Draft - Volume II

STOCKTON DELTA WATER SUPPLY PROJECT

Program Environmental Impact Report
State Clearinghouse No. 2003112060

Prepared for:
City of Stockton

April 2005

In association with

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CHAPTER 4

DELTA WATER RESOURCES AND FISHERIES

CHAPTER 4

DELTA WATER RESOURCES AND FISHERIES

This chapter addresses the potential impacts of the DWSP on surface water and fisheries resources in the Sacramento-San Joaquin Delta.

4.1 DELTA WATER RESOURCES

4.1.1 SETTING

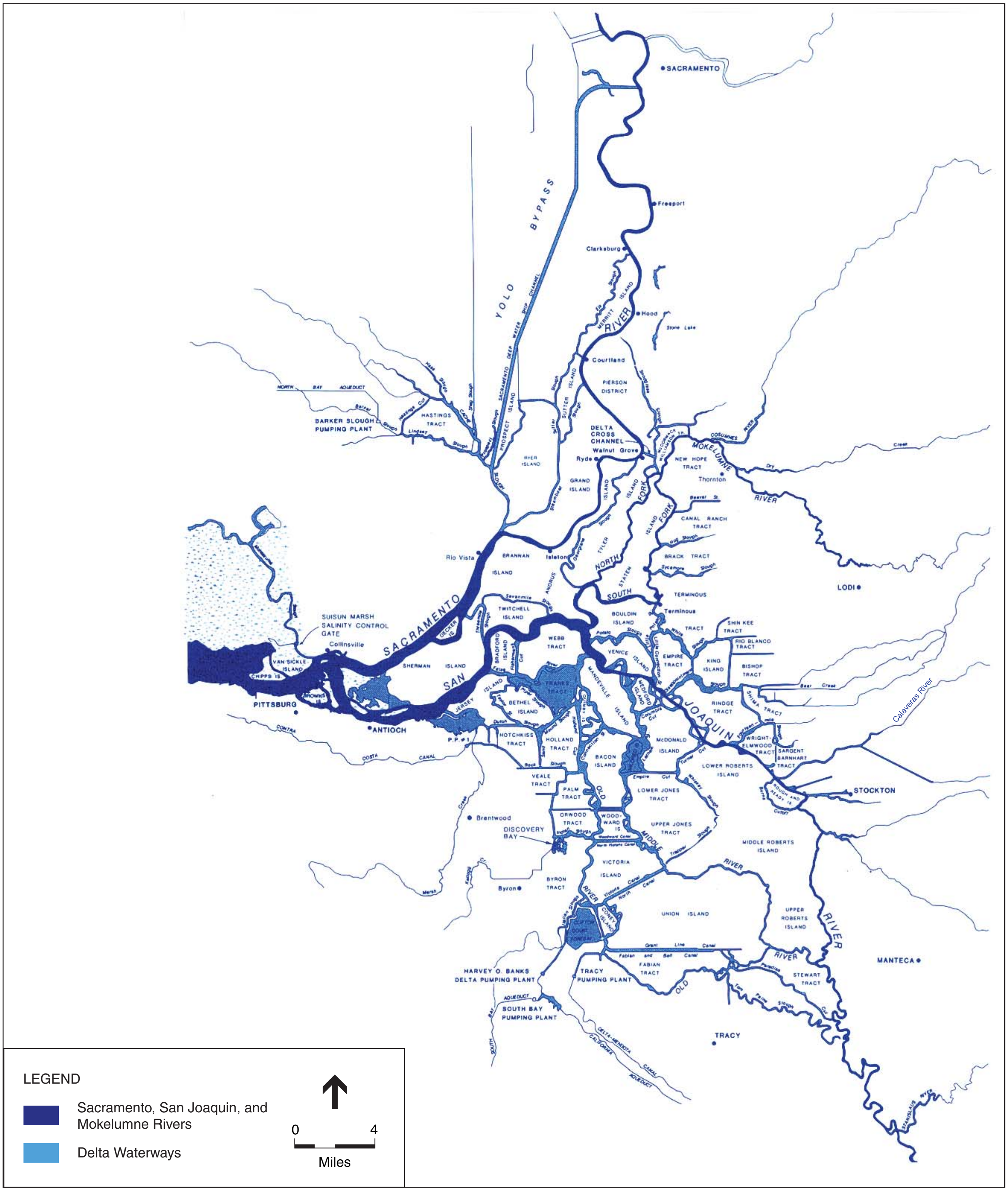
The Delta presently consists of about 740,000 acres bordered by the cities of Sacramento, Stockton, Tracy, and Pittsburg (Figure 4-1). The Delta receives runoff from a watershed that includes more than 40 percent of the state's land area. The Sacramento and San Joaquin Rivers unite at the western end of the Delta at Suisun Bay. This former wetland has been reclaimed into more than 60 islands and tracts, of which about 520,000 acres are devoted to farming. The Delta is interlaced with about 700 miles of waterways. An approximate 1,100-mile network of levees protects the islands and tracts, most of which lie near or below sea level, from flooding. Some of the island interiors are as much as 25 feet below sea level (SWRCB, 1999). The Sacramento-San Joaquin Delta provides drinking water for about 23 million people. Water flowing into the Delta is used for urban and agricultural use, recreation, navigation, and wildlife and fisheries.

HYDROLOGY

Delta Flows

The three major sources of freshwater to the Delta are the Sacramento River, the San Joaquin River, and Eastside streams (Mokelumne, Consumnes, and Calaveras Rivers). The Sacramento River (including the Yolo Bypass) contributes about 77 to 85 percent of the freshwater inflows to the Delta, while the San Joaquin River contributes about l0 to 15 percent. The minor flows of the Mokelumne, Consumes, and Calaveras Rivers, which enter into the eastern side of the Delta (Figure 4-1), contribute most of the remainder of the Delta inflow. Approximately 10 percent of the Delta inflow is withdrawn for local use, 30 percent is withdrawn for export by the Central Valley Project (CVP) and SWP, 20 percent is required for salinity control, and the remaining 40 percent provides outflow to the San Francisco Bay ecosystem in excess of minimum identified requirements (CALFED, 2000).

The Sacramento River Hydrologic Region contains the entire drainage area of the Sacramento River and its tributaries, and extends almost 300 miles from Collinsville in the Delta north to the Oregon border. The total land area within the region is approximately 27,000 square miles.



SOURCE: California Department of Water Resources, 1993; and Environmental Science Associates, 2005

Figure 4-1
Sacramento - San Joaquin Delta

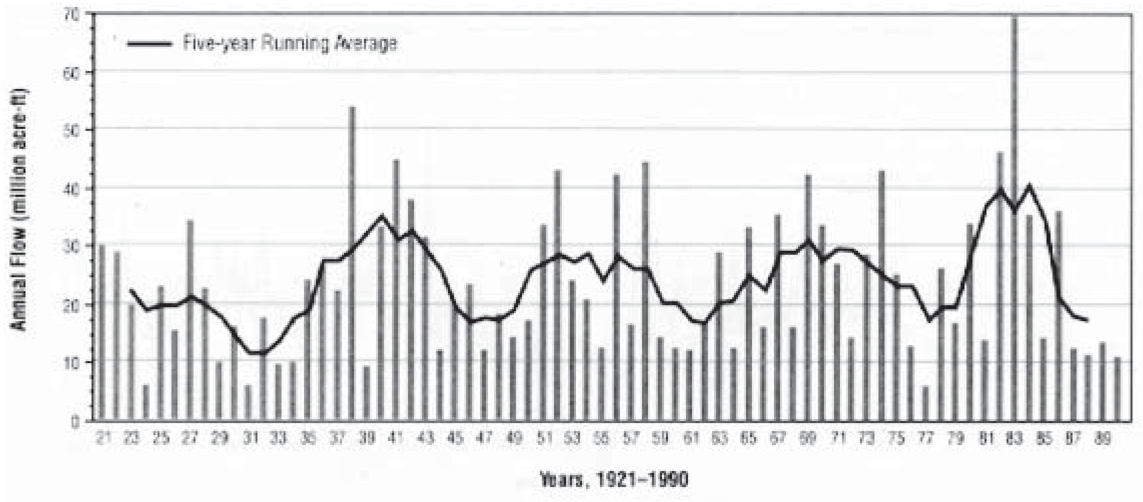
Average annual precipitation is 36 inches; average annual runoff is approximately 22.4 MAF. Unimpaired flow from the four major rivers in the Sacramento River Hydrologic Region (Sacramento, Feather, Yuba, and American Rivers) averaged 17.9 million acre feet (MAF) and ranged from 5.1 to 37.7 MAF during the 1906–1996 period. Of this, the Sacramento River (at Red Bluff) averaged 8.4 MAF (including Trinity River imports, described below), the Feather River averaged 4.5 MAF, the Yuba River averaged 2.4 MAF, and the American River averaged 2.6 MAF (CALFED, 2000). Figure 4-2 shows annual Delta inflow for 1921–1990.

The Sacramento River enters the Delta at Freeport, where its average annual flow is 16 MAF. The maximum mean monthly discharge at Freeport for the period of record (water year 1922 through water year 1994) was 71,340 cfs; the minimum mean monthly discharge was 4,494 cfs (CALFED, 2000). Most flood flows that come from the upper Sacramento River, Feather River, and Sutter Bypass are diverted west of Freeport and the Sacramento area into the Yolo Bypass through the Fremont Weir at Verona.

The flows from the San Joaquin River into the Delta are considerably lower than those from the Sacramento River. Most of the inflow to the San Joaquin River region originates from the upper watershed tributary streams between the Mokelumne River and the San Joaquin River, on the west slope of the Sierra Nevada. Inflows from the Merced, Tuolumne, and Stanislaus Rivers historically contribute over 60 percent of the flows in the San Joaquin River, as measured at Vernalis. Average annual average unimpaired runoff from the San Joaquin, Stanislaus, Tuolumne, and Merced Rivers is about 5.5 MAF. Numerous dams and diversions have been constructed on these rivers and other rivers in this system. Of the 5.5 MAF of unimpaired runoff, about 3.5 MAF is diverted from the major rivers of the San Joaquin system. An average of about 3.0 MAF annually reaches Vernalis and contributes to Delta inflows (CALFED, 2000).

The San Joaquin River enters the Delta above Vernalis. Vernalis lies just inside the boundary of the Delta, and is widely used as a monitoring point for Delta inflows and standards. The USGS has operated a gaging station on the San Joaquin River near Vernalis since 1922. The maximum instantaneous flow recorded at the station was 79,000 cfs on December 9, 1950. The minimum instantaneous flow was 19 cfs, recorded on August 10, 1961. The maximum mean monthly discharge was 40,040 cfs in March 1983, and the minimum mean monthly discharge was 93 cfs in July 1977 (CALFED, 2000).

On average, about 21 MAF of water reaches the Delta annually, but actual inflow varies widely from year to year and within a year. In 1977, a year of extraordinary drought, Delta inflow totaled only 5.9 MAF, while inflow for 1983, an exceptionally wet year, was about 70 MAF. Dry and critical year Delta inflow averages about 12 MAF annually under existing conditions. On a seasonal basis, average natural flow to the Delta varies by a factor of more than 10 between the highest month in winter or spring and the lowest month in fall (SWRCB, 1999).



SOURCE: Association of Bay Area Governments, 2004; and Environmental Science Associates, 2005

Figure 4-2
Annual Delta Inflow – 1921-1990

Delta Hydraulics

Hydraulics of the Delta is complicated by tidal influences, a multitude of agricultural, industrial, and municipal diversions for use within the Delta itself, and by SWP and CVP exports. The principal factors affecting Delta hydrodynamic conditions are: (1) river inflow and outflow from the Sacramento River and San Joaquin systems, (2) daily tidal inflow and outflow through the San Francisco Bay, and (3) export pumping from the south Delta primarily through the Banks and Tracy Pumping Plants. The Tracy, Banks, and Contra Costa Water District (CCWD) pumping plants' pump an average of approximately 3.3, 3.8, and 0.1 MAF annually, respectively. Because tidal inflows are approximately equivalent to tidal outflows during each daily tidal cycle, tributary inflows and export pumping are the principal variables that define the range of hydrodynamic conditions in the Delta. Excess outflow occurs almost entirely during the winter and spring months. Average winter outflow is about 32,000 cfs, while the average summer outflow is 6,000 cfs (CALFED, 2000).

Each region in the Delta is dominated by different hydraulic variables during any given period of time. In the west Delta, for example, tidal influences are strong and reverse flows occur frequently. The north Delta is more dominated by Sacramento River and Mokelumne River inflows. The south Delta is more affected by both San Joaquin River inflows and export pumping. All of these influences intersect in the central Delta.

The mouth of the Old River, located upstream of the mouth of the Mokelumne River, is the major conduit for water flowing from the Sacramento River, through Georgiana Slough and the Delta Cross Channel, via the Mokelumne River, to the south Delta (Figure 4-1). Additional water for the CVP–SWP export pumps moves through the mouth of the Middle River, Columbia Cut, Turner Cut, False River, Fisherman's Cut, and Dutch Slough. Net flows at the mouth of the Old River and Middle River are dependent on CVP–SWP exports and south Delta irrigation diversions (approximately 40 percent of total net Delta diversions).

Twice-daily tides move water from San Francisco Bay into the Delta. The average incoming and outgoing Delta tidal flow is about 170,000 cfs at Chipps Island (the interface between the Delta and Suisun Bay) (Figure 4-1). By comparison, the current allowable SWP and CVP combined export capacity is about 11,000 cfs. Historically, during extremely low runoff periods in summer, salt from tidal flows intruded into the Delta as far as Hood. During winter and spring, freshwater from heavy rains pushed the salt water back, well into the Bay, and sometimes beyond. Saltwater intrusion into the Delta during summer is controlled by tides, freshwater inflows from reservoir releases, and Delta pumping. With the addition of Shasta, Folsom, and Oroville dams, saltwater intrusion into the Delta during summer months has been controlled by reservoir releases during what were the traditionally dry months under natural conditions (no dams). Flows from the Eastside streams and San Joaquin River also contribute to controlling saltwater intrusion. Typically, peaks in winter and spring flows have been dampened, and summer and fall flows have been increased. In very wet years, reservoirs are unable to control runoff, and salinity in the Bay is nearly reduced to freshwater levels (SWRCB, 1999; CALFED, 2000).

Tidal action has a great influence on the flow of water in Delta channels. Over the tidal cycle, flows move downstream toward the Bay during ebb tides and move upstream during flood tides. QWEST is an index of the net flow (magnitude and direction) from the west Delta and lower San Joaquin River. Over the long-term period under existing conditions, the greatest average monthly positive QWEST flow typically occurs in February and is about 7,300 cfs. The greatest average monthly negative (reverse) QWEST flow typically occurs in October and is about -3,600 cfs. Reverse flow is due to a combination of tidal effects, reduced reservoir releases, and Delta exports. During dry and critical years under existing conditions, the greatest average monthly positive QWEST flow typically occurs in April and is about 1,300 cfs. The greatest average monthly reverse flow typically occurs in December and is about -5,000 cfs (CALFED, 2000).

Water levels, or stage, vary greatly during each tidal cycle, from less than one foot on the San Joaquin River near I-5 to more than five feet near Pittsburg. In the south Delta, lowering water levels associated with CVP and SWP pumping are of concern for local agricultural diverters. Over the long-term period under existing conditions, the highest minimum stage in Middle River typically occurs in February and is about 0.1 foot below msl. The lowest minimum stage typically occurs in August and is about 0.8 foot below msl. During dry and critical years under existing conditions, the highest minimum stage in Middle River typically occurs in April and is about 0.6 foot below msl. The lowest minimum stage typically occurs in September and is about 0.7 foot below msl (CALFED, 2000).

WATER SUPPLY AND MANAGEMENT

Several important water management facilities are located in the Delta. These include the CVP Pumping Plant at Tracy, the Delta Cross Channel (DCC) at Walnut Grove, the SWP Clifton Court Forebay (CCFB) and Harvey O. Banks Delta Pumping Plant (Banks Pumping Plant), the SWP North Bay Aqueduct (NBA) Pumping Plant, and the CCWD's pumping plants at Rock Slough, Mallard Slough, and Old River.

The CVP Tracy Pumping Plant has a maximum capacity of approximately 4,600 cfs, the nominal capacity of the Delta-Mendota Canal (DMC) at the pumping plant. The SWP Banks Pumping Plant supplies water for the South Bay Aqueduct (SBA) and the California Aqueduct, with an installed capacity of 10,300 cfs. Under current operational constraints, exports from Banks Pumping Plant are generally limited to a maximum of 6,680 cfs, except between December 15 and March 15, when exports can be increased by 33 percent of San Joaquin River flow (if greater than 1,000 cfs). The SWP also pumps water from Barker Slough into the North Bay Aqueduct for use in the Bay Region. While the maximum pumping capacity at Barker Slough is 175 cfs, the average annual pumping rate is approximately 35 cfs (CALFED, 2000).

CCWD supplies CVP water to the CCWD's water users via a pumping plant at the end of Rock Slough. CCWD also constructed and operates Los Vaqueros Reservoir, which has an intake and pumping plant on Old River for diverting surplus Delta flows to reservoir storage or contract water to CCWD users. Los Vaqueros is refilled by diversions only when source water chloride concentration is relatively low. Los Vaqueros water is used for water quality blending and delivery during low Delta outflow periods, when chloride concentration at Rock Slough and Old River is greater than 65 mg/L.

Delta inflow from the tributary basins is allocated to supply in-Delta diversions for agricultural and municipal water use, provide minimum Delta outflow required to satisfy 1995 Water Quality Control Plan (WQCP) for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (SWRCB, 1995) and Central Valley Project Improvement Act (CVPIA) objectives, and allow Delta exports within the 1995 Bay-Delta WQCP export/inflow ratio and the permitted pumping capacity. Inflow that exceeds these uses contributes to total Delta outflow. Some Delta exports are used for direct deliveries to satisfy water supply demands and some of the exports are stored in San Luis Reservoir (or other local water storage facilities) for later delivery.

To facilitate movement of Sacramento River water to pumping facilities in the south Delta, the Delta Cross Channel diverts water, by gravity, from the Sacramento River to Snodgrass Slough into the North and South Forks of the Mokelumne River. Sacramento River water moves down these channels through the central Delta and into the San Joaquin River. Flows in the channel reverse as the tide changes and, at certain stages; there is considerable flow from the channel into the Sacramento River. Two 60-foot radial gates control the flow. The channel is closed for flood control when Sacramento River flows exceed about 25,000 cfs. As outlined in the 1995 WQCP, the gates are also closed from February 1 through May 20 and periodically at other times during the year to protect fish. Downstream from the DCC, Georgiana Slough also connects the Sacramento River to the Mokelumne River system, allowing Sacramento River water to enter the central Delta.

Flow that enters the Delta via the Sacramento River flows by various routes to the export pumps in the southern Delta (Figure 4-1). Some of this flow is drawn to the SWP and CVP pumps through interior Delta channels, facilitated by the CVP's Delta Cross Channel. Water that does not travel into the central Delta continues towards the San Francisco Bay. Under certain conditions, additional Sacramento River waters flow into the central and south Delta. The Sacramento River waters flow through Threemile Slough, around the western end of Sherman Island and up the San Joaquin River towards the export pumps. When freshwater outflow is relatively low, water with a higher salt concentration enters the Central and south Delta as tidal inflow from the San Francisco Bay. When SWP and CVP exports cause flow from the Sacramento River to move toward the pumps, then "reverse flow" occurs in the lower San Joaquin River. Prolonged reverse flow has the potential to adversely affect water quality in the Delta and at the export pumps by increasing salinity (SWRCB, 1997; ENTRIX, 1996; CALFED, 2000).

Delta farmers divert water directly from Delta channels for irrigation and leaching. There are about 1,800 agricultural diversions in the Delta, ranging in diameter from 4 to 30 inches (Fox et al., l991; CDFG unpublished data). The volume of water diverted each year for in-Delta farming uses is significant, but has not changed much over the years (DWR, 1987). Taking into account agricultural return flows, Delta farms deplete Delta outflow by an average of about 960,000 AF/year. During the summer, when irrigation of Delta farmland is at a peak, the combined diversions for Delta farms may exceed 4,000 cfs (DWR, 1990). This is about the same rate at which the CVP removes water from the Delta in the summer.

WATER QUALITY

Water quality in the Delta is continually changing in response to natural hydrologic conditions, operation of upstream reservoirs, agricultural and water supply diversions, and discharges into the Delta system. Seasonal trends reflect the effects of higher spring/summer runoff and fall/winter low-flow periods.

Trends in water quality in the Delta reflect the effects of inflows, tidal exchanges with the San Francisco Bay, diversions, and pollutant releases in the Delta. The north Delta tends to have better water quality in large part because of the inflow from the Sacramento River. The quality of water in the west Delta is strongly influenced by tidal exchange with the San Francisco Bay; during low-flow periods, seawater intrusion results in increased salinity. In the south Delta, water quality tends to be poorer because of the combination of inflows of poorer water quality from the San Joaquin River, discharges (agricultural return flows) from Delta islands, and effects of diversions that can sometimes increase seawater intrusion from the Bay.

The DWR, Reclamation, USGS, the California Data Exchange Center (CDEC), various water and reclamation districts, and various cities monitor water quality in the Delta. Stockton MUD et al. (2003) discusses water quality data collected historically near the proposed intake site by these agencies. In general, water quality improves from upstream to downstream in the San Joaquin River (northwesterly direction). This improvement is due primarily to dilution from higher flows and the quality of the Sacramento River inflow that is drawn southwards to the SWP and CVP pumping plants.

Delta water quality is influenced by the following:

- Discharges from Delta islands that have elevated concentrations of total organic carbon (TOC) and salts.
- High-salinity water from Suisun and San Francisco Bays that intrudes into the Delta during periods of low Delta outflow.
- Bromides associated with seawater that lead to the formation of brominated compounds in treated water supplies.
- Agricultural drainage into the Delta that can contain elevated levels of nutrients, suspended solids, organic carbon, salinity, selenium, and boron in addition to pesticides.
- Heavy metals, including cadmium, copper, mercury, and zinc, continue to enter the Delta. Sources of these metals include runoff from abandoned mine sites, tailings deposits, downstream sediments where metals have been deposited over the past 150 years, urban runoff, and industrial and municipal wastewater.

Table 4-1 identifies current mean water quality concentrations of selected constituents at various locations in the Delta. As shown, water quality of the north Delta is generally higher than in the south Delta.

TABLE 4-1
WATER QUALITY FOR SELECTED STATIONS IN THE DELTA

Location	Mean TDS (mg/L)	Mean EC (µS/ cm)	Mean Chloride (mg/L)	Mean Bromide (mg/L)	Mean DOC (mg/L)
Sacramento River at Greene's Landing	100	160	6.8	0.018	2.5
North Bay Aqueduct at Barker Slough	192	332	26	0.015	5.3
Clifton Court Forebay	286	476	77	0.269	4.0
Tracy Pumping Plant	258	482	81	0.269	3.7
CCWD Intake at Rock Slough	305	553	109	0.455	3.4
San Joaquin River at Vernalis	459	749	102	0.313	3.9

Source: CALFED, 2000; ESA, 2004
TDS = total dissolved solids
EC = electrical conductivity
DOC = dissolved organic carbon
mg/L = milligrams per liter
µS/cm = microSiemens per centimeter
Sampling period varies, depending on location and constituent, but generally is between 1990 and 1998.

Salinity

Excess salinity in Delta waters may affect agricultural, industrial, and municipal water supply beneficial uses, as well as habitat quality for aquatic biota in the Delta. Sources of salinity include seawater intrusion, agricultural drainage, municipal wastewater, urban runoff, connate groundwater, and evapotranspiration of plants. Sea-water intrusion is the major source of salinity in the Delta (CALFED, 2000).

Total dissolved solids (TDS) and electrical conductivity (EC) are measures of dissolved salts in water. Because the EC of water generally changes proportionately to changes in dissolved salt concentrations, EC is often measured rather than salinity. In fresher waters, TDS is measured instead of salinity. Based on DWR's Municipal Water Quality Investigations (MWQI) data for Delta channels, TDS is approximately equal to EC times 0.58 (CALFED, 2000).

Salinity control in the Delta is necessary since the Delta is influenced by the ocean, and Delta water channels are at or below sea level. Unless repelled by continuous seaward flow of freshwater, sea water will advance up the estuary and into the Delta and degrade water quality.

Salinity varies geographically and seasonally within the Delta, and varies depending upon water year type (SWRCB, 1997).

CVP and SWP exports and pumping patterns have the potential to influence the direction of flow at various locations throughout the Delta, and thereby have the potential to affect the salinity at export locations. Operation of the Banks and Tracy Pumping Plants draws high quality Sacramento River water across the Delta and restricts the low quality area to the southeast corner (SWRCB, 1997). Each portion of the Delta is dominated by different hydraulic variables, and therefore, salinity varies within different sections of the Delta.

The Sacramento and San Joaquin Rivers contribute approximately 61 percent and 33 percent, respectively, to tributary inflow TDS concentrations within the Delta. TDS concentrations are relatively low in the Sacramento River, but because of its large volumetric contribution, the river contributes the majority of the TDS load supplied by tributary inflow to the Delta (DWR, 2001). Although actual flow from the San Joaquin River is lower than the Sacramento River, the TDS concentrations in San Joaquin River water averages approximately seven times that of the Sacramento River.

In addition to varying geographically within the Delta, salinity varies seasonally, depending on the quantity and quality of freshwater inflows. During winter and early-spring, flows through the Delta are usually above the minimum required to control salinity. However, for a few months in the summer and fall of most years, salinity must be carefully monitored and controlled (SWRCB, 1997). During the summer, salinity in the Delta may increase due to decreased inflows or increased salt loading resulting from agricultural runoff. Additionally, decreased inflow during the late summer increases the possibility that reverse flow could cause increased salt water intrusion within the Delta. Salinity control and monitoring is provided by the CVP and SWP, and regulated by the SWRCB under its water rights authority. Salinity is carefully monitored because water exported from the Delta for delivery to CVP and SWP contractors is used for a variety of municipal, industrial, and agricultural uses (SWRCB 1997; CALFED, 2003).

Table 4-1 shows that mean TDS concentrations are highest in the west Delta and the south Delta channels that are affected by the San Joaquin River (CALFED, 2000). Salinity problems in the western Delta result primarily from the intrusion of saline water from the San Francisco Bay system. The extent of seawater intrusion into the Delta is a function of daily tidal fluctuations, freshwater inflow from the Sacramento and San Joaquin Rivers, the rate of export at the SWP/CVP intake pumps, and the operation of various control structures (e.g., Delta Cross-Channel Gates and Suisun Marsh Salinity Control System) (DWR, 2001). In the southern Delta, salinity is largely associated with the high salt concentrations carried by the San Joaquin River into the Delta (SWRCB, 1997). The high mean TDS concentration in the San Joaquin River at Vernalis reflects the accumulation of salts in agricultural soils and the effects of recirculation of these salts via the Delta Mendota Canal (CALFED, 2000). Locations in the north Delta at Barker Slough, which is not substantially affected by seawater intrusion, and in the Sacramento River at Greene's Landing have lower mean concentrations of TDS. A similar pattern is also seen using mean EC levels as a surrogate for TDS concentrations (Reclamation and DWR, 2003).

Seasonal changes in chloride concentrations occur in the Delta. The lowest mean concentrations of chloride typically occur in early spring and early summer (March through July) (CALFED, 2000). Salinity patterns in the Delta also vary with water year type (DWR, 2001). Salinity is higher in dry years than in wet years.

Bromide

The primary source of bromide in the Delta is saltwater intrusion. Other sources include drainage returns in the San Joaquin River and the Delta, connate water (saline water trapped in sediment when the sediment was deposited) beneath some Delta islands, and possibly agricultural applications of methyl bromide. River and agricultural irrigation sources are primarily a recycling of bromide that originated from seawater intrusion. As shown in Table 4-1, TDS, EC, bromide, and chloride data indicate that seawater intrusion is highest in the western and southern portions of the Delta, where the direct effects of recirculated bromide from the San Joaquin River exist (DWR, 2001).

Overall, bromide patterns in the Delta are similar to salinity patterns in the Delta (DWR, 2001). Like salinity, bromide concentrations are highest in the west and south Delta channels affected by the San Joaquin River (DWR, 2001). Like salinity, bromide concentrations are higher in dry years than in wet years and bromide concentrations are higher during low Delta outflows as compared to medium or high flows (DWR, 2001).

Bromide is important from a drinking water perspective because during chlorination for disinfection of drinking water, bromide reacts with natural organic compounds in the water to form disinfectant byproducts (DBPs) such as trihalomethanes (THMs). Four species of THMs are regulated in drinking water including chloroform, bromodichloromethane, dibromochloromethane, and bromoform.

Organic Carbon

Naturally occurring organic carbon compounds are present in surface waters as a result of degradation of plant and animal tissues. Two forms of organic carbon occur in surface waters: (1) dissolved organic carbon (DOC), which is a measure of the dissolved organic carbon in the water; and (2) total organic carbon (TOC), which is a measure of all the organic carbon in the water, including organic carbon from particulate matter such as plant residues and DOC. Organic carbon is important because of its role in the formation of DBPs, specifically THMs.

The Sacramento and San Joaquin Rivers, and in-Delta island drainage return flows are important sources of DOC and TOC to the Delta (CALFED, 2000). Of the DOC loading contributed by tributary inflow, the Sacramento River is the major contributor to the Delta carbon load, contributing an estimated 71 percent of the total carbon load attributed to tributary inflow in the Delta (DWR, 2001). The Sacramento River is a major contributor because although its carbon concentrations are relatively low, approximately three-quarters of the inflow to the Delta come from the Sacramento River (DWR, 2001b). The San Joaquin River contributes approximately 20 percent of the total carbon load attributed to tributary inflow in the Delta (DWR, 2001b).

Drainage from Delta islands, particularly islands with highly organic peat soils, contributes significantly to the DOC load in the Delta (DWR, 2001b). Studies conducted by DWR (2001) suggest that during the winter, 38 to 52 percent of the DBP-forming carbon in the Delta is contributed by Delta island drainage, while in the summer during irrigation, island drainage contributes to 40 to 45 percent of the DBP-forming carbon. In general, monitoring data suggest that most of the TOC in the Delta is in the form of DOC (CALFED, 2000).

Similar to salinity and bromide, organic carbon concentrations in the Delta vary both geographically and seasonally. Like salinity and bromide, organic carbon concentrations are higher in west and south Delta locations (the San Joaquin River near Vernalis and Banks Pumping Plant) than in the Sacramento River at Greene's Landing (Table 4-1). However, unlike salinity and bromide, organic carbon concentrations are typically lowest in the summer and higher during the rainy winter months.

REGULATORY SETTING

Federal

Clean Water Act

The Clean Water Act established the basic structure for regulating discharges of pollutants into the waters of the U.S. and gave the USEPA the authority to implement pollution control programs such as setting wastewater standards for industry. The Clean Water Act sets water quality standards for all contaminants in surface waters. The statute employs a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff.

Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged and fill material into waters of the U.S., including wetlands. Activities in waters of the U.S. that are regulated under this program include fills for development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry. Under Section 404, any person or public agency proposing to locate a structure, excavate, or discharge dredged or fill material into waters of the U.S. or to transport dredged material for the purpose of dumping it into ocean waters must obtain a permit from the Corps. The Corps has jurisdiction over all waters of the U.S. including, but are not limited to, perennial and intermittent streams, lakes, ponds, as well as wetlands in marshes, wet meadows, and side hill seeps. The City will be required to apply for a Section 404 permit for the DWSP.

Under Section 401 of the Clean Water Act every applicant for a federal permit or license for any activity which may result in a discharge to a water body must obtain State Water Quality Certification that the proposed activity will comply with state water quality standards. The City will need a Section 401 water quality certification, issued by the CVRWQCB, for project work permitted under the Section 404 process.

In July 2003, the USEPA Region 9 issued the final 2002 Clean Water Act Section 303(d) list of water quality limited ("impaired") segments of CVRWQCB waterbodies (USEPA, 2003). The Delta is currently listed as impaired for unknown toxicity and other constituents under Section 303(d) of the Clean Water Act (Table 4-2).

TABLE 4-2
CONSTITUENTS OF CONCERN FOR 303(D) LISTED DELTA WATERBODIES

Name	Constituent	Potential Source	Estimated Area Affected	Proposed TMDL Completion
Delta Waterways (eastern portion)	Chloropyrifos	Agriculture Urban Runoff/Storm Sewers	20,135 acres	2004
	DDT	Agriculture	20,135 acres	2011
	Diazinon	Agriculture Urban Runoff/Storm Sewers	20,135 acres	2004
	Group A Pesticides	Agriculture	20,135 acres	2011
	Mercury	Resource Extraction (abandoned mines)	20,135 acres	2004
	Unknown Toxicity	Source Unknown	20,135 acres	2011
Delta Waterways (Stockton Ship Channel)	Chloropyrifos	Agriculture Urban Runoff/Storm Sewers	952 acres	2004
	DDT	Agriculture	952 acres	2011
	Diazinon	Agriculture Urban Runoff/Storm Sewers	952 acres	2004
	Group A Pesticides	Agriculture	952 acres	2011
	Mercury	Resource Extraction (abandoned mines)	952 acres	2004
	Organic Enrichment/ Low Dissolved Oxygen	Municipal Point Sources/ Urban Runoff/Storm Sewers	952 acres	2004
	Unknown Toxicity	Source Unknown	952 acres	2011
Delta Waterways (western portion)	Chloropyrifos	Agriculture Urban Runoff/Storm Sewers	22,904 acres	2004
	DDT	Agriculture	22,904 acres	2011
	Diazinon	Agriculture Urban Runoff/Storm Sewers	22,904 acres	2004
	Electrical Conductivity	Agriculture	22,904 acres	2011
	Group A Pesticides	Agriculture	22,904 acres	2011
	Mercury	Resource Extraction (abandoned mines)	22,904 acres	2004
	Unknown Toxicity	Source Unknown	22,904 acres	2011

Group A Pesticides: aldrin, dieldrin, endrin, chlordane, heptachlor expoxid, hexachlorocyclohexane, endosulfan, and toxaphene
Sources: SWRCB, 2003

Rivers and Harbors Act

The Corps is authorized to regulate the construction of any structure or work within navigable waters under sections 9 and 10 of the Rivers and Harbors Act (RHA). The RHA authorizes the Corps to regulate the construction of such diverse activities as wharves, breakwaters, or jetties; bank protection or stabilization projects; permanent mooring structures, vessels, or marinas; intake or outfall pipes; canals; boat ramps; aids to navigation; or other modifications affecting the course, location condition, or capacity of navigable waters. The Corps' jurisdiction under RHA is limited to "navigable waters," or waters subject to the ebb and flow of the tide shoreward to the mean high water mark that may be used to transport interstate or foreign commerce. The Corps must consider the following criteria when evaluating projects within navigable waters: (1) the public and private need for the activity; (2) reasonable alternative locations and methods; and (3) the beneficial and detrimental effects on the public and private uses to which the area is suited. The City will be required to apply for a Section 10 permit for the DWSP.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the U.S. This act focuses on all waters actually or potentially designated for drinking use, whether from above ground or underground sources. The SDWA authorized the USEPA to establish safe standards of purity and required all owners or operators of public water systems to comply with primary (health-related) standards. State governments, which assume this power from the USEPA, also encourage attainment of secondary standards (nuisance-related). Contaminants of concern in a domestic water supply are those that either pose a health threat or in some way alter the aesthetic acceptability of the water. These types of contaminants are currently regulated by the USEPA as primary and secondary maximum contaminant levels (MCLs) (Reclamation and DWR, 2003). Primary and secondary MCLs are established for numerous constituents of concern including turbidity, TDS, chloride, fluoride, nitrate, priority pollutant metals and organic compounds, selenium, bromate, trihalomethane precursors, radioactive compounds, and gross radioactivity. The DWSP WTP will be required to comply with the drinking water standards set by the USEPA.

Surface Water Treatment Rule

The Federal Surface Water Treatment Rule (SWTR) is implemented by the California SWTR. The California SWTR satisfies three specific requirements of the SDWA: (1) it establishes criteria for determining when filtration is required for surface waters, (2) it defines minimum levels `of disinfection for surface waters, and (3) it addresses *Giardia lamblia*, viruses, *Legionella*, turbidity, and heterotrophic plate count by setting a treatment technique. A treatment technique is set in lieu of an MCL for a contaminant when it is not technologically or economically feasible to measure that contaminant. Treatment required includes the use of a filtration system, unless very stringent source water quality and site-specific conditions are met (Reclamation and DWR, 2003). The DWSP WTP will be required to comply with the requirements under the California SWTR.

Stage 1 Disinfectants and Disinfection Byproducts Rule and Long-Term 1 Enhanced Surface Water Treatment Rule

The Stage 1 Disinfectants and Disinfection Byproducts Rule (D/DBPR) serves to regulate municipal drinking water treatment requirements based on constituent concentrations in source water. It establishes maximum residual disinfectant level goals (MRDLGs) and maximum residual disinfectant levels (MRDLs) for chlorine, chloramines, and chlorine dioxide. It also establishes maximum contaminant level goals (MCLGs) and MCLs for total trihalomethanes, haloacetic acids, chlorite, and bromate (Reclamation and DWR, 2003).

Water systems that use surface water (or groundwater under the direct influence of surface water) and use conventional filtration treatment are required to remove specified percentages of organic materials, measured as TOC that may react with disinfectants to form DBPs. Removal is to be achieved through a treatment technique (enhanced coagulation or enhanced softening), unless the system meets alternative criteria. The DWSP WTP will be required to comply with the requirements of the D/DBPR and the Long-Term 1 Enhanced Surface Water Treatment Rule.

State

Porter-Cologne Act

The Porter-Cologne Act defines water quality objectives as the limits or levels of water constituents that are established for reasonable protection of beneficial uses. The Porter-Cologne Act requires the RWQCB to establish water quality objectives, while acknowledging that water quality may be changed to some degree without unreasonably affecting beneficial uses. Beneficial uses, together with the corresponding water quality objectives, are defined as standards, per Federal regulations. Therefore, the regional plans form the regulatory references for meeting State and Federal requirements for water quality control. Changes in water quality are only allowed if the change is consistent with the maximum beneficial use of the State, does not unreasonably affect the present or anticipated beneficial uses, and does not result in water quality less than that prescribed in the water quality control plans (CVRWQCB, 1998).

Central Valley Regional Water Quality Control Plan

The preparation and adoption of water quality control plans (Basin Plans) is required by the California Water Code (Section 13240) and supported by the Federal Clean Water Act. Section 303 of the Clean Water Act requires states to adopt water quality standards which “consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses.” According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives. Because beneficial uses, together with their corresponding water quality objectives, can be defined per Federal regulations as water quality standards, the Basin Plans are regulatory references for meeting the State and Federal requirements for water quality control. One significant difference between the State and Federal programs is that California’s basin plans establish standards for groundwater in addition to surface water.

Adoption or revision of surface water standards is subject to the approval of the USEPA (Reclamation and DWR, 2003).

The Central Valley WQCP covers an area including the entire Sacramento and San Joaquin river basins, involving an area bound by the crests of the Sierra Nevada on the east and the Coast Range and Klamath Mountains on the west. The area covered in this WQCP extends some 400 miles, from the California – Oregon border southward to the headwaters of the San Joaquin River. The DWSP will be required to meet the water quality objectives in the 1998 WQCP (Basin Plan) for the Sacramento River and San Joaquin River Basins (CVRWQCB, 1998), which was designed to protect the beneficial uses of the Sacramento and San Joaquin Rivers and their tributaries.

Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary

The San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Estuary or Estuary) Plan provides for the protection of the Estuary's beneficial uses that involves salinity (from saltwater intrusion and agricultural drainage) and water project operations (flows and diversions), as well as a dissolved oxygen objective. This plan supplements other water quality control plans adopted by the SWRCB and RWQCBs, and State policies for water quality control adopted by the SWRCB, relevant to the Bay-Delta Estuary watershed. These other plans and policies establish water quality standards and requirements for parameters such as toxic chemicals, bacterial contamination, and other factors which have the potential to impair beneficial uses or cause nuisance (Reclamation and DWR, 2003). The DWSP will be required, under its SWRCB water rights permit, to meet the water quality objectives in the 1995 Bay-Delta WQCP (SWRCB, 1995), which was designed to protect the beneficial uses of Delta water.

The SWRCB recently completed a multi-day workshop to receive information and conduct detailed discussion regarding specific plan amendments or revisions to the 1995 Bay-Delta WQCP. A draft plan is anticipated in the fall of 2005.

State Water Resources Control Board Decision 1641 (D-1641)

The WQCP for the Bay-Delta Estuary contains the current water quality objectives. D-1641 and Order WR 2001-05 contain the current water right requirements to implement the Bay-Delta flow dependent objectives. D-1641 includes both long-term and temporary requirements. Order WR 2001-05 requires partial implementation that will remain in effect up to 35 years. In D-1641 and in Order WR 2001-05, the SWRCB assigned responsibilities, for specified periods, to water users (including Reclamation and DWR in D-1641, and DWR in Order WR 2001-05) in the watersheds of the San Joaquin River upstream of Vernalis, the Mokelumne River, Putah Creek, Cache Creek, within the boundaries of the North Delta Water Agency, and within the Bear River watershed. These responsibilities require that the water users in these watersheds will contribute specified amounts of water to protect water quality, and that DWR and/or Reclamation will ensure that the objectives are met in the Delta (SWRCB, 1997).

Streambed Alteration Agreement

Under Section 1601 of the Fish and Game Code, notification to the CDFG is required by any person, business, state or local government agency, or public utility that proposes an activity that will divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake, use materials from a streambed, or result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake. The Streambed Alteration Agreement identifies potential impacts of the proposed project construction and mitigation measures required to minimize and avoid impacts. Construction of the proposed DWSP intake facility on the lower San Joaquin River will require a Streambed Alteration Agreement.

State Reclamation Board Encroachment Permit

Any project encroaching into rivers, waterways, and floodways within and adjacent to federal and State authorized flood control projects and within designated floodways must obtain an encroachment permit from the Reclamation Board. Under Water Code Sections 8534, 8608, and 8710 – 8723, the Reclamation Board is required to enforce, within its jurisdiction, on behalf of the State of California, appropriate standards for the construction, maintenance, and protection of adopted flood control plans that will best protect the public from floods. The area of the Reclamation Board's jurisdiction includes the entire Central Valley, including all tributaries and distributaries of the Sacramento and San Joaquin Rivers and Tulare and Buena Vista basins. The Reclamation Board exercises jurisdiction over the levee section, the waterward area between project levees, a 10-foot-wide strip adjacent to the landward levee toe, within 30 feet of the top to the banks of unleveed project channels, and within designated floodways adopted by the Board.

California State Lands Commission Permit Regulations

Any project that includes dredging of lands under the jurisdiction of the California State Lands Commission (CSLC) must obtain a dredging lease. The CSLC has the authority detailed in Division 6 of the California Public Resources Code governing public lands. Article 2, Leasing or Other Use of Public Lands applies to the leasing of all lands under CSLC's jurisdiction for all surface uses except the exploration for or extraction of natural resources including minerals, oil, gas or other hydrocarbons, or geothermal resources or any other natural resources, excluding timber.

Section 6327 of the Public Resources Code states that if an applicant obtains a permit from the local reclamation district, State Reclamation Board, Corps, or DWR, then a lease application will not be required from the CLSC. The CLSC sent the City a letter on December 1, 2004, stating that the DWSP will not need a lease from the CSLC, provided the City obtains one of the mentioned permits. Therefore, because the City will obtain a permit from the Corps, the DWSP will not require a lease.

Local

San Joaquin County General Plan

The following objectives and policies in the San Joaquin County General Plan address surface water resources that apply to the proposed DWSP (San Joaquin, 1992).

Objective 1: To ensure adequate quantity and quality of water resources for municipal and industrial uses, agriculture, recreation, and fish and wildlife.

Objective 2. To obtain sufficient supplemental water supplies to meet all municipal and agricultural needs.

Objective 4. To prevent and eliminate contamination of surface water and groundwater supplies.

Objective 5. To recognize the surface waters of San Joaquin County as resources of State and national significance for which environmental and scenic values must be protected.

Policies:

Water Quality

1. Water quality shall meet the standards necessary for the uses to which the water resources are put.

2. Surface and groundwater quality shall be protected and improved where necessary.

3. The use and disposal of toxic chemicals, the extraction of resources, and the disposal of wastes into injection wells shall be carefully controlled and monitored to protect water quality.

Water Resource Management

1. The County shall support coordinated efforts to obtain adequate water supplies, conjunctive use of ground and surface waters, and provisions for water storage facilities to meet expected water demand.

2. The County shall support a multi-jurisdictional aquifer evaluation that involves all adjacent counties in an analysis of groundwater supplies, demand, and use. If the results of the evaluation indicate that overdrafting is occurring, a coordinated effort should be undertaken to provide an alternate water source.

3. The County shall encourage water conservation.

4. The County shall encourage wastewater reclamation efforts.

5. The County shall support properly timed, sufficient flows in the rivers to maintain spawning grounds, fish migration, and resident fish populations.

12. Water diversion projects shall protect the fishery, wildlife habitat, and recreation; shall ensure adequate water for County agricultural, municipal and industrial uses; and shall guarantee adequate Delta outflows for salinity repulsion.

City of Stockton General Plan

The following goals and policies in the City of Stockton General Plan address surface water resources that apply to the proposed DWSP (City of Stockton, 1990).

Water Facilities
Goal 1: Conserve groundwater and surface water resources in order to ensure sufficient supplies of good quality water.

Policies:

1. Pursue as the City's first priority for water resources the development and acquisition of supplemental surface water sources in order to reduce the overdraft of groundwater supplies, including participation in financing conveyance facilities.

2. Land use activities that use or store hazardous materials shall be regulated and monitored in order to prevent the contamination of groundwater or surface water resources.

5. Continue to take actions necessary to meet water quality discharge standards in the operation of the regional wastewater treatment plant.

6. Develop facilities for wastewater reclamation and reuse.

7. Encourage and support water conservation measures by all City water users.

9. Establish a regular water quality monitoring program and interruption contingency plan for municipal wells.

12. The City will comply with the requirements of the Clean Water Act with the intent of minimizing the discharge of pollutants into surface waters.

4.1.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions within the area affected by the project. A hydrology/ water quality impact would be considered significant if it would result in any of the following:

- cause substantial changes in Sacramento River, San Joaquin River, or Delta flows,
- cause substantial changes in amount of water available to other users,
- cause beneficial uses of water to be substantially adversely affected, or
- violate existing water quality standards or otherwise substantially degrade water quality.

APPROACH TO IMPACT ANALYSIS

Detailed modeling using computer models developed by Reclamation and DWR was conducted for this EIR to evaluate the potential effects of DWSP operations on Delta water resources.

Hydrologic, hydrodynamic, and water quality conditions were modeled for existing conditions and future conditions, with and without implementation of the DWSP to determine the potential impacts of the initial DWSP with a 30-mgd WTP and the ultimate DWSP with a 160-mgd WTP. A summary description of the models used and the key assumptions made in the analysis is provided here. The findings of the modeling analysis are summarized in the impact discussions below. Detailed information on the modeling methods and results is presented in the Modeling Technical Appendix to this EIR (MWH, 2005). This technical appendix is bound separately and is available upon request from the City of Stockton.[1]

The potential effects of the DWSP on upstream CVP-SWP reservoir storage levels and river flows, and Delta flows and export water operations were evaluated primarily with DWR/Reclamation's California Simulation Model (CALSIM) II. Monthly simulated Delta boundary flows from CALSIM II were subsequently used as input to DWR's hydrodynamic/ water quality model (Delta Simulation Model, Version 2 [DSM2]). Monthly simulated reservoir releases and river flows from CALSIM II were used as input to Reclamation's reservoir and river temperature models. The Modeling Technical Appendix (MWH, 2005) to this EIR describes the criteria used for the CALSIM II, DSM2, and temperature modeling and provides a comprehensive set of tabular and graphic presentations of the modeling analysis for the DWSP.

Hydrologic Modeling – CALSIM II

CALSIM II is a planning model designed to simulate the operations of the CVP and SWP reservoir and water delivery system. The primary purpose of CALSIM II is to evaluate the water supply reliability of the CVP and SWP at current or future levels of demand, with and without various assumed future facilities, and with different modes of facility operations. The model incorporates operating rules for the CVP and SWP that reflect a complex and extensive set of regulatory standards and operating criteria including water quality and endangered species requirements, flood control operating criteria, water delivery policies, instream flow, and Delta outflow requirements. Descriptions of the regulatory standards and operating criteria included in CALSIM II are presented in detail in the recent CVP (OCAP) Biological Assessment (BA) (Reclamation, 2004) and in the Benchmark Studies Assumptions Document (DWR and Reclamation, 2002). CALSIM II provides a set of system operations that meets all applicable regulatory and operational constraints in the Central Valley and Delta. Geographically, the model covers the drainage basin of the Delta and SWP exports to the San Francisco Bay Area, Central Coast, and Southern California; this geographic area is referred to as the CALSIM II Study Area in this EIR.

