek arm, due to impenetrable chamise, steep slopes and poison oak; the very tip of the Shawmut Road area, due to steep slopes; the steepest sections of the Ward's Ferry area; steep slopes in the upper area of Woods Creek Arm and a section of steep slopes on the edge of the Ramos Creek area.

¹ For the purpose of this study, this area is referred to as the possible study extent.

² A small percentage (5 percent) of the study area was inaccessible due to unsafe terrain (approximately 200 acres).

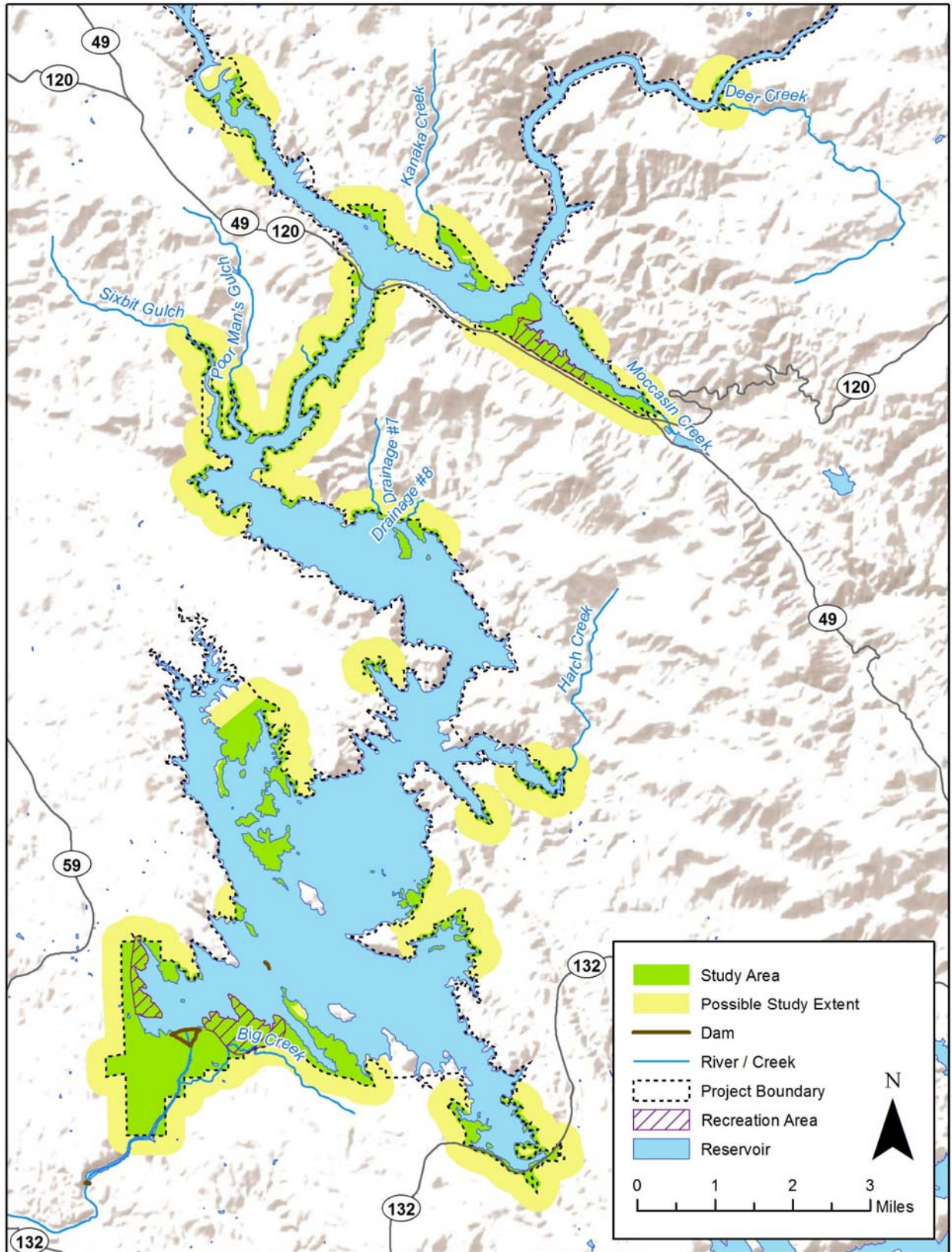


Figure 3.0-1. Noxious Weeds study area.

The Districts requested access to private lands within the areas beyond the Project Boundary, but within the possible study extent, in a letter sent to 303 landowners on February 12, 2012. Of these, 83 granted and 220 denied access to their land; private lands for which access was denied, or for which no response was received, were not surveyed.

4.0 METHODOLOGY

For the purpose of this study, noxious weeds were defined as plant species that are:

- listed as “noxious” under the Federal Plant Protection Act (FPPA);
- listed as “noxious” and with a pest rating of A, B or C by the California Department of Food and Agriculture (CDFA); or
- listed as a Target Species in the Districts’ Noxious Weed Survey Study Plan.

The study was conducted in four steps: 1) gather data and information to prepare for the field effort; 2) conduct surveys for the study area; 3) prepare data and quality assure/quality control data (QA/QC); and 4) consult with the Districts’ operations staff to identify Project O&M, or other Project-related activities, that typically occur in the area of noxious weed occurrences and have the potential to affect occurrences.

4.1 Gather Data and Prepare for Field Effort

To identify noxious weeds with the potential to occur in the study area, the Districts: 1) compiled a list of regionally known species from the Sierra-San Joaquin Noxious Weeds Alliance (2003); and 2) queried the CDFA for noxious weed listings at state and federal levels (CDFA 2012). Based on these sources, 27 noxious weeds were determined to have a reasonable potential to occur within the existing FERC Project Boundary and Project Vicinity (Table 4.1-1).

Table 4.1-1. Noxious weed species potentially occurring in the Don Pedro FERC Project Boundary, CDFA noxious weed rating, and GPS data collected.

