APPENDIX C

Biological Assessment

White Slough Water Pollution Control Facility Expansion Pond Project

Lodi, San Joaquin County, California

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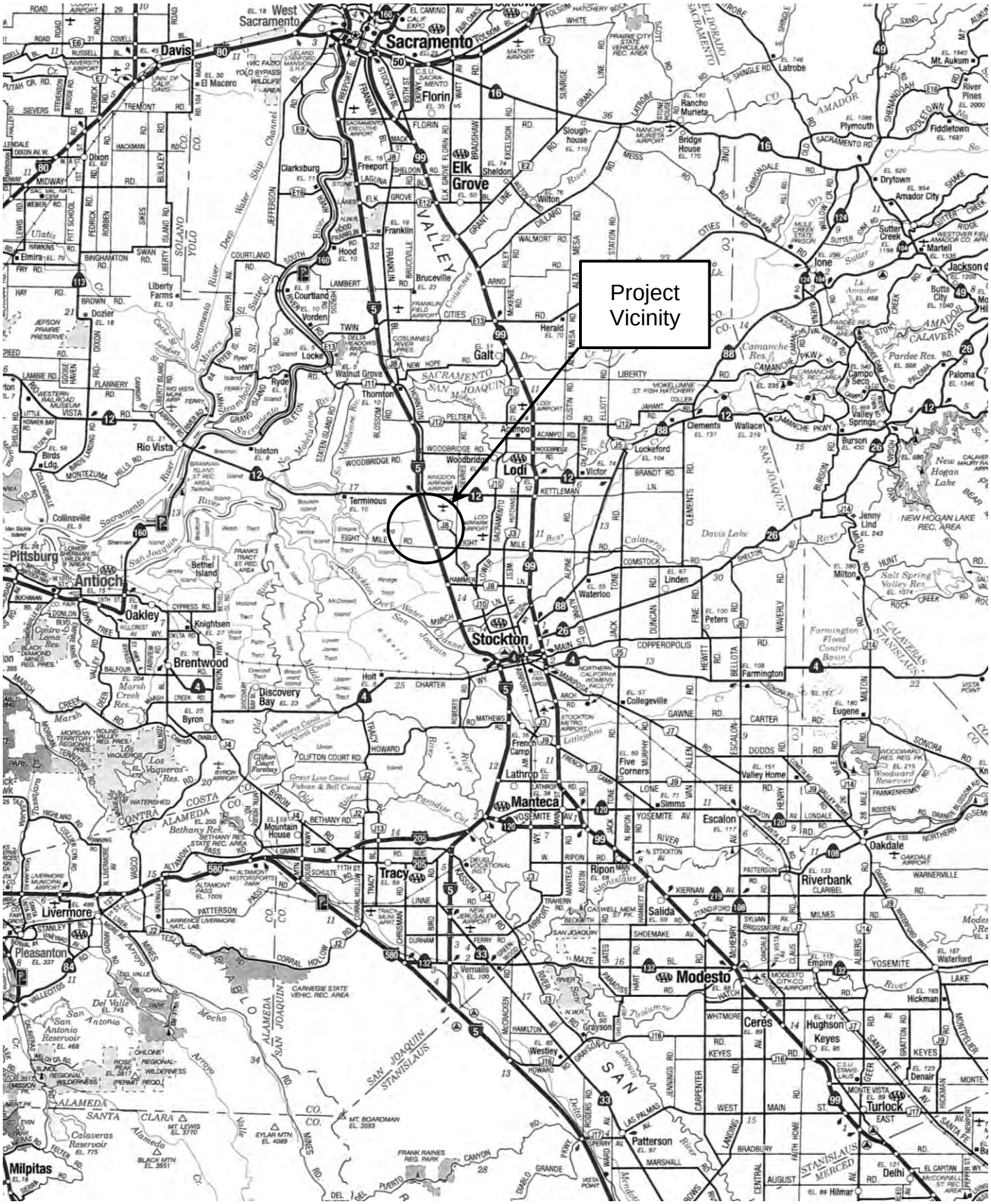
I. INTRODUCTION

The City of Lodi's White Slough Water Pollution Control Facility (WPCF) is approximately 6 miles southwest of Lodi, in San Joaquin County, California (Figures 1 and 2). The City of Lodi is proposing the construction of a 70+/- acre Expansion Pond (or cluster of ponds) and associated conveyance infrastructure at the WPCF (Figure 3). The Expansion Pond(s) will be used exclusively to store disinfected, tertiary-treated effluent produced by the WPCF for use as irrigation water on the 886.67 acres of agricultural land that surrounds the WPCF. The purpose of the Project is to provide additional WPCF effluent supplies for agricultural irrigation on these properties and to offset groundwater pumping. The use of the water for agriculture will reduce the discharge of WPCF effluent to Dredger Cut, an excavated slough that is tributary to the Delta, from January through April.

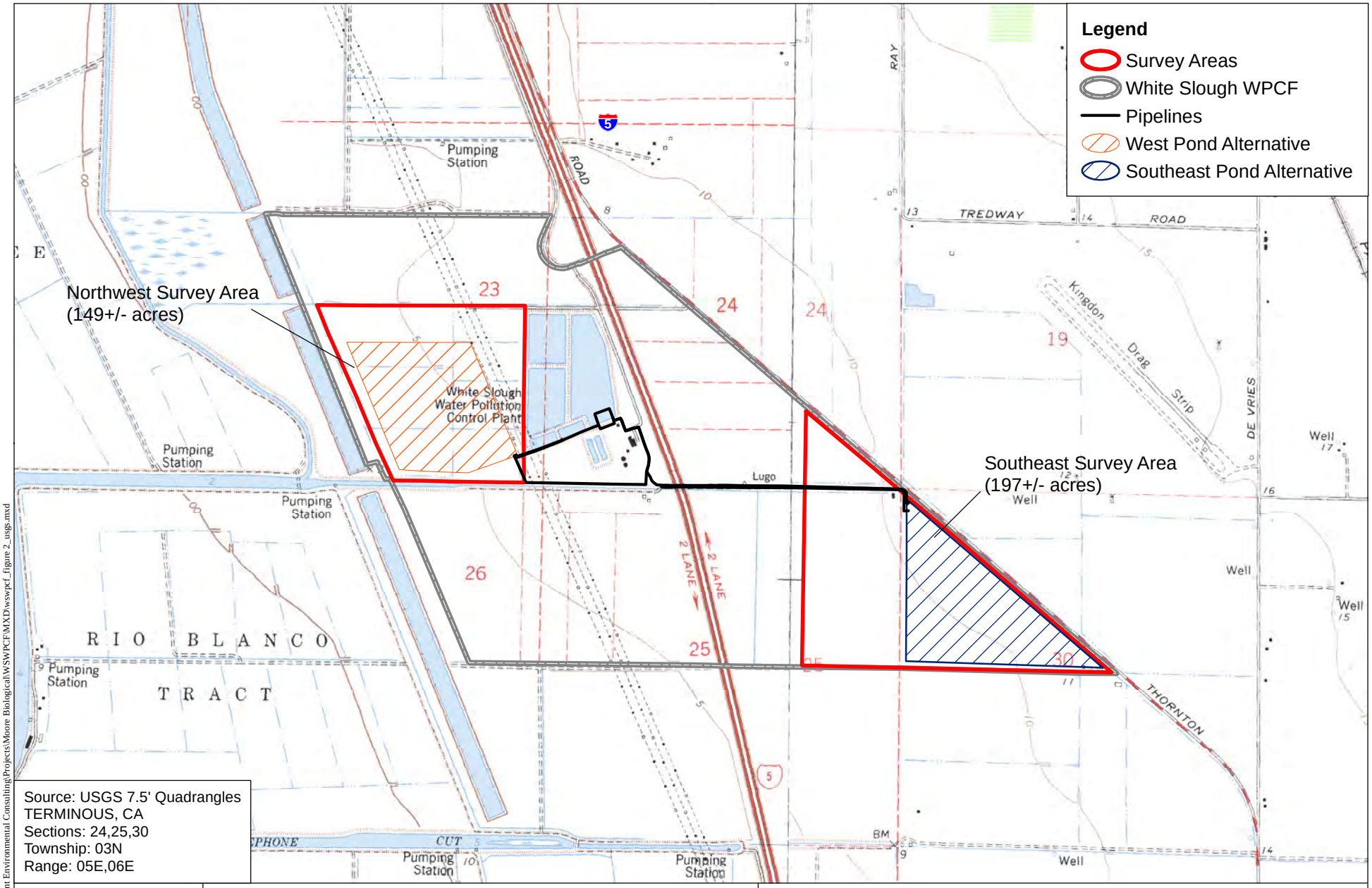
This assessment describes the existing biological environment and how the project would affect that environment. This document provides the pertinent biological information regarding Waters of the U.S. and wetlands, Federal and State special-status species, and other natural resources that may be present in the project site. This assessment also evaluates potential impacts of the proposed project to biological resources in the study area resulting from the construction and operation of the project.

This assessment addressed two areas of leveled agricultural fields that are intensively cultivated in forage crops for the proposed pond(s), and the point of discharge for WPCF effluent in Dredger Cut, which is tributary to White Slough and eventually the San Joaquin River. The upland areas in the project site provide habitat for a number of common wildlife species and a few special-status species. Swainson's hawk (*Buteo swainsoni*), burrowing owl (*Athene cunicularia*), tricolored blackbird (*Agelaius tricolor*), and Pacific pond turtle (*Emys marmorata*) are the only special-status wildlife species expected to occur in the project site on more than an occasional or transitory basis. Giant garter snake



Source: Calif. State Automobile Association

Moore Biological Consultants	0 18 Miles N W E S	**FIGURE 1** **PROJECT VICINITY**



Source: USGS 7.5' Quadrangles
TERMINOUS, CA
Sections: 24,25,30
Township: 03N
Range: 05E,06E

Figure 2

Moore Biological Consultants

0 1,000 2,000

1 inch = 2,000 feet

N W E S

Map Date:12/30/2015

Project Location

White Slough WPCF Expansion Pond Project

San Joaquin County, CA

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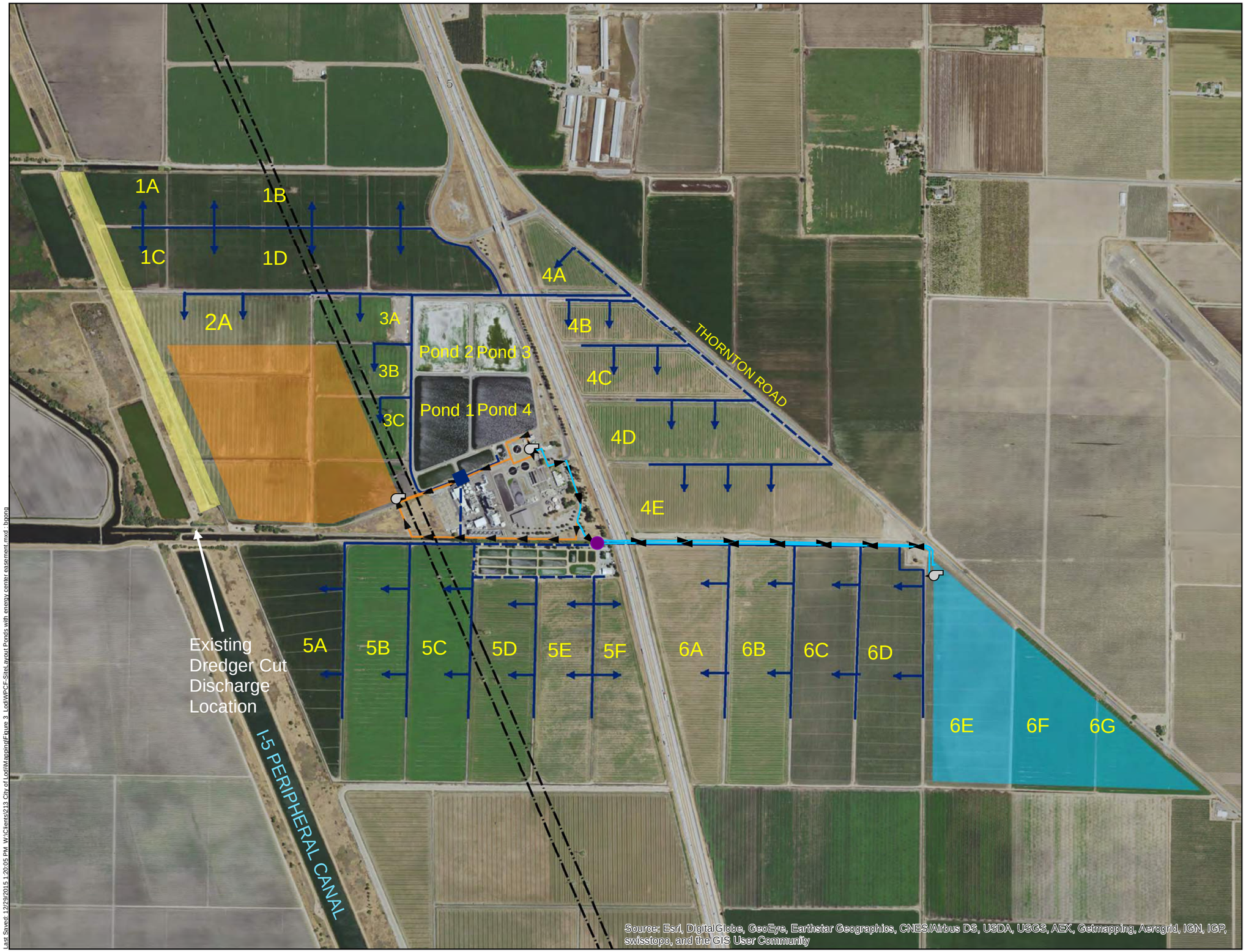
Figure 3
Potential Layout of Pond Alternatives

City of Lodi
White Slough Water Pollution Control Facility Storage

Expansion Project and Surface, Agricultural, and Groundwater Supply Improvement



N

0 500 1,000
Scale in Feet

Symbology

- Existing Irrigation Water Distribution Box
- Existing Standpipe
- West Alternative Pipeline Proposed Alignments (3)
- Southeast Alternative Pipeline Proposed Alignment
- Energy Center Easement
- Existing Irrigation Distribution Facilities (Approximate Alignment)
- Existing Irrigation Distribution Facilities (Approximate Alignment)
- New Storage Pond Pump Station
- Power Lines
- West Pond Alternative
- Southeast Pond Alternative

CITY OF LODI CALIFORNIA

WEST YOST ASSOCIATES

Last Saved: 12/29/2015 1:20:05 PM W:\Clients\213 City of Lodi\Mapping\Figure 3 Lodi\WPCF-SiteLayout Ponds with energy center easement.mxd bryong

(*Thamnophis gigas*) occurs in delta waterways northwest of the site but is unlikely to occur in the agricultural fields or Dredger Cut. Special-status fish including delta smelt (*Hypomesus transpacificus*), Central Valley steelhead (*Oncorhynchus mykiss irrideus*), longfin smelt (*Spirinchus thaleichthys*), fall-run Chinook salmon (*Oncorhynchus tshawytscha*) and green sturgeon (*Acipenser medirostris*) that occur in delta waterways west of the site, but are unlikely to occur in Dredger Cut or the waterways immediately downstream of Dredger Cut on more than a very occasional or transitory basis

The project is participating in the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) (SJCOG, 2000). With the implementation of Incidental Take Minimization Measures require by the SJMSCP, the project will have a less than significant impact to special-status plant or wildlife species. There would be no long-term adverse impacts to wetland or aquatic resources as a result of operation proposed project. The project would have minimal and likely beneficial impacts on the aquatic habitats and potentially occurring special-status species in Dredger Cut and downstream waterways. There would be no fill placed in Waters of the U.S. or wetlands under the jurisdiction of the U.S. Army Corps of Engineers (ACOE).

II. PROJECT OVERVIEW

Existing Facilities and Operations

The WPCF receives and treats municipal wastewater influent from a service area encompassing the City of Lodi and the San Joaquin Flag City Service Area. The WPCF has a design average dry weather flow treatment capacity of 8.5 million gallons a day (MGD). The WPCF treatment process includes secondary treatment with nitrification and denitrification (to provide an effluent total nitrogen level less than 10 mg/L), tertiary filtration, and UV disinfection. The WPCF disinfected, tertiary-treated effluent meets all applicable water quality objectives

for the Delta to protect its beneficial uses, which include warm water fisheries habitat, drinking watery supply, and unrestricted recreational activities. The effluent water quality is demonstrated through regular monthly water quality and acute toxicity monitoring, and quarterly three species chronic toxicity monitoring. The WPCF discharges the disinfected, tertiary-treated effluent to Dredger Cut, a dead end slough of the Sacramento-San Joaquin Delta (Delta). Flows up to 16.3 MGD may be treated and discharged year-round. The location of the existing outfall in Dredger Cut is shown on Figure 3. The dry-weather wastewater flows entering the WPCF are approximately 5.5 MGD and are expected to increase up to 8.5 MGD over the next 30 to 50 year period.

During the irrigation season (generally mid-April through September), undisinfected secondary-treated municipal effluent that has been nitrified and denitrified to provide an effluent total nitrogen level less than 10 mg/L is directed to four on-site unlined storage ponds totaling a maximum combined storage volume of 328 acre-feet. These ponds also can be used to store industrial wastewater and storm water received through the City's industrial collection system. The stored flows, along with flows entering the WPCF via the industrial collection system, are used to irrigate 790 acres of surrounding City-owned agricultural land. Crops grown include fodder crops like corn, alfalfa, ryegrass and wheat. The irrigation demand generally exceeds the available WPCF supplies in July and August, and supplemental irrigation water is obtained from groundwater pumping.

The City also supplies disinfected tertiary treated municipal effluent to the Northern California Power Agency (NCPA) power plant, and the San Joaquin County Mosquito and Vector Control District (SJCM&VCD) fish-rearing ponds year-round. These two facilities are located on City property, adjacent to the WPCF main process area. The NCPA facility consists of two power generating facilities: a 49.9 Megawatt (MW) Power Plant and a 296 MW, Lodi Energy Center. NCPA relies on the City's treated effluent for steam production and cooling system water in both facilities, and as make up water for two 250,000

gallon fire water tanks. The SJCM&VCD fish rearing ponds are used to cultivate mosquito fish (*Gambusia affinis*). During the non-irrigation season (generally October through mid-April), treated effluent that is not used by the NCPA and SJCM&VCD facilities are released to Dredger Cut.

Project Description

The Expansion Ponds(s) will be used exclusively to store disinfected, tertiary-treated effluent produced by the WPCF for use as irrigation water on the 886.67 acres of agricultural land that surrounds the WPCF. The purpose of the Project is to provide additional WPCF effluent supplies for agricultural irrigation on these properties and to offset groundwater pumping

The White Slough WPCF requires expansion and additional measures to prevent excess surface water discharge to the Delta and decrease groundwater pumping for irrigation. The proposed expansion pond(s) would allow for Title 22 tertiary treated waters to be stored and used for additional on-site irrigation, rather than discharged to the Delta. Overall, by combining the need to increase on-site wastewater storage with the need to reduce surface water discharge and groundwater pumping, the proposed Project is anticipated to have a multitude of benefits that are both local and regional in scope. Some of the major benefits include increased irrigation water supply, improved surface water quality in the Delta, and the potential to increase groundwater storage.

The Project would be funded by the Department of Water Resources (DWR) Proposition 84 Grant Funding Program, which is intended to assist in the development of projects which increase agricultural and drinking water supplies, decrease groundwater pumping, or assist in preserving water quality at source intakes. The Project, as discussed below, meets these criteria as set forth by DWR.

Two alternative sites are being considered for Expansion Pond(s):

- The Southeast Expansion Pond site is located in the southeastern portion of the City's 1,026.27-acre property (Figure 3). The Southeast Expansion Pond site would be configured within the space currently occupied by the three agricultural fields that are located at this site. These three fields, which are currently irrigated with groundwater supplied from a production well that is also located in this area, would no longer be used for agricultural production.

- The 70-acre Western Expansion Pond site is located on a portion of the City's existing agricultural fields that are directly west of the existing WPCF treatment and storage facilities (Figure 3). The Western Expansion site would be configured to avoid construction under the power lines that transect the City property and near the existing giant garter snake (*Thamnophis gigas*) habitat easement that is located along the western boundary of the City's properties. The agricultural fields and associated irrigation water infrastructure in and around the Western Expansion Pond site would be reconfigured to accommodate the Project, while also minimizing the reduction overall reduction of agricultural production area on the City's properties. This alternative also includes expansion of the City's irrigation facilities to allow for irrigation of the three fields located in the southeastern corner of the City's property (i.e. the Southeastern Expansion Pond site) with water supplied from the WPCF. This expansion would require a new 10 to 15 HP booster pump and new conveyance channels to connect the existing WPCF effluent irrigation system infrastructure to the irrigation system infrastructure that currently serves this area.

The levees of the Expansion Pond(s) will be constructed from fill dirt removed from the 70-acre construction area. The levees will be approximately 8-feet tall, and the Expansion Pond(s) will be designed to operate with a minimum freeboard of 2 feet. The bottom of the Expansion Pond(s) will be graded flat, with

a slight slope toward one corner of the pond, which is where a discharge pump station will be located.

The conveyance facilities associated with the Project include a new, 15 to 20 HP pump station constructed downstream of the existing WPCF ultraviolet disinfection facility, which will discharge disinfected tertiary-treated effluent into a new conveyance pipeline that will deliver the effluent to the Expansion Pond(s). The potential alignments of the new conveyance pipelines that will deliver effluent from the WPCF ultraviolet disinfection facility to the Southeastern and Western Expansion Pond sites are shown in Figures 4 and 5, respectively. For the Southeastern Expansion Pond site alternative, the City may rely on a portion of the City's existing irrigation water delivery infrastructure to convey treated effluent to the pond(s). This conveyance approach would require less pipeline construction, but would include a 10 to 15 HP pump station located near the end of the existing irrigation water distribution system to lift the effluent into the pond(s). This alternative alignment for the potential conveyance pipelines that will deliver effluent to the Southeastern Pond sites is shown in Figure 6.

The Project also includes conveyance infrastructure to provide for delivery of the treated effluent from the Expansion Pond(s) to the City's existing irrigation water delivery system. Under either of the alternatives, a new, 15 to 20 HP pump station will be constructed at the low end of the expansion pond(s). This new pump station will discharge the stored disinfected tertiary-treated effluent into a new conveyance pipeline that will deliver the effluent to a location within the existing irrigation water delivery system that allows for distribution to the City's fields. The alignments of the new pipelines that will deliver effluent from to the Western and Southeastern Expansion Pond sites to the irrigation system are also shown in Figures 4, 5 and 6.

Figure 4
Pipeline Alignment for Southeastern Pond Alternative

City of Lodi
White Slough Water Pollution Control Facility Storage

Expansion Project and Surface, Agricultural, and Groundwater Supply Improvement

N

0 200 400
Scale in Feet

Symbology

- Existing Irrigation Water Distribution Box
- Existing Standpipe
- Southeast Alternative Pipeline Proposed Alignment
- Existing Irrigation Distribution Facilities (Approximate Alignment)
- Existing Irrigation Distribution Facilities (Approximate Alignment)
- New Storage Pond Pump Station
- Southeast Pond Alternative

CITY OF LODI CALIFORNIA

WEST YOST ASSOCIATES

Last Saved: 12/29/2015 1:18:19 PM W:\Clients\213 City of Lodi\Mapping\Figure 4 LodiWPCF-SiteLayout Ponds ZoomSoutheast with energy center easement.mxd - bpoing

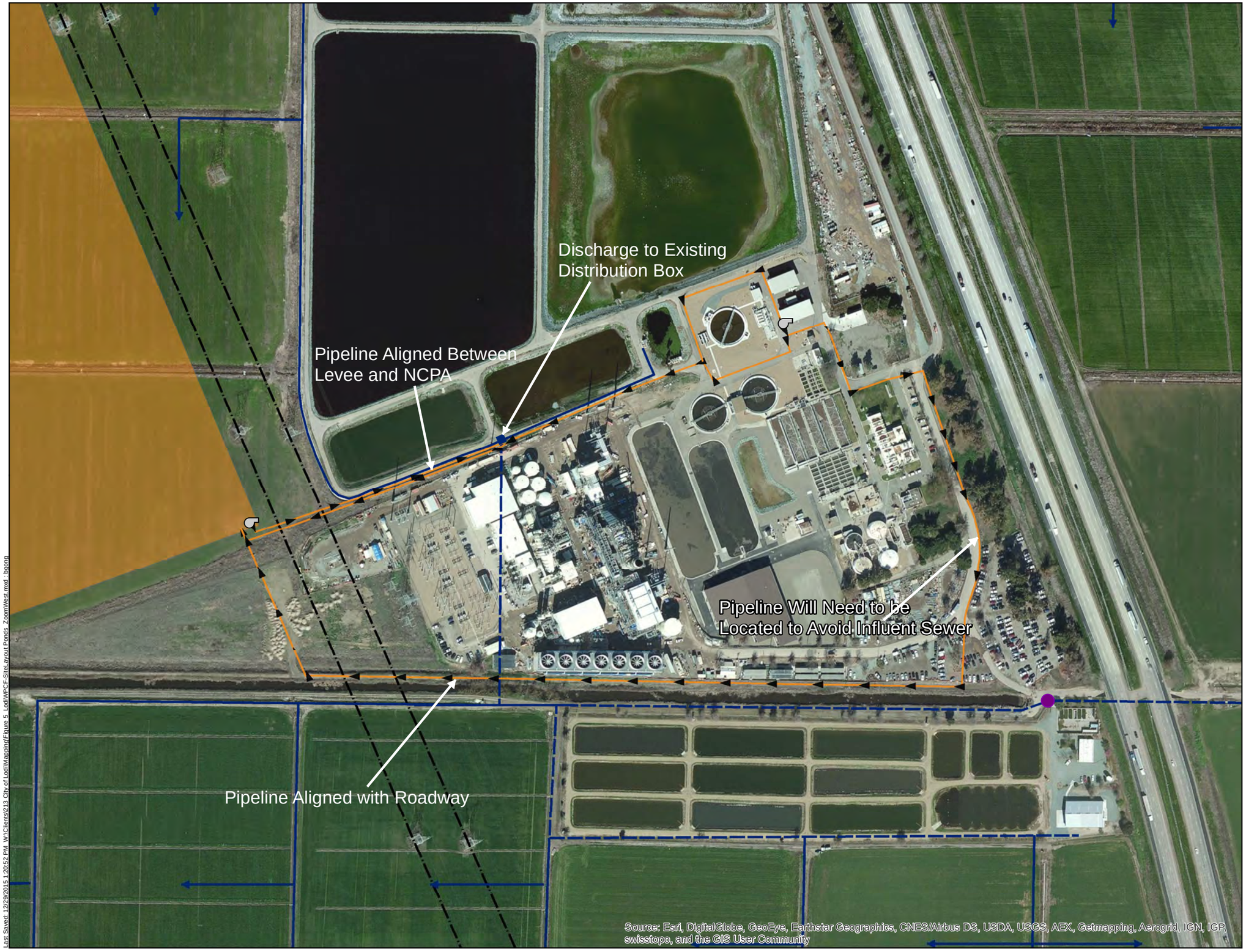


Figure 5
Pipeline Alignment for Western Pond Alternative

City of Lodi
White Slough Water Pollution Control Facility Storage

Expansion Project and Surface, Agricultural, and Groundwater Supply Improvement

N

0 125 250
Scale in Feet

Symbology

- Existing Irrigation Water Distribution Box
- West Alternative Pipeline Proposed Alignments (3)
- Existing Irrigation Distribution Facilities (Approximate Alignment)
- Existing Irrigation Distribution Facilities (Approximate Alignment)
- New Storage Pond Pump Station
- Power Lines
- West Pond Alternative

CITY OF LODI CALIFORNIA

WEST YOST ASSOCIATES

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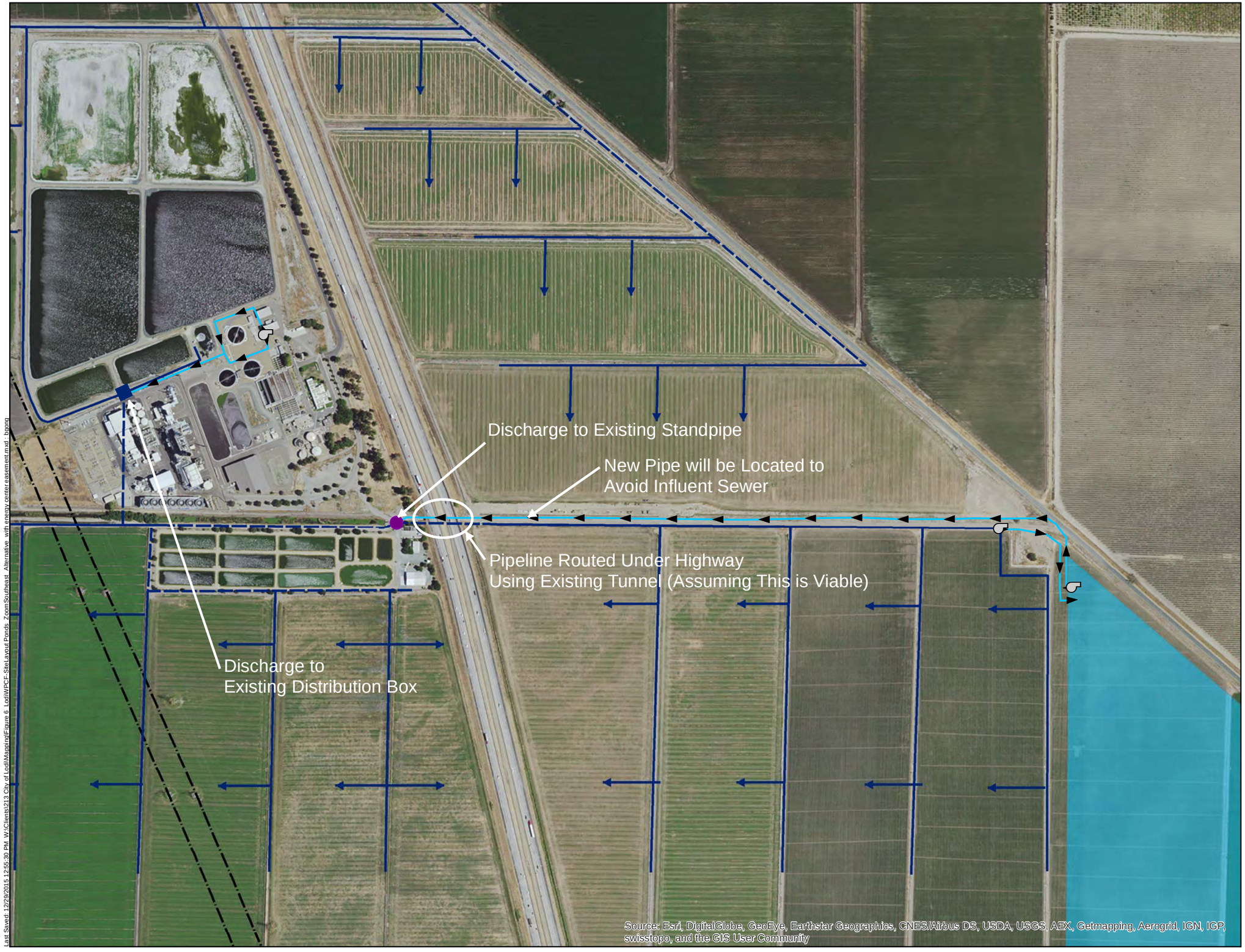
Figure 6
Alternative Conveyance Alignment for Southeastern Pond Alternative

City of Lodi
White Slough Water Pollution Control Facility Storage

Expansion Project and Surface, Agricultural, and Groundwater Supply Improvement



N

0 250 500
Scale in Feet

Symbology

- Existing Irrigation Water Distribution Box
- Existing Standpipe
- Alternative Conveyance for Southeast Pipeline
- Existing Irrigation Distribution Facilities (Approximate Alignment)
- Existing Irrigation Distribution Facilities (Approximate Alignment)
- New Storage Pond Pump Station
- Southeast Pond Alternative

CITY OF LODI CALIFORNIA

WEST YOST ASSOCIATES

Last Saved: 12/29/2015 12:55:30 PM W:\Clients\213 City of Lodi\Mapping\Figure 6 Lodi\WPCF-SiteLayout Ponds_ZoomSoutheast_Alternative_with energy center easement.mxd - bpong

The Project will reduce the volume discharged to Dredger Cut by approximately 180 and 200 million gallons; Table 1 summarizes the anticipated change in the discharge volumes. Flow will be diverted from Dredger Cut at a rate of approximately 1,500 and 1,700 gallons per minute over approximately a 90-day period between January 1 and April 30 of each year. The Project will not change the design and/or permitted treatment and discharge capacity of the WPCF. The Project will also not affect the recycled water deliveries to the NCPA and SJCM&VCD facilities.