CALSIM II is the best available tool for modeling the CVP and SWP and is the only system-wide hydrologic model being used by Reclamation and DWR to conduct planning and impact analysis of potential projects. The CALSIM II model is being used for the planning and assessment of all major Delta water projects currently in progress. In particular, the DWSP analysis is based on the

[1] The DWSP EIR Water Resources Modeling Technical Appendix is available on-line at http://www.stocktongov.com/MUD/ or contact: David Stagnaro, City of Stockton, Community Development Department, Planning Division, 345 N. El Dorado Street, Stockton, CA 95202-1997, (209) 937-8598.

CALSIM II studies conducted for the CVP 2004 OCAP and OCAP BA. Reclamation released the OCAP BA CALSIM II studies in February 2004, with revisions in June 2004. Thus, the DWSP analysis is consistent with the analysis of recent and current water projects affecting Delta water resources.

Following is a brief summary description of key elements and assumptions comprising the CALSIM II model.

Simulation Period

CALSIM II typically simulates system operation for a 73-year period using a monthly time-step. The model assumes that facilities, land use, water supply contracts, and regulatory requirements are constant over this period, representing a fixed level of development (LOD) (e.g., 2001 or 2020) within the CALSIM II study area. The historical flow record October 1921 to September 1994, adjusted for the influence of land use change and upstream flow regulation, is used to represent the possible range of water supply conditions. It is assumed that the past is a good indicator of future hydrologic conditions. The 73-year historical period provides a sufficient variety of hydrological conditions (e.g., droughts and wet-year periods of varying magnitude and length) to evaluate the potential consequences of an action. The model was used to evaluate the potential hydrologic effects of the DWSP (both the initial 30-mgd operation and the ultimate 160-mgd operation) over the long-term (73-year average annual) and in the driest period (an average of the significant dry periods during the 73-year historic period: May 1928–October 1934, October 1976–September 1977, and October 1987–September 1992).

Level of Development

DWR and Reclamation have developed land-use based estimates of water supplies and demands for use in the CVP-SWP planning studies that have been incorporated into CALSIM II. Data sets are available for 2001 and 2020 levels of development (LOD). In the CALSIM II model, existing conditions are based on 2001 level demands and hydrology within the CALSIM II study area, and future conditions are based on 2020 level demands and hydrology. DWR and Reclamation are currently working to develop 2030 level demands for inclusion in the mode; however, these are not available at this time.

For purposes of the DWSP project analysis, the 2001 LOD was used to represent existing conditions for the CALSIM II study area. The 2020 LOD was used to represent the near-term future conditions within the CALSIM II study area to assess full operation of the initial DWSP 30-mgd project, expected to be in full use by about 2015. To analyze the ultimate DWSP 160-mgd operation needed to meet projected 2050 demands, the analysis used the CALSIM II information on the 2020 LOD to represent the long-term future conditions of water demand and hydrology within the CALSIM II study area, because no other data were available at this time to estimate regional conditions beyond 2020. This Program EIR analyzes the effects of the ultimate 160-mgd DWSP to the extent possible using the best available information. As noted in Chapter 1, Introduction, when the City determines the need expand the DWSP beyond its initial 30-mgd capacity it will conduct additional CEQA environmental review, as appropriate. Additional modeling studies and impact assessments will be completed on each phase of the DWSP expansion.

Cumulative Conditions – Future Regional Water Supply Projects and Actions

The DWSP CALSIM II studies are based on the CALSIM II studies completed for the 2004 OCAP BA. The 2020 OCAP BA studies represent the "cumulative condition" of water supply developments and operations that are considered reasonably and likely to be implemented. Like the OCAP CALSIM II studies, the CALSIM II modeling for the DWSP included the following proposed water supply projects and operation actions:

CVPIA Section 3406 (b)(2) Provisions

Under CVPIA Section 3406(b)(2) authorized and directed the Secretary of the Interior to dedicate and manage annually 800,000 AF of CVP yield for the primary purpose of implementing the fish, wildlife, and habitat restoration purposes and measures authorized by CVPIA; to protect the waters of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; and to help to meet such obligations as may be legally imposed upon the CVP under state or federal law following the date of enactment of CVPIA, including but not limited to additional obligations under the Federal Endangered Species Act. The implementing agencies are USFWS and Reclamation, in coordination with CDFG, DWR, and NOAA Fisheries. Since 1993, this dedicated CVP water for (b)(2) fish actions has been applied to improve instream conditions for anadromous fishes, primarily salmon and steelhead. The program is currently implemented consistent with Interior's May 2003 (b)(2) Policy, which was issued prior to the January 2004 Ninth Circuit Court Order.

To date, actions under this program have included improved instream flows, Delta export curtailments, and Delta Cross Channel gate closures. Since 2001, Interior has coordinated and integrated the implementation of Section 3406 (b)(2) fish actions with the implementation of the Environmental Water Account fish actions.

Trinity River Mainstem Fishery Restoration EIS/EIR 2000 Record of Decision (ROD) Target Flows

The December 2000 ROD on the Trinity Mainstream Fishery Restoration EIS/EIR adopted a variable annual requirement of 369,000 to 815,000 AF/year. During on-going litigation, a Federal District Court issued an order (December 2002) that directed the CVP to release 368,000 AF during critical Trinity River inflow years and 452,000 AF during all other conditions. The Federal Ninth Circuit Court of Appeals ordered (April 2004) a release of 647,000 AF of emergency water for the Trinity River. Existing conditions with respect to the Trinity River are uncertain. CVP water supplies are more constrained under implementation of the Trinity ROD flow requirements. Trinity's flow requirements were adopted as part of the existing conditions for evaluating the DWSP.

Freeport Regional Water Project (FRWP)

The FRWP is being developed by the Freeport Regional Water Authority, a joint powers agency formed by Sacramento County Water Agency and East Bay Municipal Utility District (EBMUD). The project consists of a 185 mgd capacity diversion on the Sacramento River near the town of Freeport. The FRWP Final EIR has been certified; Reclamation issued the ROD for the Final EIS on January 4, 2005.

Delta Mendota Canal and California Aqueduct (DMC-CA) Intertie

SWP and CVP operations could be more closely linked through the construction of an intertie between the California Aqueduct and the Delta-Mendota Canal just south of the Delta. This intertie would provide enhanced flexibility between the two systems, and create additional conveyance capacity for the CVP. The DMC-CA Intertie would consist of a pipeline connection between the DMC and the California Aqueduct at DMC milepost 7.2, where the canals are about 500 feet apart. The Intertie would allow flow in both directions, providing additional flexibility to both CVP and SWP operations. The Intertie would include a 400 cfs pumping plant at the DMC that would allow water to be pumped from the DMC to the California Aqueduct. Up to 950 cfs flow could be conveyed from the California Aqueduct to the DMC using gravity flow. The Intertie would be owned by Reclamation and operated by the San Luis and Delta Mendota Water Authority. Reclamation has completed a Draft Environmental Assessment for the Intertie. A Finding of No Significant Impact (FONSI) is expected. The project is awaiting approval of final design and construction funds.

South Delta Improvement Project (SDIP)

The SDIP is one of the actions identified in the CALFED ROD to address export water needs, while maintaining water levels for agricultural diversions and improving migratory conditions for fall- and winter-run Chinook salmon in the San Joaquin River. A key component of the SDIP is an increase in the permitted pumping capacity of the SWP's Banks Pumping Plant from 6,680 to 8,500 cfs. The SDIP also would include constructing four permanent operable barriers in the south Delta and dredging key Delta channels. The SDIP is currently being undertaken by Reclamation and DWR. An Action-Specific Implementation Plan and a project-specific EIS/EIR are expected to be released for public review in 2005. Permanent operable barriers would be required before full implementation of 8,500 cfs pumping at the Banks Pumping Plant.

Environmental Water Account (EWA) Program

Although included in the OCAP BA studies, modeling of the EWA was not part of the 2004 modeling for the Integrated Storage Investigations (ISI) program. The EWA, described in the CALFED ROD, was originally a four-year program that has been implemented since 2000, and extended to 2007. Implementing of a long-term EWA as part of the operation of the CVP and SWP is envisioned. A plan of operations for the long-term EWA has not been finalized. Future implementation will be subject to National Environmental Policy Act (NEPA) and CEQA.

EWA is an additional layer of operations that provides increased stream flows through reservoir releases, and curtailment of project export pumping in the Delta at sensitive times of the year. Given the dynamic nature of EWA actions, it is difficult to accurately model the program. For the DWSP and consistent with current analysis for the ISI program, EWA was not modeled. Modeling the EWA would not significantly change the impact analysis for the DWSP.

Contra Costa Water District

Contra Costa Water District (CCWD) is almost entirely dependent on the Delta for a water supply. CCWD operates three Delta pumping plants at Mallard Slough, Rock Slough, and Old River and a blending reservoir (Los Vaqueros). The operations of CCWD's system are primarily driven by water quality concerns. The pumping plants at Rock Slough and on Old River are the primary sources of diversion. The third intake at Mallard Slough is used only when water quality conditions in the western Delta permit, usually following a prolonged period of surplus Delta outflow. CCWD is evaluating the addition of another intake in the central Delta to give it greater operational flexibility to selectively divert from locations in the Delta with the best water quality. CCWD has initiated CEQA studies, including publishing a Notice of Preparation for an EIR in February 2005. This proposed additional intake was not included in the modeling analysis of the DWSP.

CALSIM II represents CCWD operations using a single aggregated point of diversion from the Delta. The aggregated monthly diversions were developed by CCWD based on CCWD's planning models, which are an input to CALSIM II. CALSIM II does not represent CCWD's internal operations or the operation of Los Vaqueros Reservoir. To support subsequent water analysis, CCWD disaggregated the monthly diversions into diversions at Rock Slough and Old River (Mallard Slough was not added).

CALSIM II Model Outputs

The CALSIM II model can be used to compare different Delta water supply scenarios to determine the effect they have on various factors, such as stream and channel flows, deliveries to other existing water users, and reservoir storage. The output of the CALSIM II analysis provides information about the parameters shown in Table 4-3, which is then used to assess the potential impact of the DWSP in terms of potential affect on water deliveries to other water users and on Delta flow conditions that, in turn, affect in-stream aquatic and fisheries resources.

Model output for the COSMA included: (1) SEWD supply (sources and amounts), and (2) proposed DWSP operating characteristics, including the amount of supply needed, the size of the DWSP WTP, whether or not active groundwater recharge would be implemented.

Delta Hydrodynamic and Water Quality Modeling

DWR's hydrodynamic/water quality model – Delta Simulation Model, Version 2 (DSM2) was used in conjunctive with CALSIM II to evaluate the potential water quality impacts of the

TABLE 4-3
CALSIM II OUTPUT USED FOR IMPACT ANALYSIS

Delta Flows	River Flows	Water Deliveries	Reservoir Carryover Storage
Export at Banks PP Export at Tracy PP Georgiana Slough Delta Cross Channel QWEST Total Delta Inflow Net Delta Outflow Export-Inflow Ratio	Trinity River below Lewiston Sacramento River below Keswick Sacramento River below NCP Sacramento river below Freeport Feather River below Thermalito Feather River at mouth America River below Nimbus American River at H Street Calaveras River at mouth San Joaquin River at Vernalis	CVP North of Delta Agricultural contractors M&I contractors CVP South of Delta Agricultural contractors M&I contractors SWP Table A [1] Article 21 [2]	CVP Trinity Shasta Whiskeytown Folsom CVP North of Delta CVP San Luis SWP Oroville SWP San Luis Corps New Hogan

1 The contracts between DWR and the 29 SWP water contractors define the terms and conditions governing water delivery and cost repayment for the SWP. Table A refers to an exhibit to the water supply contracts, and is the contractual method for allocating available supply and for allocating some of the costs among the contractors. The total of all maximum Table A amounts for deliveries from the Delta is 4.133 MAF per year. Each contract's Table A is the amount in AF that is used to determine the portion of available supply to be delivered to that contractor (DWR, 2002).

2 Article 21 refers to a provision in the water supply contracts between SWP contractors and DWR for delivering water that is available in addition to Table A amounts. Article 21 allows SWP contractors to receive additional water deliveries only under specific conditions. It is available only when it does not interfere with SWP allocations; when excess water is available in the Delta; when conveyance capacity is not being used for SWP purposes or scheduled SWP deliveries. Article 21 water cannot be stored within the SWP system. Water supply under Article 21 becomes available only during wet months of the year, generally December through March. Because an SWP contractor must have an immediate use for Article 21 supply or a place to store it outside of the SWP, not all SWP contractors can take advantage of this additional supply.

proposed DWSP. The DSM2 model is the recognized standard for analyzing water supply projects.

CALSIM II was used to simulate monthly statewide reservoir operations, river flows and CVP–SWP deliveries for a 73-year period based on the 1922–1994 hydrologies. CALSIM II output provided flow (and salinity for the San Joaquin River) boundary conditions for DSM2. DSM2 calculated corresponding changes in water quality in the Delta compared to baseline conditions for a 16-year period (1976–1991). This 16-year period includes the 1976-77 two-year drought and the 1987–1992 six-year drought. This shorter period of simulation compared to CALSIM II (16 years vs. 72 years) is standard practice for DSM2 planning studies because of the modeling complexity for the water quality analysis and the availability of an astronomical tide. The Modeling Technical Appendix (MWH, 2005) to this EIR lists the DSM2 input assumptions and other factors that were used to assess potential impacts of the DWSP.

For the DWSP, water quality impacts were analyzed using electrical conductivity (EC) as the primary salinity parameter. Other measurements of salinity such as chloride, bromide, and TDS were estimated using regression equations determined from field data. In addition to the DSM2 results, some water quality impacts were assessed directly from the CALSIM II output. The Modeling Technical Appendix to this EIR summarizes the metrics used to assess hydrodynamic and water quality impacts of the DWSP.

Water Temperature Modeling

Water temperature modeling was performed to assess potential fishery impacts of the DWSP using Reclamation’s one-dimensional reservoir and river temperature models. The river temperature models provide temperature output at specific river sites: three locations on the Trinity River from Lewiston Dam to the North Fork, 12 locations on the Sacramento River from Keswick Dam to Freeport, 12 locations on the Feather River from Oroville Dam to the river mouth, and nine locations on the American River from Nimbus Dam to the mouth. These models have been used for temperature modeling on the Trinity, Sacramento, Feather, and American River systems. Model inputs include reservoir releases, stream flows, and climatic data. Monthly output from CALSIM II provides input to the temperature models for the 73-year hydrologic period (1992–1994). Monthly mean climatic data are based on the U.S. Weather Bureau data. These temperature models have been used to evaluate many of the current major Delta water supply and operations projects; the temperature models used to evaluate the DWSP are identical to those used by Reclamation for the 2004 OCAP BA. Additional information on the temperature modeling can be found in the Modeling Technical Appendix to this EIR.

DWSP Modeling Scenarios

Modeling scenarios were developed for this impact analysis to address three timeframes: (1) Existing Conditions, (2) 2015 Conditions (Project-level Cumulative Analysis) to address the near-term future conditions in approximately 2015 when the initial 30-mgd DWSP would be fully operational, and (3) 2050 Conditions (Program-level Cumulative Analysis) to address the long-term future conditions in approximately 2050, when the ultimate 160-mgd DWSP is projected to be in full operation. Within each of these three timeframes, one modeling scenario was developed to represent conditions without the DWSP and another modeling scenario was developed to represent conditions with the DWSP in operation. The six scenarios modeled were:

- Existing Conditions
- Existing Conditions – With 30-mgd DWSP
- 2015 Conditions – No Project
- 2015 Conditions – With 30-mgd DWSP
- 2050 Conditions – No Project
- 2050 Conditions – With 160-mgd DWSP

Table 4-4 summarizes the key assumptions that define the six modeling scenarios used for this project impact analysis. The table defines the level of development and water use within the CALSIM II study area, the cumulative projects and actions that would be in effect in the future, the level of development (demand) within the COSMA and the level of DWSP operation (initial 30-mgd or ultimate 160-md), and the availability of water to the COSMA from SEWD and from the DWSP.

COSMA Level of Development

For modeling purposes, 2003 information was used to represent existing conditions within the COSMA. This is the most recent year for which complete information on water demand and use within the COSMA were available for modeling. Further, in accordance with CEQA, 2003 represents the baseline condition for use in the impact analysis as marked by the issuance of the NOP for this EIR. As described in the section above, the year 2001 is used in the CALSIM II model to represent existing conditions within the CALSIM study area.

Two target demand levels were established for the DWSP: build-out of the current (1990) General Plan Urban Service Boundary, which is forecasted to occur by about 2015 and is intended to be served by the initial DWSP with a 30-mgd WTP, and complete build-out of the General Plan Boundary, which is forecasted to occur by about 2050 and is expected to be served by the ultimate DWSP WTP of 160-mgd (Stockton MUD et al., 2003).

For the 2003 COSMA existing conditions level of development, average annual M&I demands were 71,000 AF/year; average annual agricultural demands were 30,000 AF/year. For the 2015 COSMA level of development, the average annual M&I demands were estimated to be 85,000 AF/year; average annual agricultural demands were estimated to be 17,000 AF/year. For the 2015 analysis, COSMA 2015 demands and total deliveries were imposed on CALSIM II 2020 conditions for the CALSIM study area (i.e., Sacramento and San Joaquin Valleys and the Delta).

TABLE 4-4
MODELING SCENARIOS

	Existing Conditions Analysis		Project-Level Cumulative Analysis		Program-Level Cumulative Analysis	
Analysis	**Existing Conditions – No Project**	**30-mgd DWSP**	**2015 Conditions – No Project**	**2015 Conditions – 30-mgd DWSP**	**2050 Conditions – No Project**	**2050 Conditions – 160-mgd DWSP**
CALSIM II Study Area Level of Development [1]	2001	2001	2020	2020	2020	2020
COSMA						
Level of Development [2]	2003	2015	2015	2015	2050	2050
Demand (TAF/year)[3]	71.40	85.33	85.33	85.33	177.90	177.90
DWSP Surface Water Supply						
DWSP – Section 1485 [4]	No	Yes	No	Yes	No	Yes
DWSP – Section 11460 et seq. [5]	No	No	No	No	No	Yes
Calaveras River (via SEWD)						
Reclamation Contract (TAF/year) [6]	40.17	40.17	40.17	40.17	40.17	40.17
CACWD Transfer (TAF/year) [7]	2.4	2.4	2.4	2.4	0	0
Stanislaus River (via SEWD)						
CVP Contract (TAF/year) [8]	10	10	10	10	0	0
SSJID/OID Transfer (TAF/year) [9]	30	15	15	15	0	0
CSJWCD Transfer (TAF/year) [10]	0	0	0	0	0	0
Infrastructure						
DWSP WTP (mgd)[11]	0	30	0	0	0	160
DWSP ASR[12]	No	No	No	No	No	Yes
SEWD WTP (mgd)[13]	45	45	50	50	50	50
Other Projects/Actions – Cumulative Conditions						
MWD Demands (TAF/year)[14]	Variable	Variable	2,011	2,011	2,011	2,011
Freeport Regional Water Project[15]	No	No	Yes	Yes	Yes	Yes
DMC-CA Intertie[16]	No	No	Yes	Yes	Yes	Yes
Trinity River min. flow (TAF/year)[17]	369 - 815	369 - 815	369 - 815	369 - 815	369 - 815	369 - 815
SDIP (8,500 cfs Banks Pumping Plant) [18]	No	No	Yes	Yes	Yes	Yes
CVP-SWP Integration [19]	No	No	Yes	Yes	Yes	Yes
CALFED Storage Projects [20]	No	No	No	No	No	No

Notes:

1. Land use horizon for Sacramento Valley water supplies and demands as used in the hydrology development for CALSIM II.
2. Planning horizon for COSMA water demands and supplies.
3. Current or projected level M&I demand within the 1990 General Plan Boundary.
4. Section 1485 water is available only as part of the DWSP.
5. Section 11460 et seq. water was assumed to be used after build-out of the City's Urban Service Boundary in approximately 2015.
6. .5 percent of the "safe" yield specified in the contract less an assumed riparian diversion of 13 TAF, (i.e., 0.565*[84.10-13.00]). Actual deliveries vary with hydrologic conditions.
7. The existing interim transfer from CACWD to SEWD for M&I use was assumed to remain in place until 2015.
8. SEWD has an interim CVP water supply contract for up to 75 TAF. However, under the New Melones Reservoir IPO, the maximum combined diversion to SEWD and CSJWCD is 90 TAF, depending on the March-September forecasted inflow plus end of February storage. CSJWCD has a long-term water supply contract of 49 TAF and an interim water supply contract of 31 TAF. CSJWCD diversion has priority over SEWD, thus effectively limiting SEWD diversion to a maximum of 10 TAF.
9. The existing water transfer contract with SSJID was assumed not to be renewed in 2009. The existing water transfer contract with OID was assumed to be renewed once for a 10-year period in 2009.
10. The CSJWCD delivery capacity is approximately 35 TAF. It was assumed that CVP deliveries in excess of 35 TAF are made available to SEWD but are used for agricultural irrigation purposes.
11. Initially, the DWSP WTP is sized at 30 mgd. ESA pumping curtailment was assumed to apply in May.
12. The ASR program is not initially part of the DWSP.
13. The existing capacity of the SEWD WTP is nominally 45 mgd but is reduced during periods of high turbidity.
14. Metropolitan Water District full Table A amount is 2,011.5 TAF. At a current (2001) level of demand it was assumed that MWD requests vary with hydrologic conditions.
15. The Freeport Regional Water Project Final EIR has been certified; the Final EIS has been released and is awaiting the Record of Decision.
16. The DMC-CA Intertie is part of the CALFED conveyance program and consists of construction and operation of a pumping plant and pipeline connections between the DMC and the California Aqueduct.
17. The December 19, 2000 ROD on the Trinity River Main Stem Fishery Restoration EIS/EIR adopted a variable annual requirement of 369 to 815 TAF.
18. DWR and Reclamation have agreed to jointly pursue development of the South Delta Improvement Program. Operational features include 8,500 cfs permitted capacity at Banks Pumping Plant between March 16 through December 14, and installation of permanent barriers in the south Delta. DWR and Reclamation are currently preparing a site-specific draft EIS/EIR.
19. Project integration includes 100 TAF dedicated CVP Refuge Level 2 Pumping at Banks Pumping Plant and 75 TAF of CVP release to alleviate a portion of the SWP's in-basin obligation.
20. The CALFED storage program includes studies for a North of Delta offstream reservoir, expansion of Los Vaqueros Reservoir in Contra Costa County, new storage in the upper San Joaquin River basin, expansion of Shasta Lake, and in-Delta storage.

For the 2050 analysis, average annual COSMA M&I demands were projected to be 178,000 AF/year; average annual agricultural demands within the General Plan Boundary were assumed to be zero.

COSMA Water Supply – Sources and Demands

For analysis of the DWSP, the priorities for meeting water demands with various sources of supply were established: The SEWD water supply would be the first priority, i.e., the available SEWD supply would be used to meet demands before using the DWSP supply. Groundwater would be the third priority to meet demands. These priority supply source "rules" provide for (1) maximizing the use of existing surface water supplies available from SEWD, and (2) reduced reliance on groundwater to meet COSMA demands in order to provide for in-lieu recharge of groundwater that would, over time, remedy local overdraft and contribute to rectifying the significant regional groundwater overdraft. Use of Delta water, when available, would allow users within the COSMA to reduce groundwater pumping and allow groundwater levels to replenish.

SEWD Supply

As described in Chapter 2, Project Description (Section 2.2.2), the COSMA is currently supplied surface water by SEWD from the Calaveras and Stanislaus Rivers under various contracts. Table 4-3 summarizes the assumptions about SEWD's water supply sources and availability to serve the COSMA now and in the future. As noted above, the model was directed to use SEWD supplies first to meet COSMA demands.

It was assumed that SEWD will perform a planned upgrade of its existing WTP, which would adjust the WTP's capacity from the current nominal 45 mgd up to 50 mgd. For modeling purposes, it was assumed that a 50-mgd SEWD WTP would be in operation for the 2015 Conditions scenario and beyond.

DWSP Supply

As discussed in Chapter 2, Project Description, there are two authorities under which the City has applied for a right to divert water from the Delta: California Water Code Section 1485 (related to the City diverting an amount reciprocal to its wastewater discharge) and California Water Section 11460 et seq. (area of origin water). Please see Section 2.3.1 for further description of these codes.

Modeling of the DWSP demonstrated that water diverted under Section 1485 alone would be sufficient to supply the demands of the initial DWSP 30-mgd project. Therefore, for the analysis of the initial 30-mgd DWSP, diversion of water from the Delta was limited to Section 1485 water. Beyond the initial 30-mgd DWSP, the City would also need to divert water under Section 11460. For analysis of the ultimate 160-mgd DWSP, the modeling assumed that water would be diverted from the Delta under both Sections 1485 and 11460 et seq.

In the modeling, Delta diversion under Section 1485 was not constrained by Delta conditions or upstream water use and development. In contrast, it was assumed that diversion under Section 11460 et seq. (area of origin water) would be limited by water right standard permit Term 91. Therefore, code was added to the CALSIM II model to dynamically calculate the period when Term 91 would be in effect. Refer to Section 2.3.1 for a discussion of the Term 91 constraints on diversion.

Under existing conditions and with the initial development of the DWSP (30 mgd WTP capacity), the City would extract approximately 26,000 AF/year from the Delta under Section 1485. The average annual diversion during the driest periods would be 30,000 AF/year. For the 2015 conditions analysis, effluent discharge from the RWCF was projected to increase from 29,000 to 35,000 AF/year, and the SEWD WTP would be upgraded to a 50-mgd capacity. The additional SEWD WTP capacity would reduce M&I groundwater pumping between April and September, and reduce Delta diversions from October through March when supplemental groundwater pumping would not be required. As a result, there would be a corresponding decrease in DWSP Delta diversions from 26,000 AF/year under the existing conditions to 23,000 AF/year under 2015 cumulative conditions.

Under 2050 cumulative conditions, the City is projected to extract approximately 114,000 AF/year of water from the Delta for use at the 160-mgd WTP. On average, 101,000 AF/year of the water diverted would be used by the City to meet demand directly, while 13,000 AF of the Delta diversion would be managed for a groundwater ASR program (refer to Chapter 2). Of the 114,000 AF/year diverted from the Delta, the City would extract its maximum Section 1485 water entitlement of 73,000 AF/year (equal to the RWCF discharge). An additional 41,000 AF/year, or approximately 40 percent, would be pumped under the Section 11460 et seq. (area of origin) statutes. The increase in Delta diversion under 2050 cumulative conditions would be partly due to an increase in COSMA M&I demand (178,000 AF/year compared to 85,000 AF/year), and partly due to the reduction in available supplies from the Stanislaus River (zero under 2050 cumulative conditions compared to 18,000 AF/year under 2015 cumulative conditions). The latter would be partly offset by increased supplies from the Calaveras River (38,000 AF/year under 2050 conditions compared to 28,000 AF/year under 2015 conditions).

SUMMARY OF IMPACTS BY PROJECT COMPONENT

Table 4-5 provides a summary of the significant and less than significant Delta water resources impacts associated with specific components of the DWSP.

IMPACT STATEMENTS AND MITIGATION MEASURES

Impact WATER-1. DWSP operation could affect Delta inflow and outflow, and river flow hydrologic conditions. Less than significant.

Figures 4-3 through 4-5 present the average monthly breakdown by source of the COSMA M&I supply for the No Project and With DWSP conditions. Figure 4-3 presents results for the existing

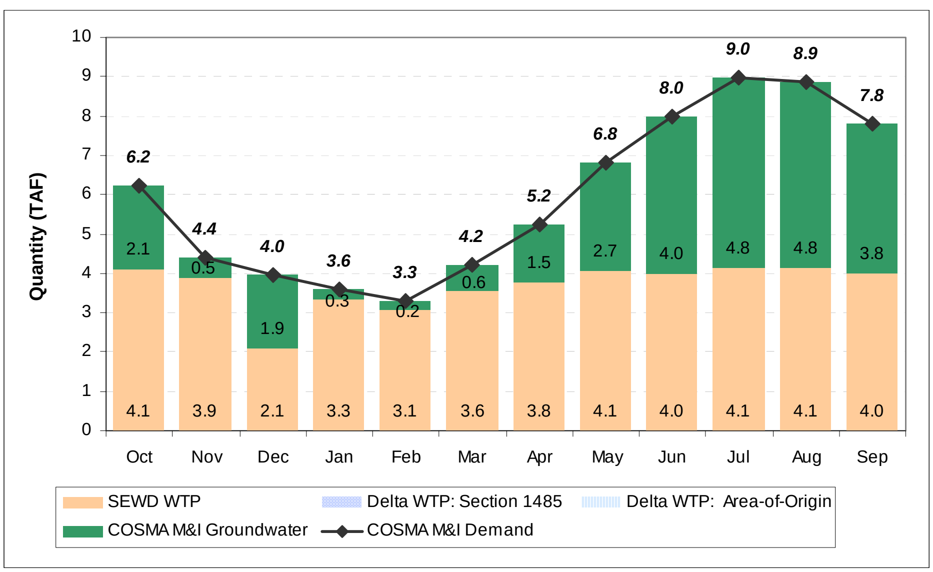
TABLE 4-5
SUMMARY OF IMPACTS – DELTA WATER RESOURCES

Impact	In-River Intake Facility	In-Bank Intake Facility	Raw Water Pipelines	Water Treatment Plant	Treated Water Pipelines
WATER-1: DWSP operation could affect Delta inflow and outflow, and river flow hydrologic conditions.	LS	LS	LS	LS	LS
WATER-2: DWSP operation could affect CVP-SWP reservoir operations and deliveries.	LS	LS	LS	LS	LS
WATER-3: DWSP operation could affect hydrodynamic and water quality conditions in the Delta and at major Delta water diversion sites.	LS	LS	NI	NI	NI

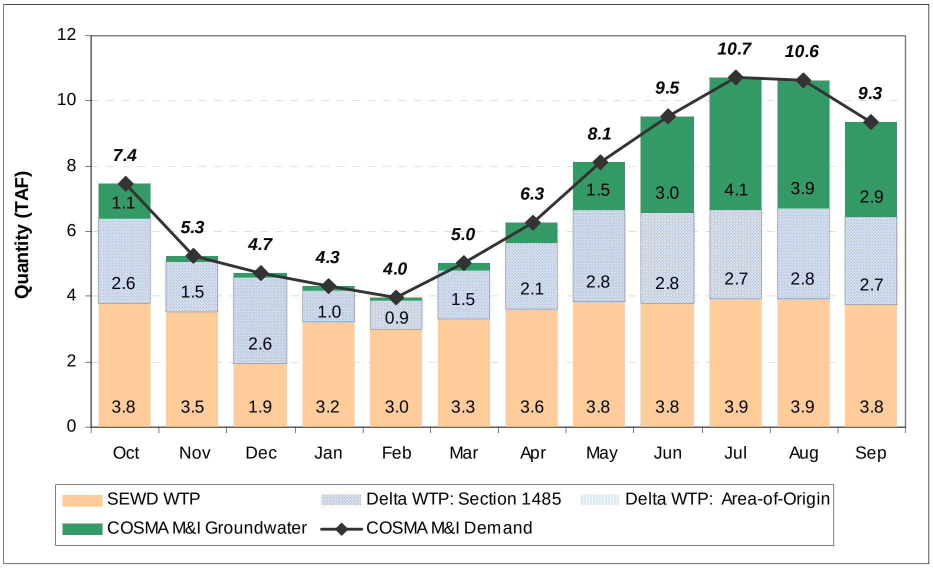
LS = Less than Significant Impact
NI = No Impact

Figure 4-3
Long-Term Average Monthly COSMA M&I Water Supply, Existing Conditions

(a) Existing Conditions



(b) DWSP Alternative (30 mgd WTP capacity)



(c) SEWD WTP Expansion Alternative

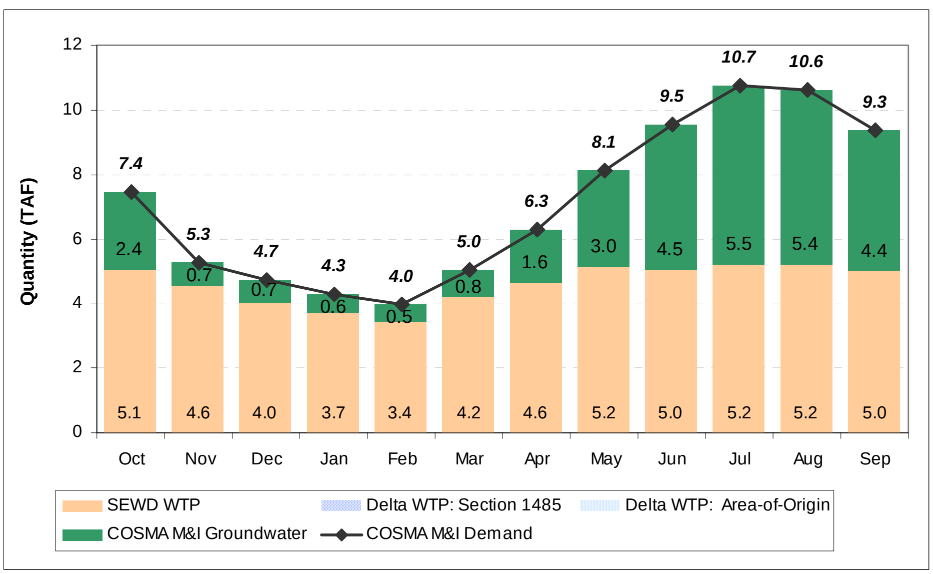
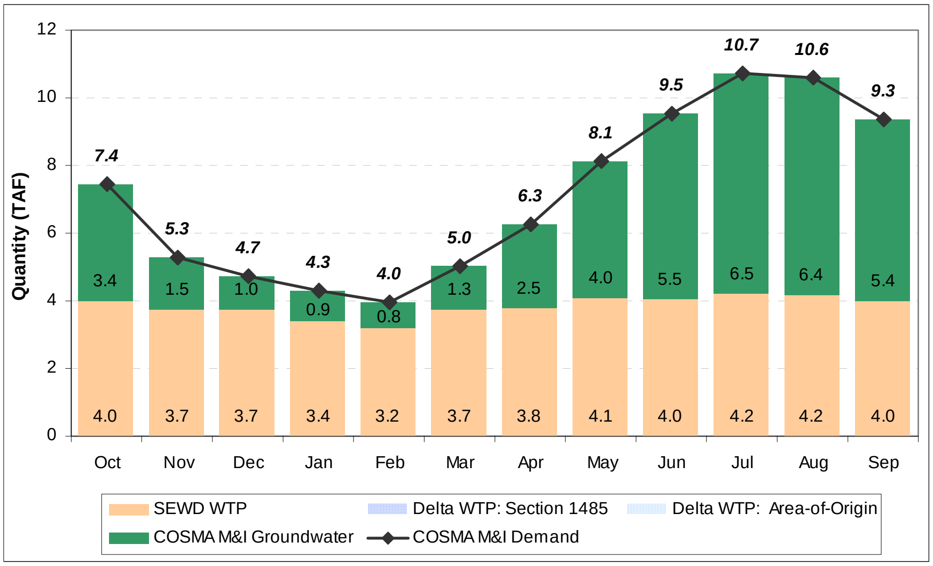


Figure 4-4
Long-Term Average Monthly COSMA M&I Water Supply, 2015 Cumulative Conditions

(a) No Project



(b) Proposed DWSP

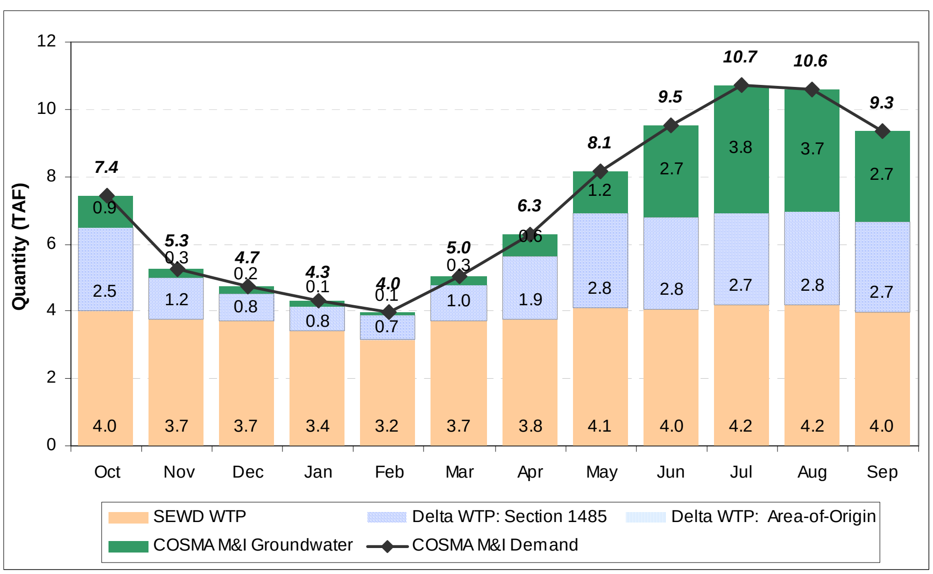
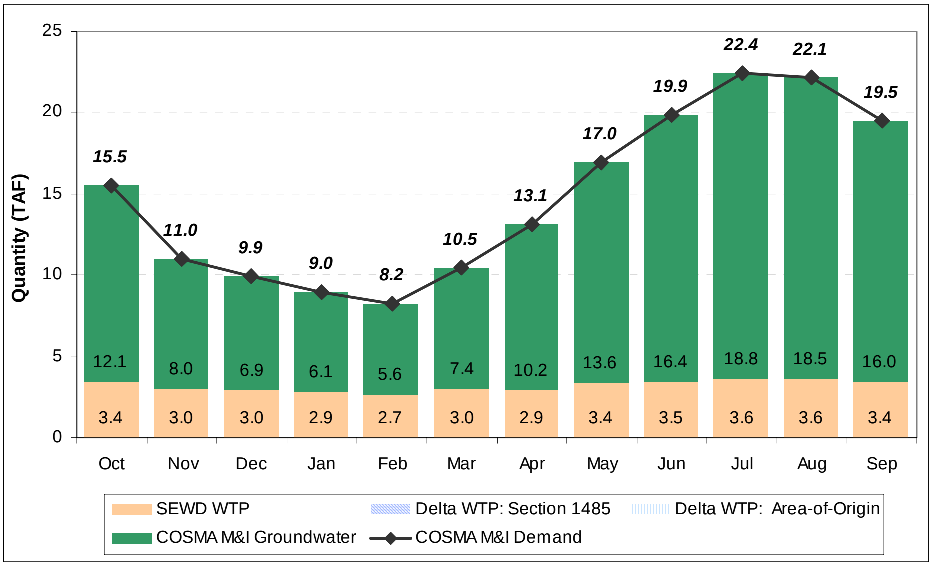
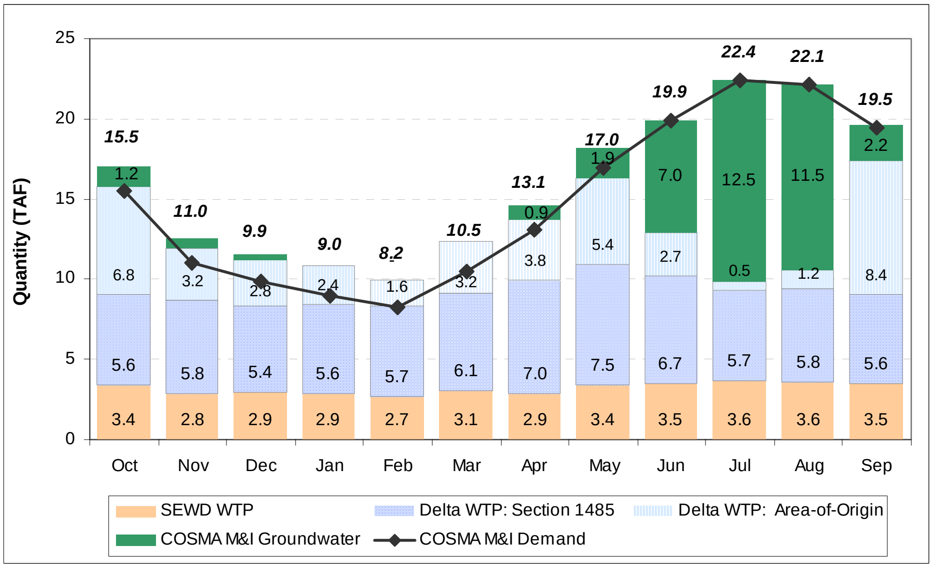


Figure 4-5
Long-Term Average Monthly COSMA M&I Water Supply, 2050 Cumulative Conditions

(a) No Project



(b) With Proposed DWSP



conditions analysis. Figure 4-4 presents results for the 2015 project-level cumulative analysis, and Figure 4-5 presents the results for the 2050 program-level cumulative analysis.

Tables 4-6 through 4-8 provide CALSIM II summary results of long-term and dry periods (May 1928–October 1934, October 1976–September 1977, and October 1987–September 1992) average annual flows for existing, 2015 cumulative, and 2050 cumulative conditions.

Delta Flows

Tables 4-9 and 4-10 present average Delta flows and exports by water year type for existing, 2015 project-level cumulative, and 2050 program-level cumulative conditions.

For this analysis, the calculation of Total Delta Inflow included the subtraction of any DWSP diversions from the Delta. CALSIM II model results show that changes in Total Delta Inflow with operation of both a 30-mgd and 160-mgd DWSP would be less than one percent. Average annual Total Delta Inflow with the DWSP would decrease by 23,000 AF/year when imposed on existing conditions (Table 4-6) and by 21,000 AF/year when imposed on 2015 project-level cumulative conditions for a 30-mgd DWSP (Table 4-7). For both existing and 2015 cumulative conditions, the reduction in Net Delta Inflow would be about 0.1 percent of the flow under No Project conditions. Under 2050 program-level cumulative conditions, model results show that the DWSP would decrease Total Delta Inflow by 108,000 AF/year (Table 4-8). This would represent about 0.5 percent of the inflow under No Project conditions.

CALSIM II model results show that changes in Net Delta Outflow with operation of both a 30 mgd and 160 mgd DWSP would be less than one percent. Average annual Net Delta Outflow would decrease by 16,000 AF/year when imposed on existing conditions (Table 4-6) and on cumulative conditions for a 30-mgd DWSP (Table 4-7). For both existing and 2015 cumulative conditions, the reduction in outflow would be about 0.1 percent of the outflow under No Project conditions. Under the 2050 cumulative conditions, model results show that the DWSP would decrease Net Delta Outflow by 79,000 AF/year (Table 4-8). This would correspond to about 0.6 percent of the outflow under No Project conditions. Based on CALSIM II inflow and outflow results, the DWSP would not have a significant impact on the E/I ratio.

River Flows

The DWSP, being located in the Delta, would have no direct impact on upstream river flows. However, indirect effects could occur because changes in Delta conditions can trigger changes in CVP-SWP reservoir operations and changes in CVP-SWP exports from the south Delta. Model results show that changes in average annual flow for the Trinity, Sacramento, Feather, and American Rivers, both long-term average and during the driest periods are negligible (Tables 4-6 through 4-8).