Scientific Name	Common name	Status ¹	Data to be collected ²
<i>Acroptilon repens</i>	Russian knapweed	B	Full
<i>Aegilops triuncialis</i>	barbed goat grass	B	Qualitative
<i>Ailanthus altissima</i>	tree-of-heaven	C	Qualitative
<i>Arundo donax</i>	giant reed	B	Full
<i>Cardaria chalepensis</i>	lens-pod whitetop	B	Full
<i>Cardaria</i> spp.	Hoarycress	B	Full
<i>Carduus pycnocephalus</i>	Italian thistle	C	Qualitative
<i>Carthamus</i> spp.	distaff thistle	A, B	Full
<i>Centaurea calcitrapa</i>	purple starthistle	B	Full
<i>Centaurea diffusa</i>	diffuse knapweed	A	Full
<i>Centaurea iberica</i>	Iberian starthistle	A	Full
<i>Centaurea solstitialis</i>	yellow starthistle	C	Qualitative
<i>Centaurea stobe</i> ssp. <i>micranthos</i>	spotted knapweed	A	Full
<i>Chondrilla juncea</i>	rush skeletonweed	A	Full
<i>Cirsium arvense</i>	Canada thistle	B	Qualitative
<i>Cynodon dactylon</i>	bermudagrass	C	Qualitative
<i>Cytisus scoparius</i>	Scotch broom	A	Full
<i>Elymus caput-medusae</i>	medusahead	C	Qualitative
<i>Euphorbia oblongata</i>	oblong spurge	B	Full
<i>Hypericum perforatum</i>	Klamathweed	C	Qualitative

Scientific Name	Common name	Status ¹	Data to be collected ²
<i>Isatis tinctoria</i>	dyer's woad	B	Full
<i>Lepidium latifolium</i>	perennial pepperweed	B	Full
<i>Lythrum salicaria</i>	purple loosestrife	B	Full
<i>Salsola tragus</i>	Russian thistle	C	Qualitative
<i>Solanum elaeagnifolium</i>	white horsenettle	B	Full
<i>Tamarix</i> spp.	tamarisk	B	Full
<i>Tribulus terrestris</i>	puncturevine	C	Qualitative

Source: Sierra-San Joaquin Noxious Weeds Alliance 2003; CDFA 2010b.

¹ CDFA Noxious Weed Rating: A-rated weeds are highest priority for eradication in the State, followed by B- and then C-rated.

² Data to be collected:

Full = use GPS to delineate an occurrence polygon for any occurrence > 0.1 acre; an occurrence line delineated for any linear occurrence > 100' (e.g., along a road); smaller occurrences mapped by a single GPS point central to the occurrence.

Qualitative = distribution of species to be described generally but with specific reference to Project features. For discrete occurrences, collect a single GPS point taken near the center of the occurrence.

For description of other (non-GPS) data to be collected, see text.

4.2 Botanical Surveys

Botanical surveys were completed on approximately 3,870 acres (ac) between March 5 and June 29, 2012. Noxious weed surveys were conducted in conjunction with other relicensing studies including Special-status Plants (Study TR-01); ESA-listed Wildlife – Valley Elderberry Longhorn Beetle (Study TR-05); and ESA- and CESA-listed Plants (Study TR-02) (TID/MID 2013). Results of these surveys are discussed in their respective study reports. Surveys were carried out by qualified botanists on foot and by boat during the appropriate phenological period for accurate plant identification. Resurveys were conducted at areas and features on where potential noxious weed species were not at the correct phenology for proper identification, particularly in areas containing late blooming species.

Surveys were floristic in nature and generally followed CDFG's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009). Plants were identified using the *Jepson Manual of Higher Plants of California* (Baldwin *et al.* 2012), *A field guide to Pacific States wildflowers: Washington, Oregon, California, and adjacent areas* (Niehaus and Ripper 1976), *Trees and shrubs of California* (Stuart and Sawyer, 2001), *Wildflowers of the Sierra Nevada and the Central Valley* (Blackwell 1999), *Field Guide to the Sedges of the Pacific Northwest* (Wilson *et al.* 2008) and *Selected Plants of Northern California and Adjacent Nevada* (Oswald 2002). As detailed in the FERC-approved study plan, surveys were conducted using a random meander technique with additional focus in areas with a higher probability of supporting noxious weeds.

At each weed occurrence, the following information was recorded: activities observed in the vicinity of the population that have a potential to spread noxious weeds, estimated phenology, if occurrence was diffuse or concentrated, acreage class³ and descriptions of reproductive state of that weed occurrence. For those species where “full” data were indicated (see Table 4.1-1), GPS was used to delineate a polygon for any occurrence that was greater than 0.1 ac. GPS was used to delineate a line for any linear occurrence greater than 100 ft. Smaller occurrences were mapped by a single GPS point central to the occurrence. For those species where “qualitative”

³ There were four acreage classes for “qualitative” weeds: 0-0.1 acre, 0.1-0.25 acre, 0.25-4.0 acre, and > 4 acres.

data were indicated, a single GPS point was taken near the center of the occurrence.

QA/QC procedures included: daily QA/QC of field data sheets, spot-checks of transcription during data compilation, and comparison of Geographic Information System (GIS) maps with field notes and field maps to verify locations. Data were entered into a database and crosschecked by a second scientist to ensure data were properly recorded. GIS maps, depicting the occurrences, Project facilities and features, were generated to display field collected GPS information and used as a second method to verify that all noxious weed occurrence locations matched the information on the data sheets. Any data corrections were noted in the Project file.

Prior to field work, the Districts' staff was consulted in the development of maps of all areas potentially affected by Project O&M and Project-related recreation, including dispersed recreation. After all observed noxious weed occurrences were verified and mapped, Project operations staff was consulted to identify Project O&M, recreation and other Project-related activities that typically occur in the area of the noxious weed occurrences that have a potential to adversely affect the occurrences.

5.0 RESULTS

Of the 704 plant species⁴ found during floristic surveys, 12 noxious weed species were observed and mapped (Attachment A). Following their identification, life history information for each of the 12 species was also compiled.

