

# Appendix G

## Biological Assessment





CITY OF MERCED  
WASTEWATER TREATMENT PLANT  
EXPANSION PROJECT  
Biological Assessment

Prepared for:  
City of Merced  
Department of Public Works

July 2006



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# **SECTION 1**

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## **Introduction**

### **1.1 Purpose of This Assessment**

The purpose of this biological assessment (BA) is to assess the proposed expansion of the City of Merced's (City) Wastewater Treatment Plant (WWTP) (Project or Proposed Action) in sufficient detail to determine to what extent it may affect any of the federally designated or proposed species listed in Section 1.3 of this document. This BA is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 USC 1536(c)) and follows the standards established in the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service's (NMFS) Section 7 Consultation Handbook (USFWS and NMFS, 1998)

The City is the lead agency for the Proposed Action. The Proposed Action will be submitted to the State Water Resources Control Board (SWRCB), Division of Clean Water Programs, to be considered for funding under the State Revolving Fund Loan Program. The SWRCB and other agencies having jurisdiction over the Project are Responsible Agencies. Because the loan program is partially funded by the U.S. Environmental Protection Agency (USEPA), it is subject to certain additional provisions of applicable federal regulations, including the Federal Endangered Species Act (FESA). This BA is prepared pursuant to Section 7(a)(2) of the Endangered Species Act, which requires that federal agencies ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat.

### **1.2 Consultation to Date**

Consultation with the USFWS began on February 8, 2006, when FESA, acting on behalf of the City, obtained from the USFWS a formal species list for the U.S. Geological Survey (USGS) 7½-minute quadrangles for Atwater and Sandy Mush (Document number: 060208123857) (see Section 1.3, below).

### **1.3 Species Considered in This Document**

Pursuant to Section 7(c) of the Endangered Species Act, the USFWS provided a list of protected species and critical habitat potentially found within the Action Area (see Appendix A). On May 17, 2006, this list was updated by accessing the USFWS' website

([www.fws.gov/pacific/sacramento/es/](http://www.fws.gov/pacific/sacramento/es/)). This list and pertinent species literature were reviewed to determine if the Action Area contained potential habitat for a given species and was within the species' known range. The following species are considered and addressed in this assessment:

**TABLE 1-1  
SPECIES CONSIDERED IN THIS ASSESSMENT**

Scientific Name	Common Name	Status
<i>Branchinecta conservatio</i>	Conservancy fairy shrimp	Endangered
<i>Branchinecta longiantenna</i>	Longhorn fairy shrimp	Endangered
<i>Lepidurus packardii</i>	Vernal pool tadpole shrimp	Endangered
<i>Oncorhynchus tshawytscha</i>	Winter-run Chinook salmon, Sacramento River	Endangered
<i>Gambelia (=Crotaphytus) sila</i>	Blunt-nosed leopard lizard	Endangered
<i>Dipodomys nitratoides exilis</i>	Fresno kangaroo rat	Endangered
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	Endangered
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp	Threatened
<i>Desmocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	Threatened
<i>Hypomesus transpacificus</i>	Delta smelt	Threatened
<i>Oncorhynchus mykiss</i>	Central Valley steelhead	Threatened
<i>Oncorhynchus tshawytscha</i>	Central Valley spring-run Chinook salmon	Threatened
<i>Ambystoma californiense</i>	California tiger salamander	Threatened
<i>Rana aurora draytonii</i>	California red-legged frog	Threatened
<i>Thamnophis gigas</i>	Giant garter snake	Threatened
<i>Haliaeetus leucocephalus</i>	Bald eagle	Threatened
<i>Chamaesyce hooveri</i>	Hoover's spurge	Threatened
<i>Neostapfia colusana</i>	Colusa grass	Threatened
<i>Oncorhynchus tshawytscha</i>	Central Valley fall/late fall-run Chinook salmon	Candidate

## 1.4 Critical Habitat Considered in This Document

Projects in the USGS 7½-minute quadrangles for Atwater and/or Sandy Mush could affect critical habitat designated for six of the above species, including: conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, California red-legged frog, Hoover's spurge, and Colusa grass (Appendix A). The Action Area is located about 17 miles west of, and downstream from, designated critical habitat for these species. The longhorn fairy shrimp, valley elderberry longhorn beetle, delta smelt, Central Valley steelhead, Central Valley spring-run Chinook salmon, winter-run Chinook salmon, Central Valley fall/late fall-run Chinook salmon, California tiger salamander, blunt-nosed leopard lizard, giant garter snake, bald eagle, Fresno kangaroo rat, and San Joaquin kit fox do not have designated critical habitat that could be affected by projects in the USGS 7½-minute quadrangles for Atwater and Sandy Mush.

## **SECTION 2**

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# **Description of Proposed Action**

## **2.1 Overview**

The Proposed Action is an upgrade and expansion of the City's existing wastewater treatment plant (WWTP) to accommodate planned wastewater loads generated within the City's Specific Urban Development Plan (SUDP) area and the University of California-Merced's (UC-Merced) Long-Range Development Plan (LRDP) area, and to comply with current and anticipated effluent quality regulatory limits. The Proposed Action would initially increase the capacity of the WWTP to 15 million gallons per day (mgd) through a series of improvements. Ultimately, the Proposed Action would increase the WWTP capacity to 20 mgd with additional improvements as needed to meet planned wastewater loads.

## **2.2 Project Location**

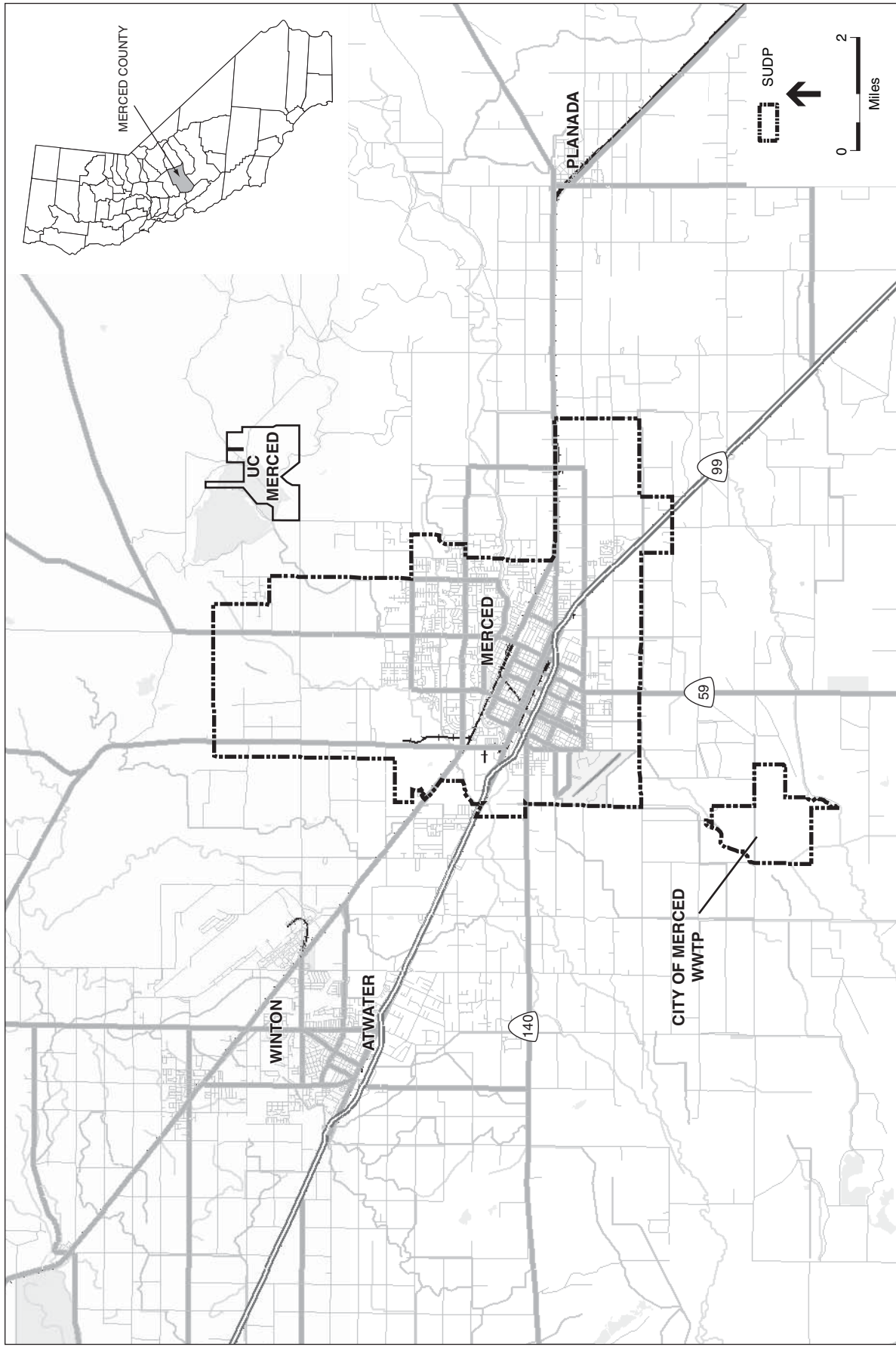
The City of Merced's WWTP is located within the city limits at the south end of Gove Road and about 1.5 miles south of the main area enclosed by the city limits (U.S. Geological Survey 7.5-minute Atwater quadrangle, T8S, R13E (MDB&M)). Figure 2-1 shows the relative location of the WWTP in relation to the City urban area. The current WWTP facilities occupy about 11.3 acres of the 1,335-acre City-owned property (see Figure 2-2).

The Merced Municipal Airport is approximately two miles north of the WWTP site (see Figure 2-1). Hartley Slough flows along the western perimeter of the WWTP property, while Miles and Owens Creeks laterally bisect the property. Duck Slough borders the southern perimeter.

The lands immediately south of the main part (mechanistic part) of the WWTP support the disposal of industrial food processing wastes, which is administered by the City but operated in accordance with a separate waste discharge permit issued by the Central Valley Regional Water Quality Control Board (CVRWQCB).

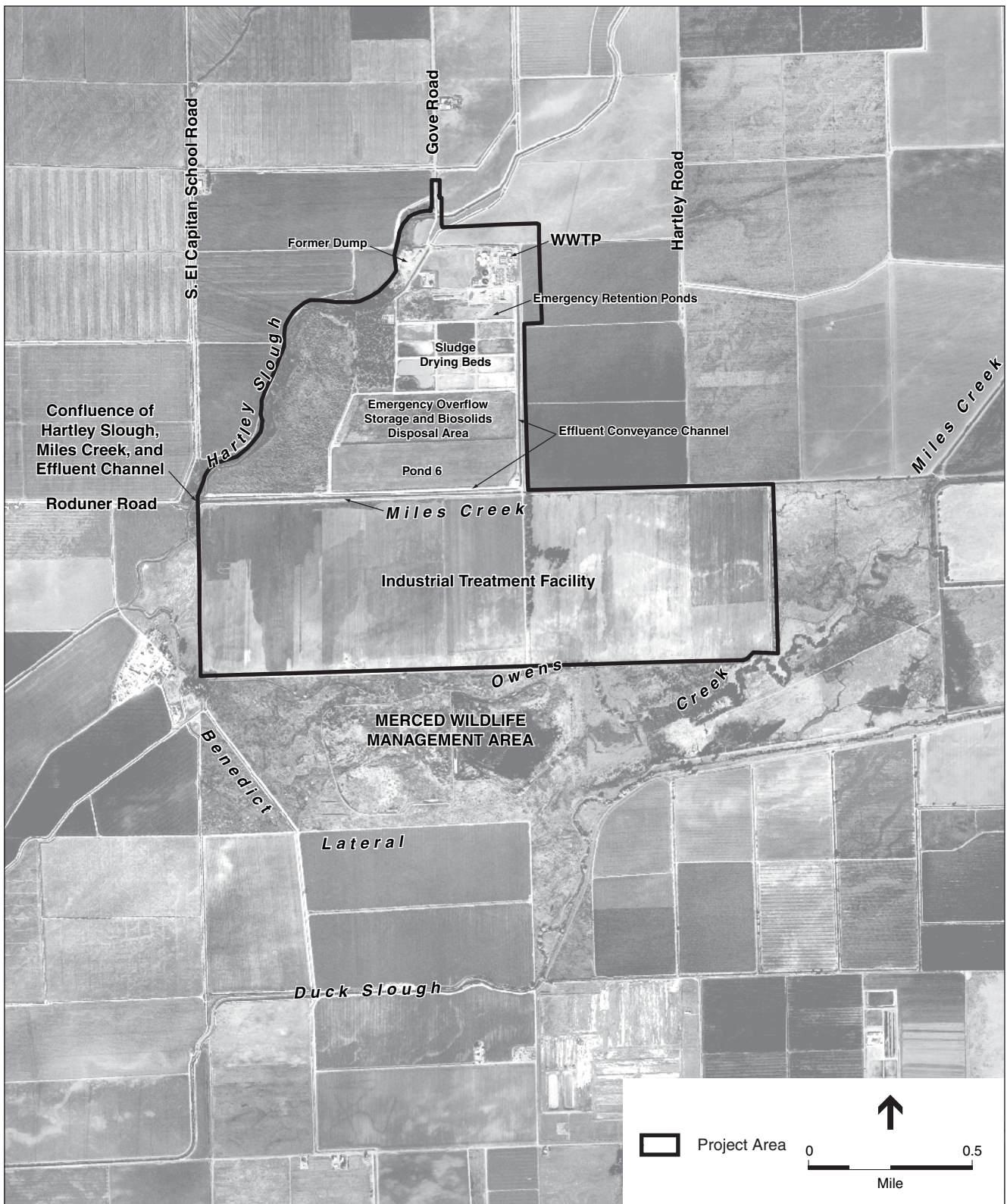
## **2.3 Project Background**

Major portions of the WWTP were constructed in the late 1970s. Since that time, it has undergone a series of improvements, starting in 1974, continuing through 1980, and occurring again in 1994 and 2003. The City prepared an environmental impact report (EIR) in 1994 that addressed the construction and operation of WWTP improvements and expansion of wastewater treatment capacity (City of Merced, 1994).