TABLE 4-6
AVERAGE ANNUAL FLOWS, PROPOSED DWSP COMPARED TO EXISTING CONDITIONS

	Proposed DWSP		Existing Conditions		DWSP Minus Existing Conditions	
	Long-Term	Driest Periods	Long-Term	Driest Periods	Long-Term	Driest Periods
COSMA (1,000 AF)						
DWSP Delta diversion						
Section 1485 water	26	30	0	0	26	30
Area of Origin water	0	0	0	0	0	0
Total (less ASR)	26	30	0	0	26	30
SEWD WTP						
Stanislaus River supply (less 5% loss)	18	11	30	20	-12	-10
Calaveras River supply	24	18	14	17	10	1
Total	42	29	44	38	-2	-9
Groundwater pumping						
M&I	18	29	27	36	-10	-7
Ag	12	13	18	19	-6	-7
Total	30	42	45	55	-16	-14
Riparian agriculture diversions	5	6	12	13	-7	-7
COSMA deliveries						
M&I	85	88	71	74	14	14
Agriculture	17	18	30	32	-13	-13
Total	103	107	101	106	1	1
Groundwater ASR	0	0	0	0	0	0
Regional Wastewater Control Facility	35	35	29	30	6	6
Delta (1,000 AF)						
Export at Banks Pumping Plant	3,454	1,915	3,460	1,927	-5	-12
Export at Tracy Pumping Plant	2,344	1,612	2,346	1,606	-2	6
Total exports	5,799	3,527	5,806	3,533	-7	-6
Contra Costa Water District diversion	124	119	124	119	0	0
North Bay Aqueduct/City of Vallejo	55	36	55	36	0	0
Georgiana Slough	2,726	1,763	2,726	1,761	0	2
Delta Cross Channel	1,277	1,212	1,276	1,209	1	3
Total Delta inflow	20,760	10,138	20,782	10,145	-23	-7
Net Delta Outflow Index	13,862	5,266	13,878	5,266	-16	-1
QWEST	774	-189	790	-182	-15	-7
River Flows (cfs)						
Trinity River below Lewiston	922	643	922	643	0	0
Sacramento River below Keswick	8,373	6,279	8,372	6,270	1	9
Sacramento River below NCP	8,988	6,051	8,985	6,042	3	9
Sacramento River below Freeport	22,142	12,058	22,140	12,042	3	15
Feather River below Thermalito	4,160	2,198	4,160	2,195	0	3
Feather River at mouth	7,449	3,408	7,449	3,405	0	3
American River below Nimbus	3,459	1,840	3,459	1,836	0	4
American River at H Street	3,328	1,701	3,328	1,697	0	4
Calaveras River below Bellota Weir	108	5	121	6	-13	0
San Joaquin River at Vernalis	3,660	1,588	3,661	1,589	-1	0
Reservoir Carryover Storage (1,000 AF)						
Trinity Lake	1,260	677	1,264	682	-4	-5
Lake Shasta	2,509	1,437	2,511	1,443	-3	-5
Folsom Lake	509	360	510	364	-1	-4
CVP total NOD storage	4,509	2,694	4,517	2,709	-8	-15
CVP San Luis Reservoir	237	234	235	229	2	5
Lake Oroville	2,022	1,391	2,027	1,408	-5	-16
SWP San Luis Reservoir	375	276	374	270	0	6
New Hogan Reservoir	136	84	147	91	-11	-7
New Melones Reservoir	1,295	784	1,297	785	-1	-1
CVP-SWP Deliveries (1,000 AF)						
CVP NOD agricultural deliveries	225	29	225	29	0	0
CVP NOD M&I deliveries	30	27	30	27	0	0
CVP SOD agricultural deliveries	1,042	145	1,044	146	-2	-1
CVP SOD M&I deliveries	121	83	121	83	0	0
SWP Table A deliveries	2,959	1,522	2,963	1,528	-4	-6
SWP Article 21 deliveries	155	122	156	123	-1	-2

TABLE 4-7
AVERAGE ANNUAL FLOWS, PROPOSED DWSP COMPARED TO 2015 NO PROJECT CUMULATIVE CONDITIONS

	Proposed DWSP		No Project,		DWSP Minus No Project	
	Long-Term	Driest Periods	Long-Term	Driest Periods	Long-Term	Driest Periods
COSMA (1,000 AF)						
DWSP Delta diversion						
Section 1485 water	23	30	0	0	23	30
Area of Origin water	0	0	0	0	0	0
Total (less ASR)	23	30	0	0	23	30
SEWD WTP						
Stanislaus River supply (less 5% loss)	18	11	18	11	0	0
Calaveras River supply	28	18	28	18	0	0
Total	46	28	46	28	0	0
Groundwater pumping						
M&I	17	30	39	60	-23	-30
Ag	12	13	12	13	0	0
Total	29	43	51	73	-23	-30
Riparian agriculture diversions	5	6	5	6	0	0
COSMA deliveries						
M&I	85	88	85	88	0	0
Agriculture	17	18	17	18	0	0
Total	103	107	103	107	0	0
Groundwater ASR	0	0	0	0	0	0
Regional Wastewater Control Facility	35	35	35	35	0	0
Delta (1,000 AF)						
Export at Banks Pumping Plant	3,631	2,030	3,636	2,039	-5	-9
Export at Tracy Pumping Plant	2,358	1,610	2,359	1,612	-1	-2
Total exports	5,989	3,640	5,994	3,651	-6	-10
Contra Costa Water District diversion	158	149	158	149	0	0
North Bay Aqueduct/City of Vallejo	68	46	68	46	0	0
Georgiana Slough	2,726	1,763	2,726	1,761	1	2
Delta Cross Channel	1,277	1,203	1,273	1,201	4	2
Total Delta inflow	20,748	10,155	20,770	10,174	-21	-19
Net Delta Outflow Index	13,648	5,165	13,664	5,173	-16	-9
QWEST	548	-338	560	-322	-12	-16
River Flows (cfs)						
Trinity River below Lewiston	917	636	917	637	0	0
Sacramento River below Keswick	8,378	6,292	8,377	6,285	1	8
Sacramento River below NCP	8,980	6,060	8,976	6,049	4	11
Sacramento River below Freeport	22,145	12,058	22,139	12,040	5	17
Feather River below Thermalito	4,160	2,191	4,160	2,188	0	3
Feather River at mouth	7,454	3,400	7,454	3,397	0	3
American River below Nimbus	3,210	1,638	3,210	1,638	0	0
American River at H Street	3,014	1,453	3,014	1,452	0	0
Calaveras River below Bellota Weir	100	4	100	4	0	0
San Joaquin River at Vernalis	3,656	1,579	3,656	1,579	0	0
Reservoir Carryover Storage (1,000 AF)						
Trinity Lake	1,250	661	1,253	668	-3	-7
Lake Shasta	2,466	1,427	2,471	1,439	-5	-13
Folsom Lake	485	336	486	337	-1	-2
CVP total NOD storage	4,432	2,644	4,442	2,666	-10	-21
CVP San Luis Reservoir	244	239	245	243	-1	-4
Lake Oroville	2,035	1,487	2,041	1,496	-6	-9
SWP San Luis Reservoir	354	259	355	258	-1	1
New Hogan Reservoir	132	81	132	81	0	0
New Melones Reservoir	1,315	813	1,315	814	0	0
CVP-SWP Deliveries (1,000 AF)						
CVP NOD agricultural deliveries	230	32	230	32	0	0
CVP NOD M&I deliveries	38	41	38	41	0	0
CVP SOD agricultural deliveries	1,071	159	1,071	159	0	-1
CVP SOD M&I deliveries	122	84	122	84	0	0
SWP Table A deliveries	3,182	1,692	3,186	1,694	-4	-2
SWP Article 21 deliveries	130	112	131	120	-2	-8

TABLE 4-8
AVERAGE ANNUAL FLOWS, PROPOSED DWSP COMPARED TO 2050 NO PROJECT CUMULATIVE CONDITIONS

	Proposed DWSP		No Project		DWSP Minus No Project	
	Long-Term	Driest Periods	Long-Term	Driest Periods	Long-Term	Driest Periods
COSMA (1,000 AF)						
DWSP Delta diversion						
Section 1485 water	73	74	0	0	73	74
Area of Origin water	42	39	0	0	42	39
Total (less ASR)	101	103	0	0	101	103
SEWD WTP						
Stanislaus River supply (less 5% loss)	0	0	0	0	0	0
Calaveras River supply	38	19	38	19	0	0
Total	38	19	38	19	0	0
Groundwater pumping						
M&I	38	63	140	166	-101	-102
Ag	0	0	0	0	0	0
Total	38	63	140	166	-101	-102
Riparian agriculture diversions	0	0	0	0	0	0
COSMA deliveries						
M&I	178	184	178	184	0	0
Agriculture	0	0	0	0	0	0
Total	178	184	178	184	0	0
Groundwater ASR	13	10	0	0	13	10
Regional Wastewater Control Facility	73	74	73	74	0	0
Delta (1,000 AF)						
Export at Banks Pumping Plant	3,619	2,014	3,644	2,051	-26	-38
Export at Tracy Pumping Plant	2,354	1,606	2,357	1,617	-3	-11
Total exports	5,973	3,620	6,002	3,669	-29	-49
Contra Costa Water District diversion	158	149	158	149	0	0
North Bay Aqueduct/City of Vallejo	68	46	68	46	0	0
Georgiana Slough	2,727	1,764	2,725	1,760	2	4
Delta Cross Channel	1,278	1,204	1,271	1,198	7	5
Total Delta inflow	20,698	10,126	20,806	10,208	-108	-82
Net Delta Outflow Index	13,613	5,156	13,693	5,189	-79	-33
QWEST	512	-353	588	-299	-76	-54
River Flows (cfs)						
Trinity River below Lewiston	914	636	919	639	-4	-2
Sacramento River below Keswick	8,382	6,293	8,376	6,274	6	19
Sacramento River below NCP	8,985	6,063	8,969	6,037	16	26
Sacramento River below Freeport	22,154	12,073	22,131	12,028	23	45
Feather River below Thermalito	4,160	2,192	4,159	2,178	1	13
Feather River at mouth	7,454	3,401	7,453	3,388	1	13
American River below Nimbus	3,210	1,646	3,210	1,644	0	2
American River at H Street	3,014	1,460	3,014	1,458	0	2
Calaveras River below Bellota Weir	88	4	88	4	0	0
San Joaquin River at Vernalis	3,662	1,581	3,662	1,581	0	0
Reservoir Carryover Storage (1,000 AF)						
Trinity Lake	1,245	652	1,257	673	-12	-21
Lake Shasta	2,462	1,408	2,478	1,443	-17	-36
Folsom Lake	484	336	489	342	-5	-6
CVP total NOD storage	4,422	2,616	4,455	2,679	-33	-63
CVP San Luis Reservoir	244	231	247	245	-3	-14
Lake Oroville	2,027	1,477	2,049	1,507	-23	-31
SWP San Luis Reservoir	352	264	360	267	-8	-3
New Hogan Reservoir	121	77	121	77	0	0
New Melones Reservoir	1,323	817	1,323	818	0	-1
CVP-SWP Deliveries (1,000 AF)						
CVP NOD agricultural deliveries	229	31	230	32	-1	-1
CVP NOD M&I deliveries	38	41	38	41	0	0
CVP SOD agricultural deliveries	1,067	153	1,070	159	-3	-6
CVP SOD M&I deliveries	121	84	121	84	0	0
SWP Table A deliveries	3,176	1,692	3,194	1,712	-18	-21
SWP Article 21 deliveries	125	100	133	123	-9	-23

TABLE 4-9
LONG-TERM AVERAGE ANNUAL DELTA FLOWS BY WATER YEAR TYPE
(a) DWSP Compared to Existing Conditions

		Flow Rate (cfs)					
Location	Existing Conditions	Average	Wet	Above Normal	Below Normal	Dry	Critical
Georgiana Slough	Existing Conditions	3,774	5,302	4,345	3,377	2,857	2,307
	Changes with proposed DWSP	0	0	-1	1	0	3
Delta Cross Channel	Existing Conditions	1,752	1,718	1,800	1,883	1,802	1,551
	Changes with proposed DWSP	1	0	0	1	2	2
Total Delta Inflow	Existing Conditions	28,825	47,972	33,085	23,281	17,839	12,885
	Changes with proposed DWSP	-31	-42	-47	-29	-26	-8
Net Delta Outflow Index	Existing Conditions	19,306	37,156	22,650	13,037	8,851	6,534
	Changes with proposed DWSP	-22	-39	-27	-20	-13	0
QWEST	Existing Conditions	1,117	4,925	1,244	-596	-1,393	-306
	Changes with proposed DWSP	-21	-32	-16	-23	-14	-14

(b) DWSP Compared to 2015 No Project Cumulative Conditions

		Flow Rate (cfs)					
Location	Cumulative Conditions	Average	Wet	Above Normal	Below Normal	Dry	Critical
Georgiana Slough	No Project Cumulative Conditions	3,774	5,294	4,348	3,385	2,855	2,312
	Changes with proposed DWSP	1	0	-1	1	1	2
Delta Cross Channel	No Project cumulative conditions	1,747	1,712	1,804	1,892	1,783	1,544
	Changes with proposed DWSP	6	2	2	1	21	2
Total Delta Inflow	No Project cumulative conditions	28,809	47,868	33,089	23,331	17,804	12,951
	Changes with proposed DWSP	-29	-32	-41	-26	-27	-22
Net Delta Outflow	No Project cumulative conditions	19,011	36,496	22,375	12,869	8,779	6,420
	Changes with proposed DWSP	-22	-34	-34	-15	-14	-8
QWEST	No Project cumulative conditions	801	4,350	933	-847	-1,508	-520
	Changes with proposed DWSP	-17	-26	-22	-18	2	-20

(c) DWSP Compared to 2050 No Project Cumulative Conditions

		Flow Rate (cfs)					
Location	Cumulative Conditions	Average	Wet	Above Normal	Below Normal	Dry	Critical
Georgiana Slough	No Project cumulative conditions	3,772	5,294	4,350	3,386	2,851	2,309
	Changes with proposed DWSP	3	1	1	3	4	6
Delta Cross Channel	No Project cumulative conditions	1,745	1,711	1,802	1,891	1,777	1,541
	Changes with proposed DWSP	10	5	7	6	26	6
Total Delta Inflow	No Project cumulative conditions	28,859	47,925	33,176	23,384	17,834	12,986
	Changes with proposed DWSP	-150	-184	-198	-132	-123	-107
Net Delta Outflow	No Project cumulative conditions	19,051	36,552	22,461	12,897	8,803	6,428
	Changes with proposed DWSP	-110	-173	-186	-85	-58	-36
QWEST	No Project cumulative conditions	840	4,393	989	-821	-1,464	-490
	Changes with proposed DWSP	-106	-148	-137	-100	-62	-69

TABLE 4-10
LONG-TERM AVERAGE ANNUAL DELTA DIVERSIONS BY WATER YEAR TYPE
(a) DWSP Compared to Existing Conditions

Location	Existing Conditions	Annual Quantity (1,000 AF)					
		Average	Wet	Above Normal	Below Normal	Dry	Critical
Exports at Banks PP	Existing Conditions	3,460	4,312	4,013	3,758	3,023	1,740
	Changes with proposed DWSP	-5	-1	-4	-5	-7	-13
Exports at Tracy PP	Existing Conditions	2,346	2,664	2,607	2,481	2,249	1,545
	Changes with proposed DWSP	-2	-2	-10	-2	-2	7
Total Export	Existing Conditions	5,806	6,976	6,620	6,239	5,273	3,285
	Changes with proposed DWSP	-7	-3	-14	-7	-9	-6
Contra Costa Water District Diversion	Existing Conditions	124	125	130	132	124	108
	Changes with proposed DWSP	0	0	0	0	0	0
North Bay Aqueduct/ City of Vallejo	Existing Conditions	55	64	60	60	49	37
	Changes with proposed DWSP	0	0	0	0	0	0

(b) DWSP Compared to 2015 No Project Cumulative Conditions

Location	Cumulative Conditions	Annual Quantity (1,000 AF)					
		Average	Wet	Above Normal	Below Normal	Dry	Critical
Exports at Banks PP	No Project cumulative conditions	3,636	4,656	4,158	3,880	3,100	1,842
	Changes with proposed DWSP	-5	0	1	-9	-7	-9
Exports at Tracy PP	No Project cumulative conditions	2,359	2,706	2,644	2,501	2,188	1,576
	Changes with proposed DWSP	-1	1	-6	0	-3	-1
Total Export	No Project cumulative conditions	5,994	7,362	6,803	6,381	5,288	3,417
	Changes with proposed DWSP	-6	2	-5	-9	-10	-10
Contra Costa Water District Diversion	No Project cumulative conditions	158	161	167	167	158	134
	Changes with proposed DWSP	0	0	0	0	0	0
North Bay Aqueduct/ City of Vallejo	No Project cumulative conditions	68	81	76	74	60	44
	Changes with proposed DWSP	0	0	0	0	0	0

(c) DWSP Compared to 2050 No Project Cumulative Conditions

Location	Cumulative Conditions	Annual Quantity (1,000 AF)					
		Average	Wet	Above Normal	Below Normal	Dry	Critical
Exports at Banks PP	No Project cumulative conditions	3,644	4,658	4,161	3,899	3,104	1,864
	Changes with proposed DWSP	-26	-12	0	-36	-35	-47
Exports at Tracy PP	No Project cumulative conditions	2,357	2,704	2,643	2,500	2,188	1,572
	Changes with proposed DWSP	-3	4	-10	2	-11	-3
Total Export	No Project cumulative conditions	6,002	7,362	6,804	6,399	5,292	3,436
	Changes with proposed DWSP	-29	-8	-10	-34	-46	-51
Contra Costa Water District Diversion	No Project cumulative conditions	158	161	167	167	158	134
	Changes with proposed DWSP	0	0	0	0	0	0
North Bay Aqueduct/ City of Vallejo	No Project cumulative conditions	68	81	76	74	61	45
	Changes with proposed DWSP	0	0	0	0	-1	-1

Under existing conditions, the DWSP would not directly impact flows in the lower Stanislaus River. COSMA M&I demands would be met from the SEWD WTP up to the plant capacity or raw water availability, before being supplemented by the DWSP and groundwater pumping.

Increasing water demand within the COSMA and increased capacity of the SEWD WTP would impact flows in the Calaveras River due to greater M&I diversion at Bellota Weir. Under existing conditions, average annual Delta inflow from the Calaveras River would be 108 cfs (Table 4-6). Under 2015 cumulative conditions, Calaveras River flow would decrease to 100 cfs due to planned growth within the COSMA and reduced availability of water from the Stanislaus River (Table 4-7). Under 2050 cumulative conditions, average annual Delta inflow from the Calaveras River would be 88 cfs (Table 4-8).

Mitigation: No mitigation is required.

Impact WATER-2. DWSP operation could affect CVP-SWP reservoir operations and deliveries. Less than significant.

Tables 4-6 through 4-8 provide summary results of long-term and dry periods (May 1928-October 1934, October 1976–September 1977, and June 1986–September 1992) for CVP–SWP deliveries and reservoir carryover storage.

CVP-SWP Deliveries

Monthly DWSP diversions were analyzed for the 73-year period of simulation for existing, 2015 project-level cumulative, and 2050 program-level cumulative conditions. The Coordinated Operations Agreement defines the flow state in the Delta as either in “balanced water conditions” or in “excess water conditions” [2] (Reclamation and DWR, 1986). Diversions during balanced water conditions must be off-set by a corresponding increase in Delta inflow from CVP–SWP storage release or by a reduction in CVP–SWP exports. The modeling analysis looked at DWSP diversions under these two conditions. Details can be found in the Modeling Technical Appendix to this EIR.

For existing conditions, the long-term average annual DWSP water diversion would be 26,000 AF/year with the greatest diversions occurring from May through October. Only in one month (April) during the period of simulation would the DWSP diversion trigger a change of Delta conditions from excess to balanced water conditions. Figures 4-6 and 4-7 show the simulated

[2] Balanced water conditions means periods when DWR and Reclamation agree that releases from upstream reservoirs plus unregulated flow approximately equal the water supply needed to meet Sacramento Valley inbasin uses, plus exports. Excess water conditions means periods when DWR and Reclamation agree that releases from upstream reservoirs plus unregulated flow exceed Sacramento Valley inbasin uses, plus exports (i.e., additional water is available in the system).

Figure 4-6
Time Series of DWSP Annual Delta Diversion, Existing Conditions

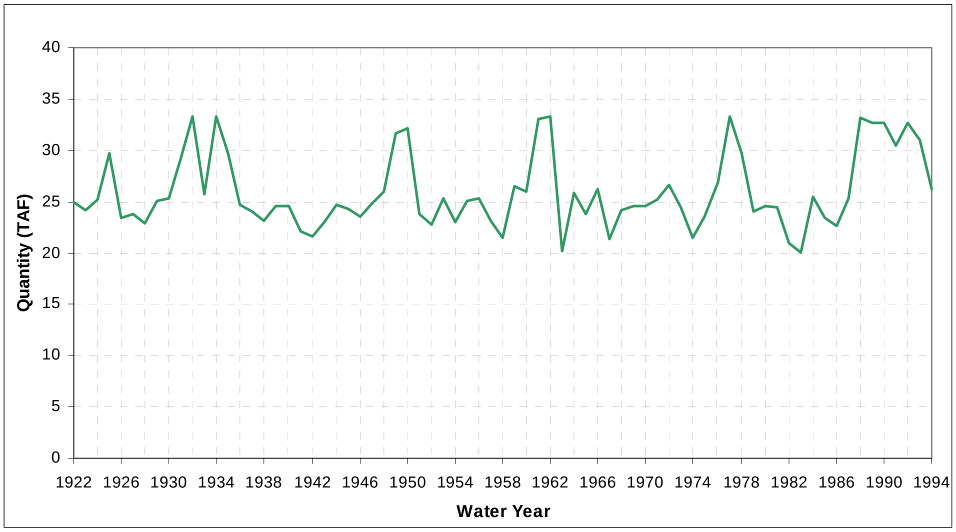
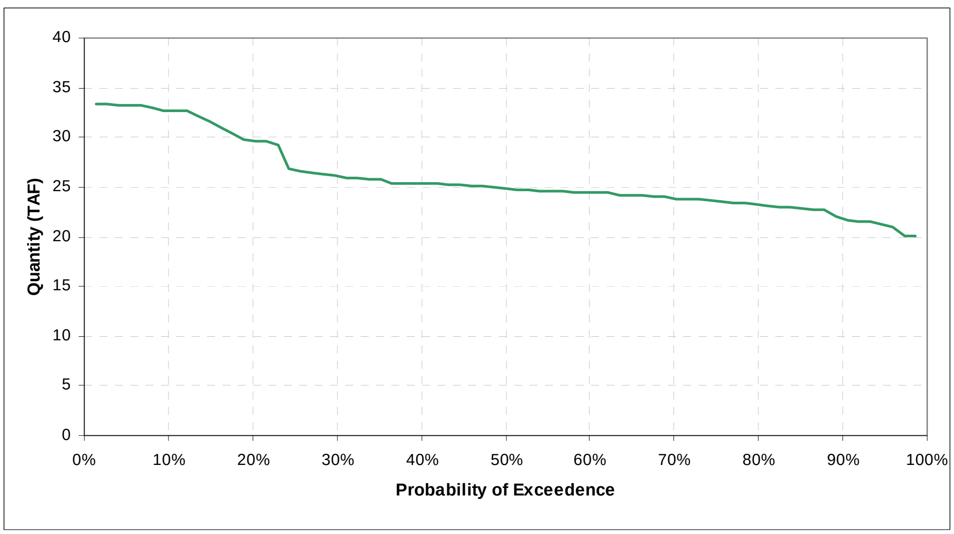


Figure 4-7
Exceedence of DWSP Annual Delta Diversion, Existing Conditions



DWSP diversion in the form of annual time series and annual exceedence plots. Annual DWSP diversion would vary between 20,000 and 33,000 AF/year. About 50 percent of the time diversion would exceed 25,000 AF/year.

For 2015 cumulative conditions, the long-term average annual DWSP water diversion would be 23,000 AF/year with the greatest diversions occurring from May through October. Only in two months (May and June) during the period of simulation would DWSP diversions trigger a change of Delta conditions from excess to balanced water conditions. Figures 4-8 and 4-9 show the simulated DWSP diversion in the form of annual time series and annual exceedence plots. Annual DWSP diversion would vary between 15,000 and 33,000 AF/year. About 50 percent of the time diversion would exceed 20,000 AF/year.

For cumulative conditions in 2050, the long-term average annual diversion would be 114,000 AF/year with the greatest diversions occurring from May through October. Only in five months (twice in May, twice in June, and once in October) during the period of simulation would DWSP diversions trigger a change of Delta conditions from excess to balanced water conditions. Figures 4-10 and 4-11 show the simulated DWSP diversion in the form of annual time series and annual exceedence plots. Annual DWSP diversion would vary between 84,000 and 141,000 AF/year. About 50 percent of the time diversion would exceed 115,000 AF/year.

DWSP diversion of Section 1485 water during balanced water conditions would trigger additional releases from upstream CVP–SWP reservoirs or a reduction in CVP–SWP export pumping. Delta diversion of area of origin water by the DWSP during balanced water conditions, but outside Term 91 restrictions, similarly would trigger additional releases or reduced exports.

Table 4-11 presents average annual CVP and SWP deliveries to their water contractors by water year type. CVP deliveries are separated by location (north of Delta [NOD] and south of Delta [SOD]) and type (agricultural and M&I). SWP deliveries are separated into Table A and Article 21 deliveries to the long-term SWP Contractors. CVP deliveries to water right holders (Settlement Contractors in the Sacramento Valley and Exchange Contractors in the San Joaquin Valley) and wildlife refuges are not shown. Similarly, SWP deliveries to water right holders in the Feather River service area are not shown. These CVP and SWP deliveries are a function of inflow hydrology and contract conditions rather than water supply conditions. As such, they would not be affected by the proposed DWSP.

Under existing conditions, DWSP impacts to CVP long-term average annual deliveries would be about 2,000 AF/year. DWSP impacts to the SWP long-term average annual deliveries would be about 5,000 AF/year. Under 2015 cumulative conditions, DWSP impacts to CVP long-term average annual deliveries would be less than 1,000 AF/year. DWSP impacts to SWP long-term average annual deliveries would be about 6,000 AF/year (including 2,000 AF/year reduction in Article 21 deliveries). Under 2050 cumulative conditions, impacts to the CVP would be about 4,000 AF/year. Under 2050 cumulative conditions, SWP average annual Table A deliveries would be reduced by 18,000 AF/year or 0.6 percent; SWP average annual Article 21 deliveries would be reduced by 9,000 AF/year or about seven percent.

Figure 4-8
Time Series of DWSP Annual Delta Diversion, 2015 Cumulative Conditions

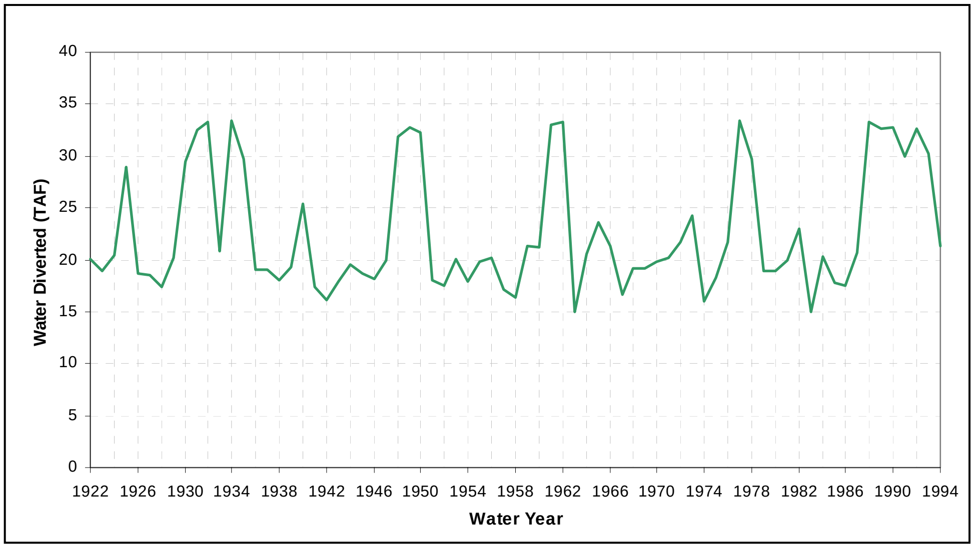


Figure 4-9
Exceedence of DWSP Annual Delta Diversion, 2015 Cumulative Conditions

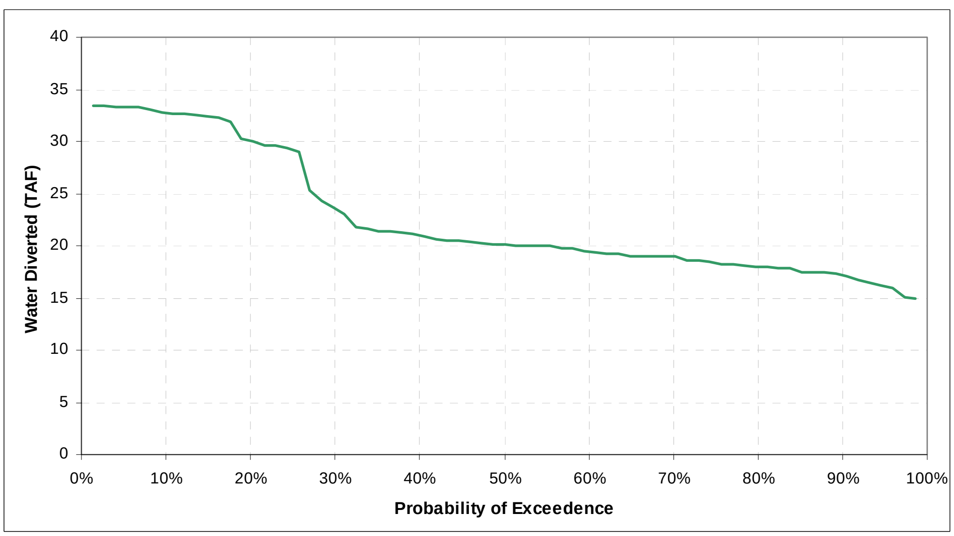
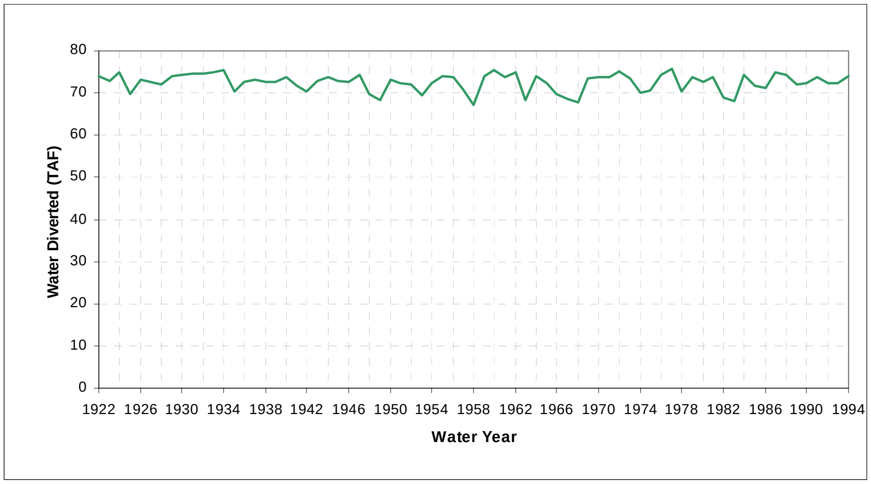
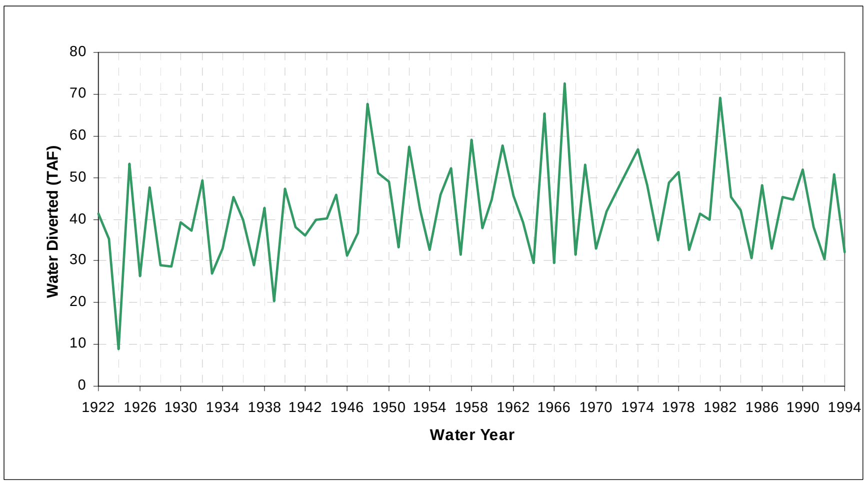


Figure 4-10
Time Series of DWSP Annual Delta Diversion, 2050 Cumulative Conditions

(a) Section 1485 Water



(b) Area of Origin Water



(c) Total Diversion

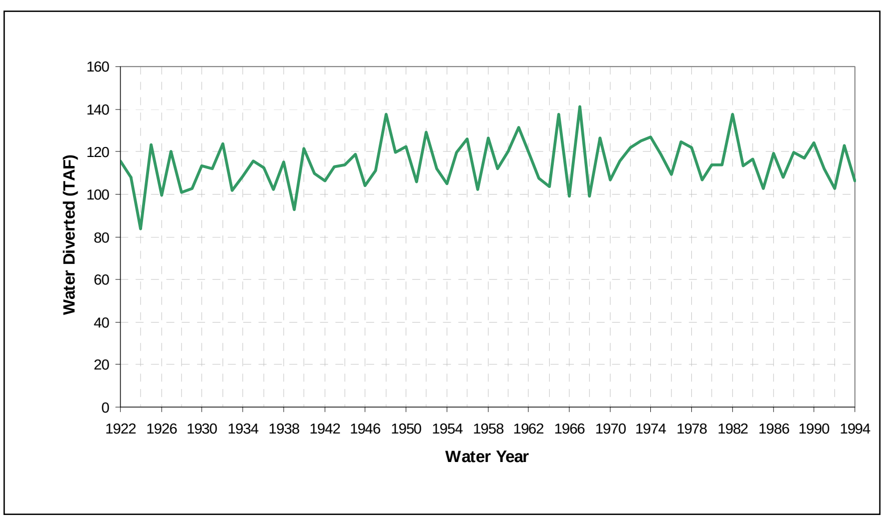
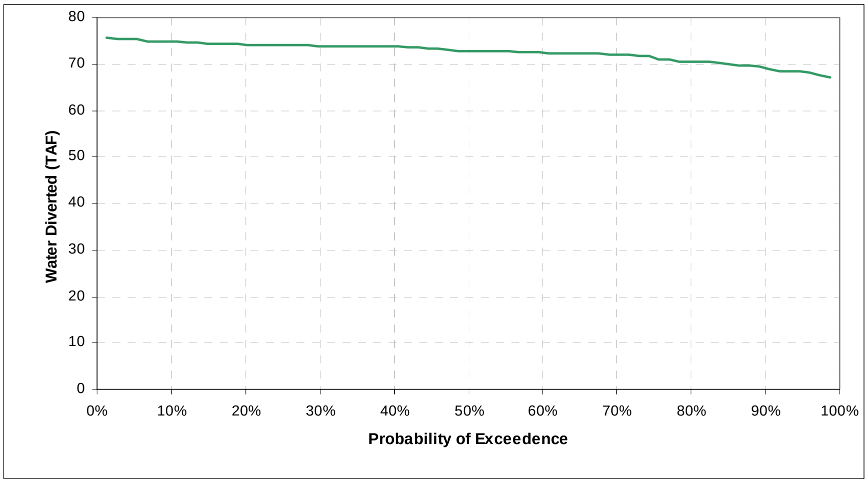
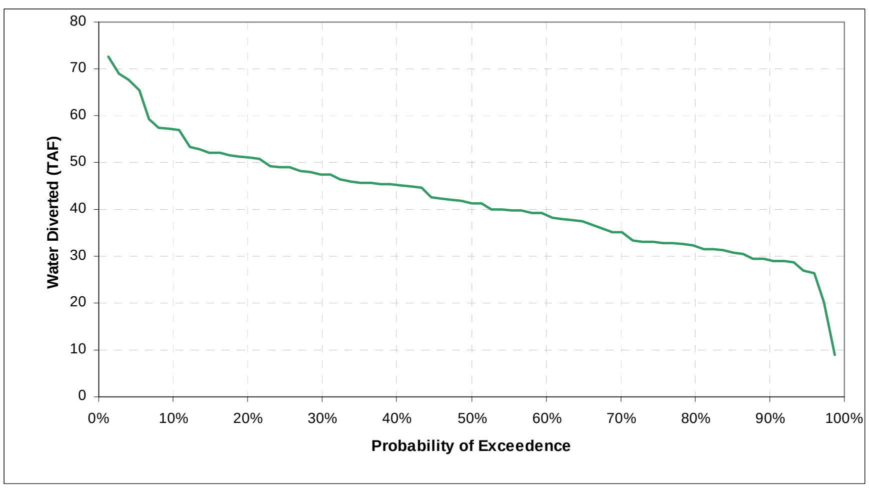


Figure 4-11
Exceedence for DWSP Annual Delta Diversion, 2050 Cumulative Conditions
(a) Section 1485 Water



(b) Area of Origin Water



(c) Total Diversion

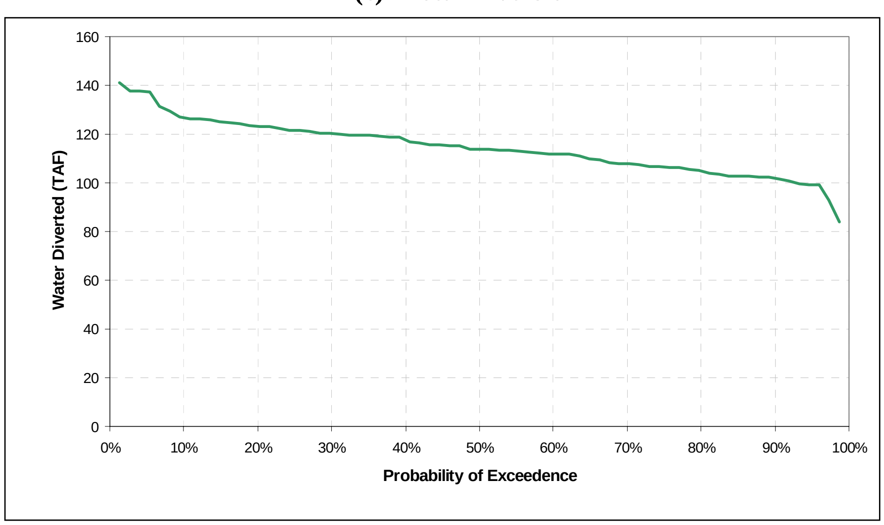


TABLE 4-11
LONG-TERM AVERAGE ANNUAL CVP AND SWP DELIVERIES BY WATER YEAR TYPE

(a) DWSP Compared to Existing Conditions

		Annual Delivery (1,000 AF)					
Contract Type	**Existing Conditions**	**Average**	**Wet**	**Above Normal**	**Below Normal**	**Dry**	**Critical**
CVP							
NOD Agricultural	Existing Conditions	225	320	323	253	159	18
	Changes with proposed DWSP	0	0	0	-1	-1	0
NOD M&I	Existing Conditions	30	31	31	31	29	26
	Changes with proposed DWSP	0	0	0	0	0	0
SOD Agricultural	Existing Conditions	1,044	1,560	1,420	1,081	754	94
	Changes with proposed DWSP	-2	0	1	-5	-6	2
SOD M&I	Existing Conditions	121	142	138	124	109	79
	Changes with proposed DWSP	0	0	0	0	0	0
SWP							
Table A	Existing Conditions	2,963	3,485	3,507	3,485	2,734	1,143
	Changes with proposed DWSP	-4	0	0	-2	-6	-15
Article 21	Existing Conditions	156	288	165	121	74	61
	Changes with proposed DWSP	-1	-1	-4	-1	-1	0

(b) DWSP Compared to 2015 No Project Cumulative Conditions

		Annual Delivery (1,000 AF)					
Contract Type	**Cumulative Conditions**	**Average**	**Wet**	**Above Normal**	**Below Normal**	**Dry**	**Critical**
CVP							
NOD Agricultural	No Project cumulative conditions	230	336	340	249	146	24
	Changes with proposed DWSP	0	0	0	0	0	0
NOD M&I	No Project cumulative conditions	38	34	35	38	41	41
	Changes with proposed DWSP	0	0	0	0	0	0
SOD Agricultural	No Project cumulative conditions	1,071	1,640	1,513	1,092	684	120
	Changes with proposed DWSP	0	0	0	0	1	-1
SOD M&I	No Project cumulative conditions	122	142	140	126	107	81
	Changes with proposed DWSP	0	0	0	0	0	0
Table A	No Project cumulative conditions	3,186	3,963	3,853	3,609	2,729	1,224
	Changes with proposed DWSP	-4	0	0	-6	-8	-5
Article 21	No Project cumulative conditions	131	251	134	102	59	45
	Changes with proposed DWSP	-2	-2	0	-1	-2	-4

(c) DWSP Compared to 2050 No Project Cumulative Conditions

		Annual Delivery (1,000 AF)					
Contract Type	**Cumulative Conditions**	**Average**	**Wet**	**Above Normal**	**Below Normal**	**Dry**	**Critical**
CVP							
NOD Agricultural	No Project cumulative conditions	230	337	340	250	147	23
	Changes with proposed DWSP	-1	0	-1	-3	-2	0
NOD M&I	No Project cumulative conditions	38	34	35	38	41	41
	Changes with proposed DWSP	0	0	0	0	0	0
SOD Agricultural	No Project cumulative conditions	1,070	1,644	1,514	1,092	677	114
	Changes with proposed DWSP	-3	-1	-3	-2	-9	1
SOD M&I	No Project cumulative conditions	121	143	140	126	107	81
	Changes with proposed DWSP	0	0	0	0	0	0
SWP							
Table A	No Project cumulative conditions	3,194	3,963	3,850	3,621	2,744	1,241
	Changes with proposed DWSP	-18	0	2	-28	-38	-29
Article 21	No Project cumulative conditions	133	255	129	105	62	46
	Changes with proposed DWSP	-9	-11	0	-9	-10	-11

Note: Changes are defined as alternative minus baseline.

Reservoir Carryover Storage

The amount of carryover storage affects the balance between CVP-SWP long-term average annual deliveries and dry year deliveries. It is indicative of operators and contractors tolerance of risk. A reduction in water supply available to the CVP-SWP will partly translate into reduced deliveries and partly translate into reduced carryover storage.

CALSIM II modeling shows small changes in CVP and SWP carryover storage would occur under the DWSP compared to baseline conditions (Tables 4-6 through 4-8). For the existing, 2015 project-level cumulative, and 2050 program-level cumulative analyses, the long-term average change in CVP total carryover storage (Trinity, Shasta, Folsom, CVP San Luis) would be 6 TAF, 11 TAF, and 36 TAF, respectively. Similarly for the existing, 2015 cumulative, and 2050 cumulative analyses, the long-term average change in SWP total carryover storage (Oroville, SWP San Luis) would be 5 TAF, 7 TAF, and 31 TAF, respectively. These changes would be small compared to the total average carryover storage under existing conditions of about 4.7 MAF for the CVP and 2.4 MAF for the SWP. Changes in carryover storage are considered to be partly an artifact of CALSIM II modeling, rather than reflecting a potential change in project operations. It is possible to recalibrate CVP–SWP reservoir model operations and project delivery allocations to explicitly account for the reduced availability of surface water in the Delta. This was not done given the relatively small volume that would be diverted under the DWSP.

Under existing conditions, the DWSP would not directly impact operations of New Melones Reservoir. COSMA M&I demands would be met from the SEWD WTP up to the plant capacity or raw water availability, before being supplemented by the DWSP and groundwater pumping. Deliveries from Goodwin Diversion Dam on the Stanislaus River are typically supply-constrained or limited by the existing capacity of the SEWD WTP, rather than being driven by COSMA demands. For the 2015 cumulative analysis, model results for New Melones storage with the DWSP are similar to those for the No Project conditions (Table 4-7). Model results show minor differences in monthly flow and reservoir storage due to differences in CVP south of Delta agricultural allocations, and changes in the resulting drainage return flows to the San Joaquin River.

Mitigation: No mitigation is required.

Impact WATER-3. DWSP operation could affect hydrodynamic and water quality conditions in the Delta and at major Delta water diversion sites. Less than significant for the intake facility. No impact for the raw and treated water pipelines and the WTP.

Water quality in the Delta is a function of many factors, including tidal action, agricultural diversions and return flows, operation of flow control structures (Delta Cross Channel, temporary barriers in the south Delta, and Suisun Marsh Salinity Control Gate), Delta inflows (Sacramento River, Yolo Bypass, San Joaquin River, and Eastside streams), and export pumping at CVP and

SWP facilities. Delta outflow is the key determinant of salinity. Daily outflow, averaged over a tidal cycle, can range from negative 6,000 cfs to over 500,000 cfs during extreme flood events such as January 1997. Average monthly outflow can vary between 3,000 and 20,000 cfs. Correspondingly salinity at most water quality stations can vary by a factor of ten.

Included in the impact analyses were the DWSP's potential effects on drinking water, ecosystem health, agriculture, and water levels. An increase in Delta salinity could adversely affect conjunctive use and groundwater management, agriculture, water reclamation, and reuse; and increase salinity damage from corrosion. The location of X2, a surrogate measure of ecosystem health in the Delta, during February to June indirectly affects the reproduction and survival of several fish species. Net Delta Outflow[3], an indicator of freshwater flow through the Delta, directly affects salinity in the downstream estuarine environment and the abundance of fish and other aquatic organisms. The export to inflow ratio (E/I) provides a measure of migration and transport for resident and anadromous fish in the Delta, and the risk of fish loss through entrainment at the export pumps. QWEST is used as an indicator of changes in habitat conditions and Chinook salmon smolt survival. Water levels in the south Delta are a concern to agriculture water users, because when water levels are low, sufficient pump draft cannot be maintained and irrigation can be interrupted.

The hydrodynamic and water quality conditions within the Delta are driven by the tidal flow and tidal salinity boundary conditions, freshwater inflow, and CVP-SWP exports. Table 4-12 presents a comparison of flow boundary conditions[4] as average monthly values for the 16-year period of simulation. DWSP diversion is accounted for in the aggregate San Joaquin River inflow; they are also shown separately. Changes to Delta boundary flow under the DWSP would have less than one percent effect on tidal flow boundary conditions for existing, 2015 cumulative, and 2050 program cumulative conditions.

Salinity

Changes in salinity at Martinez impact salinity throughout the Delta by tidal action. The salinity boundary condition at Martinez is a function of Net Delta Outflow. Changes in EC at Martinez propagate through the Delta during periods of low Delta outflow.

Table 4-13 presents the average monthly changes in EC due to the DWSP at selected locations in the Delta for existing, 2015 cumulative, and 2050 cumulative conditions. Table 4-14 presents the average monthly percentage change in EC for existing, 2015 cumulative, and 2050 cumulative conditions. Additional EC data for other Delta locations can be found in the Modeling Technical Appendix to this EIR. The greatest EC (salinity) impacts would occur in the late summer, fall and early winter when Net Delta Outflow is low.

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[3] Net Delta Outflow (NDO) is an indication of how much net flow leaves the Delta, typically considered as the net flow at Martinez or Chipps Island. NDO is difficult to measure directly at either Martinez or Chipps Island, so it is often estimated by either summing flows in several channels that represent total outflows, or by computing the mass balance between inflows, exports, and consumptive use in the Delta.

[4] A 19-year repeating mean tide is used as the Martinez stage boundary in DSM2 Hydro module for determining the salinity boundary in the Delta.

TABLE 4-12
BOUNDARY FLOW CONDITIONS
(a) DWSP Compared to Existing Conditions

Location	Average Monthly Flow (cfs)												Total (1,000 AF/year)
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
Sacramento River inflow													
Existing Conditions	12,163	15,719	24,801	32,856	39,075	33,917	24,498	19,532	17,924	17,809	14,072	13,309	15,979
Changes with proposed DWSP	-23	-4	-10	-1	12	3	-10	5	21	18	7	-7	1
San Joaquin River inflow													
Existing Conditions	2,917	2,008	3,232	4,372	6,196	6,144	6,105	5,306	4,116	2,126	1,559	1,782	2,758
Changes with proposed DWSP	-32	-47	-140	-26	-38	-35	-15	-19	-15	-13	-22	-30	-26
CVP-SWP Exports (Tracy PP and Banks PP)													
Existing Conditions	8,241	8,198	9,750	10,403	9,527	7,907	5,356	4,585	6,132	8,370	8,697	9,071	5,808
Changes with proposed DWSP	-11	-13	-23	0	-4	-3	-16	3	10	11	-2	-21	-4
Net Delta Outflow													
Existing Conditions	5,815	9,328	20,498	35,470	47,080	39,291	26,888	19,187	12,202	7,176	4,250	4,612	13,886
Changes with proposed DWSP	-44	-37	-127	-32	-31	-29	-10	-17	-5	-5	-13	-14	-22
DWSP													
Existing Conditions	0	0	0	0	0	0	0	0	0	0	0	0	0
Changes with proposed DWSP	42	24	43	14	14	23	34	46	46	44	45	45	25

(b) DWSP Compared to 2015 No Project Cumulative Conditions

Location	Average Monthly Flow (cfs)												Total (1,000 AF/year)
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
Sacramento River inflow													
No Project cumulative conditions	12,309	15,848	24,994	32,874	39,265	34,248	24,743	19,217	17,872	17,702	13,788	12,820	15,979
Changes with proposed DWSP	-40	25	-67	18	15	0	17	17	-18	-26	151	-18	4
San Joaquin River inflow													
No Project cumulative conditions	2,816	1,987	3,095	4,390	6,209	6,159	5,981	5,505	4,116	2,216	1,633	1,799	2,761
Changes with proposed DWSP	-36	-17	-11	-10	-11	-17	-29	-45	-47	-45	-45	-45	-22
CVP-SWP Exports (Tracy PP and Banks PP)													
No Project cumulative conditions	8,564	8,534	10,632	10,927	9,788	8,511	5,562	4,657	6,224	8,395	8,436	9,115	5,997
Changes with proposed DWSP	27	7	-74	40	-18	-35	13	28	-26	-50	108	-39	-1
Net Delta Outflow													
No Project cumulative conditions	5,489	9,093	19,657	34,861	46,984	39,126	26,712	18,974	12,068	7,115	4,245	4,114	13,682
Changes with proposed DWSP	-102	1	1	-30	19	28	-29	-57	-39	-22	-2	-30	-16
DWSP													
No Project cumulative conditions	0	0	0	0	0	0	0	0	0	0	0	0	0
Changes with proposed DWSP	40	17	9	8	10	17	29	45	46	44	45	45	22

(c) DWSP Compared to 2050 No Project Cumulative Conditions

Location	Average Monthly Flow (cfs)												Total (1,000 AF/year)
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
Sacramento River inflow													
No Project cumulative conditions	12,316	15,860	25,018	32,953	39,301	34,307	24,723	19,197	17,712	17,642	13,796	12,777	15,974
Changes with proposed DWSP	-106	-9	-30	-20	-14	-70	55	45	67	74	-17	115	5
San Joaquin River inflow													
No Project cumulative conditions	2,925	2,024	3,046	4,423	6,275	6,238	6,067	5,614	4,223	2,293	1,708	1,858	2,808
Changes with proposed DWSP	-194	-148	-139	-132	-136	-167	-165	-208	-159	-101	-113	-234	-114
CVP-SWP Exports (Tracy PP and Banks PP)													
No Project cumulative conditions	8,575	8,545	10,593	10,981	9,765	8,553	5,577	4,682	6,176	8,390	8,472	9,121	6,002
Changes with proposed DWSP	18	-7	-79	7	0	-46	-22	-4	-106	60	-66	-67	-19
Net Delta Outflow													
No Project cumulative conditions	5,594	9,130	19,674	34,929	47,133	39,232	26,758	19,038	12,064	7,136	4,292	4,125	13,722
Changes with proposed DWSP	-317	-149	-92	-171	-166	-203	-98	-159	14	-88	-64	-66	-94
DWSP													
No Project cumulative conditions	0	0	0	0	0	0	0	0	0	0	0	0	0
Changes with proposed DWSP	201	148	139	130	135	166	164	208	158	101	113	234	115

TABLE 4-13
AVERAGE MONTHLY ELECTRICAL CONDUCTIVITY AT SELECTED DELTA LOCATIONS
(a) DWSP Compared to Existing Conditions

	Average Monthly EC (µS/cm)												
Location	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Avg**
Sacramento River at Emmaton													
Existing Conditions	2,188	1,659	1,170	795	571	308	344	530	945	1,025	1,570	2,251	1,113
Changes with proposed DWSP	-13	-10	5	-3	-2	0	1	4	-3	-49	-9	18	-5
Old River at CCWD's Los Vaqueros intake													
Existing Conditions	648	556	542	493	480	369	316	350	339	361	425	604	457
Changes with proposed DWSP	3	-2	1	3	1	0	5	3	1	-1	-4	5	1
Old River at Rock Slough													
Existing Conditions	714	601	591	520	472	326	273	295	323	370	473	700	471
Changes with proposed DWSP	2	-4	2	2	1	1	2	2	1	-4	-6	6	0
West Canal at mouth of Clifton Court Forebay intake													
Existing Conditions	587	515	506	463	464	433	354	377	353	358	398	539	446
Changes with proposed DWSP	3	-1	1	3	0	0	4	2	1	-1	-3	4	1
Delta Mendota Canal at Tracy Pumping Plant													
Existing Conditions	594	534	526	478	481	470	374	392	374	392	440	593	471
Changes with proposed DWSP	3	-1	1	2	0	0	3	2	1	0	-3	4	1
Rock Slough at Contra Costa Canal at Pumping Plant No. 1													
Existing Conditions	746	675	657	735	782	682	484	417	363	415	486	654	591
Changes with proposed DWSP	5	-2	-2	5	0	3	2	3	1	-1	-7	2	1
San Joaquin River at Jersey Point													
Existing Conditions	1,856	1,573	1,358	995	675	363	301	402	688	918	1,423	2,143	1,058
Changes with proposed DWSP	-6	-8	11	1	-2	0	0	3	1	-18	-6	18	0
Martinez/Benicia boundary condition													
Existing Conditions	20,223	18,106	16,156	12,882	10,328	8,150	9,588	12,507	15,335	17,715	20,030	21,020	15,170
Changes with proposed DWSP	-5	-9	33	24	3	4	4	15	1	-50	-27	10	0

(b) DWSP Compared to 2015 No Project Cumulative Conditions

	Average Monthly EC (µS/cm)												
Location	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Avg**
Sacramento River at Emmaton													
No Project cumulative conditions	2,113	1,726	1,387	981	601	344	134	493	798	1,001	1,490	2,200	1,106
Changes with proposed DWSP	-8	-1	1	2	1	0	0	0	-1	-2	-2	3	-1
Old River at CCWD's Los Vaqueros intake													
No Project cumulative conditions	624	579	574	590	515	385	167	339	333	357	415	575	455
Changes with proposed DWSP	1	-1	2	0	0	-1	-1	-1	-1	0	1	2	0
Old River at Rock Slough													
No Project cumulative conditions	722	599	642	619	474	321	266	277	303	356	457	702	478
Changes with proposed DWSP	0	-1	2	1	-1	0	0	-1	0	0	1	3	0
West Canal at mouth of Clifton Court Forebay intake													
No Project cumulative conditions	570	540	519	531	496	430	213	366	359	362	397	521	442
Changes with proposed DWSP	1	0	1	1	1	0	0	-1	-1	0	1	2	0
Delta Mendota Canal at Tracy Pumping Plant													
No Project cumulative conditions	589	544	532	538	514	470	229	372	386	413	451	591	469
Changes with proposed DWSP	1	0	1	0	0	0	0	-1	-1	0	0	2	0
Rock Slough at Contra Costa Canal at Pumping Plant No. 1													
No Project cumulative conditions	716	701	659	808	845	716	371	438	368	398	467	620	592
Changes with proposed DWSP	2	-2	0	0	-2	-3	-1	-1	0	0	1	2	0
San Joaquin River at Jersey Point													
No Project cumulative conditions	1,895	1,588	1,597	1,320	784	426	128	376	555	856	1,283	2,019	1,069
Changes with proposed DWSP	-2	1	3	2	2	1	1	2	1	1	4	9	2
Martinez/Benicia boundary condition													
No Project cumulative conditions	20,519	18,440	17,041	14,925	11,271	8,625	7,782	11,653	14,324	17,379	19,646	20,887	15,208
Changes with proposed DWSP	0	5	9	12	8	16	10	11	5	1	2	8	7

(c) DWSP Compared to 2050 No Project Cumulative Conditions

Location	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Avg
	Average Monthly EC (µS/cm) and Change in Monthly EC (µS/cm)												
Sacramento River at Emmaton													
No Project cumulative conditions	2,195	1,631	1,225	807	544	309	327	555	882	1,005	1,625	2,334	1,120
Changes with proposed DWSP	-37	-3	-1	14	4	2	3	10	-11	-20	-7	12	-3
Old River at CCWD's Los Vaqueros intake													
No Project cumulative conditions	662	566	579	585	492	370	333	337	341	355	423	606	471
Changes with proposed DWSP	4	-2	8	5	0	-1	-4	-2	-3	-2	1	14	1
Old River at Rock Slough													
No Project cumulative conditions	721	598	640	611	475	321	269	281	305	354	457	698	477
Changes with proposed DWSP	2	-3	9	4	0	-1	-1	0	0	-1	3	18	2
West Canal at mouth of Clifton Court Forebay intake													
No Project cumulative conditions	604	532	521	530	476	428	387	364	369	359	403	549	460
Changes with proposed DWSP	5	-1	6	4	4	1	-2	-3	-3	-5	-1	12	1
Delta Mendota Canal at Tracy Pumping Plant													
No Project cumulative conditions	608	535	536	533	498	468	397	367	399	413	458	621	486
Changes with proposed DWSP	5	-1	5	3	3	1	-2	-3	-1	-5	-2	9	1
Old River at Contra Costa Canal at Pumping Plant No. 1													
No Project cumulative conditions	762	693	650	818	847	722	504	407	349	396	472	642	605
Changes with proposed DWSP	10	-7	3	2	-1	-2	-1	-2	0	0	-1	13	1
San Joaquin River at Jersey Point													
No Project cumulative conditions	1,922	1,547	1,629	1,141	675	373	282	405	602	879	1,341	2,171	1,081
Changes with proposed DWSP	-17	9	11	7	11	8	5	7	8	-1	25	56	11
Martinez/Benicia boundary condition													
No Project cumulative conditions	20,599	18,319	16,666	13,488	10,439	8,218	9,605	12,504	15,306	17,728	20,040	21,154	15,339
Changes under proposed DWSP	5	28	25	66	68	83	76	74	19	-12	10	35	40

For existing conditions, changes in average monthly EC would be about one percent or less for the entire year. For 2015 cumulative conditions, changes in average monthly EC would be less than 0.5 percent for the entire year.