5.1 Noxious Weed Occurrence Summary

The study team recorded 636 occurrences of 12 noxious weed species in the study area:

- Barbed goat grass (*Aegilops triuncialis*)
- Tree-of-heaven (*Ailanthus altissima*)
- Giant reed (*Arundo donax*)
- Italian thistle (*Carduus pycnocephalus*)
- Smooth distaff thistle (*Carthamus creticus*)
- Yellow starthistle (*Centaurea solstitialis*)
- Bermudagrass (*Cynodon dactylon*)
- Medusahead grass (*Elymus caput-medusae*)
- Klamathweed (*Hypericum perforatum*)
- Russian thistle (*Salsola tragus*)
- Tamarisk (*Tamarix* sp.)
- Puncturevine (*Tribulus terrestris*)

The most widespread weed identified was Italian thistle, which was ubiquitous throughout the study area.⁵ Bermudagrass was also common, occurring in a band around Don Pedro Reservoir just below high water mark, as well as an additional 76 occurrences. Other frequently located weeds included Medusahead grass with 317 occurrences and Klamathweed with 158 occurrences.

Of the total noxious weed occurrences, eight species were observed at 85 occurrences on public lands administered by the BLM. On BLM lands, there were four barbed goatgrass, three tree-of-heaven, one giant reed, six smooth distaff thistle, 17 yellow starthistle, 19 Bermudagrass, 24 Medusahead grass and 11 Klamathweed occurrences recorded. Barbed goatgrass, giant reed, and smooth distaff thistle are CDFA B-listed species, while Klamathweed, Medusahead grass, yellow starthistle, and tree-of-heaven are CDFA C-listed species (CDFA 2010b). Bermudagrass is considered a nuisance weed by the BLM.

⁴ A complete list of all 704 plant species found during floristic surveys performed in support of the Don Pedro Project relicensing is included in the Districts' Study Report TR-01, Special-Status Plants.

⁵ Individual occurrences of Italian thistle were not recorded because the species was ubiquitous throughout the study area.

5.2 Noxious Weed Descriptions

Twelve noxious weed species were located within the Project study area; barbed goatgrass, Tree-of-Heaven, giant reed, Italian thistle, smooth distaff thistle, yellow starthistle, Bermudagrass, Medusahead grass, Klamathweed, Russian thistle, tamarisk and puncturevine. None of the observed weeds are federally listed by FPPA, but barbed goatgrass, tree-of-heaven, giant reed, Italian thistle, smooth distaff thistle, yellow starthistle, Klamathweed, Medusahead grass, Russian thistle, tamarisk and puncturevine are CDFA state-listed. Four of these species, barbed goatgrass, giant reed, smooth distaff thistle and tamarisk, are CDFA B-listed. Noxious weeds occurred throughout a full range of habitat types within the study area. Specific descriptions of the locations and area of infestation are summarized in Sections 5.3-1 through 5.3-12. Attachment A indicates locations of noxious weed occurrences within the study area, and information regarding each of the noxious weed occurrences is summarized in Attachment C. Representative photos of noxious weed occurrences are located in Attachment B.

5.2.1 Barbed Goatgrass

Barbed goatgrass is a winter annual species introduced from Mediterranean Europe and western Asia. The species is known to form near monotypic stands of 50 percent cover or more (Cal-IPC 2004b) with fibrous roots that develop rapidly (CDFA 2012) and is widespread in the foothill grasslands of Central California. The species is often found in disturbed roadside environments but has been found within sites that have moisture available and throughout open grassy areas (Cal-IPC 2004b). Barbed goatgrass is dispersed by livestock, human activities, water and wind and reproduces by seed (CDFA 2012). The species is CDFA B-listed, meaning eradication, containment, control or other holding action of the species is at the discretion of the commissioner (CDFA 2010).

Five occurrences of barbed goatgrass were surveyed at three locations: four occurrences on public lands administered by the BLM (two at Sixbit Gulch and two at Poor Man's Gulch), and one occurrence on Districts' land above Recreation Bay. Over ten thousand stems were estimated to occur located in these occurrences, primarily in Sixbit and Poor Man's gulches. The estimated area of the combined occurrences is approximately 21.6 ac.

5.2.2 Tree-of-Heaven

Tree-of-heaven is a tree species introduced from China in the late 1700s (USDA 2012b). The species can have a negative allelopathic effect⁶ on other vegetation, giving it a competitive advantage in colonization. The tree is adapted to a wide range of habitat conditions and tolerant of both anthropogenic and natural disturbance, and is able to spread clonally via root suckers and generate large quantities of seeds. Additionally, tree-of-heaven is known to basal sprout when stems are cut (Cal-IPC 2003a). This species is CDFA C-listed, meaning no state action is required except to retard the speed of spreading (CDFA 2010).

Tree-of-Heaven was found at seven occurrences at three locations: one on Districts' land at Fleming Meadows Point, three on Districts' and private land at Shawmut Road and three on

⁶ Allelopathic effect refers to the beneficial or harmful effects of one plant on another plant.

lands administered by the BLM below Don Pedro Dam and the Powerhouse. Nearly 150 trees were counted at these occurrences. The estimated area of the combined occurrences was less than an acre.

5.2.3 Giant Reed

Giant reed is a large grass believed to have been introduced from Asia in the 1800s. It typically will colonize the banks of waterways and can root from the nodes of broken stems. The species can displace native riparian vegetation, shade out competing lower level plant species and increase water temperatures due to a reduction in shade provided by native trees that it outcompetes. The spread of the species can be locally slow because the species only reproduces asexually; however, in periods of flood events and mechanical damage, the overall spread is considered to be rapid (Cal-IPC 2003b). New infestations can develop downstream in undisturbed habitats from fragmentation of upstream populations. This species is CDFA B-listed, meaning eradication, containment, control, or other holding action is at the discretion of the commissioner (CDFA 2010).

Giant reed was found at one location on BLM land, at a turn along the Don Pedro Powerhouse Access Road. There were over five hundred plants growing in an area of approximately 0.1 ac.