Table 1

Flows Discharged to Dredger Cut from the White Slough WPCF

Under Existing and Proposed Conditions

Month	Current Volume Discharged (2012 -2014 Average), Million Gallons	Maximum Volume Discharged After the Project is Implemented, Million Gallons	Minimum Volume Discharged After the Project is Implemented, Million Gallons
January	105	52	47
February	98	44	39
March	75	34	30
April	74	38	35
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	39	39	39
November	90	90	90
December	139	139	139
Total	**620**	**436**	**419**

III. REGULATORY FRAMEWORK

Federal Endangered Species Act

The Federal Endangered Species Act (FESA) of 1973 (16 U.S.C. 1531-1543) and subsequent amendments provide guidance for the conservation of endangered and threatened species and the ecosystems upon which they depend.

Section 7 of FESA requires Federal agencies, in consultation with and with the assistance of the Secretary of the Interior or the Secretary of Commerce, as appropriate, to insure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. The United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) share responsibilities for administering the Act. Regulations governing interagency cooperation under Section 7 are found at 50 CFR Part 402. The opinions issued at the conclusion of consultation include statements authorizing take that may occur incidental to an otherwise legal activity.

Clean Water Act

The Clean Water Act (CWA) (33 U.S.C. 1251-1376) provides guidance for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. Section 404 of the CWA established a permit program administered by the U.S. Army Corps of Engineers (ACOE) regulating the discharge of dredged or fill material into waters of the United States (including wetlands). Implementing regulations by ACOE are found at 33 CFR Parts 320-330. Guidelines for implementation are referred to as the Section 404 (b)(1) Guidelines and were developed by the Environmental Protection Agency (EPA)

in conjunction with ACOE (40 CFR Parts 230). The Guidelines allow the discharge of dredged or fill material into the aquatic system only if there is no practicable alternative that would have less adverse impacts.

Waters of the U.S., including wetlands, are broadly defined under 33 Code of Federal Regulations (CFR) 328 to include navigable waterways, their tributaries, and adjacent wetlands. The U.S. Environmental Protection Agency (EPA) and ACOE published their Final Rule on the definition of Waters of the U.S. in June 2015 (80 CFR 124: 37054-37127). The Final Rule was intended to replace all prior rules and guidance on the definition as used in implementing the Clean Water Act and became effective on August 28, 2015. However, the Final Rule was stayed nationwide shortly thereafter, with a Sixth Circuit Court ruling on October 9, 2015.

State and federal agencies regulate Waters of the U.S. and wetlands, and Section 404 of the Clean Water Act requires that a permit be secured prior to the discharge of dredged or fill materials into any waters of the U.S., including wetlands. California Department of Fish and Wildlife (CDFW) also has jurisdiction over modifications to rivers, lakes, and streams under Section 1600 of Fish and Game Code of California.

"Waters of the U.S.", as defined in 33 CFR 328.4, encompasses Territorial Seas, Tidal Waters, and Non-Tidal Waters; Non-Tidal Waters includes interstate and intrastate rivers and streams, as well as their tributaries. The limit of federal jurisdiction of Non-Tidal Waters of the U.S. extends to the "ordinary high water mark". The ordinary high water mark is established by physical characteristics such as a natural water line impressed on the bank, presence of shelves, destruction of terrestrial vegetation, or the presence of litter and debris.

Jurisdictional wetlands and Waters of the U.S. include, but are not limited to, perennial and intermittent creeks and drainages, lakes, seeps, and springs; emergent marshes; riparian wetlands; and seasonal wetlands. Wetlands and

Waters of the U.S. provide critical habitat components, such as nest sites and a reliable source of water, for a wide variety of wildlife species.

Section 401 of the CWA requires an applicant for a Federal license or permit that allows activities resulting in a discharge to waters of the U.S., to obtain a state certification that the discharge complies with other provisions of the CWA. The Regional Water Quality Control Board (RWQCB) administers the certification program in California.

Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 et seq.) is administered by ACOE. This section requires permits in, above, or below navigable waters of the U. S. for all structures such as docks, bridges, riprap, and activities such as dredging. Navigable waters are defined as those subject to the ebb and flow of the tide and susceptible to use in their natural condition or by reasonable improvements as means to transport interstate or foreign commerce. The ACOE grants or denies permits based on the effects on navigation. Most activities covered under this act are also covered under Section 404 of CWA, so a Section 404 permit process usually also covers Section 10 of the Rivers and Harbors Act, where appropriate.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC, Section 703-711; 40 Stat. 755), as amended, prohibits killing, possessing, or trading in migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. This act applies to whole birds, parts of birds, and bird nests and eggs. The MBTA does not provide protection for habitat of migratory birds, but does prohibit the destruction or possession of individual birds, eggs, or nest in active use without a permit from USFWS.

California Endangered Species Act

The California Endangered Species Act (CESA) (Fish and Game Code 2050 et seq.) establishes the policy of the State to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that State agencies should not approve projects that would jeopardize the continued existence of threatened or endangered species, if reasonable and prudent alternatives are available that would avoid jeopardy. CESA requires State lead agencies to consult with the during the California Environmental Quality Act **(**CEQA) process to avoid jeopardy to threatened or endangered species. As an outcome of consultation, CDFW is required to issue a written finding indicating if a project would jeopardize threatened or endangered species and specifying reasonable and prudent alternatives that would avoid jeopardy. The Act provides for joint consultations when species are listed by both the State and Federal governments.

California Environmental Quality Act

With respect to biological resources, the California Environmental Quality Act (CEQA) Guidelines Section 15206 specifies that a project shall be deemed to be of statewide, regional, or area wide significance if it would substantially affect sensitive wildlife habitats, including but not limited to riparian lands, wetlands, bays, estuaries, marshes, and habitats for rare and endangered species.

CEQA Guidelines Section 15380 provides that a species not listed under the FESA or CESA may be considered rare or endangered under specific criteria. These criteria have been modeled after the definitions in FESA and CESA. Section 15380 was included in the CEQA Guidelines primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on a candidate species that has not yet been listed by either USFWS or CDFW. Thus, Section 15380 provides an agency with the ability to protect a species from a project’s potential impacts until the respective resource

agencies have had an opportunity to designate the species as protected, if warranted.

An example would be the vascular plants listed as rare or endangered by the California Native Plant Society (CNPS), but which may have no designated status or protection under FESA or CESA. The CNPS created five lists:

- List 1A: Plants presumed extinct in California,
- List 1B: Plants rare, threatened, or endangered in California and elsewhere,
- List 2: Plants rare, threatened, or endangered in California, but more numerous elsewhere,
- List 3: Plants about which more information is needed; a “review list”, and
- List 4: Plants of limited distribution; a “watch list”.

In general, plants appearing on CNPS List 1A, 1B, or 2 are considered to meet the criteria of Section 15380.

Fish and Game Code of California (Sections 1600 and 3503)

Under Section 1600 of the Fish and Game Code of California, project proponents are required to notify CDFW prior to initiating activities for any project that would divert water from, or obstruct or change the natural flow, bed, channel, or bank of any river, stream, or lake. When an existing fish or wildlife resource may be substantially adversely affected, CDFW is required to propose reasonable project changes to protect the resource. These modifications are formalized in a Streambed Alteration Agreement.

Section 3503 of the Fish and Game Code prohibits unlawful take, possession or needless destruction of the nest or eggs of any bird. Section 3503.5 of the Fish and Game Code states that it is “unlawful to take, possess, or destroy any birds-of-prey in the orders Falconiformes or Strigiformes . . .” (i.e., hawks, owls, eagles,

and falcons). The loss of an active nest is considered a violation of this code by CDFW. This statute does not provide for the issuance of any type of incidental take permit.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, “Waters of the State” fall under the jurisdiction of the State Water Resource Control Board (SWRCB) and California Regional Water Quality Control Boards (RWQCBs). The RWQCBs are required to prepare and periodically update water quality control basin plans, which set forth water quality standards for surface water and groundwater, as well as actions to control non-point and point sources of pollution to achieve and maintain these standards.

Projects that affect Waters of the State may also be required to meet waste discharge requirements (WDRs) of the RWQCBs. SWRCB’s Resolution 2008-0026 identified a need to protect Waters of the State that are not subject to CWA Section 404 permitting and associated CWA Section 401 Water Quality Certification. In 2013, the SWRCB issued a Revised Draft Wetland and Riparian Area Protection Policy (WRAPP) for informational purposes, including authorization procedures for dredge and fill discharges to Waters of the State. Once adopted, the Central Valley Regional Water Quality Board is expected to develop a program requiring WDRs for the fill of isolated wetlands that not subject to CWA Section 404 that authorize the impacts by issuing WDRs or in some cases, a WDR waiver.

California Native Plant Protection Act

The California Native Plant Protection Act (codified in Fish and Game Code Sections 1900-1913) is intended to preserve, protect, and enhance endangered or rare native plants in the state. The act directs CDFW to establish criteria for determining what native plants are rare or endangered. Under Section 1901, a

species is endangered when its prospects for survival and reproduction are in immediate jeopardy from one or more causes. A species is rare when, although not threatened with immediate extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens. Under the Act, the Fish and Game Commission may adopt regulations governing the taking, possessing, propagation, or sale of any endangered or rare native plant.

San Joaquin County Multi-Species Habitat Conservation and Open Space Plan

The San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) (SJCOG, 2000) is a comprehensive program adopted by the County for mitigating the biological impacts of land development, mining and other development activities (http://www.sjcog.org/DocumentCenter/View/5).

The SJMSCP is voluntary and may be used throughout the approximately 900,000-acre county and the 50-year term of the plan; the proposed project is eligible for participation in the SJMSCP. Open space and habitat lands addressed by the SJMSCP are classified into major categories, including Natural Lands, Agricultural Habitat Lands, Multi-Purpose Open Space Lands and Urban Lands. The SJMSCP accounts for potential conversion of open space lands over the life of the plan, and for the potential take associated with open space conversion, which was estimated at 109,300 acres with an overall habitat loss of approximately 71,800 acres.

The SJMSCP provides coverage for non-federal projects under FESA, CESA, CEQA and other applicable requirements. Under FESA and CESA, participation in the SJMSCP is considered compensation for Incidental Take for the SJMSCP covered species. SJMSCP species include approximately 100 federal and state special-status species that occur in approximately 50 vegetative communities that are considered “open space” as defined in the plan.

IV. METHODS

Database Review

A search of CDFW's California Natural Diversity Database (CNDDB, 2016) was conducted prior to the field surveys. The CNDDB search included the USGS 7.5-minute Terminous and Lodi South topographic quadrangles, which encompass approximately 120 square miles surrounding the site. The USFWS IPaC Trust Report of Federally Threatened and Endangered species that may occur in or be affected by projects in the project vicinity was also reviewed (Appendix A). This information was used to identify wildlife and plant species that have been previously documented in the project vicinity or have the potential to occur based on suitable habitat and geographical distribution. The USFWS maps of designated critical habitat were also downloaded.

Field Surveys

Moore Biological Consultants conducted field surveys on September 29, October 16 and 22, and December 10 and 29, 2015; and January 21 and May 15, 2016. In order to allow for minor shifts in the location and/or configuration of the pond(s), the field surveys covered areas larger than the proposed ponds; the "Northwest Survey Area" and the "Southeast Survey Area" are shown in Figure 7.

The field surveys consisted of walking throughout the site observing habitat conditions and noting surrounding land uses, general habitat types, and plant and wildlife species. The surveys included an assessment of the site for potentially jurisdictional Waters of the U.S. (a term that includes wetlands) as defined by ACOE (1987; 2008), special-status species, and suitable habitat for special-status species (e.g., blue elderberry shrubs, wetlands). Trees in and near the site were assessed for the potential use by nesting raptors, especially Swainson's hawk (*Buteo swainsoni*). The site and surrounding areas were also

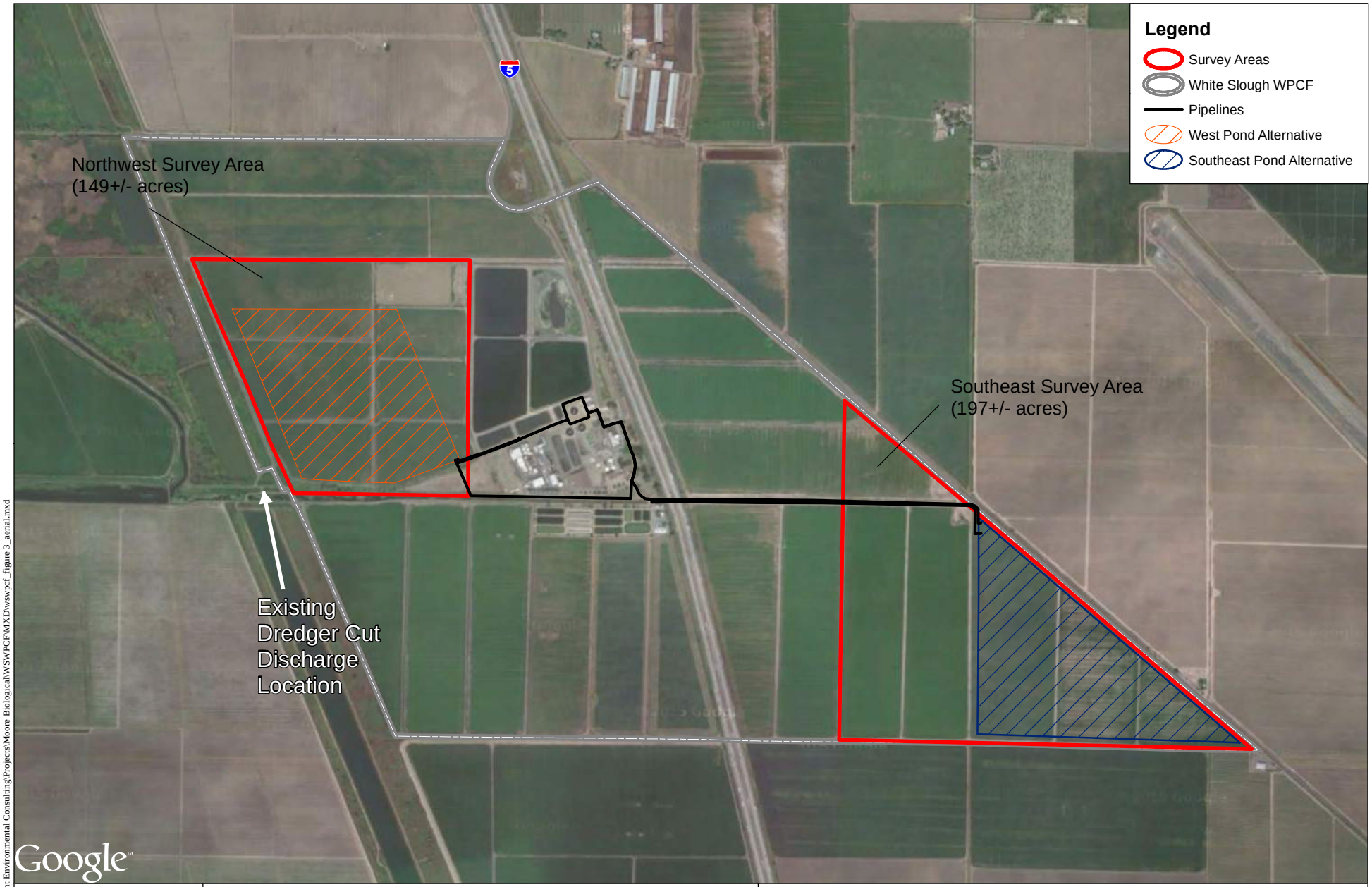


Figure 7

Moore Biological Consultants

0 750 1,500

1 inch = 1,500 feet

N W E S

Map Date:12/30/2015
Aerial Photo: Google Earth (2015)

AERIAL

White Slough WPCF Expansion Pond Project

San Joaquin County, CA

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searched for burrowing owls (*Athene cunicularia*) or ground squirrel burrows that could be utilized by burrowing owls.

Under contract to Moore Biological Consultants, Ecorp Consulting, Inc. prepared a Habitat Assessment of the federally threatened giant garter snake, which has been documented just west of the site in the White Slough Wildlife Area. Ecorp's work involved a search of CDFW's CNDDB, a literature review, field surveys, and analysis of effects of the project's potential impacts to giant garter from project construction and operation, including reduced discharge to Dredger Cut.

Under contract to Moore Biological Consultants, Fishbio prepared a Habitat Assessment of special-status fish including delta smelt (*Hypomesus transpacificus*), Central Valley steelhead (*Oncorhynchus mykiss irrideus*), longfin smelt (*Spirinchus thaleichthys*), fall-run Chinook salmon (*Oncorhynchus tshawytscha*) winter-run Chinook salmon (*Oncorhynchus tshawytscha*), Spring-run Chinook salmon (*Oncorhynchus tshawytscha*) and green sturgeon (*Acipenser medirostris*). Fishbio's work involved a literature review, field survey, review of data collected at fish monitoring stations in the project vicinity, and analysis of effects of the project's reduced discharge to Dredger Cut on special-status fish.

V. RESULTS AND DISCUSSION

Setting

The project site is approximately 6 miles southwest of Lodi, in San Joaquin County, California (Figure 1). The site is in Sections 23, 24, 25 and 26, within Township 3 North, Range 5 East, and Section 30, within Township 3 North, Range 6 East MDBM of the USGS 7.5-minute Terminous and Lodi South topographic quadrangles (Figure 2). The site is located at elevations of approximately seas level to 15 feet above mean sea level. The WPCF spans

Interstate 5 (I-5) and is bounded by Thornton Road on the east. The peripheral canal pits associated with the construction of I-5 are located just west of the WPCF (Figure 3).

Surrounding land uses in this portion of San Joaquin County are primarily agricultural, with widely scattered residences and outbuildings. Most of the parcels in the greater project vicinity are farmed in vineyards, orchards, hay, and annual crops. There are vineyards, hay, and annual crops on the north, east, and south sides of the WPCF. More natural areas bound the site to the west, including the White Slough Preserve immediately west of the Northwest Survey Area, which managed by the SJMSCP for giant garter snake and other species. The White Slough Wildlife Area is located just west of the White Slough Preserve.

Vegetation

Vegetation communities in the project site include annual cropland and riparian corridors. These vegetation communities and wildlife habitat types generally correspond to the SJMSHCP habitat types “C” (cropland) and “W” (drainages and wetlands). During the 2015 field surveys, some of the fields were planted in alfalfa, some were fallow and had been farmed in corn earlier in the year, and some fields appeared to have just been disked and planted in winter wheat.

Historically, the California Annual Grassland series (Sawyer and Keeler-Wolf, 1995) was the most widespread upland vegetation type occurring in the project site. The ruderal areas along the edges of fields, roads, and irrigation ditches are vegetated with highly disturbed and routinely maintained patches of the California Annual Grassland series. The vegetation in these ruderal habitats is periodically scraped and/or disked, mowed, or treated with herbicides, primarily for fire suppression. Some of the most common grasses include oats (*Avena* sp.), soft chess brome (*Bromus hordeaceus*), ripgut brome (*B. diandrus*), foxtail barley (*Hordeum murinum*), and perennial ryegrass (*Lolium perenne*). Other grassland

species such as yellow star-thistle (*Centaurea solstitalis*), black mustard (*Brassica nigra*), bull thistle (*Cirsium vulgare*), morning glory (*Convolvulus arvensis*), rancher's fireweed (*Amsinckia menziesii*), wild radish (*Raphanus sativa*), fireweed (*Epilobium brachycarpum*), prickly lettuce (*Lactuca serriola*), fennel (*Foeniculum vulgare*), common mallow (*Malva neglecta*), and filaree (*Erodium* spp.) are intermixed with the grasses. Table 2 is a list of plant species observed in the site.

White Slough and relatively undeveloped and natural Delta waterways to the west of the WPCF support a variably wide band of riparian woodland vegetation. The Valley oak series, Fremont cottonwood series, and Arroyo willow series (Sawyer and Keeler-Wolf, 1995) best describe the vegetation communities along riparian corridors in the project site. Dominant trees in the riparian habitats include valley oak (*Quercus lobata*), Fremont cottonwood (*Populus fremontii*), black walnut (*Juglans californicus*), white alder (*Alnus rhombifolia*), red willow (*Salix laevigata*), Gooding's black willow (*Salix goodingii*), and arroyo willow (*Salix lasiolepis*). Narrow-leaved willow (*Salix exigua*), California button-willow (*Cephalanthus occidentalis*), Himalayan blackberry (*Rubus discolor*), California wild rose (*Rosa californica*), and California wild grape (*Vitis californicus*) are dominant shrubs and vines. The understory is comprised of grasses and weeds typical of the nearby annual grasslands (see photographs in Appendix B).

Dredger Cut in completely chokes with water hyacinth (*Eichhornia crassipes*), which forms a thick blanket on top of the water from bank to bank. White Slough, the Highline Canal, and other Delta waterways to the west of the WPCF have lesser amounts of water hyacinth, more open water, and support variably wide fringes of tules (*Scirpus acutus*), cattails (*Typha* sp.), umbrella sedge (*Cyperus eragrostis*), water smartweed (*Polygonum lapathifolium*), water primrose (*Ludwigia peploides*), and other emergent wetland vegetation along the banks.

No blue elderberry (*Sambucus mexicana*) shrubs were observed in or adjacent to the site.

TABLE 2

PLANT SPECIES OBSERVED IN THE SITE

Alnus rhombifolia	white alder
Amsinckia menziesii	rancher's fireweed
Artemisia douglasii	mugwort
Avena sp.	oat
Brassica nigra	black mustard
Bromus diandrus	ripgut brome
Bromus hordeaceus	soft chess brome
Capsella bursa var. pastoris	shepherds purse
Carduus pycnocephalus	Italian thistle
Centaurea solstitialis	yellow star-thistle
Cephalanthus occidentalis	California button-willow
Cerastium glomeratum	mouse-eared chickweed
Chamomilla suaveolens	pineapple weed
Cirsium vulgare	bull thistle
Conium maculatum	poison hemlock
Convolvulus arvensis	morning glory
Conyza canadensis	horseweed
Cynodon dactylon	Bermuda grass
Cyperus eragrostis	umbrella sedge
Eichornia crassipes	water hyacinth
Epilobium brachycarpum	willowherb
Eremocarpus setigerus	dove weed
Erodium botrys	filaree
Eschscholzia californica	California poppy
Foeniculum vulgare	fennel
Fraxinus latifolia	Oregon ash
Geranium molle	geranium

TABLE 2 (Continued)

PLANT SPECIES OBSERVED IN THE SITE

Ludwigia peploides	water primrose
Geranium dissectum	cut-leaf geranium
Gnaphalium sp.	cudweed
Heterotheca grandiflora	telegraph weed
Hordeum marinum	Mediterranean barley
Hordeum murinum	foxtail barley
Juglans californicus	black walnut
Juncus balticus	Baltic rush
Juncus bufonius	toad rush
Lactuca serriola	prickly lettuce
Lamium amplexicaule	clasping henbit
Lepidium latifolium	perennial pepperweed
Lolium perenne	perennial ryegrass
Malva neglecta	common mallow
Medicago polymorpha	California bur clover
Mentha pulegium	pennyroyal
Montia perfoliata	miner’s lettuce
Paspalum dilatatum	dallis grass
Phytolacca americana	pokeberry
Pinus sp.	ornamental pine
Plantago lanceolata	plantain
Poa annua	annual bluegrass
Polygonum lapathifolium	water smartweed
Polygonum persicaria	lady’s thumb
Polypogon monspeliensis	rabbit’s foot grass
Populus fremontii	Fremont cottonwood
Quercus lobata	valley oak

TABLE 2 (Continued)

PLANT SPECIES OBSERVED IN THE SITE

Quercus agrifolia	coastal live oak
Raphanus sativus	wild radish
Rosa californica	California wild rose
Rubus discolor	Himalayan blackberry
Rumex crispus	curly dock
Salix exigua	narrow-leaved willow
Salix goodingii	Gooding's black willow
Salix lasiolepis	arroyo willow
Salsola iberica	Russian thistle
Scirpus acutus	tule
Senecio vulgaris	common groundsel
Sonchus asper	prickly sow thistle
Sorghum halepense	Johnsongrass
Taeniatherum caput-medusae	medusahead grass
Tribulus terrestris	puncture vine
Trifolium hirtum	rose clover
Typha sp.	cattail
Verbena hastata	common verbena
Vicia americana	winter vetch
Vicia sativa	common vetch
Vitis californica	California wild grape
Xanthium strumarium	cocklebur

Wildlife

Within the project site, the intensively farmed fields primarily provide foraging habitat for a variety of bird species. In contrast, the well-developed riparian wetlands and woodlands associated with White Slough, Dredger Cut, the peripheral canal cut west of the Northwest Survey Area, and Delta waterways further west provide high-quality habitat for a wide variety of wildlife species and support numerous special-status plant and wildlife species. In addition to resident wildlife, the project site provides seasonal habitats for a wide variety of migratory wildlife, primarily waterfowl.

A variety of bird species were observed during the field surveys; all of these are common species found in agricultural and riparian areas of northwest San Joaquin County (Table 3). Several birds were flying around and over the site and perching in trees and shrubs. Turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), northern flicker (*Colaptes auratus*), northern mockingbird (*Mimus polyglottos*), western kingbird (*Tyrannus verticalis*), mourning dove (*Zenaida macroura*), western scrub jay (*Aphelocoma coerulescens*), Brewer's blackbird (*Euphagus cyanocephalus*), and red-winged blackbird (*Agelaius phoeniceus*) are representative of the avian species observed in the site.

The relatively more natural areas along White Slough, Dredger Cut, and the Delta waterways to the west of the WPCF support a more diverse assemblage of birds. Birds including Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), great egret (*Casmerodias albus*), great blue heron (*Ardea herodias*), and American coot (*Fulica americana*) are widespread along the Delta waterways in and near the White Slough Wildlife Area.