SOURCE: ESRI, 2005; City of Merced; and ESA, 2005

City of Merced Wastewater Treatment Plant Improvement Project - 205087  
**Figure 2-1**  
 Regional Location Map



SOURCE: GlobeXplorer, 2001; and ESA, 2006

City of Merced Wastewater Treatment Plant Improvement Project . 205087

**Figure 2-2**  
City of Merced WWTP Property

This document analyzed the environmental consequences of discharging up to 20 mgd of treated effluent and concluded that the implementation of the WWTP improvements and expansion of treatment capacity would result in the significant and unavoidable loss of local agricultural lands. The EIR concluded that all other potential environmental impacts could be mitigated to less-than-significant levels.

Most recently, the City approved the installation of additional blowers at the WWTP to improve aeration reliability. These new facilities were addressed in separate California Environmental Quality Act (CEQA) documentation prepared in 2005 (City of Merced, 2005; Environmental Review #05-27). The City is currently permitted to discharge up to 10 mgd of secondary treated effluent from the WWTP to Hartley Slough.

### **2.3.1 Changes to Community Plans and Wastewater Characteristics**

Several circumstances in the City and County of Merced have changed, necessitating the expansion of the WWTP. These changes include the adoption of the 1997 SUDP Update (City of Merced, 1997a), the 2001 UC-Merced LRDP (University of California, 2001). In addition, the City is currently proceeding in preparing an update to its 1997 SUDP. These plans propose continued future population growth within the City and the adjacent UC-Merced campus. The SUDP at buildout will generate an estimated 17.1 mgd of wastewater flows, while the flow from the UC-Merced LRDP is estimated at 2.25 mgd.

The City is also expecting that waste discharge requirements will become more stringent and further restrict the allowable concentration of constituents in the WWTP effluent. In order to meet these anticipated requirements, additional treatment methods will need to be installed and other systems, such as chlorine disinfection systems, will need to be ended.

### **2.3.2 Description of Current WWTP Facilities**

The WWTP consists of influent screens, grit removal channels, raw sewage pumps, primary clarifiers, aeration basins, secondary clarifiers, chlorine disinfection, dechlorination, and an outfall channel connecting to Hartley Slough. Biosolids-handling facilities at the WWTP include dissolved air flotation thickening, anaerobic digestion, and biosolids-drying beds.

#### **Major Components of the WWTP**

The WWTP has three reactor basins and three secondary clarifiers, capable of treating 15 mgd. The City assumes that only two of the three of each reactor basins and clarifiers are reliably available, comprising a firm average dry weather flow capacity of 10 mgd. The full capacity of the aeration basins cannot be used until the recently approved additional aeration capacity is installed (ECO:LOGIC, 2005), and the discharge permit from the CVRWQCB is revised.

Although there are three secondary clarifiers, limitations on the return activated biosolids (RAS) pumping facility preclude using the full capacity of these clarifiers. The RAS pumping system was designed to serve only two of the clarifiers at a time and has a reliable capacity of 10 mgd.

Waste activated biosolids are thickened in dissolved air flotation thickeners and then combined with biosolids and digested in anaerobic digesters. The digested biosolids are currently pumped to onsite unlined drying beds, which allow the digested biosolids to be solar-dried. One to three times per year, the solar-dried biosolids are applied to the City's 580-acre farmland site, south of the WWTP facilities. There is no existing biosolids dewatering system operating at the WWTP (ECO:LOGIC, 2005).

## Operations

The WWTP currently provides a secondary level of wastewater treatment and discharges the treated effluent to Hartley Slough and the Merced Wildlife Management Area.<sup>1</sup> The secondary wastewater treatment process consists of the following steps: (1) inflow to the WWTP is sent to the primary clarifier, where settleable solids are separated from the waste stream; (2) the wastewater is then sent to aeration basins, where microorganisms decompose organic material; and (3) the treated wastewater is then sent to a secondary clarifier, where final clarification occurs. The treated wastewater is then disinfected with sodium hypochlorite prior to its discharge from the WWTP into Hartley Slough. Biosolids generated under current operations are either applied to the City's 580 Industrial Treatment Facility or are hauled offsite to a permitted landfill.

## Current Permits and Approvals

The WWTP is subject to the regulatory authority of Waste Discharge Requirements (WDRs) and a National Pollutant Discharge Elimination System (NPDES) permit issued by the CVRWQCB. The WWTP operations are currently regulated by WDR 5-00-246 (NPDES No. CA00792198), issued in 2000. The WWTP is also currently operating under Mandatory Penalty Complaint No. R5-2004-0537 in response to permit violations for total coliform bacteria and total residual chlorine, Group I and Group II pollutants, respectively (CVRWQCB, 2004).

Other receiving water limits imposed on the WWTP are based upon water quality objectives contained in the Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) (CVRWQCB, 1998). These limitations specify that the WWTP discharge shall not

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<sup>1</sup>In 1978, the City established the Merced Wildlife Management Area (WMA) on 385 acres of native pastureland that had been subject to seasonal flooding from Owens Creek. The WMA was established to mitigate for the loss of wetland habitat as a consequence of establishing the City's industrial food wastewater disposal site, which is located immediately north of the WMA. The WMA comprises two large enclosed pond features and a small wetland area. Surface waters within the WMA are maintained through the discharge of 1.2 mgd (or 1,300 acre-feet per year [AF/yr]) of treated effluent from the WWTP. The California Department of Fish and Game (CDFG) manages the WMA. The CDFG reports that, as of November of 2000, the WMA has become outstanding habitat for migratory waterfowl, wetland-associated species, and that its construction and operation meets or exceeds the City's mitigation requirements. Public access to the WMA is regulated and supervised by the CDFG. During the hunting season, the CDFG limits public access to around 10 people three days a week.

cause the following conditions to occur in the receiving surface water (i.e., Hartley Slough and the Merced Wildlife Management Area):

- Concentrations of dissolved oxygen to fall below 5.0 milligrams per liter (mg/L)
- Oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.
- Chlorine to be detected in concentrations equal to or greater than 0.01 mg/L
- Normal ambient pH to fall below 6.5 or exceed 8.5. The monthly average pH change shall not exceed 0.5 unit. In calculating the monthly average pH change, the discharger may omit values of pH change recorded on days when upstream receiving water pH exceeds 8.5.
- Normal ambient temperature to increase more than 5 degrees Celsius.
- Toxic pollutants to be present in the water column, sediments, or biota in concentrations that adversely affect beneficial uses; that produce detrimental physiological response in human, plant, animal, or aquatic life; or that bioaccumulate in aquatic resources at levels that are harmful to human health.
- Where three toxicity tests result in exceeding 1.0 Chronic Toxicity Units (TUC) when TUC equals the ratio of 100/Highest Concentration with No Observable Effect, as determined in accordance with the procedures outlined in EPA 600/4-91/002 *Short-Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Water to Freshwater Organisms* and EPA 505/2-90-001 (Technical Support Document for Water Quality-Based Toxic Control). Consistent chronic toxicity is defined as three consecutive tests that exceed 1.0 TUC.
- Neither the WWTP operation nor its discharges to land or to the Merced Wildlife Management Area, alone or in combination with other sources, shall cause or threaten to cause degradation of area groundwater.

### **Current Effluent Quality**

The most stringent operating conditions determine the reliable capacity of the WWTP, including peak month flows, loads (influent strength), and colder temperatures. A key factor considered in successful wastewater treatment is the operation of the aeration basins and their ability to reduce biological oxygen demand (BOD) of the wastewater. The BOD concentration is an important water quality parameter that is regulated by the CVRWQCB. Other water quality parameters regularly monitored by the City and their respective concentrations in the WWTP effluent are listed in Table 2-1.



**TABLE 2-1  
CURRENT WASTEWATER TREATMENT PLANT  
EFFLUENT QUALITY**

Constituent	Units	Average Daily Discharge*	Maximum Daily Discharge
Flow	mgd	8.5	11.32
Chlorine (Total Residual)	mg/L	<0.01	0.94
Biochemical Oxygen Demand	mg/L	3.54	8.0
Chemical Oxygen Demand	mg/L	31.2	106
Temperature (Winter)	degrees F	68.54	73.94
Temperature (Summer)	degrees F	79.664	82.76
Fecal Coliforms	MPN/100 mL	19.4	900
Oil and Grease	mg/L	<1.0	16.0
Phosphorus (total)	mg/L	2.0	3.0
Total Kjeldahl Nitrogen	mg/L	1.2	3.1
Ammonia	mg/L	0.28	5.43
Nitrate +Nitrite (as N)	mg/L	11.3	18.0
Total Suspended Solids	mg/L	6.84	30.5
pH (Minimum)	pH units	--	7.7
pH (Maximum)	pH units	--	8.1
Dissolved Oxygen	mg/L	4.8	8.38
Total Dissolved Solids	mg/L	427	597

Source: ECO:LOGIC, 2005

\* Peak Month

Note: mgd = million gallons per day; mg/L = milligrams per liter; F = Fahrenheit; MPN = Most Probable Number per 100 mL

## 2.4 Proposed Action Objectives

The City has two primary objectives for implementing the Project. The first objective is to install sufficient WWTP capacity to meet wastewater loads generated by planned population growth and development within the City's SUDP area and UC Merced's LRDP area. The second objective is to install additional wastewater treatment capability sufficient to meet current and future effluent quality regulatory limits by replacing aged facilities with improved wastewater treatment technologies and processes.

## **2.5 Description of the Proposed Action**

### **2.5.1 Action Area**

The Action Area is shown in Figure 2-3. This area incorporates all areas that would be affected by construction activities for the Proposed Action, and Hartley Slough, which would receive treated effluent at a new discharge location. The portion of Hartley Slough included in the Action Area is shown in Figure 2-3. With the exception of adjacent farmland required for expansion and Hartley Slough, the Action Area encompasses lands operated and managed by the City.



City of Merced Wastewater Treatment Plant Improvement Project - 205087  
**Figure 2-3**  
Action Area

SOURCE: GlobeXplorer, 2001; and ESA, 2006

## 2.5.2 Facility Improvements

The WWTP would be expanded in three stages with treatment capacities rated at 11.5 or 12 mgd, 16 mgd, and 20 mgd, respectively. The 11.5 mgd capacity would be available immediately upon issuance of WDRs and installation of previously approved aerating equipment, and completion of the ongoing California Environmental Quality Act (CEQA) review process. The WWTP capacity would remain at 11.5 mgd until additional facilities and improvements being proposed as part of this Project are installed and operational. If population growth slows, the City may opt to hold the WWTP at 12 mgd until demand warrants further expansion of the treatment capacity. Whereas, if population continues to increase at historical rates, the City may opt to proceed with expanding the WWTP from 11.5 to 16 mgd in a single phase.

The 16 mgd capacity would be available with the installation of equipment described in Table 2-2. The 20 mgd capacity would eventually become available with the installation of the additional equipment and improvements listed in Table 2-2. Figure 2-4 depicts the layout of existing and planned facilities composing the WWTP.