5.2.4 Italian Thistle

Italian thistle is an annual (occasionally biennial) native to the Mediterranean region and is a widely distributed weed in the Sierra Nevada foothills. Occurrences can reach nearly 100% cover in some areas and inhibit the recruitment and survivorship of natives. Plants are considered to spread aggressively by seed, which can travel long distances by wind. Seeds can persist for 7-10 years and germinate under drought conditions (CDFA 2012). This species is CDFA C-listed, meaning no state action is required except to retard the speed of spreading (CDFA 2010).

Italian thistle is prevalent throughout the Project, particularly in annual grasslands and blue oak woodlands of Don Pedro reservoir. Italian thistle was found in denser patches in shady areas and wet drainages, but also grew in more diffuse occurrences in sunny grasslands and on exposed slopes. The only areas where Italian thistle was less common were the Red Hills ACEC and dense areas of chamise. Even there, Italian thistle grew in openings and disturbed areas. There were hundreds of thousands of plants covering many acres through the study area.

5.2.5 Smooth Distaff Thistle

Smooth distaff thistle is a winter annual species, introduced from the Mediterranean. The plant forms a slender, elongated taproot with many fibrous roots (CDFA 2012). The species is known to form dense stands, out-competing other species for moisture, light and nutrients (Cal-IPC 2005). The plant inhabits disturbed areas of open grasslands weakened by overgrazing, pastures and agricultural lands. Distaff thistle reproduces by seed. The vast majority of the seeds are dispersed passively near the parent plant, attach to animal fur, by water or will remain in the persistent seed heads (CDFA 2012). Each plant produces as many as 255 viable seeds with most

germinating within two years but can remain viable up to eight years (Cal-IPC 2005). This species is CDFA B-listed, meaning eradication, containment, control or other holding action of the species is at the discretion of the commissioner (CDFA 2010).

Smooth distaff thistle was found at fifteen locations: six occurrences on public lands administered by the BLM and nine occurrences on Districts' lands. Of these, six were on Kanaka Point, five were near or along Jacksonville Road, three were in Moccasin Point Recreation Area and one was on Woods Creek Arm. Approximately 1600 plants were counted over a combined area of nearly two acres.

5.2.6 Yellow Starthistle

Yellow starthistle is an annual, sometimes biennial, species that is highly competitive and will typically develop into very dense stands, displacing native vegetation in otherwise natural areas. The species was originally introduced from southern Europe into California around 1850. It has since infested extremely large areas within the state. This species is a prolific seed producer, producing seeds at levels of 10,000 per square meter, which remain viable in soil for three or more years. Seeds can be transported by human vectors, including the movement of contaminated hay and infested equipment or vehicle transport. Some seeds are dispersed by wind, or birds and mammals after ingestion (CDFA 2012). This species is CDFA C-listed, meaning no state action is required except to retard the speed of spreading (CDFA 2010).

Yellow starthistle was found at a total of thirty-eight occurrences; four near the Grizzly Road area, two at the Highway 49 bridge, five occurrences at multiple locations along Jacksonville Road, four within or near Kanaka Point, nineteen within or near Moccasin Point Recreation Area and single occurrences at Poor Man's Creek, Shawmut Road, Wood's Creek Arm and within the Moccasin Transmission line area. Seventeen of these occurrences were located on public lands administered by BLM, while the rest (21) were located on Districts' or private lands. Tens of thousands of individual plants were observed in these occurrences, which were estimated to cover over 20 acres.

5.2.7 Bermudagrass

Bermudagrass is a sod-forming, perennial species introduced from Africa. The species is known to form extensive networks of creeping rhizomes and stolons. The species can form dense ground covering mats which inhibit native vegetation and fragment habitat. Additionally, it is thought to have potent negative allelopathic effects on nearby vegetative communities (Cal-IPC 2004a). Bermudagrass favors disturbed sites, gardens, agronomic crops, orchards, turf, landscaped, and forested areas. It prefers moist soil types in irrigated areas, or areas that receive some warm seasonal moisture (CDFA 2012). The species can be spread through seed and vegetatively. Long distance dispersal may be achieved via contaminated hay, livestock feed, soil movement, and transport of mowing equipment and vehicles (Cal-IPC 2004a). This species is CDFA C-listed, meaning no state action is required except to retard the speed of spreading (CDFA 2010).

Bermudagrass was found growing in a thin band below the high water mark around Don Pedro Reservoir. The Districts also documented an additional seventy-six occurrences at other locations within the study area. The majority of these additional occurrences grew in disturbed areas within recreation sites and along roadways. Nineteen of these occurrences were located on public lands administered by BLM, while the rest (57) were located on Districts' or private lands. The 76 additional occurrences were estimated to contain over 50,000 plants (due to the rhizomal nature of this species, individuals are difficult to differentiate) on around 20 ac, but the bulk of this plant occurs under the high water mark.

5.2.8 Medusahead Grass

Medusahead grass, a noxious annual introduced from Europe, is a regular invader of rangeland communities, developing dense stands and displacing native vegetation and wildlife. Medusahead grass is unpalatable to livestock, except during the early growth stages. Senesced individuals form dense layers of litter that decompose slowly, creating fuel for wildfire and altering moisture characteristics in the soil. This species tends to colonize disturbed sites, including grassland, oak woodland, and agronomic fields. A prolific seed producer, seeds are dispersed locally via wind and water, and achieve long distance dispersal through movement of contaminated soil, clinging to the feet and fur of animals, and various human activities (CDFA 2012). This species is CDFA C-listed, meaning no state action is required except to retard the speed of spreading (CDFA 2010).

Medusahead grass was found at nineteen locations with a total of 317 occurrences. These occur mostly in large, diffuse patches within annual grasslands. Twenty-four of the occurrences were located on public lands administered by the BLM, while the rest (293) were on Districts' and private lands. Hundreds of thousands of plants were observed.