The existing wastewater treatment ponds just east of the Northwest Survey Area are used by a variety of birds. Black-neck stilt (*Himantopus mexicanus*), great egret, Canada goose, canvasback (*Aythya valisineria*), bufflehead (*Bucepahala*

TABLE 3

WILDLIFE SPECIES DOCUMENTED IN THE SITE

Birds

Double-crested cormorant	*Phalacrocorax auritis*
Great blue heron	*Ardea herodias*
Great egret	*Casmerodius albus*
Black-crowned night-heron	*Nycticorax nycticorax*
Canada goose	*Branta canadensis*
Mallard	*Anas platyrhynchos*
Bufflehead	*Bucepahala albeola*
Canvasback	*Aythya valisineria*
California gull	*Larus californicus*
Turkey vulture	*Cathartes aura*
Black-shouldered kite	*Elanus caeruleus*
Northern harrier	*Circus cyaneus*
Swainson's hawk	*Buteo swainsoni*
Red-tailed hawk	*Buteo jamaicensis*
Red-shouldered hawk	*Buteo lineatus*
American kestrel	*Falco sparverius*
Sandhill crane	*Grus canadensis*
American coot	*Fulica americana*
Killdeer	*Charadrius vociferous*
Black-necked stilt	*Himantopus mexicanus*
Rock dove	*Columba livia*
Mourning dove	*Zenaida macroura*
Belted kingfisher	*Ceryle alcyon*
Northern flicker	*Colaptes auratus*
Black phoebe	*Sayornis nigricans*
Western kingbird	*Tyrannus verticalis*

TABLE 3 (Continued)

WIDLIFE SPECIES DOCUMENTED IN THE SITE

Western scrub jay	*Aphelocoma coerulescens*
Yellow-billed magpie	*Pica nuttalli*
American crow	*Corvus brachyrhynchos*
American robin	*Turdus migratorius*
Northern mockingbird	*Mimus polyglottos*
White-crowned sparrow	*Zonotrichia leucophrys*
Red-winged blackbird	*Agelaius phoeniceus*
Brewer's blackbird	*Euphagus cyanocephalus*
House finch	*Carpodacus mexicanus*
Mammals	
California ground squirrel	*Spermophilus beecheyi*
Raccoon	*Procyon lotor*
Virginia opossum	*Didelphis virginiana*
Black-tailed hare	*Lepus californicus*
Desert cottontail	*Sylvilagus audubonii*
Reptiles and Amphibians	
Red-eared slider	*Trachemys scripta elegans*
Pacific pond turtle	*Emmys marmorata*
Pacific chorus frog	*Pseudacris regilla*
Western fence lizard	*Sceloporus occidentalis*

albeola), California gull (*Larus californicus*), and American coot were observed in the existing wastewater treatment ponds. The ponds do not provide nesting habitat or a food source and appear to primarily be used for loafing.

There are several potential nest trees in and near the site that are suitable for nesting raptors and other protected migratory birds, including Swainson's hawk. A few stick nests were observed within some of the trees within and near the site. Given the presence of large trees and raptor foraging habitat (i.e., open fields) in and near the site, it is likely one or more pairs of raptors, plus a variety of songbirds, nest in trees in the site each year. Further, it is considered likely that numerous songbirds nest within trees, shrubs, and grassland habitats in or adjacent to the site each year.

A variety of mammals common to agricultural areas likely occur in the project site. However, black-tailed hare (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), and California ground squirrel (*Spermophilus beecheyi*) were the only mammals observed during the surveys; sign of raccoon (*Procyon lotor*) and Virginia opossum (*Didelphis virginiana*) was also observed. Coyote (*Canis latrans*), beaver (*Castor canadensis*), and striped skunk (*Mephitis mephitis*) are expected to occur in the area. A number of species of small rodents including mice (*Mus musculus, Reithrodontomys megalotis,* and *Peromyscus maniculatus*) and voles (*Microtus californicus*) also likely occur.

Based on habitat types present, a variety of amphibians and reptiles may use habitats in the site. Western fence lizard (*Sceloporus occidentalis*), Pacific chorus frog (*Pseudacris regilla*), Pacific pond turtle (*Emys marmorata*), and a red-eared slider (*Trachemys scripta elegans*) were observed during the recent surveys. Bullfrog (*Rana catesbeiana*), common garter snake (*Thamnophis sirtalis*), and gopher snake (*Pituophis melanoleucus*) are known from the greater project vicinity and may occur in the site on occasion.

Given relatively warm water temperatures and aquatic habitat conditions in Dredger Cut primarily supports fish species such as largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieui*), bluegill (*Lepomis macrochirus*), and catfish (*Ictlaurus* spp.). Dredger Cut does not provide suitable habitat for special-status fishes such as fall-run Chinook salmon

(*Oncorhynchus tshawytscha*), Central Valley steelhead (*Oncorhynchus mykiss*), and Delta smelt (*Hypomesus transpacificus*), which are known to occur in the nearby San Joaquin River.

Waters of the U.S. and Wetlands

The San Joaquin River is a navigable Water of the U.S. subject to Section 10 of the River and Harbor Act as well as Section 404 of the Clean Water Act. White Slough, Dredger Cut, Highline Canal, Bishop Cut, and other Delta waterways west and southwest of the site are also Waters of the U.S., although some may not be considered navigable. The limit of federal jurisdiction on all of these waterways is high tide, which is a few feet above mean sea level. These waterways also fall under the jurisdiction of CDFW and the RWQCB. There is no worked proposed in White Slough, Dredger Cut, or any other Delta waterways.

Beyond the San Joaquin River and other Delta waterways west and southwest of the site, no other potentially jurisdictional wetlands or Waters of the U.S. were observed in or near the site. All of the managed and maintained irrigation and drainage ditches that serve the fields were excavated in uplands and are do not meet the technical and regulatory criteria of jurisdictional wetlands or Waters of the U.S. Further, there are no vernal pools, seasonal wetlands, or other types of wetlands within the leveled fields, paved and dirt roads, and patches of highly disturbed ruderal upland grassland habitat within the WPCF where the project facilities will be constructed.

Special-Status Species

Special-status species are plants and animals that are legally protected under the CESA, FESA, or other regulations. Special-status species also include other species that are considered rare enough by the scientific community and trustee agencies to warrant special consideration, particularly with regard to protection of

isolated populations, nesting or denning locations, communal roosts, and other essential habitat.

The likelihood of occurrence of listed, candidate, and other special-status species in the project site is generally low. Table 4 provides a summary of the listing status and habitat requirements of special-status species that have been documented in the greater project vicinity or for which there is potentially suitable habitat in the greater project vicinity. This table also includes an assessment of the likelihood of occurrence of each of these species in the site. The evaluation of the potential for occurrence of each species is based on the distribution of regional occurrences (if any), habitat suitability, and field observations.

SPECIAL-STATUS PLANTS

Eight (8) species of special-status plants were identified in the CNDDB (2016) search or are on the USFWS IPaC Trust Report: large-flowered fiddleneck (*Amsinckia grandiflora*), succulent owl's clover (*Castilleja campestris ssp. succulenta*), wooly rose mallow (*Hibiscus lasiocarpus*), Delta tule pea (*Lathyrus jepsonii var. jepsonii*), Mason's lilaeopsis (*Lilaeopsis masonii*), delta mudwort (*Limosella australis*), side-flowering skullcap (*Scutellaria lateriflora*), and Suisun marsh aster (*Symphotrichum lentum*) (Table 4 and Appendix A).

Special-status plants generally occur in relatively undisturbed areas and are largely found within unique vegetation communities such as vernal pools, marshes and swamps, and areas with unique soils. Almost all of the species listed in Table 4 occur in marshes and swamps. Wooly rose mallow, Delta tule pea, Mason's lilaeopsis, delta mudwort, side-flowering skullcap, and Suisun marsh aster are recorded in the CNDDB (2016) growing in or along the waterways in the greater project vicinity. Wooly rose mallow is widespread in delta waterways west and southwest of the site, including a population in the Highline Canal, approximately 0.25 miles west of the Northwest Survey Area CNDDB (2016). Mason's lilaeopsis has been found in Bishop Cut, approximately

TABLE 4

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
PLANTS						
Large-flowered fiddleneck	*Amsinckia grandiflora*	E	E	1B	Cismontane woodland, valley and foothill grassland.	Unlikely: the project site not provide suitable habitat for large-flowered fiddleneck and is below the elevation range of this species (CNPS, 2016). There are no occurrences of this species recorded in the CNDDB (2016) search area.
Succulent owl's clover	*Castilleja campestris ssp. succulenta*	T	E	1B	Vernal pools.	Unlikely: there are no vernal pools in or adjacent to the site and no occurrences of succulent owl's clover in the CNDDB (2016) search area. The site is not in designated critical habitat for this species (USFWS, 2005a).
Wooly rose mallow	*Hibiscus lasiocarpus*	None	None	2	Freshwater marshes and swamps.	Unlikely: the agricultural fields in the Northwest Survey Area and the Southeast Survey Area do not provide suitable marsh or swamp habitat for wooly rose mallow. White Slough provides potentially suitable habitat for this species, while Dredger Cut is choked with water hyacinth and provides marginal habitat. Wooly rose mallow is widespread in delta waterways west and southwest of the site, including a population in Highline Canal, approximately 0.25 miles west of the Northwest Survey Area CNDDB (2016).
Delta tule pea	*Lathyrus jepsonii var. jepsonii*	None	None	1B	Marshes and swamps.	Unlikely: the agricultural fields in the Northwest Survey Area and the Southeast Survey Area do not provide suitable marsh or swamp habitat for Delta tule pea. White Slough provides potentially suitable habitat for this species, while Dredger Cut is choked with water hyacinth and provides marginal habitat for this species. The nearest occurrence of Delta tule pea in the CNDDB (2016) search area is approximately 4 miles southwest of the site.
Mason's lilaeopsis	*Lilaeopsis masonii*	None	R	1B	Marshes, swamps and riparian scrub.	Unlikely: the agricultural fields in the Northwest Survey Area and the Southeast Survey Area do not provide suitable marsh or swamp habitat for this species. White Slough provides potentially suitable habitat for this species, while Dredger Cut is choked with water hyacinth and provides marginal habitat for Mason's lilaeopsis. The nearest occurrence of this species in the CNDDB (2016) search area is in Bishop Cut, approximately 1 mile west of the Dredger Cut point of discharge.

TABLE 4

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
Delta mudwort	*Limosella subulata*	None	None	2	Marshes and swamps.	Unlikely: the agricultural fields in the Northwest Survey Area and the Southeast Survey Area do not provide suitable marsh or swamp habitat for Delta mudwort. White Slough provides potentially suitable habitat for this species, while Dredger Cut is choked with water hyacinth and provides only marginal habitat. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 5 miles west of the site.
Side-flowering skullcap	*Scutellaria laterifolia*	None	None	2	Marshes and swamps.	Unlikely: the agricultural fields in the Northwest Survey Area and the Southeast Survey Area do not provide suitable marsh or swamp habitat for this species. White Slough provides potentially suitable habitat for this species, while Dredger Cut is choked with water hyacinth and provides marginal habitat for side-flowering skullcap. The nearest occurrence of this species in the CNDDB (2016) search area is approximately 6 miles northwest of the site.
Suisun marsh aster	*Symphotrichum lentum*	None	None	1B	Marshes and swamps.	Unlikely: the agricultural fields in the Northwest Survey Area and the Southeast Survey Area do not provide suitable marsh or swamp habitat for Suisun marsh aster. White Slough provides potentially suitable habitat for this species, while Dredger Cut is choked with water hyacinth and provides only marginal habitat. Suisun marsh aster is widespread in delta waterways west and southwest of the site; the nearest occurrences of this species in the CNDDB (2016) search area are approximately 4 miles west of the site in the Delta, and approximately 4 miles southeast of the site in Bear Creek.
WILDLIFE						
Birds						
Tricolored blackbird	*Agelaius tricolor*	None	SC	N/A	Open water and protected nesting substrate, usually cattails and riparian scrub with surrounding foraging habitat.	Moderate: the agricultural fields in the Northwest Survey Area and the Southeast Survey Area provide suitable foraging habitat for tricolored blackbird and White Slough, Dredger Cut, and Delta waterways to the west provide suitable nesting habitat for this species. The nearest occurrence of nesting tricolored blackbirds in the CNDDB (2016) search area is approximately 4.5 miles northeast of the site.

TABLE 4

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
Swainson's hawk	*Buteo swainsoni*	None	T	N/A	Breeds in stands of tall trees in open areas. Requires adjacent suitable foraging habitats such as grasslands or alfalfa fields supporting rodents.	Moderate: the agricultural fields in the Northwest Survey Area and the Southeast Survey Area provide suitable foraging habitat for Swainson's hawks and trees in and near the site provide suitable nesting habitat for this species. There are many records of nesting Swainson's hawks in the project vicinity; the nearest occurrences of nesting Swainson's hawks in the CNDDB (2016) search area are immediately east and immediately west of the Northwest Survey Area. Swainson's hawks were observed nesting in May 2016 in a cottonwood on the west side of Interstate 5 approximately 400 feet south of the underpass connecting Thornton Road with the access road in to the WPCF. The tree is between Interstate 5 and the access road to the WPCF and the hawks are accustomed to traffic and noise. The female was incubating eggs while the male perched nearby.
Burrowing owl	*Athene cunicularia*	None	SC	N/A	Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation.	Moderate: numerous ground squirrels and their burrows were observed along the edges of the agricultural fields in the Northwest Survey Area and the Southeast Survey Area. No burrowing owls or evidence of occupancy were observed in or near the site. The nearest occurrence of nesting burrowing owls in the CNDDB (2016) search area is approximately 2.5 miles south of the site.
White-tailed kite	*Elanus leucurus*	None	None	FP	Herbaceous lowlands with variable tree growth and dense population of voles.	Moderate: the agricultural fields in the Northwest Survey Area and the Southeast Survey Area provide suitable foraging habitat for white-tailed kites and trees in and near the site provide suitable nesting habitat for this species. White-tailed kites are reported in the CNDDB (2016) along the north side of White Slough, just west of Interstate 5.
California black rail	*Laterallus jamaicensis coturniculus*	None	T	N/A	Mainly inhabits salt marshes bordering larger bays	Unlikely: the agricultural fields in the Northwest Survey Area and the Southeast Survey Area do not provide suitable marsh and swamp habitat for California black rail. White Slough and Dredger Cut provide potentially suitable habitat for this species. The nearest occurrence of California black rail in the CNDDB (2016) search area is just west of the Northwest Survey Area.

TABLE 4

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
Song sparrow ("Modesto Population")	*Melospiza melodia*	None	SC	N/A	Brackish water marshes. Inhabits cattails, tules, and tangles bordering sloughs.	Moderate: the agricultural fields in the Northwest Survey Area and the Southeast Survey Area do not provide suitable marsh or swamp habitat for song sparrow. White Slough, Dredger Cut, and Delta waterways further west provide suitable habitat for this species. The nearest occurrence of song sparrow in the CNDDB (2016) search area is 1 mile west of the Northwest Survey Area.
Mammals						
Riparian brush rabbit	*Sylvilagus bachmani riparius*	E	E	N/A	Riparian thickets in Stanislaus and southern San Joaquin Counties.	Unlikely: the agricultural fields in the Northwest Survey Area and the Southeast Survey Area do not provide suitable habitat for riparian brush rabbit. There are no occurrences of this species recorded in the CNDDB (2016) within the search area.
Reptiles & Amphibians						
Giant garter snake	*Thamnophis gigas*	T	T	N/A	Freshwater marsh and low gradient streams. Uses drainage canals and irrigation ditches, primarily for dispersal or migration.	Unlikely: White Slough, Dredger Cut, the peripheral canal cut west of the Northwest Survey Area, and Delta waterways further west provide suitable habitat for giant garter snake. In contrast, the agricultural fields in the Northwest Survey Area and the Southeast Survey Area do not provide suitable foraging or aestivation habitat for this species. The nearest documented occurrence of this species in the CNDDB (2016) search area is a 35-year old record mapped just west of the Northwest Survey Area. The CNDDB describes that the exact location of this occurrence is not known. It is possible that giant garter snakes could and may move through the Northwest Survey Area on occasion.
California tiger salamander	*Ambystoma californiense*	T	T	N/A	Seasonal water bodies without fish (i.e., vernal pools and stock ponds) and grassland/ woodland habitats with summer refugia (i.e., burrows).	Unlikely: the site does not provide suitable habitat for California tiger salamander. This species occurs in the transitional bands between the valley floor and foothills and is not known to occur in the Delta. There are no occurrences of this species recorded in the CNDDB (2016) within the search area. The project site is not within designated critical habitat for California tiger salamander (USFWS, 2005b).

TABLE 4

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
California red-legged frog	*Rana aurora draytonii*	T	SC	N/A	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation.	Unlikely: the site does not provide suitable habitat for California red-legged frog, which is also presumed extinct on the floor of the Central Valley of California. There are no occurrences of this species recorded in the CNDDB (2016) within the search area. The project site is not within designated critical habitat for California red-legged frog (USFWS, 2006a).
Pacific pond turtle	*Emys marmorata*	None	SC	N/A	Ponds, marshes, streams, and ditches with emergent aquatic vegetation and basking areas.	Unlikely: White Slough, Dredger Cut, and Delta waterways further west provide suitable habitat for Pacific pond turtle. The nearest documented occurrence of this species in the CNDDB (2016) search area is along the northern edge of the Northwest Survey Area.
Fish						
Steelhead – Central Valley DPS	*Oncorhynchus mykiss irideus*	T	None	N/A	Riffle and pool complexes with adequate spawning substrates within Central Valley drainages.	Unlikely: this species occurs in the San Joaquin River and other Delta waterways a few miles west of the site on a seasonal basis, but has rarely been documented at juvenile fish monitoring stations in the project vicinity. The closest occurrence of this species in the CNDDB (2016) search area is approximately 6 miles southwest of the site. Bishop Cut, White Slough, the San Joaquin River, and other Delta waterways west and southwest of the site are designated critical habitat for Central Valley steelhead (NOAA, 2005). Dredger Cut and the section of White Slough east of Bishop Cut are not in the habitat designation.
Winter-run Chinook salmon	*Oncorhynchus tshawytscha*	E	E	N/A	Deep flowing pools and riffle complexes with adequate spawning substrates; currently known only in the Sacramento River system.	Very unlikely: although historically present in the project vicinity, viable populations of winter-run Chinook salmon are currently restricted to the Sacramento River and some of its major tributaries. There are no occurrences of this species recorded in the CNDDB (2016) within the search area.

TABLE 4

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
Spring-run Chinook salmon	*Oncorhynchus tshawytscha*	T	T	N/A	Deep flowing pools and riffle complexes with adequate spawning substrates; currently known only from the Sacramento River system.	Very unlikely: although historically present in the project vicinity, viable populations of spring-run Chinook salmon are currently restricted to the Sacramento River and some of its major tributaries. There are no occurrences of this species recorded in the CNDDB (2016) within the search area.
Fall-run Chinook salmon	*Oncorhynchus tshawytscha*	None	SC	N/A	Deep flowing pools and riffle complexes with adequate spawning substrates within Central Valley drainages.	Unlikely: fall-run Chinook salmon occur in Delta waterways including the mainstem San Joaquin River on a seasonal basis and may occur in the greater project vicinity on occasion. There are no occurrences of fall-run Chinook salmon recorded in the CNDDB (2016) search area.
Delta smelt	*Hypomesus transpacificus*	T	T	N/A	Shallow lower delta waterways with submersed aquatic plants and other suitable refugia.	Unlikely: Delta smelt occur in the mainstem San Joaquin River and other Delta waterways a few miles west of the site on a seasonal basis, but have rarely been documented at juvenile fish monitoring stations in the project vicinity. The closest documented occurrence of delta smelt in the CNDDB (2016) search area is approximately 5 miles northwest of the site, in Little Potato Slough. The entire site is in designated critical habitat for delta smelt (USFWS, 1994).
Green sturgeon	*Acipenser medirostris*	T	SC	N/A	Freshwater and saltwater habitats; spawn in freshwater rivers.	Unlikely: this species occurs in Delta waterways on a seasonal basis and may occur in the greater project vicinity on occasion. However, green sturgeon primarily occur in the Sacramento River and some of its major tributaries, and occur in limited numbers in the San Joaquin River system. There are no occurrences of green sturgeon recorded in the CNDDB (2016) within the search area.

TABLE 4

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED OR POTENTIALLY-OCCURRING IN THE PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence in the Project Site
Longfin smelt	*Spirinchus thaleichthsy*	None	SC	N/A	Brackish estuarine habitats	Unlikely: this species occurs in Delta waterways on a seasonal basis and may occur in the greater project vicinity on occasion. The nearest occurrence of the longfin smelt in the CNDDB (2016) search area is approximately 5 miles northwest of the site, in Little Potato Slough.
Invertebrates						
Vernal pool fairy shrimp	*Branchinecta lynchi*	T	None	N/A	Vernal pools	Unlikely: there are no vernal pools in or adjacent to the site. There are no occurrences of vernal pool fairy shrimp in the CNDDB (2016) search area. The site is not within designated critical habitat for this species (USFWS, 2005a).
Vernal pool tadpole shrimp	*Lepidurus packardi*	E	None	N/A	Vernal pools	Unlikely: there are no vernal pools in or adjacent to the site. The nearest occurrence of vernal pool tadpole shrimp in the CNDDB (2016) search area is approximately 4 miles northeast of the site. The site is not within designated critical habitat for vernal pool tadpole shrimp or other listed branchiopods (USFWS, 2005a).
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	T	None	N/A	Elderberry shrubs, usually in Central Valley riparian habitats.	Unlikely: there are no blue elderberry shrubs in or adjacent to the site. There are no occurrences of valley elderberry longhorn beetle in the CNDDB (2016) search area.
San Bruno elfin butterfly	*Callophrys mossii bayensis*	E	None	N/A	Rocky outcrops and cliffs in coastal scrub habitats.	Unlikely: the site does not provide suitable habitat for this species. There are no occurrences of San Bruno elfin butterfly in the CNDDB (2016) search area.

1 T= Threatened; E = Endangered.

2 T = Threatened; E = Endangered; R = Rare; SC = State of California Species of Special Concern

3 CNPS List 1B includes species that are rare, threatened, or endangered in California and elsewhere; List 2 includes plants that are rare, threatened or endangered in California but are more common elsewhere.

1 mile west of the Dredger Cut point of discharge. All of the Special-status plants in Table 4 that occur in marshes or swamps may occur in White Slough, Dredger Cut, Highline Canal, Bishop Cut, the San Joaquin River, and other Delta waterways west and southwest of the site at and below the water line.

The leveled fields, maintained irrigation ditches, and patches of highly disturbed ruderal upland grassland habitat within the WPCF do not provide suitable habitat for any special-status plants. Succulent owl's clover is a vernal pool species; there are no vernal pools in or near the project site.

SPECIAL-STATUS WILDLIFE

The potential for intensive use of habitats within the project site by special-status wildlife species is generally low. Swainson's hawk, tricolored blackbird (*Agelaius tricolor*), burrowing owl, white-tailed kite (*Elanus leucurus*), California black rail (*Laterallus jamaicensis coturniculus*), the "Modesto population" of song sparrow (*Melospiza melodia*), giant garter snake, Pacific pond turtle, Central Valley steelhead (*Oncorhynchus mykiss*), delta smelt (*Hypomesus transpacificus*), longfin smelt (*Spirinchus thaleichthsy*), and vernal pool tadpole shrimp (*Lepidurus packardi*) are the twelve (12) special-status wildlife species identified in the CNDDB (2016) query. The USFWS IPaC Trust Report also includes riparian brush rabbit (*Sylvilagus bachmani riparius*), California red-legged frog (*Rana aurora draytonii*), California tiger salamander (*Ambystoma californiense*), Conservancy fairy shrimp (*Branchinecta conservatio*), vernal pool fairy shrimp (*Branchinecta lynchi*), and San Bruno elfin butterfly (*Callophrys mossii bayensis*). Finally, fall-run Chinook salmon (*Oncorhynchus tshawytscha*) winter-run Chinook salmon (*Oncorhynchus tshawytscha*), spring-run Chinook salmon (*Oncorhynchus tshawytscha*) and green sturgeon (*Acipenser medirostris*) were added to Table 4 because they are known to occur in nearby delta waterways on a seasonal basis.

While the project vicinity may have provided habitat for several special-status wildlife species at some time in the past, agriculture and development in and

adjacent to the site have modified the natural habitats and associated potential to support special-status wildlife species. Of the wildlife species identified in the CNDDB and IPaC Trust Report, Swainson's hawk, burrowing owl, tricolored blackbird, and Pacific pond turtle are the only species with potential to occur in the site on more than a transitory or very occasional basis. Other special-status birds may fly over or forage in the area on occasion, but are not expected to nest in the project site.

SWAINSON'S HAWK: The Swainson's hawk is a migratory hawk listed by the State of California as a Threatened species. The Migratory Bird Treaty Act and Fish and Game Code of California protect Swainson's hawks year-round, as well as their nests during the nesting season (March 1 through September 15). Swainson's hawks are found in the Central Valley primarily during their breeding season, a population is known to winter in the San Joaquin Valley.

Swainson's hawks prefer nesting sites that provide sweeping views of nearby foraging grounds consisting of grasslands, irrigated pasture, hay, and wheat crops. Most Swainson's hawks are migratory, wintering in Mexico and breeding in California and elsewhere in the western United States. This raptor generally arrives in the Central Valley in mid-March, and begins courtship and nest construction immediately upon arrival at the breeding sites. The young fledge in early July, and most Swainson's hawks leave their breeding territories by late August.

The CNDDB (2016) contains several records of nesting Swainson's hawks in the project vicinity; the nearest occurrences of nesting Swainson's hawks in the CNDDB (2016) search area are immediately east and immediately west of the Northwest Survey Area (Appendix A).

The site is along the heart of the nesting range of the species and relatively larger valley oaks, cottonwoods, willows, and other trees in and near the site and in the greater project vicinity provide suitable nesting habitat for this species.

Swainson's hawks were observed nesting in May 2016 in a cottonwood on the west side of Interstate 5 approximately 400 feet south of the underpass connecting Thornton Road with the access road in to the WPCF (see photograph in Appendix B). The tree is between Interstate 5 and the access road to the WPCF, with freeway traffic passing within approximately 20 feet of the nest. The pair of hawks appear accustomed to traffic and noise. Swainson's hawks will likely nest in the future in this location and in other trees in and near the site.

The agricultural fields that make up the Northwest Survey Area and the Southeast Survey Area provide suitable foraging habitat for Swainson's hawks. The extent of use of these fields by foraging Swainson's hawks is not known, but is expected to be moderate to high based on the number of nesting pairs in the project vicinity. The conversion of agricultural fields to ponds would result in a minor reduction of suitable Swainson's hawk foraging habitat in the site.

BURROWING OWL: Burrowing owls are not listed either under FESA or CESA, but the MBTA and Fish and Game Code of California protect burrowing owls year-round, and their nests and eggs during the nesting season (February 1 through August 31). Burrowing owls are a year-long resident in a variety of grasslands as well as scrub lands with low growing vegetation, but a low density of trees and shrubs (CDFG, 2012). Burrowing owls that nest in the Central Valley may winter elsewhere.

The primary habitat requirement of the burrowing owl is small mammal burrows for nesting (CDFG, 2012). The owl usually nests in abandoned ground squirrel burrows, although they have been known to dig their own burrows in softer soils. In urban areas, burrowing owls often utilize artificial burrows including pipes, culverts, and piles of concrete pieces. This semi-colonial owl breeds from March through August, and is most active while hunting during dawn and dusk. The nearest occurrence of nesting burrowing owls in the CNDDB (2016) search area is approximately 2.5 miles south of the site.

Numerous ground squirrels and their burrows were observed throughout the site, especially along fence lines, roads, and the edges of ditches. Annual croplands and annual grasslands in the site provides suitable foraging habitat for burrowing owls. No burrowing owls or evidence of occupancy were observed in or near the site.

TRICOLORED BLACKBIRD: The tricolored blackbird is a State of California Species of Concern and is also protected by the federal Migratory Bird Treaty Act and Fish and Game Code of California. Tricolors are colonial nesters requiring very dense stands of emergent wetland vegetation and/or dense thickets of wild rose or blackberries adjacent to open water for nesting. This species is endemic to California. The nearest occurrence of tricolored blackbird in the CNDDB (2016) search area is approximately 4.5 miles northeast of the site.

The expansive patches of tules or cattails in White Slough, Dredger Cut, the peripheral canal cut west of the Northwest Survey Area, and Delta waterways further west provide suitable nesting habitat for tricolored blackbird. The extent of use of these fields by foraging tricolored blackbirds is not known. The agricultural where the ponds would be located provide suitable foraging habitat for this species. The conversion of agricultural fields to ponds would result in a reduction of suitable tricolored blackbird foraging habitat in the site.

GIANT GARTER SNAKE: The giant garter snake is listed as threatened both under FESA and CESA. Critical habitat has not been designated for this species; a draft recovery plan for giant garter snake was prepared (USFWS, 1999a), but has not been finalized. Giant garter snake is endemic to the Sacramento and San Joaquin valleys where it is found in lowland areas (USFWS, 1999a; 2012). Historically, this species was found throughout the Central Valley from Butte County in the north to Kern County in the south. Currently, giant garter snake is only known to occur in 11 discrete populations in the Sacramento and San Joaquin valleys in Butte, Colusa, Fresno, Glenn, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo counties (USFWS, 2012).

The giant garter snake is one of the most aquatic of garter snakes and is usually found in streams, marshes, and sloughs with mud bottoms. This species prefers slow moving waters with emergent herbaceous wetland vegetation for cover and foraging, and grassy banks and openings for basking (Hansen, 1988). Giant garter snakes feed primarily on small fishes, tadpoles, and frogs. Since they are aquatic hunters, they must have access to permanent, though not necessarily extensive, water.

Giant garter snake is apparently absent from large rivers, other water bodies that support introduced populations of large predatory fish, and from wetlands with sand, gravel or rock substrates (Rossman and Stewart, 1987; Brode 1988; G. Hansen, 1988). Historically, oxbows, overflow areas, and backwater sloughs or channels could have provided suitable habitat. Riparian woodlands do not typically provide suitable habitat because of excessive shade, lack of basking sites, and the absence of prey populations.

Essential habitat components of giant garter snake consist of: (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter; giant garter snakes inhabit small mammal burrows and other soil crevices for aestivation.

A population of giant garter snakes occupies the “Coldani Marsh” core habitat area approximately one mile northwest of the WPCF. White Slough, Dredger Cut, the peripheral canal cut west of the Northwest Survey Area, and Delta waterways further west provide potentially suitable habitat for giant garter snake. The Coldani Marsh population of giant garter snakes may extend south as far as the delta waterways and wetland habitats west of the Northwest Survey Area.