As part of the Project, the City proposes constructing facilities for expanding of wastewater treatment capacity, including a new headworks and influent pump station to replace the existing 30-year old pump station, which is deteriorating and odorous. The facilities would be covered to reduce potential odors. Other improvements include new septage/debris receiving stations, an additional primary clarifier and aeration basin, a secondary clarifier, a new blower building, a return biosolids pump station, and a new digester.

Wastewater treatment improvements would include (1) denitrification sufficient to comply with a 10 mg/L nitrate-nitrogen limitation, (2) coagulation, filtration, and UV disinfection for the production of pathogen free effluent containing no disinfection byproducts, (3) effluent re-aeration, and (4) centrifuge dewatering and active solar drying for production of Class A Biosolids.<sup>2</sup>

To accommodate the new facilities, the Project would acquire about 380 acres of land immediately north and east of the existing WWTP and develop about 20 acres for installing proposed WWTP facilities. This land would be rezoned for public use and used for the expansion of the WWTP's new headworks, a combined administrative/laboratory building, and access to portions of the incoming City sewer. Additional agricultural land to the northwest of the WWTP may be used for the disposal of Class A biosolids.

New levees would be constructed within the expansion area around the northern end of the WWTP to provide 100-year flood protection. These levees would be similar to the levees found at the WWTP and would range from 5 to 7 feet high with a crest width of about 15 feet to enable vehicle access. As part of the levee's construction, the Paden Drain and Hartley Lateral would be rerouted to Hartley Slough, east of the proposed access road. The proposed expansion area is illustrated in Figure 2-4.

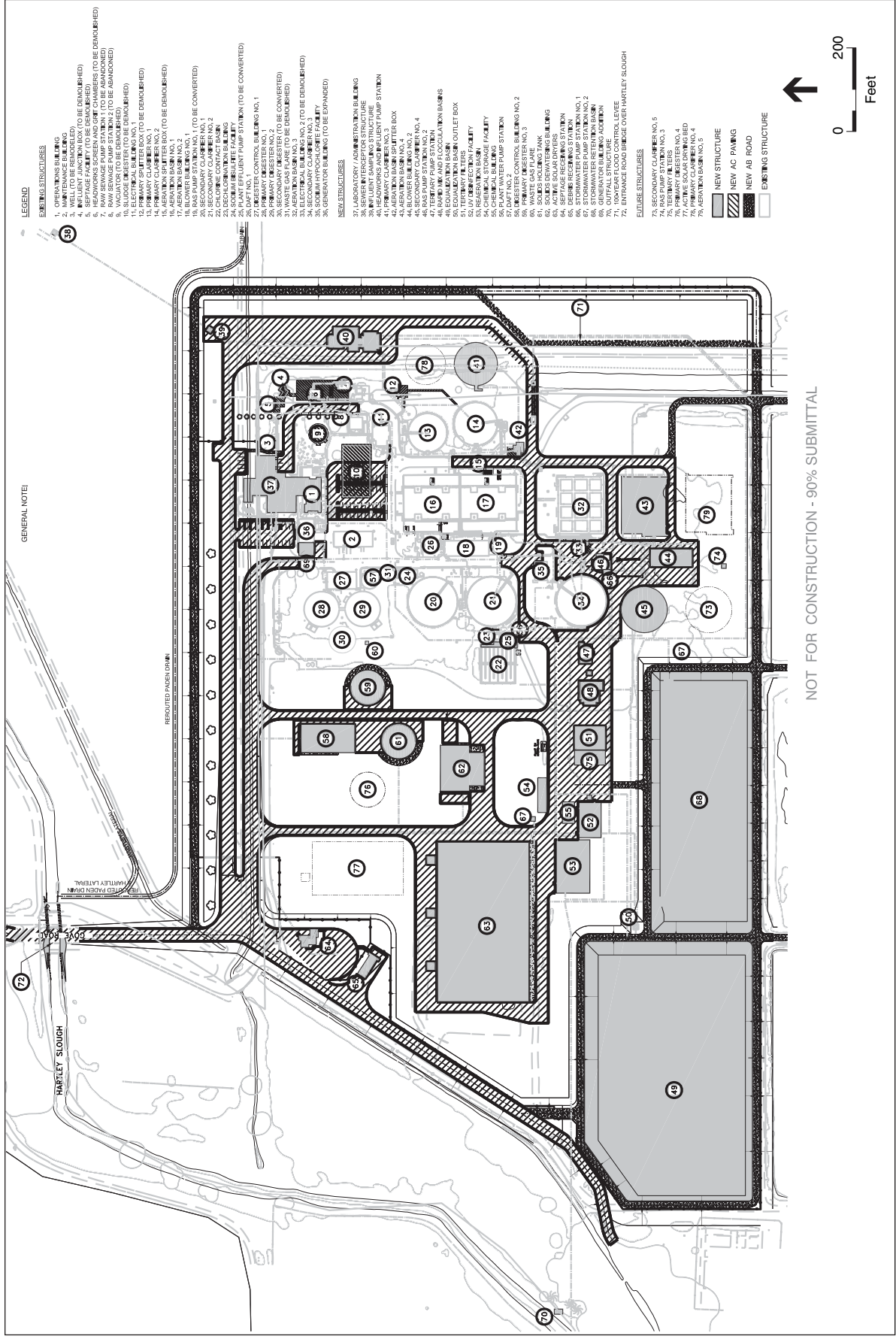
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<sup>2</sup> To achieve Class A certification, biosolids must undergo heating, composting, digestion or increased pH that reduces pathogens to below detectable levels. Once these goals are achieved, Class A biosolids can be land applied without any pathogen-related restrictions at the site and marketed to the public for application to lawns and gardens.

**TABLE 2-2  
PROPOSED FACILITY IMPROVEMENTS**

Improvements	Description
<b>16 mgd Capacity</b>	
Plant entrance	New entry road and security gates
Septage receiving access	Separate access road for septage haulers
Septage/stormwater receiving station	Automated septage receiving station
Headworks	New headworks with two mechanical screens and two grit chambers
Influent pump station	New pump station with five submersible pumps
Primary splitter box	New splitting structure with gates to each primary clarifier
Primary clarifier No. 3	Addition of a third 95-foot-diameter primary clarifier
Aeration basin #4	Addition of a fourth 1.25 million-gallon aeration basin
Blower building No. 2	New blower building housing 3 new aeration blowers
Activated biosolids pump station	New return biosolids pump station for secondary clarifiers No. 3 and 4
Secondary clarifier No. 4	Addition of a fourth 110-foot-diameter secondary clarifier
Tertiary pump station	New tertiary pump station for pumping secondary effluent to filters
Equalization basin	New 7-million-gallon basin to equalize peak hourly flows
Rapid mix & flocculation basin	New basin used to chemical condition the secondary effluent prior to filtration
Tertiary filters	Six cloth disk filter units
Ultraviolet disinfection	Three low pressure high intensity lamp ultra-violet channels for pathogen removal
Reaeration basin	New reaeration basin to maintain dissolved oxygen levels above 5 milligrams per liter
Outfall pipe to Hartley Slough	New 54-inch pipe directly to Hartley Slough
Stormwater drain pump station	Two stormwater pump stations that pump stormwater to first flush basin and then back to plant headworks for treatment
Chemical storage	Chemical tanks for coagulants and pH adjustment
Chemical building	New chemical building housing chemical metering pumps and electrical switchgear
Dissolved air flotation thickener	New dissolved air flotation thickener for thickening waste solids prior to digestion
Gas flare	New gas flare for digester gas
Primary digester	New 80-foot-diameter primary digester
Digester control building	New building for digester feed pumps and heat exchangers
Solids dewatering building	New building housing three centrifuges and a truck loading station for biosolids dewatering
Digested biosolids holding tank	New 80-foot tank for digested biosolids prior to dewatering
Active solar dryers	Nine greenhouses to dry biosolids to above 50 percent solids prior to disposal
Emergency generator	Expansion of the plant's generator system for emergency power
Laboratory and administration building	New water/wastewater laboratory and offices for plant staff located near plant entrance
<b>20 mgd Capacity</b>	
Head works	Addition of one mechanical screen
Influent pump station	Addition of one submersible pump
Primary clarifier No. 4	Addition of a fourth 95-foot-diameter primary clarifier
Aeration basin No. 5	Addition of a fifth 1.25-million gallon aeration basin
Secondary clarifier No. 5	Addition of a fifth 110-foot-diameter secondary clarifier
Tertiary filtration	Construction of two additional cloth disk filter units
Ultra-violet (UV) disinfection	Construction of an additional UV channel
Effluent cooling	Use of additional surface aerators or cooling towers
Primary digester	Construction of a fourth primary digester

Source: ECO:LOGIC, 2005



SOURCE: ECO-LOGIC, 2006; City of Merced; and ESA, 2006

City of Merced Wastewater Treatment Plant Improvement Project - 205087  
**Figure 2-4**  
 Proposed WWTP Facilities

## 2.5.3 Treatment Process Improvements

### Secondary Treatment Improvements

Secondary treatment improvements to the WWTP consist of reconfiguring the current reactor basins, constructing Reactor Basin 4, constructing a new return activated biosolids pump station to serve Secondary Clarifiers 3 and 4, and constructing Secondary Clarifier 4. Additional aeration capacity beyond the recently approved blowers would also be installed.

### Tertiary Treatment Improvements

Tertiary treatment improvements to the WWTP include the addition of cloth-media “disk” filters and replacing the chlorine disinfection system with an ultra-violet light disinfection system. This filtration technology would produce acceptable quality tertiary effluent consistent with California Department of Health Services (DHS) “Title 22” pathogen-free reuse criteria. Prior to discharge, a re-aeration basin would aerate the final effluent so that its dissolved oxygen level would be maintained at or above 5 mg/L.

### Biosolids Management and Handling Improvements

The Project would implement improved treatment and handling of biosolids at the WWTP. Such improvements include improving biosolids thickening with the addition of a new dissolved air flotation thickener (DAFT), expanded anaerobic digestion facilities, new centrifuge dewatering, and new drying and stabilization to Class A quality solids using active solar dryers. These improvements would be operational by 2008.

Active solar dryers would be used to dry, stabilize, and temporarily store biosolids prior to offsite hauling. The unlined drying beds currently in use would be ended. At 16 mgd, the WWTP would produce approximately 19,700 pounds per day (lb/day) of solids on an annual basis. At 20 mgd, the WWTP would produce about 24,667 lb/day. These quantities of biosolids would generate about 284 haul trips per year at 16 mgd and about 355 haul trips per year at 20 mgd.

Approximately 580 acres of the industrial food processing waste disposal facility, located south of Miles Creek and within the City’s property, would continue to be used for the application of treated biosolids. This use is expected to continue in compliance with WDR Order No. 97-034 through 2007. The application of the biosolids as a Class A soil amendment could occur on adjacent agricultural properties. For purposes of this document, it is assumed that biosolids would be applied to agricultural areas within two miles of the WWTP. Application to offsite areas would be conducted consistent with the Merced County 2006 biosolids disposal ordinance and Title 40 Code of Federal Regulations, Part 503.

## 2.5.4 Effluent Discharge Location

As part of the Proposed Action, a new outfall structure would be constructed in Hartley Slough approximately 3,000 feet upstream of the current WWTP effluent discharge. The structure would be a 54-inch pipe with a bar screen outlet to prevent unauthorized access into the pipe. As proposed, a single pipeline would be buried roughly 8 to 10 feet below the ground surface and extend just over 1,000 feet. A permanent easement of up to 30 feet, located on City property, would be required for the outfall pipeline. A general schematic of the outfall structure is provided in Figure 2-5.

## 2.5.5 Other Improvements

Other WWTP improvements include installing a separate gated entry for septage haulers, landscaping improvements, levee improvements to provide 100-year flood protection of WWTP facilities, expanding the emergency generator building, and adding a second standby generator to provide standby power to the new facilities. In addition, the Project includes constructing a new laboratory building and administration building.

As part of the Proposed Action, use of about one-half of the outfall channel (the east-west oriented reach on the southern boundary of the Action Area) would be ended and filled in place. The north-south portion of the outfall channel near the WWTP facility would continue to be used to convey treated effluent to the Merced Wildlife Management Area. The fill material is anticipated to originate from a combination of on- and offsite locations. Several agricultural ditches and drains, located north of the WWTP, would be rerouted as a result of the Proposed Action.

## 2.5.6 Proposed Effluent Quality

With the proposed improvements, the WWTP would utilize nitrification/denitrification processes followed by a tertiary treatment process. The Project would continue to discharge treated effluent into Hartley Slough; however, disinfection would be accomplished by ultraviolet light exposure instead of chlorine disinfection. The Proposed Action would also produce Class A-quality biosolids. The Proposed Action would achieve an effluent quality of 30 mg/L BOD, 30 mg/L total dissolved solids, and 10 mg/L nitrate as N at the rated capacities of 15 mgd and 20 mgd. Table 2-3 lists the expected effluent quality of the WWTP at rated capacities of 10 mgd, 15 mgd, and 20 mgd.