5.2.9 Klamathweed

Klamathweed, also known as St. Johnswort, is a perennial native to Europe that displaces native plants. Plants spread aggressively by rhizomatous growth and through seed dispersal, with seeds remaining viable for up to 10 years. Known long-distance vectors include vehicle tires and other heavy equipment, while wind, water and soil movement provide short-distance dispersal (CDFA 2012). This species is CDFA C-listed, meaning no state action is required except to retard the speed of spreading (CDFA 2010).

Klamathweed was found at thirteen locations with a total of 158 occurrences. Eleven of the occurrences were located on public lands administered by the BLM, while the rest (147) occupied Districts' or private lands. Over one- hundred thousand plants were observed.

5.2.10 Russian Thistle

Russian thistle is a summer annual species introduced from Eurasia. Adult plants break off at ground level under windy conditions allowing plants to disperse numerous seeds as they tumble. This species is strongly competitive in semiarid areas and persist in dryland cropping systems, overgrazed rangelands, roadsides and waste areas (CDFA 2012). Seedlings require loose soil

for successful establishment, often being the first to colonize disturbed sites. Although the species is believed to lack the ability to dominate native plant communities, it may influence the abundance of some native grass species and also compete with them for water and nutrients. This thistle species does, however, have a significant effect on the dispersal of wind-borne seeds of native plants (Cal-IPC 2004c). This species is CDFA C-listed, meaning no state action is required except to retard the speed of spreading (CDFA 2010).

Russian thistle was found at two locations: one occurrence on Districts' land in the DPRA staff housing area and one occurrence on Districts' land within the Blue Oaks Campground. The occurrences covered less than 0.1 ac and contained about 35 plants.

5.2.11 Tamarisk

Tamarisk, also known as saltcedar, is a multi-branched tree introduced from central Asia with small scale-like leaves that have salt glands (Cal-IPC 2012). Trees typically develop a deep, extensive root system and access deep soil groundwater and surface water. The roots extract salts from deep soil layers and excrete them from the leaves (Cal-IPC 2006). This salt is then deposited on the soil surface with the leaf litter, increasing the salinity of the upper soil profile and inhibiting the growth, survival and recruitment of native vegetation (Cal-IPC 2006). Tamarisk reproduces by seed and sometimes vegetatively from root sprouts and stem fragments. A tree can produce up to 500,000 seeds per year that disperse by wind and water. Roots also sprout adventitiously. Disturbed sites are particularly favorable for tamarisk establishment. It thrives on saline soils where most native, woody, riparian plants cannot survive (Cal-IPC 2012). This species is CDFA B-listed, meaning eradication, containment, control or other holding action of the species is at the discretion of the commissioner (CDFA 2010).

Tamarisk was found at one location. Ten plants were located on Districts' land adjacent to a restroom facility within the Moccasin Point Recreation Area, in an occurrence approximately 0.1 ac in size.

5.2.12 Puncturevine

Puncturevine is a summer annual that was once considered one of California's most troublesome weeds. The species is now controlled by the stem weevil (*Microlarinus lypriformis*) and the seed weevil (*Microlarinus lareynii*), both introduced in 1961 from Italy. Puncturevine produces burrs with spines robust enough to injure people and animals. The foliage is toxic to livestock, especially sheep, when consumed in large quantities. Puncturevine prefers disturbed habitat such as roadsides, railways, cultivated fields, waste areas, and walkways. Dispersal is achieved through seeds adhering to tires, shoes, and clothing of people and the fur, feathers, and feet of animals. Newly matured seeds are generally dormant, requiring a 6-12 month after ripening period to germinate. Buried seeds can retain viability for several years (CDFA 2012). This species is CDFA C-listed, meaning no state action is required except to retard the speed of spreading (CDFA 2010).

Three occurrences of puncturevine were found on Districts' lands within Fleming Meadows Recreation Area. All occurrences are found along the paved road to the marina and contained around 50 plants. The estimated area of the combined occurrences was approximately 0.02 ac.

5.3 Terrestrial Vegetation Types

The botanical communities within the study area included primarily upland vegetation alliances, with minimal areas of wetland, riparian, or littoral habitats. The Project study area was comprised of tree-dominated, shrub-dominated or grass-dominated communities. Vegetation classification types described below are based on CALVEG systems (USFS 2012a), as identified in the PAD, and reflect the habitats observed during field surveys.

The study area was dominated by three vegetation alliances: Blue Oak, Chamise, and Annual Grasses and Forbs. There were also large areas of Gray Pine, and smaller inclusions of Lower Montane Mixed Chaparral and Interior Live Oak.

The shoreline of Don Pedro Reservoir is predominantly Blue Oak, and Annual Grasses and Forbs. Willow Creek Arm, Hatch Creek Arm, and Don Pedro Bar are dominated by Chamise. The Tuolumne Arm and Wood's Creek Arm are composed of a mixture of alliances, including Lower Montane Mixed Chaparral, Chamise, Interior Live Oak, Gray Pine, Annual Grasses and Forbs and a few small areas of Riparian Mixed Hardwoods.

5.4 Project Operation and Maintenance and Recreation Activities

Consistent with the FERC-approved study plan, the study team consulted with Project operations staff to identify specific project O&M activities and recreation that typically occur in the study area and have the potential to affect, noxious weed occurrences. Information gathered from this consultation is summarized in Table 5.4-1.

Noxious weeds were found throughout the study area, so that the occurrences overlapped with most Project O&M activities, as well as recreation, grazing and road use. Some occurrences were specifically noted to be in areas potentially affected by Project O&M:

- Graded- tree-of-heaven (occurrence number 900⁷); yellow starthistle (occurrence numbers 230, 262, 1208); Bermudagrass (occurrence numbers 278, 280-1); and Medusahead grass (occurrence numbers 158-9 and 437).
- Mowed- Bermudagrass 582; Medusahead grass 374, 380, 552, 570-1, 575-8, 581, 583-4, 586-7, 590 and 599; and Klamathweed 228.
- Sprayed- Medusahead grass 1268-9.
- Within waste or storage area- distaff thistle 266; Bermudagrass 178, 192; and Medusahead grass 175 and 176.