The nearest documented occurrence of giant garter snake in the CNDDB (2016) search area is a series of sightings from 1974 through 1982 west of the Northwest Survey Area. The “Lodi White Slough Preserve”, an existing giant garter snake habitat area managed by SJCOG, encompasses a strip of land along the west edge of the WPCF in the vicinity of this old sighting. The location of this habitat area (i.e., the “Energy Center Easement”) is depicted in Figure 3. Giant garter snakes were not detected in this area during intensive trapping efforts in the greater vicinity of Coldani Marsh between 2009 and 2011, during which time snakes were only trapped in habitats a mile or more northwest of the site (Hansen, 2011). Given the historical records and presence of suitable habitat, the Energy Center Easement and lands further west would be presumed occupied under the SJCMSHCP.

The potential for occurrence of giant garter snakes in the project site and surrounding areas is discussed in detail in the Habitat Assessment for the project prepared by ECORP Consulting, Inc. (Appendix C). In summary, the agricultural fields in the Northwest Survey Area and the Southeast Survey Area do not provide suitable foraging or aestivation habitat for this species. The fields are tilled at least twice a year and do not contain cracks and burrows required by aestivating giant garter snake. The irrigation and drainage ditches that serve the fields could potentially be used for movement, but are not expected to provide suitable foraging habitat, as the ditches are often dry and do not contain prey items such as fish and frogs. In contrast, Dredger Cut and White Slough provide suitable aquatic habitat for giant garter snake and the banks of these waterways contain burrows and cracks that could be used for aestivation.

ECORP concluded that it is unlikely giant garter snakes ever occur in the Southeast Survey Area due to lack of nearby aquatic habitat and lack of suitable foraging or aestivation habitat in the Southeast Survey Area. In contrast, ECORP concluded that if giant garter snakes are present in off-site lands just west of Northwest Survey Area, individual snakes may move through the

Northwest Survey Area on occasion, but use of the fields and ditches would be limited to occasional movement.

The conversion of agricultural fields to ponds would result in a minor reduction of potential giant garter snake movement habitat in the site. The ECORP Assessment also describes the key minimization and avoidance measures that would be required pursuant to project compliance with the SJCMSHCP. These measures include construction scheduling, pre-construction surveys, protective fencing, worker training, minimizing vegetation clearing, and other measures.

As described above, the Project will reduce the annual volume discharged to Dredger Cut by approximately 180 and 200 million gallons. The proposed project will result in reductions of discharge to Dredger Cut at a rate of approximately 1,500 and 1,700 gallons per minute over approximately a 90-day period between January 1 and April 30 of each year. This would result in lower water temperatures during January through April, and minor improvements of water quality in Dredger Cut and downstream waterways. The ECORP study concluded this reduction of discharge from the WPCF into Dredger Cut and White Slough during the hibernation period of January through April is not anticipated to have any consequences for giant garter snakes, because snakes would be in torpor, above the water level established at the time they entered hibernation.

PACIFIC POND TURTLE: The Pacific pond turtle is a state species of concern, but is not a listed species at the state or federal level. Pacific pond turtles are associated with permanent or nearly permanent bodies of water with adequate basking sites such as logs, rocks or open mud banks. The nearest documented occurrence of this species in the CNDDB (2016) search area is along the northern edge of the Northwest Survey Area.

The agricultural fields that make up the Northwest Survey Area and the Southeast Survey Area do not provide suitable habitat for Pacific pond turtle. In

contrast, White Slough, Dredger Cut, the peripheral canal cut west of the Northwest Survey Area, and Delta waterways further west provide suitable habitat for this species and Pacific pond turtles were observed in White Slough and Dredger Cut during the 2015 surveys. The lower water temperatures in Dredger Cut and downstream waterways during January through April and minor improvements of water quality would result in minor improvement of Pacific pond turtle habitat.

SPECIAL-STATUS FISH: The potential for occurrence of special-status fish in the project site and surrounding areas is discussed in detail in the Fisheries Assessment for the project prepared by FishBio (Appendix D). White Slough, Dredger Cut, the San Joaquin River, and Delta waterways further west provide movement and/or rearing habitat for two special-status salmonids that occur in the area on a seasonal basis: fall-run Chinook salmon and Central Valley steelhead. While fall-run Chinook salmon are known to occur in the San Joaquin River, populations of federally-listed winter-run and spring-run Chinook salmon only occur in Central Valley drainages located further to the north. White Slough, Dredger Cut, the San Joaquin River, and Delta waterways further west also provide potentially suitable habitat for Delta smelt (*Hypomesus transpacificus*), the southern Distinct Population Segment (sDPS) of green sturgeon (*Acipenser medirostris*).

The FishBio Assessment provides information on the life history and distribution of special-status and concludes that it is unlikely that Central Valley California Steelhead, fall-run Chinook salmon, Delta smelt, or green sturgeon occur in Dredger Cut or the waterways immediately downstream of Dredger Cut on more than a very occasional or transitory basis. The Assessment provides an analysis of how the reduction in discharge may affect the habitat suitability of Dredger's Cut and connecting waterways during January through April. FishBio identified that the project has the potential to modify aquatic habitats in three ways:

- a reduction in the total volume discharged into the project vicinity may affect current velocities and/or the total volume of water within the San Joaquin River or the total Delta outflow.
- a reduction in discharge may affect the area that is currently thermally impacted and overall water temperatures in that affected area; and,
- a reduction in discharge may affect water quality via either a reduction or increase in nutrient inputs.

The existing discharge is a minor input to overall flows in the San Joaquin River and downstream waterways. From an analysis of the changes in discharge and river flows during wet, normal and dry years, FishBio concluded no appreciable changes in the total volume, or any measures related to the total volume discharged (i.e., current velocities) in the San Joaquin River or Delta would be expected to occur with the change in discharge from the WPCF. The reduction in temperature and changes in water quality during January through April is expected to result in a negligible change or a positive effect on the suitability of Dredger Cut, White Slough, and downstream waterway for special-status fish.

OTHER SPECIAL-STATUS SPECIES: Special-status bats may fly over the area on occasion, but would not be expected to roost in the site. The site does not provide suitable aquatic habitat for California tiger salamander, giant garter snake, or California red-legged frog. There are no blue elderberry shrubs in the site, precluding the potential occurrence of valley elderberry longhorn beetle. There are no vernal pools or seasonal wetlands in the site for vernal pool branchiopods (i.e., fairy and tadpole shrimp).

CRITICAL HABITAT: Several Central Valley drainages, including the San Joaquin River and White Slough are Designated Critical Habitat for federally listed anadromous salmonids. The project site is located within designated critical habitat for Central Valley California Steelhead but not within designated critical habitat for winter-run Chinook salmon (*Oncorhynchus tshawytscha*), spring-run Chinook salmon (*Oncorhynchus tshawytscha*) (NOAA, 2005). The entire site,

including the agricultural fields that would be developed in to ponds is designated critical habitat for delta smelt (USFWS, 1994) (Appendix E), as the habitat extends far inland from the waterways where this fish actually occurs,

The site is not within designated critical habitat for California red-legged frog (USFWS, 2006a), federally listed vernal pool shrimp or plants (USFWS, 2005a), California tiger salamander (USFWS, 2005b), valley elderberry longhorn beetle (USFWS, 1980), or other federally listed species (Appendix E).

VI. CONCLUSIONS AND RECOMMENDATIONS

- The project site consist of intensively farmed fields primarily provide foraging habitat for a variety of bird species. The well-developed riparian wetlands and woodlands associated with White Slough, Dredger Cut, the peripheral canal cut west of the Northwest Survey Area, and Delta waterways further west provide high-quality habitat for a wide variety of wildlife species and support numerous special-status plant and wildlife species.

- White Slough, Dredger Cut, Highline Canal, Bishop Cut, and other Delta waterways west and southwest of the site are jurisdictional Waters of the U.S. No other potentially jurisdictional wetlands or Waters of the U.S. were observed in or near the site.

- Due to a lack of suitable habitat, it is unlikely that special-status plants occur in the site.

- Swainson's hawk, tricolored blackbird, and Pacific pond turtle are the only species with potential to occur in the site on more than a transitory or very occasional basis. Giant garter snake may occur in wetland habitat just west of the site, but is unlikely to occur on-site. It is also unlikely that Central Valley California Steelhead, fall-run Chinook salmon, Delta smelt, or green

sturgeon occur in Dredger Cut or the waterways immediately downstream of Dredger Cut on more than a very occasional or transitory basis.

- The conversion of agricultural fields to ponds would result in a minor reduction of suitable Swainson's hawk, tricolored blackbird, and burrowing owl foraging habitat in the site.

- Reductions of discharge in to Dredger Cut is expected to have no impact or a less than significant impact on giant garter snake, Pacific pond turtle, special-status fish, or the potential habitats for these species in Dredger Cut, White Slough, the peripheral canal cut west of the Northwest Survey Area, or Delta waterways further west.

- The project will participate in the San Joaquin County Multi-species Habitat Conservation Plan (SJCOG, 2000). This will involve payment of fees and implementation of standard Take Avoidance measures outlined in the HCP for Swainson's hawks, burrowing owls, Pacific pond turtle, and giant garter snake. The SJCOG utilizes fees to secure and manage lands for covered species, providing compensatory habitat to offset the loss of habitat from the proposed project.

- Trees, shrubs, and grasslands in the area could be used by other birds protected by the Migratory Bird Treaty Act of 1918. Any construction or vegetation removal during the avian nesting season (February 1 through August 31) should be immediately preceded by survey. If active nests are found, a qualified biologist should mark the nest location(s), and identify an appropriate setback between the nest and construction or vegetation removal activities. Construction or vegetation removal within the setback shall be delayed until the young fledge.

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APPENDIX A

CNDDB Summary Report and Exhibits

& USFWS IPaC Trust Resource Report

Selected Elements by Scientific Name

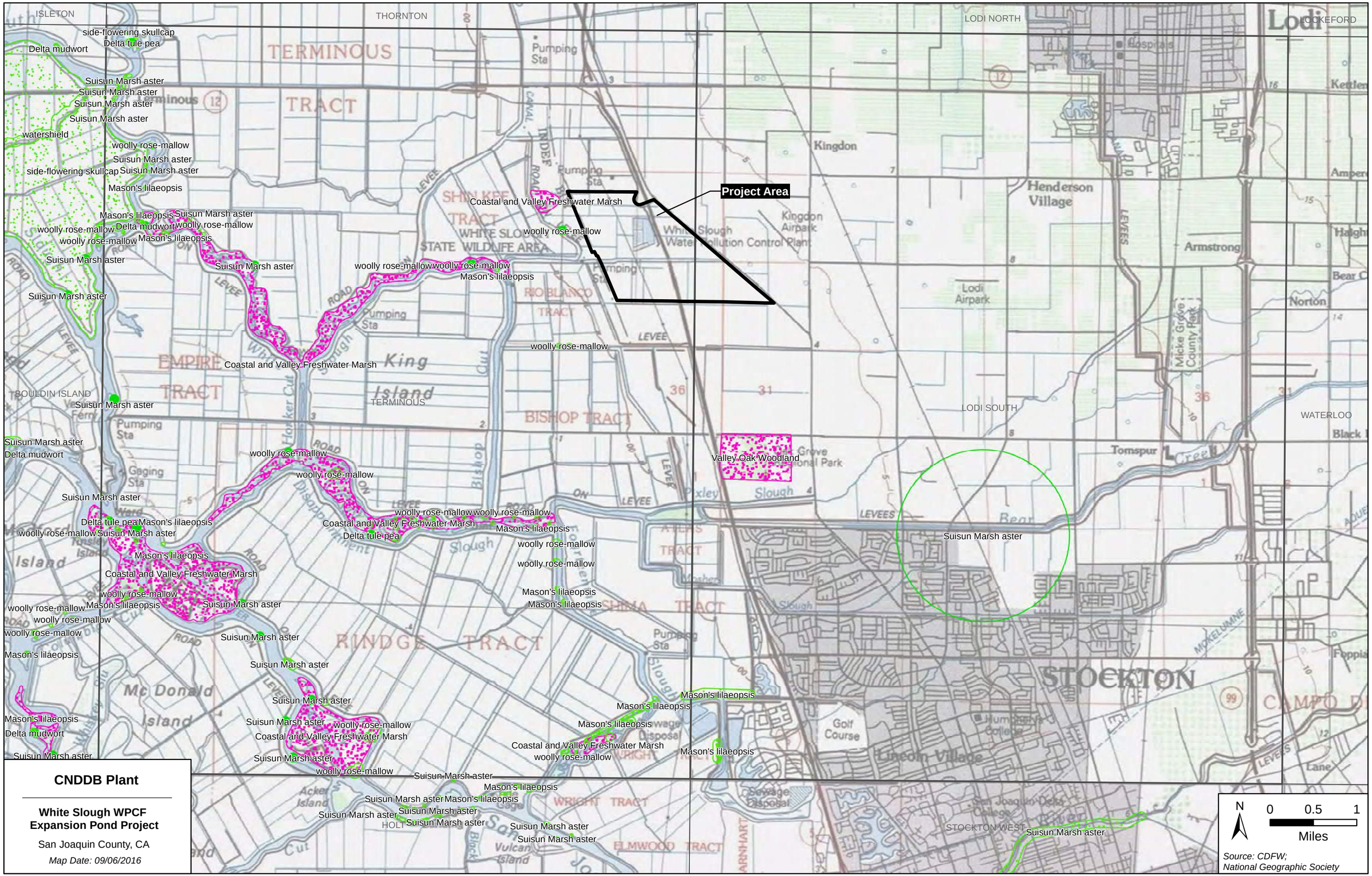
California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad = Lodi South (3812113) OR Terminous (3812114)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	None	G2G3	S1S2	SSC
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
Coastal and Valley Freshwater Marsh Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	G3	S2.1	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Hibiscus lasiocarpos var. occidentalis woolly rose-mallow	PDMAL0H0R3	None	None	G5T2	S2	1B.2
Hypomesus transpacificus Delta smelt	AFCHB01040	Threatened	Endangered	G1	S1	
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Lathyrus jepsonii var. jepsonii Delta tule pea	PDFAB250D2	None	None	G5T2	S2	1B.2
Lepidurus packardi vernal pool tadpole shrimp	ICBRA10010	Endangered	None	G4	S3S4	
Lilaeopsis masonii Mason's lilaeopsis	PDAPI19030	None	Rare	G2	S2	1B.1
Limosella australis Delta mudwort	PDSCR10050	None	None	G4G5	S2	2B.1
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Melospiza melodia song sparrow ("Modesto" population)	ABPBXA3010	None	None	G5	S3?	SSC
Oncorhynchus mykiss irideus steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	G5T2Q	S2	
Scutellaria lateriflora side-flowering skullcap	PDLAM1U0Q0	None	None	G5	S2	2B.2
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	SSC
Symphyotrichum lentum Suisun Marsh aster	PDASTE8470	None	None	G2	S2	1B.2
Thamnophis gigas giant gartersnake	ARADB36150	Threatened	Threatened	G2	S2	
Valley Oak Woodland Valley Oak Woodland	CTT71130CA	None	None	G3	S2.1	

Record Count: 21

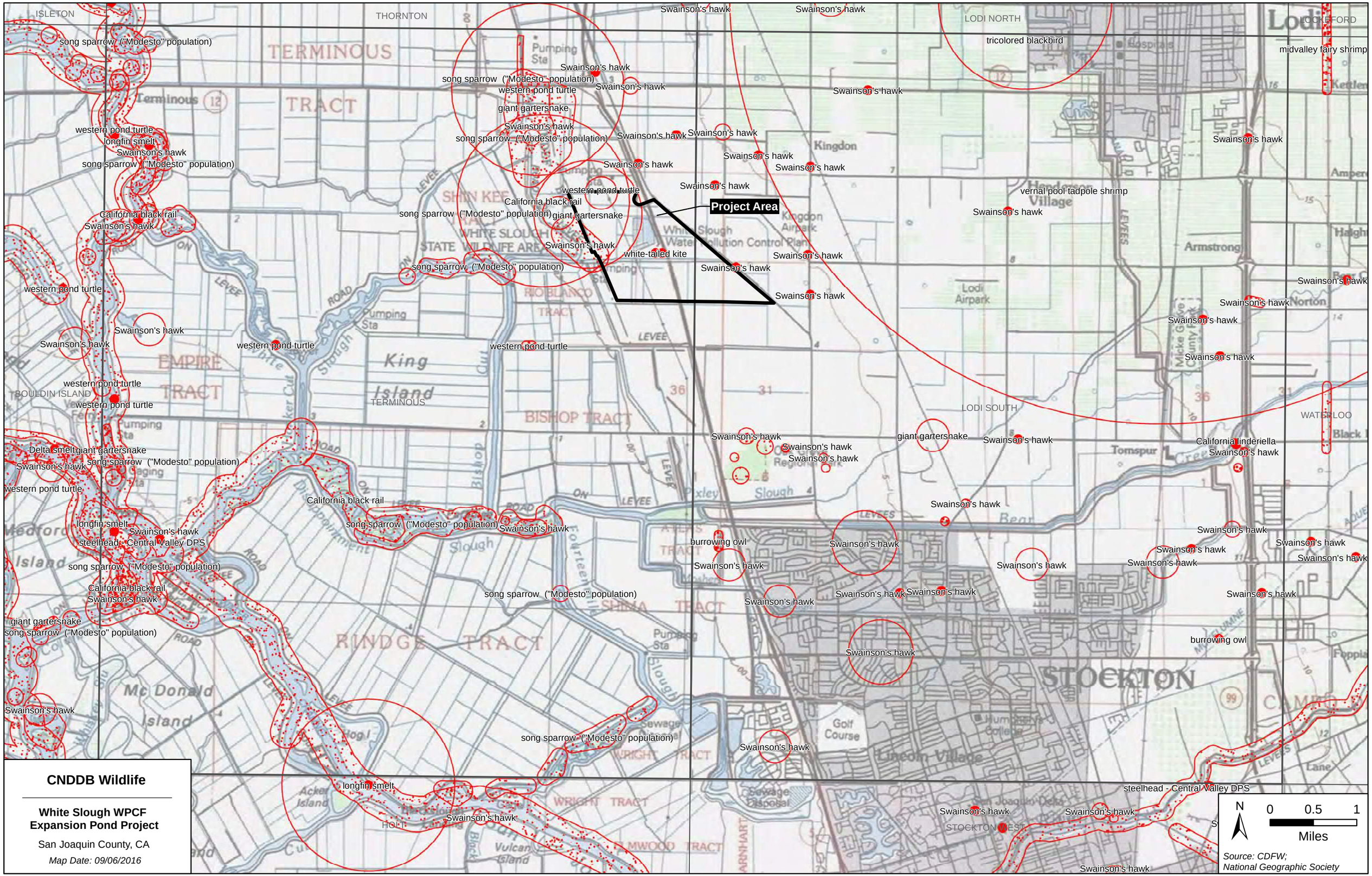


CNDDB Plant

White Slough WPCF Expansion Pond Project

San Joaquin County, CA

Map Date: 09/06/2016


Project Area
Swainson's hawk
song sparrow ("Modesto" population)
western pond turtle
giant gartersnake
California black rail
longfin smelt
Delta smelt
steelhead - Central Valley DPS
burrowing owl
tricolored blackbird
midvalley fairy shrimp
vernal pool tadpole shrimp
California linderiella
ISLETON
THORNTON
LODI NORTH
LOCKEFORD
TERMINOUS
TRACT
BOULDIN ISLAND
LODI SOUTH
WATERLOO
STOCKTON
STOCKTON WEST
Kingdon
Armstrong
King Island
Mc Donald Island
Acker Island
Vulcan Island
Lodi Airport
Golf Course
Lincoln Village
Sewage Disposal
Pumping Sta
LEVEE
ROAD
CNDDB Wildlife
White Slough WPCF Expansion Pond Project
San Joaquin County, CA
Map Date: 09/06/2016
N
0
0.5
1
Miles
Source: CDFW; National Geographic Society

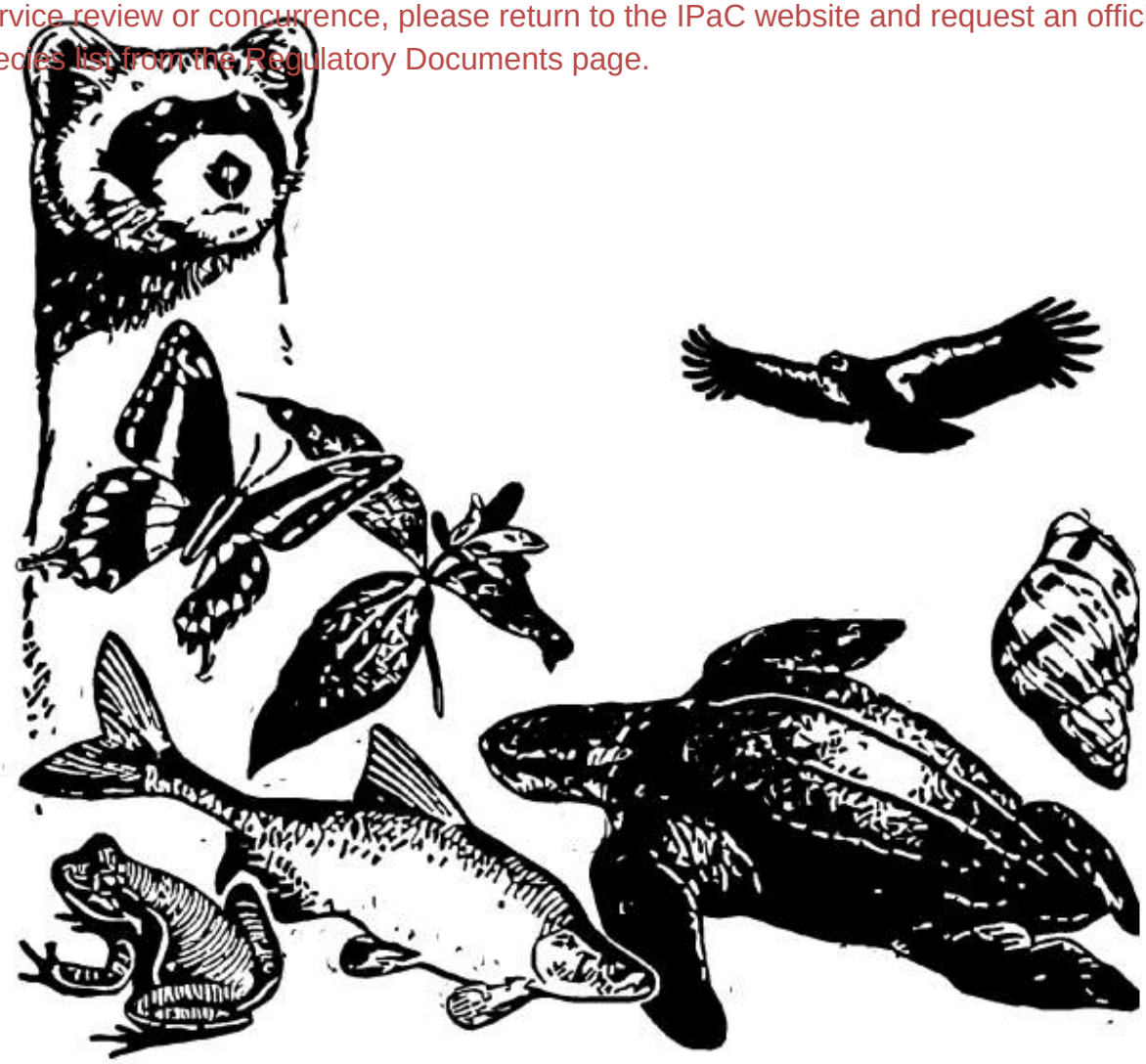
U.S. Fish & Wildlife Service

White Slough Water Pollution Control Facility Ponds

IPaC Trust Resources Report

Generated September 06, 2016 11:47 AM MDT, IPaC v3.0.8

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

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Wetlands 10

U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

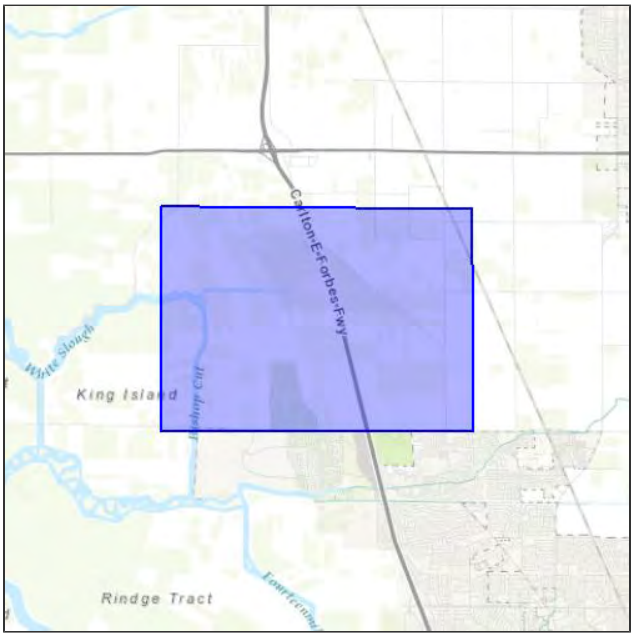
White Slough Water Pollution Control Facility Ponds

LOCATION

San Joaquin County, California

IPAC LINK

https://ecos.fws.gov/ipac/project/IVSZD-CAEG5-G7VNT-FTSC4-K23A7U



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

San Francisco Bay-delta Fish And Wildlife
650 Capitol Mall
Suite 8-300
Sacramento, CA 95814
(916) 930-5603

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Amphibians

California Red-legged Frog Rana draytonii — Threatened

MANAGED BY
Sacramento Fish And Wildlife Office
San Francisco Bay-delta Fish And Wildlife

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=D02D

California Tiger Salamander Ambystoma californiense — Threatened

MANAGED BY
Sacramento Fish And Wildlife Office
San Francisco Bay-delta Fish And Wildlife

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=D01T

Crustaceans

Vernal Pool Fairy Shrimp Branchinecta lynchi

Threatened

MANAGED BY
Sacramento Fish And Wildlife Office
San Francisco Bay-delta Fish And Wildlife

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=K03G

Vernal Pool Tadpole Shrimp Lepidurus packardi

Endangered

MANAGED BY
Sacramento Fish And Wildlife Office
San Francisco Bay-delta Fish And Wildlife

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=K048

Fishes

Delta Smelt Hypomesus transpacificus

Threatened

MANAGED BY
Sacramento Fish And Wildlife Office
San Francisco Bay-delta Fish And Wildlife

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E070

Steelhead Oncorhynchus (=Salmo) mykiss

Threatened

MANAGED BY
Sacramento Fish And Wildlife Office
San Francisco Bay-delta Fish And Wildlife

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E08D

Flowering Plants

Fleshy Owl's-clover Castilleja campestris ssp. succulenta

Threatened

MANAGED BY
Sacramento Fish And Wildlife Office
San Francisco Bay-delta Fish And Wildlife

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q0CG

Large-flowered Fiddleneck Amsinckia grandiflora

Endangered

MANAGED BY
San Francisco Bay-delta Fish And Wildlife

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q1SU

Insects

San Bruno Elfin Butterfly Callophrys mossii bayensis

Endangered

MANAGED BY
Sacramento Fish And Wildlife Office
San Francisco Bay-delta Fish And Wildlife

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=I00Q

Valley Elderberry Longhorn Beetle Desmocerus californicus dimorphus

Threatened

MANAGED BY
Sacramento Fish And Wildlife Office
San Francisco Bay-delta Fish And Wildlife

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=I01L

Mammals

Riparian Brush Rabbit Sylvilagus bachmani riparius

Endangered

MANAGED BY
Sacramento Fish And Wildlife Office
San Francisco Bay-delta Fish And Wildlife

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0DN

Reptiles

Giant Garter Snake Thamnophis gigas — Threatened

MANAGED BY
Sacramento Fish And Wildlife Office
San Francisco Bay-delta Fish And Wildlife

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=C057

Critical Habitats

This location overlaps all or part of the critical habitat for the following species:

Delta Smelt Hypomesus transpacificus
Final designated critical habitat
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E070#crithab

Steelhead Oncorhynchus (=Salmo) mykiss
Final designated critical habitat
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E08D#crithab

APPENDIX B

Photographs

Disked field in the south part of the Northwest Survey Area, looking east; 10/22/15.

Tranmission lines crossing through the Northwest Survey Area, looking southeast; 10/22/15.

Irrigation ditch along the north edge of Field 2B, looking west; 10/22/15.

Concrete lined irrigation ditch along the east side of Field 2B, looking south; 10/22/15.

Alfalfa field in the Southeast Survey Area, looking southwest; 10/22/15.