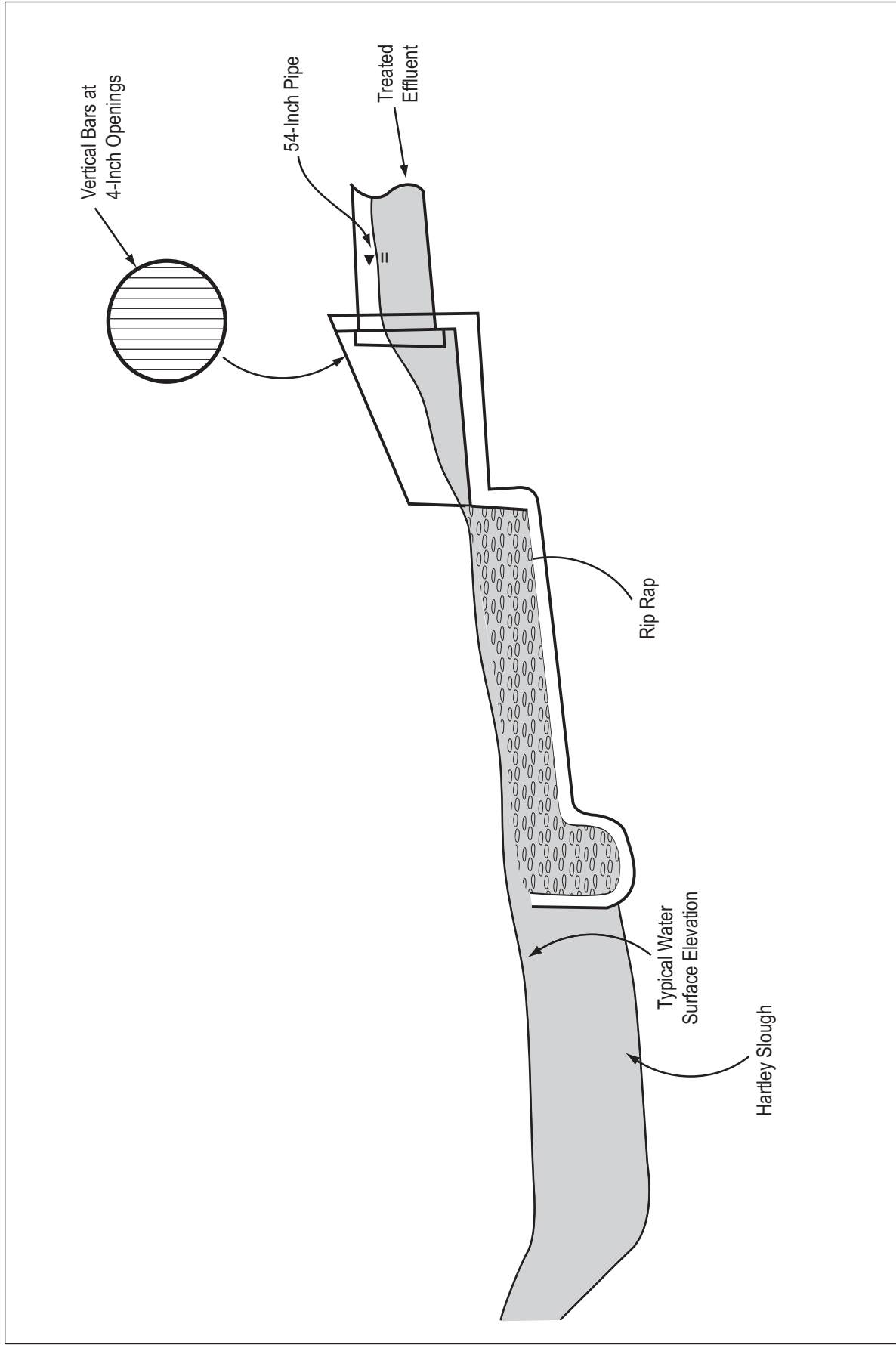
**TABLE 2-3  
PROPOSED WASTEWATER TREATMENT PLANT EFFLUENT QUALITY**

Parameter	10 mgd (Permitted)	16 mgd	20 mgd
Average Flow (mgd)	10	15	20
Biochemical Oxygen Demand (mg/L)	30	30	30
Total Suspended Solids (mg/L)	30	30	30
Nitrate as N (mg/L)	10	10	10
Peak Hour Wet Weather Flow (mgd)	23	23 (Equalized)	31 (Equalized)

SOURCE: ECO:LOGIC, 2005

Note: mgd = million gallons per day; mg/L = milligrams per liter





SOURCE: ECO-LOGIC Engineering, 2006; and ESA, 2006

City of Merced Wastewater Treatment Plant Improvement Project - 205087  
**Figure 2-5**  
 Site View of Proposed Effluent Outfall Facilities into Hartley Slough

## 2.5.7 Construction Methods

Construction of the proposed treatment WWTP facilities would consist of several activities, including grading currently unimproved property, excavation and soil removal, transporting and installing equipment, and constructing process units. The construction would occur with periodic activity peaks, requiring brief periods of significant effort followed by longer periods of reduced activities.

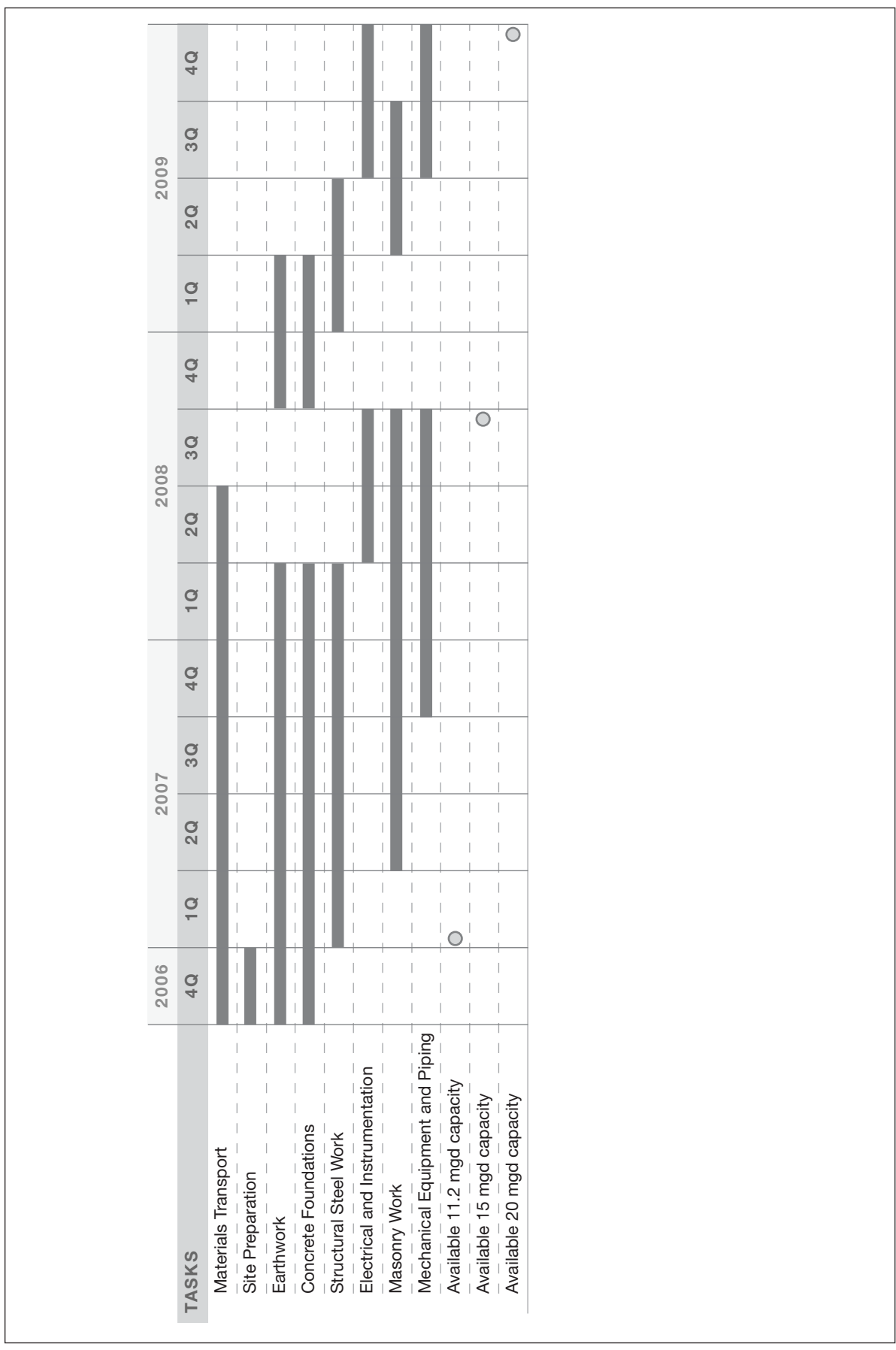
Construction of the Project is scheduled to begin in the first quarter of 2007. Upon completion of the construction of additional facilities and improvements in October 2008, the WWTP would raise its operational capacity from 11.5 mgd to 16 mgd. Construction completion is scheduled for October 2009, when the WWTP would be able to operate at a rated capacity of 20 mgd. A general construction schedule is provided in Figure 2-6.

Final construction scheduling would be completed during engineering and contractor bidding, which may result in variations to the planned construction schedule. Typical construction activities involved in the construction of wastewater treatment plant upgrades include:

- Materials transport
- Site preparation - tree and brush removal, and structure demolition (if necessary)
- Earthwork - grading, excavation, backfill
- Concrete foundations - forming, rebar placement, and concrete delivery and placement
- Structural steel work - assembly and welding
- Electrical/instrumentation work
- Masonry construction
- Installation of mechanical equipment and piping

It has been assumed that construction of the WWTP treatment upgrades could occur simultaneously with pipeline installation with the most intense construction activities occurring during late 2007 into fall 2008. In order to characterize and analyze potential construction impacts, the City has identified maximum crew size, truck trips, and worker trips, based on expected excavation volumes and quantities of imported materials. In support of these activities, the main pieces of equipment that may be used at any one time during construction may include:

- Up to 2 track-mounted excavators
- Up to 3 backhoes
- Up to 2 graders
- Up to 1 crane
- Up to 3 scrapers
- Up to 2 compactors
- Up to 3 end and bottom dump trucks
- Up to 2 front-end loaders
- Up to 2 water trucks
- Up to 1 paver and roller
- Up to 3 flat-bed delivery trucks
- Up to 2 forklifts
- Up to 2 concrete trucks
- Up to 2 compressors/jack hammers



City of Merced Wastewater Treatment Plant Improvement Project - 205087  
**Figure 2-6**  
 Construction Schedule

SOURCE: ESA, 2006

## Materials Transport and Employee Trip Generation

Excavated material would mostly remain onsite and would be used for backfill after process unit and yard piping installation. Additional truck trips would be necessary to deliver materials, equipment, and asphalt-concrete to the site. During peak excavation and earthwork activities, the Project could generate up to 100 round-trip truck trips per day. However, average daily truck trips would be less and range from about 30 to 50 round trips per day during much of construction. Roadways that would be used by construction traffic include Gove Road, Dickenson Ferry Road, and State Routes 99 and 59.

The typical crew size for each construction phase would be 5 to 10 people, plus inspectors. It is expected that up to four construction crews could be present during the most intense construction periods. Work hours would be governed by permits issued by regulatory agencies, but these are not expected to be restrictive because the area contains few residences.

During Project operations, the expanded WWTP would generate up to 355 truck trips per year associated with the transfer and disposal of biosolids at the WWTP. This number of truck trips would more than double the truck trips currently associated with biosolids disposal from the WWTP. Up to three trips per day could be generated by biosolids disposal truck trips.

Additional WWTP operators would generate about six new daily commuter trips to and from the WWTP.

## Installation of the Outfall Pipeline

A majority of the new outfall pipeline would be installed in an open trench using conventional cut and cover construction techniques in upland areas. Depending on the soil conditions encountered, the trench would be braced with a trench box, solid shoring, or speed shoring. The active work area along the open trench, including equipment and materials staging areas, would require a width of up to 60 feet, but may be reduced to reflect the available right-of-way. Trench width would range from 15 to 20 feet, and trench depth would average 8 to 10 feet. The rate of work is estimated to average 50 feet per day per crew along the entire route, and the overall active work zone on any given workday would average 100 to 200 feet in length. The key steps in the construction process are:

- Surface Preparation
- Trench Shoring
- Excavation
- Pipeline Installation
- Trench Backfilling
- Surface Restoration

In order to reduce potential impacts to the levee and wetland margins of Hartley Slough during the installation of the outfall structure, equipment would be restricted to wide-track or amphibious equipment designed to reduce bearing weight. Alternatively, crane mats would be required if larger excavation equipment (track-mounted excavator) is required. Staging areas for storage of pipe, construction equipment, and other materials would be placed at locations that would minimize hauling distances and long-term disruption.