⁷ Occurrence numbers are not sequential; details on each are provided in Attachments A and C.

- Below reservoir high-water mark- barbed goatgrass 669; tree-of-heaven 903; distaff thistle 109, 216, 285, 672; yellow starthistle 286; Medusahead grass 403, 412, 415-6, 423, 426, 496, 515, 533, 547, 950; and Klamathweed 497.

Additionally, grading and removal of flood debris occurred once near occurrences 109 and 672 of smooth distaff thistle at Kanaka Point.

Table 5.4-1. Project O&M, recreation, and non-Project uses in areas with noxious weed occurrences.

Location Description	Species (common name)	Occurrence Number	Activities with Potential to Affect Noxious Weeds		
			O&M	Recreation Use	Non-Project Use
Moccasin Point Recreation Area and surroundings	Yellow starthistle	26, 30, 34-35, 38-39, 51, 59, 62-64, 70, 96, 106, 112, 115, 117, 119, 123, 127, 262, 265, 1286	Campsites, structures and roadsides (up to 6-10 ft adjacent to roads and turnouts) are sprayed with herbicides annually (generally Roundup, Goaltender and Milestone) after first soaking rain in the fall.	Recreation is heaviest during high water years in the summer months. Campsites are full usually only on holidays and weekends. Walk-in use area is used heavily year-round to access the reservoir.	Hetch Hetchy facility and housing in area maintained by Hetch Hetchy.
	Bermudagrass	57, 65, 111, 114, 261, 264, 1287			
	Klamathweed	22, 27-29, 31, 33, 41, 56, 97-102, 105, 107-108, 113, 116, 118, 120, 124-126, 258, 260, 1289-1291	Campgrounds and associated roads are also mechanically mowed/weed-eaten. Districts conduct infrequent prescribed burns of vegetation directly in and around developed camping areas.	Grizzly Road area used heavily for day use off end of cul-de-sac.	Grizzly Road maintained by county.
	Smooth distaff thistle	266, 268-269			
	Medusahead grass	40, 61, 69, 95, 103-104, 122, 267, 1288			
	Tamarisk	259			
Hwy 49 bridge and surroundings	Yellow starthistle	205, 648	--	Heavy boat use year round but limited land use in area.	Roads and pullouts maintained by CalTrans.
Powerhouse/Dam access, DPRA Headquarters and surroundings	Bermudagrass	130-131, 145-147, 169-170, 517, 519, 622, 624-625, 635, 931	Districts use dirt roads to the dam a few times a year, and paved roads daily. Districts mechanically mow the roadsides (up to 2 feet adjacent to road) annually.	--	Boating off private property.
	Klamathweed	135-136, 148, 150, 908, 910-911, 913-914, 916-917			

Location Description	Species (common name)	Occurrence Number	Activities with Potential to Affect Noxious Weeds		
			O&M	Recreation Use	Non-Project Use
Powerhouse/Dam access, DPRA Headquarters and surroundings (con't)	Medusahead grass	132-134, 137-140, 149, 152-166, 171-174, 179-187, 518, 626, 628, 631, 634, 636, 640-643, 901, 905-906, 909, 912, 915, 918-921, 928-930, 932	Structures, roadsides and around staff housing area (up to 6-10 ft adjacent to roads and turnouts) are sprayed with herbicides annually (generally Roundup, Goaltender and Milestone) after first soaking rain in the fall. Permitted grazing on far side of spillway.	--	--
	Giant Reed	907			
	Tree-of-Heaven	900, 902-903			
Hatch Creek Area	Bermudagrass	209-211, 215	Recently installed fence at Marsh's Flat Rd. Districts conduct trash collection in area.	Sporadic day use recreation by fishermen from road. Home owners allowed to moor boats at shoreline with permit.	ATV use, non-permitted grazing.
	Klamathweed	213-214			
Moccasin transmission line area	Bermudagrass	276-281	--	Shoreline house boating and sporadic day use off the reservoir.	Hetch Hetchy maintains the transmission line and access roads in the area. Non-permitted grazing occurs in area.
	Medusahead grass	934, 936			
	Yellow starthistle	935			
Shawmut Road	Bermudagrass	252	--	This area is open for free day use. No camping. Fairly heavy use, particularly during summer months.	Road maintained by county.
	Medusahead grass	255			
	Yellow starthistle	246, 253-254			

Location Description	Species (common name)	Occurrence Number	Activities with Potential to Affect Noxious Weeds		
			O&M	Recreation Use	Non-Project Use
Blue Oaks Recreation Area, Sewage Treatment Ponds and surroundings	Bermudagrass	178, 191-192, 197, 300, 336, 345, 360, 371, 397-398, 413-414, 421, 601-602	Campsites, structures, Shoreline Trail and roadsides (up to 6-10 ft adjacent to roads and turnouts) are sprayed with herbicides annually (generally Roundup, Goaltender and Milestone) after first soaking rain in the fall. Campgrounds and associated roads are also mechanically mowed. Prescribed burns of vegetation directly in and around developed camping areas is a potential tool, but not used often. Mechanical vegetation management on hillside before the 4th of July for annual fireworks display and parking.	Recreation is heaviest during the summer months. Campsites are usually full on holidays and weekends. Shoreline Trail is not highly used except in summer months.	Non-permitted grazing (recent fencing repairs may limit future grazing).
	Medusahead grass	175-177, 189-190, 193-196, 199-200, 323, 330-331, 333, 335, 341, 344, 355, 372-386, 388-396, 399-400, 402-412, 415-420, 422-424, 426-430, 600			
	Klamathweed	188, 198, 401			
	Russian thistle	425			