For 2050 cumulative conditions, maximum increases in average monthly EC would be less than three percent. The largest impacts would occur in December/January and September. There is no accepted standard for a significance threshold with regard to model determinations of project impacts. CALFED estimates modeling uncertainty at 10 percent and identifies all impacts below 10 percent as less than significant (CALFED, 2000).

Prior to expansion of the DWSP beyond the 30-mgd capacity, additional CEQA environmental review will be required to re-evaluate the impacts of expanded DWSP operation. At that time, additional Delta water resources modeling will be conducted using the latest models and information about current and future Delta conditions. Several potential actions could influence and alter Delta conditions in the future. For example, it is possible that in the future operation of Friant Dam may have changed so that more water is being released into the San Joaquin River than is presently. Other developments in the Delta may also affect the impacts of the DWSP. If at that time, modeling shows that the DWSP would significantly affect salinity concentrations at other intakes, then DWSP operations would be modified to keep impacts to less than significant. This would involve altering water diversion patterns for the DWSP – modifying the quantity and timing of diversions to maintain Delta water quality at acceptable levels.

TABLE 4-14
PERCENT CHANGE IN AVERAGE MONTHLY ELECTRICAL CONDUCTIVITY AT SELECTED DELTA LOCATIONS

(a) DWSP Compared to Existing Conditions

Location	Change in Average Monthly EC (%)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Avg
Sacramento River at Emmaton	-0.6	-0.6	0.4	-0.4	-0.3	0.0	0.2	0.7	-0.3	-4.8	-0.6	0.8	-0.5
Old River at CCWD's Los Vaqueros intake	0.5	-0.4	0.2	0.6	0.2	0.0	1.4	0.8	0.3	-0.4	-1.0	0.8	0.3
Old River at Rock Slough	0.3	-0.6	0.4	0.5	0.1	0.2	0.8	0.7	0.3	-1.0	-1.3	0.9	0.1
Rock Slough at Contra Costa Canal	0.7	-0.3	-0.3	0.6	0.1	0.4	0.4	0.6	0.3	-0.1	-1.4	0.2	0.1
West Canal at mouth of Clifton Court Forebay	0.5	-0.2	0.2	0.6	0.0	0.0	1.1	0.7	0.4	-0.2	-0.8	0.8	0.3
Delta Mendota Canal at Tracy Pumping Plant	0.5	-0.2	0.1	0.4	0.1	0.0	0.9	0.6	0.3	-0.1	0.7	0.6	0.2
San Joaquin River at Jersey Point	-0.3	-0.5	0.8	0.1	-0.3	0.1	0.1	0.8	0.2	-2.0	-0.4	0.8	0.0
Martinez/Benicia boundary condition	0.0	-0.1	0.2	0.2	0.0	0.0	0.0	0.1	0.0	-0.3	-0.1	0.0	0.0

(b) DWSP Compared to 2015 No Project Cumulative Conditions

Location	Change in Average Monthly EC (%)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Avg
Sacramento River at Emmaton	-0.4	-0.1	0.1	0.2	0.1	0.1	0.3	-0.1	-0.1	-0.2	-0.1	0.1	-0.1
Old River at CCWD's Los Vaqueros intake	0.1	-0.1	0.3	0.1	0.0	-0.2	-0.3	-0.3	-0.2	0.0	0.2	0.4	0.0
Old River at Rock Slough	0.0	-0.2	0.3	0.2	-0.2	-0.1	-0.1	-0.2	0.0	0.0	0.2	0.5	0.1
Rock Slough at Contra Costa Canal	0.2	-0.2	0.0	0.0	-0.2	-0.4	-0.2	-0.2	-0.1	0.0	0.1	0.3	0.0
West Canal at mouth of Clifton Court Forebay	0.2	-0.1	0.3	0.1	0.2	0.0	-0.2	-0.3	-0.2	-0.1	0.2	0.4	0.1
Delta Mendota Canal at Tracy Pumping Plant	0.2	0.0	0.2	0.1	0.1	0.0	-0.1	-0.3	-0.2	-0.1	0.1	0.3	0.0
San Joaquin River at Jersey Point	-0.1	0.0	0.2	0.1	0.2	0.3	0.7	0.6	0.2	0.2	0.3	0.5	0.2
Martinez/Benicia boundary condition	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0

(c) DWSP Compared to 2050 No Project Cumulative Conditions

Location	Change in Average Monthly EC (%)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Avg
Sacramento River at Emmaton	-1.7	-0.2	-0.1	1.7	0.8	0.5	0.9	1.8	-1.3	-2.0	-0.5	0.5	-0.3
Old River at CCWD's Los Vaqueros intake	0.6	-0.3	1.4	0.8	0.0	-0.4	-1.3	-0.6	-1.0	-0.7	0.2	2.4	0.3
Old River at Rock Slough	0.3	-0.4	1.4	0.6	0.0	-0.4	-0.5	-0.2	0.0	-0.4	0.6	2.6	0.5
Rock Slough at Contra Costa Canal	1.2	-1.0	0.4	0.3	-0.1	-0.2	-0.2	-0.5	0.0	-0.1	-0.2	2.0	0.2
West Canal at mouth of Clifton Court Forebay	0.9	-0.2	1.2	0.8	0.9	0.2	-0.6	-0.9	-0.7	-1.3	-0.4	2.1	0.3
Delta Mendota Canal at Tracy Pumping Plant	0.9	-0.1	0.9	0.6	0.6	0.1	-0.5	-0.9	-0.3	-1.3	-0.4	1.5	0.2
San Joaquin River at Jersey Point	-0.9	0.6	0.7	0.6	1.7	2.1	1.9	1.8	1.4	-0.1	1.9	2.6	1.0
Martinez/Benicia boundary condition	0.0	0.2	0.2	0.5	0.6	1.0	0.8	0.6	0.1	-0.1	0.0	0.2	0.3

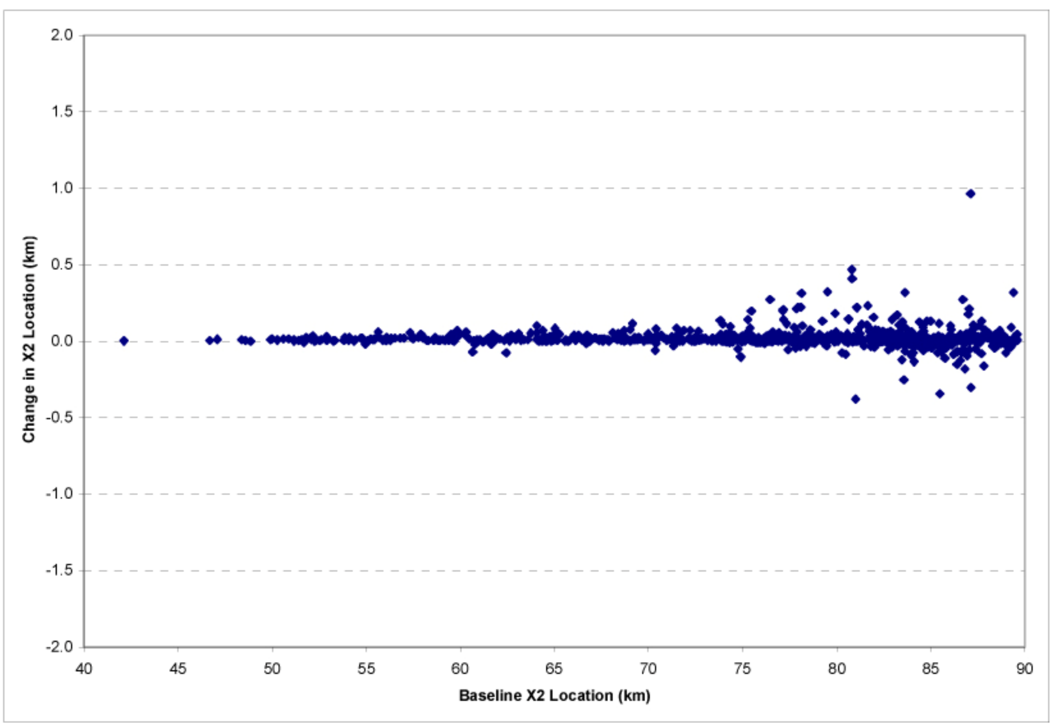
X2

The DWSP may affect the location of X2 either directly through Delta diversion, reducing Net Delta Outflow, or indirectly by triggering changes in CVP–SWP reservoir operations or exports as a result of DWSP diversion during Delta balanced conditions. Under existing conditions analysis, the average monthly DWSP diversion would range from 16 to 46 cfs. This is small compared to the 11,400 cfs flow required to maintain X2 at Chipps Island on the Sacramento River (located at 74.0 kilometers [km]). A DWSP diversion of 46 cfs in conjunction with a Net

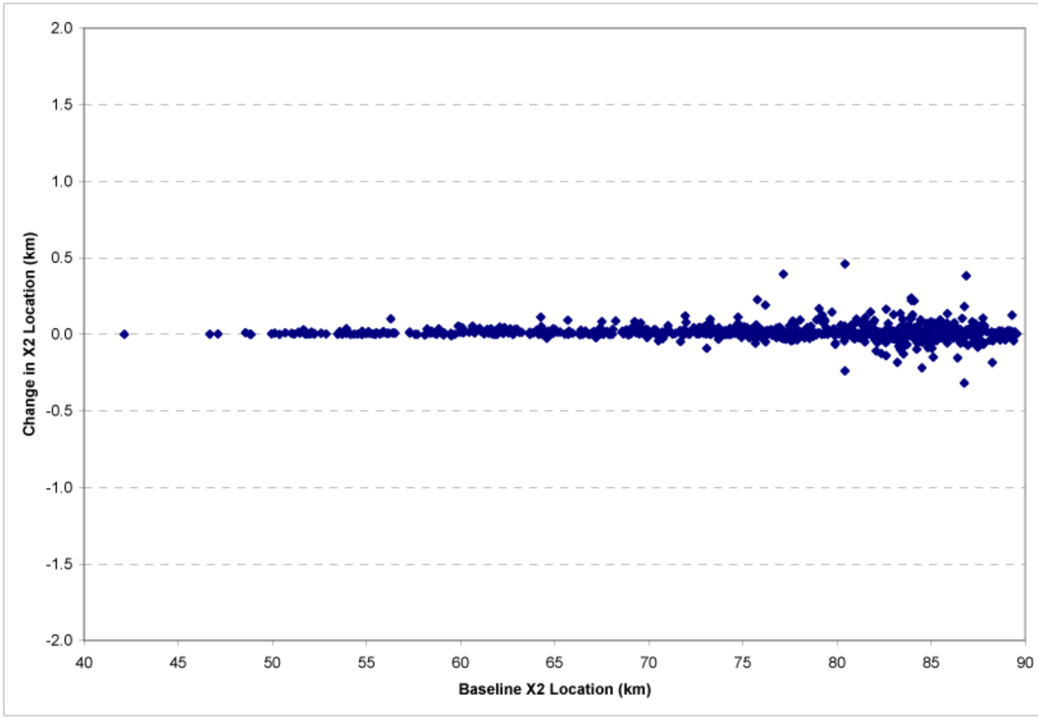
Delta Outflow of 11,400 cfs would cause X2 to move upstream by approximately 0.03 km. Figure 4-12 shows the change in X2 location with the DWSP compared to existing conditions. On average, the maximum increase in X2 location with the DWSP would be approximately 0.5 km, and would be caused by changes in CVP-SWP operations. Average monthly changes in X2 location would be 0.1 km or less.

For 2015 project-level cumulative conditions, the average monthly DWSP diversion would range from 12 to 46 cfs. Figure 4-12 shows the change in X2 location with the DWSP (30 mgd WTP capacity) compared to No Project conditions. The maximum average increase in X2 location under with the DWSP would be approximately 0.5 km, resulting from changes in CVP–SWP operations. Average monthly changes in the X2 location would be about 0.03 km or less.

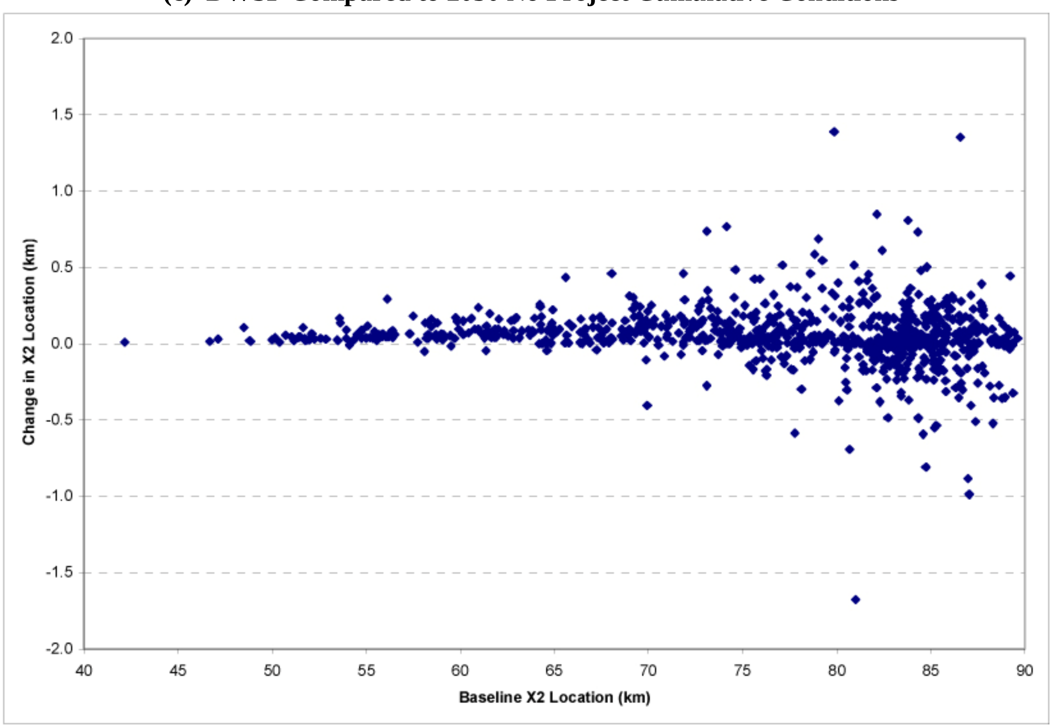
FIGURE 4-12
CHANGE IN X2 LOCATION
(a) DWSP Compared to Existing Conditions



(b) DWSP Compared to 2015 No Project Cumulative Conditions



(c) DWSP Compared to 2050 No Project Cumulative Conditions



Under 2050 program-level cumulative conditions, the average monthly DWSP diversion would range from 99 to 232 cfs. A DWSP diversion of 232 cfs in conjunction with a Net Delta Outflow of 11,400 cfs would cause X2 to move upstream by approximately 0.16 km. Figure 4-12 shows the change in X2 location with the DWSP (160 mgd WTP capacity) compared to the 2050 No Project cumulative conditions. The maximum increase in X2 location under with the DWSP would be approximately 1.4 km, resulting from changes in CVP–SWP operations. Average monthly changes in the X2 location would be about 0.1 km or less.

Water Temperature

Changes in reservoir and river water temperature are caused primarily by changes in CVP and SWP operations. Temperature changes in rivers for the DWSP compared to existing, 2015 cumulative and 2050 cumulative conditions would be typically about 0.1^{o} F or less. Model simulation results show that in a few specific months, temperature changes would be greater. These temperature differences typically would result from differences in the timing of storage transfer from north of the Delta to San Luis Reservoir, and are not a direct consequence of the DWSP. Temperature differences in reservoir operations in specific months are triggered by reaching threshold values or by step functions used in the model, and often are a modeling artifact, rather than an impact caused by the DWSP. Details of the modeling analysis can be found in the Modeling Technical Appendix to this EIR.

Dissolved Oxygen

One of the most significant water quality problems in the Delta occurs in the first seven miles of the Stockton Deep Water Ship Channel below the Port of Stockton. In this reach of the channel, dissolved oxygen concentrations can be 0 mg/L for extended periods of time (Lee and Jones-Lee, 2004). Because of low dissolved oxygen concentrations over the last 30 to 40 years, the CVRWQCB has listed this reach of the San Joaquin River as Clean Water Act 303(d) “impaired.” For this reason, the CVRWQCB has developed a total maximum daily load (TMDL) for oxygen-demanding materials and other factors that may contribute to the low dissolved oxygen concentrations. The construction and operation and of the proposed DWSP would not discharge any nutrients, heavy metals, pesticides, or other chemical compounds that would deplete the dissolved oxygen concentrations in the river. Therefore, the DWSP would not impact dissolved oxygen concentrations in the river.

Operation of the proposed 30-mgd DWSP would not significantly affect hydrodynamic and water quality conditions in the San Joaquin River near the intake, the Delta, or at major Delta water diversion sites or flows within the Stockton Deep Water Ship Channel. Therefore, the impact would be less than significant.

Significance After Mitigation: No mitigation is required.

4.2 FISHERIES

4.2.1 SETTING

STATUS AND OCCURRENCE OF FISH SPECIES

The Sacramento-San Joaquin Delta, the most upstream portion of the Bay-Delta estuary, is a triangle-shaped area composed of islands, river channels, and sloughs at the confluence of the Sacramento and San Joaquin rivers. The Delta's tidally influenced channels and sloughs, covering a surface area of approximately 75 square miles, support a number of resident freshwater fish and invertebrate species. The waters are also used as migration corridors and rearing areas for anadromous fish species and as spawning and rearing grounds for many estuarine species. Shallow-water habitats (i.e., less than three meters in depth [mean low water]) are considered particularly important forage, reproduction, rearing, and refuge areas for numerous fish and invertebrate species (Reclamation and DWR, 2003).

The geographic distribution of species within the Delta is determined in part by salinity gradients. Results of a number of investigations have shown changes in species composition and abundance within the Delta over the past several decades. Many of the fish and macroinvertebrate species have experienced a generally declining trend in abundance (Moyle et al., 1995). Several factors have contributed to the decline of fish species within the Delta, including changes in hydrologic patterns resulting from water project operations, loss of habitat, contaminant input, entrainment in diversions, and introduction of non-native species.

Seasonal and yearly variability in hydrologic conditions, including the magnitude of flows into the Bay-Delta estuary from the Sacramento and San Joaquin rivers and the outflow from the Delta into San Francisco Bay, have been identified as important factors affecting habitat quality and availability, and abundance of fish and invertebrate species within the Bay-Delta estuary. Flows within the Bay-Delta system may affect larval and juvenile transport and dispersal, water temperatures (primarily within the upstream tributaries), dissolved oxygen concentrations (e.g., during the fall within the lower San Joaquin River), and salinity gradients within the estuary. The seasonal timing and geographic location of salinity gradients are thought to be important factors affecting habitat quality and availability for a number of species (Baxter et al., 1999). Operation of upstream storage impoundments, in combination with natural hydrologic conditions, affects seasonal patterns in the distribution of salinity within the system. Water project operations, for example, may result in a reduction in Delta inflows during the late winter and spring with an increase in Delta inflows, when compared to historical conditions, during the summer months (Reclamation and DWR, 2003). Objectives have been established for the location of salinity gradients during the late winter and spring to support estuarine habitat for a number of species (X2 location), in addition to other salinity criteria for municipal, agricultural, and wetland benefits (Reclamation and DWR, 2003).

Despite the high degree of habitat modification that has occurred in the Delta, Delta habitats are of key importance to fisheries, as illustrated by the more than 120 fish species that rely on its unique habitat characteristics for one or more of their lifestages (USEPA, 1993). Fish species found in the Delta include anadromous species, as well as freshwater, brackish water, and saltwater species. The Delta provides spawning and nursery habitat for more than 40 resident and anadromous fish species, including Delta smelt, Sacramento splittail, American shad, and striped bass. The Delta also is a migration corridor and seasonal rearing habitat for Chinook salmon and steelhead (Reclamation and DWR, 2003). Table 4-15 gives the common and scientific names for fish species found in the Delta that could be potentially affected by the DWSP.

ESSENTIAL FISH HABITAT

The Pacific Fisheries Management Council (PFMC) has designated the Central San Francisco Bay, Suisun Bay, and the Delta as Essential Fish Habitat (EFH) to protect and enhance habitat for coastal marine fish and macroinvertebrate species that support commercial fisheries. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The amended Magnuson-Stevens Fishery Conservation and Management Act, also known as the Sustainable Fisheries Act (Public Law 104-297), requires all federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH of commercially managed marine and anadromous fish species. The EFH provisions of the Sustainable Fisheries Act are designed to protect fishery habitat from being lost due to disturbance and degradation.

Under the Pacific Coast Salmon Fishery Management Plan, the entire San Francisco Bay-Delta estuary has been designated as EFH for spring-, fall-, late fall- and winter-run Central Valley Chinook salmon (Pacific salmon). These areas serve as a migratory corridor, holding area and rearing habitat for both adult and juvenile salmon. The Delta, including the proposed water intake structure location, has been designated as EFH for Pacific salmon. In addition, operation of the DWSP intake facility would have the potential to directly and indirectly affect Delta outflow, seasonal salinity, and hydrodynamics within the estuary that serves as EFH for other managed species. These potential project effects on EFH are assessed as part of the DWSP impact analyses.

CRITICAL HABITAT

On December 19, 1994, USFWS designated critical habitat for Delta smelt within the Sacramento-San Joaquin system. Specific areas identified as critical habitat for Delta smelt spawning include Barker, Lindsay, Cash, Prospect, Georgiana, Beaver, Hog, Sycamore Sloughs and the Sacramento River in the Delta, and the tributaries of northern Suisun Bay. Areas identified as critical habitat for Delta smelt rearing extend eastward from the Carquinez Straits, including Suisun Bay (including the contiguous Grizzly, and Honker Bays), Montezuma Slough and its tributary sloughs, up the Sacramento River to its confluence with Three-Mile Slough, and south along the San Joaquin River including Big Break. The DWSP intake would be located within the critical habitat of Delta smelt.

TABLE 4-15
FISHES SPECIES POTENTIALLY AFFECTED BY THE DWSP

Common Name	*Scientific Name*
Pacific lamprey *	*Lampetra tridentate*
River lamprey *	*Lampetra ayersi*
White sturgeon *	*Acipenser transmontanus*
Green sturgeon *	*Acipenser medirostris*
American shad	*Alosa sapidissima*
Threadfin shad	*Dorosoma petenense*
Central Valley steelhead *	*Oncorhynchus mykiss*
Chum salmon	*Oncorhynchus keta*
Chinook salmon (winter, spring, fall, and late-fall runs) *	*Oncorhynchus tshawytscha*
Longfin smelt *	*Spirinchus thaleichthys*
Delta smelt *	*Hypomesus transpacificus*
Wakasagi	*Hypomesus nipponensis*
Hitch *	*Lavinia exilicauda*
Sacramento blackfish *	*Orthodon microlepidotus*
Sacramento splittail *	*Pogonichthys macrolepidotus*
Hardhead *	*Mylopharodon conocephalus*
Sacramento pikeminnow *	*Ptychocheilus grandis*
Fathead minnow	*Pimephales promelas*
Golden shiner	*Notemigonus chrysoleucas*
Common carp	*Cyprinus carpio*
Goldfish	*Carassius auratus*
Sacramento sucker *	*Catostomus occidentalis*
Black bullhead	*Ameiurus melas*
Brown bullhead	*Ameiurus nebulosus*
Yellow bullhead	*Ameiurus natalis*
White catfish	*Ameiurus catus*
Channel catfish	*Ictalurus punctatus*
Western mosquitofish	*Gambusia affinis*
Rainwater killfish	*Lucania parva*
Striped bass	*Morone saxatilis*
Inland silverside	*Menidia beryllina*
Bigscale logperch	*Percina macrolepida*
Bluegill	*Lepomis macrochirus*
Redear sunfish	*Lepomis microlophus*
Green sunfish	*Lepomis cyanellus*
Warmouth	*Lepomis gluosus*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*
Largemouth bass	*Micorpterus salmoides*
Smallmouth bass	*Micropterus dolomieui*
Bigscale logperch	*Percina macrolepida*
Tule perch *	*Hysterocarpus traski*
Threespine stickleback *	*Gasterosteus aculeatus*
Yellowfin goby	*Acanthogobius flavimanus*
Chameleon goby	*Tridentiger trigonocephalus*
Prickly sculpin *	*Cottus asper*

* indicates a native species.

NOAA Fisheries has designated the Sacramento River, Delta, and the San Francisco Bay as critical habitat for winter-run Chinook salmon. The DWSP intake would not be located within the region of the estuary designated as critical habitat for winter-run Chinook salmon. In December 2004, NOAA Fisheries proposed to designate critical habitat within the Delta and its tributaries for spring-run Chinook salmon and Central Valley steelhead. A final rule designating critical habitat for the species is expected in the summer of 2005. The DWSP intake would not be located within the region of the estuary proposed as critical habitat for spring-run Chinook salmon, but would be located within the proposed critical habitat for Central Valley steelhead.

The potential impacts of DWSP intake construction and operation on critical habitat for both Delta smelt and Central Valley steelhead are included below in the analysis of both direct and indirect DWSP effects.

SPECIAL-STATUS SPECIES

A species has special status when it is listed as threatened or endangered; is proposed as or is a candidate for listing as threatened or endangered; is a species of special concern (state); is fully protected (state), according to applicable federal or state law, such as the federal Endangered Species Act of 1973 and the California Endangered Species Act of 1972; or is subject to specific management programs designed to protect or enhance the species status.

The construction and operation of the DWSP may affect special-status fish species that inhabit the Delta. Table 4-16 lists the special-status species, as designated by federal or state agencies, found in the Delta near the intake site.

The following descriptions summarize the life history, distribution, and current status of the special-status fish species that inhabit the Delta near the intake site.

TABLE 4-16
SPECIAL-STATUS FISH SPECIES FOUND IN THE SACRAMENTO/SAN JOAQUIN DELTA

		Listing Status	
Common Name	**Scientific Name**	**Federal[1]**	**State[2]**
Delta smelt	*Hypomesus transpacificus*	FT	ST
Central Valley steelhead	*Oncorhynchus mykiss*	FT	--
Central Valley spring-run Chinook salmon	*Oncorhynchus tshawytscha*	FT	ST
Winter-run Chinook salmon	*Oncorhynchus tshawytscha*	FE	SE
Central Valley fall/late fall-run Chinook salmon	*Oncorhynchus tshawytscha*	FP	CSC
Green sturgeon	*Acipenser medirostris*	FP	CSC
River lamprey	*Lampetra tridentate*	FSC	CSC
Sacramento splittail	*Pogonichthys macrolepidotus*	FSC	CSC
Longfin smelt	*Spirinchus thaleichthys*	FSC	CSC

Sources: CNDDB, 2004; NOAA Fisheries, 2004; USFWS, 2004.
[1] FE = Federal endangered, FT = Federal threatened; FP = Federal proposed; FSC = Federal species of concern
[2] SE = State endangered; ST = state threatened; CSC = California species of special concern.

Chinook Salmon

Chinook salmon typically return to their natal stream to spawn. The timing of spawning of the four races of Chinook salmon in Central Valley rivers follows (SWRCB, 1999).

- Adult fall-run Chinook salmon migrate through the Sacramento/San Joaquin Delta and into Central Valley rivers from July through December, and spawn from October through December. Peak spawning activity usually occurs in October and November.

- Adult late-fall-run Chinook salmon migrate through the Delta and into the Sacramento River from October through March, or possibly April, and spawn from January through April. Peak spawning activity occurs in February and March.

- Adult winter-run Chinook salmon migrate through the Delta from late November through June and into the Sacramento River from December through July. Winter-run Chinook salmon remain in the river up to several months before spawning. Spawning occurs from mid-April through August (Moyle, 2002), with peak spawning activity in May and June.

- Adult spring-run Chinook salmon migrate through the Delta from January through June, enter the Sacramento River and its tributaries from March through September, and remain in the rivers up to several months before spawning. Spawning occurs from late August through October, with peak spawning activity in September. Table 4-17 summarizes the timing of Chinook salmon occurrence in the Delta by race and lifestage.

Chinook salmon lay their eggs in the gravel of the stream bottom where they incubate for six to nine weeks, depending on water temperature. The newly emerged fry remain in the gravel for another two to four weeks. The timing of rearing and outmigration is different for the various runs of Chinook salmon. Rearing salmonids feed on a variety of aquatic and terrestrial insects

TABLE 4-17
TIMING OF CHINOOK SALMON IN THE SACRAMENTO-SAN JOAQUIN DELTA

	Sacramento River				San Joaquin River
Lifestage	**Fall-run**	**Late fall-run**	**Winter-run**	**Spring-run**	**Fall-run**
Adult upstream migration	July – December	October – April	Late November – June	January – June	July – December
Juvenile Rearing and Emigration	January – June (fry/smolts) October – December (yearlings)	April – December	September – May	October – June (young-of-the-year) mid-October March (yearlings)	January – June

Sources: Reclamation, 1997; CDFG, 1998; SWRCB, 1999.

and other small invertebrates. Newly emerged fry are sometimes prey to older steelhead. Juveniles begin the smolting process as they migrate seaward. Smolting consists of physiological, morphological, and behavioral changes that stimulate emigration and prepare the salmonids for ocean life. Chinook salmon generally outmigrate in the first year and spend two to four years in the ocean before returning to spawn (SWRCB, 1999).

A variety of environmental factors affect the abundance, mortality, and population dynamics of Chinook salmon. One of the primary factors affecting population abundance has been the loss of access to historic spawning and juvenile rearing habitat as a result of the migration barrier caused by construction of major dams and reservoirs. Water temperatures within the rivers and creeks have also been identified as a factor affecting incubating eggs, holding adults, and growth and survival of juvenile Chinook salmon. Juvenile Chinook salmon are also vulnerable to entrainment at a large number of unscreened water diversions located along the Sacramento River and within the Delta in addition to entrainment and salvage mortality at the SWP and CVP export facilities. Changes in habitat quality and availability for spawning and juvenile rearing, exposure to contaminants and acid mine drainage, predation mortality by Sacramento pikeminnow, striped bass, and other predators, and competition and interactions with hatchery-produced Chinook salmon have all been identified as factors affecting Chinook salmon abundance. In addition, subadult and adult Chinook salmon are vulnerable to recreational and commercial fishing, ocean survival is affected by climatic and oceanographic conditions, and adults are vulnerable to predation mortality by marine mammals.

In recent years a number of changes have been made to improve the survival and habitat conditions for Chinook salmon. Modifications have been made to reservoir operations for instream flow and temperature management, modifications been made to operation of the Red Bluff diversion gate operations, and several large previously unscreened water diversions have been equipped with positive barrier fish screens. Changes to ocean salmon fishing regulations, and modifications to SWP and CVP export operations have also been made to improve the survival of both adult and juvenile Chinook salmon. These changes in management actions, in combination with favorable hydrologic and oceanographic conditions in recent years, are thought to have contributed to the trend of increasing abundance of adult Chinook salmon returning to the upper Sacramento River to spawn.

Adult and juvenile Chinook salmon primarily migrate upstream and downstream within the mainstem Sacramento River. Fall-run Chinook salmon also migrate through the lower San Joaquin River to spawning and juvenile rearing areas within the tributaries. Juvenile Chinook salmon migrate from the Sacramento River and San Joaquin Rivers into the interior Delta during their downstream migration, and may occur within the central Delta, including the lower San Joaquin River, during the winter and early spring migration period. Because winter-run and spring-run Chinook salmon do not occur in the San Joaquin River, their potential occurrence within the DWSP area is expected to be extremely low. Although the probability of juvenile winter-run and spring-run Chinook salmon occurring within the DWSP area is low, the occurrence of juvenile salmon in the SWP and CVP salvage operations suggests that some juvenile salmon do migrate into the Delta and, therefore, may occur within the DWSP area.

The majority of juvenile Chinook salmon migrating past the proposed water intake and fish screen is expected to be fall-run salmon. The occurrence of juvenile Chinook salmon within the central Delta would be expected to occur during the late fall through early spring when water temperatures within the central Delta would be suitable for juvenile Chinook salmon migration.

Although the majority of adult winter-run and spring-run Chinook salmon migrate upstream within the mainstem Sacramento River, there is a probability, although low, that adults may migrate into the central Delta. The diversion of water from the Sacramento River through the central Delta via the Delta Cross Channel, Georgiana Slough, and Threemile Slough may contribute to olfactory cues and an increased probability that adult Chinook salmon would migrate into the Delta. Adult salmon migrating upstream into the San Joaquin River are fall-run Chinook salmon. The occurrence of adult fall-run Chinook salmon within the Delta, and potentially the DWSP area, would be limited to the fall period of adult upstream migration. Because Chinook salmon do not spawn within the Delta, there is low probability that the DWSP would adversely affect Chinook salmon spawning or egg incubation.

Steelhead

Steelhead typically return to their natal streams to spawn. Considerable variation occurs in steelhead-run timing. Stocks in the Central Valley are all winter steelhead. Adults migrate upstream through the Delta and into the Sacramento River and tributaries primarily during the late fall, winter, and spring. Steelhead begin moving through the mainstem in July, and continue migrating through February or March. A few adults have also been observed in April, May, and June. Steelhead in the Sacramento River basin spawn primarily from January through March, but spawning can begin as early as late December and can extend through April (SWRCB, 1999). The timing of steelhead runs in the San Joaquin River basin is assumed to be similar to the Sacramento River basin. However, currently there is evidence of only a small anadromous run of steelhead in the basin and the origin of these fish is unknown (SWRCB, 1999).

Similar to Chinook salmon, steelhead lay their eggs in the gravel of the stream bottom where they incubate for approximately six to nine weeks depending on water temperature. The newly emerged fry remain in the gravel for another two to four weeks. The timing of rearing and outmigration is different for the various runs of steelhead. Rearing salmonids feed on a variety of aquatic and terrestrial insects and other small invertebrates, and newly emerged fry are sometimes prey of older steelhead. Juvenile steelhead begin the smolting process as they migrate seaward. Smolting consists of physiological, morphological, and behavioral changes that stimulate emigration and prepare the salmonids for ocean life (SWRCB, 1999).

The life history of steelhead differs from that of Pacific salmon in several ways. Unlike salmon, steelhead do not necessarily die after spawning; a small portion of steelhead survive to become repeat spawners. Post-spawning survival rates are generally low, and vary considerably between populations. Juvenile steelheads also have a longer freshwater rearing requirement (usually from one to three years) and both adults and juveniles are much more variable in the length of time they spend in fresh and salt water. Some individuals may remain in a stream, mature, and even spawn without ever going to sea, others may migrate to the ocean at less than a year old, and some may return to freshwater after spending less than a year in the ocean (SWRCB, 1999).

As a result of significant declines in steelhead populations in the Central Valley, NOAA Fisheries listed the Central Valley, California, Evolutionarily Significant Unit as threatened under the Endangered Species Act on March 19, 1998.

Factors affecting steelhead abundance are similar to those described for Chinook salmon. One of the primary factors affecting population abundance of steelhead has been the loss of access to historic spawning and juvenile rearing habitat within the upper reaches of the Sacramento and San Joaquin Rivers and their tributaries and the San Joaquin River as a result of the migration barriers caused by construction of major dams and reservoirs. Water temperatures within the rivers and creeks, particularly during summer and early fall months, have also been identified as a factor affecting growth and survival of juvenile steelhead. Juvenile steelhead are vulnerable to entrainment at a large number of unscreened water diversions located along the Sacramento River and within the Delta in addition to entrainment and salvage mortality at the SWP/CVP export facilities. Changes in habitat quality and availability for spawning and juvenile rearing, exposure to contaminants, predation mortality, passage barriers and impediments to migration, changes in land use practices, and competition and interactions with hatchery-produced steelhead have all been identified as factors affecting steelhead abundance. Unlike Chinook salmon, steelhead are not vulnerable to recreational and commercial fishing within the ocean, although steelhead support a small inland recreational fishery for hatchery produced fish. Ocean survival is affected by climatic and oceanographic conditions, and adults are vulnerable to predation mortality by marine mammals. In recent years a number of changes have been made to improve the survival and habitat conditions for steelhead. Several large previously unscreened water diversions have been equipped with positive barrier fish screens. Improvements to fish passage facilities have also been made to improve migration and access to spawning and juvenile rearing habitat.

Adult and juvenile steelhead primarily migrate upstream and downstream within the Sacramento River mainstem. Juvenile steelhead may migrate from the Sacramento River into the Delta during their downstream migration and may occur within the Delta, including the lower San Joaquin River, during the winter and early spring migration period. Since steelhead do not occur in the San Joaquin River (observations have been reported for a small number of potential steelhead on San Joaquin River tributaries; however, there is no indication of a significant population), their potential occurrence within the DWSP area is expected to be extremely low. Although the probability of juvenile steelhead occurring within the DWSP area is low, the occurrence of juvenile steelhead in the SWP and CVP salvage operations suggests that some juvenile steelhead do migrate into the Delta, and therefore, may occur within the DWSP area. The occurrence of juvenile steelhead within the Delta would be expected to occur during the winter and early spring migration period when water temperatures within the Delta would be suitable for juvenile steelhead migration.

Although the majority of adult steelhead migrate upstream within the Sacramento River mainstem, there is a probability, although low, that adults may migrate into the central Delta.

The diversion of water from the Sacramento River through the central Delta via the Delta Cross Channel, Georgiana Slough, and Threemile Slough may contribute to olfactory cues and an increased probability that adult steelhead would migrate into the central Delta. Adult steelhead are also known to migrate into the Mokelumne River and hence would potentially occur in the DWSP area. The occurrence of adult steelhead within the central Delta and the DWSP area would be limited to the winter and early spring period of adult upstream migration.

Because steelhead do not spawn within the Delta, there is no probability that the proposed DWSP would adversely affect steelhead spawning or egg incubation.

Delta Smelt

Delta smelt generally spend their entire life cycle in the open, surface waters of the Sacramento/ San Joaquin Delta and Suisun Bay. They are small (typically 2.5 inches, maximum length approximately five inches), rarely live more than one year, have low fecundity, and are not taken in recreational or commercial fisheries. Delta smelt are euryhaline (i.e., tolerates a wide range of salinity) fish that are rarely found in water of more than 10 to 12 ppt salinity (SWRCB, 1999).

Delta smelt are endemic to the upper Sacramento-San Joaquin Delta. Juvenile and adult Delta smelt typically inhabit open waters of the lower Delta and Suisun Bay including Suisun Marsh. Delta smelt inhabit shallow-water areas (typically less than nine feet deep at the lower low water); however, juvenile and adult Delta smelt are also known to occur within the deeper channel areas (Hanson, unpublished data). Juvenile and adult Delta smelt are generally found in the lower reaches of the Sacramento River downstream of Rio Vista, the San Joaquin River downstream of Mossdale, and within Suisun Bay (SWRCB, 1999). They move into freshwater when spawning (from January to July) and can be found in the Sacramento River, the Delta channels, Cache Slough, and Montezuma Slough. Peak spawning occurs during April through mid-May (Moyle, 2002).

Most spawning occurs in sloughs and shallow edge-waters of channels in the upper Delta. Specific areas identified as important Delta smelt spawning habitat include Barker, Lindsey, Cache, Prospect, Georgiana, Beaver, Hog, and Sycamore Sloughs; the Sacramento River in the Delta; and tributaries of the northern Suisun Bay. Laboratory observations indicate that Delta smelt are broadcast spawners and that their eggs sink to the bottom and attach to the substrate. Newly hatched Delta smelt have a large oil globule that makes them semi-buoyant, allowing them to maintain themselves just off the bottom, where they feed on rotifers and other microscopic prey. Once the swimbladder develops, larvae become more buoyant and rise higher in the water column. At this stage (0.6 to 0.7 inch total length), most are presumably washed downstream until they reach the mixing zone[5] or the area immediately upstream of it. The boundaries are undefined, as the area is subject to annual and seasonal fluctuations in response to tidal patterns, freshwater inflow, winds, and other hydrologic and climatic factors. Because of the varying freshwater and ocean water densities, the mixing zone produces a convergence process, causing a

[5] The mixing zone refers to a variable area where saline ocean water mixes with fresh water.

concentration of nutrients to exist at the boundary of the different water densities, suitable for Delta smelt to feed on. Growth is rapid, and juvenile fish are 1.6 to 2.0 inches long by August (SWRCB, 1999).

Delta smelt feed primarily on planktonic copopods, cladocerans, and amphipods (all small crustaceans commonly used by fish for food) and, to a lesser extent, insect larvae. Delta smelt are a minor prey item of juvenile and sub-adult striped bass, and have been reported in the stomach contents of white catfish and black crappie (SWRCB, 1999).

Delta smelt were once one of the most common pelagic fish in the upper Sacramento/San Joaquin Estuary. While their annual abundance has fluctuated greatly in the past, between 1981 and 1990, Delta smelt abundance was consistently low. The causes of decline are multiple and synergistic, including reduction in flows; entrainment losses to water diversions; high outflows; changes in food organisms; toxic substances; disease, competition, and predation; and loss of genetic integrity (SWRCB, 1999).

The USFWS listed the Delta smelt as threatened on March 5, 1993, and issued a formal biological opinion (BO) for SWP and CVP operations on May 26, 1993. The CDFG listed the Delta smelt as threatened on December 9, 1993. The USFWS issued an amended BO for SWP and CVP operations in February 1994 and again in March 1995. In August 2004, an updated BO was issued on the revised CVP/SWP operating plan.

Although juvenile and adult Delta smelt are most abundant within the western Delta and Suisun Bay, they may occur within the lower San Joaquin River throughout the year. Adult Delta smelt potentially spawn within the lower San Joaquin River action area during the late winter and spring. Delta smelt larvae also occur within the proposed DWSP area, with the greatest likelihood of occurrence during the spring months. As a result of their life history and geographic distribution, Delta smelt may occur within the lower San Joaquin River near the DWSP at various lifestages throughout the year.

Longfin Smelt

The longfin smelt is a small, planktivorous fish that is found in several Pacific coast estuaries from San Francisco Bay to Prince William Sound, Alaska. Longfin smelt can tolerate a broad range of salinity concentrations, ranging from freshwater to seawater. Spawning occurs in fresh-to-brackish water over sandy-gravel substrates, rocks, or aquatic vegetation. In the Bay/Delta Estuary, the longfin smelt life cycle begins with spawning in the lower Sacramento and San Joaquin Rivers, the Delta, and freshwater portions of Suisun Bay. Spawning may take place as early as November and extend into June, with the peak spawning period occurring from February to April. The eggs are adhesive, and, after hatching, the larvae are carried downstream by freshwater outflow to nursery areas in the lower Delta and Suisun and San Pablo Bays. Adult longfin smelt are found mainly in Suisun, San Pablo, and San Francisco Bays, although their distribution is shifted upstream in years of low outflow (SWRCB, 1999).

Like the Delta smelt, the longfin smelt spawn adhesive eggs in river channels of the eastern Estuary and have larvae that are carried to nursery areas by freshwater outflow; otherwise the two species differ substantially. Consistently, a measurable portion of the longfin smelt population survives into a second year. During the second year of life, they inhabit the San Francisco Bay and, occasionally, the Gulf of the Farallones. Therefore, longfin smelt are often considered anadromous (SWRCB, 1999).