The pipeline would be encased in concrete in sensitive areas (such as culvert crossings), where it would be difficult to access the pipe to repair minor leaks or where a leak could cause considerable damage before being repaired.

## SECTION 3

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# Existing Environment

### 3.1 WWTP Facilities

#### 3.1.1 Biological Resources

Biological resources within the study area were identified after a review of pertinent literature and database queries. In addition, field surveys were conducted on August 3, November 15 through 17, and December 6, 2005 by walking portions of the Action Area and evaluating the area for its potential to support special-status species, sensitive habitats, and jurisdictional waters of the United States. Wildlife habitats and plant communities were mapped via aerial photograph interpretation followed by ground-truthing in November 2005. A search of the California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDDB) (CDFG, 2006) and California Native Plant Society On-line Inventory (CNPS, 2005) was conducted for the following USGS 7.5-minute quadrangles to determine which special-status species have been reported from the vicinity of the Action Area: Sandy Mush, Arena, Atwater, El Nido, Bliss Ranch, Merced, Turner Ranch, Delta Ranch, and Santa Rita Bridge.

#### Plant Communities and Wildlife Habitats

The wildlife habitats identified in this document are described using California Department of Fish and Game's *A Guide to Wildlife Habitats* (Mayer and Laudenslayer, 1988), which generally correlate with plant communities. Where appropriate wildlife habitat descriptions are not available, general plant community types are provided. Figure 3-1 shows the distribution of habitats within the Action Area.

##### ***Eucalyptus***

Approximately 1.3 acres of eucalyptus occur in the Action Area. This habitat is characterized by a closed canopy of mature blue gum (*Eucalyptus globulus*) trees with a sparse understory of annual grasses and non-native forbs. Understory components include blue gum saplings, milkthistle, prickly lettuce, poison hemlock, and grasses including salt grass, ripgut brome, and foxtail barley. The northern portion of this habitat was recently burned and lacks an established understory, although one small elderberry shrub occurs here. The remaining understory appears to have been mowed sometime during the growing season. Approximately one-third of the original stand has been removed recently at the southern end of the stand.



City of Merced Wastewater Treatment Plant Improvement Project - 205087

**Figure 3-1**  
Habitats in the Action Area

SOURCE: GlobeXplorer, 2001; and ESA, 2006

### **Ruderal**

Approximately 0.7 acre of ruderal vegetation occurs in the Action Area. Ruderal vegetation occurs in disturbed or maintained areas and is characterized by a predominance of invasive non-native plant species. Dominant species are generally tall-growing invasive species such as poison hemlock, perennial pepperweed, prickly lettuce, and shortpod mustard interspersed with annual grasses such as Italian ryegrass (*Lolium multiflorum*), foxtail barley, and soft chess. The ruderal area near the proposed outfall pipeline is characterized by a dense stand of milkthistle and shortpod mustard with some downed eucalyptus trees and debris piles. Areas closer to Hartley Slough are dominated by Italian ryegrass and poison hemlock. Another small ruderal area occurs in the northern portion of the Action Area near Gove Road. It is characterized by a few mature Goodding's willow trees with open grassy areas dominated by wild oats (*Avena fatua*), Italian ryegrass, common tarweed, milkthistle, and shortpod mustard.

### **Disked Field**

Approximately 33.9 acres of disked fields occur in the Action Area. Disked fields in the northeastern portion of the Project area, adjacent to and outside the current WWTP footprint, are in agricultural production. Other areas south and west of the WWTP site have been disked to prevent vegetation overgrowth. In these areas, the vegetation cover ranges from 10 to 60 percent and includes ruderal species such as poison hemlock, Bermuda grass (*Cynodon dactylon*), and amaranth (*Amaranthus* sp.). The disked field immediately south-southwest of the WWTP plant facilities serves as an emergency overflow retention pond that is rarely needed. The eastern half of this field is characterized by a mostly continuous cover of Italian ryegrass with associated species such as cheeseweed (*Malva parviflora*), goosefoot, fiddle dock, and mustard (*Brassica* sp.), but the center of this area has a few large bare areas. The western half of this field has approximately 45 percent vegetation cover with dominants including Johnson grass, field bindweed (*Convolvulus arvensis*), cheeseweed, goosefoot, and common knotweed (*Polygonum arenastrum*).

### **Developed Area**

Approximately 61.5 acres of the Action Area are developed and include the WWTP facilities, paved and unpaved roads, a series of sludge drying-beds and emergency stormwater ponds, and parking lots. The edges of roads are sparsely to densely vegetated by ruderal species including poison hemlock, prickly lettuce, Johnson grass, and everlasting cudweed (*Gnaphalium luteoalbum*). Landscaped areas within WWTP facilities include a solid groundcover of iceplant (*Carpobrotus edulis*), a row of oleander (*Nerium oldeander*) shrubs, areas of lawn, and scattered ornamental pines (*Pinus* sp.). The drying beds and stormwater ponds are regularly maintained to prevent the establishment of permanent vegetation.

### **Riverine and Fresh Emergent**

About 12.8 acres of riverine (2.1 acres) and fresh water emergent habitat (10.7 acres) occur in the Action Area. These two habitats occur in close association in Hartley Slough and various drainage and agricultural ditches within the Action Area. Each of the various waterways in the Action Area is described below. Refer to Figure 3-1 for the locations of these features.

### Hartley Slough

Surface waters within the immediate vicinity of the WWTP site drain into Hartley Slough. Hartley Slough borders the western perimeter of the Action Area and, when unobstructed, flows in a southwesterly direction to Owens Creek and eventually flowing to Deep Slough and the San Joaquin River. An irrigation diversion, located about 1000 feet downstream of the effluent channel, redirects all flows from the slough for much of the year (approximately March-November, but the timing varies based on irrigation requirements). During this period, there is no direct hydrologic connection from the WWTP downstream of the diversion. Water levels within Hartley Slough near the WWTP are at their highest when this diversion is operational. Flows in Hartley Slough are also influenced by stormwater runoff, WWTP effluent, and groundwater base flows. To the City's knowledge, no flow data are available for Hartley Slough; however, it is thought that the City's effluent discharge is a major contributor during much of the year.

Hartley Slough is a steep-banked perennial drainage channel characterized by both open water and fresh emergent marsh habitat. While the total average channel width is approximately 30 feet within the Action Area, the area of open water is only approximately 15 feet due to the fresh emergent marsh along portions of the edge of the slough. Common plant species observed in fresh emergent habitat include common tule (*Scirpus acutus*), broad-leaved cattail (*Typha latifolia*), stinging nettle (*Urtica dioica* ssp. *holosericea*), common water smartweed (*Polygonum punctatum*), and common rush. The presence of a beaver dam likely contributes to the upstream establishment of emergent wetland species within the channel.

While the slough lacks a closed-canopy corridor of riparian trees or shrubs, a few scattered trees and shrubs occur along its edge, including Goodding's willow, blue gum, edible fig, tobacco tree, and northern California black walnut hybrid. One segment of channel has a closed-canopy overstory of blue gum eucalyptus with lower channel banks dominated by common rush and tall flatsedge and upper banks dominated by salt grass. The small segment of Harley Slough in the northernmost portion of the Project study area on the west side of Gove Road has a dense swath of emergent vegetation along its southern bank that is approximately 15 feet wide and dominated by common tule with occasional broad-leaved cattail and stinging nettle. However, the northern bank appears to be maintained and generally lacks emergent vegetation. The sparse vegetation on the northern bank includes common tarweed, shortpod mustard, and milkthistle, but small scattered common tule is present. The slough channel on the east side of Gove Road is well maintained and has little instream vegetation. This segment has pockets of common tule within the channel, but the channel banks are dominated by ruderal species including Johnson grass, common water smartweed, slender willowherb, and dallis grass.

Several common carp (*Cyprinus carpio carpio*), mosquitofish (*Gambusia affinis*), and Sacramento pikeminnow (*Ptychocheilus grandis*) have been observed in the slough and channels in the Action Area.



### WWTP Effluent Channel

The WWTP effluent channel (Ditch D-5 in Figure 3-1), which lies in the southern part of the Action Area, is a maintained open water channel. The banks of the effluent channel are about 20 feet wide, maintained, and very little vegetation is established. Approximately 80 percent of the channel banks along the eastern segment are bare soil. Where vegetation is present, the dominant plants are generally ruderal species including slender willowherb (*Epilobium ciliatum*) and prickly lettuce. Portions of the banks of the southern segment of the channel are lined with concrete rubble with only approximately 10 percent vegetation cover. The plant species observed along the southern segment include Johnson grass, slender willowherb, common water smartweed, and water cress (*Nasturtium officinale*). The entire southern section (running east to west) of this channel and several hundred feet of the northern reach of the eastern section would be filled by the Proposed Action.

### Agricultural Ditches

Ditch D-1 extends along Gove Road in the northern portion of the Action Area (Figure 3-1). Its average width is 5 feet. The channel has continuous cover of dense emergent vegetation both within the channel and on the channel banks. Dominant species include Johnson grass, slender willow herb, panicgrass (*Panicum* sp.), common water smartweed. This channel would be filled by the Proposed Action.

Ditch D-2 (Hartley Lateral), which is confluent with Hartley Slough, is on average 10 feet wide. The northern segment of this ditch is maintained and supports a sparse cover of emergent marsh vegetation along its lower banks. Dominant plant species include broad-leaved cattails, panicgrass, mustard, and common monkeyflower (*Mimulus guttatus*). The channel's upper banks are dominated by the ruderal species field sow thistle (*Sonchus arvensis*). In the middle segment, vegetation cover is dense and dominant species within the channel and on the channel banks include common tule, common water smartweed, and common rush. In its southern extent, where the ditch flows through a stand of blue gum eucalyptus, emergent vegetation is sparse and primarily restricted to channel banks. Dominant species in this segment of the drainage include common rush, tall flatsedge (*Cyperus eragrostis*), dallis grass (*Paspalum dilatatum*), Goodding's willow saplings, and common tule. Much of this channel would be realigned by the Proposed Action.

Ditch D-3 (Paden Drain), which is also confluent with Hartley Slough, is approximately 10 feet wide in the Action Area and varies in the amount of emergent vegetation cover along its extent. The lower reach of the channel (downstream of the entrance to the WWTP) has approximately 50 percent cover of emergent marsh vegetation. The dominant emergent species within this segment include common tule, common rush, and broad-leaved cattail. The upper channel banks are lined by scattered mature riparian trees including Oregon ash (*Fraxinus latifolia*), Goodding's willow, and edible fig with an almost continuous understory of poison hemlock and milkthistle. The segment of this drainage that parallels the WWTP facility has been recently maintained and supports little emergent vegetation. Only the lowest portion of the channel banks has vegetation cover consisting primarily of tall flatsedge and mustard. Much of this channel would be realigned by the Proposed Action.

Ditch D-4 is approximately 5 feet wide in the Action Area and varies in the density and amount of emergent vegetation cover throughout its extent. The ditch generally supports sparse emergent vegetation in its northern extent and continuous cover of emergent vegetation in its southern extent near its confluence with Miles Creek. The drier northern segment has tall flatsedge established within the channel and ruderal species such as prickly lettuce on the channel banks. The wetter southern segment is characterized by dense emergent vegetation both within the channel and on the channel banks including common water smartweed, tall flatsedge, slender willowherb, mugwort (*Artemisia douglasiana*), and Johnson grass. Several hundred feet of this channel would be realigned by the Proposed Action.

## SECTION 4

# Species Accounts and Status of the Species in the Action Area

The listed species introduced in Section 1, their preferred habitats, and whether a given species has the potential of being affected by the Proposed Action, based on the Proposed Action description, are discussed in this section. Species in the Proposed Action Area are presented in Table 4-1 and are addressed in detail below.

### 4.1 Species Likely to Occur in the Action Area

The species presented in Section 1.3 were evaluated for their potential to be affected by construction or operation of the Proposed Action. Three species listed for protection under FESA as “threatened” or “endangered” may be affected by construction/operation in the Action Area. Species accounts and the status of each species in the Action Area are presented in Table 4-1.