Location Description	Species (common name)	Occurrence Number	Activities with Potential to Affect Noxious Weeds		
			O&M	Recreation Use	Non-Project Use
49er Bay, Mine Island and surroundings	Bermudagrass	941-942	--	Heavy use for boat-in and houseboat camping during summer months, with most activity on or near the reservoir.	Non-permitted, heavy grazing.
	Medusahead grass	644-646, 651, 662, 664-666, 937-940, 943-960			Cabin in area and potential non-grazing within FERC boundary. Fences in local area, some well maintained.
Kanaka Point, Jacksonville Road, Harney Lane and surroundings	Yellow starthistle	91, 94, 218-219, 230, 234, 238, 242, 1208	Mow edge of access road to 6-10 feet off the side to limit fire hazard.	Popular, free area for day-use, particularly fishing. People hike in both directions from Kanaka Point parking area to access the reservoir.	Kanaka Point access road maintained by county but infrequently.
	Bermudagrass	92, 222-223, 231, 236-237, 243-245, 247	Area graded within Kanaka Point for one-time removal of debris left after flood; evidence of disturbance still remains.		
	Medusahead grass	1210	Burn woody debris below HWM at Harney Lane area; approx. 8 piles.	Sporadic day use from Harney Lane; park at turn-around and walk to reservoir.	Trash dumping off the end of the open access area within Kanaka Point area.
	Klamathweed	221, 224-228, 232-233, 235, 240-241, 1209, 1211			
Kanaka Point, Jacksonville Road, Harney Lane and surroundings (con't)	Smooth distaff thistle	109, 216, 229, 239, 248-251, 270, 671-672	Installed fence to prevent dumping at Harney Lane area.		Evidence of mining in Kanaka Point area.
Willow Creek Area	Klamathweed	680	--	Little activity in area besides fishermen on the reservoir. Some recreation from home owners in area walking from road to shoreline.	Non-permitted grazing.
Sixbit & Poor Man's Gulch	Yellow starthistle	962	--	Little activity in area besides fishermen on the reservoir.	Non-permitted grazing.
	Bermudagrass	667, 670			
	Barbed goatgrass	668-669, 961, 963		Some recreation from above, particularly horse riding.	

Location Description	Species (common name)	Occurrence Number	Activities with Potential to Affect Noxious Weeds		
			O&M	Recreation Use	Non-Project Use
Green Bay	Medusahead grass	648, 677-679	--	Heavy use for boat-in camping with some hiking in surrounding areas.	Non-permitted grazing.
Schoolhouse Area	Medusahead grass	201-204	--	Light use as boat-in and houseboat camping during summer months.	Non-permitted grazing.
Fleming Meadows Recreation Area and surroundings	Bermudagrass	76, 87, 551-552, 556, 565-566, 572, 579-580, 582, 585, 595, 1213, 1218-1219, 1248, 1261, 1281	Campsites, structures and roadsides (up to 6-10 ft adjacent to roads and turnouts) are sprayed with herbicides annually (generally Roundup, Goaltender and Milestone) after first soaking rain in the fall. Permitted grazing occurring.	Recreation is heaviest during the summer months. Campsites are usually full on holidays and weekends. Some boat-in recreation on the far side of Fleming Point.	--
	Tree-of-Heaven	11	Campgrounds and associated roads are also mechanically mowed/weed-eaten. Permitted grazing occurring.	Recreation is heaviest during the summer months. Campsites are usually full on holidays and weekends. Some boat-in recreation on the far side of Fleming Point.	--
	Klamathweed	44, 47, 74, 77, 82, 597-598, 1201-1202, 1263, 1273, 1276, 1285	Prescribed burns of vegetation directly in and around developed camping areas is a potential tool, but not used often. Permitted grazing occurring.		--
	Puncturevine	1205, 1267, 1280	Spray coffer dam with pre-emergent (generally Roundup or Surflin) and mechanically mow in row near dikes B & C.		--

Location Description	Species (common name)	Occurrence Number	Activities with Potential to Affect Noxious Weeds		
			O&M	Recreation Use	Non-Project Use
	Medusahead grass	45, 48, 72-73, 75, 78-80, 83-84, 88, 90, 539-540, 546-550, 553, 557-560, 564, 567-571, 575-578, 581, 583-584, 586-594, 596, 599, 1200, 1203, 1207, 1212, 1214-1217, 1219-1221, 1226-1228, 1230, 1237-1241, 1243-1245, 1249, 1251-1253, 1257-1259, 1262, 1264, 1268-1272, 1274-1275, 1277-1279, 1282, 1284	Permitted grazing from the road to the coffer dam as well as on the entirety of Fleming Point.		--
Ramos Creek Area	Medusahead grass	653	--	Sporadic day use by recreationists boating into the area.	Non-permitted grazing throughout area. Residential use and roads. Recreation and vegetation management by home owners in area.
	Klamathweed	652, 654-661			
Rogers Creek Arm	Bermudagrass	463, 470, 473, 525, 542	Occasional use of the old access road.	Heaviest day use area, particularly during the summer weekends and holidays. Walk-in access near the area of pullouts along the road.	Fencing and non-permitted grazing throughout area. Trash dumping off the side of the road. ATV use. County maintained road with heavy car use.
	Medusahead grass	437, 441-444, 455, 465-466, 468-469, 496, 509, 512, 515, 520-524, 526-530, 531-537, 541, 543-545			
	Klamathweed	431-436, 438-440, 445-458, 460-462, 464, 467, 471-472, 474-488, 490-495, 497-506, 510-511, 513-514, 538	Maintain fences as needed; pick up trash; maintain barrier to vehicle access.		