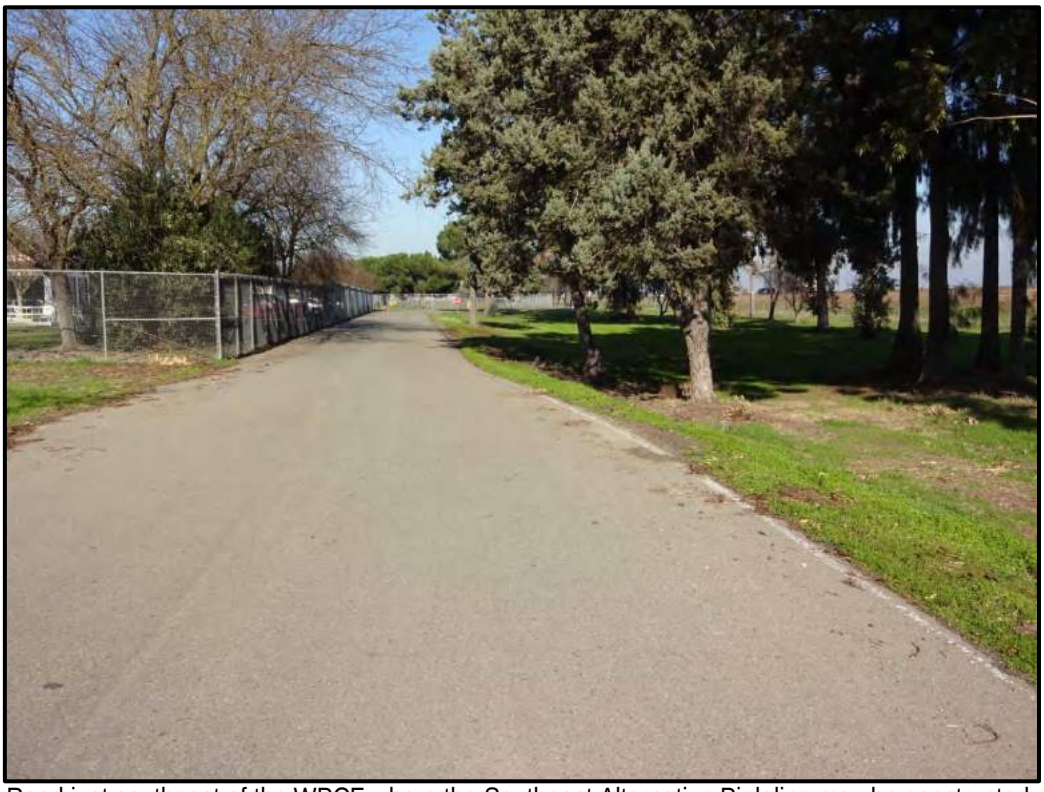
Farm road along the south edge of the Southeast Survey Area, looking east; 10/22/15.

Concrete lined irrigation ditch along the east side of Field 6E, looking southeast; 09/29/15.

Irrigation ditch in between Fields 6E and 6F, looking south; 09/29/15. Note that one field is in alfalfa and the other is bare dirt where corn had been grown earlier in the year.

Tunnel under Interstate 5 through which the Southeast Alternative Pipeline may be constructed, looking west ; 12/29/15.

Paved road just east of Interstate 5 where the Southeast Alternative Pipleline may be constructed, looking east; 12/29/15.



Road just southeast of the WPCF where the Southeast Alternative Pipleline may be constructed, looking northwest; 12/29/15.

Dirt road along the north edge of White Slough, south of the WPCF, looking west; 12/29/15. The West Alternative Pipleline may be constructed in this road.

Dirt road along the north edge of White Slough, south of the NCPA Facility, looking west; 12/29/15. The West Alternative Pipleline may be constructed in this road.

Road through the WPCF where the West Alternative Pipleline may be constructed, looking west; 12/29/15.

Point of Discharge in Dreder Cut, looking west; 12/10/15. The discharge pipe is under the cat walk and is not visible.

Dredger Cut looking east toward the Point of Discharge from near the Highline Canal; 12/10/15.

Highline Canal, looking northwest from the west end of Dredger Cut; 12/10/15. While this photograph was taken, the tide was coming in and water was flowing "upstream" (i.e., northwest).

White Slough, looking west from the west end of Dredger Cut; 12/10/15. Note that White Slough has open water and with fringes of emergent wetland vegetation along the banks.

White Slough along the south edge of the Northwest Survey Area, looking west; 10/22/15.

Lodi White Slough Preserve and White Slough Wildlife Area, looking northwest from the northwest Survey Area; 10/22/15. The riparian vegetation in the distance is in the White Slough Wildlife Area.

Swainson's hawk nest along Interstate 5 just north of the WWTP, looking north; 05/10/16. The nest is 400+/- feet south of the underpass connecting Thornton Road and the WWTP access road.

Waterfowl in one of the ponds, looking southwest; 01/21/16. A variety of ducks loaf on the ponds.

APPENDIX C

Giant Garter Snake Habitat Assessment

Giant Garter Snake (*Thamnophis gigas*) Habitat Assessment

White Slough Water Pollution Control Facility

San Joaquin County, California

Prepared for:

Moore Biological Consultants

13 January 2016

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

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Attachment B – Representative Site Photographs
Attachment C – Datasheets

1.0 INTRODUCTION

At the request of Moore Biological Consultants, ECORP Consulting, Inc. (ECORP) conducted a habitat assessment for the state and federally listed threatened giant garter snake (*Thamnophis gigas*) within two alternative locations in the White Slough Water Pollution Control Facility (WPCF) Project study area. The project site is located approximately 4.5 miles west/southwest of Lodi in San Joaquin County, California (Figure 1. *Project Location and Vicinity*). The project study area corresponds to portions of Sections 24 and 25, Township 03 North, Range 05 East (Mount Diablo Base Meridian [MDBM]) of the "Terminous, California" and Section 30, Township 03 North, Range 06 East (MDBM) of the "Lodi South, California" 7.5-minute quadrangles (U.S. Department of the Interior, Geological Survey (USGS) 1993 and 1976, respectively). The approximate center of the site is located at 38° 05' 17" North and 121° 23' 8" West within the Upper Mokelumne and San Joaquin Delta watersheds (Hydrologic Unit Codes #18040012 and 18040003, USGS 1978). The WPCF is located in a primarily agricultural area, adjacent to Interstate 5 (I-5) and 1.2 miles south of Highway 12. The WPCF address is 12751 North Thornton Road, Lodi, California, and consists of ±1,026.27 acres of land, including the WPCF and surrounding City-owned agricultural fields. The City of Lodi General Plan designates the WPCF as "Industrial" and the surrounding City-owned agricultural fields where the expansion pond is proposed as "Public/Quasi-Public."

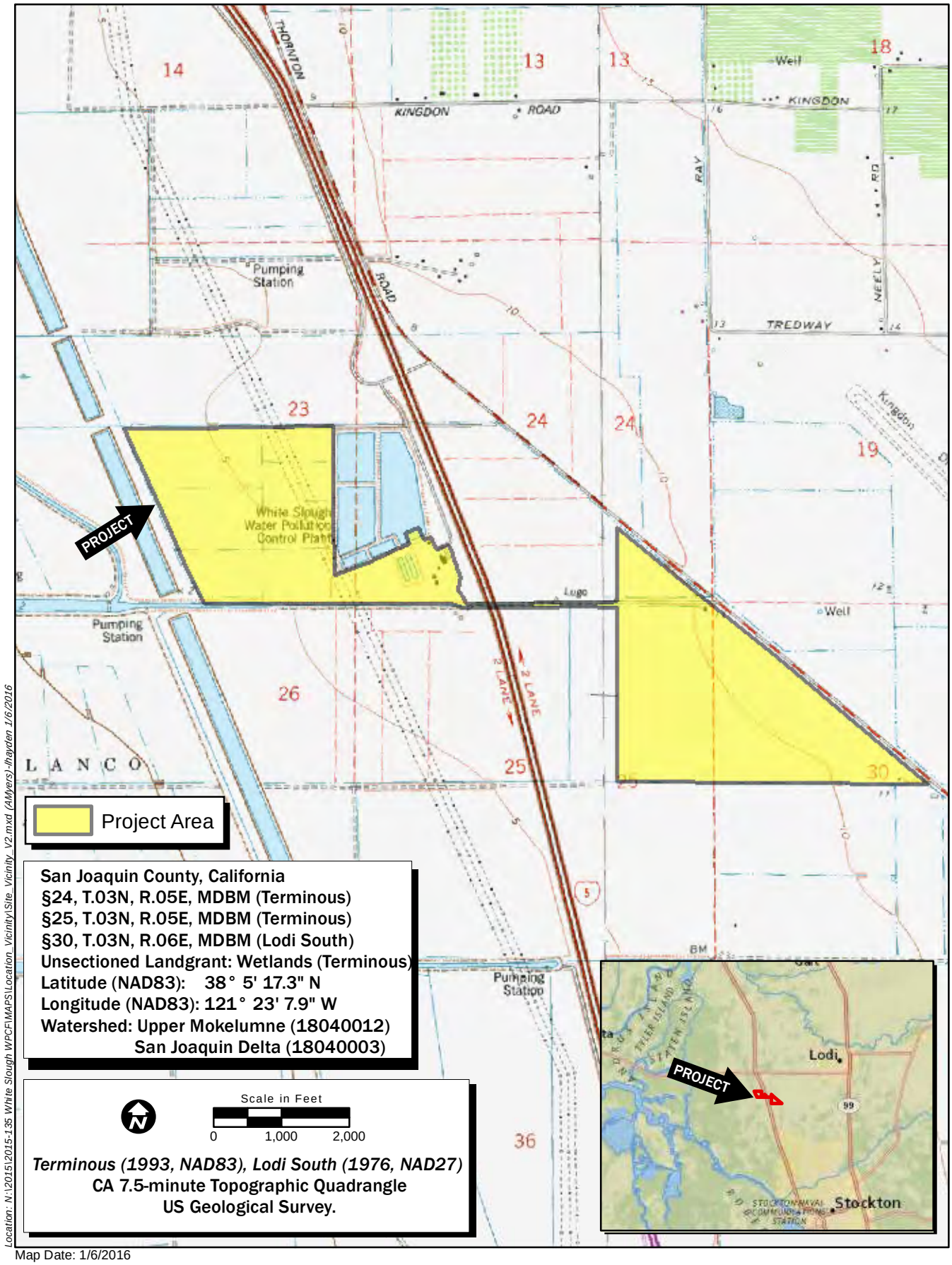
Two pond alternative sites were evaluated in this habitat assessment, as well as an existing dredger cut discharge location at which water discharge will be reduced in January through April, and two alternative pipeline locations, both in unpaved roadways, one west of Highway 12 and one east of the highway.

1.1 Project Description

The City of Lodi is proposing the construction of a 70-acre Expansion Pond and associated conveyance infrastructure at the City-owned White Slough WPCF (Project). The Expansion Pond will be used exclusively to store disinfected, tertiary-treated effluent produced by the WPCF for use as irrigation water on the 886.67 acres of agricultural land that surround the WPCF. The purpose of the Project is to provide additional WPCF effluent supplies for agricultural irrigation on these properties and to offset groundwater pumping. Studies have demonstrated that the storage provided by this project will significantly offset groundwater pumping (West Yost Associates, 2014). The Project would be funded by the Department of Water Resources (DWR) Proposition 84 Grant Funding Program, which is intended to assist in the development of projects which increase agricultural and drinking water supplies, decrease groundwater pumping, or assist in preserving water quality at source intakes. The Project, as discussed below, meets these criteria as set forth by DWR.

Two alternative Expansion Pond sites are being considered for the Project:

- The Southeastern Expansion Pond site is located in the southeastern portion of the City's 1,026.27-acre property (Figure 2. *Survey Areas and Project Components*). The Southeastern Expansion Pond site would be configured within the space currently occupied by the three agricultural fields that are located at this site. These three fields, which are currently irrigated with groundwater supplied from a production well that is also located in this area, would no longer be used for agricultural production.



Map Date: 1/6/2016
Service Layer Credits: National Geographic

Figure 1. Project Location and Vicinity

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

2015-135 White Slough WPCF

Figure 2.
Survey Area and Project Components

Map Features

- Survey Area
- West Pond Alternative
- Southeast Pond Alternative
- Southeast Alternative Pipeline
- West Alternative Pipeline

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Location: N:\2015\2015-135 White Slough WPCF\MAPS\Aerial_Maps\WS_Aerial_Overview.mxd (LMH) lhayden 1/7/2016

2015-135 White House Slough WPCF

Scale in Feet
0 1,200

Photo (or Base) Source: USGS 2012

Map Date: 1/7/2016

The 70-acre Western Expansion Pond Site is located on a portion of the City's existing agricultural fields that are directly west of the existing WPCF treatment and storage facilities (Figure 2). The Western Expansion Pond site would be configured to avoid construction under the power lines that transect the City property and near the existing Giant Garter Snake habitat easement that is located along the western boundary of the City's properties. The agricultural fields and associated irrigation water infrastructure in and around the Western Expansion Pond Site would be reconfigured to accommodate the Project, while also minimizing the reduction overall reduction of agricultural production area on the City's properties. This alternative also includes expansion of the City's irrigation facilities to allow for irrigation of the three fields located in the southeastern corner of the City's property (i.e. the Southeastern Expansion Pond) with water supplied from the WPCF. This expansion would require a new 10- to 15-horsepower (HP) booster pump and new conveyance channels to connect the existing WPCF effluent irrigation system infrastructure to the irrigation system infrastructure that currently serves this area (Figure 2).

The WPCF receives and treats municipal wastewater influent from a service area encompassing the City of Lodi and the San Joaquin Flag City service area. The WPCF has a design average dry weather flow treatment capacity of 8.5 million gallons per day (MGD). The WPCF treatment process includes secondary treatment with nitrification and denitrification (to provide an effluent total nitrogen level less than 10 mg/L), tertiary filtration, and UV disinfection. The WPCF disinfected, tertiary-treated effluent meets all applicable water quality objectives for the Sacramento-San Joaquin Delta (Delta) to protect its beneficial uses, which include warm water fisheries habitat, drinking watery supply, and unrestricted recreational activities. The effluent water quality is demonstrated through regular monthly water quality and acute toxicity monitoring and quarterly three-species chronic toxicity monitoring. The WPCF discharges the disinfected, tertiary-treated effluent to Dredger Cut, a dead-end slough of the Delta. Flows up to 16.3 MGD may be treated and discharged year-round. The location of the existing outfall in Dredger Cut is shown on Figure 2. The dry-weather wastewater flows entering the WPCF are approximately 5.5 MGD and are expected to increase up to 8.5 MGD over the next 30- to 50-year period. The Project will not change the design and/or permitted treatment and discharge capacity of the WPCF.

During the irrigation season (generally mid-April through September), undisinfected secondary-treated municipal effluent that has been nitrified and denitrified to provide an effluent total nitrogen level less than 10 mg/L is directed to four on-site unlined storage ponds totaling a maximum combined storage volume of 328 acre-feet. These ponds also can be used to store industrial wastewater and stormwater received through the City's industrial collection system. The stored flows, along with flows entering the WPCF via the industrial collection system, are used to irrigate 790 acres of surrounding City-owned agricultural land. Crops grown include fodder crops like corn, alfalfa, ryegrass and wheat. The irrigation demand generally exceeds the available WPCF supplies in July and August; supplemental irrigation water is obtained from groundwater pumping. The City also supplies disinfected tertiary treated municipal effluent to the Northern California Power Agency (NCPA) power plant, and the San Joaquin County Mosquito and Vector Control District (SJCM&VCD) fish-rearing ponds year-round. These two facilities are located on City property, adjacent to the WPCF main process area. The NCPA facility consists of two power generating facilities: a 49.9 Megawatt (MW) Power Plant and a 296 MW, Lodi Energy Center. NCPA relies on the City's treated effluent for steam production and cooling system water in both facilities and as make up water for

two 250,000-gallon fire water tanks. The SJCM&VCD fish rearing ponds are used to cultivate mosquito fish (*Gambusia affinis*). The Project will not affect the recycled water deliveries to these two facilities.

During the non-irrigation season (generally October through mid-April), treated effluent not used by the NCPA and SJCM&VCD facilities are released to Dredger Cut. The Project will reduce the volume discharged to Dredger Cut by approximately 180 and 200 million gallons. Flow will be diverted from Dredger Cut at a rate of approximately 1,500 and 1,700 GPM over approximately a 90-day period between 1 January and 30 April each year. The table below summarizes the anticipated change in the discharge volumes:

Flows Discharged to Dredger Cut from the White Slough Water Pollution Control Facility			
Month	Current Volume Discharged (2012 -2014 Average), Million Gallons	Maximum Volume Discharged After the Project is Implemented, Million Gallons	Minimum Volume Discharged After the Project is Implemented, Million Gallons
January	105	52	47
February	98	44	39
March	75	34	30
April	74	38	35
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	39	39	39
November	90	90	90
December	139	139	139
Total	620	436	419

The Expansion Pond levees will be constructed from fill dirt removed from the 70-acre construction area. The levees will be approximately 2.4 m (8 feet) tall and the Expansion Pond will be designed to operate with a minimum freeboard of 0.6 m (2 feet). The bottom of the Expansion Pond will be graded flat with a slight slope toward one corner, which is where a discharge pump station will be located.

The conveyance facilities associated with the Project include a new, 15- to 20-HP pump station constructed downstream of the existing WPCF ultraviolet disinfection facility, which will discharge disinfected tertiary-treated effluent into a new conveyance pipeline that will deliver the effluent to the Expansion Pond. The potential alignments of the new conveyance pipelines that will deliver effluent from the WPCF ultraviolet disinfection facility to the Southeastern and Western Expansion Pond sites are shown in Figure 2. For the Southeastern Expansion Pond site alternative, the City may rely on a portion of the City's existing irrigation water delivery infrastructure to convey treated effluent to the pond. This conveyance approach would require less pipeline construction, but would include a 10- to 15-HP pump station located near the end of the existing irrigation water distribution system to lift the effluent into the pond.

The Project also includes conveyance infrastructure to provide for delivery of the treated effluent from the Expansion Pond to the City's existing irrigation water delivery system. For both alternatives,

a new, 15- to 20-HP pump station will be constructed at the low end of the expansion pond. This new pump station will discharge the stored disinfected tertiary-treated effluent into a new conveyance pipeline that will deliver the effluent to a location within the existing irrigation water delivery system that allows for distribution to the City's fields. The alignments of the new pipelines that will deliver effluent from to the Western and Southeastern Expansion Pond sites to the irrigation system are also shown in Figure 2.

The White Slough WPCF requires expansion and additional measures to prevent excess surface water discharge to the Delta and decrease groundwater pumping for irrigation. The proposed expansion pond (70 acres in size) would allow for Title 22 tertiary treated waters to be stored and used for additional on-site irrigation, rather than discharged to the Delta. Overall, by combining the need to increase on-site wastewater storage with the need to reduce surface water discharge and groundwater pumping, the proposed Project is anticipated to have a multitude of benefits that are both local and regional in scope. Some of the major benefits include increased irrigation water supply, improved surface water quality in the Delta, and the potential to increase groundwater storage.

1.2 Environmental Setting

The White Slough Water Pollution Control Facility is located within the San Joaquin Valley Subregion (SnJV) of the Great Central Valley Region (Baldwin et al. 2012). This is the larger and more xeric subdivision of the Central Valley. Land use throughout this subregion is primarily agricultural, but grasslands, marshes, vernal pool complexes, riparian and oak woodlands, and alkali/saline playas remain (Baldwin et al. 2012). The study area occurs at elevations below 6 m (20 feet) above mean sea level and is split between two watersheds. The Upper Mokelumne drains the Northwestern part of the Survey Area, while the San Joaquin Delta drains the Southeastern Survey Area. Shin Kee Tract occurs west of the White Slough Wildlife Area. Prior to European settlement, the area consisted of natural freshwater sloughs and tule marshes, but systematic water diversion with hand-build canals, dykes, and ditches, began in the early to mid-1800's (Kirk 1994, Gronberg et al. 1998). Federal involvement and rapid widespread changes to hydrology and water conveyance began in the late 1940's (Gronberg et al. 1998 and references therein). Mean annual precipitation in the area averages between 10 to 20 inches, all occurring as rainfall, and the area features a Mediterranean climate with cool wet winters and hot, dry summers (Gronberg et al. 1998). The surrounding marshes, including White Slough and Bishop Cut adjacent to the project site, receive tidal influence and reverse direction four times daily (West Yost unpublished report).

1.3 Giant Garter Snake

Giant garter snake was listed as threatened by the State of California in 1971 and by U. S. Fish and Wildlife Service (USFWS) in 1993. A detailed account of the taxonomy, ecology, and biology of the snake is presented in the *Draft Recovery Plan for the Giant Garter Snake (Thamnophis gigas)* (USFWS 1999), the *Revised Draft Recovery Plan for the Giant Garter Snake (Thamnophis gigas)* (USFWS 2015,) in the final rule (58 FR 54053), and in Halstead et al. (2015a). Five-year reviews of its listing status were conducted in 2006 and 2012 (USFWS 2006, USFWS 2012). To date, there is no designated critical habitat for the giant garter snake. The *Draft Recovery Plan* divided the range of the giant garter snake into four recovery units and thirteen populations. The 2012 status review

reduced the number of populations to nine based on presumed connectivity between three populations formerly thought to be isolated and the apparent extirpation of two other populations. The WPCF survey area falls within the geographic boundaries of the Delta Basin Recovery Unit.

1.3.1 Species Biology

The giant garter snake is a California endemic species, only occurring in the Sacramento and San Joaquin Valleys from Butte County to Kern County (Rossman et al. 1996). It is the largest garter snake species, attaining a maximum length of 165 cm (65 inches) (Stebbins and McGinnis 2012). Like most Natricines, these snakes are sexually dimorphic with females being both longer and proportionally heavier than males (Wylie et al. 2010). The species occurs in two general color/pattern variants with much variation among those morphologies. In the Sacramento Valley, the giant garter snake has a dark brown/blackish dorsal coloration with lighter yellow vertebral and lateral stripes reminiscent of many garter snake species (*Thamnophis*). A pattern variant found in southern parts of its range is more variable and may feature a darkish background color of brown, green, or gray with two rows of alternating dark spots between indistinct vertebral and lateral stripes, more reminiscent of eastern watersnakes (*Nerodia* sp.) (Rossman et al. 1996). The lateral stripes, when present, are on the second and third lateral scales (Rossman et al. 1996). The snout is longer and narrower than in sympatric garter snake species. Among the eight supralabial scales, the sixth is shorter and narrower than the seventh; another condition not shared with other co-existing garter snakes (Hansen 1980).

Until 1987, the taxonomy for this species was in flux (Rossman et al. 1996). It was originally described as a subspecies of the then wide-ranging *Thamnophis ordinoides* group (northwestern garter snake) (Fitch 1940). The group as it then existed was considered an *artekreis*, a closely related and ill-defined species group in which three subgroups were recognized based on ecology and morphology (Fitch 1940). Various workers recognized the distinctness of taxa within the group, however, with varying attempts at sorting the taxonomy (Johnson 1947, Fitch 1948, Fox 1948, Lawson and Dessauer 1979). It was not until 1987 that the giant garter snake was determined to be a full species (Rossman and Stewart 1987). Paquin et al. (2006) subsequently confirmed this arrangement and found farther subdivision within the range of the giant garter snake, which they attribute to partial isolation within watersheds. Even more recent studies indicate five genetic clusters, with snakes from White Slough sharing genes with Badger Creek to the north and Volta Wildlife Area (in the San Joaquin Basin population) to the south (Wood et al. 2015). There is an approximately 100-km (62-mile) north-south gap in distribution between White Slough and the San Joaquin Basin population, possibly the result of the narrow floodplain of the San Joaquin River (Hansen and Brode 1980).

The giant garter snake is semi-aquatic and occurs in sloughs, ponds, low gradient streams, and irrigation/drainage canals (USFWS 1999). Rice agriculture now provides habitat and supports populations when the seasonally flooded fields and associated water conveyance systems are managed for the species (USFWS 1999), and is one reason giant garter snake populations in the Sacramento Valley are more robust than those south (Halstead et al. 2010). Privately-owned duck clubs and advocacy groups (e.g., Ducks Unlimited) have preserved and managed wetland habitats throughout the range of giant garter snakes to the benefit of the species (USFWS 1999).

The giant garter snake is an active, generally diurnal predator, which hunts by sight or olfaction (Ernst and Ernst 2003) and its diet is almost entirely aquatic. Historically, they depended on native prey such as California red-legged frog (*Rana draytonii*), Sacramento blackfish (*Orthodon microlepotus*), and thick-tailed chub (*Gila crassicauda*), species that have undergone recent major declines or extirpations (Rossman et al. 1996). Diet is now dominated by introduced species such as mosquitofish, American bullfrogs (*Lithobates catesbeianus*), and common carp (*Cyprinus carpio*) (Fitch 1941, Brode 1988, Rossman et al. 1996).

Seasonally, the giant garter snake becomes active in early spring, emerging from overwintering sites to bask on emergent willows, tules, saltbush, and riprap (Hansen and Tremper in Rossman et al. 1996). Generally by May, all giant garter snakes have emerged from hibernacula and are actively foraging for food. Males immediately start searching for mates (USFWS 1999). Live young are born in late July through early September (Hansen and Hansen 1990) and by October, most snakes begin searching for overwintering sites. Most are in hibernacula by November (Hansen and Hansen 1990). As with most ectothermic vertebrates, the exact timing of activities is dependent on current climatic conditions. Males are sexually mature in approximately three years. Females, which achieve sexual maturity at larger size, mature in five years (G. Hansen pers. comm. in USFWS 1999).

Giant garter snakes are known for their wariness. When disturbed, they quickly dive underwater and swim away or hide motionless for several minutes before surfacing (Ernst and Ernst 2003). As befits their mid-trophic level position, numerous animals are predators of this snake. Introduced American bullfrogs and warm-water fish probably prey upon neonate and juvenile giant garter snakes (Rossman et al. 1996, Wylie et al. 2003), while mesopredators such as raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), opossums (*Didephis virginiana*), and great blue herons (*Ardea herodias*) likely take juveniles and adults (USFWS 2012).

Both the distribution and abundance of the giant garter snake have been reduced from historic levels. Flood control activities and the drainage of marshes and other wetlands for agriculture have led to extirpation in the Buena Vista, Tulare, and Kern lakebeds in the southern one-third of its range (Hansen and Brode 1980). Most of the San Joaquin Valley has undergone similar wetland modification together with upstream watershed projects, urban development, and the proliferation of introduced and subsidized aquatic predators (USFWS 2012). As a result, the giant garter snake in the central and southern San Joaquin Valley is extremely rare and population trends appear to be declining (Hansen 2008). At locations in the Sacramento Valley, the garter snake is generally more numerous and habitat quality appears to be better, although trends in abundance are unclear (USFWS 2012).

1.3.2 Habitat Requirements

The giant garter snake is one of the most aquatic garter snakes (USFWS 1999). It is rarely found far from water and can be considered ecologically analogous to watersnakes (Rossman et al. 1996), which fill similar niches east of the Rocky Mountains (Gibbons and Dorcas 2004). This species historically inhabited the marshes and sloughs of California's Central Valley at low elevations (less than 122 m [400 feet]) (Stebbins 2003). Essential habitat components required are permanent water to support a sufficient prey base, emergent vegetation for escape cover and foraging habitat,

near-bank upland habitat for basking, and higher-elevation habitats for winter refugia (USFWS 1999 and references therein).

Current occupied habitat includes marshes and sloughs, irrigation and drainage canals, small lakes and ponds, rice agricultural fields, and low gradient streams (USFWS 1999). Waters inhabited by this species typically feature substrates of soil, mud, or other fines. Giant garter snakes tend to be absent from larger rivers and wetlands with sand, gravel, cobble, or rock substrates, as well as from areas with extensive shading. Small mammal burrows, crayfish burrows, and soil cracks on south- or west-facing slopes are used as retreats during the active season, as is riprap along drainage ditches and canals (USFWS 1999). Tules (*Shoenoplectus* spp.) and cattails (*Typha* spp.) are usually present and used for cover and as basking sites (Stebbins 2003).

Giant garter snakes use grassy bank-side habitats for basking and use higher elevation uplands for cover and retreat from floodwaters during the inactive winter season (USFWS 1999). Use of uplands is highly unpredictable (Halstead et al. 2015b): giant garter snakes may occur as far as 50 m (164 feet) from water in the active period and as far as 250 m (820 feet) from water during the winter (Wylie et al. 1997 in USFWS 1999; Halstead et al. 2015b). A recent study found that giant garter snakes were found in upland habitats more often than not and that almost all winter locations were in terrestrial habitats (Halstead et al. 2015b). However, although snakes in this study modeled movements of up to 174 m (571 feet) from aquatic habitat, 95 percent of summer locations were within 10 m (33 feet) of water, and 90 percent of winter locations were within 20 m (66 feet).

Networks of canals near rice agriculture (aquatic agriculture) are positively associated with giant garter snake presence, to the point that some experts believe that without this aquatic crop, few populations would remain (Halstead et al. 2010). However, population density and body condition were lower in rice agriculture than in natural landscapes (Halstead et al. 2010). Presence of streams and other agriculture methods, including row crops, are negatively associated with giant garter snake presence (Halstead et al. 2010, USFWS 2012). In telemetry studies performed to investigate how the removal of water from rice fields affects giant garter snakes, snakes have been found to leave previously occupied fields when fallowing continues for more than one season (USFWS 2012, and references therein).

The giant garter snake is an aquatic prey specialist and feeds primarily on small fish, frogs, and tadpoles (USFWS 1999). It is thought that historically, native fish and California red-legged frogs were important prey items. However, nonnative American bullfrogs, carp, mosquitofish, and catfish now make up most of its diet (Rossman et al. 1996). Shallow water is a necessary habitat component because the giant garter snake is an active forager that traps prey in shallow water and pooled areas (Hansen 1980, Hansen and Brode 1993).

Numerous factors have led to the decline of giant garter snakes across their range, with perhaps the largest contributors being habitat destruction, modification, and conversion (USFWS 1999). The Delta has the largest watershed in the western United States (Orme 2002a). However, California now has more than 1,200 large reservoirs which move nearly one-fourth of the country's water supply through the world's largest aqueduct system (Cohen 1994). Massive wetlands such as the Buena Vista, Tulare, and Kern lakebeds (an area once called The Valley of Lakes) in the southern third of the snake's range, which once featured large expanses of habitat, have been drained and

converted to agriculture (Hansen and Brode 1980, Brode and Hansen 1992, Dasmann 1994). The historic landscape condition for the Sacramento Valley consisted of broad and shallow basins that filled seasonally (Hinds 1952). Upstream water storage and diversions, the filling of wetlands by sedimentation from hydraulic mining (Orme 2002b), and efforts to accommodate urban growth and agriculture have led to a loss of 97 percent of the Delta's waters (Cohen 1994).