**TABLE 4-1  
SPECIES POTENTIALLY OCCURRING IN THE ACTION AREA**

Species	Federal Status	General Habitat and Range	Addressed Further?
<b>Invertebrates</b>			
<i>Branchinecta conservatio</i> Conservancy fairy shrimp	Endangered	Lifecycle restricted to vernal pools in the Central Valley.	No. No vernal pools or seasonal wetlands that would support vernal pool crustaceans occur within the Action Area.
<i>Branchinecta longiantenna</i> Longhorn fairy shrimp	Endangered	Lifecycle restricted to vernal pools in the Central Valley.	No. No vernal pools or seasonal wetlands that would support vernal pool crustaceans occur within the Action Area.
<i>Branchinecta lynchi</i> Vernal pool fairy shrimp	Threatened	Lifecycle restricted to vernal pools in the Central Valley.	No. No vernal pools or seasonal wetlands that would support vernal pool crustaceans occur within the Action Area.
<i>Desmocerus californicus dimorphus</i> Valley elderberry longhorn beetle	Threatened	Breeds and forages exclusively on blue elderberry shrubs below 3,000 feet in the Central Valley and adjacent foothills.	<b>Yes. Elderberry shrubs with stems larger than 1” in diameter occur within the Action Area.</b>
<i>Lepidurus packardii</i> Vernal pool tadpole shrimp	Endangered	Lifecycle restricted to vernal pools in the Central Valley.	No. No vernal pools or seasonal wetlands that would support vernal pool crustaceans occur within the Action Area.

**TABLE 4-1  
SPECIES POTENTIALLY OCCURRING IN THE ACTION AREA**

<b>Species</b>	<b>Federal Status</b>	<b>General Habitat and Range</b>	<b>Addressed Further?</b>
<b>Fish</b>			
<i>Hypomesus transpacificus</i> Delta smelt	Threatened	Delta estuaries with dense aquatic vegetation and low occurrence of predators. May be affected by downstream sedimentation.	No. This species does not occur in the Action Area or vicinity.
<i>Oncorhynchus mykiss</i> Central Valley Steelhead	Threatened	Enters Sacramento and San Joaquin Rivers and their tributaries from July to May; spawning from December to April. Young move to rearing areas in and through the Sacramento and San Joaquin Rivers, Delta, and San Pablo and San Francisco Bays.	No. This species does not occur in the Action Area or vicinity.
<i>Oncorhynchus tshawytscha</i> Central Valley spring-run Chinook salmon	Threatened	Enters Sacramento and San Joaquin Rivers and tributaries March to July; spawning from late August to early October. Young move to rearing areas in and through the Sacramento and San Joaquin Rivers, Delta, and San Pablo and San Francisco Bays.	No. This species does not occur in the Action Area or vicinity.
<i>Oncorhynchus tshawytscha</i> Winter-run Chinook salmon, Sacramento River	Endangered	Enters Sacramento River December to May; spawning peaks May and June. Upstream movement occurs more quickly than in spring run population. Young move to rearing areas in and through the Sacramento River, Delta, and San Pablo and San Francisco Bays.	No. This species does not occur in the Action Area or vicinity.
<i>Oncorhynchus tshawytscha</i> Central valley fall/late fall run Chinook salmon,	Candidate	Enters Sacramento and San Joaquin Rivers and tributaries March to July; spawning from late August to early October. Young move to rearing areas in and through the Sacramento and San Joaquin Rivers, Delta, and San Pablo and San Francisco Bays.	No. This species does not occur in the Action Area or vicinity.
<b>Amphibians</b>			
<i>Ambystoma californiense</i> California tiger salamander	Threatened	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Needs underground refuges and vernal pools or other seasonal water sources.	No. No suitable breeding habitat occurs in the Action Area.
<i>Rana aurora draytonii</i> California red-legged frog	Threatened	Breeds in slow moving streams, ponds, and marshes with emergent vegetation and an absence of predators within foothills surrounding the Central Valley and the Coast Range.	No. Presumed extirpated from the Central Valley floor by the 1960s (61 FR 25815).

**TABLE 4-1  
SPECIES POTENTIALLY OCCURRING IN THE ACTION AREA**

Species	Federal Status	General Habitat and Range	Addressed Further?
<b>Reptiles</b>			
<i>Gambelia (=Crotaphytus) sila</i> Blunt-nosed leopard lizard	Endangered	Occurs in open valley and foothill grasslands, valley saltbush scrub, and alkali playa communities of the San Joaquin Valley, Carrizo Plain, and Cuyama Valley. Uses small mammal burrows for refuge.	No. No suitable habitat occurs in the Action Area.
<i>Thamnophis gigas</i> Giant garter snake	Threatened	Generally inhabits marshes, sloughs, ponds, slow-moving streams, ditches, and rice fields which have water from early spring through mid-fall, emergent vegetation (such as cattails and bulrushes), open areas for sunning, and high ground for hibernation and escape cover.	<b>Yes. Aquatic and upland habitats occur within the Action Area.</b>
<b>Birds</b>			
<i>Haliaeetus leucocephalus</i> Bald eagle	Threatened	Nests in large trees with open branches along lake and river margins, usually within one mile of water.	No. No breeding or foraging habitat occurs in the Action Area..
<b>Mammals</b>			
<i>Dipodomys nitratoides exilis</i> Fresno kangaroo rat	Endangered	Subspecies of San Joaquin kangaroo rat. Found in sandy and saline sandy soils in annual Valley grassland, chenopod scrub, alkali sink communities. Needs open/sparse vegetation, loose soils.	No. No suitable habitat occurs in the Action Area.
<i>Vulpes macrotis mutica</i> San Joaquin kit fox	Endangered	Occurs in native valley and foothill grasslands and chenopod scrub communities of the valley floor and surrounding foothills. Prefers open level areas with loose-textured soils supporting scattered, shrubby vegetation and little human disturbance.	<b>Yes. Action Area is within historic range and provides foraging habitat.</b>
<b>Plants</b>			
<i>Neostapfia colusana</i> Colusa grass	Threatened	Found in the bottoms of large, deep vernal pools, often associated with adobe clay soils; up to 650 feet in elevation. Blooms May-August.	No. No vernal pools or seasonal wetlands that would support vernal pool species occurs within the Action Area.
<i>Chamaesyce hooveri</i> Hoover's spurge	Threatened	Found in relatively large, deep vernal pools among rolling hills, remnant alluvial fans, and depositional stream terraces at the base of the Sierra Nevada foothills.	No. No vernal pools or seasonal wetlands that would support vernal pool species occurs within the Action Area.

## 4.1.1 Valley Elderberry Long-Horned Beetle

### Distribution

Valley elderberry longhorn beetle (VELB) was once common throughout the Central Valley; however, clearing for agricultural and urban development has removed over 90 percent of the riparian habitat in the Central Valley, and the remaining habitat is fragmented. Current locations are scattered throughout its historical range, from Redding in Shasta County to Bakersfield in Kern County. A survey conducted from 1984 through 1991 revealed only 12 patches of natural riparian forests along the Sacramento, American, and San Joaquin Rivers and their tributaries. These patches yielded either beetles or emergence holes indicating their presence (CDFG, 2002)

### Habitat and Life History

The VELB is thought to be completely dependent upon its host plant, elderberry (*Sambucus*). According to the USFWS (1984) Recovery Plan, it is believed that adults emerge from pupation inside the wood of these shrubs in the spring, making distinctive small oval openings that may be the only indication of the species occurring. Adults eat the elderberry foliage until about June when mating begins. The females lay eggs in crevices in the bark; upon hatching, the larvae tunnel into the shrub where they will spend one to two years eating the interior wood (pith), which is their sole food source. The VELB will utilize a shrub with a stem diameter of at least 1 inch for all of its life stages. Seldom occurring above 3,000 feet in elevation, VELB habitat generally occurs along waterways and in floodplains that support remnant riparian forests; such habitat is a fairly common component of the Central Valley.

### Habitat and Distribution in the Action Area

On November 15 and 16, 2006, a survey was conducted for elderberry shrubs with at least one stem greater than 1 inch in diameter in the Action Area. One elderberry shrub was found. The shrub was marked with a metal tag, measured, and checked for emergence holes (see Figure 5-1 for the shrub's location). The shrub can be found in the eucalyptus grove located along the access road north of the firing range. This shrub contains five stems greater than 1 inch (but less than 3 inches) in diameter, does not have beetle exit holes, and is located within historically riparian habitat. The closest record to the Action Area for VELB occurrence is from 1990 and occurred 15 miles northwest of the Action Area (CDFG, 2006).

The Action Area is within the species' historic range and contains suitable habitat. Although the elderberry shrub in the Action Area lacks exits holes, others shrubs in the vicinity of the Action Area have them. Therefore, the species may occur in the Action Area and could be affected by the Proposed Action. Habitat for VELB within the Action Area is shown on Figure 4-1.

### Critical Habitat

The USFWS designated critical habitat for VELB on August 8, 1980 (45 FR 52803). Designated critical habitat includes the Sacramento region, within the City of Sacramento, and along the American River Parkway (USFWS, 2006). The Action Area is entirely outside the identified critical habitat for VELB.



City of Merced Wastewater Treatment Plant Improvement Project - 205087

**Figure 4-1**  
 Giant Garter Snake and  
 Valley Elderberry Longhorn Beetle  
 Habitats in the Action Area

SOURCE: GlobeXplorer, 2001; and ESA, 2006

## 4.1.2 Giant Garter Snake

### Distribution

The giant garter snake population has probably always been disjunct, with a southern population occurring from the vicinity of Buena Vista Lake in Kern County to Merced County, and a northern population occurring from San Joaquin County to Butte County. To the east and west, the populations were probably confined by the foothills of the Sierra Nevada and the Coast Range (USFWS, 1999a). The USFWS presently recognizes 13 separate populations. These coincide with historic flood basins and tributary streams in the Central Valley (USFWS, 1999a). The two closest populations to the Action Area are in the North and South Grasslands Waterfowl Easement Areas (USFWS easements, Merced County) and the Mendota State Wildlife Area. Dispersal corridors do not exist between populations (USFWS, 1999a).

### Habitat and Life History

The giant garter snakes, the most aquatic of garter snakes, is generally active from April through September. It breeds from March into May and during a brief period in September. Young are brooded internally by females and born from late July into September. After being born, the young giant garter snakes disperse into dense cover. From early October to April, giant garter snake takes refuge in winter retreats and is not active. The snake feeds primarily on native and introduced aquatic prey such as small fishes, tadpoles, and frogs (USFWS, 1999a).

The giant garter snake is endemic to the wetlands of the Central Valley. It inhabits irrigation and drainage canals, ricelands, marshes, sloughs, ponds, small lakes, low-gradient streams, and adjacent uplands. The snake requires enough water during their active season to maintain high densities of prey. It requires emergent wetland vegetation (e.g., *Scirpus* and *Typha*) for cover and foraging, and adjacent uplands and openings in streamside vegetation for basking sites. Small mammal burrows and soil crevices in higher uplands are used for cover and refuge from floodwaters during their non-active season. The giant garter snake is typically absent from wetlands with sand, gravel, or rock substrates and from riparian woodlands (USFWS, 1999a).

### Habitat and Distribution in the Action Area

Aquatic giant garter snake habitat occurs in the Action Area (Table 4-1). Emergent wetland vegetation is present in Hartley Slough and in several irrigation ditches and Miles Creek (Figure 3-1), which is located immediately south of the Action Area. Upland refuge habitat can be found within 200 feet of aquatic habitat. Some of the uplands (e.g., roads) do not contain suitable aestivation habitat. The WWTP effluent channel is maintained regularly to prevent aquatic vegetation from becoming established. Although it contains basking habitat, it also contains water and prey during the snake's active period. It does not contain suitable emergent herbaceous vegetation needed for escape cover and cover when foraging.



The Giant Garter Snake Recovery Plan (USFWS, 1999a) describes two populations in the general vicinity of the Action Area: North and South Grasslands Waterfowl Easement Areas, about 15 miles west of the Action Area; and the Mendota State Wildlife Area, 35 miles to the south. The closest recent (2000) record in the CNDDDB (CDFG, 2006) is from 17 miles southwest of the Action Area.

The Action Area is within the species' historic range and contains suitable habitat. Hartley Slough drains to Owens Creek and eventually to the San Joaquin River in the vicinity of the North Grasslands Wildlife Area, providing a potential linkage from a known population to the Action Area. Therefore, the species may occur in the Action Area and could be affected by the Proposed Action. Figure 4-1 illustrates habitat within the Action Area for Giant Garter Snake.

### **Critical Habitat**

None has been designated.