Longfin smelt are also more broadly distributed throughout the Delta and found at higher salinities than Delta smelt. Because longfin smelt seldom occur in freshwater, except to spawn, but are widely dispersed in brackish waters of the bay, it seems likely that their range formerly extended as far up into the Delta as saltwater intruded. The easternmost catch of longfin smelt in fall mid-water trawl samples has been at Medford Island in the central Delta. The depth of habitat is a pronounced difference between the two species in their region of overlap in Suisun Bay; longfin smelt are caught in greater quantities at deep stations (more than 32 feet), whereas Delta smelt are more abundant at shallow stations (less than 10 feet) (SWRCB, 1999).

The main food of longfin smelt is the opossum shrimp (*Neomysis mercedi*s), although copepods and other crustaceans are important at times, especially to small fish. Longfin smelt, in turn, are eaten by a variety of predatory fishes, birds, and marine mammals (SWRCB, 1999).

Longfin smelt were once one of the most common fish in the Delta. Their abundance has fluctuated widely in the past, but, since 1982, abundance has declined significantly, reaching its lowest levels during drought years. The number of longfin smelt also has declined in abundance relative to other fishes, dropping from first or second in abundance in most trawl surveys during the 1960s and 1970s, to seventh or eighth in abundance. Abundance improved substantially in 1995 but was again relatively low in 1996 and 1997. The causes of decline are multiple and synergistic, including reduction in outflows, entrainment losses to water diversions, climatic variation, toxic substances, predation, and introduced species (SWRCB, 1999). The longfin smelt is a Federal Species of Concern and a California Species of Special Concern.

Green Sturgeon

San Francisco Bay, San Pablo Bay, Suisun Bay, and the Delta support the southernmost reproducing population of green sturgeon. White sturgeon are the most abundant sturgeon in the system, and green sturgeon have always been comparatively uncommon. Habitat requirements of green sturgeon are poorly known, but spawning and larval ecologies probably are similar to those of white sturgeon. Adult green sturgeon are more marine than white sturgeon, spending limited time in estuaries or freshwater (SWRCB, 1999).

Indirect evidence indicates that green sturgeon spawn mainly in the Sacramento River; spawning has been reported in the mainstem as far north as Red Bluff. Spawning times in the Sacramento River are presumed to be from March through July, peaking from mid-April to mid-June. Adult sturgeon are in the river, presumably spawning, when temperatures range from 46°F to 57°F. Their preferred spawning substrate is large cobble, but substrates range from clean sand to bedrock. Eggs are broadcast spawned and externally fertilized in relatively high water velocities and at depths of less than 10 feet.

Female green sturgeon produce 60,000 to 140,000 eggs, each approximately 0.15 inch in diameter. Eggs hatch approximately 196 hours after spawning, and larvae are 8 to 19 millimeters long. Juveniles range in size from less than one inch to almost five feet. Juveniles migrate to sea before two years of age, primarily during the summer and fall. They remain near estuaries at first but may migrate considerable distances as they grow larger (SWRCB, 1999).

Green sturgeon grow approximately three inches per year until they reach maturity at four to five feet, around age 15 to 20. Thereafter, growth slows down. The largest fish are thought to be 40-years old, but this estimate may be low. Adults can reach sizes of 7.5 feet and 350 pounds, but in the San Francisco Bay, most are less than 100 pounds (SWRCB, 1999).

Both the juvenile and adult green sturgeon are benthic feeders and may also eat small fish. Juveniles in the Delta feed on opossum shrimp (*Neomysis mercedis*) and amphipods (*Corophium* sp.). The green sturgeon is apparently reduced in numbers throughout its range, although evidence is limited. Rough estimates of the numbers of green sturgeon longer than three feet in the estuary between 1954 and 1991 range from 200 to 1,800 fish, based on intermittent studies by the CDFG. There is no direct evidence of a decline in the numbers of green sturgeon in the Sacramento River. However, the population is so small that a collapse could occur, and it would hardly be noticed because of limited sampling (SWRCB, 1999).

In the Delta the major factors that may negatively affect green sturgeon abundance are sport fisheries, modification of spawning habitat, entrainment, and toxic substances. The green sturgeon is a Federal Candidate for listing and a California Species of Special Concern.

Sacramento Splittail

The Sacramento splittail is a large minnow endemic to the Bay/Delta Estuary. Once found throughout low-elevation lakes and rivers of the Central Valley from Redding to Fresno, this native species now occurs in the lower reaches of the Sacramento and San Joaquin Rivers and tributaries, the Delta, Suisun and Napa marshes, the Sutter and Yolo Bypasses, and the tributaries of north San Pablo Bay. Although the Sacramento splittail is generally considered a freshwater species, the adults and sub-adults have an unusually high tolerance for saline waters (up to 10 to 18 ppt) for a member of the minnow family. The salt tolerance of splittail larvae is unknown, but they have been observed in water with salinities of 10 to 18 ppt (SWRCB, 1999).

The Sacramento splittail, which has a high reproductive capacity, can live five to seven years, and generally begins spawning at two years of age. Spawning, which seems to be triggered by increasing water temperatures and day length, occurs over beds of submerged vegetation in slow-moving stretches of water (such as flooded terrestrial areas and dead-end sloughs). Adults spawn from February through May in the Delta, upstream tributaries, Napa Marsh, Napa and Petaluma Rivers, Suisun Bay and Marsh, and the Sutter and Yolo bypasses. Hatched larvae remain in shallow, weedy areas until they move to deeper offshore habitat later in the summer. Young splittail may occur in shallow and open waters of the Delta and San Pablo Bay, but they are particularly abundant in the northern and western Delta (SWRCB, 1999).

Splittail are bottom foragers that feed extensively on opossum shrimp and opportunistically on earthworms, clams, insect larvae, and other invertebrates. They are preyed on by striped bass and other predatory fish in the estuary. The splittail is commonly used by anglers as bait when fishing for striped bass (SWRCB, 1999).

Splittail have disappeared from much of their native range because dams, diversions, and agricultural development have eliminated or drastically altered much of the lowland habitat these fish once occupied. Access to spawning areas or upstream habitat is now blocked by dams on the large rivers (SWRCB, 1999).

Young-of-the-year splittail abundance appears to fluctuate widely from year to year. Young splittail abundance dropped dramatically during the 1987 to 1992 drought. However, wet conditions in 1995 resulted in high indices for most measures of young-of-the-year abundance. Abundance was relatively low in 1996 and 1997, but higher than during the drought years. In 1998, young-of-the-year abundance, indexed by the summer trawl survey, was again relatively high (SWRCB, 1999).

In contrast to young splittail, adult abundance shows no obvious decline during the 1987 to 1992 drought. Adult population variation is moderated by the species' long lifespan and multiple year classes. Factors affecting abundance of young splittail include variations in flooding of terrestrial areas that provide spawning and rearing habitat; changed estuarine hydraulics, especially reduced outflow; modifications of spawning habitat; climatic variation; toxic substances; introduced species; predation; and exploitation (SWRCB, 1999). The Sacramento splittail is a Federal Species of Concern and a California Species of Special Concern.

River Lamprey

The river lamprey has been captured mostly in the upper portion of the Sacramento-San Joaquin estuary and its tributaries in California. The habitat requirements of spawning adults and ammocoetes (larvae) have not been studied in California. Presumably, the adults need clean gravelly riffles in permanent streams for spawning in April and May, while the ammocoetes require sandy backwaters or stream edges in which to bury themselves, where water quality is continuously high and temperatures do not exceed 25°C (CFDG, 1995).

Adults migrate back into freshwater in the fall and spawn during the winter or spring months in small tributary streams. While maturing in streams, river lampreys shrink in length by about 20 percent. They dig saucer-shaped depressions in gravelly riffles for spawning. Adults die after spawning. Ammocoetes remain in silt-sand backwaters and eddies and feed on algae and microorganisms. The length of the ammocoetes stage is not known but it is probably three to five years, so the total life span of river lamprey would be six to seven years (CDFG, 1995).

The ammocoetes begin their transformation into adults when they are about 4.5 inches total length during the summer. The process of metamorphosis may take nine to 10 months, the longest known for any lamprey. Lampreys in the final stages of metamorphosis congregate immediately upriver from saltwater and enter the ocean in late spring. Adults apparently only spend three to four months in saltwater, where they grow rapidly reaching 10 to 12 inches total length (CDFG, 1995).

River lamprey ammocoetes are morphologically similar to those of the Pacific lamprey. This, coupled with their overlapping distributions, makes positive identification of ammocoetes very difficult. No information concerning incubation and development time exists. The ammocoete stage lasts several years. Ammocoetes have no teeth, and they feed on microscopic plants and animals. The ammocoetes, transforming adults, and newly transformed adults have been collected in plankton nets in Suisun Bay, Montezuma Slough, and Delta sloughs. The presence of river lamprey in collections made above dams, such as upper Sonoma Creek, would indicate that some river lamprey may spend their entire life in fresh water. The adults are parasitic in California rivers; most common prey are herring and salmon. River lampreys can apparently feed in either salt or fresh water. There is no accurate assessment of the damage to fish populations (CDFG, 1995).

The river lamprey has become uncommon in California, and it is likely that the populations are declining because the Sacramento, San Joaquin, and Russian rivers and their tributaries have been severely altered by dams, diversions, pollution, and other factors. Two tributary streams where spawning has been recorded in the past (Sonoma and Cache Creeks) are both severely altered by channelization, urbanization, and other problems (CDFG, 1995). The river lamprey is a Federal Species of Concern and a California Species of Special Concern.

REGULATORY SETTING

Federal

Central Valley Project Improvement Act

The CVPIA mandates changes in CVP management to protect, restore, and enhance fish and wildlife. The statutory obligations include increasing instream flows in Central Valley streams to provide for improved flow stability, and migration and attraction flow conditions for anadromous fish, in accordance with the fish, wildlife, and habitat restoration purposes and measures authorized by the CVPIA.

The CVPIA directs the Secretary of the Interior to develop and implement a program in coordination with the Anadromous Fish Restoration Program (AFRP) to acquire water to supplement up to 800,000 AF of CVP yield dedicated for fish and wildlife purposes (Section 3406(b)(2)); to assist the State of California in its efforts to protect the waters of the Bay-Delta estuary; and to help meet such obligations as may be legally imposed upon the CVP under state or Federal law subsequent to enactment of the CVPIA. The prescription for the dedicated water, commonly called “(b)(2) water,” varies depending on hydrologic conditions, and is determined annually by the USFWS through consultation with Reclamation. To the extent that (b)(2) water is either not available or insufficient to meet the fish and wildlife provisions of the CVPIA, supplemental water is acquired under the authority of Section (b)(3) of the Act from willing sellers within the geographic area of need. The purpose of the water acquisition program under Section (b) (3) is to acquire water supplies to meet the habitat restoration and enhancement goals of the CVPIA and to improve the Department of the Interior's ability to meet regulatory water quality requirements. (USFWS, 2001

Endangered Species Act

The ESA requires that both the USFWS and NOAA Fisheries maintain lists of threatened species and endangered species. Section 9 of the ESA makes it illegal to "take" (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in such conduct) any endangered species of fish or wildlife and most threatened species of fish or wildlife. Section 7 of the ESA requires that Federal agencies consult with the USFWS and/or NOAA Fisheries on any actions that may destroy or adversely modify critical habitat. Critical habitat is defined as the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the ESA, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the ESA, upon a determination by the Secretary that such areas are essential for the conservation of the species. NOAA Fisheries' jurisdiction under the ESA is limited to the protection of marine mammals and fishes, and anadromous fishes; all other species are within the USFWS' jurisdiction.

Section 7 of the ESA requires that all agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of habitat critical to such species survival. To ensure against jeopardy, each agency must consult with the USFWS or NOAA Fisheries, or both, regarding the agency actions. The consultation is initiated when the Federal agency determines that its action may affect a listed species and submits a written request for initiation to the USFWS or NOAA Fisheries, along with the agency's biological assessment of its proposed action. If the USFWS or NOAA Fisheries concurs that the action is not likely to adversely affect a listed species, the action may be carried forward without further review under the ESA. Otherwise, the USFWS or NOAA Fisheries, or both, must prepare a written BO describing how the agency action will affect the listed species and its critical habitat, and as needed, identify avoidance and mitigation measures to reduce potential impacts to protected species and their habitats to acceptable levels.

The proposed DWSP will be required to consult under the ESA as part of obtaining the Corps permit for construction of the intake facility. Information on potential impacts of construction, operation, and mitigation actions designed to reduce and avoid potential impacts is presented in the impact analysis and will provide technical information to be used in ESA consultations with both USFWS and NOAA Fisheries.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson- Stevens Act) establishes a management system for national marine and estuarine fishery resources including designation of specific fish conservation areas or EFH. Under 16 U.S.C. 1802 (10), Congress defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The EFH guidelines under 50 CFR 600.10 further interpret the EFH definition as follows: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

In Section 303(a)(7) of the amended Magnuson-Stevens Act, Congress directs NOAA Fisheries and the eight regional Fishery Management Councils, under the authority of the Secretary of Commerce, to describe and identify EFH in each fishery management plan, minimize to the extent practicable the adverse effects of fishing on EFH, and identify other actions to encourage the conservation and enhancement of EFH. In Section 305 (b)(2) of the amended Magnuson - Stevens Act, Congress directs each Federal Agency to consult with the Secretary with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat identified under the Magnuson-Stevens Act. Federal activities that occur outside of an essential fish habitat but that may, nonetheless, have an impact on essential fish habitat waters and substrate must also be considered in the consultation process.

The Magnuson-Stevens Act states that consultation regarding EFH should be consolidated, where appropriate, with the interagency consultation, coordination, and environmental review procedures required by other Federal statutes, such as NEPA, the Fish and Wildlife Coordination Act (FWCA), the Clean Water Act, and the ESA. Essential fish habitat consultation requirements can be satisfied through concurrent environmental compliance if the lead agency provides NOAA Fisheries with timely notification of actions that may adversely affect essential fish habitat and if the notification meets requirements for essential fish habitat assessments.

As part of the NOAA Fisheries ESA consultation, the proposed DWSP will be required to also evaluate the potential for adverse impacts to managed species and EFH for Pacific salmon and other species.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) requires consultation with the USFWS, or, in some instances, with NOAA Fisheries and with State fish and wildlife resource agencies before undertaking or approving water projects that control or modify surface water. The purpose of this consultation is to ensure that wildlife concerns receive equal consideration with water resource development projects and are coordinated with the features of these projects.

The consultation is intended to promote the conservation of fish and wildlife resources by preventing their loss or damage and to provide for the development and improvement of fish and wildlife resources in connection with water projects. Agencies undertaking water projects are required to fully consider recommendations made by USFWS, NOAA Fisheries, and state fish and wildlife resource agencies in project reports and to include measures to reduce impacts on fish and wildlife in project plans.

State

California Endangered Species Act

Like the Federal ESA, the California ESA provides for the protection and conservation of threatened and endangered species and their habitats. In general, California ESA authorizes 1996, from the California Bay Delta Environmental Enhancement Act, passed by Congress in 1996, and from voluntary contributions from urban water agencies.

Delta Protection Act

The Delta Protection Act of 1959 requires adequate water supplies for multiple uses (e.g., agriculture, industry, urban, and recreation) within the Delta and for export. Section 29702 finds and declares that the basic goals of the State toward the Delta are to (a) protect, maintain, and, where possible, enhance and restore the overall quality of the Delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities, (b) assure orderly, balanced conservation and development of delta land resources, and (c) improve flood protection by structural and nonstructural means to ensure an increased level of public health and safety.

Local

San Joaquin County General Plan

The San Joaquin County General Plan lists the following objectives and policies pertaining to fish resources (San Joaquin County, 1992).

Objectives:

1. To protect and improve the County's vegetation, fish, and wildlife resources.

Policies:

Resource Protection and Management

1. Resources of significant biological and ecological importance in San Joaquin County shall be protected.

11. Fisheries shall be protected by:

    (b) designing and timing waterway projects to protect fish populations; and

(c) operating water projects to provide adequate flows for spawning of anadromous fish.

12. The County shall support restoration plans for anadromous fisheries and shall work with CDFG and other agencies or organizations in developing such plans.

16. Habitat that is required to be protected, restored, or created as mitigation for project's impacts shall be monitored and maintained in accord with a County-approved program.

Water Resources Management

10. The County shall support properly timed, sufficient flows in the rivers to maintain spawning grounds, fish migration, and resident fish populations.

11. Water projects shall:

    (a) incorporate safeguards for fish and wildlife.

13. Water diversion projects shall protect the fishery, wildlife habitat, and recreation; shall ensure adequate water for County agricultural, municipal, and industrial uses; and shall guarantee adequate Delta outflows for salinity repulsion.

City of Stockton General Plan

The Open Space Element in the City of Stockton General Plan lists the following policies for preservation of fish habitat (City of Stockton, 1990).

Goal 1: Preserve and enhance open space areas for preservation of natural resources including plant life, habitat for fish and wildlife species, ecologically sensitive areas, and historic and cultural resources.

4.2.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Potential impacts associated with construction and operation of the proposed water supply intake and positive barrier fish screens on fish and macroinvertebrates were evaluated. The evaluation considered (1) construction activities and the area anticipated being disturbed, (2) aquatic habitat conditions currently existing in the project area, and (3) known or presumed occurrence of fish species in the area.

Criteria used to assess potential significance of fishery impacts included:

- Directly or indirectly reduce the growth, survival, or reproductive success of individuals of species listed, or proposed for listing, as threatened or endangered under the federal or California Endangered Species Acts. Potential impacts and/or incidental take of fish species listed for protection under the federal and/or state Endangered Species Act were assessed at both the individual and population levels as identified below:

- Incidental take, including both direct take of individuals and changes in habitat conditions that adversely affect individual fish but are not of sufficient magnitude to adversely affect the population dynamics or status of the species as a whole (may affect, but would not adversely affect the species); and

- Direct and indirect effects on the species or their habitat that would be of a magnitude sufficient to adversely affect the species population leading to a risk that the species would be in jeopardy of becoming endangered or at risk of extinction.

- Directly or indirectly reduce the growth, survival, or reproductive success of substantial portions of candidate species populations, or Species of Special Concern, or regionally important commercial or game species; or

- Reduce the quality and quantity of important and/or unique habitat for fish species or their prey that would adversely impact the ability of the species to successfully reproduce and maintain self-supporting populations. Aquatic habitats considered in this impact analysis include, but are not limited to, areas designated or proposed for designatation as critical habitat for species protected under the state and federal ESAs and Essential Fish Habitat for managed species.

METHODOLOGY

An impact assessment was performed to evaluate the potential effects of construction and operation of the proposed DWSP water supply intake on the fish and macroinvertebrates inhabiting the Delta and the lower San Joaquin River. The following assessment of potential fishery and aquatic resource impacts is based, in part, on results of hydrologic modeling (CALSIM II), which describes water diversion operations over a range of environmental and hydrologic conditions (MWH, 2005). The seasonal timing and magnitude of water diversions from the Delta and lower San Joaquin River could affect aquatic species directly through entrainment and/or impingement or indirectly through changes in hydrologic conditions and the associated changes in the quality and/or availability of aquatic habitat.

The assessment included an analysis of environmental conditions associated with existing conditions and with the proposed DWSP operating influences. Operations of the proposed intake have the potential to affect Delta fisheries by (1) increasing the risk of direct entrainment and impingement mortality at existing water intakes (e.g., SWP and CVP exports), and (2) modifying habitat quality and availability for various resident and migratory estuarine species. Indices of mortality risk and habitat quality and availability developed from hydrologic modeling include:

- Water diversion export operations;
- Hydrologic conditions;
- Delta inflow and outflow;
- E/I ratio;
- Location of the X2; and
- Water temperatures.

Biological relationships were established based upon results of fishery investigations conducted by the USFWS, CDFG, DWR, and others for use in evaluating the biological effects of changes in many of the habitat-related parameters potentially affected by the proposed water diversion operations. For example, the USFWS has developed preliminary relationships between Sacramento and San Joaquin River flows and juvenile Chinook salmon survival (Brandes and McLain, 2001). The relationship between San Joaquin River flow, SWP and CVP export rates, and juvenile Chinook salmon survival has also been investigated as part of the Vernalis Adaptive Management Plan (VAMP; SJRGA, 2004).

CALFED (2000) estimated that modeling uncertainties were 10 percent and assumed that changes in fishery habitat conditions associated with flow below this threshold would be less than significant. For purposes of this assessment, changes in average flows of less than one percent between the DWSP and baseline conditions were assumed to be within the error and reasonable detection limits of the CALSIM II hydrologic model (Reclamation and DWR, 2003) and would not represent a biologically significant change in habitat quality or availability as a result of the proposed water diversion operations. The criteria used to assess potential impacts to fishery habitat in this analysis are more conservative than criteria used in evaluating potential impacts to habitat in the San Joaquin River as part of other impact analyses (e.g., impact analysis of the San Joaquin River Agreement and VAMP (Reclamation and SJRGA, 1999) and by CALFED (2000) and hence should provide a conservative assessment of potential impacts to fishery habitat resulting from the proposed DWSP operations.

The analysis of the proposed DWSP diversion on fishery and aquatic resources addresses the seasonal distribution of sensitive fish species within the lower San Joaquin River and Delta; the potential seasonal operational patterns of the water diversion and the corresponding seasonal distribution of early lifestages of fish (i.e., fish eggs and larvae) vulnerable to entrainment; potential effects of the water diversion on fish populations, and on the quality and availability of aquatic habitat within the Delta.

The potential effects of intake construction activity on water quality (e.g., suspended sediments) and other habitat conditions within the lower San Joaquin River were assessed based on the two alternative intake configurations presented in Chapter 2, Project Description. Installation of cofferdams, the potential risk of contaminant spills, noise during construction, and other potential short-term impacts on fishery habitat were assessed. Section 4.1.1 above provides additional information on the potential for DWSP construction and operations to adversely affect local water quality conditions and the associated quality and availability of fishery habitat within the lower San Joaquin River in the vicinity of the water intake.

Operation of the proposed intake structure and water diversion from the Delta and the lower San Joaquin River would increase over time in response to increasing demand. Anticipated diversions during the initial 30-mgd facility operations (2015 cumulative conditions) and the 160-mgd facility (2050 programmatic cumulative conditions) are discussed in Section 4.1.2. Results of hydrologic analyses presented in Section 4.1.2 were subsequently used to assess potential changes in hydrologic conditions occurring within the Delta that may affect habitat quality and/or availability for various species of fish and macroinvertebrates. Information on seasonal patterns of diversion operation were also used, in combination with information from CDFG larval fish surveys (CDFG 20-mm Delta smelt surveys) conducted during the spring months in the lower San Joaquin River and elsewhere within the Delta as a basis for estimating potential entrainment losses of planktonic eggs and larvae of various fish species.

The analysis of potential diversion operations on fish and macroinvertebrates also considered the design and operational criteria for the proposed positive barrier fish screens. Fish screen design criteria utilized in developing the proposed intake structure, and as a basis for this impact analysis on fishery populations, assumed that the positive barrier fish screen would be designed and operated in conformance with the general CDFG, NOAA Fisheries, and USFWS design criteria.

Based on evaluation of the potential impacts that may directly or indirectly affect protected fish, other fish, and macroinvertebrates, or their habitat, a series of avoidance and minimization (conservation) measures are recommended. Avoidance and minimization (conservation) measures have been included for steelhead, winter-run and spring-run Chinook salmon, critical habitat for winter-run Chinook salmon, proposed critical habitat for spring-run Chinook salmon and Central Valley steelhead, Delta smelt and its designated critical habitat, and EFH for Pacific salmon and other managed aquatic species inhabiting the Delta. The conservation measures would also serve to protect and reduce the potential for significant impacts to other resident and migratory fish (e.g., green and white sturgeon, hardhead, lamprey, Sacramento splittail, catfish, striped bass, largemouth bass, and others) and macroinvertebrates and their habitat within the Delta and the lower San Joaquin River.

Because the mechanism for effects to salmonid species and their habitat (winter-run Chinook salmon critical habitat, proposed critical habitat for spring-run Chinook salmon and steelhead, and EFH for Pacific salmon) in the vicinity of the DWSP is the same for all species, conservation measures incorporated into the DWSP for their protection would be correspondingly the same. These conservation measures are also applicable to the non-salmonid species inhabiting the lower San Joaquin River and the Delta. Measures that are protective of salmonids will generally provide even greater effective protection for the non-salmonid species; for example, salmonids are more sensitive to turbidity than are hardhead or California roach (Hanson, unpublished data). The conservation measures incorporated into the DWSP are consistent with avoidance and mitigation measures for other Bay-Delta fish screening projects (e.g., Hanson Environmental, 2004) developed in consultation with USFWS, NOAA Fisheries, and CDFG.

SUMMARY OF IMPACTS BY PROJECT COMPONENT

Table 4-18 provides a summary of the significant and less than significant public services and utilities and energy impacts associated with specific components of the DWSP.

IMPACT STATEMENTS AND MITIGATION MEASURES

Impact FISH-1: Construction of the DWSP intake could temporarily affect the fisheries by increasing turbidity and thus degrading water quality. Less than significant with mitigation.

TABLE 4-18
SUMMARY OF IMPACTS – FISHERIES

Impact	In-River Intake Facility	In-Bank Intake Facility	Raw Water Pipeline	Water Treatment Plant	Treated Water Pipelines
FISH-1: Construction of the DWSP intake could temporarily affect fisheries by increasing turbidity and thus degrading water quality.	LSM	LSM	NI	NI	NI
FISH-2: Noise generated by in-river construction could temporarily affect the behavior and local distribution of fish and macroinvertebrates.	LSM	LSM	NI	NI	NI
FISH-3: Dewatering of the cofferdam during intake construction could result in stranding fish and other aquatic species.	LSM	LSM	NI	NI	NI
FISH-4: Construction of the DWSP intake facility could alter the availability of spawning and rearing habitat, and migratory corridors.	LS	LS	NI	NI	NI
FISH-5: Construction of the DWSP intake structure could contribute to localized changes in habitat conditions.	LS	LS	NI	NI	NI
FISH-6: Operation of the DWSP intake facility could cause entrainment and impingement mortality of fish and macroinvertebrates.	LSM	LSM	NI	NI	NI
FISH-7: Operation of the DWSP intake facility could significantly affect Delta hydrology and water quality, which, in turn, could significantly affect associated fish habitat conditions.	LS	LS	NI	NI	NI

LSM = Less than Significant Impact with Mitigation
LS = Less than Significant Impact
NI = No Impact

Construction of the intake structure and positive barrier fish screen would result in temporary, localized changes in aquatic habitat in the immediate vicinity of the proposed intake site on the lower San Joaquin River. Construction of both the in-river and in-bank intake configurations has the potential to affect water quality (Section 3.4, Drainage and Floodplain Management) and fish habitat. Therefore, to minimize these impacts, in-water construction would be isolated using a cofferdam.

Installation of a cofferdam and dredging as part of site preparation would result in temporary localized increases in turbidity (suspended sediment concentrations). In addition, during site preparation fish and macroinvertebrates may be exposed to underwater sound pressure levels (e.g., noise), which may temporarily affect the behavior and local distribution of fish and macroinvertebrates in the immediate vicinity of the construction site. Installation and dewatering of the cofferdam would also increase the risk that fish may be trapped and stranded within the cofferdam during dewatering. These short-term, localized construction-related impacts to fish resources and their habitat are briefly described below.

Pre-construction dredging and cofferdam construction is expected to temporarily increase turbidity levels within a localized area of the lower San Joaquin River. The area temporarily affected would be about 5.7 acres in size (approximately 250 feet wide and 1,000 feet long, based on experience at the recently constructed fish screens within the Sacramento River). These effects would occur for about 60 days when cofferdam construction activity may disturb sediments and increase turbidity for a period of about eight to 10 hours per day.

Construction activities would result in increased exposure of various lifestages and species of fish to temporary increases in turbidity. Migration of Chinook salmon and steelhead through the construction area may be affected through a behavioral change and avoidance of areas with elevated suspended sediment concentrations, depending on the seasonal period when site preparation and installation/removal of the cofferdam would occur. The distribution of Delta smelt and other sensitive fish species may also be affected by localized increases in suspended sediments and underwater sound during site preparation (e.g., installation of the cofferdam and initial dredging). Based upon the relatively small volume of material to be removed from the lower San Joaquin River by construction dredging, and the limited period of time when site preparation would occur within the San Joaquin River, potential impacts on habitat and fishery populations inhabiting the river are expected to be short-term and limited to the immediate vicinity of the intake construction.

Avoidance and minimization measures, including seasonal periods for cofferdam installation (summer and early fall), use of silt curtains, and preferential use of a vibration hammer for sheet pile installation as part of the cofferdam have been identified to reduce and avoid potential construction related impacts to fishery resources. Based on the proposed avoidance and minimization measure, the turbidity (suspended sediment concentrations) and duration of exposure for Chinook salmon, steelhead, and other species to conditions within the Delta and lower San Joaquin River during construction of the proposed DWSP intake structure and fish screens are expected to be below the levels reported in the literature to result in significant adverse effects. The effects would be temporary and localized. Therefore, potential impacts on fishery habitat and aquatic resources would be less than significant.

Construction of the intake structure and fish screens would require the use of hazardous and toxic materials such as cement, oil and grease, and other chemicals. The inclusion of avoidance and minimization measures described in Mitigation Measure GEO-1 such as compliance with CVRWQCB requirements for turbidity, hazardous material control and spill prevention and response, erosion control, and storm water pollution prevention would reduce the potential risk of impacts to fisheries and aquatic resources to less than significant.

Mitigation Measure FISH-1: Installation of the cofferdam for construction of the intake structure is expected to result in short-term increases in local suspended sediment concentrations that may affect the distribution and behavior of sensitive fish species and their habitat. To avoid and minimize these impacts, site preparation and installation of the sheet pile cofferdam will occur during the summer and fall.

Significance After Mitigation: Less than significant.

Impact FISH-2: Noise generated by in-river construction could temporarily affect the behavior and local distribution of fish and macroinvertebrates. Less than significant with mitigation.

Installation of the cofferdam in the river may be performed using either a vibration hammer and/or percussion hammer, depending on substrate conditions. Information from the scientific literature and field observations at other construction sites within the Bay-Delta estuary indicates that exposure of sensitive fish species to underwater sound pressure levels exceeding approximately 180–220 dB may result in sublethal effects such as physiological damage and sensory cell damage (Hanson et al., 2004). Exposure to sound pressure levels above approximately 225 dB may result in fish stunning, loss of equilibrium, and mortality (Hanson et al., 2004). Exposure of sensitive fish to underwater sound pressure levels exceeding approximately 140 – 160 dB may result in behavioral avoidance or delays in migration (Hanson et al., 2004).

Because the lower San Joaquin River in the vicinity of the proposed intake site serves as the migration corridor for juvenile and adult Chinook salmon moving to and from San Joaquin River tributaries and also serves as seasonal habitat for Delta smelt (CDFG, unpublished data), installation of the cofferdam should avoid the potential risk of adverse impacts to these species. Potential risk of adverse impacts to Chinook salmon, Delta smelt, and other fish species, would be avoided by installation of the sheet pile cofferdam using a vibration hammer that does not generate underwater sound pressure levels that would adversely affect sensitive fish species.

If a higher intensity percussion hammer is required for installation of the cofferdam, avoidance of potential adverse impacts can be achieved by installing the cofferdam during the summer months (approximately mid-June and mid-September) when water temperatures within the lower San Joaquin River are seasonally elevated and adjacent habitat is considered to be unsuitable for both salmonids and Delta smelt. Chinook salmon and steelhead migrate through the lower San Joaquin River during the late winter and spring as juveniles and during the fall and winter as adults (Brandes and McLain, 2001; SJRGA, 2004). Chinook salmon and steelhead are not present within the lower San Joaquin River during the summer months as reflected in their absence from fish salvage monitoring at the SWP and CVP export facilities (DWR, unpublished data) and other fishery surveys conducted in the area by CDFG and USFWS (unpublished data). Chinook salmon and Delta smelt avoid habitats, including the lower San Joaquin River, when seasonal water temperatures increase during the late spring and early summer reaching levels above 25^{o} C (77^{o} F; Bennett pers. comm. to C. Hanson). Installation of the cofferdam during the summer months would avoid and minimize the potential risk of adverse impacts.

Mitigation Measure FISH-2. To avoid and minimize noise impacts to the fisheries, a vibration hammer will be used to install the sheet pile cofferdam during the summer and early fall (mid-June through mid-September).

Significance After Mitigation: Less than significant.

Impact FISH-3: Dewatering of the cofferdam during intake construction could result in stranding fish and other aquatic species. Less than significant with mitigation.

Stranding of fish and macroinvertebrates within the cofferdam during the construction of the intake structure has been identified as a potential impact that could result in mortality to fish and macroinvertebrates. A fish rescue and relocation effort has been identified as an avoidance and minimization action to reduce potential stranding during cofferdam dewatering to less than significant.

Mitigation Measure FISH-3: Installation of a cofferdam and dewatering may result in stranding and the loss of protected fish and other species. The City will ensure that a qualified fisheries biologist will design and conduct a fish rescue and relocation effort to collect fish from the area within the cofferdam involving the capture and return of those fish to suitable habitat within the lower San Joaquin River. To ensure compliance, a fisheries biologist shall provide observation during initial dewatering activities within the cofferdam. The fish rescue plan (Appendix F) will be provided for review and comment to NOAA Fisheries, USFWS, and CDFG prior to implementation.

The success of this dewatering measure would be the effective capture and removal of fish from the area to be dewatered with a minimum of capture and handling mortality for those fish returned to the lower San Joaquin River. Implementation of the fish rescue and relocation program would avoid and minimize impacts to Chinook salmon, steelhead, other fish, and macroinvertebrate species, and thus reduce impacts to less than significant.

Significance After Mitigation: Less than significant.

Impact FISH-4: Construction of the DWSP intake facility could alter the availability of spawning and rearing habitat, and migratory corridors. Less than significant.

Although various fish species are present in the area, the habitat within the lower San Joaquin River at the proposed intake site is characterized by riprap-stabilized levees; a relatively deep, high velocity maintained (dredged) navigation ship channel, and silt and sand substrate. Tules and other emergent vegetation associated with shallow water habitat occur in the general area, but are not abundant at the proposed intake site. Fish habitat at the proposed intake site is characterized as highly disturbed.

As a result of substrate and other habitat conditions, the proposed DWSP intake area is not used as spawning habitat by either Chinook salmon or steelhead. Adult and juvenile Chinook salmon and steelhead use the area as a migratory corridor and juvenile rearing area during downstream migration. Resident fish species inhabit the area year-round. Habitat in the vicinity of the proposed intake location is used by resident fish and macroinvertebrates for spawning, juvenile rearing, migration, foraging, and adult holding.

Construction would not alter riverine habitat or access to this habitat (channel sides and substrate) for resident or migratory species, except for the intake structure footprint that would remove less than 0.5 acre habitat and some existing riprap levee that would be further stabilized and protected. Specifically, construction of the fish screens (if extended into the river as an in-river intake) would exclude fish from an area approximately 125 feet long and 50 feet wide (approximately 6,000 square feet), along the channel margin of the river. The area within the in-river intake structure, where exclusion would occur, represents only a small fraction of the available habitat and is of low quality for rearing salmon, steelhead, or other species. Loss of approximately 6,000 square feet of this habitat would not adversely affect Chinook salmon or steelhead populations or critical habitat for winter-run Chinook salmon or EFH for Pacific salmon within the lower San Joaquin River and the Delta. No spawning or vegetated juvenile rearing habitat would be lost. The aquatic habitat is currently disturbed and is not considered to be unique. The long-term fishery habitat loss incrementally would be less than significant, but would contribute to cumulative changes to aquatic habitat within the estuary. No habitat exclusion would occur with the in-bank intake.

Mitigation: No mitigation is required.

Impact FISH-5: Construction of the DWSP intake structure could contribute to localized changes in habitat conditions. Less than significant.

The presence of an in-river type intake structure within the lower San Joaquin River would contribute to localized changes in habitat conditions including water velocities and current patterns and the availability of cover habitat utilized by various fish species, such as striped bass. Changes in localized current patterns and water velocities within the immediate area adjacent to the in-river intake structure may affect sediment deposition and erosion patterns, thereby affecting benthic macroinvertebrate habitat in the localized area.

Based on similar facilities in the Delta, changes in current patterns may affect localized movement patterns for fish and macroinvertebrates within the area. However, changes in water velocities and current patterns associated with the in-river intake structure are not expected to be a barrier or impediment to either adult or juvenile fish movement within the area, because the intake structure would affect only about eight percent of the channel cross-section of the lower San Joaquin River and would not extend into the Stockton Deepwater Ship Channel (Figures 2-10a and 2-11a).

Physical structures, such as the in-river water intake, provide physical habitat and cover that may attract various species of fish to the area. A number of predatory fish species, such as striped bass and largemouth bass, may also be attracted to the habitat and cover where predation on juvenile fish may occur. The behavioral response and attraction of these predatory fish species to an in-river intake structure, or the potential risk of increased predation mortality, cannot be quantitatively assessed.

Because the in-bank intake configuration (Figures 2-10b and 2-11b) would be oriented parallel and contiguous with the existing channel shoreline, it would have less affect on local water velocities and current patterns when compared to the in-river intake configuration. Similarly, the in-bank intake configuration would be expected to provide less cover and attraction of potential predatory fish when compared to the in-river intake configuration. The in-bank intake configuration would not be expected to result in a barrier or impediment to adult or juvenile fish migration within the lower San Joaquin River.

The addition of riprap to the proposed intake site would affect localized substrate conditions and localized habitat for both fish and benthic macroinvertebrates. The change in habitat quality and availability associated with the use of riprap as part of the fish screen and intake structure construction would be less than significant. The volume of riprap proposed for both intake structure configurations is relatively small (Table 2-5), and its use would be limited to the area immediately adjacent to the intake structure. Furthermore, aquatic habitat conditions at the proposed intake site are currently degraded, and are not unique.

Riprap has been used extensively within the lower San Joaquin River in the general vicinity of the proposed intake site as part of bank and levee stabilization. Although the use of riprap as part of the proposed DWSP has been identified as a less than significant incremental impact on aquatic habitat characteristics, these changes to aquatic habitat as a result of construction would contribute to cumulative adverse impacts to the quality and availability of aquatic habitat within the lower San Joaquin River and the Delta. However, the incremental contribution of the proposed DWSP to these cumulative impacts to aquatic habitat conditions would be small and insignificant.

Changes in habitat characteristics in the immediate vicinity of the proposed water intake structure (both in-river and in-bank configurations), including localized changes in current patterns, sediment deposition and erosion, riprap as part of construction and channel bank stabilization, and the potential for the intake structure to attract predatory fish, have been identified, but are considered to be less than significant.

Mitigation: No mitigation is required.

Impact FISH-6. Operation of the DWSP intake facility would cause entrainment[6] and impingement[7] mortality of fish and macroinvertebrates. Less than significant with mitigation.

The seasonal distribution of fish and invertebrate species within the Delta is dependent upon a variety of factors, including the timing of spawning activity, egg incubation and hatching, larval dispersal, juvenile rearing, and, for a number of species, seasonal patterns in juvenile and adult migration. For many species, such as Chinook salmon and steelhead, adults migrate seasonally upstream through the Delta to spawning and juvenile rearing areas located in upstream tributary areas. Juvenile lifestages of these species subsequently emigrate from the upstream rearing areas, moving downstream through the Delta before entering coastal marine waters.

Operation of the proposed water intake structure has the potential to directly and indirectly impact fishery resources and aquatic habitat within the lower San Joaquin River and Delta by entrainment of fish eggs and larvae that are not effectively excluded from the intake by the positive barrier fish screen. However, the design and operation of functional positive barrier fish screens, complying with CDFG, NOAA Fisheries and USFWS approved design criteria (i.e., approach velocity of 0.2 ft/sec, screen openings 1.75 mm, etc.; Chapter 2, Project Description), would provide protection for juvenile (fish greater than approximately one inch in length) and adult fish. However, planktonic fish eggs and larvae and most invertebrates (e.g., mysid shrimp, copepods, etc.) may not be excluded from entrainment into a water intake equipped with positive barrier fish screens.

6 Entrainment is the process of drawing fish, other aquatic organisms, eggs, and larvae into diversions along with water, resulting in the loss of such fish.

7 Impingement is the entrapment of fish and other aquatic organisms on the outer part of an intake structure or against screening devices during periods of intake water withdrawal.

Data from available studies show that the greatest vulnerability of fish eggs and larvae to entrainment occurs during the spring months (April through June) in the Delta, although fish eggs and larvae have been also observed during winter months (January through March) at lower densities (CDFG, unpublished data). A variety of fish species, including Delta smelt and striped bass, spawn within the Delta and upstream San Joaquin River areas during the spring months. Information on the seasonal distribution of fish eggs and larvae in the central Delta is available from the CDFG 20-mm Delta smelt survey program. CDFG has conducted 20-mm Delta smelt surveys each year between 1995 and 2004 within the lower San Joaquin River and the Delta. The 20-mm Delta smelt surveys are typically conducted from March through early August at approximately two-week intervals. The surveys sample larval and early juvenile Delta smelt, including lifestages that would be vulnerable to entrainment. Results are reported as the number of Delta smelt per 10,000 cubic meters (m^3) at each sampling site. In general, results of these surveys show that Delta smelt larvae and early juveniles are present in the Delta and the lower San Joaquin River during April and May, although smelt have also been collected in June in some years (e.g., 1999). The seasonal occurrences of Delta smelt and other larval fish within the Delta is thought to vary among years, with occurrences earlier during the spring when water temperatures are warm (frequently in years characterized by low river and Delta outflows), and later during the spring in years when temperatures are cooler (frequently in years when river and Delta outflow are high).

Based upon the general seasonal patterns of larval fish abundance within the Delta, and with emphasis on Delta smelt (federal and state listed as threatened), the seasonal period of greatest vulnerability of fish eggs and larvae to entrainment losses at a surface water intake would occur during the spring months (April through May). Based on analyses of these observations and fishery monitoring results, it was concluded that operation of the DWSP intake facility has the potential to adversely impact larval Delta smelt during the spring (April and May) through entrainment mortality. Other fish species, e.g., striped bass, longfin smelt, and gobies, are also present as eggs and larvae, and therefore, would also be vulnerable to entrainment. The seasonal timing of the occurrence of fish and larvae for various species can vary from year to year based on factors such as river flow and water temperatures. Although these fish eggs and larvae are widely distributed throughout the Delta, and the magnitude of water diversions at the proposed DWSP intake would be small (26,000 AF/year) compared to the volume and flow of water within the lower San Joaquin River and Delta, the risk of entraining larval Delta smelt has been identified as potentially significant.

Several approaches are available to avoid and minimize larval Delta smelt entrainment mortality. Alternative avoidance and minimization measures, discussed below in Mitigation Measure FISH-6, include seasonal reduction or curtailment in diversion operations based on real-time Delta smelt monitoring data (available from the CDFG 20-mm Delta smelt survey program) or seasonal installation of a aquatic filter barrier during the seasonal period that larval Delta smelt would be potentially vulnerable to entrainment at the DWSP intake. An aquatic filter barrier is a fine-mesh fabric with a large surface area that can be deployed in front of a water intake. Velocities of water passing through the barrier are extremely low, thereby reducing biological losses from entrainment and impingement. An example is the Gunderboom Marine Life Exclusion System (MLES™)[8]. Through these avoidance and minimization measures the potential impact of entrainment mortality to larval Delta smelt would be reduced to less than significant. Installation of an aquatic filter barrier would require additional permits.

The use of spring diversion reductions or curtailments (that could be flexible based on information regarding the distribution of sensitive fish species available from fishery monitoring such as the CDFG 20 mm surveys) or physical exclusion devises would reduce the incremental impact of fish egg and larval entrainment. Although entrainment mortality at the proposed DWSP intake would result in the loss of individual fish, the magnitude of entrainment mortality would be low based on seasonal diversion rates, the relatively low densities of sensitive fish within the lower San Joaquin River, and the wide distribution of fish eggs and larvae within the Delta, and therefore, would not result in significant impacts to the population abundance of fish inhabiting the Delta.

Entrainment would contribute to the incremental mortality of some fish species depending on their geographic and seasonal distribution within the Delta. Therefore, entrainment mortality would contribute to the cumulative impacts of water diversion operations and other factors contributing to the mortality and population dynamics of these fish eggs and larvae. Based on consideration of the proposed diversion operations, positive barrier fish screens, seasonal and geographic distribution and densities of larval Delta smelt, it was concluded that operation of the DWSP intake may affect Delta smelt and other fish species. Seasonal modification of diversion operations and/or seasonal installation of a physical barrier would reduce and avoid losses, reducing the potential impact to less than significant. The anticipated magnitude of Delta smelt entrainment mortality would not be expected to result in adverse impacts to the population dynamics or result in jeopardy to the continued existence of the species.

Installation and long-term operation of the positive barrier fish screens would avoid entrainment and impingement of juvenile, sub-adult, and adult fish at the DWSP intake. Because Chinook salmon and steelhead do not spawn in the project area, the small emergent life stages (e.g., swim-up fry) of these fish would not be vulnerable to diversion operations. The proposed fish screens would substantially reduce or eliminate entrainment of juvenile and older life stages of Chinook salmon, steelhead, other resident and migratory fish species including fry, and macroinvertebrates. Typically, positive barrier fish screens are expected to be about 95 percent (or greater) effective in avoiding fish losses (Hanson Environmental, 2004).

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8 Gunderboom's MLES™ is a water-permeable barrier that keeps fish eggs, larvae, and other aquatic organisms a safe distance from an intake structure, and thus, prevents impingement and entrainment of fish eggs, larvae, and juvenile aquatic organisms. The MLES™ is comprised of a pocket formed by two layers of treated polypropylene/ polyester fabric. The MLES™ curtain is either suspended by flotation billets and anchored in place, or integrated into existing shoreline intake structures. Sealed against the bottom or shoreline, the MLES™ completely surround the intake structure. Sediment and passively floating organisms drawn onto the fabric are freed when the automatic airburst cleaning system releases high-pressure air at the boom's base. Bursts of air shake each fabric panel, releasing deposits and ensuring a steady flow of water through the curtain.

Fish exposure to screens may cause injury and affect swimming behavior, resulting in increased vulnerability to predation. Given that approach velocities to the screen would be 0.2 ft/sec, the net effect on fish swimming behavior in the vicinity of the intake is likely to be minimal. The proposed fish screens would be designed to meet CDFG, NOAA Fisheries, and USFWS design criteria (Chapter 2, Project Description) and would be maintained and operated to meet these criteria. City personnel would inspect and repair the facility, as needed to meet criteria, and would maintain replacement screens that can be installed rapidly in case repair is needed. Therefore, long-term operation is expected to be reliable; periods of non-function would be brief. Routine monitoring and maintenance of the fish screens has been identified as a measure designed to avoid and minimize the risk of impingement of juvenile and adult fish and macroinvertebrates, and ensure that the fish screens operate in accordance with the design criteria. Therefore, the potential for juvenile and adult fish and macroinvertebrates to be impinged on the positive barrier fish screen would be less than significant.

The entrainment of fish eggs and larvae and small invertebrates (zooplankton), and low levels of impingement of juvenile and adult fish (expected to be less than five percent when compared to an unscreened intake), would contribute to cumulative mortality. Based on the diversion schedule, seasonal reduction or curtailment, or the use of a physical exclusion devise to avoid and reduce entrainment, design and operation of the fish screen in accordance with CDFG, NOAA Fisheries, and USFWS design criteria, and typically low seasonal densities of various lifestages of fish and invertebrates inhabiting the lower San Joaquin River and the central Delta, the contribution of entrainment and impingement to cumulative impacts would not be significant.

Mitigation Measure FISH-6a: The City will reduce or curtail diversion operations during periods when Delta smelt larvae are present in the vicinity of the intake or exclude larval Delta smelt entrainment using an aquatic filter barrier. Either alternative 1 or alternative 2 will be selected as directed by the resource agencies and as regulated through the Biological Opinion.

Alternative 1: The City will manage and operate the DWSP intake to reduce and avoid the increased risk of fish egg and larval entrainment during the spring months using reductions and/or curtailment in diversions. The actual reduction or curtailment period would be flexible and managed, to the extent possible, to respond to variation in the seasonal timing and geographic distribution of sensitive fish species vulnerable to entrainment into the intake. The primary focus will be on the protection of larval Delta smelt. Measures taken to protect Delta smelt would also protect Chinook salmon and other fish and macroinvertebrates.

Using data from CDFG’s 20-mm Delta smelt surveys, the City, in coordination with the CDFG and USFWS, will determine the potential diversion reduction or curtailment period each year, based on the geographic distribution of larval Delta smelt and its density in the immediate vicinity of the intake during the spring (April through June). Diversion operations will be managed in direct proportion to the concentration of larval Delta smelt (less than 20 mm in length) occurring in the lower San Joaquin River at CDFG sampling stations 906, 910, and 912 during each survey. Diversion operations will range from zero to 100 percent curtailment.