2.0 METHODS

ECORP biologist Eric Stitt conducted field-based habitat assessments for the giant garter snake on 13 and 26 October, 2015 and 03 January, 2016. In conducting the assessments, Mr. Stitt walked meandering transects through the Survey Areas while noting current environmental conditions, current and historic land use, presence of favorable or unfavorable habitat conditions relevant to giant garter snake occupancy, wildlife species present, and other factors.

Habitat assessments were based primarily on habitat requirements as described by USFWS (1999) as well as personal knowledge of the species. Aquatic features and adjacent uplands were evaluated as to their potential to support breeding, foraging activities, refugia, and as dispersal corridors. Prior to the site visit, the California Natural Diversity Database (CNDDB), maintained by the California Department of Fish and Wildlife (CDFW), was queried for giant garter snake occurrences within the "Bouldin Island," Bruceville," Jersey Island," Lodi South," Stockton East," Stockton West," and "Terminous, California" USGS quadrangles (Figure 3. *California Natural Diversity Database Occurrences for Giant Garter Snake)*. A literature search was performed to gather other information relevant to giant garter snakes in and surrounding the study area.

3.0 RESULTS

3.1 Nearby Occurrences

The WPCF study site borders a known and relatively well-studied population of giant garter snakes, and multiple records are known from the area (Figure 3). CNDDB element occurrence #50 is a record from the White Slough Wildlife Area immediately adjacent to the study area. At this site, two giant garter snakes were collected in 1982 by CDFW as part of a captive breeding study. Additional sightings were recorded for the site in prior years and in 2009 an intensive trapping study of parts of White Slough was initiated. Subsequently, 27 giant garter snakes were captured in 2009 and 2011 (Hansen 2011). Most captures were concentrated in the area of Coldani Marsh, approximately 1.3 miles northwest of the study area (CNDDB element occurrence #49 encompasses this area). Despite extensive trapping farther south and east closer to the WPCF, no captures were made (Hansen 2011). Reasons for the apparently localized distribution at Coldani Marsh were unclear but may have to do with differences in substrates at different waters in the area, the higher proportion of open water at sites where snakes were not found, the presence of abundant large predatory fish in those larger waters, and differing degrees of tidal influence (Hansen 2011).

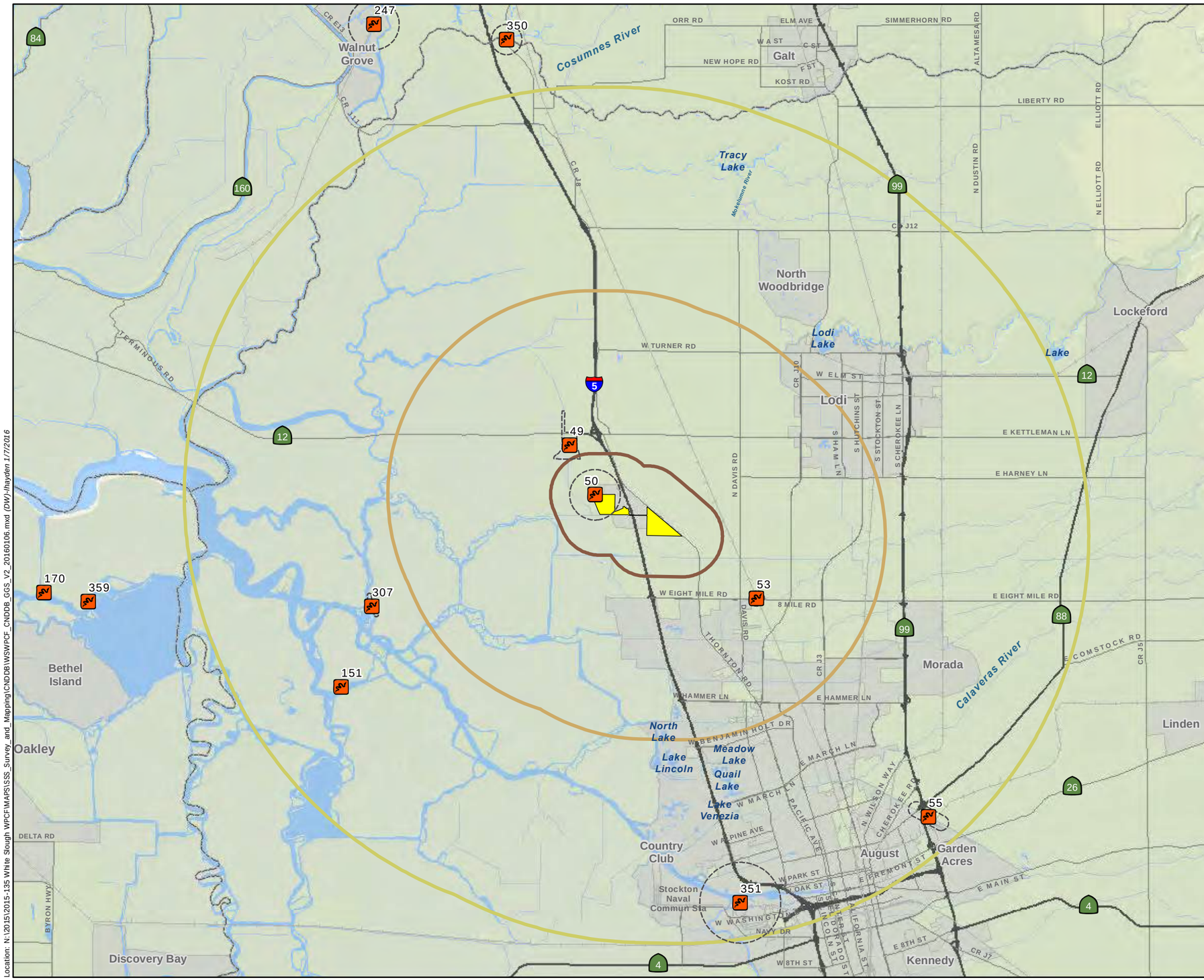


Figure 3.
California Natural Diversity Database Occurrences of Giant Garter Snake

Distance From Project

- 1 mile
- 5 miles
- 10 miles

Boundaries

- Project Boundary [1]

CNDDB Occurrences [2]

- CNDDB Polygon Extent
- Giant Garter Snake

This map may include multiple species' occurrences at each location, some of which may not be visible on this graphic. The CNDDB occurrences shown may not reflect the actual location of the occurrence.

[1] Project Boundary: West Yost Associates
[2] CDFW California Natural Diversity Database (CNDDB), Oct 2015 Update (GIS Shapefile)
CNDDB Occurrences Located on USGS 7.5' Quadrangles: Bouldin Island, Bruceville, Jersey Island, Lodi South, Stockton East, Stockton West, Terminous

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Location: N:\2015\2015-135 White Slough WPCF\MAPS\SS_Survey_and_Mapping\CNDDB\WSWPCF_CNDDB_GGS_V2_20160106.mxd (DW)-lhayden 1/7/2016

2015-135 White Slough WPCF

Miles
0 1 2 3

Map Date: 1/7/2016

There is only one record for giant garter snakes east of I-5 in the vicinity of the Southeast Survey Area. Record #53 describes a 1949 observation of a giant garter snake, subsequently updated with additional sightings in 1976, in an area off Eight Mile Road near Chagall Lane in North Stockton. At least one additional survey effort has been conducted since the 1976 surveys; no additional sightings have been recorded.

3.2 Site Descriptions

3.2.1 Southeastern Survey Area and Southeast Alternative Pipeline

The Southeastern Survey Area encompasses 197 acres in fields 6E, 6F, and 6G (Figure 2). The nearest western edge of the triangular site is approximately 0.4 miles east of I-5. Between the site and I-5 are agricultural fields that, at the time of the site visits, were either planted in alfalfa (*Medicago sativa*) or recently harvested and disced. The proposed Southeast Alternative Pipeline would be routed under Highway 12 and buried within the existing, frequently maintained unpaved access road beside roadside ditches.

No perennial water source occurs east of I-5 in the vicinity of the Southeastern Survey Area. Water conveyance is seasonal, apparently via a siphon and pump. Ditches in the survey area ranged from 1.5 m (5 feet) to 4.5 m (15 feet) in width and the soil ditches appeared to be frequently maintained. Minimal vegetation in the ditches consisted of weedy non-hydric species such as asthmaweed (*Conyza bonariensis*), Russian thistle (*Salsola tragus*), cheeseweed (*Malva parviflora*), barnyard grass (*Echinochloa crus-galli*), and Bermuda grass (*Cynodon dactylon*). All ditches were dry and appeared not to have conveyed water in some time. California ground squirrels (*Otospermophilus beecheyi*) were abundant, and burrows lined the ditches in many places. Fields were maintained to the edges of the ditches.

Although presence of a giant garter snake in this area cannot be completely ruled out, the potential appears very low. There appears to be no connectivity between occupied habitat west of Highway 5 and the eastern fields. Habitat, when inundated, would be of very poor quality given the degree of disturbance, frequent maintenance of the ditches and adjacent fields, and lack of natural habitat buffering the ditches from agricultural fields. Vegetative emergent cover indicative of quality habitat (e.g., supporting *Typha* and/or *Shoenoplectus*) was entirely missing east of I-5 and the lack of natural buffers between ditches and fields would leave garter snakes vulnerable to predation and mortality during routine farming practices as they moved upland. Prey species would be limited in abundance and distribution, consisting only of those prey items carried by irrigation water. No aquatic prey occur east of I-5 when the ditches are not inundated.

3.2.2 Western Survey Area and West Alternative Pipeline

The Western Survey Area consists of a 149-acre polygon over parts of fields 2A, 2B, 2C, 3A, 3B, 3C, and 3D. These fields are immediately west of the Water Pollution Control Facility and its inundated ponds and immediately east of the Interstate 5 Peripheral Canals and White Slough Preserve (ICF 2010). White Slough Wildlife Area is presumed occupied giant garter snake habitat and occurs immediately south of fields 2C and 3D. The slough, as it approaches its easternmost point just west of I-5 narrows from approximately 21 m (70 feet) to approximately 7.6 m (25 feet) in width.

Habitat quality for giant garter snakes is high in this eastern extent of White Slough. Not only is it contiguous with a known population, the slough in this section features perennial water, abundant emergent vegetation including bulrush (*Schoenoplectus* sp.) and cattails, complex banks with cobble, riprap, and vining bankside vegetation (Himalayan blackberry [*Rubus armeniacus]*), and abundant prey including mosquitofish and American bullfrog tadpoles. Numerous turtles were observed throughout this section of the slough, including native Western pond turtles (*Actinemys marmorata*), a California species of special concern. A dense infestation of water hyacinth (*Eichhornia crassipes*) covered much of the open water in this slough.

Water conveyance onto fields into the Western Site is from the WPCF: no water is conveyed directly from the I-5 Peripheral Canals or White Slough (ICF 2010). At the time of the site visits, all fields had recently been disced; however, ponded water from four cm (1.6 inches) to approximately 50 cm (20 inches) in depth remained in several ditches, and mosquitofish were densely aggregated in places.

Treated water will be delivered from the plant to the Western Expansion Pond Site via one of two routes (Figure 2). The proposed West Alternative Pipeline may be installed into an existing unpaved road that parallels White Slough within 10 m (33 feet) of water's edge (Figure 2), then run northeast for approximately 100 m (328 feet) under an existing power line easement to the new pond. Alternately, the West Alternative Pipeline may travel through the plant west to the new pond.

The proximity of the Western Site to a known population (1.3 miles northwest of the site), coupled with the near distance to presumed occupied habitat to the south, and a water conveyance system that provides dispersal habitat (irrigation ditches) for giant garter snakes as well as prey species, renders this site as not an ideal location for new project infrastructure. Additionally, giant garter snakes may use the unpaved road along the north side of White Slough for basking or dispersal, given its proximity to presumed occupied habitat.

3.2.3 Dredger Cut Discharge Location

The existing Dredger Cut Discharge Location, from which water is discharged from on-site, and then drains into White Slough, is similar to and contiguous with White Slough adjacent to the West Pond Alternative site. Water was slowly moving here, banks were steep (more than 45°), and composed of soil and riprap. Numerous small mammal burrows and interstitial spaces were documented in the banks, which may provide winter or active-season refugia for giant garter snakes. Aquatic prey were abundant here. Water hyacinth provided 100 percent cover of the aquatic surface at the time of the habitat assessment.

3.3 Effects of the Proposed Project on Giant Garter Snake

3.3.1 Potential Impacts to GGS from Project Construction and Operation

Construction of the ponds and pipelines could result in direct impacts to giant garter snake if the species is present in the work area(s) during construction. As described above, the potential for giant garter snakes to occur in the Southeastern Survey Area east of I-5 is considered very low. In contrast, snakes may move on occasion into the Northwest Survey Area or along the unpaved road on the north side of White Slough where the West Alternative Pipeline may be constructed. Injury

or mortality may occur during use and staging of construction equipment, or through increased construction activity in the area.

Operation of the project will involve filling and emptying of the new pond annually. If the pond is constructed in the Southeastern Survey Area, operation of the project is expected to have no impacts on giant garter snakes**.** In contrast, giant garter snakes may conceivably move in and use a pond constructed in the Northwest Survey Area if prey species such as bullfrog larvae or mosquitofish are present. Operations such as driving along the perimeter of the pond could lead to injury or mortality of basking or foraging giant garter snakes. These effects can compound if prey species become abundant and easy to procure within the constructed pond (conceivably leading to a sink for the population). Additionally, extended exposure of individual snakes to treated waste water may result in direct mortality or reduced health and vigor of individual snakes, although the body of literature regarding water quality effects on giant garter snakes is sparse and incompletely understood.

3.3.2 Potential Effect of Reduced Water Releases to Dredger Cut from January through April

Giant garter snakes hibernate during the winter, generally from October to early April, but timing is dependent upon current weather conditions (USFWS 2015). Hibernacula tend to be within small mammal burrows, riprap, and other heterogeneous microhabitats adjacent to ditches and marshes, but can be as far as 250 m (820 feet) from aquatic foraging habitat. Overwintering snakes appear to avoid areas where flooding occurs (USFWS 2015 and references therein), and snakes would be assumed to choose microsites for hibernacula that would be free from flooding in areas with tidal influence. A reduction of 184 to 201 million gallons of discharge from the WPCF into the tidally influenced Dredger Cut and White Slough during the hibernation period of January through April is not anticipated to have any consequences for giant garter snakes, because snakes would be in torpor, above the water level established at the time they entered hibernation.

3.4 Mitigation and Minimization Measures for Giant Garter Snake

Mitigation guidelines required under the San Joaquin County Multi-species Habitat Conservation and Open Space Plan (SJMSHCP 2000) specifically acknowledge this area as one of high importance for the giant garter snake, and lists numerous measures required of projects in the area (pages 5-35 to 5-37). Among the required mitigation measures are the following:

1. Construction shall occur during the active period for the snake, between 1 May and 1 October. Between 2 October and 30 April, the Joint Powers Authority, with concurrence of the permitting agencies' representative on the Technical Advisory Committee, shall determine if additional measures are necessary to minimize and avoid take.
2. Limit vegetation clearing within 61 m (200 feet) of the banks of potential giant garter snake aquatic habitat to existing roadways to the minimal area necessary.
3. Confine the movement of heavy equipment within 61 m (200 feet) of the banks of potential giant garter snake aquatic habitat to existing roadways to minimize habitat disturbance.

4. Prior to ground disturbance, all on-site construction personnel shall be given instruction regarding the presence of SJMSHCP Covered Species and the importance of avoiding impacts to these species and their habitats.
5. In areas where wetlands, irrigation ditches, marsh areas, or other potential giant garter snake habitats are being retained on the site:

    a. install temporary fencing at the edge of the construction area and the adjacent wetland, marsh, or ditch;
    b. restrict working areas, spoils, and equipment storage and other project activities to areas outside of marshes, wetlands, and ditches; and
    c. maintain water quality and limit construction runoff into wetland areas through the use of hay bales, filter fences, vegetative buffer strips, or other accepted equivalents.

6. If on-site wetlands, irrigation ditches, marshes, etc., are being relocated in the vicinity: the newly created aquatic habitat shall be created and filled with water prior to dewatering and destroying the pre-existing aquatic habitat. In addition, non-predatory fish species that exist in the aquatic habitat and are to be relocated shall be seined and transported to the new aquatic habitat as the old site is dewatered.
7. If wetlands, irrigation ditches, marshes, etc., will not be relocated in the vicinity, the aquatic habitat shall be dewatered at least two weeks prior to commencing construction.
8. Pre-construction surveys for the giant garter snake (conducted after completion of environmental reviews and prior to ground disturbance) shall occur within 24 hours of ground disturbance.
9. Other provisions of the *USFWS Standard Avoidance and Minimization Measures during Construction Activities in Giant Garter Snake Habitat* shall be implemented (excluding programmatic mitigation ratios which are superseded by the SJMSHCP's mitigation ratios).

4.0 CONCLUSIONS

ECORP Consulting performed a habitat assessment for the federally threatened giant garter snake at the White Slough Pollution Control Facility near Lodi, California. Two alternative survey areas were evaluated: the Southeastern Survey Area occupies 197 acres approximately 0.4 miles east of I-5, while the Western Survey Area occurs west of I-5 and consists of 149 acres. A well-known population of giant garter snakes occurs west of and adjacent to the Western Survey Area. Irrigation ditches present potential habitat for the garter snake in this northwestern area, and mitigation measures as outlined by the SJMSHCP would be required of the project if sited here. Implementing the recommended 61 m (200-feet) buffers around ditches in the Western Survey Area may significantly reduce the useable area needed by the project. Conversely, habitat for giant garter snakes is lacking in and near the Southeastern Survey Area, which is better sited with relation to lessening potential impacts to giant garter snakes. Implementation of the required Mitigation and Minimization Measures for Giant Garter Snake pursuant to the SJMSHCP will minimize the potential for construction-related impacts to giant garter snake.

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LIST OF ATTACHMENTS

Attachment A – California Natural Diversity Database Search Results

Attachment B – Representative Site Photographs

Attachment C – Datasheets

ATTACHMENT A

California Natural Diversity Database Search Results

Thamnophis gigas

giant garter snake

Element Code: ARADB36150

Status		NDDB Element Ranks		Other Lists	
Federal:	Threatened	**Global:**	G2	**CDFG Status:**	
State:	Threatened	**State:**	S2		

Habitat Associations

General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.

Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.

Occurrence No. 49 **Map Index:** 77096 **EO Index:** 630

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2010-09-23
Site: 2010-09-23

Record Last Updated: 2014-11-26

Quad Summary: Terminous (3812114/479C)
County Summary: San Joaquin

Lat/Long: 38.11168º / -121.41038º
UTM: Zone-10 N4219399 E639356
Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON
Area:

Township: 03N
Range: 05E
Section: 15 **Qtr:** XX
Meridian: M
Elevation: 3 ft

Location: COLDANI MARSH, 0.8 MI W OF THORNTON ROAD AT HWY 12, WHITE SLOUGH WILDLIFE AREA, 7.6 MI WSW OF LODI POST OFFICE.

Location Detail: MAPPED TO PROVIDED COORDINATES & LOCATION DESCRIPTION OF "COLDANI'S MARSH" AND "POND 8." COLDANI MARSH NOT LABELED ON USGS TOPO, LOCATED ALONG UPLAND CANAL ON N EDGE OF SHIN KEE TRACT. MAP FROM CA DWF USED TO DETERMINE MARSH BOUNDARIES.

Ecological: IRRIGATION/DRAINAGE CANAL RANGING FROM APPROXIMATELY 5-25 METERS WIDE, CHARACTERIZED BY MUD/SILT. PERMANENT WETLAND WITH DENSE BULRUSH & OTHER EMERGENT VEGETATION. A MIX OF ALFALFA, CORN TO THE EAST AND NORTH, & FALLOW FIELDS TO THE WEST.

Threat: FLOOD CONTROL/WETLAND RECLAMATION, URBANIZATION, FLOODING, INTRODUCED PREDATORS, PEST CONTROL, POLLUTION.

General: A. SARTAIN DETECTED 6-15 SNAKES IN 1974. 1 SNAKE COLLECTED 21 MAY 1977 (LSU #35176). OBSERVED DURING 1976, 1983, & 1986-1987 STUDIES. DETECTED IN 1995. 14 CAPTURED JUL-SEP 2009. 20 CAPTURED 11 MAY-23 SEP 2010.

Owner/Manager: DFG, DWR

Sources

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HAN10D0001 HANSEN, E. EXCEL WORKBOOK CONTAINING INFORMATION ON GIANT GARTER SNAKES COLLECTED DURING 2010 [SC-003881]. 2010-XX-XX.

HAN80R0002 HANSON, G.E. & J.M. BRODE. STATUS OF THE GIANT GARTER SNAKE, THAMNOPHIS GIGAS (FITCH), DEPT. OF FISH AND GAME, INLAND FISHERIES ENDANGERED SPECIES PROGRAM, SPECIAL PUBLICATIONS 80-5. 1980-09-XX.

HAN88R0001 HANSEN, G.E. DRAFT FOR REVIEW OF THE STATUS OF THE GIANT GARTER SNAKE (THAMNOPHIS COUCHII GIGAS) AND ITS SUPPORTING HABITAT DURING 1986-1987. 1988-XX-XX.

LSU05S0001 LOUISIANA STATE UNIVERSITY MUSEUM OF ZOOLOGY. PRINTOUT OF THAMNOPHIS GIGAS RECORDS. 2005-06-21.

WAR06R0001 WARNE, B. ET AL. (USFWS). GIANT GARTER SNAKE (THAMNOPHIS GIGAS) 5-YEAR REVIEW: SUMMARY AND EVALUATION. 2006-09-XX.

Thamnophis gigas

giant garter snake

Element Code: ARADB36150

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G2	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.

Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.

Occurrence No. 50 **Map Index:** 93506 **EO Index:** 628

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1982-05-26
Site: 1982-05-26

Record Last Updated: 2014-09-03

Quad Summary: Terminous (3812114/479C)
County Summary: San Joaquin

Lat/Long: 38.09409º / -121.39879º
UTM: Zone-10 N4217466 E640405
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 3/5 mile

Township: 03N
Range: 05E
Section: 23 **Qtr:** XX
Meridian: M
Elevation: 10 ft

Location: ABOUT 1.5 MILES S OF HWY 12 & I-5 JUNCTION, 2 MILES SE OF HWY 12 & GRAND RD JUNCTION, WHITE SLOUGH WILDLIFE AREA.

Location Detail: MAPPED TO PROVIDED LOCATION DESCRIPTIONS OF "1.5 S STATE 12 THORTON RD INTERSECTION" (1974), "WHITE SLOUGH, 1 MI W THORTON RD., 1.5 MI S HWY 12" (1976), AND "WHITE'S SLOUGH WILDLIFE AREA, SAN JOAQUIN CO." (1982).

Ecological: ALL SNAKES COLLECTED BY CA DEPT. OF FISH AND WILDLIFE. 1982 COLLECTION WAS USED AS PART OF CAL POLY, POMONA'S CAPTIVE BREEDING STUDY. CAS SPECIMEN COLLECTED AT "WHITE SLOUGH MARSH W. OF POND #12," EXACT LOCATION UNKNOWN.

Threat:

General: 1 DETECTED BY A. SARTAIN ON 6 MAY 1974 (FIELD NOTES #4). PRESENT IN 1976; EXACT NUMBER DETECTED UNK. 1 ADULT MALE COLL DURING SUMMER OF 1982; DIED OF NEMATODE INFESTATION AUGUST 1985 AT CAL POLY, POMONA. 1 COLL 26 MAY 1982 (CAS # 178590).

Owner/Manager: DWR, PVT

Sources

BRO80U0001 BRODE, J. (CDFW). GEOGRAPHIC REFERENCE CARD CATALOG OF SPECIMENS AND FIELD NOTE RECORDS COMPILED BY JOHN BRODE (DFG). 1980-XX-XX.

HAN80R0002 HANSON, G.E. & J.M. BRODE. STATUS OF THE GIANT GARTER SNAKE, THAMNOPHIS GIGAS (FITCH), DEPT. OF FISH AND GAME, INLAND FISHERIES ENDANGERED SPECIES PROGRAM, SPECIAL PUBLICATIONS 80-5. 1980-09-XX.

MUT82S0001 MUTH, D. & K. NICOL (CALIF. ACADEMY OF SCIENCES). CAS HERPETOLOGICAL SPECIMEN #178590, COLLECTED AT WHITE SLOUGH MARSH, W. OF POND #12, SAN JOAQUIN CA. 1982-05-26.

STE86U0006 STEWART, G. (CAL POLY POMONA). LETTER TO J. BRODE (DFG) WITH UPDATE ON FIELD WORK ON GIANT GARTER SNAKE AND RUBBER BOA PER MEMORANDUM OF UNDERSTANDING (INCLUDES LIST OF STEWART & ROSSMAN GGS SPECIMEN LOCALS). 1986-01-06.

Thamnophis gigas

giant garter snake

Element Code: ARADB36150

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G2	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.

Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.

Occurrence No. 52 **Map Index:** 11349 **EO Index:** 27579

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1976-07-07
Site: 1987-XX-XX

Record Last Updated: 2014-12-02

Quad Summary: Bruceville (3812134/496C)
County Summary: Sacramento

Lat/Long: 38.36740º / -121.45523º
UTM: Zone-10 N4247709 E634951
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 1/5 mile

Township: 06N
Range: 05E
Section: 17 **Qtr:** SW
Meridian: M
Elevation: 8 ft

Location: VICINITY OF FRANKLING BLVD, ABOUT 0.5 MI S OF INTERSECTION WITH HOOD-FRANKLING RD, 3.5 MI E OF HOOD PO, SW OF ELK GROVE.

Location Detail: MAPPED GENERALLY TO PROVIDED LOCATION DESCRIPTION OF "FRANKLIN BLVD. ~0.5 MI S. OF HOOD-FRANKLIN RD."

Ecological:

Threat:

General: UNKNOWN NUMBER DETECTED ON 7 JUL 1976 BY G. HANSEN (FIELD NOTES # 271). NONE DETECTED DURING 1986-1987 SURVEYS CONDUCTED BY G. HANSEN; LEVEL OF EFFORT UNKNOWN.

Owner/Manager: UNKNOWN

Sources

BRO80U0001 BRODE, J. (CDFW). GEOGRAPHIC REFERENCE CARD CATALOG OF SPECIMENS AND FIELD NOTE RECORDS COMPILED BY JOHN BRODE (DFG). 1980-XX-XX.

HAN80R0002 HANSON, G.E. & J.M. BRODE. STATUS OF THE GIANT GARTER SNAKE, THAMNOPHIS GIGAS (FITCH), DEPT. OF FISH AND GAME, INLAND FISHERIES ENDANGERED SPECIES PROGRAM, SPECIAL PUBLICATIONS 80-5. 1980-09-XX.

HAN88R0001 HANSEN, G.E. DRAFT FOR REVIEW OF THE STATUS OF THE GIANT GARTER SNAKE (THAMNOPHIS COUCHII GIGAS) AND ITS SUPPORTING HABITAT DURING 1986-1987. 1988-XX-XX.

Thamnophis gigas

giant garter snake

Element Code: ARADB36150

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G2	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.

Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.

Occurrence No. 53 **Map Index:** 11589 **EO Index:** 27576

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1976-XX-XX
Site: 1987-XX-XX

Record Last Updated: 2014-11-26

Quad Summary: Lodi South (3812113/479D)
County Summary: San Joaquin

Lat/Long: 38.05769º / -121.32550º
UTM: Zone-10 N4213539 E646906
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 1/5 mile

Township: 03N
Range: 06E
Section: 33 **Qtr:** NW
Meridian: M
Elevation: 18 ft

Location: EIGHT MILE RD, INTERSECTION WITH WESTERN PACIFIC RAILROAD, ABOUT 0.4 MILES E OF DAVIS RD, N EDGE OF STOCKTON.

Location Detail: MAPPED TO PROVIDED 1976 DETECTION LOCATION OF "EIGHT MILE RD. AT W. P. RAILROAD TRACKS, 3.5 MILES W HWY. 99." EXACT LOCATION OF 1949 COLLECTION UNKNOWN; PROVIDED LOCATION DESCRIPTION WAS "5 MI N STOCKTON."

Ecological:

Threat:

General: 1 GIANT GARTER SNAKE COLLECTED ON 5 MAY 1949 BY M. LARSON (MVZ #66720). UNKNOWN NUMBER DETECTED ON 14 JUL 1976 BY G. HANSEN (FIELD NOTES #280). NONE DETECTED DURING 1986-1987 SURVEYS BY G. HANSEN; LEVEL OF EFFORT UNKNOWN.

Owner/Manager: UNKNOWN

Sources

BRO80U0001 BRODE, J. (CDFW). GEOGRAPHIC REFERENCE CARD CATALOG OF SPECIMENS AND FIELD NOTE RECORDS COMPILED BY JOHN BRODE (DFG). 1980-XX-XX.

HAN80R0002 HANSON, G.E. & J.M. BRODE. STATUS OF THE GIANT GARTER SNAKE, THAMNOPHIS GIGAS (FITCH), DEPT. OF FISH AND GAME, INLAND FISHERIES ENDANGERED SPECIES PROGRAM, SPECIAL PUBLICATIONS 80-5. 1980-09-XX.

HAN88R0001 HANSEN, G.E. DRAFT FOR REVIEW OF THE STATUS OF THE GIANT GARTER SNAKE (THAMNOPHIS COUCHII GIGAS) AND ITS SUPPORTING HABITAT DURING 1986-1987. 1988-XX-XX.

LAR49S0001 LARSON, M. (MUSEUM OF VERTEBRATE ZOOLOGY). MVZ HERPETOLOGICAL COLLECTION #66720, COLLECTED 5 MI N STOCKTON. 1949-05-05.