## **4.1.3 San Joaquin Kit Fox**

### **Distribution**

The San Joaquin kit fox occurs only in and around the Central Valley, inhabiting open habitat in the San Joaquin Valley and surrounding foothills. Historically, it ranged in the San Joaquin Valley from Tracy, San Joaquin County, on the west to La Grange, Stanislaus County on the east, south to southern Kern County. Its current range includes the foothills of the Coast Ranges, Sierra Nevada, and Tehachapi Mountains, from Contra Costa County south to Kern County, and from Alameda and San Joaquin Counties east to Stanislaus County. The fox is fragmented and uncommon throughout this range. The greatest density of occurrences is located in the southern portion of its range. Most of the habitat on the valley floor in the northern part of their range has been eliminated (USFWS, 1998)

### **Habitat and Life History**

The San Joaquin kit fox is a permanent resident of arid grasslands or open scrubland, where friable soils are present. Dens are usually dug, but the fox will use dens constructed by other animals or use human-made structures. Dens are required year-round for reproduction, shelter, temperature regulation, and protection from predators. The San Joaquin kit fox is principally a nocturnal carnivore of small to medium-sized mammals, small birds, reptiles, and insects, but it will also forage on vegetation (USFWS, 1998; USFWS, 2006). The San Joaquin kit fox requires open grassland and savannah habitats for foraging and dispersal. Grasslands with friable soils are considered the principal habitat for denning, foraging, and dispersal, while open oak woodlands provide lower quality foraging and dispersal habitat. It will use habitats that have been extensively modified by humans, including grasslands and scrublands with active oil fields, wind turbines, and agricultural matrices (USFWS, 1998).

## Habitat and Distribution in the Action Area

During a site assessment conducted on December 6, 2005, no sign of use by San Joaquin kit fox was detected. Most of the Action Area is composed of disturbed lands with little sign of activity by potential prey for San Joaquin kit fox; however, adjacent farmlands and small areas of grasslands could provide foraging habitat. The Action Area contains few suitable features that could be used as dens. Several ground squirrel burrows are located on either side of the unpaved roads between the sludge drying beds just south of the WWTP facilities and on the sloped banks at the edge of the facility grounds. Since these areas experience moderate to high levels of human disturbance, it is unlikely they would be used as dens.

The CNDDDB (CDFG, 2006) has several records near the Action Area for the fox. A non-specific polygon (dated 1986) occurs within 3.3 miles southwest of the Action Area and contains more recent sightings, including multiple den sites and adults with young. The most recent record (2001) is located about nine miles east of the Action Area.

The Action Area is within the species' historic range, contains some suitable foraging habitat, and could provide linkage habitat for San Joaquin kit fox moving between the valley floor and eastern Merced County. Therefore, the species may be affected by the Proposed Action.

## Critical Habitat

None has been designated.

## 4.2 Other Listed Species

Eighteen other species in the area have been listed for protection under FESA as “threatened” or “endangered” that are unlikely to be adversely affected by the Proposed Action. Lack of habitat in the Action Area is the primary factor for determining that these species will not be adversely affected. The following listed species are not considered further in this document:

- *Branchinecta conservatio* – Conservancy fairy shrimp
- *Branchinecta longiantenna* – Longhorn fairy shrimp
- *Branchinecta lynchi* - Vernal pool fairy shrimp
- *Lepidurus packardi* – Vernal pool tadpole shrimp
- *Hypomesus transpacificus* - Delta smelt
- *Oncorhynchus mykiss* - Central Valley steelhead
- *Oncorhynchus tshawytscha* - Central Valley spring-run Chinook salmon
- *Oncorhynchus tshawytscha* - Winter-run Chinook salmon, Sacramento River
- *Oncorhynchus tshawytscha* – Central Valley fall/late fall-run Chinook salmon,
- *Ambystoma californiense* - California tiger salamander
- *Rana aurora draytonii* - California red-legged frog
- *Gambella* (= *Crotaphytus*) *silva* – Blunt-nosed leopard lizard
- *Haliaeetus leucocephalus* - Bald eagle
- *Dipodomys nitratoides exilis* - Fresno kangaroo rat
- *Chamaesyce hooveri* – Hoover's spurge
- *Neostapfia Colusana* – Colusa grass

## SECTION 5

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# Effects on Species and Habitat

This section analyzes the potential direct, indirect, and cumulative effects the Proposed Action may have upon the species identified in Section 4. Based on this analysis, a determination is made as to whether the Proposed Action may adversely affect these species, and recommends any mitigation that may reduce potential adverse effects. These potential effects are summarized below.

Possible interrelated and interdependent actions to the Proposed Action are also evaluated. Categories for effects are defined as follows:

- **Direct Effect.** Those effects generated directly from the Proposed Action, such as incidental take during construction and the elimination of suitable habitat by Project construction (50 CFR 402.02).
- **Indirect Effect.** Those effects that are caused by the Proposed Action and are later in time, such as the discharge of sediment or chemicals that adversely affect water quality downstream of the Proposed Action or an increase in human activity during Project operation (50 CFR 402.02).
- **Cumulative Effect.** Effects of future state or private activities that are reasonably certain to occur within the area of the Proposed Action, and which may cumulatively increase the magnitude of direct and indirect effects described previously (50 CFR 402.02).
- **Interrelated Actions.** Those actions that are part of, and dependent upon, a larger action, such as the need for utilities for a development (50 CFR 402.02).
- **Interdependent Actions.** Actions that have no independent utility apart from the Proposed Action, such as future actions that are dependent upon the Proposed Action taking place (50 CFR 402.02).

The Proposed Action would primarily have direct effects upon federally listed species. These direct effects include the potential for incidental take of individuals or through the loss of suitable habitat.

## 5.1 Valley Elderberry Longhorn Beetle

### Direct and Indirect Effects

The Proposed Action would directly affect one elderberry shrub that meets the habitat requirements of the VELB. This shrub would be removed for construction of the outfall pipeline. It consists of five stems greater than 1 inch (but less than 3 inches) in diameter, does not have beetle exit holes, and is located within historically riparian habitat.

### Modifications to the Proposed Action to Mitigate Effects

The Proposed Action was designed to minimize impacts to elderberry shrubs; however, where effects to shrubs cannot be avoided, mitigation is necessary. Replacement ratios have been determined using the USFWS Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS, 1999b) for all stems one inch or greater in diameter at ground level that are either “transplanted or destroyed.” All potentially adversely affected shrubs must be transplanted, if possible, to a suitable conservation area (i.e., an approved mitigation bank or non-bank), subject to the USFWS’ approval, in the vicinity of the affected area, unless otherwise approved by the USFWS.

One shrub would be directly affected by the Proposed Action. Therefore, compensatory measures (as described in the USFWS 1999 guidelines) are included in the Proposed Action. A summary of affected stems is presented in Table 5-1, which also presents USFWS compensation ratios and the compensation required for the affected stems. Compensation ratios differ for shrubs in riparian versus non-riparian habitat; Because the one affected shrub is located in riparian habitat, only the riparian-associated compensation ratios are presented.

In addition to compensatory elderberry plantings, compensation includes plantings of associated riparian native species (Table 5-1). Based on site surveys, appropriate associated species would include Goodding’s willow and black walnut.

**TABLE 5-1  
COMPENSATION FOR RIPARIAN ELDERBERRY SHRUBS**

Stem Size	Shrub with Exit Holes?	Number of Stems	Elderberry Planting Ratio	Number of Elderberry Plantings Required	Associated Native Ratio	Number of Associated Native Plantings Required
1"≤stems≤3"	No	5	2:1	10	1:1	5
3">stems≤5"	No	0	3:1	0	1:1	0
5">stems	No	0	4:1	0	1:1	0
<b>Total</b>				<b>10</b>		<b>5</b>

The USFWS guidelines state that the one transplanted shrub, associated elderberry plantings, and associated native species must be planted in an onsite or offsite conservation area. This area must provide a minimum area of 1,800 square feet for each transplanted elderberry shrub and 10 associated plantings. An additional 1,800 square feet is required for every additional 10

associated plantings (or portion thereof). Therefore, for one transplant and 15 associated plantings (10 elderberry and 5 native plantings), the minimum area required for the Proposed Action's compensatory plantings would be 3,600 square feet (= 0.08 acres):

1 shrub and 10 elderberry plantings = 1,800 square feet

5 additional plantings (Goodding's willow and black walnut) = 1,800 square feet

Conservation areas must also be maintained and protected in perpetuity through a conservation easement or deed restriction. They must also be fenced and posted with signs stating that the area is habitat for the federally listed valley elderberry longhorn beetle.

## Cumulative Effects

No other development is currently planned in or around the WWTP that would remove or further degrade elderberry habitat. In addition, the Proposed Action would not have any long-term effects to habitat quality in the region, which would maintain the same general habitat character for the area. Therefore the Proposed Action would not result in cumulative effects on valley elderberry longhorn beetle.

## Interdependent and Interrelated Effects

The Proposed Action would not generate any interrelated actions. However, urban growth associated with development approved under the City of Merced's General Plan and the UC-Merced LRDP is interdependent with the Proposed Action and may not occur without the Proposed Action taking place. The potential effects associated with this Proposed Action are fully described in the City's General Plan Vision 2015 (City of Merced, 1997b) and the UC Merced LRDP Draft EIR (UC-Merced, 2001).

## 5.2 Giant Garter Snake

### Direct and Indirect Effects

The Draft Recovery Plan for the Giant Garter Snake (USFWS, 1999a) identifies loss of habitat as the greatest threat to this species and recognizes degradation of habitat as an additional threat. Suitable habitat exists in Hartley Slough, Miles Creek, the agricultural ditches (Ditches 1, 2, 3, and a portion of 4), and their respective adjacent uplands, up to 200 feet from the bank (Figure 5-1) where suitable (e.g., not routinely disked). Approximately 9.0 acres of aquatic and 4.3 acres of upland habitat (including 1.11 acres of unvegetated upland habitat along the upper portion of the bank on the north side of the effluent channel) exist in the Action Area.

Construction of the new roadway over Hartley Slough at the WWTP entrance and the new effluent outfall, the filling of the southern portion of the effluent channel, the rerouting of Hartley Lateral and Paden Drain, and subsequent dewatering of a portion of Hartley Lateral would

involve work within potential giant garter snake aquatic and upland habitat and would result in temporary and permanent habitat loss (see Table 5-2).

**TABLE 5-2  
EFFECT ON GIANT GARTER SNAKE HABITAT**

Habitat Type	Duration of Loss	Acres Affected
Aquatic	Permanent	0.54
	Temporary	0.21
Upland	Permanent	0.70
	Temporary	1.82

Source: ESA, 2006

The Proposed Action would increase discharges to Hartley Slough. This could result in higher flows that could initially affect stream vegetation through scouring and increased sedimentation. Changes in aquatic habitats as a result of scouring or sedimentation may adversely or beneficially affect giant garter snakes, depending on the habitat values of the resulting habitat.

Water quality may also be affected through increased temperatures in the Action Area. Giant garter snake typically inhabits shallow, slow-moving water bodies (e.g., marshes, sloughs, ponds, small lakes, low gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals and rice fields) that would generally be considered warm-water habitats. Incidents of increased receiving water temperatures would primarily occur from October through March, which corresponds to the snake's inactive period, when it would not be in aquatic habitat. Therefore, it is unlikely that elevated water temperatures would adversely affect the species.

## Modifications to the Project to Mitigate Effects

The City shall develop and implement a monitoring program to determine if increased effluent discharges are inducing excessive stream channel erosion on Hartley Slough downstream of the effluent discharge to the location of the existing agricultural water diversion facility. If observed, bank stabilization practices and other best management practices (BMPs) to control erosion shall be implemented. Measures could include placing riprap and planting stabilizing vegetation. If no substantial stream channel erosion is observed, the program may be terminated.

The following measures shall be implemented to reduce Proposed Action impacts on giant garter snake:

- A. All construction activity within giant garter snake habitat shall be conducted between May 1 and October 1. This is the active period for giant garter snakes and the potential for direct impacts are reduced because snakes are actively moving and avoiding danger. More danger is posed to snakes during their inactive period,

because they are occupying underground burrows or crevices and are more susceptible to direct effects, especially during excavation. Between October 2 and April 30 the City will contact the USFWS Sacramento Office to determine if additional measures are necessary to minimize and avoid take.