Based on results of CDFG's 20-mm Delta smelt surveys at approximately two-week intervals using actual survey schedules and available CDFG data, from April 1 through June 30 each year, will be used to determine curtailment/reduction. The City will maintain records and other documentation on the actual diversion operations and will provide the CDFG and USFWS a brief letter report each year documenting the curtailment of diversion operations designed to avoid and minimize the risk of fish entrainment.

In the event that the CDFG does not conduct the 20 mm Delta smelt surveys in any given year, the City will implement a monitoring program at the DWSP intake to determine the potential occurrence of larval Delta smelt entrainment. The entrainment monitoring program will be conducted from April 1 through June 30. Fishery sampling (entrainment monitoring) would be performed at two-day intervals to determine the densities and estimated number of larval Delta smelt in the vicinity of the DWSP intake. Sampling will occur downstream of the intake screens, using techniques similar to those employed to monitor larval fish entrainment at CCWD's Old River intake.

Based on results of the entrainment monitoring, water diversions would be reduced if Delta smelt larvae are present in samples collected on two consecutive sampling days. The reduction in diversions will continue until no larval Delta smelt are detected in the samples over three consecutive sampling days. These measures are designed to reduce and avoid the risk of larval Delta smelt entrainment through seasonal reductions in diversions while continuing to effectively operate the WTP.

To further reduce the potential for entrainment of larval Delta smelt and other fish eggs and larvae during the spring months, the City will schedule, to the extent practicable, routine WTP maintenance outages during these months (April through June).

Alternative 2: The City will install and maintain an aquatic filter barrier (e.g., Gunderboom's MLES™) that would serve to exclude fish eggs and larvae from entrainment into the DWSP intake from April 1 through June 30 each year. The fine-mesh curtain would completely surround the intake extending throughout the water column. The City will conduct a biological survey (fish egg and larval sampling) over the first three years of DWSP operations to demonstrate performance of the fine-mesh curtain in effectively excluding larval Delta smelt and other fish eggs and larvae from entrainment. In the event that the performance monitoring does not demonstrate that the fine-mesh curtain is effective in excluding larval Delta smelt from entrainment into the diversion, the City will implement the seasonal reduction and/or curtailment diversion operation alternative.

Mitigation Measure FISH-6b: To minimize potential impingement of juvenile and adult fish, the City will conduct long-term monitoring and maintenance of the intake fish screens to ensure that the screens operate as intended and incidental mortality associated with diversions will conform to the goals and objectives of the proposed DWSP. Monitoring will include approach velocity measurements immediately after initiation of screen operations, with fine-tuning of velocity control baffles or other modifications as necessary, to achieve uniformity of velocities in conformance with the CDFG, USFWS, and NOAA Fisheries criteria (0.2 ft/sec). The City will also monitor the condition of the positive barrier screen on an annual basis, and will do periodic visual inspections to remove accumulated debris and repair screen panels as necessary. CDFG, USFWS, and NOAA Fisheries will have access to the fish screens for underwater inspections following completion of the screen construction. The standards for success will be long-term reliable operation of the fish screens, and conformance with intake screen design criteria.

Significance After Mitigation: Less than significant.

Impact FISH-7: Operation of the DWSP intake facility could significantly affect Delta hydrology and water quality, which, in turn, could significantly affect associated fish habitat conditions. Less than significant.

Water Diversion Export Operations

Fish and macroinvertebrates, which are resident within the Delta and/or use the Delta as a seasonal migration pathway, are vulnerable to direct and indirect effects of water diversion operations. Direct diversion effects include impingement of larger individuals on screens and entrainment of smaller individuals into the water diversion. Although fish are vulnerable to entrainment and impingement at water diversions throughout the year, the majority of losses occur during the late winter and spring and during the fall months (DWR, unpublished data). A variety of factors influence the vulnerability of fish and macroinvertebrates to entrainment and impingement, including the location of the diversion, local hydraulic conditions, approach and sweeping velocities across a screen, fish screen design, and other factors. However, changes in the seasonal volume of water diverted have been identified as a key indicator of the potential impact of diversion operations on fishery resources. Therefore, a one percent increase in the average volume of water diverted at various existing facilities located within the Delta, associated with the proposed DWSP, when compared to baseline conditions, was considered as potentially significant.

2015 Project-Level Cumulative Conditions

SWP diversion facilities (Banks Pumping Plant and Skinner Salvage Facility) and the CVP Tracy Pumping Plant and Fish Collection Facility divert water from Old and Middle Rivers and subsequently through their fish salvage facilities. Salvaged fish are trucked to release locations within the central Delta and lower Sacramento and San Joaquin Rivers. If the proposed DWSP were to result in an increase in SWP-CVP exports, an expected increase in fish salvage and mortality at the SWP-CVP fish salvage facilities would occur. Hydrologic modeling results (MWH, 2005) show no significant changes in the SWP-CVP diversions, and as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in an increase in entrainment or risk of fish salvage as a result of SWP and CVP diversion operations.

CCWD operates an unscreened water intake in Rock Slough, and screened intakes in Old River and Mallard Slough. If the proposed DWSP were to cause an increase in water diversions at the CCWD intakes, particularly at the unscreened intakes, an increase in entrainment and mortality for fish and macroinvertebrates could occur. Hydrologic modeling results (MWH, 2005) show no significant changes in CCWD diversion operations; consequently, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in an increase in entrainment or risk of fish salvage as a result of CCWD diversion operations.

The North Bay Aqueduct (NBA) operates an unscreened surface water diversion within Suisun Bay. If operation of the proposed DWSP caused an increase in water diversions at the NBA, an increase in the risk of entrainment mortality to Delta smelt and other species could occur. Hydrologic modeling results (MWH, 2005) show no significant changes in NBA diversions; therefore, no adverse effects to fish species and aquatic habitat would be caused by the proposed DDWSP. Therefore, the proposed DWSP would not result in an increase in entrainment or risk of fish salvage as a result of NBA diversion operations.

2050 Program-Level Cumulative Conditions

Hydrologic modeling results (MWH, 2005) show no significant changes in water diversion exports; as a result, no adverse effects to fish species and aquatic habitats would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant incremental reduction in the quality or quantity of aquatic habitat within the Delta or increase the vulnerability of fish to entrainment or salvage at existing CVP-SWP water export facilities. The proposed DWSP would contribute to the cumulative changes in fishery habitat within the Delta; however, the incremental contribution of the proposed DWSP to these cumulative effects would not be significant.

Delta Flows

Hydrologic conditions within the central Delta channels influence water velocities, channel scour, water quality, and other factors affecting habitat conditions for resident and migratory fish and macroinvertebrates. Flow from the Sacramento River into the central Delta through the Delta Cross-channel, Georgiana Slough, and Three-mile Slough affects the migratory pathways for juvenile salmon and steelhead (San Luis and Delta Mendota Water Authority and Hanson, 1996; Brandes and McLain, 2001; DWR and Reclamation, 2000; Newman and Rice, 2002; Reclamation and DWR, 2003), and has been hypothesized to increase juvenile Chinook salmon mortality (Brandes, pers. comm. to C. Hanson). Changes in flows from the Sacramento River into the central Delta could potentially affect fishery habitat, alter migration pathways for juvenile and adult fish, and increase the risk of juvenile mortality.

Freshwater flows into and through the Delta are also important for the downstream transport and dispersal of planktonic fish eggs and larvae (e.g., Delta smelt, striped bass, longfin smelt, and other species). Freshwater flows also affect habitat quality and availability along channel margins and seasonally inundated floodplains (e.g., Yolo Bypass) as well as directly affecting salinity gradients within the Delta.

2015 Project-Level Cumulative Conditions

Georgiana Slough is a naturally-occurring channel that conveys water from the mainstem Sacramento River into the interior Delta. The confluence between the Sacramento River and Georgiana Slough is located near Walnut Grove. Studies conducted by the USFWS (Brandes pers. comm. to C. Hanson) indicate that survival of juvenile Chinook salmon emigrating from the Sacramento River downstream into Georgina Slough is lower than for those juvenile Chinook salmon continuing to migrate downstream within the mainstem Sacramento River. An increase in flow from the Sacramento River into Georgiana Slough could potentially result in a greater number of juvenile Chinook salmon, steelhead, and other fish species migrating from the Sacramento River into the interior Delta where mortality risk may be higher. Hydrologic modeling results (MWH, 2005) show no significant changes in the Georgiana Slough flows; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not increase the risk of fish losses resulting from increased vulnerability to mortality within the central Delta as a result of changes in Georgiana Slough.

The Delta Cross Channel is a Reclamation facility that conveys water from the Sacramento River into the interior Delta. The confluence between the Sacramento River and the Delta Cross Channel is located at Walnut Grove. The Delta Cross Channel is regulated using radial gates that can be opened to allow flow from the Sacramento River into the interior Delta or closed. Results of recent fishery and hydrologic studies (Herbold pers. comm. to C. Hanson) have shown that juvenile Chinook salmon migrating downstream in the Sacramento River may move into the Delta Cross Channel and subsequently the interior Delta. USFWS fishery studies (Brandes pers. comm. to C. Hanson) have demonstrated that mortality of juvenile Chinook salmon migrating into the interior Delta through the Delta Cross Channel is higher than for those juvenile Chinook salmon migrating downstream within the mainstem Sacramento River. Hydrologic modeling results (MWH, 2005) show no significant changes in the Delta Cross Channel flows; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not increase the risk of fish losses resulting from increased vulnerability to mortality within the central Delta as a result of changes in Delta Cross Channel flows.

Surplus outflow from the Sacramento and San Joaquin River systems to the Delta provides an indicator of freshwater flow passing through the Delta and habitat conditions further downstream within the estuarine regions of Suisun Bay, San Pablo Bay and central San Francisco Bay. Delta outflow affects salinity gradients within these downstream estuarine aquatic habitats and the geographic distribution and abundance of various fish and macroinvertebrates (Baxter et al., 1999). A significant reduction in surplus outflow would affect Delta hydrology, dispersal of planktonic fish eggs and larvae, and salinity gradients within the Delta that affect habitat quality and availability for a variety of estuarine fish and macroinvertebrates. Hydrologic modeling results (MWH, 2005) show no significant changes in surplus Delta outflow; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant reduction in the quality or quantity of aquatic habitat within the Delta as a result of changes in surplus Delta outflows.

The SWRCB water right permits require that both the SWP and CVP operate upstream impoundments and water diversions in a manner that maintains the minimum required level of Delta outflow. Delta outflow provides an important transport process for fish, macroinvertebrates, organic material, and sediments to move downstream from the Delta into the Suisun, San Pablo, and San Francisco Bay. Delta outflow also has a significant effect on salinity gradients within the estuary that are important in providing suitable habitat conditions for a variety of migratory and resident freshwater, estuary, and marine fish and macroinvertebrates species. Hydrologic modeling results (MWH, 2005) show no significant changes in required Delta outflow; therefore, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant reduction in the quality or quantity of aquatic habitat within the estuary as a result of changes in required Delta outflows.

The Yolo Bypass, located in the general vicinity of Sacramento on the Sacramento River, provides an overflow floodwater conveyance and storage area designed to reduce flood flows within the Sacramento River and the risk of flooding urban and agricultural areas located along the Sacramento River and downstream within the Delta. The Yolo Bypass is an important habitat for a variety of fish species, including juvenile Chinook salmon and splittail (Sommers et al., 2001a, b). Investigations conducted by Sommers et al. (2001a, b) have demonstrated that the growth rates of juvenile Chinook salmon seasonally inhabiting the Yolo Bypass are greater than growth rates for juvenile Chinook salmon rearing within the mainstem Sacramento River. Increased juvenile growth rates is thought to be one of the factors contributing to higher survival of juvenile salmon during their downstream migration from freshwater tributaries to coastal marine waters. Hydrologic modeling results (MWH, 2005) show no significant changes in Yolo bypass flows; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant reduction in the quality or quantity of aquatic habitat within the estuary as a result of changes in Yolo Bypass flows.

2050 Program-Level Cumulative Conditions

Hydrologic modeling results (MWH, 2005) show no significant changes in the hydrologic conditions within the central Delta; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant incremental reduction in the quality or quantity of aquatic habitat within the estuary. The proposed DWSP would contribute to the cumulative changes in fishery habitat within the Delta; however, the incremental contribution of the proposed DWSP to these cumulative effects would not be significant.

River Flows

The quality and availability of fishery habitat within the Sacramento and San Joaquin Rivers is directly influenced by seasonal patterns and the magnitude of river flow. Species such as Chinook salmon, steelhead, splittail, Delta smelt, sturgeon, striped bass, and many more use the upper and lower reaches of the rivers and their tributaries as spawning and juvenile rearing areas. River flows also affect adult and juvenile migration, water velocities and circulation, water quality (including seasonal water temperatures within many reaches), water depths, and other factors affecting habitat conditions. Reduced river flows have been identified as a factor affecting the survival of juvenile salmon and other fish species (DWR and Reclamation, 2000; Brandes and McLain, 2001; Reclamation and DWR, 2003; SJRGA 2004; and others). A significant reduction in river flows as a result of the proposed DWSP could significantly affect habitat for migration, spawning and egg incubation, juvenile rearing and foraging, transport of planktonic eggs and larvae, and survival of juveniles during downstream migration.

2015 Project-Level Cumulative Conditions

The Sacramento River is used by a number of fish species, either as direct habitat during one or more of their lifestages or as a migration corridor to upstream habitat in other river systems. Flows within the Sacramento River are important in providing both physical habitat for a variety of fish species (water depths and velocities), providing migratory corridors for anadromous fish species including Chinook salmon, steelhead, striped bass, American shad, and for providing downstream transport and dispersal of planktonic fish eggs and larvae for species such as striped bass and Delta smelt. Hydrologic modeling results (MWH, 2005) show no significant changes in Sacramento River flows; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant reduction in the quality or quantity of aquatic habitat within the Delta as a result of changes in Sacramento River flows.

The San Joaquin River is used as a migratory corridor for the fall-run Chinook salmon and as habitat for a variety of resident and migratory fish species. Flows in the San Joaquin River at Vernalis are controlled by operations on upstream tributaries, including New Exchequer, New Don Pedro, Friant, and New Melones Dams. Studies are currently being conducted as part of VAMP (SJRGA, 2004) to evaluate the significance of San Joaquin River flows at Vernalis on the survival of downstream migrating juvenile Chinook salmon. Data available to date from the VAMP investigation and analysis of historic adult salmon escapement to the river show a general trend suggesting that salmon survival increases as a function of increased flow at Vernalis (SJRGA, 2004). Flow at Vernalis also contributes to river habitat conditions supporting a variety of other fish and macroinvertebrates. Flow from the San Joaquin River into the Delta also contributes to salinity gradients, physical habitat conditions, and other factors affecting habitat quality and availability within the Bay-Delta estuary for resident and migratory fish and macroinvertebrate species. Hydrologic modeling results (MWH, 2005) show no significant changes in San Joaquin River flows; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant reduction in the quality or quantity of aquatic habitat within the Delta as a result of changes in San Joaquin River flows.

2050 Program-Level Cumulative Conditions

Hydrologic modeling results (MWH, 2005) show no significant changes in Sacramento and San Joaquin river flows; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant incremental reduction in the quality or quantity of aquatic habitat within the rivers or estuary. The proposed DWSP would contribute to the cumulative changes in fishery habitat within the Delta; however, the incremental contribution of the proposed DWSP to these cumulative effects would not be significant.

Total Delta Inflow and Outflow

Total Delta inflow and outflow have been used as indices of seasonal habitat conditions within the central Delta and downstream estuarine regions of the system for both resident and migratory fish and macroinvertebrates (Reclamation and DWR, 2003). Indices of abundance for many of the fish species inhabiting the Delta have been found to increase as total Delta inflow and outflow increase. For example, indices of juvenile longfin smelt and splittail have both been found to increase as flows increase (Hanson, 2005). Delta inflow and outflow are thought to affect species transport and dispersal downstream into the estuary, locate low-salinity estuarine waters within Suisun Bay where water depths are relatively shallow and productivity, particularly during the spring and early summer months, is increased generating greater abundance of phytoplankton and zooplankton as a food resource for larval and juvenile fish. Information on the importance of Delta inflow and outflow as a factor affecting habitat conditions and the growth and survival of various fishery resources has been developed by Jassby et al. (1995), Baxter et al. (1999), Kimmerer (2000a, b), Reclamation and DWR (2003), and others. A significant decrease in Delta inflow and/or outflow would potentially adversely affect the quality and availability of habitat, growth, survival, and geographic distribution of these fish and macroinvertebrate species.

2015 Project-Level Cumulative Conditions

Delta inflow from the Sacramento and San Joaquin river systems provides an indicator of several key ecological processes, including: (1) migration and transport of various lifestages of resident and anadromous fishes using the Delta; (2) salinity levels at various locations within the Delta as measured by the locations of X2; and (3) the Delta's primary (phytoplankton) and secondary (zooplankton) production. Hydrologic modeling results (MWH, 2005) show no significant changes in Delta inflow; as a result, no adverse impacts to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant reduction in the quality or quantity of aquatic habitat within the Delta as a result of changes in Delta inflow.

Delta outflow provides an indicator of freshwater flow passing through the Delta and habitat conditions further downstream within Suisun Bay, San Pablo Bay and central San Francisco Bay.

Delta outflow affects salinity gradients within these downstream aquatic habitats and the geographic distribution and abundance of various fish and macroinvertebrates (Baxter et al., 1999). Hydrologic modeling results (MWH, 2005) show no significant changes in Delta outflow; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant reduction in the quality or quantity of aquatic habitat within the Delta as a result of changes in Delta outflow.

2050 Program-Level Cumulative Conditions

Hydrologic modeling results (MWH, 2005) show no significant changes in Delta inflow or outflow; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant incremental reduction in the quality or quantity of aquatic habitat within the Delta. The proposed DWSP would contribute to the cumulative changes in fishery habitat within the Delta; however, the incremental contribution of the proposed DWSP to these cumulative effects would not be significant.

Export/Inflow Ratio

The E/I ratio, the percentage of Delta inflow diverted from the Sacramento and San Joaquin River systems and the Delta, provides an indicator of several key ecological processes, including: (1) migration and transport of various lifestages of resident and anadromous fishes using the Delta; (2) salinity levels at various locations within the Delta as measured by the locations of X2; and (3) the risk of direct and indirect fish losses resulting from export operations. Although no specific biological relationships have been developed regarding the abundance of various fish and macroinvertebrate species and the E/I ratio, the ratio is used in SWRCB D-1641 as one of the bases for regulating the rate of freshwater exports from the Delta. The E/I ratio reflects the balance between freshwater inflows to the Delta and the corresponding percentage of inflows that can be exported through the SWP and CVP diversion facilities. The E/I ratio varies with the season of the year. E/I is limited to 35 percent during the February–June period when juvenile fish are most vulnerable to losses resulting from diversions and increase to 65 percent during the remainder of the year. The E/I ratio represents a tool for reducing the effects of CVP and SWP diversion operations on resident and migratory fish inhabiting the Delta. An significant increase in the E/I ratio, indicating greater exports from the Delta relative to the inflow of freshwater from the tributary rivers, would be interpreted as an increase in the potential risk of adverse effects on fishery resources and their habitat resulting from entrainment and salvage at the SWP and CVP export facilities.

2015 Project-Level Cumulative Conditions

Hydrologic modeling results (MWH, 2005) show no significant changes in the E/I ratio; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant reduction in the quality or quantity of aquatic habitat within the Delta, or the risk of entrainment and salvage mortality at the water export facilities, as a result of changes in E/I ratios.

2050 Program-Level Cumulative Conditions

Hydrologic modeling results (MWH, 2005) show no significant changes in the E/I ratio; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant incremental reduction in the quality or quantity of aquatic habitat within the Delta. The proposed DWSP would contribute to the cumulative changes in fishery habitat within the Delta; however, the incremental contribution of the proposed DWSP to these cumulative effects would not be significant.

Salinity/X2 Location

The location of the X2 location (2 ppt salinity isohaline) has been identified as an important indicator of habitat conditions within the Bay-Delta system (Jassby et al., 1995; Kimmerer, 2002a, b). The location of X2 within Suisun Bay during the February through June period is thought to be directly and/or indirectly related to the reproductive success and survival of the early lifestages for a number of estuarine species. Locating the low-salinity waters of the estuary within the shallow-water areas of Suisun Bay is thought to increase production of phytoplankton and zooplankton that are the food supply for larval and juvenile fish and other aquatic species inhabiting the estuary. Results of statistical regression analyses suggest that the abundance of several estuarine species (e.g., longfin smelt, splittail) is greater when the X2 location during the spring occurs within the western portion of Suisun Bay, and is lower for those years when the X2 location is further to the east, near the confluence between the Sacramento and San Joaquin Rivers. A significant reduction in the X2 location (moving X2 upstream further toward the Delta and away from Suisun Bay) during the February through June period would be identified as a potentially significant adverse impact to fishery resources and their habitat.

For purposes of evaluating changes in habitat quantity and quality for estuarine species, a significance criterion of an upstream change in X_2 location within 0.25 km of the baseline conditions was considered to be less than significant. The 0.25 km X2 criterion used in this analysis is more conservative than the criterion (an upstream movement in average monthly X2 location greater than one km applied to the environmental analysis of the Environmental Water Account (Reclamation and DWR, 2003). The 0.25 km change in average monthly X2 location represents a change in location, on average, of less than approximately 275 yards.

2015Project-Level Cumulative Conditions

Hydrologic modeling results (MWH, 2005) show no significant long-term changes in the X2 location; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant reduction in the quality or quantity of aquatic habitat within the Delta, or the risk of entrainment and salvage mortality at the water export facilities, as a result of changes in the X2 location.

2050 Program-Level Cumulative Conditions

Hydrologic modeling results (MWH, 2005) show no significant long-term changes in the X2 location; as a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant incremental reduction in the quality or quantity of aquatic habitat within the Delta. The proposed DWSP would contribute to the cumulative changes in fishery habitat within the Delta; however, the incremental contribution of the proposed DWSP to these cumulative effects would not be significant.

River Water Temperatures

Water temperature has been identified as a significant environmental factor affecting habitat suitability, growth, and survival of Chinook salmon, steelhead, and other fish species inhabiting river systems tributary to the Delta. For example, seasonal water temperatures during September are a significant factor affecting upstream migration of adult fall-run Chinook salmon while water temperatures during the spring (April through June) are a significant factor affecting survival of downstream migrating juvenile fall-run Chinook salmon (SJRGA, 2004; and others). Seasonal water temperatures are a major factor affecting Chinook salmon survival on the lower San Joaquin River and other Central Valley river systems. Many river management strategies (e.g., American, Feather, Sacramento, Mokelumne, and other rivers) focus on coldwater pool and water temperature management to improve habitat and success of salmon in spawning, egg incubation, juvenile rearing, and migration.

A variety of approaches and criteria have been developed for use in assessing the potential effects of project operations on fishery habitat as a result of seasonal changes in water temperatures. In evaluating the potential effects of changes in water temperatures affecting fishery habitat on the Trinity River, the USFWS et al. (1999) used a 0.5°F change in the long-term average temperature as a significance criteria while the CVRWQCB typically uses a 1°F change as a significance criteria (Reclamation and DWR, 2003). The Environmental Water Account EIS/EIR (Reclamation and DWR, 2003) used a 0.3°F change in water temperature to assess potential effects on fishery habitat. Given the resolution of the temperature models and the ability to detect biologically meaningful changes in habitat conditions, a temperature criterion of 0.5°F (temperature increase above baseline) was selected for use in these fishery impact analyses.

2015 Project-Level Cumulative Conditions

Results of water temperature modeling (MWH, 2005) show no significant changes in water temperatures on the American River at Sunrise Bridge, Feather River below Thermalito Afterbay, Sacramento River a Keswick Dam, Bend Bridge, and Red Bluff Diversion Dam, or on the Trinity River at Lewiston Dam in above normal, below normal, dry, and critical water years. The temperature difference is greatest on the Trinity River at Lewiston Dam, exceeding 0.6°F in two months (out of 252 months); however, the long-term average temperature change would not be significant. As a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant reduction in the quality or quantity of aquatic habitat within the river systems as a result of increased water temperatures.

2050 Program-Level Cumulative Conditions

Results of water temperature modeling (MWH, 2005) show no significant long-term changes in water temperatures on the American River at Sunrise Bridge, Feather River below Thermalito Afterbay, Sacramento River a Keswick Dam, Bend Bridge, and Red Bluff Diversion Dam, or on the Trinity River at Lewiston Dam. The temperature difference is greatest on the Trinity River at Lewiston Dam, exceeding 0.6°F in eighteen months (out of 252 months). As a result, no adverse effects to fish species and aquatic habitat would be caused by the proposed DWSP. Therefore, the proposed DWSP would not result in a significant reduction in the quality or quantity of aquatic habitat within the river systems as a result of increased water temperatures.

Mitigation: No mitigation is required.

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CHAPTER 5

GROUNDWATER RESOURCES

CHAPTER 5

GROUNDWATER RESOURCES

This chapter addresses the potential impacts of the DWSP on groundwater resources within the project area.

5.1 GROUNDWATER RESOURCES

5.1.1 SETTING

The San Joaquin River Hydrologic Region, covering approximately 15,200 square miles, contains two entire groundwater basins and part of the San Joaquin Valley Groundwater Basin. The San Joaquin Valley Groundwater Basin is divided into nine subbasins in this region (DWR, 2003). Of these nine subbasins, the proposed DWSP would occur within the area defined by the Eastern San Joaquin Subbasin.

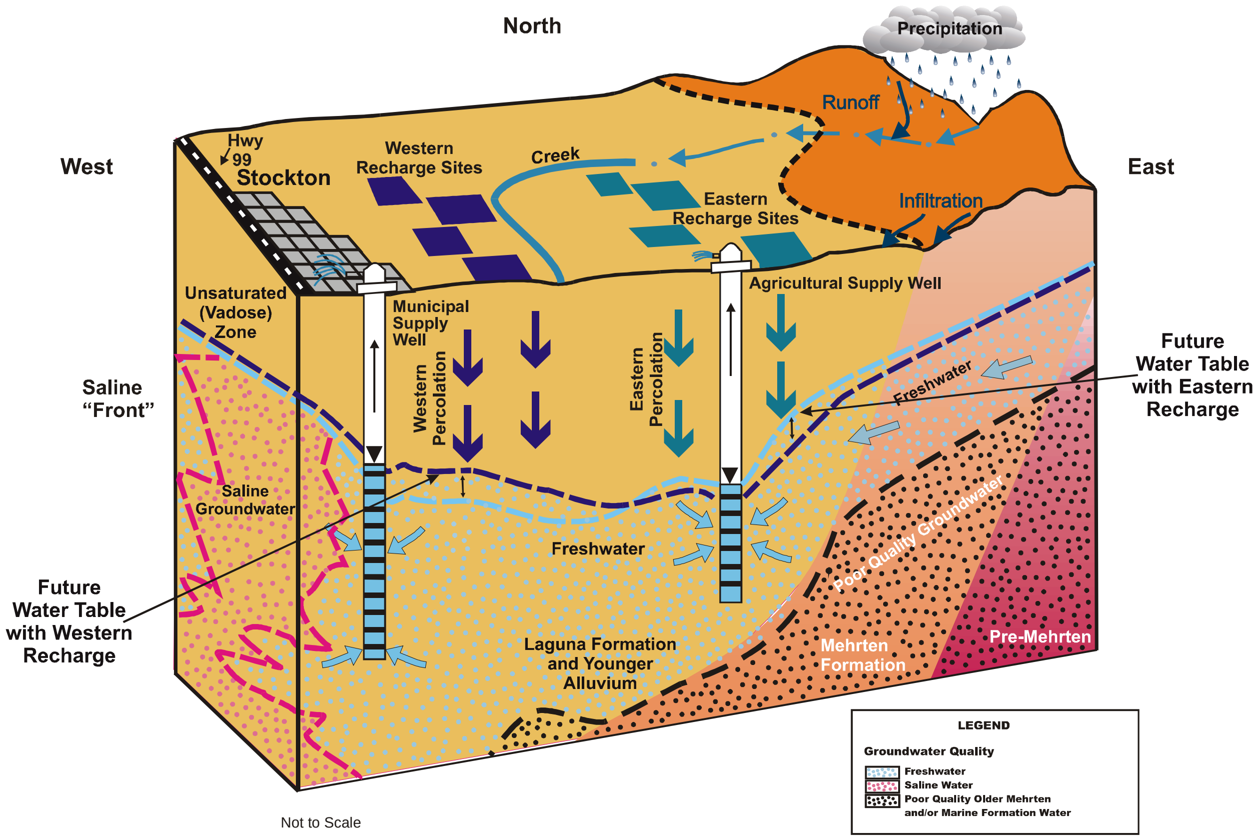
The Eastern San Joaquin Subbasin is bound by the Mokelumne River on the north and northwest, the San Joaquin River on the west, the Stanislaus River on the south, and the Sierra Nevada to the east. The Eastern San Joaquin Subbasin is drained by the San Joaquin River and its major tributaries – the Stanislaus, Calaveras, and Mokelumne Rivers. The San Joaquin River flows northward into the Sacramento and San Joaquin Delta and discharges into the San Francisco Bay. Annual precipitation within the subbasin ranges from about 11 inches in the southwest to about 25 inches in the northeast.

Groundwater in San Joaquin County moves from sources of recharge to areas of discharge. Most recharge to the aquifer system occurs from the Delta and along active stream channels where extensive sand and gravel deposits are found. Consequently, the highest groundwater elevations typically occur near the Delta and the Stanislaus and San Joaquin Rivers. Other sources of recharge within the project area include subsurface recharge from fractured geologic formations to the east, as well as deep percolation from applied surface water and precipitation. Groundwater underlying the COSMA generally flows to the east (Stockton MUD et al., 2003).

HYDROGEOLOGY

Water-bearing zones in the Eastern San Joaquin Subbasin consist of the Alluvium and Modesto/ Riverbank Formations, Flood Basin Deposits, Laguna Formation, and Mehrten Formation. The thickness of the usable aquifer ranges from less than 100 feet in the eastern edge of the County to over 3,000 feet in the southwestern edge, and is approximately 1,000 feet beneath Stockton. In general, the sedimentary units dip westward with the older Tertiary sedimentary formations (primarily Mehrten and Laguna formations) exposed in the east. These relationships are shown schematically in Figure 5-1, which is based on data from the San Joaquin County Groundwater Investigation (DWR, 1967). These older formations are overlain by younger Tertiary and Quaternary alluvium (stream deposits) that include the lower to middle Pleistocene Riverbank

FIGURE 5-1
EAST SAN JOAQUIN COUNTY GROUNDWATER SYSTEM



Sources: Stockton MUD et al., 2003

Formation and upper Modesto Formation (broadly correlative with the Victor Formation in Sacramento County).

The Alluvium and Modesto/Riverbank Formations (undifferentiated) are exposed within the subbasin along a band approximately 15 miles wide that extends from about Stockton eastward (DWR, 1967). Groundwater occurs unconfined within these units. Well yields to ± 650 gallons per minute (gpm) are reported. Because these units are limited in thickness, most wells penetrate them in order to tap deeper aquifers in the area. The average specific yield in San Joaquin County is 7.3 percent. The Victor Formation as defined in DWR Bulletin 146 correlates with these units (DWR, 1967).

Flood Basin Deposits are exposed in the Delta area of the San Joaquin Valley. Groundwater in this unit occurs under unconfined to confined conditions. The unit, in general, has low permeability and may create semi-confined to confined conditions when interfingered with the Alluvium and Modesto/Riverbank Formations. Occasional pockets of fresh water are found in the Delta deposits; generally the formation contains poor quality water.

From the Laguna Formation, yields of 1,500 gpm have been reported from highly permeable beds; average groundwater yields are about ± 900 gpm. Groundwater occurs under unconfined to locally semi-confined conditions within this unit. Occasional minor perched water zones are also encountered, particularly in the Mokelumne River area.

The Mehrten Formation is exposed in the easternmost part of the subbasin where it forms readily identifiable, nearly flat-topped hills. The Mehrten Formation is approximately 400 feet thick in eastern surface outcrops to over 600 feet thick in the subsurface near Stockton. Mehrten Formation sands commonly yield about 1,000 gpm from wells. The formation appears to be semi-confined at least locally in the Stockton area, due to the inferred extensive fine-grained beds in its upper part.

GROUNDWATER OVERDRAFT

Overdraft is defined as the additional annual extraction from a groundwater basin over a long period of time above the annual safe yield. Basin overdraft can occur when groundwater withdrawal exceeds natural recharge of the aquifer system. In wet years, recharge into developed groundwater basins tends to exceed extractions. Conversely, in dry years, groundwater basin recharge tends to be less than groundwater basin extractions. By definition, overdraft is not a measure of these annual fluctuations in groundwater storage volume. Instead, overdraft is a measure of the long-term trend associated with these annual fluctuations (DWR, 1998).

Measurements over the past 40 years show a fairly continuous decline in groundwater levels in Eastern San Joaquin County (Corps, 2001). Groundwater pumping in San Joaquin County averaged 830,000 AF between 1970 and 1990. Since then groundwater levels have declined at an average rate of 1.7 feet per year and have dropped as much as 100 feet in some areas. It is estimated that groundwater overdraft during the past 40 years has reduced storage in the basin by as much as two million AF (DWR, 2003).

Since the late 1940s and early 1950s, groundwater extraction to meet agricultural and urban demands has created two pronounced pumping depressions. The larger depression is between the Mokelumne and Stanislaus Rivers. The center of this depression is east of Stockton, where groundwater levels can be more than 70 feet below surface level following the irrigation season. This pumping depression has caused poorer water quality from the Delta to migrate toward the City of Stockton. Several municipal wells in west Stockton have been abandoned because of the decline in groundwater quality. The other groundwater depression is between the Consumnes and Mokelumne Rivers (DWR, 1998).

DWR (1967) concluded that continued groundwater overdraft in Eastern San Joaquin County had caused the groundwater depression beneath Stockton to deepen from -30 feet msl in 1950 to -70 feet msl in 1964. DWR also noted that the depression had broadened to the north, south, and east, and that the largest change in water levels was a drop of 65 feet near Collegeville (DWR, 1967). Continued water level declines were predicted unless the groundwater overdraft was addressed.

Significant groundwater depressions are present below the City of Stockton, east of Stockton, and east of Lodi (SJCFCWCD, 1999). Several of these groundwater depressions extend to depths of about 100 feet below ground surface (bgs) (or more than 40 feet below mean sea level).

Subsidence was investigated during the 1960s in the Stockton area where a substantial quantity of groundwater had been withdrawn. Before 1964, subsidence in the central Stockton area exceeded two feet and subsidence of up to 0.5 feet was recognized to extend for more than four miles to the east and north of Stockton. The average rate of subsidence for the period from 1963 to 1987 was 0.1 and 0.2 feet per year near Stockton, decreasing eastward to approximately 0.05 feet per year (San Joaquin County, 1992).

Reclamation (1996) estimated the 1990 annual groundwater extraction in San Joaquin County to be about 731,000 AF/year, which exceeded the estimated safe yield of 618,000 AF/year. This resulted in an estimated overdraft of 113,000 AF/year. An estimated 70,000 AF/year of overdraft occurs in northeastern San Joaquin County and about 35,000 AF/year of overdraft occurs in the Stockton East Water District area.

GROUNDWATER QUALITY

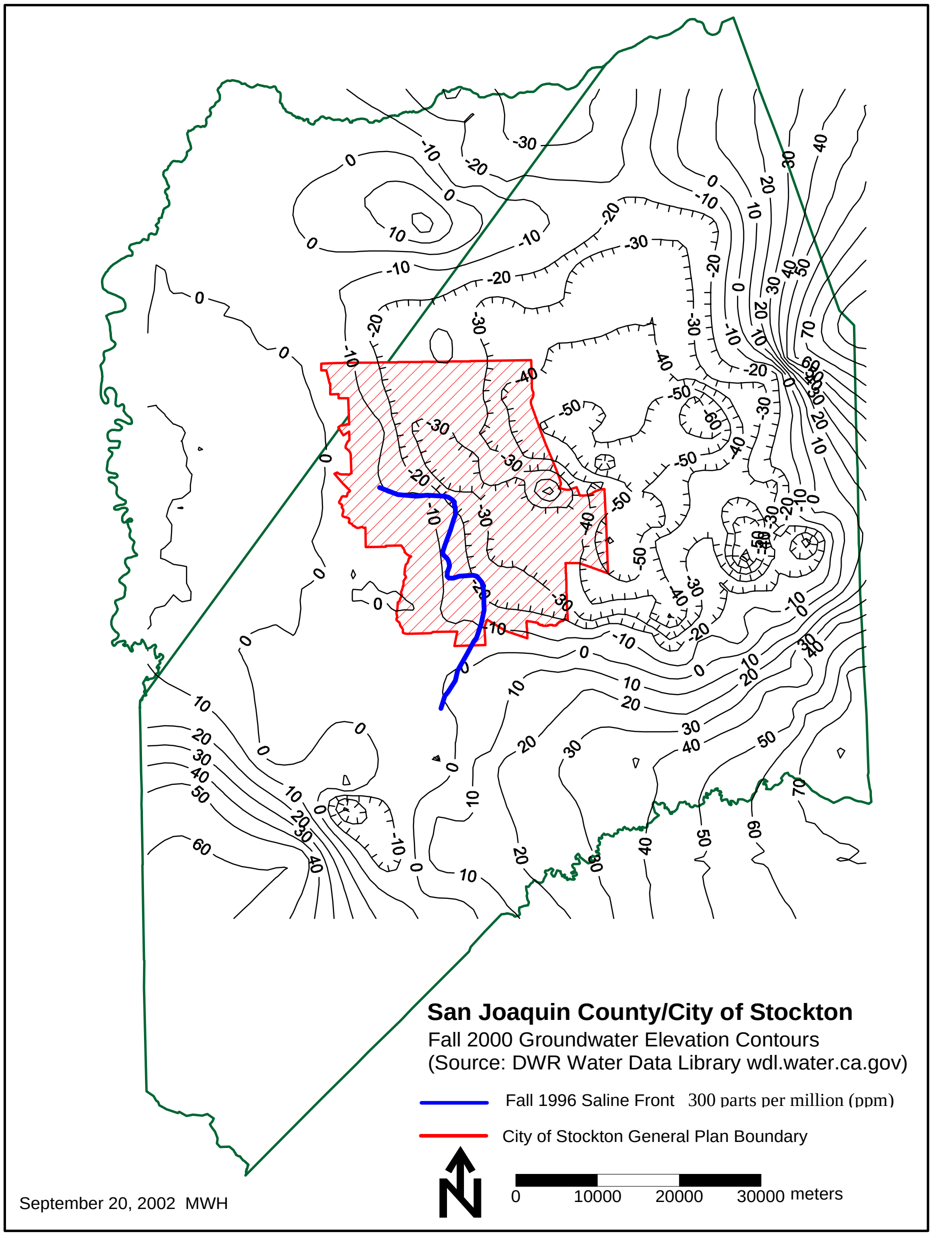
The majority of the groundwater in the basin is characterized by calcium-magnesium bicarbonate or calcium-sodium bicarbonate types (Sorenson, 1981). Bicarbonate is the predominant anion in the eastern part of the basin. Large areas of chloride type water occur along the western margin of the subbasin along the San Joaquin River. Based on analyses of 174 water supply wells in the subbasin, total dissolved solids (TDS) ranges from 30 to 1,632 mg/L and averages about 310 mg/L (DWR, 2003). Sorenson (1981) found in San Joaquin County that the TDS of the groundwater ranged from 50 to 3,520 mg/L with a mean of 463 mg/L and median of 269 mg/L. The specific conductance of the groundwater ranged from 78 to 5,390 µmhos/cm, with a mean of 685 µmhos/cm and a median of 356 µmhos/ cm. Some of the highest specific conductance values have been found along the western part of the subbasin and San Joaquin River alignment (DWR, 2003).

Since the late 1970s saline intrusion has threatened the groundwater quality in the COSMA area, especially in dry years when groundwater is used more heavily. As a result of declining water levels, a cone of depression has formed creating a gradient that allows saline water underlying the Delta region to migrate northeast within the southern portions of the COSMA. Figure 5-2 shows the approximate location of the saline front. Poor quality water has been moving east along a 16-mile front on the east side of the Delta (DWR, 1967). Increased lateral inflow from the west is undesirable, as this water is typically higher in TDS and chloride levels and can further cause the degradation of water quality in the basin.

> The degradation of the groundwater is particularly evident in the Stockton area where the saline front is moving eastward at a rate of 140 to 150 feet per year. Data from 1980 and 1996 indicate that the saline front has continued to migrate eastward up to about one mile

beyond its 1963 extent (USACE, 2001). In the COSMA, saline intrusion degrades water quality, threatens the

FIGURE 5-2
SAN JOAQUIN COUNTY GROUNDWATER CONTOURS AND SALINE FRONT



Sources: Stockton MUD et al., 2003

long-term productivity of the groundwater basin, and compromises the future of the basin as a source of municipal water supply.

The Stockton MUD operates 24 groundwater wells in North Stockton, six groundwater wells in South Stockton, and three groundwater wells at the Walnut Plant. Cal Water operates 37 groundwater wells in Central Stockton. The quality of the groundwater is generally good (Tables 5-1 and 5-2). The Stockton MUD and Cal Water groundwater quality data indicate the following:

- Hardness concentrations range from 44 to 350 mg/L.
- Turbidity values range from not detected (ND) to 2.5 nephelometric turbidity units (NTU).
- Chloride concentrations range from 3 to 106 mg/L.
- Arsenic concentrations range from ND to 45 micrograms per liter (µg/L). A discussion of arsenic in Stockton MUD and Cal Water groundwater wells can be found in Chapter 2, Project Description.
- All metal concentrations are at or below their maximum contaminant level (MCL) or their secondary MCL.
- All organic chemicals of concern (e.g., tetrachloroethene and trichloroethene) are below their MCL.

GROUNDWATER BASIN FOR POTENTIAL AQUIFER STORAGE AND RECOVERY

As noted in Chapter 2, Project Description, after the development of the 30 mgd DWSP, the City would consider the need for an ASR program to optimize use of Delta water in periods when supply exceeds demand. Initially the City would study and implement a pilot program to test the feasibility of an ASR program and define the potential location of injection/extraction wells.

The thickness, texture, and lateral extent of water bearing formations beneath the COSMA are favorable for groundwater storage. DWR (1967) describes the base of freshwater to be approximately 1,000 feet beneath COSMA. In general, this freshwater exists within the Laguna Formation's various sequences of deposits of interbedded and discontinuous gravels, sands, silts, and clays. The Laguna Formation is generally unconfined, although the heterogeneous nature of the formation causes it to behave as semi-confined at depth in some areas.

The lowered groundwater levels in COSMA and the agricultural area to the east have created favorable conditions for groundwater storage. The general flow of groundwater under pre-development conditions is from northeast to southwest. However, historical groundwater pumping has altered the flow direction, which is now toward groundwater depressions generally in the center of the East San Joaquin subbasin. Recent groundwater contour maps (such as the fall 2000 data shown in Figure 5-2) indicate that the groundwater depression east of Stockton is generally comparable to that present in 1980 (SJCFCWCD, 1985). The deepest portions of the depression are still east of the COSMA. However, the depression has broadened and migrated a few miles to the northeast and southeast and is up to -80 feet msl.

Groundwater flow directions also remain generally similar to 1980. Regionally, groundwater flows toward the depression from recharge areas in the foothills to the east, Mokelumne River to the north, the Stanislaus River to the south, and the San Joaquin

TABLE 5-1
WATER QUALITY OF STOCKTON MUD GROUNDWATER WELLS

Constituent	Units	Primary MCL (Secondary MCL)	PHG (MCLG)	2000 – 2002 Range	2000 – 2002 Average	2001 – 2003 Range	2001 – 2003 Average
Detected Constituents with Primary Drinking Water Standards							
Aluminum	mg/L	1 (0.2)	0.6	< 0.05 – 0.82	< 0.05	< 0.05 – 0.82	< 0.05
Arsenic	µg/L	50[1]	n/a	< 2.0 – 17	5.3	< 2.0 – 19	5.7
Barium	mg/L	1	2	< 0.1 – 0.26	0.17	< 0.1 – 0.25	0.17
Chromium, Total	µg/L	50	(100)	< 10 -13	< 10	< 10 – 13	< 10
Fluoride	mg/L	2 (2)	1	< 0.1 – 0.91	< 0.1	< 0.1 – 0.29	< 0.1
Nickel	µg/L	100	12	< 10 – 19	< 10	< 10 – 19	< 10
Nitrate (as NO_3)	mg/L	45	45	< 2.0 – 23	9.2	< 2.0 – 29	8.5
Selenium	µg/L	50	(50)	< 5.0 – 8.3	< 5.0	< 5.0 – 8.3	< 5.0
Tetrachloroethylene	µg/L	5	0.06	< 0.5 – 2.8	< 0.5	< 0.5 – 7.1	0.6
Alpha Activity, Gross	pCi/L	15[2]	n/a	-0.20 – 10.30	3.76	-0.20 – 10.3	3.64
Combined Radium[3]	pCi/L	15[2]	n/a	-0.35 – 1.17	0.18	-0.49 – 1.17	0.18
Uranium	pCi/L	20[2]	0.5	-0.24 – 8.88	3.69	-0.24 – 8.8	3.73
Beta Activity, Gross	pCi/L	50[2]	n/a	-31.1 – 50.61[4]	NR	2.00 -9.00[4]	NR
Detected Constituents with Secondary Drinking Water Standards							
Chloride	mg/L	(250)	n/a	6.6 – 91	33	6.6 – 84	33
Color	Units	(15)	n/a	0 – 5	0	0 – 5	0
Copper	mg/L	(1)	n/a	< 0.05 – 0.12	< 0.05	< 0.05 – 0.12	< 0.05
Iron	µg/L	(300)	n/a	< 100 – 3,300	154	< 100 – 3,300	158
Manganese	µg/L	(50)	n/a	< 10 – 240	44	< 20 – 240	46
Specific Conductivity	µmhos/cm	(1,600)	n/a	270 – 740	454	260 – 700	454
Sulfate	mg/L	(250)	n/a	4.4 – 48	22	4.0 – 41	23
Total Dissolved Solids	mg/L	(500)	n/a	190 – 510	308	170 – 430	304
Turbidity	NTU	(5)	n/a	< 0.1 – 2.5	0.12	< 0.5 – 2.5	< 0.5
Zinc	mg/L	(5)	n/a	< 0.05 – 0.084	< 0.05	< 0.05 – 0.084	< 0.05
Detected Unregulated Constituents							
Total Hardness (as $CaCO_3$)[6]	mg/L	n/a	n/a	78 – 350	190	63 – 300	190
Total Alkalinity	mg/L	n/a	n/a	110 – 300	152	110 – 300	157
Calcium	mg/L	n/a	n/a	21 – 82	44	17 – 70	45

TABLE 5-1 (Continued)
WATER QUALITY OF STOCKTON MUD GROUNDWATER WELLS

Constituent	Units	Primary MCL (Secondary MCL)	PHG (MCLG)	2000 – 2002		2001 – 2003	
				Range	Average	Range	Average
Magnesium	mg/L	n/a	n/a	6.3 – 36	19	5.1 – 32	19
Potassium	mg/L	n/a	n/a	2.7 – 6.5	4.8	2.9 – 6.5	< 1
Sodium	mg/L	n/a	n/a	14 -56	26	14 – 56	26
Boron	mg/L	n/a	n/a	100 – 400	< 100	< 100 – 400	< 100
Chromium, Hexavalent	µg/L	n/a	n/a	< 1.0 – 7.0	2.0	< 1.0 – 7.0	< 1.0
Perchlorate	µg/L	n/a	n/a	< 4.0 – 19	< 4	< 4.0 – 19	< 4.0
1,2,3-Trichloropropane	µg/L	n/a	n/a	< 0.005 – 0.015	< 0.005	< 0.005 – 0.015	< 0.005
Vanadium	µg/L	n/a	n/a	< 3.0 – 30	15	< 3.0 – 33	15
Radon	pCi/L	n/a	n/a	408 811[5]	633	---	717[6]

1 The new arsenic MCL of 10 µg/L will become effective January 23, 2006.
2 Compliance based on average values for four quarters.
3 Reported values are for radium 226; radium 228 was not required.
4 Sampled during 1992 – 1994. Highest level reported in range is the result of an individual sample result.
5 Sampled in 1992 and 2000.
6 Result if from one source sampled in 2000.