Thamnophis gigas

giant garter snake

Element Code: ARADB36150

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G2	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.

Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.

Occurrence No. 55 **Map Index:** 11716 **EO Index:** 27577

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1976-09-12
Site: 1976-09-12

Record Last Updated: 2014-12-03

Quad Summary: Stockton West (3712183/462A), Stockton East (3712182/461B)
County Summary: San Joaquin

Lat/Long: 37.98044º / -121.24734º
UTM: Zone-10 N4205094 E653924
Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON
Area:

Township: 02N
Range: 07E
Section: 31 **Qtr:** NW
Meridian: M
Elevation: 25 ft

Location: ALONG STOCKTON DIVERTING CANAL, JUST SSE OF HWY 88 & HWY 99 INTERCHANGE, 2.7 MI NE OF STOCKTON POST OFFICE (DOWNTOWN).

Location Detail: MAPPED AS BEST GUESS TO PROVIDED LOCATION DESCRIPTIONS OF "STOCKTON DIVERTING CANAL" AND "STOCKTON DIVERTING CANAL, 0.5 MI E HWY 88 AT HWY 99."

Ecological:

Threat:

General: UNKNOWN NUMBER OF SNAKES DETECTED ON 27 JUL AND 12 SEP 1976 BY G. HANSEN (FIELD NOTES # 294 & 311). NONE DETECTED DURING 1986-1987 SURVEYS CONDUCTED BY G. HANSEN; LEVEL OF EFFORT UNKNOWN.

Owner/Manager: UNKNOWN

Sources

BRO80U0001 BRODE, J. (CDFW). GEOGRAPHIC REFERENCE CARD CATALOG OF SPECIMENS AND FIELD NOTE RECORDS COMPILED BY JOHN BRODE (DFG). 1980-XX-XX.

HAN80R0002 HANSON, G.E. & J.M. BRODE. STATUS OF THE GIANT GARTER SNAKE, THAMNOPHIS GIGAS (FITCH), DEPT. OF FISH AND GAME, INLAND FISHERIES ENDANGERED SPECIES PROGRAM, SPECIAL PUBLICATIONS 80-5. 1980-09-XX.

HAN88R0001 HANSEN, G.E. DRAFT FOR REVIEW OF THE STATUS OF THE GIANT GARTER SNAKE (THAMNOPHIS COUCHII GIGAS) AND ITS SUPPORTING HABITAT DURING 1986-1987. 1988-XX-XX.

Thamnophis gigas

giant garter snake

Element Code: ARADB36150

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G2	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.

Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.

Occurrence No. 133 **Map Index:** 32429 **EO Index:** 2291

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: XXXX-XX-XX
Site: XXXX-XX-XX

Record Last Updated: 1996-01-18

Quad Summary: Bruceville (3812134/496C)
County Summary: Sacramento

Lat/Long: 38.36134º / -121.48735º
UTM: Zone-10 N4246990 E632155
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 3/5 mile

Township: 06N
Range: 04E
Section: 24 **Qtr:** NE
Meridian: M
Elevation: 10 ft

Location: STONE LAKE; SOUTHWEST OF THE INTERSECTION OF HOOD FRANKLIN ROAD & I-5.
Location Detail:
Ecological:
Threat:
General: SNAKE OBSERVED PRIOR TO, BUT NOT DURING A 1986-87 STUDY BY G. HANSEN.
Owner/Manager: UNKNOWN

Sources

HAN88R0001 HANSEN, G.E. DRAFT FOR REVIEW OF THE STATUS OF THE GIANT GARTER SNAKE (THAMNOPHIS COUCHII GIGAS) AND ITS SUPPORTING HABITAT DURING 1986-1987. 1988-XX-XX.

Thamnophis gigas

giant garter snake

Element Code: ARADB36150

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G2	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.

Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.

Occurrence No. 151 **Map Index:** 41320 **EO Index:** 41320

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1996-XX-XX
Site: 1996-XX-XX

Record Last Updated: 1999-06-30

Quad Summary: Bouldin Island (3812115/480D)
County Summary: San Joaquin

Lat/Long: 38.02464º / -121.51239º
UTM: Zone-10 N4209593 E630568
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 17.4 acres

Township: 02N
Range: 04E
Section: 14 **Qtr:** XX
Meridian: M
Elevation: 5 ft

Location: NORTH SIDE OF COLUMBIA CUT, AT THE WEST END, NEAR THE CONFLENCE WITH MIDDLE RIVER, AT THE SW END OF MEDFORD ISLAND.

Location Detail: ISLAND INTERIOR IS MUCH LOWER THAN SURROUNDING TIDAL WATER, PERHAPS 10 FEET LOWER THAN SEA LEVEL.

Ecological: VEGETATED BY WEEDS AND ANNUAL GRASSES ON THE LANDSIDE SLOPE OF THE LEVEE. TOE DRAIN IS OFTEN CHOKED WITH CATTAILS, BUT IS CLEANED WITH A BACKHOW ON A REGULAR, BUT NOT ANNUAL, BASIS. LEVEE SOIL IS MOSTLY CLAY; ISLAND SOIL IS MOSTLY PEAT.

Threat: THREATENED BY TOE DRAIN MAINTENANCE.

General: SNAKE SKIN FOUND BY EARL COOLEY (MEDFORD ISLAND MANAGER) AND IDENTIFIED BY JOHN BRODE (DFG HERPETOLOGIST).

Owner/Manager: PVT

Sources

PER96F0001 PERRINE, P. (CA WILDLIFE CONSERVATION BOARD). FIELD SURVEY FORM FOR THAMNOPHIS GIGAS. 1996-XX-XX.

Thamnophis gigas

giant garter snake

Element Code: ARADB36150

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G2	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.

Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.

Occurrence No. 247 **Map Index:** 64680 **EO Index:** 64759

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1992-XX-XX
Site: 1992-XX-XX

Record Last Updated: 2006-05-12

Quad Summary: Courtland (3812135/497D), Bruceville (3812134/496C)
County Summary: Sacramento

Lat/Long: 38.26075º / -121.50076º
UTM: Zone-10 N4235810 E631165
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 3/5 mile

Township: 05N
Range: 04E
Section: 24 **Qtr:** XX
Meridian: M
Elevation: 10 ft

Location: VICINITY OF SNODGRASS SLOUGH, 0.75 MI NNE OF LOCKE.
Location Detail:
Ecological:
Threat:
General: UNKNOWN NUMBER OF SNAKES OBSERVED DURING 1992.
Owner/Manager: UNKNOWN

Sources

HAN96R0001 HANSEN, G. GPS COORDINATES FOR LOCATIONS OF THE GIANT GARTER SNAKE (THAMNOPHIS GIGAS) IN THE SACRAMENTO VALLEY AT THE TIME OF FEDERAL LISTING. 1996-09-12.

Thamnophis gigas

giant garter snake

Element Code: ARADB36150

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G2	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.

Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.

Occurrence No. 307 **Map Index:** 92491 **EO Index:** 93635

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2010-04-24
Site: 2010-04-24

Record Last Updated: 2014-08-18

Quad Summary: Terminous (3812114/479C)
County Summary: San Joaquin

Lat/Long: 38.05355º / -121.49883º
UTM: Zone-10 N4212820 E631705
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 39.0 acres

Township: 02N
Range: 04E
Section: 01 **Qtr:** NW
Meridian: M
Elevation: 0 ft

Location: ALONG EMPIRE TRACT RD, JUST NE OF LITTLE VENICE ISLAND, ABOUT 0.4 MILES S OF EIGHT MILE RD JUNCTION, NW OF STOCKTON.

Location Detail: MAPPED TO PROVIDED COORDINATES. LOCATION OF DETECTIONS DESCRIBED AS EMPIRE TRACT RD ADJACENT TO LILTTLE CONNECTION SLOUGH, SOUTH OF THE H & H MARINA.

Ecological: OPEN WATER, DENSE PATCHES OF TULE, AND RIP-RAPPED LEVEE BANKS. AGRICULTURAL FARMLAND (CORN & BLUEBERRY) AND DITCHES FOUND TO THE EAST OF LEVEE ROAD. EAST SLOPE OF LEVEE WAS GRASSY WITH POTENTIAL SNAKE FORAGING HABITAT.

Threat: TRAFFIC; VEHICLE COLLISIONS. AGRICULTURAL ACTIVITY & FLOOD CONTROL MAINTENANCE. LOCATION IS ALSO A POPULAR FISHING AREA.

General: 3 GIANT GARTER SNAKES FOUND DEAD ON ROAD AND 1 LIVE SNAKE OBSERVED BASKING ON SHOULDER OF THE ROAD ON 24 APR 2010. LIVE INDIVIDUAL RETREATED INTO THE RIP RAP AND WAS NOT OBSERVED SWIMMING.

Owner/Manager: UNKNOWN

Sources

HUY10F0001 HUYNH, L. (ESA). FIELD SURVEY FORM FOR THAMNOPHIS GIGAS. 2010-04-24.

KEL10F0046 KELLY, D. (USFWS). FIELD SURVEY FORM FOR THAMNOPHIS GIGAS. 2010-04-24.

Thamnophis gigas

giant garter snake

Element Code: ARADB36150

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G2	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.

Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.

Occurrence No. 350 **Map Index:** 94528 **EO Index:** 95644

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1976-07-07
Site: 1976-07-07

Record Last Updated: 2014-11-24

Quad Summary: Bruceville (3812134/496C)
County Summary: Sacramento, San Joaquin

Lat/Long: 38.25589º / -121.44069º
UTM: Zone-10 N4235357 E636429
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 2/5 mile

Township: 05N
Range: 05E
Section: 28 **Qtr:** XX
Meridian: M
Elevation: 30 ft

Location: VICINITY OF THORTON RD AND MOKELUMNE RIVER INTERSECTION, ABOUT 2.4 MILES NNW OF THORTON POST OFFICE, JUST E OF I-5.

Location Detail: MAPPED ACCORDING TO PROVIDED LOCATION DESCRIPTION OF "THORNTON RD., N. END OF BENSON FERRY BRIDGE." USED HISTORICAL USGS MAPS (1894 & 1941) TO DETERMINE LIKELY LOCATION OF "BENSON BRIDGE" AND "BENSON."

Ecological:

Threat:

General: AT LEAST 1 COLLECTED ON 7 JUL 1976; PART OF G. HANSEN FIELD COLLECTION #275.

Owner/Manager: UNKNOWN

Sources

BRO80U0001 BRODE, J. (CDFW). GEOGRAPHIC REFERENCE CARD CATALOG OF SPECIMENS AND FIELD NOTE RECORDS COMPILED BY JOHN BRODE (DFG). 1980-XX-XX.

Thamnophis gigas

giant garter snake

Element Code: ARADB36150

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G2	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.

Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.

Occurrence No. 351 **Map Index:** 93623 **EO Index:** 94754

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1880-05-XX
Site: 1880-05-XX

Record Last Updated: 2014-08-28

Quad Summary: Stockton West (3712183/462A)
County Summary: San Joaquin

Lat/Long: 37.94930º / -121.33169º
UTM: Zone-10 N4201503 E646578
Mapping Precision: NON-SPECIFIC
Symbol Type: POINT
Radius: 1 mile

Township: 01N
Range: 06E
Section: 08 **Qtr:** XX
Meridian: M
Elevation: 15 ft

Location: CANALS ABOUT 2.5 MILES TO THE W OF STOCKTON POST OFFICE, E END OF ROUGH AND READY ISLAND, NW END OF MOSS TRACT.

Location Detail: MAPPED GENERALLY TO PROVIDED LOCATION DESCRIPTION OF "STOCKTON." EXACT LOCATION UNKNOWN. MAPPED USING HISTORIC 1913 USGS TOPO MAP, AND MAPPED TO CANALS JUST WEST OF HISTORIC STOCKTON.

Ecological: MUCH OF THE AREA HAS BEEN DEVELOPED, VISIBLE IN 1993-2013 AERIAL PHOTOS. POTENTIAL GIANT GARTER SNAKE HABITAT (CANALS) TO THE WEST OF STOCKTON.

Threat:

General: 3 COLLECTED IN MAY 1880 BY AN UNKNOWN COLLECTOR (USNM #10430, 10431, & 564370).

Owner/Manager: UNKNOWN

Sources

ANO80S0007 ANONYMOUS (NATIONAL MUSEUM OF NATURAL HISTORY). USNM REPTILE SPECIMEN # 10430, 10431, & 564370, COLLECTED AT STOCKTON. 1880-05-XX.

Thamnophis gigas

giant garter snake

Element Code: ARADB36150

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G2	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.

Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.

Occurrence No. 359 **Map Index:** 93953 **EO Index:** 95080

Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 2014-04-17
Site: 2014-04-17

Record Last Updated: 2014-09-25

Quad Summary: Bouldin Island (3812115/480D), Jersey Island (3812116/480C)
County Summary: Contra Costa

Lat/Long: 38.05409º / -121.62659º
UTM: Zone-10 N4212707 E620495
Mapping Precision: SPECIFIC
Symbol Type: POINT
Radius: 80 meters

Township: 02N
Range: 03E
Section: 03 **Qtr:** NE
Meridian: M
Elevation: 0 ft

Location: ABOUT 0.9 MI NE OF BETHEL ISLAND RD AT WILLOW RD, 7.5 MI S OF ISLETON, S LEVEE OF WEBB TRACT ALONG FALSE RIVER.

Location Detail: MAPPED TO PROVIDED COORDINATES. WEBB ISLAND IS PART OF THE DELTA WETLANDS PROJECT AND IS ANTICIPATED TO BE FLOODED IN THE FUTURE. BRADFORD ISLAND IS SUSPECTED TO PROVIDED MORE NATURAL LANDS THAT THE SNAKES MAY BE USING.

Ecological: SNAKE FOUND ON NORTH FACING LEVEE SLOPE ALONG THE SOUTHERN LEVEE AT THE BASE OF A FOUR FOOT TALL WEED (MALVA PARVIFLORA OR RAPHANUS RAPHANISTRUM) AND NATIVE BUNCH GRASSES. SEVERAL MICROTUS SP. ALSO OBSERVED ALONG STRETCH OF LEVEE.

Threat: VEHICLES ON LEVEE SLOPE, MOWING OF WEEDS, AND HERBICIDE SPRAYING FOR WEED CONTROL.

General: 1 FOUND, CAPTURED, AND PHOTOGRAPHED ON 17 APR 2014 DURING WEED REMOVAL ACTIVITIES. NO SNAKES WERE DETECTED IN RECENT YEARS AT WEBB TRACT, 2002 WAS LAST DETECTION (OCC. 170); "2 YEARS WERE SPENT TRYING TO FIND MORE ON WEBB - TO NO AVAIL."

Owner/Manager: PVT

Sources

HOG14F0001 HOGAN, J. (DWR). FIELD SURVEY FORM FOR THAMNOPHIS GIGAS. 2014-04-17.

ATTACHMENT B

Representative Site Photographs

Northwestern corner of the Northwestern Study Area, looking southeast. Newly disced agricultural field is to the left (east), and Lodi White Slough Preserve is to the right (west).

Example of a concrete drainage ditch present in Northwestern Survey Area. During the October site visits, several ditches were wetted and mosquitofish (*Gambusia* sp.) were present. Ground squirrels and their burrows were exceedingly common along most ditches.

Another view of a wetted concrete ditch in the Northwestern Survey Area.

Wetted soil ditch looking east toward Pollution Control Facility from within Northwestern Survey Area.

View of White Slough looking west into White Slough Wildlife Area. Note the dense infestation of water hyacinth (*Eichhornia crassipes*) in the foreground, and matted duckweed (*Lemna* sp.) in the background. Banks here were lined with Himalayan blackberry (*Rubus armeniacus*), mustard (Brassicaceae), cobble, and rip-rap. Emergent vegetation consisted of bulrush (*Schoenoplectus* sp.) and cattail (*Typha latifolia*). This section of the slough is contiguous with known occupied giant garter snake habitat. Numerous turtles were documented here, including native western pond turtles (*Actinemys marmorata*). Prey species for giant garter snake were also documented, including American bullfrog (*Lithobates catesbeianus*) tadpoles, and small fish.

View of eastern terminus of White Slough at Highway 5.

Water level relative to pump intake at site shown above. Water is below intake for part of the year.

Ditch on eastern side of Highway 5.

Typical soil ditch in Southeastern Survey Area. All ditches east of the highway were dry and lacking cover and prey species for giant garter snake.

Representative photograph of habitat conditions in fields east of Highway 5, in the Southeastern Survey Area.

View of dredger cut discharge location. Discharge will be reduced here in January through April. The area receives tidal flows, and the reduction of discharge will probably not affect water level in the slough.

Unpaved road between WPCF and White Slough (to left). West Alternative Pipeline Proposed Alignment would be placed here. Note the proximity to presumed occupied habitat.

Unpaved road under which Southeast Alternative Pipeline Proposed Alignment would be installed. Note concrete ditch to right (south) which is dry much of the year, and heavily managed agricultural lands surrounding the area.

ATTACHMENT C

Datasheets

Appendix D. con't. Giant Garter Snake (GIANT GARTER SNAKE)
Habitat Evaluation Form 1/

Site Name: White Slough PCF - Northwestern Area

Surveyor's Name and Affiliation: Eric Stitt - ECORP

Factor	Present (+) or Absent (-)
1. Still or slow--flowing water over a mud or silt-substrate.	(+)
2. Flowing water over sand, gravel, rock, or cement substrate.	(+)
3. Water available:	
a) April through October only (irrigation).	( )
b) All year.	(+)
c) During winter only (runoff).	( )
4. Banks are sunny.	(+)(%) 100
5. Banks are shaded by overstory vegetation (large trees, willow thickets)	(-)(%) 0
6. Aquatic or emergent vegetation present.	(+)
7. Terrestrial vegetation present:	
a) On banks.	(+)
b) In adjacent uplands.	
8. Subterranean retreats (broken concrete or animal burrows) present:	
a) in banks.	(+)
b) In adjacent uplands.	(-)
9. Small fish present.	(+)
10. Introduced gamefish are present.	(+)
11. Amphibians present.	(+)
12. Site is subject to severe seasonal flooding.	( )
13. Site receives polluted runoff.	(+)

Notes and Comments (attached additional pages if necessary):
Ditches inundated in Areas - Dense aggregations of bumbuscla present in places -
White Slough to South is Good habitat - Contiguous w/ occupied habitat

1/ Complete this form for each site surveyed. If site has been recently disturbed (channel maintenance, bank repair), survey the nearest undisturbed similar site, preferably on the same water course.

Appendix D. con't. Giant Garter Snake (GIANT GARTER SNAKE)
Habitat Evaluation Form 1/

Site Name: White Slough PCF - Southeastern Site

Surveyor's Name and Affiliation: Eric Stitt - ECORP

Factor	Present (+) or Absent (-)
1. Still or slow--flowing water over a mud or silt-substrate.	(-)
2. Flowing water over sand, gravel, rock, or cement substrate.	(-)
3. Water available:	
a) April through October only (irrigation).	(+)
b) All year.	( )
c) During winter only (runoff).	( )
4. Banks are sunny.	( )(%) 100
5. Banks are shaded by overstory vegetation (large trees, willow thickets)	( )(%) 0
6. Aquatic or emergent vegetation present.	(-)
7. Terrestrial vegetation present:	
a) On banks.	(-)
b) In adjacent uplands.	
8. Subterranean retreats (broken concrete or animal burrows) present:	
a) in banks.	(+)
b) In adjacent uplands.	(-)
9. Small fish present.	(-)
10. Introduced gamefish are present.	(-)
11. Amphibians present.	(-)
12. Site is subject to severe seasonal flooding.	(-)
13. Site receives polluted runoff.	(+)

Notes and Comments (attached additional pages if necessary):
All ditches dry - No source of H_2O - No perennial H_2O this side of Highway 5. No prey species, No vegetative cover. Ag fields maintained clean to ditch edges - Very poor/Non-habitat.

1/ Complete this form for each site surveyed. If site has been recently disturbed (channel maintenance, bank repair), survey the nearest undisturbed similar site, preferably on the same water course.

APPENDIX D

Special-Status Fish Habitat Assessment

FISHBIO

1617 S. Yosemite Avenue • Oakdale, CA 95361 • Phone: (209) 847-6300 • Fax: (209) 847-1925

TO: Diane Moore

FROM: FISHBIO (Gabriel Kopp, Patrick Cuthbert, and Matt Peterson)

DATE: January 8, 2016

SUBJECT: White Slough Water Pollution Control Facility Project Fisheries Assessment

The City of Lodi has recently proposed the construction of a 70-acre expansion pond to the White Slough Water Pollution Control Facility Project (hereafter referred to as WPCF or Project). The facility is located roughly 6.5 miles west of Lodi and 4 miles north of Stockton, in an unincorporated portion of northern San Joaquin County. There are currently two locations being proposed for the expansion pond, both within the boundary of the current facility (Figure 1). Funding for the project would be attained from the Department of Water Resources (DWR) Proposition 84 Grant Funding Program. Funds from this program are intended to increase agricultural and drinking water supplies, decrease groundwater pumping, or assist in preserving water quality at source intakes.

Upon completion, this project will reduce the current amount of wastewater discharge into the Sacramento-San Joaquin Delta, and redirect that water to regional irrigators. The WPCF receives and treats municipal wastewater from both the City of Lodi and the San Joaquin Flag City Service Area year round and discharges treated wastewater to the delta from October 1 to April 30. The facility is expected to treat between 5.5 million gallons per day (MGD) and 8.5 MGD over the next 30 to 50 years. This operational change will reduce the amount of groundwater used for agricultural irrigation near the facility. The planned expansion pond would also be unlined so as to allow the percolation of water to deeper soils, resulting in improved groundwater recharge. The reduction of discharge will also incrementally improve water quality in the Delta.

FISHBIO was contracted to assist in providing an assessment of impacts (positive or negative) that the White Slough WPCF may have on protected fish species or water quality near the project area. It has been determined that critical habitat designations for Delta smelt (*Hypomesus transpacificus*), the southern Distinct Population Segment (sDPS) of Green Sturgeon (*Acipenser medirostris*), and Central Valley steelhead (*Oncorhyncus mykiss*) all lie adjacent to the project area. Chinook also pass through the nearby San Joaquin River during their adult and juvenile migrations.

This memorandum used key findings from recently prepared technical documents and focused, where appropriate, on how reduced discharge into the Delta may positively or negatively affect protected fish species in relation to criteria set forth in recent regulatory processes. To the extent possible, analyses incorporated key documents that were recently prepared as part of temperature compliance monitoring conducted by the WPCF. For example, temperature effects on Delta smelt in the vicinity of the WPCF and recent Delta smelt occurrence data were thoroughly summarized in Robertson-Bryan (2012). Based on these analyses, changes in operation that reduce discharge into the Delta may affect protected fish species through three primary pathways: 1) reduction in discharge;

FISHBIO
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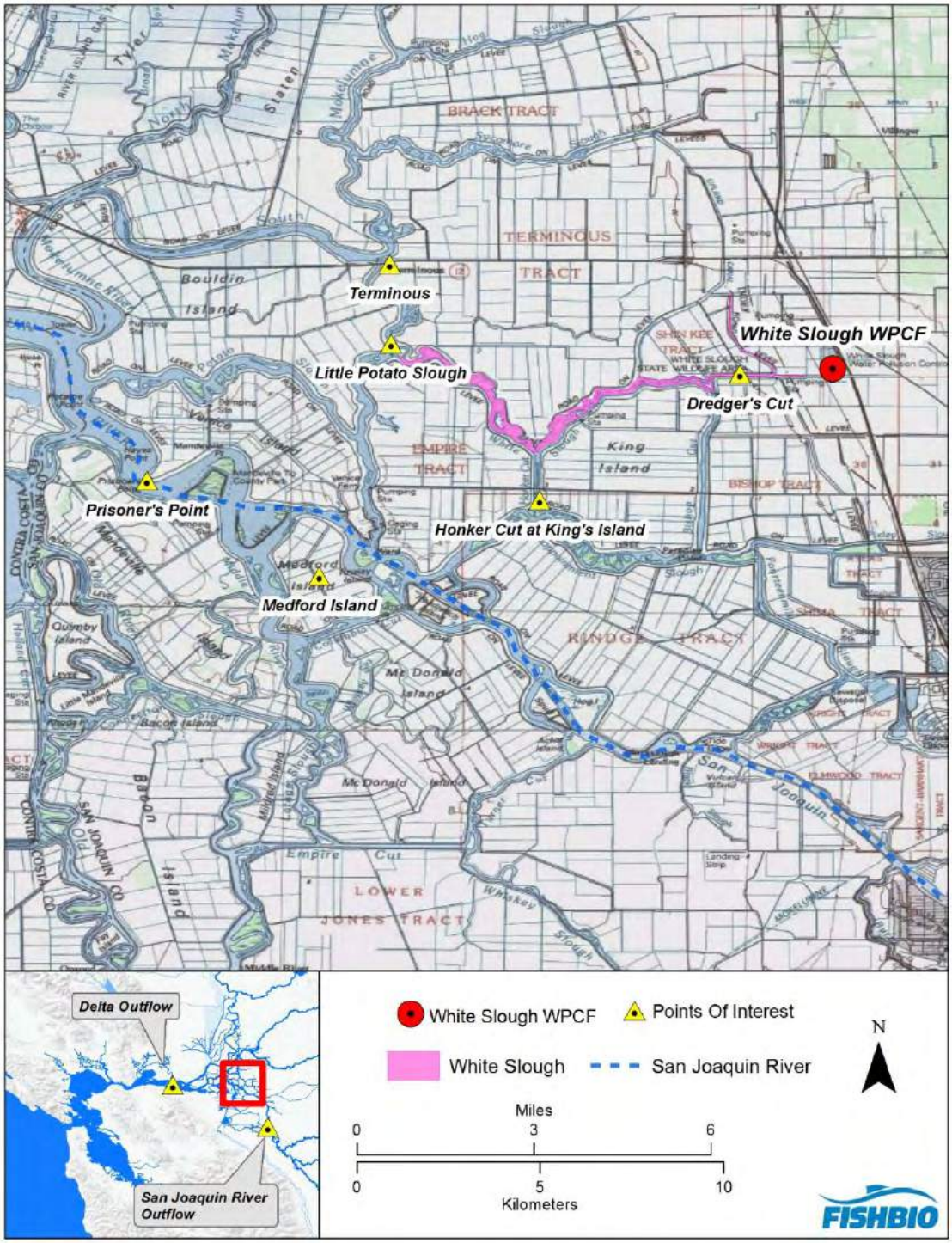

Figure 1. Map of White Slough WPCF, adjacent waterways, and key points of interest.

2) decrease in localized water temperature; and 3) reduction of nutrient inputs. A detailed project description, a summary of biological resources, and respective analyses for each of the listed pathways are provided below.

Project Description and Operations

Treated wastewater is discharged from the WPCF by pipeline into Dredger Cut, a man-made channel that terminates to the west of the project area. The channel was originally constructed to allow agricultural irrigation return water to reenter the Delta, and also allows the drainage of numerous irrigation canals and storm water collection drains. Land use in the vicinity of the facility is primarily for agriculture; however, there are additional areas zoned for industrial, business, and residential purposes.

Water from White Slough connects with the San Joaquin River through a myriad of other connected waterways that are both natural and man-made. Little Potato Slough, Honker Cut, Little Connection Slough, Potato Slough, Disappointment Slough, and Bishop Cut are all within a five-mile radius of White Slough (Figure 1). The aquatic habitat in White Slough and the other connected regional sloughs is characterized by slow moving, tidally influenced channels typically found in the northern Delta.

Both Dredger Cut and Highline Canal are man-made, dead-end canals that only receive upstream flow from either storm water or agricultural runoff. The cross section of the canal is deeply channelized with steep banks. Many of the waterways connected to White Slough are heavily impacted by invasive species, with water hyacinth (*Eichhornia crassipes*) being of particular concern (see Figure 2). Emergent and riparian vegetation, as well as large woody debris, provide primary cover for the local aquatic species of White Slough, while the channelized cuts and canals offer little to no overhead cover. The streambeds in the cuts and canals are uniform and are dominated by fine sediments (sand and silt) and emergent vegetation, and lack the more diverse substrate that generally comprises preferred fish spawning habitat (RBI 2010 pg. 9).

Figure 2. Recent example of water hyacinth in the project area, December 10, 2015.

Due to the increased capacity of the expanded facility, effluent discharge volume is expected to be reduced by approximately half, primarily during the months of January through April (Table 1). The revised flow schedule provided by West Yost & Associates, shows that discharge will remain similar to the volume discharged between 2012 and 2014 during the late spring/early winter months (May -December), but will be reduced in the late winter/spring (January through April; see Table 1). Although originally provided in million gallons per day, the data provided by West Yost & Associates have been converted to acre-feet per day, as this unit is more commonly used by water managers.

$$MG/7.5 = CF/43{,}560 = AC\text{-}FT$$

Table 1. The current and expected discharge volume, based on the average volume discharged between 2012 and 2014. Data provided by West Yost Associates.