- B. Any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.
- C. Construction personnel shall participate in a worker environmental awareness program. Under this program, workers shall be informed about the presence of giant garter snakes and habitat associated with the species and that unlawful take of the animal or destruction of its habitat is a violation of FESA. This instruction shall be conducted by a USFWS approved biologist prior to construction activities. Proof of this instruction shall be submitted to the USFWS.
- D. Within 24 hours before construction activities begin, a USFWS-approved biologist shall inspect the site. The biologist will provide the USFWS with a field report form documenting the monitoring efforts within 24 hours of commencement of construction activities. The monitoring biologist shall be available thereafter; if a snake is encountered during construction activities, the monitoring biologist shall have the authority to stop construction activities until appropriate corrective measures have been completed or it is determined that the snake will not be harmed. Giant garter snakes encountered during construction activities will be allowed to move away from construction activities on their own. Capture and relocation of trapped or injured individuals shall only be attempted by personnel or individuals with current USFWS recovery permits pursuant to section 10(a)(1)(A) of FESA. The biologist shall be required to report any incidental take to the USFWS immediately by telephone and by written letter within one working day. The project area shall be reinspected whenever construction activity lapses for two weeks or more.
- E. Clearing of wetland vegetation will be confined to the minimal area necessary to excavate the toe of the bank for riprap or fill placement. Excavation of the channel for removal of accumulated sediments will be accomplished by using equipment located on and operated from top of bank, with the least interference practical for emergent vegetation.
- F. Movement of heavy equipment to and from the Project site shall be restricted to established roadways to minimize habitat disturbance. Preserved giant garter snake habitat shall be designated as Environmentally Sensitive Areas and shall be flagged by a USFWS approved biologist and avoided by all construction personnel.
- G. After completion of construction activities, any temporary fill and construction debris shall be removed and, wherever feasible, disturbed areas shall be restored to pre-Project conditions.
- H. Affected giant garter snake habitat shall be replaced or restored in kind at a 3:1 ratio (see Table 5-3). This table assumes that temporary impacts will only last one season. Permanent loss includes temporary impacts that span more than two seasons (one season is May 1 to October 1).

**TABLE 5-3  
MITIGATION FOR LOSS OF GIANT GARTER SNAKE HABITAT**

Habitat Type	Duration of Loss	Acres Affected	Mitigation Ratio	Mitigated Acres Replaced
Aquatic	Permanent	0.54	3:1	1.62
	Temporary	0.21	n/a	Restore
Upland	Permanent	0.70	3:1	2.10
	Temporary	1.82	n/a	Restore

Source: ESA, 2006

- I. All replacement habitat must include both upland and aquatic habitat components. Upland and aquatic habitat components must be included in the replacement habitat at a ratio of 2:1 upland acres to aquatic acres (see Table 5-3).
- J. Restored habitat shall receive one year of monitoring with a photo documentation report due to the USFWS one year from implementation of the restoration with pre- and post-construction Action Area photos.
- K. Monitoring of replacement habitat with a photo-documentation report shall be conducted for five years and submitted to the USFWS annually.

The calculations of acres lost assumes no impacts to land north of the access road paralleling the north bank of the southern reach of the effluent channel; disturbance during only one season; and the revegetation of all temporarily disturbed areas.

The closest USFWS-approved mitigation bank for purchasing giant garter snake credits is Wildlands' Kimball Island Mitigation Bank. It is anticipated that the City would purchase mitigation credits at this bank for compensation resulting from loss of habitat because of the Proposed Action.

## Cumulative Effects

No other development is currently planned in or around the WWTP that would remove additional giant garter snake habitat. Therefore, the Proposed Action would not result in cumulative effects on giant garter snake.

## Interdependent and Interrelated Effects

The Proposed Action would not generate any interrelated actions. However, urban growth associated with development approved under the City of Merced's General Plan and the UC-Merced LRDP is interdependent with the Proposed Action and may not occur without the Proposed Action taking place. The potential effects associated with this Proposed Action are fully



described in the City's General Plan Vision 2015 (City of Merced, 1997b) and the UC-Merced LRDP Draft EIR (UC-Merced, 2001).

## **5.3 San Joaquin Kit Fox**

### **Direct and Indirect Effects**

The Action Area may serve as foraging or movement habitat for San Joaquin kit fox traveling between eastern Merced County and the Central Valley floor. Loss of foraging or dispersal habitat for expansion of the WWTP, or disturbance associated with construction or operation activities of the expanded WWTP could reduce the value of the Action Area for San Joaquin kit fox. However, the Action Area does not provide any unique habitat values compared to adjacent farmland or nearby habitat managed for wildlife (e.g., the Merced Wildlife Management Area). Therefore, it is unlikely that the species would be affected by the Proposed Action.

### **Cumulative Effects**

No other development is currently planned in or around the WWTP that would modify additional San Joaquin kit fox habitat. Therefore, the Proposed Action would not result in cumulative effects on San Joaquin kit fox.

### **Interdependent and Interrelated Effects**

The Proposed Action would not generate any interrelated actions. However, urban growth associated with development approved under the City of Merced's General Plan and the UC Merced LRDP is interdependent with the Proposed Action, and may not occur without the Proposed Action taking place. The potential effects associated with this Proposed Action are fully described in the City's General Plan Vision 2015 (City of Merced, 1997b) and the UC Merced LRDP Draft EIR (UC Merced, 2001).



# SECTION 6

## Conclusions and Determination

### 6.1 Conclusions

In Chapter 1, federal-listed or proposed species with the potential to occur in the Action Area were identified. Three of these species (valley elderberry longhorn beetle, giant garter snake, and San Joaquin kit fox) were determined to have habitat or the potential to be affected by actions in the Action Area, and therefore, be potentially affected by the Proposed Action.

Compensation and avoidance and minimization measures are proposed in Section 5 for effects on valley elderberry longhorn beetle, giant garter snake, and San Joaquin kit fox. These measures are, where available, based on USFWS guidelines (e.g., USFWS, 1999b) or programmatic Biological Opinions (e.g., USFWS, 1997).

### 6.2 Determination

Based on the information presented in this BA, the following determinations have been made:

The proposed Project would have no effect on the following species, either because the Action Area contains no suitable habitat or because the Action Area is out of the species' natural range:

<i>Branchinecta conservatio</i>	Conservancy fairy shrimp	Endangered
<i>Branchinecta longiantenna</i>	Longhorn fairy shrimp	Endangered
<i>Dipodomys nitratoides exilis</i>	Fresno kangaroo rat	Endangered
<i>Oncorhynchus tshawytscha</i>	Winter-run Chinook salmon, Sacramento River	Endangered
<i>Gambelia (=Crotaphytus) sila</i>	Blunt-nosed leopard lizard	Endangered
<i>Ambystoma californiense</i>	California tiger salamander	Threatened
<i>Rana aurora draytonii</i>	California red-legged frog	Threatened
<i>Haliaeetus leucocephalus</i>	Bald eagle	Threatened
<i>Neostapfia colusana</i>	Colusa grass	Threatened
<i>Chamaesyce hooveri</i>	Hoover's spurge	Threatened
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp	Threatened
<i>Oncorhynchus tshawytscha</i>	Central Valley fall/late fall-run Chinook salmon	Candidate

Based on the rationale presented in Section 5, the Project may affect, but is not likely to adversely affect the following species:

<i>Desmocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	Threatened
<i>Thamnophis gigas</i>	Giant garter snake	Threatened
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	Endangered



## SECTION 7

### References

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# Appendix A

Species List for Expansion of  
the City of Merced's  
Wastewater Treatment Plant







## Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species  
that Occur in or may be Affected by Projects in the  
SANDY MUSH (402A)  
U.S.G.S. 7 1/2 Minute Quad

Database Last Updated: May 5, 2006

Document Number: 060517120543

**Species of Concern** - The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. See [www.fws.gov/sacramento/es/spp\\_concern.htm](http://www.fws.gov/sacramento/es/spp_concern.htm) for more information and links to these sensitive species lists.

**Red-Legged Frog Critical Habitat** - The Service has designated final critical habitat for the California red-legged frog. The designation becomes final on May 15, 2006. See our [map index](#).

### Listed Species

#### Invertebrates

Branchinecta conservatio

Conservancy fairy shrimp (E)

Critical habitat, Conservancy fairy shrimp (X)

Branchinecta longiantenna

longhorn fairy shrimp (E)

Branchinecta lynchi

Critical habitat, vernal pool fairy shrimp (X)

vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*

valley elderberry longhorn beetle (T)

*Lepidurus packardii*

Critical habitat, vernal pool tadpole shrimp (X)

vernal pool tadpole shrimp (E)

## Fish

*Hypomesus transpacificus*

delta smelt (T)

*Oncorhynchus mykiss*

Central Valley steelhead (T) (NMFS)

## Amphibians

*Ambystoma californiense*

California tiger salamander, central population (T)

*Rana aurora draytonii*

California red-legged frog (T)

## Reptiles

*Gambelia (=Crotaphytus) sila*

blunt-nosed leopard lizard (E)

*Thamnophis gigas*

giant garter snake (T)

## Birds

*Haliaeetus leucocephalus*

bald eagle (T)

## Mammals

*Dipodomys nitratoides exilis*

Fresno kangaroo rat (E)

*Vulpes macrotis mutica*

San Joaquin kit fox (E)

## Plants

*Chamaesyce hooveri*

Critical habitat, Hoover's spurge (X)

*Neostapfia colusana*

Colusa grass (T)

Critical habitat, Colusa grass (X)

## Key:

- (E) *Endangered* - Listed (in the Federal Register) as being in danger of extinction.
- (T) *Threatened* - Listed as likely to become endangered within the foreseeable future.
- (P) *Proposed* - Officially proposed (in the Federal Register) for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the [National Marine Fisheries Service](#). Consult with them directly about these species.
- *Critical Habitat* - Area essential to the conservation of a species.
- (PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.
- (C) *Candidate* - Candidate to become a proposed species.
- (X) *Critical Habitat* designated for this species

## Important Information About Your Species List

### How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey [7½ minute quads](#). The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, or may be affected by projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

### Plants

Any plants on your list are ones that have actually been observed in the quad or quads covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the nine surrounding quads through the California Native Plant Society's online [Inventory of Rare and Endangered Plants](#).

### Surveying

Some of the species on your list may not be affected by your project. A trained biologist or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list.

For plant surveys, we recommend using the [Guidelines for Conducting and Reporting Botanical Inventories](#). The results of your surveys should be published in any environmental documents prepared for your project.

## Your Responsibilities Under the Endangered Species Act

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Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal [consultation](#) with the Service.

During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

## [Critical Habitat](#)

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our [critical habitat page](#) for maps.

## Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

## Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

## Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be August 15, 2006.

## Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species  
that Occur in or may be Affected by Projects in the  
ATWATER (422D)

U.S.G.S. 7 1/2 Minute Quad

Database Last Updated: May 5, 2006

Document Number: 060517120352

**Species of Concern** - The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. See [www.fws.gov/sacramento/es/spp\\_concern.htm](http://www.fws.gov/sacramento/es/spp_concern.htm) for more information and links to these sensitive species lists.

**Red-Legged Frog Critical Habitat** - The Service has designated final critical habitat for the California red-legged frog. The designation becomes final on May 15, 2006. See our [map index](#).

### Listed Species

#### Invertebrates

Branchinecta conservatio

Conservancy fairy shrimp (E)

Branchinecta longiantenna

longhorn fairy shrimp (E)

Branchinecta lynchi

vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus

valley elderberry longhorn beetle (T)

*Lepidurus packardii*

vernal pool tadpole shrimp (E)

## Fish

*Hypomesus transpacificus*

delta smelt (T)

*Oncorhynchus mykiss*

Central Valley steelhead (T) (NMFS)

*Oncorhynchus tshawytscha*

Central Valley spring-run chinook salmon (T) (NMFS)

winter-run chinook salmon, Sacramento River (E) (NMFS)

## Amphibians

*Ambystoma californiense*

California tiger salamander, central population (T)

*Rana aurora draytonii*

California red-legged frog (T)



## Reptiles

*Gambelia* (=Crotaphytus) sila

blunt-nosed leopard lizard (E)

*Thamnophis* gigas

giant garter snake (T)

## Birds

*Haliaeetus leucocephalus*

bald eagle (T)

## Mammals

*Vulpes macrotis mutica*

San Joaquin kit fox (E)

## Plants

*Neostapfia colusana*

Colusa grass (T)

## Candidate Species

### Fish

*Oncorhynchus tshawytscha*

Central Valley fall/late fall-run chinook salmon (C) (NMFS)

## Key:

- (E) *Endangered* - Listed (in the Federal Register) as being in danger of extinction.
- (T) *Threatened* - Listed as likely to become endangered within the foreseeable future.
- (P) *Proposed* - Officially proposed (in the Federal Register) for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the [National Marine Fisheries Service](#). Consult with them directly about these species.
- *Critical Habitat* - Area essential to the conservation of a species.
- (PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.
- (C) *Candidate* - Candidate to become a proposed species.
- (X) *Critical Habitat* designated for this species

## Important Information About Your Species List

### How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey [7½ minute quads](#). The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, or may be affected by projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

### Plants

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