Location Description	Species (common name)	Occurrence Number	Activities with Potential to Affect Noxious Weeds		
			O&M	Recreation Use	Non-Project Use
Ward's Ferry Bridge	Klamathweed	257	Districts maintain restrooms exclusively for rafters.	Rafting take-out use from April to September.	Large amounts of trash dumping.
				Heavy use area for recreationalists year-round.	
Woods Creek Arm	Medusahead grass	287	Occurrences below HWM.	Little activity in area besides fishermen on the reservoir.	--
	Smooth distaff thistle	285			
	Yellow starthistle	286			
Recreation Bay	Bermudagrass	282	--	Sporadic use by recreationists boating/camping in the area.	Non-permitted grazing. Hetch Hetchy maintains the transmission line and access roads in the area.
	Barbed goatgrass	283			
	Medusahead grass	284			
Gasburg Dike	Medusahead grass	167, 923, 925-926	Gate opened once per year to the channel.	--	--
	Klamathweed	168, 922, 924, 927	Road is driven approx. 6 times per year. Spray near dike with pre-emergent (generally Roundup or Surflin) and weed-eat post emergent.	--	--
Don Pedro Bar	Medusahead grass	674, 676	Past revegetation project at the old gravel mine.	Heavy use for boat-in camping with some hiking in surrounding areas.	Non-permitted grazing.
	Klamathweed	673, 675, 681-682, 684	Districts use private road during recreation season to maintain restroom facility.		
	Bermudagrass	650, 683			

6.0 DISCUSSION AND FINDINGS

Noxious weed surveys were conducted over approximately 3,870 terrestrial acres from March 5, 2012 through June 29, 2012. Twelve noxious weed species were located at 636 occurrences. Of the 12 species, four were CDFA B-listed: barbed goatgrass, giant reed, smooth distaff thistle and tamarisk. CDFA B-listed weeds are usually subject to eradication on BLM lands and can be subject to eradication on all lands (CDFA 2010). Of the 22 occurrences of CDFA B-listed weeds, 11 of them occurred on BLM lands. This included four occurrences of barbed goatgrass in and two occurrences of distaff thistle directly adjacent to the Red Hills ACEC.

FERC's Scoping Document 2 identified the following issues potentially affecting noxious weeds:

- Potential effects of project operation, including recreation, water level fluctuations, ground-disturbing activities, and maintenance on the presence and spread of noxious weeds, including yellow star-thistle.
- Effects of vegetation clearing for project maintenance on wildlife and botanical resources, and the presence and spread of noxious weeds.

Don Pedro Project O&M includes normal operations within the currently licensed elevation range (up to 830 feet), as well as operation of three formal recreation areas (Moccasin Point, Blue Oaks, and Fleming Meadows), vegetation management within these recreation areas and Project facilities, and ongoing reservoir debris removal and disposal. Recreation activities occur along portions of the shoreline and include dispersed camping, fishing and hiking. Additionally, the Districts have granted four grazing permits on a limited area within the Project Boundary, on a total of 559 acres. The main potential contributors to the spread of noxious weeds in the study area are roads, recreational use and livestock grazing. Certain aspects of Project O&M may have an effect as well.

Nearly 100 occurrences of noxious weeds were documented along or in roads within the Project area. Vehicles carry noxious weed seeds and plant parts long distances, and roadsides provide disturbed habitat for weed colonization. One CDFA B-listed weed, distaff thistle, was located at two locations along roads; one location on Jacksonville Road and one on the Harney Road. The most common weeds along and on roads were Bermudagrass, Medusahead grass and Klamathweed. Roads in and along the Fleming Meadows and Moccasin Point Recreation Areas were particularly prone to noxious weed occurrences. The only two documented occurrences of puncturevine were found along roads in Fleming Meadows Recreation Area.

All areas of concentrated recreation were found to support noxious weed occurrences, with nearly 150 occurrences located in or around recreation areas. Recreationists cause disturbances, which can create areas for noxious weed colonization. Additionally, recreationists carry seeds and plant parts on their clothing, vehicles and other equipment. Seven of the fifteen occurrences of the CDFA B-listed weed, distaff thistle, were located in areas of heavy recreation use, such as Moccasin Point Recreation Area and Kanaka Point. Additionally, the one occurrence of the CDFA B-listed weed, tamarisk, was located in the Moccasin Point Recreation Area and appeared

to have been planted adjacent to a restroom facility. The majority of yellow starthistle occurrences were also located in areas subject to heavy recreation.

Numerous occurrences of noxious weeds located in areas subject to cattle grazing, including over 130 on lands included within the Districts' four grazing permits. Cattle spread weeds via transport on their hooves, hair or skin, and in their digestive tracts. Ground disturbance and overgrazing caused by cattle can also open areas to invasion by noxious weeds. The most common noxious weed found in grazed areas was Medusahead grass, along with many occurrences of Bermudagrass and Klamathweed. An occurrence of the CDFA B-listed weed, barbed goatgrass, was located on Recreation Bay in a grazed area not included within the Districts' four grazing permits.

Nineteen occurrences of noxious weeds were located below the high water mark of Don Pedro Reservoir, including four occurrences of distaff thistle. Because distaff thistle and other noxious weed seeds may be dispersed by water, these occurrences may present a risk of dispersal to adjacent or downstream lands. Propagules of barbed goatgrass, tree-of-heaven, giant reed, smooth distaff thistle, Bermudagrass, Medusahead grass, Klamathweed and tamarisk can similarly be transported by water.

A variety of Project O&M activities (e.g., grading, mowing, and vegetation management) were also found to occur within or near noxious weed occurrences. Ten occurrences were directly located in areas of grading; five were found in waste or storage areas, and nineteen were located in areas that were mowed. Each of these represents a potential that noxious weeds may be picked up by District's staff or equipment and spread to other areas. The genesis of these occurrences is undetermined.

During surveys, the study team hand-treated some noxious weed occurrences, including four occurrences of distaff thistle (248, 285, 671, 672) and one small patch of Medusahead grass (665). The study team also pulled several noxious weed occurrences within the Red Hills ACEC, including barbed goatgrass (occurrence 283) and yellow starthistle (occurrence 242 and 962).

Noxious weeds are common throughout the region and California. Across the western United States, noxious weeds have invaded and modified millions of acres of wild and agricultural lands (SSJNWA 2003). Non-Project activities and non-Project uses of Project lands play a significant role in the establishment and spread of noxious weeds in the study area, including adjacent land management activities and cattle grazing. Adjacent lands may also contain untreated source occurrences of noxious weeds: surveyors noted that non-Project lands adjacent to the study area frequently supported the same weed species recorded during this study.

7.0 STUDY VARIANCES AND MODIFICATIONS

The study was conducted consistent with the FERC-approved Noxious Weeds Study Plan (TR-04). No variances occurred.

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