MCL = Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.
MCLG = Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health as set by USEPA.
Mg/L = milligrams per liter
µg/L = micrograms per liter
µmhos/cm = micromhos per centimeter
n/a = not applicable
NR = Testing not required
NTU = Nephelometric Turbidity Unit
pCi/L = picocuries per liter
PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health as set by Cal-EPA.
Sources: City of Stockton, 2003 and City of Stockton and OMI Thames Water, 2004

TABLE 5-2
WATER QUALITY OF CAL WATER GROUNDWATER WELLS

Constituent	Units	Primary MCL (Secondary MCL)	PHG (MCLG)	2000 – 2002		2001 – 2003	
				Range	Average	Range	Average
Detected Constituents with Primary Drinking Water Standards							
Aluminum	mg/L	1 (0.2)	0.6	ND – ND	ND	--	--
Arsenic	µg/L	50[1]	n/a	ND – 45	11	ND – 43	10
Barium	mg/L	1	2	ND – 0.36	0.12	ND -0.67	0.12
Chromium, Total	µg/L	50	(100)	ND – ND	ND	--	2
Fluoride	mg/L	2 (2)	1	ND – 0.33	0.14	ND – 0.37	0.15
Nitrate (as NO_3)	mg/L	45	45	ND – 28	4	ND – 54	5
Selenium	µg/L	50	(50)	--	--	ND – 6	1
Dibromochloropropane	µg/L	200	1.7	ND – 10	ND	--	--
1,1-Dichoroethylene	µg/L	6	10	--	--	ND – 4.3	0.08
Tetrachloroethylene	µg/L	5	0.06	ND – 1.3	ND	--	--
Tricloroethylene	µg/L	5	0.8	ND – 3.6	ND	ND – 4.5	0.16
Alpha Activity, Gross	pCi/L	15[2]	n/a	ND -6.3	1	ND – 6.3	1.07
Uranium	pCi/L	20[2]	0.5	ND -12.0	ND	ND – 7.5	4.2
Total Trihalomethanes	µg/L	80	n/a	ND – 86.5	35.9	ND – 50.7	28.5
Total Haloacetic Acids	µg/L	60	n/a	ND – 42.0	19.7	ND – 18.9	9.7
Chlorine	Mg/L	4	4	0.01 – 1.46	0.56	ND – 2.2	0.54
Detected Constituents with Secondary Drinking Water Standards							
Boron	mg/L	AL = 1,000	n/a	ND – 550	136	ND – 450	102
Chloride	mg/L	(250)	n/a	4 – 160	23	5 – 284	27
Color	Units	(15)	n/a	ND – 19	3	ND – 19	3
Dichlorofluoromethane	µg/L	AL = 1,000	n/a	--	--	ND – 2.4	0.07
Foaming Agents (MBAS)	µg/L	500	n/a	ND – 140	4	ND – 140	5
Iron	µg/L	(300)	n/a	ND – 580	ND	ND – 600	18
Manganese	µg/L	(50)	n/a	ND – 390	49	ND – 800	73
Odor	Units	(3)	n/a	ND – 6	ND	ND – 6	0
Perchlorate	µg/L	AL = 4	n/a	--	--	ND – 5	ND
pH	Units	(6.5 – 8.5)	n/a	7.6 – 8.2	7.9	7.20 – 8.16	7.88
Specific Conductivity	µmhos/cm	(1,600)	n/a	252 – 822	391	240 – 1,111	397
Sulfate	mg/L	(250)	n/a	ND – 29	11	ND – 31	11

TABLE 5-2 (Continued)
WATER QUALITY OF CAL WATER GROUNDWATER WELLS

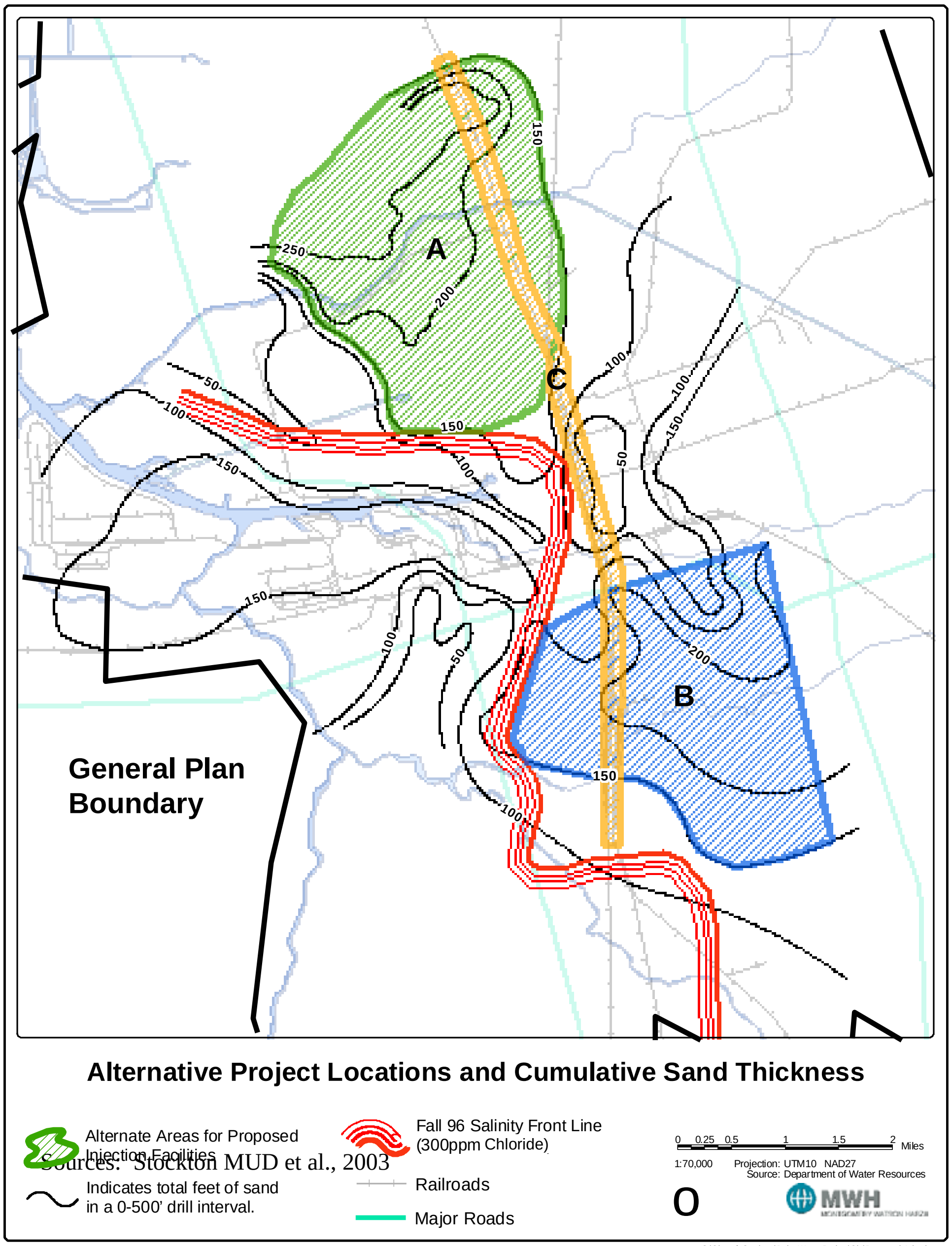
Constituent	Units	Primary MCL (Secondary MCL)	PHG (MCLG)	2000 – 2002		2001 – 2003	
				Range	Average	Range	Average
Total Dissolved Solids	mg/L	(500)	n/a	140 – 466	244	140 – 622	244
Turbidity	NTU	(5)	n/a	ND – 2	ND	ND -	
Vanadium	µg/L	AL = 50	n/a	ND – 53	11	ND – 25	10
Detected Unregulated Constituents							
Total Hardness (as $CaCO_3$)[6]	mg/L	n/a	n/a	26 – 306	126	22 – 390	127
Total Alkalinity	mg/L	n/a	n/a	--	--	ND – 450	102
Calcium	mg/L	n/a	n/a	8 – 71	29	6 – 98	29
Magnesium	mg/L	n/a	n/a	3 – 38	14	3 – 36	14
Sodium	mg/L	n/a	n/a	16 – 80	34	16 – 60	34
Chromium, Hexavalent	µg/L	n/a	n/a	ND – 7.0	1.1	ND – 7	1

AL = Regulatory Action Level: Concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
MCL = Maximum Contaminant Level: Highest level of a contaminant allowed in drinking water. Primary MCLs are set as close to PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.
MCLG = maximum contaminant level goal: Level of a contaminant in drinking water below which there is no known or expected risk to health as set by USEPA.
mg/L = milligrams per liter
µg/L = micrograms per liter
µmhos/cm = micromhos per centimeter
n/a = not applicable
ND = not detected
NTU = nephelometric turbidity unit
pCi/L = picocuries per liter
PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health as set by Cal-EPA.
Sources: California Water Service Company, 2003, 2004; ESA, 2004

River and Delta to the west. The depression east of Stockton has also produced a reversal of the westward groundwater flow direction of predevelopment conditions. This eastward groundwater flow in the Stockton area began about 50 years ago. The eastward horizontal gradient remains at least as steep as it was in 1980 (10 to 20 feet per mile).

DWR used well log data in the Stockton area to construct an isopach map contouring the cumulative thickness of sand in the 0 to 500 foot depth interval below ground surface (Figure 5-3). Areas of thicker cumulative sand are more favorable for groundwater storage

FIGURE 5-3
ISOPACH DIAGRAM

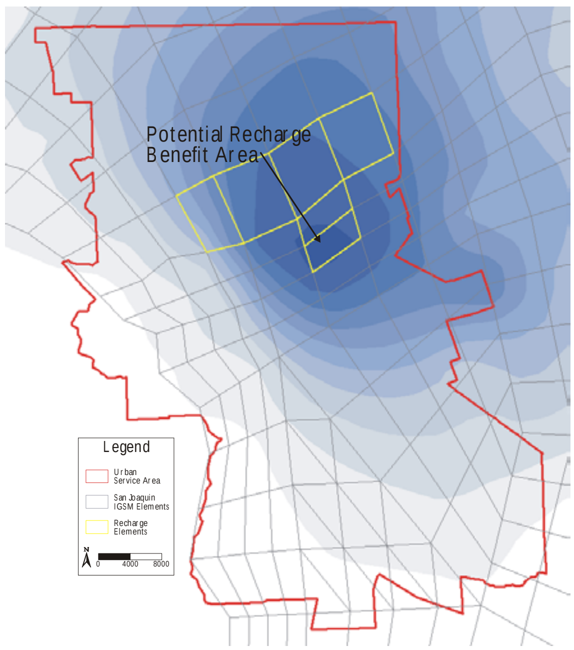


Sources: Stockton MUD et al., 2003

G:\City_of_Stockton\Delta Water Project\Gis\Proposed_Injection.mxd projects because water can be injected and withdrawn from the aquifer more quickly and because water injected into the aquifer in these areas is less likely to be lost before being extracted.

The San Joaquin Integrated Groundwater – Surface Water Model (IGSM) was used to model the mounding effect from a continuous recharge of 5,300 AF/year (maximum recharge amount in wet years) within the area described above and shown in Figure 5-4 (Stockton MUD et al., 2003). The modeling shows that the highest mounding would be centrally located within the City (dark shaded area) and would have predominant east-west dispersion creating an effective barrier to salinity intrusion from the west.

FIGURE 5-4
MOUNDING EFFECTS OF GROUNDWATER INJECTION



The Beckman Test Injection/Extraction Project, conducted by the Eastern San Joaquin Parties Water Authority (ESJPWA) in conjunction with East Bay Municipal Utility District (EBMUD), demonstrated that recharge of Mokelumne River Aqueduct water could be accomplished in the ESJPWA Basin with injection wells. The test was conducted in 1998 northeast of Stockton adjacent to the Mokelumne River Aqueduct near Highway 88. It was concluded that mounding was temporary, capacities of 500 to 1,000 gpm were feasible, plugging could be predicted and addressed, and injected water could be extracted with little water quality degradation (Boyle Engineering, 1999).

Review of cross-sections extending east-west through COSMA and Lodi to the vicinity of the Beckman Test Injection/Extraction Project indicate that the thickness and lateral extent of water bearing zones at the test site are similar to the subsurface conditions in COSMA (Stockton MUD et al., 2003). In fact the Laguna Formation is thicker in COSMA (600 to 800 feet) than at the

Beckman Test Site (approximately 300 feet) (DWR, 1967 Plate 2A Cross-section locations, Plate 3 Cross Section A-A’, Plate 4 Cross Section B).

REGULATORY SETTING

Federal

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was originally passed by the Congress in 1974 to protect public health by regulating the nation’s public drinking water supply (refer to Chapter 4, Delta Water Resources and Fisheries for details). The SDWA applies to every public water system in the U.S. The USEPA sets national standards for drinking water. The SDWA includes the Wellhead Protection Program and the Underground Injection Control (UIC) program wells to prevent degradation of groundwater supplies.

Wellhead Protection Program

The Wellhead Protection Program is a pollution prevention and management program used to protect underground based sources of drinking water. The federal program was established in 1986 by the SDWA.

State

Porter-Dolwig Ground Water Basin Protection Law

The Porter-Dolwig Ground Water Basin Protection Law (California Water Code §12920 et seq.) gives the DWR authority to initiate or participate in investigations, studies, plans and design criteria for projects to prevent degradation of ground water throughout the State. The law authorizes the DWR to evaluate, review if necessary, and provide technical assistance to the local agency if necessary. Sections 12923 and 12924 state that DWR shall, in conjunction with other public agencies, conduct an investigation of the state’s groundwater basins. The DWR shall identify the state’s groundwater basins on the basis of geological and hydrological conditions and consideration of political boundary lines whenever practical. The DWR shall also investigate existing general patterns of groundwater pumping and groundwater recharge within such basins to the extent necessary to identify basins which are subject to critical conditions of overdraft.

Groundwater Ambient Monitoring and Assessment Program

The Groundwater Ambient Monitoring and Assessment Program, administered by the SWRCB, is a recently enacted program that provides a comprehensive assessment of water quality in water wells throughout the state. The program has two main components: the California Aquifer Susceptibility Assessment and the Voluntary Domestic Well Assessment Project.

Groundwater Quality Monitoring Act

The Groundwater Quality Monitoring Act (AB599, Water Code, §10780 et seq.) requires the SWRCB to develop a comprehensive monitoring program in a report to the legislature. Section 10781 states that in order to improve comprehensive groundwater monitoring and increase the availability to the public of information about groundwater contamination, the

SWRCB, in consultation with other responsible agencies, shall follow a list of actions such as forming an interagency task force.

State Drinking Water Program

The California Department of Health Services' (DHS) Drinking Water Program, part of the Division of Drinking Water and Environmental Management, is responsible for DHS implementation of the federal SDWA, as well as California statutes and regulations related to drinking water. The Division of Drinking Water and Environmental Management develops and implements the Drinking Water Source Assessment Program (DWSAP). The DWSAP Program describes DHS' procedures for conducting drinking water source assessments, such as location of the drinking water source, delineation of zones (based on readily available hydrogeologic information on ground water flow, recharge, and discharge, and other information deemed appropriate by the State).

The DHS regulates the operation of potable and recycled water systems, issues operating permits for these facilities, reviews plans and specifications for new facilities, enforces existing laws and regulations (e.g., the SDWA); and reviews water quality monitoring results. Furthermore, the DHS also conducts source water assessments, and evaluates projects utilizing injection and extraction into potable groundwater basins.

Central Valley Regional Water Quality Control Plan

The CVRWQCB is responsible for the protection of beneficial uses of water resources within the San Joaquin River Basin. The CVRWQCB uses planning, permitting, and enforcement authorities to meet this responsibility, and has adopted its Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins includes "groundwater" and "groundwater basins" and water quality objectives for groundwater (CVRWQCB, 1998). The CVRWQCB also has a anti-degradation policy, such that any new supply of water recharged into the basin must not degrade the existing groundwater basin.

Local

San Joaquin County General Plan

The San Joaquin County General Plan 2010 (1992) lists the following relevant objectives and policies related to groundwater resources:

Objectives:

2. To obtain sufficient supplemental water supplies to meet all municipal and agricultural needs.

3. To protect the groundwater basins of the County from further overdraft.

4. To prevent and eliminate contamination of surface water and groundwater supplies.

Policies:

Water Quality

1. Water quality shall meet the standards necessary for the uses to which the water resources are put.

2. Surface and groundwater quality shall be protected and improved where necessary.

3. The use and disposal of toxic chemicals, the extraction of resources, and the disposal of wastes into injection wells shall be carefully controlled and monitored to protect water quality.

Water Resource Management

1. The County shall support coordinated efforts to obtain adequate water supplies, conjunctive use of ground and surface waters, and provisions for water storage facilities to meet expected water demand.

2. Substantial groundwater recharge areas shall be kept in open space.

3. The replenishment of aquifers shall be supported to minimize the overdraft of groundwater.

4. The County shall support a multi-jurisdictional aquifer evaluation that involves all adjacent counties in an analysis of groundwater supplies, demand, and use. If the results of the evaluation indicate that overdrafting is occurring, a coordinated effort should be undertaken to provide an alternate water source.

14. The County shall encourage the development of artificial recharge projects of all scales within the County and cities to increase recharge to the aquifers.

16. The County shall support the investigation and evaluation of subsidence within the County related to overdrafting and compaction of the groundwater aquifers in the Stockton area.

San Joaquin County Groundwater Ordinance

Title 5, Health and Sanitation, Section 5-8300 of the County Code deals with the regulation of the extraction and exportation of groundwater from San Joaquin County.

City of Stockton General Plan

The City of Stockton General Plan (1990) lists the following relevant goals and policies related to groundwater resources:

Goal: Conserve groundwater and surface water resources in order to ensure sufficient supplies of good quality water.

Policies:

1. Pursue as the City’s first priority for water resources the development and acquisition of supplemental surface water sources in order to reduce the overdraft of groundwater supplies, including participation in financing conveyance facilities.

2. Land use activities that use or store hazardous materials shall be regulated and monitored in order to prevent the contamination of groundwater or surface water resources.

3. All urban development shall be served by a sanitary sewage system to avoid possible contamination of groundwater from septic systems.

9. Establish a regular water quality monitoring program and interruption contingency plan for municipal wells.

5.1.2 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

CEQA Guidelines defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions within the area affected by the project. A groundwater resources impact would be considered significant if it would result in any of the following:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater water quality;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would decline to a level which would not support existing land uses or planned uses for which permits have been granted);

APPROACH TO IMPACT ANALYSIS

The impacts and benefits of the DWSP to the groundwater system were evaluated in terms of changes in groundwater levels, gradients, and groundwater flow. Modeling results for groundwater levels with and without the DWSP were compared for the COSMA and the entire Eastern San Joaquin County Groundwater Basin (ESJCGB) to determine the potential for both regional and local impacts and benefits. Potential groundwater quality impacts were evaluated by comparing the groundwater gradients and flow into the COSMA from areas west of COSMA that have high TDS concentrations (DWR, 2003). Groundwater flow budgets also were used to analyze the changes in the groundwater-surface water interaction. Land subsidence was not explicitly modeled; however the potential for land subsidence was evaluated by comparing the modeled groundwater levels to historic levels in the groundwater basin.

Groundwater conditions were modeled for existing and future conditions, with and without implementation of the DWSP to determine the potential impacts of the initial DWSP with a 30-mgd WTP and the ultimate DWSP with a 160-mgd WTP. A description of the groundwater model, assumptions, and the results of the modeling analysis are summarized in the impact discussions below. The Groundwater Analysis Technical Memorandum (CDM, 2005) to this EIR provides detailed information on the groundwater modeling methods and results. This technical memorandum is bound separately and is available upon request from the City of Stockton.[1]

DYNFLOW Groundwater Flow Model

The DYNFLOW groundwater flow model was used to evaluate the potential impacts and benefits of the DWSP. This model was originally developed to support San Joaquin County's water management efforts. Additional information on the model is available in the San Joaquin County Water Management Plan (CDM, 2001).

The DYNFLOW groundwater flow model is generally used for large-scale basin modeling projects and site-specific remedial design investigations. DYNFLOW simulates fully three-dimensional multi-layer aquifer systems and allows a wide range of stresses and boundary conditions to be applied. The model also has one-dimensional elements for simulating multi-layer wells, underdrains, and fractured rock interconnections, and two-dimensional elements that can represent fault barriers and slurry walls. It can run in steady state or transient mode, and allows for input data updating at any time step during transient runs.

Parameters used for performing the DWSP modeling analysis included: aquifer hydraulic properties, boundary conditions, surface water hydrology, land use, and applied hydraulic stresses (groundwater pumping, surface water deliveries, groundwater recharge, and surface water interaction. Simulations were run for a period of 24 years (1970–1994) using a sequence of representative hydrologic inputs, including rainfall, stream flow, and surface water diversion rates. A range of relatively wet and dry conditions was applied to each scenario.

DWSP Modeling Scenarios

Modeling scenarios were developed for this impact analysis to address three time frames: (1) existing conditions, (2) 2015 future conditions to address the near-term future conditions in approximately 2015 when the initial 30-mgd DWSP would be fully operational, and (3) 2050 future conditions to address the long-term future conditions in approximately 2050, when the ultimate 160-mgd DWSP is projected to be in full operation. Three scenarios were modeled to evaluate the No Project Alternative, and two scenarios were modeled to evaluate the DWSP. The five scenarios modeled were:

- Existing Conditions – No Project
- 2015 Conditions – No Project
- 2015 Conditions – with 30-mgd DWSP
- 2050 Conditions – No Project
- 2050 Conditions – with 160-mgd DWSP

Levels of Development

Existing conditions were based on water year 2003. M&I pumping in San Joaquin County was based on the reported groundwater production from the Cities of Stockton, Ripon, Lodi, Manteca

[1] The DWSP EIR Groundwater Analysis Technical Memorandum is available on-line at http://www.stocktongov.com/MUD/ or contact: David Stagnaro, City of Stockton, Community Development Department, Planning Division, 345 N. El Dorado Street, Stockton, CA 95202-1997, (209) 937-8598.

and Lathrop. M&I pumping in Escalon was based on the demand estimates developed for the San Joaquin County Water Management Plan (CDM, 2001).

For the projected 2015 and 2050 levels of development, M&I pumping in San Joaquin County was based on the demand projections from the San Joaquin County Water Management Plan (CDM, 2001), except for the Cities of Stockton and Lodi. The 2015 and 2050 projected demand and surface water deliveries for the City of Stockton were based on the CALSIM II model developed for this study (MHW, 2005). Demand projections for the City of Lodi were based on the Lodi Water Supply Study (Schlumberger, 2004).

Additionally, it was assumed that the City of Lodi would utilize its 6,000 AF contract for surface water with Woodbridge Irrigation District to satisfy M&I demands by 2015, thereby reducing groundwater pumping. The contracted amount was assumed to be available in wet, above normal, and below normal years. Fifty percent of the contract amount was assumed to be available in dry and critical years.

Land use was based on the DWR San Joaquin County land use survey (DWR, 1996), but was modified based on the assumption that agricultural land within the urban spheres of influence would be converted to urban land use at a linear rate of growth, with full build-out occurring by 2030. The year 2030 is the planning horizon for the San Joaquin County Water Management Plan (CDM, 2001).

SUMMARY OF IMPACTS BY PROJECT COMPONENT

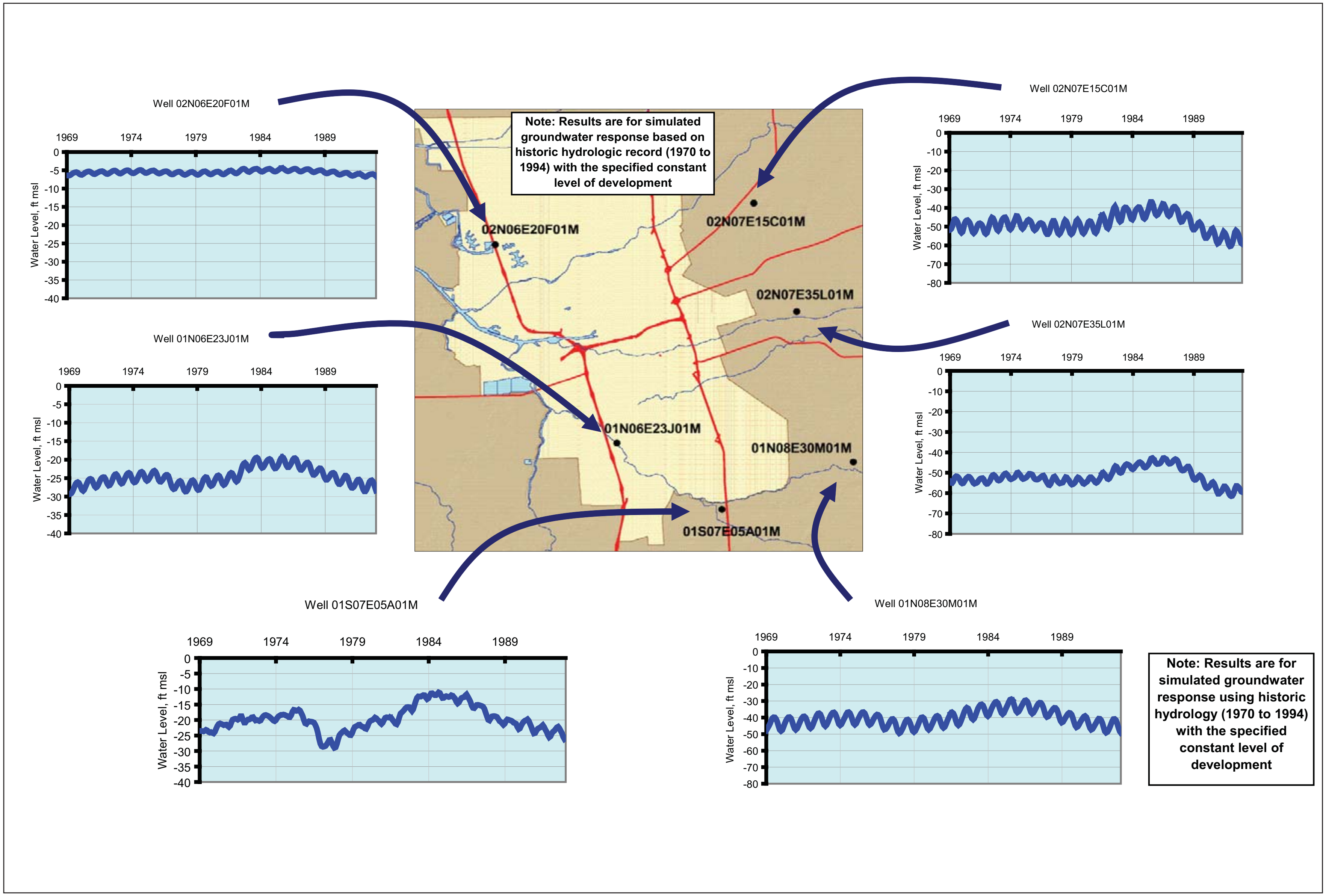
Table 5-3 provides a summary of the groundwater resources impacts associated with specific components of the DWSP.

IMPACT STATEMENTS AND MITIGATION MEASURES

Impact GW-1: Operation of the DWSP would improve groundwater water levels. Beneficial impact.

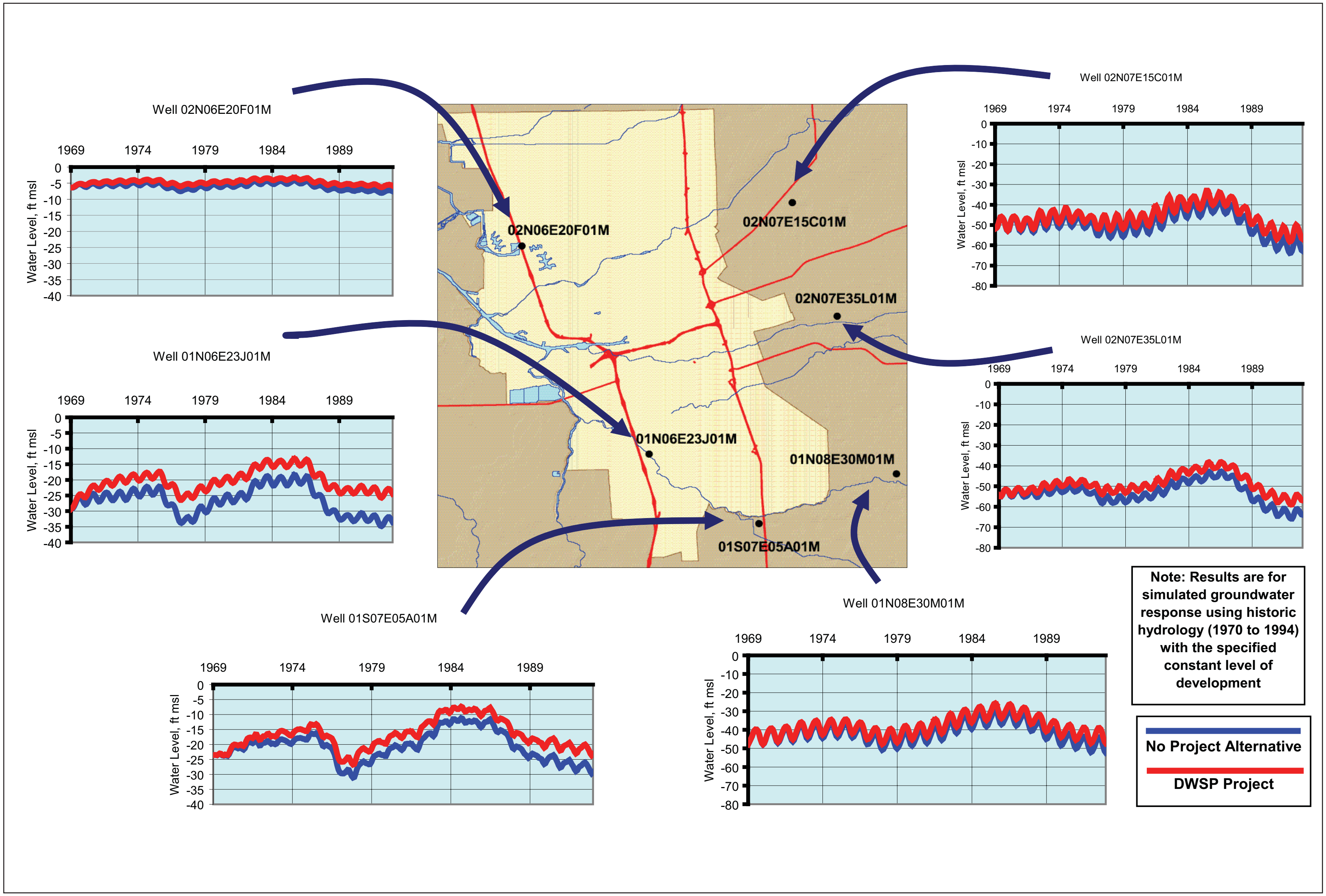
The ESJCGB is in a state of over-draft, and based on limited surface water availability within San Joaquin County and the projected growth in water demand, groundwater levels would likely continue to decline. Declining groundwater levels could potentially result in increased groundwater pumping cost due to increased pumping depth, decreased yield from groundwater wells due to reduction in the saturated thickness of the aquifer, and reduced groundwater volume in storage. Additionally, declining groundwater levels would result in steeper local groundwater gradients, which would be expected to accelerate the eastward migration of poor quality water.

Figures 5-5, 5-6, and 5-7 illustrate the simulated groundwater level responses for six wells located in and around the COSMA. Figure 5-5 shows that under existing hydrological conditions, groundwater levels in and around the COSMA would likely continue to remain 20 to 55 feet below sea level. Wells on the eastside of the COSMA would exhibit lower groundwater levels, because they are closer to the main cone of depression located in the central ESJCGB.



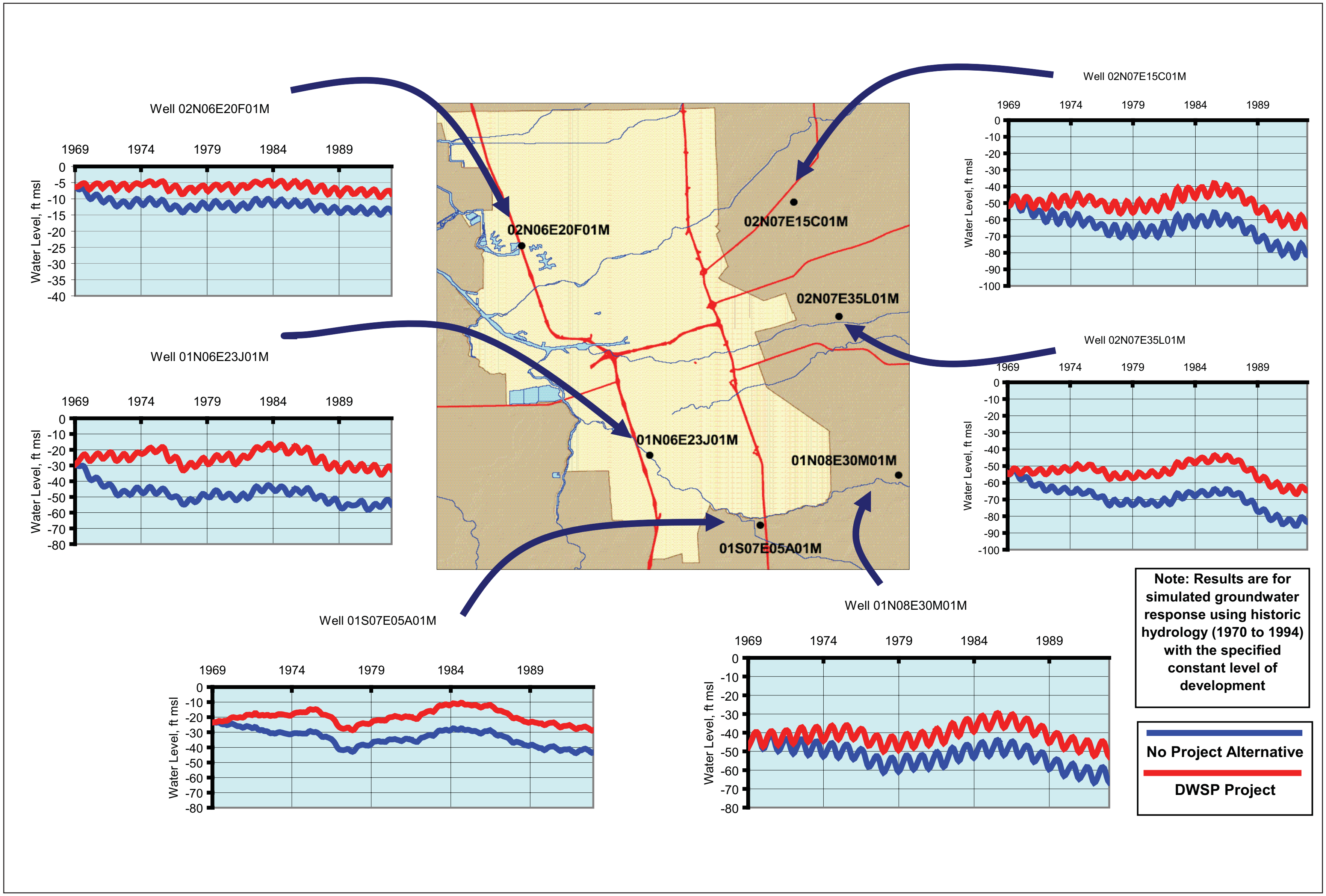
SOURCE: CDM, 2005; and Environmental Science Associates, 2005

Figure 5-5
Simulated Groundwater Level Response
No Project – Existing Conditions



SOURCE: CDM, 2005; and Environmental Science Associates, 2005

Figure 5-6
Simulated Groundwater Level Response
Comparison of Project and No Project – 2015 Cumulative Conditions



SOURCE: CDM, 2005; and Environmental Science Associates, 2005

Figure 5-7
Simulated Groundwater Level Response
Comparison of Project and No Project – 2050 Cumulative Conditions

Figure 5-6 illustrates the groundwater response for both the 2015 No Project Alternative and the DWSP under a range of hydrologic conditions. Modeling results indicate that within 10 years after the operation of the DWSP, as much as a five foot increase in groundwater levels would occur due to utilization of surface water rather than groundwater by the COSMA. Groundwater levels with the DWSP would remain higher than the No Project Alternative under both wet and dry year conditions.

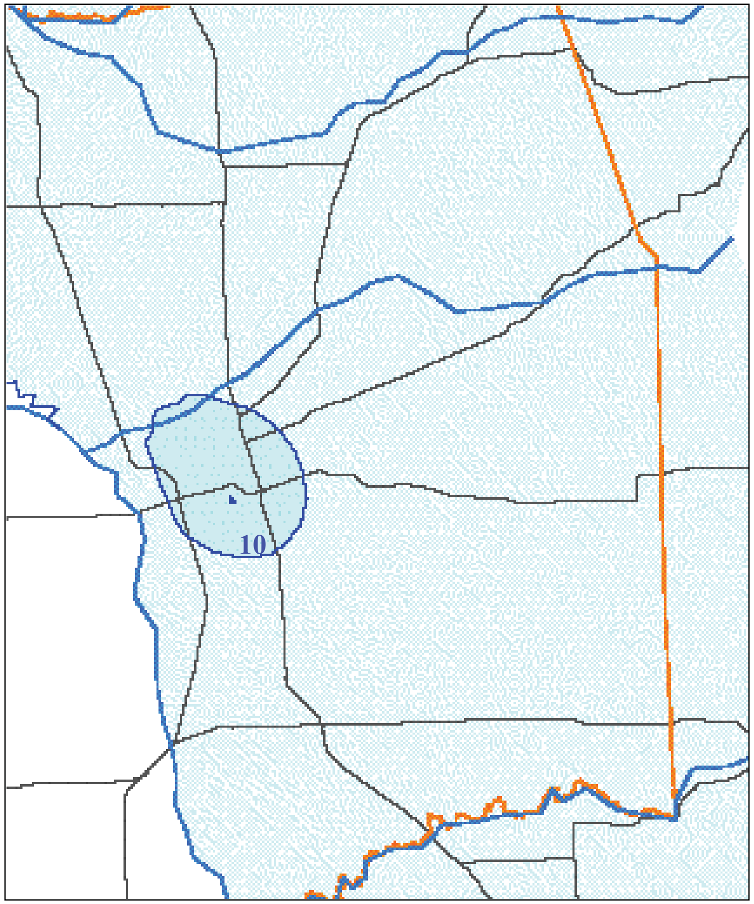
TABLE 5-3
SUMMARY OF IMPACTS –GROUNDWATER RESOURCES

Impact	Initial DWSP Operation	Ultimate DWSP Operation
GW-1: Operation of the DWSP would improve groundwater water levels.	BI	BI
GW-2: Operation of the DWSP would not alter the existing hydrological interaction between the surface water and the groundwater.	NI	NI
GW-3: Operation of the DWSP would reduce the risk of land subsidence in the region.	LS	LS
GW-4: Operation of the DWSP would improve groundwater water quality and not violate water quality standards.	BI	LS

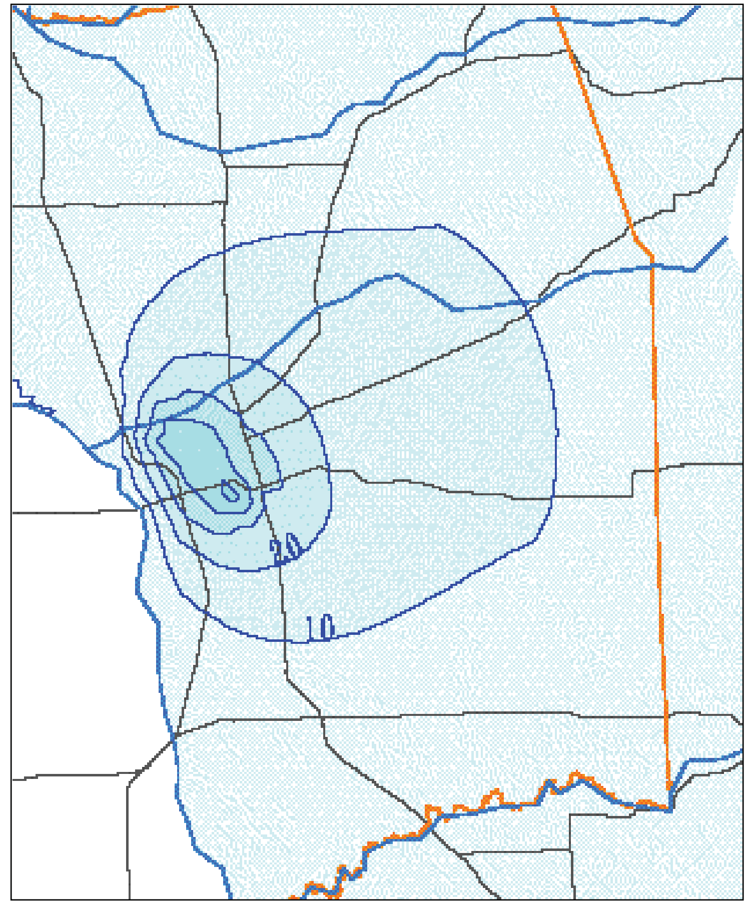
BI = Beneficial Impact
NI = No Impact
LS = Less than Significant Impact

Figure 5-7 illustrates the groundwater response for both the 2050 No Project Alternative and the DWSP under a range of hydrologic conditions. By 2050, the model results shown on Figure 5-7 clearly illustrate the benefits of the DWSP. Even under the ‘constant’ 2015 project conditions, the effect of decreased reliance on groundwater and the resulting enhanced recharge would be evident within three to four years from the start of DWSP operation. After 10 years, groundwater levels in the COSMA would be in some areas 20 feet higher with the DWSP.

Figure 5-8 graphically depicts the simulated increase in groundwater levels between the No Project Alternative and the DWSP for both the 2015 and 2050. The contours represent the difference between groundwater table heads at the end of the simulation period. At 2015, the groundwater levels in the COSMA would average 10 feet higher with the DWSP compared to the No Project Alternative. At 2050, the difference in groundwater levels would be significantly greater, with groundwater levels in COSMA approximately 30 feet higher with the DWSP than



Simulated Increase in Groundwater Levels for 2015 due to DWSP Operation
Based on Heads for Ending Period.
Distance in Feet



Simulated Increase in Groundwater Levels for 2050 due to DWSP Operation
Based on Heads for Ending Period.
Distance in Feet

SOURCE: CDM, 2005; and Environmental Science Associates, 2005

Figure 5-8
Simulated Increase in Groundwater Table Heads for 2015 and 2050 with DWSP Operation

the No Project Alternative. Additionally, the groundwater levels in central portion of the ESJCGB would be approximately 10 feet higher with the DWSP, highlighting the regional effects. Table 5-4 provides a summary of the modeled groundwater flow budgets for the COSMA for all five scenarios.

TABLE 5-4
COMPARISON OF SIMULATED GROUNDWATER FLOW BUDGETS FOR THE COSMA

Description	Existing Conditions	2015 No Project	2050 No Project	2015 With DWSP	2050 With DWSP
		Inflows (AF/year)			
Natural Deep Percolation	12,800	10,100	5,400	10,100	4,800
Project Recharge (ASR)					13,000
Inflow from West	21,500	23,000	42,600	18,800	23,800
Inflow from North, East, South	23,500	26,400	69,700	13,600	20,100
Surface Water Seepage	15,200	16,900	32,500	13,300	16,600
Total Inflows	**73,000**	76,400	150,200	55,800	78,300
		Outflows (AF/year)			
Agricultural Pumping	16,600	10,900	500	10,900	500
Municipal & Industrial Pumping	56,700	67,000	157,900	44,200	79,900
Total Outflows	73,300	77,900	158,400	55,100	80,400
Groundwater from Aquifer Storage*	300	1,500	8,000	-700	2,000

* A positive value indicates that groundwater is withdrawn from the aquifer system to meet demands resulting in a decline in groundwater levels. A negative value indicates that groundwater is recharged to the aquifer system resulting in an increase in groundwater levels.

Under existing conditions, groundwater levels are -20 to -55 msl. With the DWSP in 2015, groundwater levels would improve, that is they would increase about five feet, ranging from about -15 to -50 feet msl. With the DWSP in 2050, groundwater levels would remain about the same as under existing conditions. Although the groundwater basin would be used to serve an increased demand, it would be able to do such because it would be actively being recharged. Compared to existing conditions, groundwater levels would decrease a few feet in some levels, and increase up to five feet in others, generally hovering around current levels. Therefore, at 2050 the DWSP would not make a big improvement in groundwater levels over current conditions, but it would maintain them with no adverse impacts while providing for substantial municipal supply. The DWSP in 2015 and 2050 would have substantially better groundwater levels than the No Project in 2015 and 2050.

The comparison of the groundwater flow budgets for the five scenarios in Table 5-4 illustrates the benefits of the DWSP. Without the DWSP, the COSMA demands would be primarily met with groundwater pumping, which would result in a significant increase in lateral inflows, seepage from surface water, and mining of groundwater from aquifer storage. With the implementation of the DWSP, groundwater pumping would be reduced and aquifer recharge increased through active recharge or injection. As a result, seepage from surface water and lateral inflow of potentially poorer quality water from the west would be reduced. The results illustrate that groundwater levels with the DWSP would be higher than the No Project Alternative. Therefore, the DWSP would have a beneficial impact on groundwater levels.

Mitigation: No mitigation is required.

Impact GW-2: Operation of the DWSP would not alter the existing hydrological interaction between the surface water and the groundwater. No impact.

Groundwater pumping within the vicinity of a surface water body could change the existing interactions between the surface water and the groundwater, potentially resulting in decreased stream flows and levels, with potential adverse effects to the riparian habitat and downstream users. The pumping of groundwater near wetland habitats could also result in adverse environmental effects.

The groundwater flow budgets summarized in Table 5-4 illustrate that under existing conditions, recharge from surface water (San Joaquin and Calaveras Rivers) in the COSMA area is about 15,000 AF/year. Under the No Project Alternative, seepage would increase to 16,900 AF/year and 32,500 AF/year for 2015 and 2050, respectively. With the implementation of the DWSP, recharge from surface water would be similar to the existing conditions (13,300 AF/year in 2015 and 16,600 AF/year in 2050). Based on these results the DWSP would not alter the current rate of seepage (groundwater recharge) from the San Joaquin and Calaveras Rivers to the underlying groundwater basin. Therefore, the DWSP would not have a significant impact on the hydrological interaction between surface water seepage and the groundwater, and would avoid increases projected with the No Project Alternative.

Mitigation: No mitigation is required.

Impact GW-3: Operation of the DWSP would reduce the risk of land subsidence in the region. Less than significant impact.

Land subsidence is the lowering of the land surface due to underground changes. Land subsidence can be caused by excessive groundwater extraction (i.e., pumping). Excessive groundwater extraction from confined and unconfined aquifers can result in a lowering of groundwater levels and, in confined aquifers, a decline in water pressure. Reduction in water pressure results in increased loading of the clay and silt beds, which may subsequently consolidate, resulting in the lowering of the ground surface. Subsidence can cause damage to structures and increase the flooding potential of low-lying areas. Reduction in the aquifer permeability, resulting from compaction of clay beds, would slightly reduce the vertical movement of water in the aquifer system. Subsidence is most likely to occur under the following conditions: (1) highly confined aquifer system, (2) coarse-grained aquifers that have thin clay layers interspersed throughout the strata, (3) clay interbeds that are subjected to a low degree of natural pre-consolidation pressures, and (4) large reduction in groundwater levels (DWR, 2002).

Land subsidence was not explicitly modeled (CDM, 2005). However, the potential for land subsidence was evaluated by comparing the modeled groundwater levels to the historic groundwater levels in the groundwater basin as shown in Table 5-5.

TABLE 5-5
COMPARISON OF SIMULATED AND HISTORICAL LOW GROUNDWATER LEVELS IN THE COSMA

Well	Lowest Historical Groundwater Head Measurement	Average Historical Groundwater Head Measurement	Lowest Simulated Groundwater Head Based on 1970 to 1994 Historical Hydrology				
			Existing Conditions	2015 No Project	2050 No Project	2015 With DWSP	2050 With DWSP
	feet at msl						
02N06E20F01M	-31	-13	-7	-8	-15	-6	-9
01N06E23J01M	-41	-25	-29	-35	-58	-29	-41
01S07E05A01M	-37	-19	-29	-31	-44	-27	-33
01N08E30M01M	-54	-39	-49	-52	-67	-48	-56
02N07E35L01M	-76	-43	-61	-66	-86	-59	-71
02N07E15C01M	-73	-40	-60	-64	-83	-58	-69

The modeling results show that for the No Project Alternative in 2050, the risk of land subsidence would be increased due to the potential lowering of the water table below the historic low levels already experienced in the groundwater basin. With the DWSP in 2050, modeling results show that the groundwater levels would be close to the historical low levels. Therefore, based on this assessment, the DWSP would reduce the risk of increased land subsidence in the COSMA, because less groundwater would be pumped from the aquifer. Therefore, the DWSP would have a beneficial impact on subsidence.