Month	Current Discharge Volume (MG)	Revised Discharge Volume (MG)	Current Discharge Volume (AC-FT)	Revised Discharge Volume (AC-FT)	Percent of Change
January	105.3	51.8	323.2	159.0	49.2%
February	98.0	43.8	300.8	134.4	44.7%
March	75.1	34.1	230.5	104.7	45.4%
April	74.3	38.3	228.0	117.5	51.6%
May	0.0	0.0	0.0	0.0	No Change
June	0.0	0.0	0.0	0.0	No Change
July	0.0	0.0	0.0	0.0	No Change
August	0.0	0.0	0.0	0.0	No Change
September	0.0	0.0	0.0	0.0	No Change
October	39.0	39.0	119.7	119.7	No Change
November	89.5	89.5	274.7	274.7	No Change
December	138.8	138.8	426.0	426.0	No Change

Fisheries Resources

The project vicinity is a relatively disturbed area that is predominately occupied by non-native species. RBI (2010) provided a list of species that occur or are thought to occur in White Slough and connecting waterways (see RBI 2010, Table 2). Native species listed include: Delta smelt, Sacramento sucker, Pacific staghorn sculpin, prickly sculpin, hardhead, hitch, Sacramento pikeminnow, Sacramento splittail, Tule perch, threespine stickleback, starry flounder, Chinook salmon and steelhead. However, notable exceptions from the RBI (2010) species list include green and white sturgeon, which are known to be present in the mainstem San Joaquin River (Jackson and Van Eenennaam 2013). Non-native species include: inland silverside, black and white crappie, largemouth and smallmouth bass, bluegill, green and redear sunfish, warmouth, American and threadfin shad, carp, fathead minnow, golden shiner, goldfish, rainwater killifish, Western mosquitofish, bigscale logperch, chameleon and yellowfin goby, white catfish, and striped bass. Based on data collected from nearby monitoring stations, the fish community in the vicinity of the WPCF is numerically dominated by non-native species, with 81.6% of 5,623 fish captured in Honker Cut over a 27-year period being non-native (RBI 2012). Of the 37 fish species that occur in this region of the Delta, 24 species (or about 65%) are non-native (RBI 2012). The large proportion of non-native species in the project vicinity is likely the result of significant impacts to the nearby aquatic habitats as described above.

The list provided by RBI (2010) provided a broad picture of the fish community, but more current data were employed to fine-tune the analyses of potential effects to notable species. Where appropriate, we summarized more recent monitoring data (e.g., data that were

collected after RBI 2012) by using data from many regional programs and the Interagency Ecological Program, which have been monitoring juvenile fishes and their life history distributions throughout the Delta for decades. Data that were incorporated into analyses were downloaded from the Lodi United States Fish & Wildlife Service (USFWS) Field Office website (USFWS 2015a; accessed January 4, 2016).

We determined the occurrence of critical habitat designations and fish species that are listed as threatened or endangered by the Endangered Species Act (ESA) using two readily accessible government websites. The first source examined was the project-planning tool (Information for Planning and Conservation; IPaC) provided by the USFWS (USFWS 2015b; accessed December 4, 2015). The project location used in the planning tool included Lodi WPCF, Dredger's Cut, White Slough, Bishop Cut, Potato Slough, Little Potato Slough, and the San Joaquin River near Mandeville Island. Using the IPaC data viewer and automated reporting system, critical habitat designations for Central Valley steelhead and Delta smelt were located within the defined boundaries.

The second website utilized was from the NOAA Fisheries website (NOAA 2015; accessed January 5, 2016). GIS shapefiles were downloaded from the website and viewed with Google Earth Pro software. All shapefiles of critical habitat designations for listed Chinook salmon stocks and the shapefile for the sDPS Green sturgeon were downloaded. Upon examination of the shapefiles, critical habitat for sDPS green sturgeon is located in White Slough and Bishop Cut, as well as connecting waterways to the west and south of the junction between White Slough and Dredger's Cut. No critical habitat designations were found for either Central Valley spring- or winter-run Chinook salmon stocks.

Based on this information, we focused this technical memorandum on the following species:

- Chinook salmon,
- Central Valley steelhead,
- Delta smelt, and
- sDPS green sturgeon.

Chinook salmon

Although critical habitat designations were not found for either winter- or spring-run Chinook salmon near the project site (the two federally listed runs), we provide a brief description of each run's potential for occurrence in the project vicinity. Sacramento River ESU winter-run Chinook salmon were listed as endangered under the ESA in January 1994 (59 FR 440). Fall-run Chinook are currently the most abundant run in the San Joaquin River basin, and are not listed under the ESA. They are, however, listed as a Species of Special Concern (SSC) under the California Endangered Species Act (CESA). Winter-run Chinook salmon are highly unlikely to enter the project vicinity due to their reliance on the Sacramento River system for spawning, rearing, and migration. Previous communication between NOAA staff and RBI (see RBI 2010, Appendix E) indicated that the project area

has relatively low habitat value for rearing or spawning of anadromous salmonids; therefore, these fish are unlikely to occur in the affected area. Based on low habitat value and distance away from migratory corridors, all the runs of Chinook are either very unlikely or unlikely to seasonally occur in the project vicinity.

Steelhead

Steelhead (*Oncorhynchus mykiss*) is a species of salmonid native to California that is commonly known under two names: steelhead (the anadromous form) and rainbow trout (the resident form). The California Central Valley Steelhead has been listed as threatened under the ESA since January 2006. Anadromous steelhead can be expected to enter freshwater streams between August and November; however, spawning typically takes place between December and April. Juveniles begin to emerge from late winter to summer, and will then spend between one and three years in freshwater before emigrating in the spring (Williams 2006). Recent habitat modeling conducted by Lindley et al. (2006) suggests that waterways on the floor of the Central Valley are unfavorable spawning and rearing locations for steelhead due their excessively high summer temperatures. The study also noted that many of the small tributaries of the San Joaquin are too degraded to support viable populations.

Abundance data reveals that populations in the Central Valley are relatively low for naturally occurring steelhead. *O. mykiss* counts at the Red Bluff Diversion Dam from 1967 to 1993 revealed a precipitous decline in returns to the upper Sacramento River. While more recent data are scarce, an updated report from NOAA Fisheries (Goode et al. 2005) estimated the average number of naturally spawning female steelhead occurring in the Central Valley between 1998-2000 to be 3,628, based on the adipose-fin-clip ratio.

Potential to be exposed to project changes

At the King's Island location (approximately 5.0 miles west of the WPCF; Figure 1), zero (0) steelhead (either hatchery or natural) have been captured in beach seine surveys since 2011 (USFWS, 2015). A similar pattern was observed at the Medford Island location, which is approximately 7.6 miles southwest of the WPCF (Figure 1). At the Terminous location (approximately 6.4 miles northwest of the WPCF), a total of seven hatchery steelhead (i.e. adipose fin-clipped) have been captured in beach seine surveys since 2011 (USFWS, 2015). Although the hatchery of origin is unknown for these particular hatchery steelhead, they are most likely from the Mokelumne River Hatchery due to the location of capture. All were classified as pre-smolts or smolts based on outward appearance, and ranged from 168 to 260 mm. Zero natural steelhead were observed at this site. No monitoring of adult steelhead on either their upstream migration or downstream migration (i.e., after spawning) is conducted in the immediate vicinity of the project area.

Based on the relatively infrequent catches of steelhead smolts in the project area, the low habitat value for rearing, and the distance away from a migratory corridor, it is unlikely that steelhead smolts or adults regularly migrate through White Slough, Bishop, or Honker Cuts. If steelhead were to occur on a seasonal basis in the area, these fish are active swimmers and could likely avoid any area impacted by the change in discharge operations.

Delta Smelt

The Delta smelt was listed as a threatened species in March 1993 (USFWS; 58 FR 12854). The State of California listed the Delta smelt as threatened under the CESA in 1993, and designated the fish as endangered in 2008. Based on data collected through standardized surveys conducted by CDFW and USFWS, Delta smelt have been observed throughout the Delta and in the lower portions of the tributaries (i.e., Sacramento, San Joaquin, Mokelumne, and Napa rivers and Cache Slough; Merz et al. 2011). These programs have documented extremely low frequencies of observation for most life stages across the Eastern Delta region, where the WPCF is located (Merz et al. 2011). Aside from the central regions, the Cache Slough and Ship Channel were the only regions that produced higher than average catches of Delta smelt across all life stages (Merz et al. 2011). Several notable non-native species that may impact Delta smelt populations include striped bass, largemouth bass, and inland silversides. Both piscivores (striped bass and largemouth bass) and other non-native predators directly impact Delta smelt. In contrast, inland silversides share many ecological traits with Delta smelt and may serve as a strong competitor (Bennett 2005).

Data summarized by RBI (2012) indicate that observations of Delta Smelt at nearby locations (e.g., Honker Cut at King's Island, Little Potato Slough, and stations on the San Joaquin River, all of which are within 5 to 10 miles southwest, west, and northwest of the WPCF) were infrequent with all sampling gear types. As RBI (2012) reported, only 14 Delta smelt were captured from 1979 to 2011 at the King's Island sampling location, with most being classified as adults. Over a 17-year period, a total of 652 larval and juvenile Delta smelt were captured in 20-mm townet surveys, with approximately 36 percent captured during the months of March and April (RBI 2012, Table 3). Since 2005, larval surveys for Delta smelt have been conducted at nearby locations with much less success compared to the tow net surveys. Only six larval Delta smelt were captured from 2005 to 2011 (RBI 2012). Infrequent observations of adult Delta smelt have been made on the San Joaquin River at Medford Island, Potato Slough, Hog Island, and in Little Potato Slough, using Kodiak trawls. All were classified as adults based on size (i.e., >56mm). Catches primarily occurred during January, February, and March (RBI 2012).

A brief summary of Delta smelt catches since the publications of RBI (2010) and Merz et al. (2011) are summarized in Table 2. Similar to the findings reported in in those documents, catches of Delta smelt from 2012 to 2015 were infrequent in the areas surrounding the WPCF. The life stage composition was also similar. Very few larval or juvenile Delta smelt were observed, and the majority of captures were classified as sub-adults or adults.

Table 2. Delta smelt observations by method, years of collection, location (distance away from WPCF), and life stage since 2011.

Method	Location(s)	Sampling Period	Life Stage(s)	Total Observed	Data Source
Kodiak Trawl	SJR at Prisoner's Point (9.3 miles away)	Dec 2014 – Mar 2015	Sub-adults and adults	33	USFWS 2015a
Beach Seine	Honker Cut at King's Island (5.0 mi)	Seasonally 2011 - 2015	N/A	0	USFWS 2015a
Beach Seine	Terminous (6.4 mi)	Seasonally 2011 - 2015	N/A	0	USFWS 2015a
Beach Seine	San Joaquin River at Medford Island (7.6 mi)	Seasonally 2011 - 2015	Adult	1	USFWS 2015a

Potential to be exposed to project changes

Based on findings from long-term monitoring data summarized by RBI (2012) and Merz et al. (2011), in combination with a brief review of more recent occurrence data of Delta smelt (Table 2), there is a low potential for Delta smelt to be in the project vicinity. The most-affected life stages are the larval and juvenile stages, and very few observations of these life stages have been made based on monitoring data (RBI 2012, p. 24). Most observations occur in the mainstem of the San Joaquin River, and not at monitoring stations closer to the project area (e.g., Honker Cut or Little Potato Slough). There is little to no suitable rearing or spawning habitat for Delta smelt (RBI 2012), and the relatively high abundance of piscivores in the project area further limit the potential for Delta smelt occurrence.

Green Sturgeon

Green sturgeon (*Acipenser medirostris*) is an iteroparous anadromous species that reproduces from March to July in California, with a peak spawning period from mid-April to mid-June (Emmett et al. 1991, Poytress et al. 2009). Spawning adults prefer deep (>10 ft), cool (46-57°F), and fast-flowing water (Moyle 2002). Eggs usually hatch within two weeks (Moyle 2002) and larvae probably reside near natal sites (Kynard et al. 2005). Freshwater rearing juveniles prefer elevated flows and temperatures between 52-64°F (Cech et al. 2000; Van Eenennaam et al. 2005). Juveniles migrate downstream to the

estuary during summer and fall after typically spending one year in the freshwater environment. Juveniles rear in estuarine nursery grounds, usually until age 3, before migrating to marine waters (Nakamoto et al. 1995). Subadults require approximately 6-10 years to become sexually mature (Nakamoto et al. 1995). Post-spawned adults likely require a 2-4 year period before their next reproductive effort (NOAA 2005).

The southern Distinct Population Segment (sDPS) of North American green sturgeon was listed as threatened under the ESA in 2006 (NOAA 2006). Its designated critical fresh and brackish water habitat in California includes portions of the Sacramento, lower Feather, and lower Yuba rivers; the Sacramento-San Joaquin Delta; and the Suisun, San Pablo, and San Francisco bays (NOAA 2009). The mainstem San Joaquin River above the Stanislaus River confluence is not considered critical freshwater habitat because sturgeon do not appear to occupy the area in a viable manner (NOAA 2009). According to the CDFW Sturgeon Report Card data, only six green sturgeon were reported between 2008 and 2012 upstream of Stockton (Jackson and Van Eenennaam 2013). Furthermore, no green sturgeon eggs were detected using egg mats from March 2012 to May 2012 positioned at four sites between Sturgeon Bend (downstream of confluence with Stanislaus River) and Grayson Road Bridge (upstream of the confluence with Tuolumne River; Jackson and Van Eenennaam 2013). However, very little monitoring data exist in the San Joaquin River for green sturgeon, and Jackson and Eenennaam (2013) state that, "it remains unknown how and to what extent green sturgeon use the San Joaquin River."

Potential to be exposed to project changes

The proposed change in operations at the WPCF is unlikely to impact green sturgeon for several reasons. As already mentioned, little or no spawning occurs in the San Joaquin River basin. Dredger Cut is a far distance from the main Sacramento River migratory corridor for juveniles and adults. Also, the October 1 to April 30 discharge period is largely outside of the peak spawning period, and likely outside the peak emigration window for juveniles. Furthermore, any green sturgeon occurring near the project location would likely be strays moving upstream from the Sacramento River. Lastly, adults and juveniles are mobile swimmers and consequently would be able to actively leave impacted areas.

Assessment of Project Impacts

The reduction in effluent discharge from the White Slough WPCF will primarily occur during the months of January through April (Table 1). As stated in the introduction, the reduction in discharge may affect the environmental conditions in the project vicinity (i.e., Dredger's Cut and connecting waterways) in three ways: (1) it would reduce the total volume discharged into the project vicinity, which may affect current velocities and/or the total volume of water within the San Joaquin River or the total Delta outflow; (2) the reduction in discharge may affect the area that is currently thermally impacted and overall water temperatures in that affected area; and, (3) it may affect water quality via either a reduction or increase in nutrient inputs.

Discharge

To examine the potential effects of reduced WPCF discharge on the total discharge of the San Joaquin River and the Delta, we compiled data from the DAYFLOW website managed by the California Department of Water Resources (CDWR 2015; data accessed January 6, 2016). The dataset provides an estimate of average daily discharge that exits the Delta based on water inflows, evaporation, and diversions, among other factors. This particular analysis was limited to the months of January through April (Table 1). Additionally, to characterize potential effects on hydrologic conditions, we analyzed daily average flow data from the most recent water year types from the San Joaquin River basin, which are based on total basin water production (Table 3). Daily average flow data were converted to acre-feet per day using the previously described conversion method. Data from Table 1 were used to calculate the difference in discharge released from the WPCF on a daily basis.

For example, in January, the difference between the current discharge (in million gallons; MG) and revised discharge (MG) was 1.72 MG per day, or 5.3 acre-feet per day. Then we calculated the daily volume of water that was discharged out of the San Joaquin River (using the "SJR" column; CDWR 2015) and Delta (using the "OUT" column; CDWR 2015). On January 1 of the most recent "wet" year (water year 2011; Table 3), the average daily flow (in cubic feet per second; cfs) in the San Joaquin River was 13,000 cfs. We converted 13,000 cfs into acre-feet, which equals 25,785 acre-feet discharged from the location for the entire day. Therefore, the estimated difference in outflow in the San Joaquin River was 0.021%. Similar calculations were used to calculate the effect on the total Delta outflow, which on the same day had a daily average discharge (in cfs) of 79,851 cfs or a total discharge of 157,847 acre-feet for the day. The effect of reducing discharge at the WPCF by 5.3 acre-feet per day on total daily outflow from the Delta was 0.003%.

As a comparison between a "Wet" year (2011) and a "Dry" year (2012), we also performed the same series of calculations using data from January 1, 2012. On January 1, 2012 of the most recent "Dry" year (water year 2012; Table 3), the San Joaquin River had a daily average discharge of 1,800 cfs (3,570 acre-feet / day). The estimated difference in outflow in the San Joaquin River for this particular day during a "Dry" year was 0.15%. The difference Delta outflow was 0.04% on the same day. The average, minimum, and maximum percentage daily differences were summarized for each month (January–April), for each most recent water year type, and for both the San Joaquin River and total Delta outflow (see Table 4).

Table 3. Water year types for the San Joaquin River basin (2008–2014) from DAYFLOW website maintained by CDWR (CDWR 2015). Bolded rows indicate which water year data were used.

Water Year (beginning October 1)	Water Year Type	Definition
2008	C	Critically Dry
2009	**BN**	**Below Normal**
2010	**AN**	**Above Normal**
2011	**W**	**Wet**
2012	**D**	**Dry**
2013	C	Critically Dry
2014	**C**	**Critically Dry**

The revised flow schedule will affect the operating period between January 1 and April 30, and will reduce the volume of water discharged from the WPCF by nearly half (Table 1). The flow schedule will be left unchanged for the remainder of the year, as the facility does not discharge through the summer period (May 1 to September 30), and the winter schedule will remain similar to previous discharge years (2012 to 2014).

The average anticipated change in volume for all types of water years in the Delta, and particularly in the San Joaquin River, would be less than 0.5% across all the months with reduced outflow volume (Table 4). The drier water years (Dry and Critically Dry) show the most response in terms of daily volume in the San Joaquin River. For the overall Delta outflow, the change in discharge volume results in a negligible change in terms of overall outflow to the Delta (does not exceed an average of 0.06% change). The maximum expected change to Delta outflow during critically dry years is anticipated to be no more than 0.08%. The reduction in discharge from the WPCF is anticipated to have even less effect on the total San Joaquin River outflow volume and Delta outflow volume during Above Normal and Wet water year types, with average daily discharge change totaling less than 0.1% and negligible change to Delta outflow volume occurring in the late spring (0.00% average in March and April).

Table 4. The expected change (in percent) in average daily volume (minimum and maximum in parentheses) in both the San Joaquin River and Sacramento-San Joaquin Delta based on the difference between current and revised White Slough WPCF discharge schedules provided by West Yost Associates (see Table 1).

Water Year Type	Percent Change in San Joaquin River			
	January	**February**	**March**	**April**
Wet	**0.03%** (0.02 - 0.04)	**0.04%** (0.02 - 0.04)	**0.02%** (0.01 - 0.02)	**0.01%** (0.01 - 0.01)
Above Normal	**0.18%** (0.07 - 0.24)	**0.13%** (0.08 - 0.17)	**0.11%** (0.06 - 0.15)	**0.05%** (0.03 - 0.10)
Below Normal	**0.26%** (0.21-0.29)	**0.21%** (0.17 - 0.26)	**0.22%** (0.13 - 0.27)	**0.13%** (0.09 - 0.18)
Dry	**0.16%** (0.13 - 0.18)	**0.19%** (0.15 - 0.24)	**0.13%** (0.10 - 0.17)	**0.08%** (0.05 - 0.12)
Critically Dry	**0.36%** (0.31 - 0.46)	**0.38%** (0.31 – 0.46)	**0.37%** (0.26 – 0.53)	**0.15%** (0.06 – 0.26)
Water Year Type	**Percentage Change in Delta**			
	January	**February**	**March**	**April**
Wet	**0.01%** (0.00 - 0.01)	**0.01%** (0.01 - 0.02)	**0.00%** (0.00 - 0.01)	**0.00%** (0.00 - 0.00)
Above Normal	**0.03%** (0.00 - 0.05)	**0.01%** (0.01 - 0.04)	**0.02%** (0.01 - 0.04)	**0.01%** (0.01 - 0.01)
Below Normal	**0.06%** (0.02 - 0.10)	**0.02%** (0.01 - 0.04)	**0.02%** (0.01 - 0.04)	**0.02%** (0.01 - 0.03)
Dry	**0.04%** (0.01 - 0.06)	**0.03%** (0.02 - 0.03)	**0.02%** (0.00 - 0.03)	**0.01%** (0.00 - 0.01)
Critically Dry	**0.06%** (0.04 - 0.07)	**0.03%** (0.01 - 0.06)	**0.03%** (0.01 - 0.08)	**0.03%** (0.01 - 0.05)

Based on the review of existing outflow volume data for the most recent of each type of water year, the anticipated change in outflow volumes in the San Joaquin River and entire Delta should be negligible. Even in the driest years (Critically Dry), the overall change in outflow volume would be less than 0.5% across all months. Therefore, no appreciable changes in the total volume, or any measures related to the total volume discharged (i.e., current velocities), in the San Joaquin River or Delta would be expected to occur with the change in discharge from the WPCF.

Temperature

A reduction in relatively warmer discharge water is expected to lead to a decrease in the size and magnitude of warming as a result of the project. Perhaps the most important finding from the RBI (2010) study is that water temperatures of discharged effluent rapidly decrease with increased distance from the discharge location. Temperature effects rapidly

attenuate to the background temperatures of the receiving waters in Dredger's Cut within about 1,000 feet (i.e., near the confluence of the Highline Canal). This observation is best depicted in Figure 5 from RBI (2012; p. 21), in which monthly average water temperatures were plotted against distance from the discharge outfall.

A clear and consistent pattern can be observed with a rapid decline in monthly average water temperatures within the first 1,000 feet away from the discharge location. No decline was observed during the months of May, June, or July; however, changes in operation (i.e., reduced discharge) will not occur during these months. The rapid attenuation during the winter and early spring months is due to the amount (or rate) of discharge relative to the large volume of receiving water, resulting in a relatively small area that is thermally impacted by the discharge.

Temperature effects could not be detected based on data collected at the temperature monitoring station at RW1, which is located approximately 1,000 feet from the outfall of the WPCF (RBI 2010). Therefore, the actual area affected by the discharge only includes the small area near the confluence of Dredger's Cut and Highline Canal. For perspective, the linear distance between the discharge outfall and the confluence of Dredger's Cut and White Slough is approximately 5,000 feet (temperature monitoring station RW2; RBI 2010).

Based on the relevant findings described in RBI (2010 and 2012) described above, any reductions in discharge during the operational period will likely result in a smaller area that will be impacted by thermal effects from the discharge outfall, not a larger one. Therefore, no increase thermally affected area is expected to occur with the change in project operations. Additionally, due to the substantial distance between the area impacted by the change in project operations and the closest critical habitat designations (for green sturgeon, steelhead, and Delta smelt), no changes in temperature are likely to occur in the designated critical habitat. No increases in water temperature within the currently affected area (i.e., within the first 1,000 feet of Dredger's Cut) are expected to occur, and it is even possible that a slight decrease in water temperatures may occur.

Water Quality

The WPCF meets all water quality requirements for operation and conducts ongoing monitoring to ensure discharge is compliant. As a result, there are few nutrients of concern; however, water prior to treatment typically has high concentrations of nitrogen. Elevated levels of nitrogen are common for unprocessed wastewater. To be compliant, WPCF is required to treat the water (i.e., nitrify and denitrify effluent) to reach a level of less than 10 mg/L. The compliance concentration for treatment is generally established based on the volume of water circulation and the extent of mixing that dilutes the effluent upon release. For example, San Francisco International Airport (near San Francisco Bay with relatively higher water circulation) averages 57 mg/L of nitrogen at the point of discharge (Baykeeper 2012). Conversely, areas with minimum urban or agricultural inputs can have

nitrogen levels of less than 1 mg/L (SWRCB 2006). The WPCF is in a relatively low circulation area (i.e., a slough), and thus the upper limit of nitrogen concentration in discharge effluent was set lower than locations with higher circulation.

Nitrogen is an important nutrient for plant development (USGS 2015), but at elevated levels can indirectly lead to negative impacts on fish. Elevated levels of nitrogen can cause overproduction (i.e. eutrophication) or algal blooms, which reduce dissolved oxygen levels. Low dissolved oxygen levels can become deadly (even for more tolerant warmwater fish) and can lead to fish kills. Eutrophic water also reduces the value of water for other municipal or agricultural uses.

The proposed project modification will lead to less discharge and result in lower proximal levels of nitrogen input. By lowering the amount of nitrogen input, water quality may incrementally improve for fish. The WPCF already releases a low level of nitrogen in its discharge, so the actual change will likely be relatively minor. Regardless, the effect of the change will either lead to negligible change or a positive effect.

Summary and Conclusions

A detailed review was completed that included the current Project operations, the potential for protected fish species to be exposed to the project, and the possible effects of proposed changes to the Project on those fish species. Overall, the Project features characteristics of relatively disturbed areas, including high predator abundance and low amounts of usable habitat for coldwater fishes.

A review of monitoring and sampling in the area identified four species for further assessment, which included Chinook salmon, steelhead, Delta smelt, and green sturgeon. Chinook salmon and steelhead both use the San Joaquin River as a migratory corridor, but are unlikely to venture off-channel to rear or spawn in the Project's slough habitat. Green sturgeon habitat usage and potential presence is similar to that of Chinook salmon and steelhead, as each population lacks of a major source population in the area. This further reduces the potential for being present. Finally, Delta smelt populations are continuing to decline in size and distribution. Recent sampling shows few fish sporadically captured in areas outside of the Project. The lack of usable habitat and extremely low catch outside of the Project suggests possible presence to be unlikely.

While the presence for analyzed fish species is likely to be minimal if not absent, the potential effects of the Project also appear to be negligible. Reduction in discharge in the San Joaquin River from the project modifications would lead to no more than a calculated maximum discharge reduction of 0.38% and no more than 0.06% in the Delta overall. The impact of the Project on water temperature was found to be minimal and localized, regardless of proposed operational changes. Implementing the proposed changes would lead to less warm water discharge from the treatment facility and result in a localized reduction or cooling of water temperature. Cooling the water could provide benefits to

coldwater fish species, given the relatively high water temperatures already occurring in the slough. Finally, aquatic nutrient input is currently regulated to a relatively minimal level through water treatment. Reducing discharge would reduce nutrient input and incrementally improve water quality for fish, leading to another positive change to any nearby aquatic resources.

In conclusion, this review identified minimal potential for fish to be present in the Project area, and also found that proposed changes to the Project would likely result in negligible or potentially positive effects on fish and their habitat.

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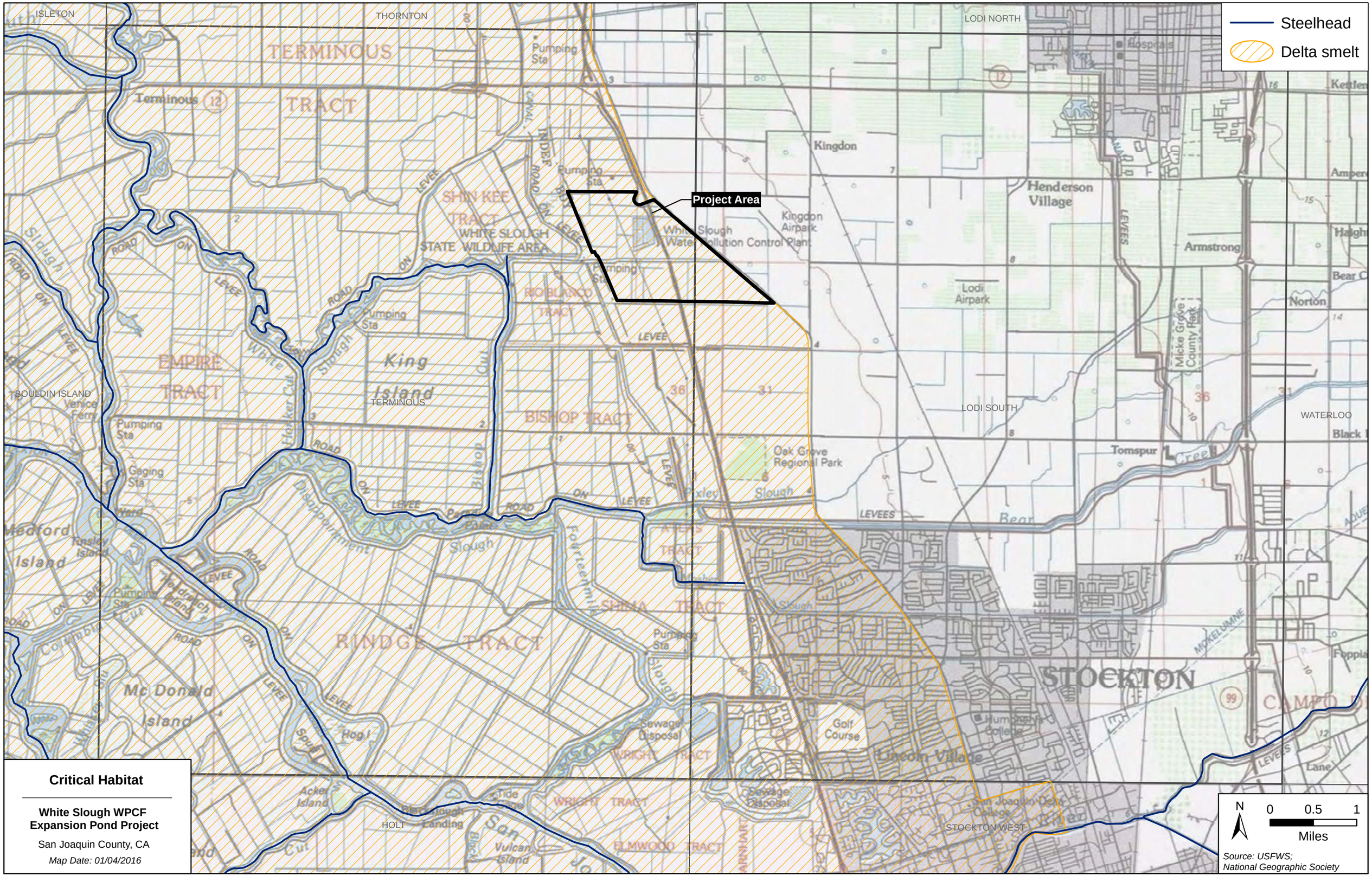
APPENDIX E

Designated Critical Habitat



Critical Habitat

White Slough WPCF Expansion Pond Project

San Joaquin County, CA

Map Date: 01/04/2016