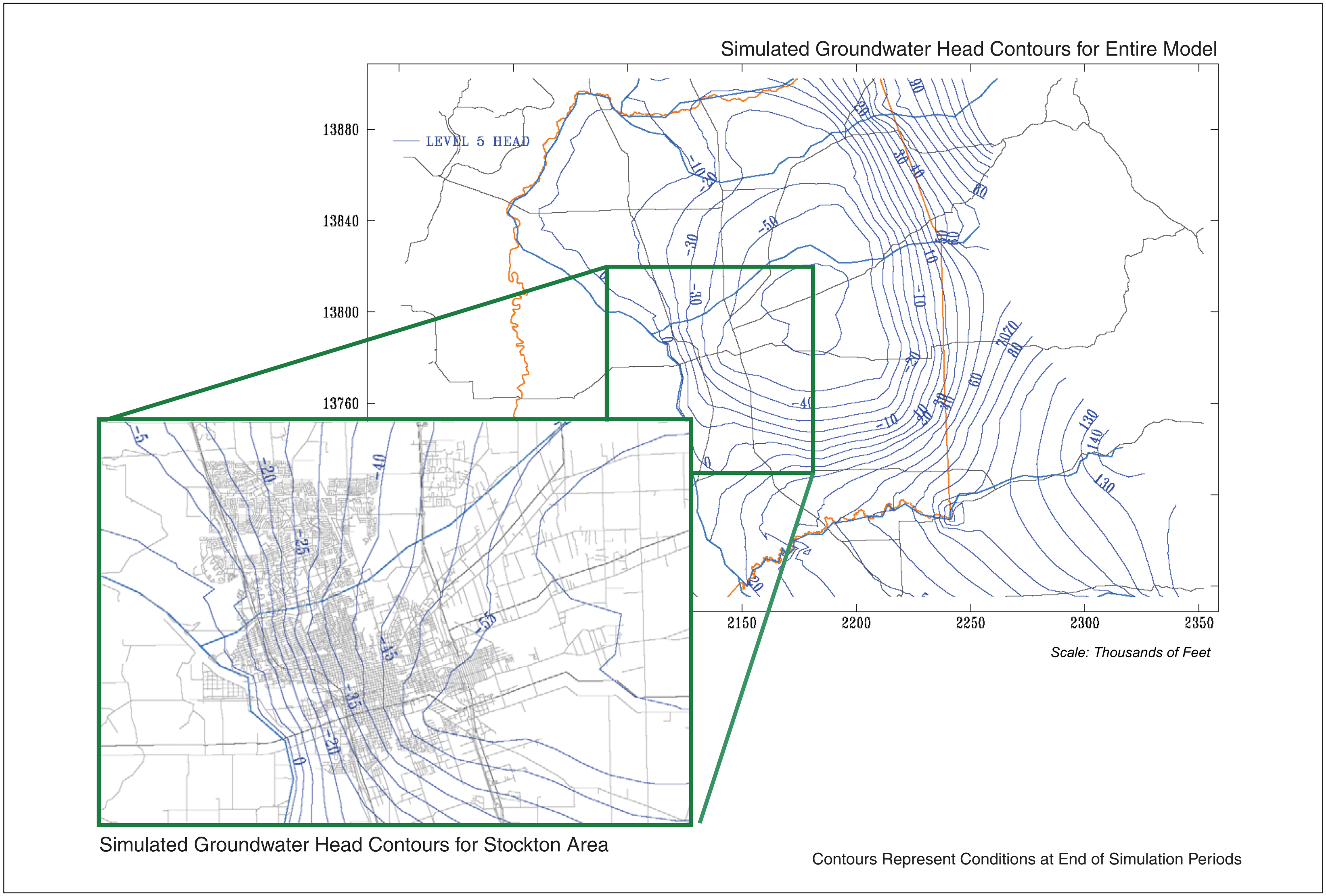
Table 5-5 shows that under both DWSP 2015 and DWSP 2050, groundwater levels would remain generally above historic lows (except in well 01N08E30M01M at 2050, which could vary a few feet below the historic low in some years. Compared to existing conditions, groundwater levels under DWSP operations in 2015 would remain similar to existing conditions. However, under DWSP 2050 operations, groundwater levels in certain years could be lower than existing conditions. Therefore, DWSP operation in 2050 has the potential to increase the risk of subsidence over existing conditions. However, adverse conditions already exist without the DWSP and would likely deteriorate if the DWSP is not built. Both the DWSP in 2015 and 2050 would increase the risk of subsidence less than the No Project Alternative at 2015 and 2050. Comparison of the No Project Alternative with the DWSP in both 2015 and 2050 shows that the groundwater levels with the DWSP would always be higher, and therefore, the potential for land subsidence would not be significant with the DWSP.

Mitigation: No mitigation is required.

Impact GW-4: Operation of the DWSP would improve groundwater water quality and violate water quality standards. Beneficial impact for the initial DWSP operation and a less than significant impact for the ultimate DWSP operation.

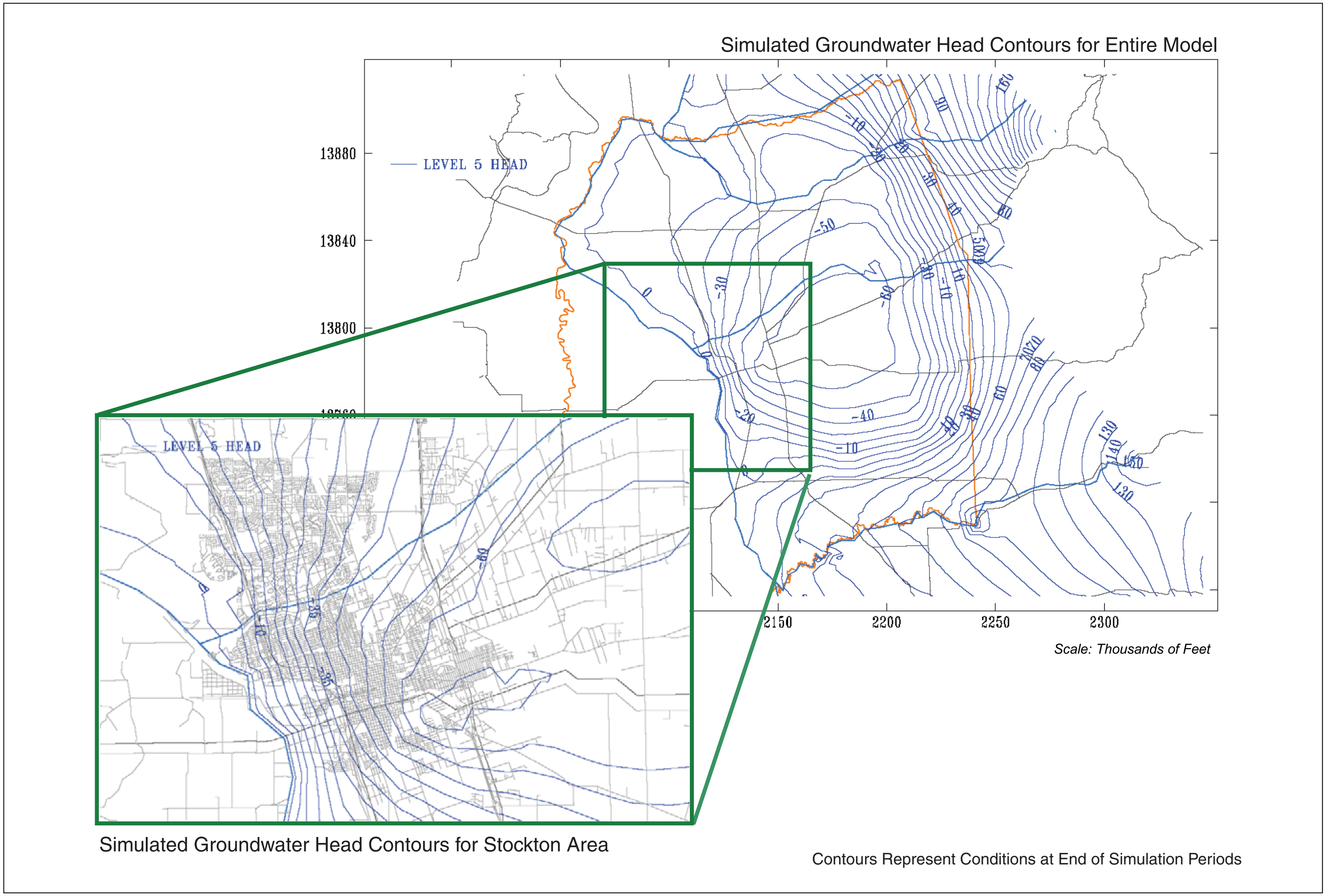
Changes in groundwater levels or in the prevailing groundwater flow regime could cause a change in groundwater quality through a number of mechanisms. One mechanism is the potential mobilization of areas of poorer quality water, drawn down from shallow zones or drawn up into previously unaffected areas. Changes in groundwater gradients and flow directions could also cause (or speed) the lateral migration of poorer quality water. Artificial or enhanced recharge of the aquifer with water of poorer quality or even with different geochemical constituents, could adversely affect existing conditions. Geochemical differences between the recharged water and groundwater could affect resultant groundwater quality through geochemical processes, such as precipitation, bacterial activity, ion exchange, and adsorption.

The groundwater depression in the central portion of ESJCGB and strong west to east groundwater gradients have resulted in poor quality migrating eastward along a 16-mile front along the eastside of the Delta (DWR, 1967). In the COSMA the saline front has been estimated to be moving eastward at a rate of 140 to 150 feet per year (DWR, 2003). Figures 5-9 through 5-13 illustrate the simulated groundwater table contours for all five scenarios. The potential for water quality impacts was evaluated based on (1) groundwater gradients (the steeper the west-to-east gradient, the greater the potential for saline intrusion) and (2) the simulated rate of lateral inflow from the west into Stockton (the more volume flowing in from the west, the greater the potential for chloride contamination). The contours represent the conditions at the end of the 24-year simulation period. The eastward gradient towards the center of the ESJCGB is clearly evident. With the increased development and increased reliance on groundwater, the cone of depression in ESJCGB would deepen and the west-to-east gradients would increase. These conditions would tend to increase the migration rate of poorer quality water into the groundwater basin. Figures 5-12 and 5-13 illustrate the resulting groundwater table contours with the DWSP. For both the 2015 and 2050 scenarios, the decreased reliance on groundwater, or “in-lieu’ recharge effect of the DWSP would result in increased groundwater heads and reduced west-to-east gradients.



SOURCE: CDM, 2005; and Environmental Science Associates, 2005

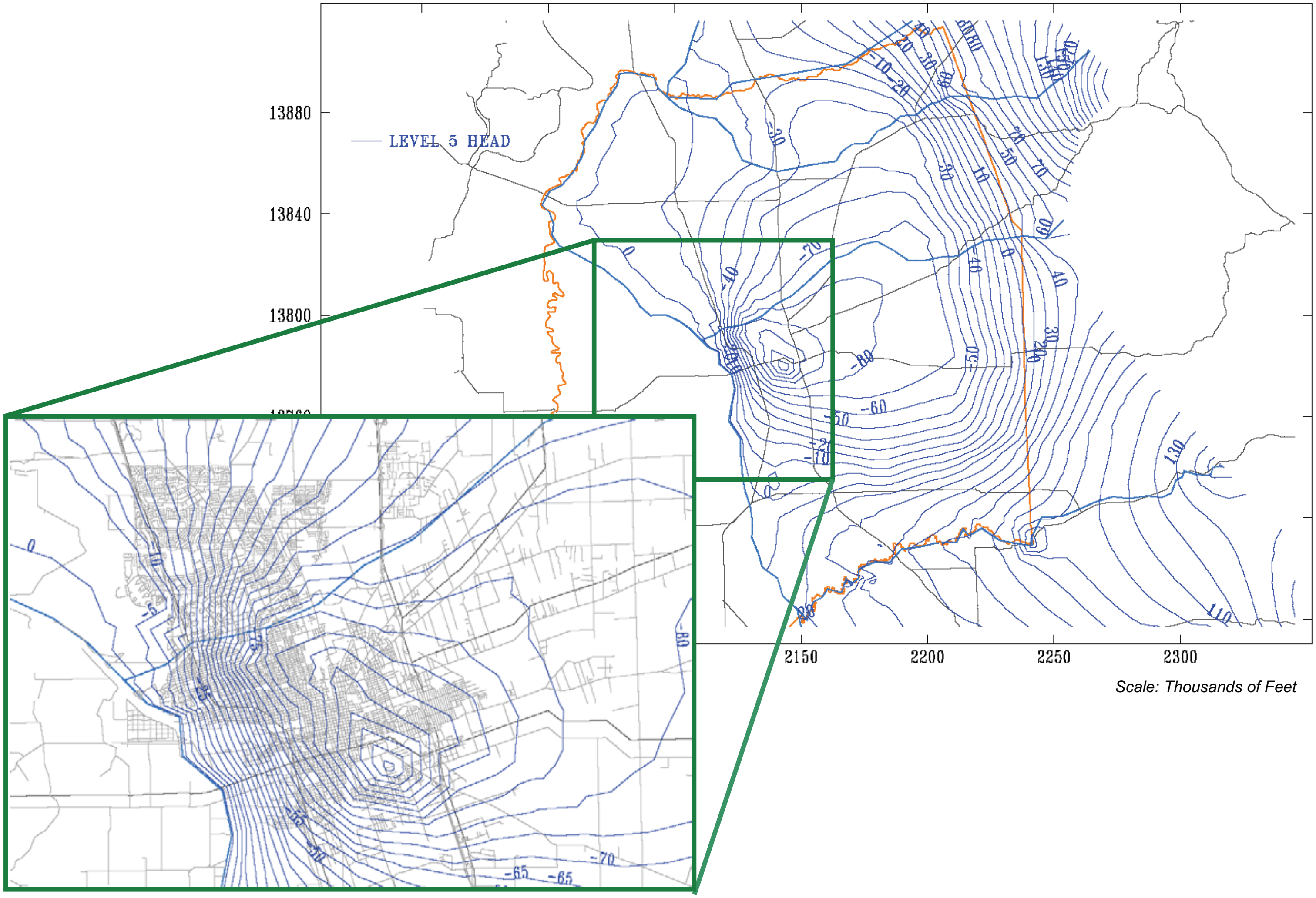
Figure 5-9
Simulated Groundwater Table Existing Conditions



SOURCE: CDM, 2005; and Environmental Science Associates, 2005

Figure 5-10
Simulated Groundwater Table – 2015 No Project

Simulated Groundwater Head Contours for Entire Model

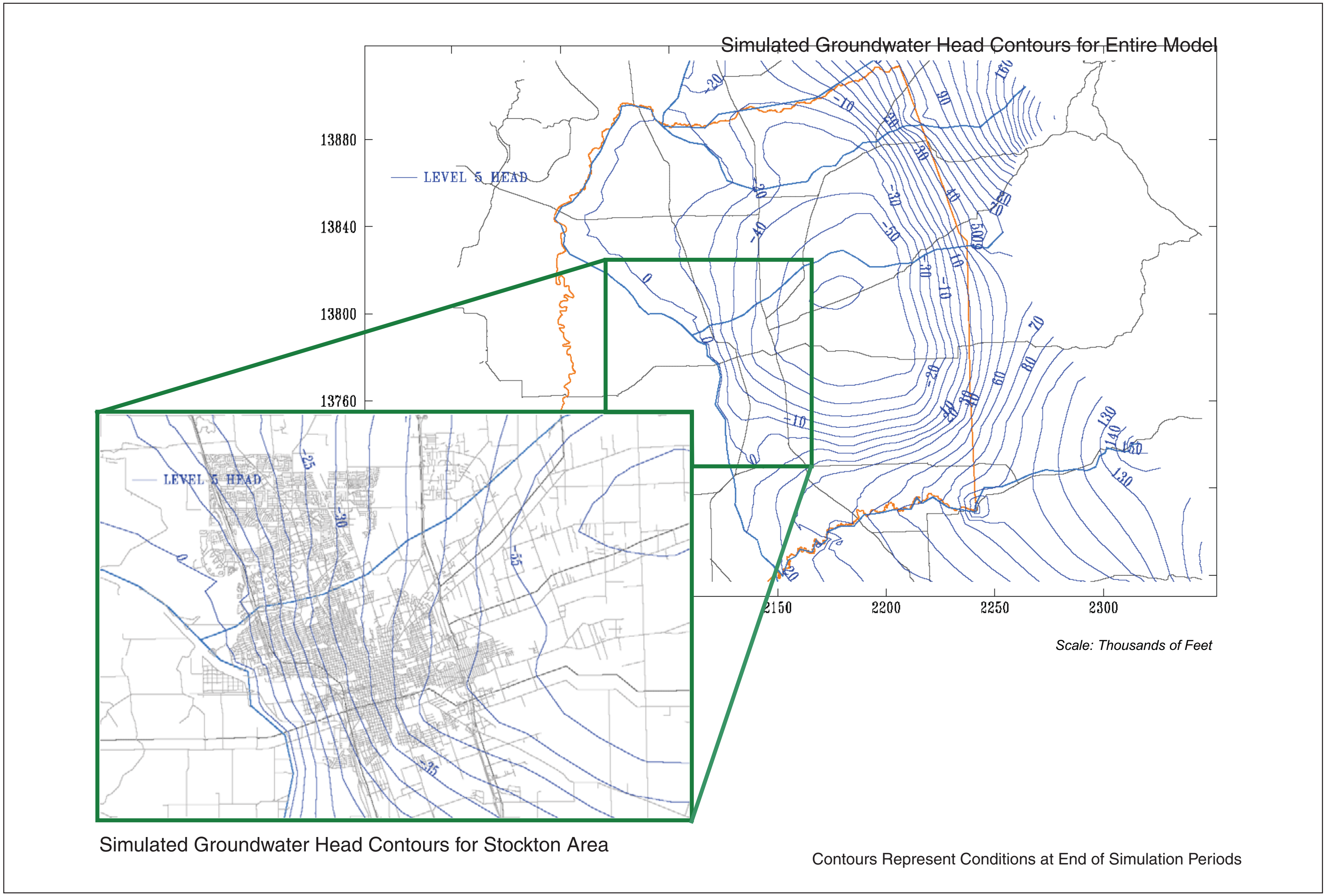


Simulated Groundwater Head Contours for Stockton Area

Contours Represent Conditions at End of Simulation Periods

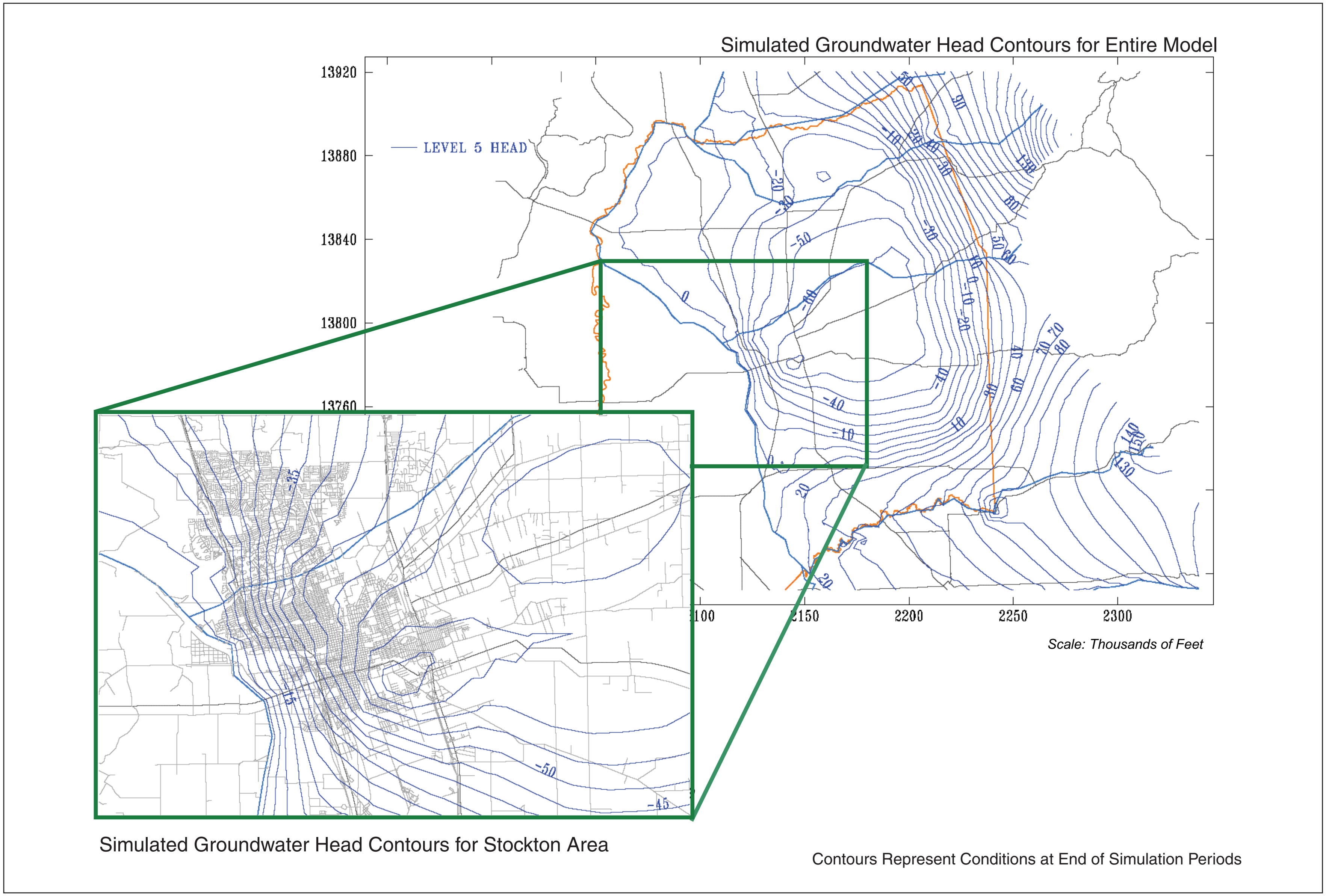
SOURCE: CDM, 2005; and Environmental Science Associates, 2005

Figure 5-11
Simulated Groundwater Table – 2050 No Project



SOURCE: CDM, 2005; and Environmental Science Associates, 2005

Figure 5-12
Simulated Groundwater Table – 2015 with DWSP



SOURCE: CDM, 2005; and Environmental Science Associates, 2005

Figure 5-13
Simulated Groundwater Table – 2050 with DWSP

The simulated quantity of groundwater flowing into the ESJCGB from the west is shown in Table 5-4. The results show that under the No Project scenarios, the flow rate would increase from 21,500 AF/year under existing conditions to 42,600 AF/year by 2050. Without the implementation of the DWSP, the increased reliance on groundwater pumping to meet demands will likely exacerbate water quality conditions by increasing the rate of eastward migration of groundwater high in TDS. Table 5-4 illustrates that with the DWSP, lateral inflow from the west into the ESJCGB would be maintained at a rate similar to the current rate of inflow. Based on these results, the DWSP would actually decrease the projected rate of eastward migration of poorer quality water. Therefore, the DWSP would have a beneficial effect on groundwater quality.

Table 5-4 compares the simulated groundwater flow budgets for the COSMA. The lateral inflow with the DWSP in 2015 would be 18.8 TAF vs. 21.5 TAF under existing conditions. Therefore, based on this performance measure the DWSP in 2015 would have no impact on the groundwater when compared to existing conditions. Lateral inflow with the DWSP in 2050 would be 23.8 TAF. Thus, there would be a small increase compared to existing conditions, indicating the potential for some water quality impacts. However, adverse conditions are projected to occur in future years with or without the DWSP, and in fact would be worse without the project. In other words, the DWSP would have a beneficial impact on already adverse conditions (i.e., future conditions would only deteriorate further if the DWSP is not built). Comparison of the No Project Alternative with the DWSP in 2015 and 2050 shows that the DWSP would benefit the groundwater basin.

Mitigation: No mitigation is required.

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CHAPTER 6

GROWTH INDUCEMENT POTENTIAL AND SECONDARY EFFECTS OF GROWTH

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GROWTH INDUCEMENT POTENTIAL AND SECONDARY EFFECTS OF GROWTH

6.1 INTRODUCTION

6.1.1 CEQA DEFINITION OF GROWTH INDUCEMENT

The CEQA *Guidelines* require that an EIR evaluate the growth-inducing impacts of a proposed action (Section 15126.2[d]). A growth-inducing impact is defined by the CEQA *Guidelines* as:

> *[T]he ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.*

A project can have direct and/or indirect growth inducement potential. Direct growth inducement would result if a project involved construction of new housing. A project can have indirect growth-inducement potential if it would establish substantial new permanent employment opportunities (e.g., commercial, industrial or governmental enterprises) or if it would involve a substantial construction effort with substantial short-term employment opportunities and indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, under CEQA, a project would indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service. An example of this indirect effect would be the expansion of a wastewater treatment plant, which might allow for more development in service areas.

6.1.2 APPROACH TO GROWTH INDUCEMENT ANALYSIS

The environmental impacts of growth inducement are secondary, or indirect, physical effects of growth. Secondary effects of growth inducement include, but are not limited to, increased traffic, degradation of air quality, loss of biological resources, and increased demand on public services. Local land use plans (e.g., general plans) provide for land use development patterns and growth policies that allow for the orderly expansion of urban development supported by adequate urban public services, such as water supply, roadway infrastructure, sewer service, and solid waste service. A project that would induce “disorderly” growth (i.e., conflict with the local land use plans) could indirectly cause additional adverse environmental impacts and other public services impacts not previously envisioned. Thus, to assess whether a project with potential to induce growth will result in adverse secondary effects beyond what is anticipated by local jurisdictions, it is important to assess the degree to which the growth associated with a project would or would not be consistent with applicable land use plans. To assess the growth inducement potential of the DWSP, the additional urban development that would be supported by DWSP deliveries was compared to the level of growth allowed by and analyzed in applicable land use plans (primarily the City of Stockton General Plan, 1990a). This analysis of growth inducement potential and secondary effects of growth addresses both the 30-mgd DWSP and the ultimate 160-mgd DWSP, projected to be needed to meet 2050 demands within the COSMA.

6.1.3 OVERVIEW OF THE DELTA WATER SUPPLY PROJECT'S GROWTH INDUCEMENT POTENTIAL

The provision of a domestic water supply is one of the primary public services needed to support urban development. The DWSP would provide domestic water supply that would service growth that is planned and anticipated to occur within the COSMA. Some of the water provided by the DWSP would replace existing groundwater supplies currently used within the COSMA and surface water supplies that may be unavailable after 2009. Thus, the DWSP is needed to maintain adequate water supplies to existing City residents and businesses. The DWSP also would provide additional supply for new users and, as a result, would remove one constraint to future growth. In the near-term, the DWSP would support a development level consistent with the City's current 1990 General Plan. In the long-term, future expansion of the DWSP would provide surface water supplies to support population growth beyond that envisioned by the 1990 General Plan. An update of the Stockton General Plan, currently underway, will provide a framework for growth through 2035 (see Section 6.2.2, below).

6.2 DEVELOPMENT AND GROWTH TRENDS IN THE PROJECT AREA

6.2.1 CURRENT DEVELOPMENT PATTERNS

The estimated 2003 population of the City was 262,553, with 85,988 housing units (CDOF, 2004). The City currently covers 36,000 acres (or 27,442 net acres) after accounting for street right-of-ways, waterways, and other unpopulated area (City of Stockton, 2004a). The DWSP Feasibility Report projects the build-out of the 1990 General Plan to occur in approximately 2015, when the remaining lands designated for urban uses within the COSMA are developed (Stockton MUD et al., 2003). The estimated 2015 build-out of the 1990 General Plan would be between 340,000 and 346,000.[1] This estimate corresponds with other growth projections.

The San Joaquin Council of Governments (SJCOG) projects a 2015 population of 342,849 for the City (SJCOG, 2004). Population projections beyond 2015, based on a continued 1.9 percent

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1 The DWSP Feasibility Report uses 340,000 as the build-out population for the 1990 General Plan (Stockton MUD et al., 2003). Applying existing population densities to vacant residential land in the 1990 General Plan Area as of 2003 yields a population of approximately 346,000 (City of Stockton, 2004b).

growth rate beyond the 1990 General Plan build-out, would result in a 2050 population of 658,890 (Stockton MUD et al., 2003). (Official projections are not available for 2050.) SJCOG estimates a 2025 population of 406,482. Extending this growth trend to 2050 provides a slightly higher population of 668,000 (based on a 2.01 percent growth rate). The SJCOG projections are somewhat lower than the projections of the California Department of Finance (CDOF). However, the CDOF projections are not available on a city level. If the City maintains its current 43 percent share of the total San Joaquin County population, the 2050 City population would be approximately 738,000.

6.2.2 PLANNED GROWTH STRATEGIES AND OTHER FACTORS AFFECTING GROWTH

STOCKTON GENERAL PLAN

The City's current General Plan was adopted on January 22, 1990. The accompanying EIR was prepared in 1989 and certified on January 22, 1990. The 1990 General Plan, a comprehensive update of the 1978 General Plan, identified land that was mostly vacant into which urbanization could be safely directed and accommodated by the systematic extension of the City's infrastructure. The City's intention was to direct most new residential and commercial growth into these areas, known as Future Growth Areas (FGAs). The FGAs are located at the edge of the Planning Area Boundary. The Planning Area Boundary, which encompasses 81,260 acres, also forms the limits of the COSMA (Figure 2-1). Located within the 1990 Planning Area Boundary is the Urban Services Area, which includes those lands designated for urban development under the 1990 General Plan and requiring urban services, such as water. Therefore, build-out of the 1990 General Plan does not include development of those lands outside of the Urban Services Area but within the Planning Area.

The 1990 General Plan identifies almost 15,000 acres for new development, of which the FGAs account for almost 11,000 acres.[2] In north Stockton, the FGA is located north of Morada Lane and Bear Creek to Eight Mile Road and to the east from the Union Pacific Railroad tracks to the Central California Traction tracks in the Morada area. The land west of I-5 to Ten Mile and Mosher Sloughs is also included in the urbanization boundaries. In south Stockton, a FGA was located south of French Camp Slough between I-5 and the San Joaquin River (Weston Ranch). Since the 1990 General Plan update, much of the land identified for future urban growth has been developed. Urbanization has proceeded past Morada Lane up to Eight Mile Road in the northeast; and only a few large parcels remain between I-5 and the San Joaquin River in the southwest. Growth has become integrated with existing county neighborhoods to much of the east. South Stockton is quickly being developed with low density subdivisions. Build-out of the 1990 General Plan is expected to occur by 2015, when the supply of developable land within the Planning Area Boundaries is exhausted.

[2] The remaining 4,000 acres include infill areas and areas already identified for development under the previous 1978 General Plan.

2004 Housing Element Update

In 2004, the City updated the Housing Element of its General Plan, as required by state law. The Housing Element assesses the existing housing stock, housing needs, available land, constraints, housing programs, and incentives for new housing (City of Stockton, 2004a). The new element also analyzes the progress made since the 1992 Housing Element. The 2004 Housing Element incorporates the 2001–2008 Regional Housing Needs Allocation Plan for San Joaquin County, which identifies the City's housing needs by income group (very low, low, moderate, and above moderate). The analysis in the 2004 Housing Element demonstrates that the City can accommodate the number and type of housing units needed through 2008 within the existing city limits. Therefore, the Housing Element update is consistent with the projected 2015 build-out of the current General Plan Area.

General Plan Update

In April 2003, the Stockton City Council approved the work plan for an update of the City's General Plan. This updated General Plan will guide future development and land use within the COSMA beyond the year 2015. The General Plan update will provide comprehensive long-term planning over a 20-year horizon through the year 2035. The 2035 time frame will allow for informed long-term decision making about the location of future growth and long-term infrastructure investments such as the DWSP. As a part of the General Plan update process the City is also preparing master plans for its major infrastructure systems including water, wastewater and stormwater to insure that these systems expand to support orderly, planned growth.

The General Plan Background Report, describing current conditions within the 1990 Planning Area Boundaries and the surrounding area, was released in February 2004. The study area for the General Plan update covers 123,000 acres, a 52 percent increase over the 1990 Planning Area. Similar to the 1990 General Plan, the study area will include a smaller Urban Services Area in which future urban development will occur. In August 2004, an NOP for the General Plan EIR was released for agency and public review. Completion of the Draft General Plan Update and its accompanying EIR should occur sometime in 2005.

REGIONAL GROWTH CONTROL POLICIES AND STANDARDS

San Joaquin County

The San Joaquin County General Plan (1992) identifies key strategies that address growth accommodation. Growth accommodation strategies include the following:

- Urban communities, including incorporated cities and unincorporated communities, shall accommodate the vast majority of the development, because it is in these areas that urban services exist or are expected. In particular, growth shall be directed to the cities as much as possible.

- Rural communities shall grow primarily through infill and should not be expanded.

- Rural areas encompass all land outside designated communities and shall accommodate minimal growth because open space and agricultural preservation are paramount in these areas (San Joaquin County, 1992).

San Joaquin County Local Agency Formation Commission

The San Joaquin County Local Agency Formation Commission (LAFCO) is responsible for consideration and approval of local agency boundary modifications and the provision of public services. While the LAFCO does not exercise jurisdiction in the general plan process, cities must petition LAFCO for approval of any actions associated with altering city boundaries or spheres of influence. Prior to approving a boundary change, the LAFCO will review the adequacy of municipal services, including the timely availability of water. LAFCO's powers are set forth in the Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000. The legislative intent of the Cortese-Knox-Hertzberg Act is that each LAFCO establish policies and exercise its powers in a manner that provides planned, well-ordered, efficient urban development patterns with appropriate consideration of open space lands. LAFCO's general purposes are the discouragement of urban sprawl and the encouragement of the orderly formation of local agencies based upon local conditions and circumstances. Specific policy statements of the Cortese-Knox Act are:

- Encourage orderly growth and development patterns (Government Code Section 56001);
- Shape the development of local agencies so as to advantageously provide for the present and future needs of each county and its communities (Government Code Section 56301); and
- Guide development away from open space and prime farmland uses unless such action would not promote planned, orderly and efficient development (Government Code Section 56377).

City of Stockton

The Stockton General Plan (1990) identifies goals and policies that address growth accommodation. Growth accommodation goals and policies include the following:

Goal 2: Promote development and redevelopment within the City of those areas already served, or which may be readily served, by City services and facilities in order to maintain and revitalize the existing urban area.

Policy 4. Provide, and where necessary, upgrade services and facilities to encourage development within the existing urbanized area consistent with the Land Use/Circulation Diagram.

Goal 3: Foster intergovernmental cooperation and coordination in order to maximize the effectiveness of local policies which strive toward guiding the location and timing of Stockton's urban growth and development.

Goal 5: Promote the balanced growth and development of all geographic areas of Stockton.

The City noted in the 1990 General Plan EIR that the New Melones water supply secured by SEWD should be considered a "long-term interim supply." Long-term because it was expected to be available to SEWD and the City until approximately the year 2020; and yet still only "interim" because the ultimate rights belonged to upstream users that would claim it for use eventually. As discussed in Chapter 2, Project Description, and Chapter 4, Delta Water Resources, the actual supplies to SEWD and Stockton from New Melones are much less than expected and do not fully support the City's needs now, let alone into the future.

6.3 GROWTH INDUCEMENT POTENTIAL OF THE PROJECT

The objectives of the DWSP are: (1) to replace declining and unreliable surface water supplies, (2) to protect and restore groundwater resources, and (3) to provide adequate water supply to accommodate planned growth. The DWSP would be expanded in increments to keep pace with needs based on the timing of existing supply reductions and increased demand associated with planned and approved growth in the COSMA over time. Initially the DWSP would be sized with a WTP capacity to treat and deliver up to 30 mgd of water. For a complete discussion of the DWSP facilities and capacities refer to Chapter 2, Project Description.

The DWSP Feasibility Report analyzes future water demands for two timeframes : near-term through build-out of urban land uses within the Urban Services Boundary of the 1990 General Plan and long-term through 2050 (Stockton MUD et al., 2003). Consequently, this analysis of the growth inducement potential is also broken into near-term and long-term. Near-term runs from the initial operation of the DWSP, projected to begin operation in 2009 through the projected General Plan build-out of planned urban land use in approximately 2015. In the near-term, the DWSP is needed both as a replacement for existing surface water supplies that will be reduced overtime and as a supplement to accommodate the needs of planned growth. In the long-term, expansion of the DWSP would support growth beyond 2015 to approximately 2050 as well as continue to help replenish and maintain the health of the groundwater basin, both locally and regionally.

6.3.1 NEAR-TERM (2015) GROWTH INDUCEMENT POTENTIAL

Current average water supplies will fall short of demand sometime before the 2015 projected build-out of the current 1990 General Plan. Dry year and critical year supplies are already in danger of failing to meet demand. Projected future demand is shown in Section 2.2 of this EIR. Demand in 2004 was 69,222 AF/year. In 2015, at the projected 1990 General Plan build-out, water demand is expected to be 85,330 AF/year. Section 2.2 in Chapter 2, Project Description, reviews existing water supplies, projected future demands, and the unmet needs that the DWSP is proposed to address. As discussed in that section, the City will face water supply shortfalls into the future, with or without new development. Figure 2-3 shows the near-term water demands representing build-out of the current 1990 General Plan urban land uses projected to occur by about 2015, and the long-term demands representing a population growth rate of 1.9 percent per year out to 2050. Assuming for planning purposes that only one of the SSJID and OID temporary water supply contracts is renewed between 2009 and 2019 and growth occurs, the City would need an average of 7,000 AF/year by 2015.

The City has specifically designed the initial phase of the DWSP (30-mgd) to correspond to the demand associated with the buildout of urban land uses planned under its current adopted 1990 General Plan, which is projected to occur around the year 2015. Initially, the DWSP facilities and operation would only accommodate the level of urban growth currently allowed under the existing adopted 1990 General Plan. As a result, the secondary effects of growth supported by the 30-mgd DWSP are those already addressed in the 1990 General Plan EIR.

The timing of when demand may exceed existing supplies depends on several factors, such as the actual timing and pace of development, and the timing and magnitude of reductions in existing in supplies. In addition, groundwater supplies can be used more heavily in the short-term, but in the long-term will need to be replenished and managed through an active conjunctive use program with surface water. Although the exact timing of the need for supplemental supplies can not be established, it is clear that over the next 10 years the City will need to have a supplemental water supply to support its multiple goals. The City's goals include replacing existing surface water supplies that will be reduced in the future, reducing long-term reliance on groundwater and providing for a sustainable conjunctive use program, and reliably meeting planned community growth over the long-term.

6.3.2 LONG-TERM (2050) GROWTH INDUCEMENT

In 2015, based on projected land use, total water demand within the COSMA is expected to be 85,330 AF/year. After build-out of the 1990 General Plan, population-based demand projections were used. Water demand within the COSMA is expected to steadily increase, reaching 111,821 AF/year in 2025 and 177,900 AF/year in 2050 (Stockton MUD et al., 2003).[3]

In 2050, surface water supplies from existing sources would be approximately 31,000 AF/year on average, and range between 56,000 AF/year in a wet year to only 18,000 AF/year in a dry or critical year. Groundwater production from the Urban Services Area (using a safe yield of 0.6 AF/acre/year) would be 40,000 AF/year. Assuming that by 2050, an additional 16,000 acres outside of the Urban Services Area, but within the General Plan Boundary, are converted to urban use, a total of 49,000 AF/year of groundwater would be available. This gives an average supply of 80,000 AF/year and a dry year supply of 61,000 AF/year to meet a projected demand of 177,900 AF/year.

[3] Preliminary demand projections based on the General Plan update preferred land use alternative vary slightly from the population based projections used in the DWSP Feasibility Report (Stockton et al., 2003). Preliminary projections used in the General Plan update process are higher for 2025, at 129,200 AF/year, but lower in 2050, at 166,000 AF/year (City of Stockton, 2005). As these projections are based on a draft land use plan, the Feasibility Report projection of 177,900 AF/year for 2050 is used in this EIR.

Projected supplemental water needs would average 34,000 AF/year by 2025 and up to 83,000 AF/year in 2050 (See Figure 2-4). Actual unmet demands would vary year to year and could be greater in any given year. The DWSP could potentially provide up to 125,000 AF/year, and the City would be able to meet its projected long-term dry and average year demands and groundwater management goals. Although the 50-year supply and demand projections are inherently imprecise, future expansion of the DWSP would allow the City to meet its average year and dry year water demands while initiating an active groundwater recharge program (ASR). The City will consider expansion of the DWSP beyond the initial 30-mgd as needed to meet the needs of additional planned growth tied to an updated and approved General Plan.

Expansion of the DWSP beyond the 30-mgd initial project would be able to accommodate urban growth beyond that planned for in the current 1990 Stockton General Plan. However, the City intends to expand the DWSP incrementally, and only as appropriate, to continue to match the needs of planned growth as the City's General Plan is updated and approved. Thus, each phase of DWSP expansion would be clearly tied to the City's approved land use plans at the time. When the City proposes expansion of the DWSP WTP and operations, the City will conduct subsequent CEQA review as appropriate and review the consistency of the expansion with current approved land use plans and adopted growth policies.

6.4 IMPACTS AND MITIGATION MEASURES

This section provides a summary overview of the potential secondary effects of growth that could result from implementation of the proposed DWSP within the Stockton General Plan EIR (City of Stockton, 1990b).

SIGNIFICANCE CRITERIA

The Stockton General Plan EIR includes significance criteria for the environmental effects associated with planned growth for the project area. The significance criteria are incorporated by reference into General Plan EIR pursuant to CEQA Guidelines Section 15150.

IMPACT STATEMENT AND MITIGATION MEASURES

Impact GROWTH-1: Consistent with the 1990 Stockton General Plan, the DWSP would accommodate planned growth in the City, which would result in secondary environmental effects. The effects of planned growth have been identified and addressed in the EIR for the 1990 Stockton General Plan. Some of these secondary effects of growth are significant and unavoidable; others are significant but can be mitigated. Potentially significant, unavoidable impacts as a result of planned growth in the City have been identified for the following areas: loss of agricultural land, loss of habitat, increased traffic and traffic congestion, air quality impacts, increased traffic noise, increased energy and wastewater treatment demand, alteration of the region's visual character and increased use of non-renewable fossil fuels. The DWSP would not address nor alter (improve or worsen) the other significant and unavoidable impacts, which would remain significant and unavoidable. The EIR addresses the need for additional water supply and infrastructure,

groundwater overdraft, and saline groundwater intrusion as less than significant with mitigation. Mitigations for these impacts include the development and use of additional surface water sources and the reduction in dependence on groundwater. The DWSP would address these mitigations for surface and groundwater impacts.

The 30-mgd DWSP would accommodate a level of growth consistent with the 2015 build-out of the Stockton General Plan. The indirect environmental effects of the DWSP would be those associated with the implementation of the current General Plan. The effects are analyzed in the 1990 EIR for the City's General Plan Revision and Infrastructure/Public Facilities Master Plans (City of Stockton, 1990b).

Beyond 2015, the effects of growth may exceed existing and available analysis. Although population projections are generally reliable, the exact location and nature of future development is difficult to predict. The current update effort for the Stockton General Plan will provide comprehensive land use plans and policies through 2035. The General Plan update will be accompanied by an EIR that evaluates potential significant effects to the environment. An updated General Plan EIR would provide a basis for future infrastructure planning, including the analysis of future DWSP expansion.[4] At present, the environmental consequences of the city's development beyond 2015 are speculative. Nevertheless, the future effects of growth, based on impacts identified for build-out of the 1990 General Plan and existing trends, can be framed and are discussed later in this chapter.

6.4.1 SUMMARY OF CITY OF STOCKTON GENERAL PLAN EIR

The City's 1990 General Plan provides the goals and policies necessary for the orderly physical growth and development of the community. The EIR prepared for the City's General Plan Revision and Infrastructure/Public Facilities Master Plans (City of Stockton, 1990b) also analyzed various public facility master plans and was identified as a master environmental assessment per CEQA *Guidelines* §15169. In addition, pursuant to CEQA *Guidelines* §15091 and 15093 and Public Resources Code §21081.6, the City also prepared for the Findings, Statement of Overriding Considerations and Mitigation Monitoring Program (Findings) for the General Plan Revision (City of Stockton, 1990c). The Findings presented the potential impacts identified in the final EIR, mitigation measures for the impacts, the agency or agencies responsible for implementing the mitigation measures, and the findings required in accordance with CEQA *Guidelines* §15091.

SIGNIFICANT AND UNAVOIDABLE IMPACTS

In the 1990 General Plan EIR (City of Stockton, 1990b), the following environmental impacts were determined to be significant and unavoidable:

[4] This is not meant to imply that EIRs associated with a future general plan updates or specific plans would be sufficient to describe the effects of future DWSP expansion, but that such documents may provide a basis to evaluate the indirect growth inducement effects of water supply expansion.

Land Use

Loss of Agricultural Land

Build-out of the General Plan's future growth areas would convert approximately 9,000 acres of agricultural land (approximately half classified as prime farmland) to urban uses. The General Plan EIR includes goals and policies to promote orderly and efficient growth; the impact was determined to be significant and unavoidable.

Compatibility Impacts between Agricultural and Urban Uses

Conflicts between agricultural and urban uses include dust, smoke, pesticides, and noise from agricultural operations; and potential trespass, vandalism, and litter from the urban population. The City adopted a right-to-farm ordinance (Ordinance No. 3233) as mitigation for this impact; the impact was determined to be significant and unavoidable.

Biological Resources

Loss of Habitat

Although the General Plan Area includes some grassland and riparian habitat, the vast majority of potential habitat is agricultural land (City of Stockton, 2004b). As discussed above, approximately 9,000 of acres of agricultural land would be lost at build-out with 3,300 acres within or adjacent to the Delta. Several General Plan policies address the loss of habitat. The City hopes to participate in the SJMSCP for the WTP and pipeline portion of the DWSP. The impact was determined to be significant and unavoidable.

Transportation

Traffic Volume Increase Resulting in Some Capacity Deficiencies

The increase in traffic volumes, resulting in capacity deficiencies at a number of existing streets and freeway segments, is identified as a significant impact. Without mitigation measures, numerous local streets, as well as large sections of I-5 and SR-99 would be expected to operate at an unacceptable level of service by 2010. The implementation of feasible mitigation measures (intersection and roadway improvements) are expected to reduce traffic impacts to a less than significant level for all but the following street and freeway segments: Hammer Lane from El Dorado Street to Holman Road; West Lane from Morada Lane to Bianchi Road; I-5 from March Lane to Del Rio Drive; and I-5 from Country Club Boulevard to Downing Avenue. Because these segments would operate below an acceptable LOS, this impact was determined to be significant and unavoidable.

Air Quality

Regional Air Quality Impacts

The 1990 General Plan EIR identifies both regional and local air quality impacts resulting from build-out of the General Plan Area. At the time when the 1990 General Plan was approved, the

City was located in a non-attainment area (according to federal standards) for ozone precursors, CO, and PM_{10}. The General Plan EIR found that implementation of the plan would contribute to regional air quality problems. Mitigation measures are included in the General Plan EIR, including transportation and land use policies designed to reduce the amount of vehicle miles traveled, and working with the local air district to reduce direct sources of air emissions, such as wood-burning stoves. The impact to regional air quality was nevertheless considered significant and unavoidable.

Since the 1990 General Plan was approved, the City has been reclassified as an attainment area for CO.[5] The City, as part of the SJVAB, is still in "severe non-attainment" for ozone according to both federal and state standards. The SJVAB is in attainment for federal PM_{10} standards, but "non-attainment" according to the more restrictive state standard (SJVAPCD, 2004).

Localized Air Quality Impacts

The 1990 General Plan EIR also identified localized air quality impacts, specifically, CO "hotspots." Three intersections were identified as potentially exceeding the federal and state 8-hour CO standard (9.0 ppm): West Lane/Hammer Lane, Thornton/Hammer Lane, and West Lane/March Lane.

Noise

Noise Impacts Adjacent to Freeways and Major Thoroughfares

The 1990 General Plan EIR identified noise impacts adjacent to freeways and major thoroughfares as a significant and unavoidable impact. This finding was based on the number of homes that would be exposed to 60 dB Ldn as a result of traffic noise. In some areas adjacent to I-5 and SR-99, the noise contours associated with the General Plan build-out would double in size. Although no attempt was made to quantify the number of residences affected, or analyze the effects of geographical features that might attenuate traffic noise, this impact was determined to be significant. While the General Plan EIR includes policies to minimize the adverse impacts of noise on new residential construction, or resulting from new industrial uses, these measures would not reduce the effects of traffic noise on existing residences.

Wastewater Collection and Treatment

Potential Growth-Inducing Effects Due to Increased Sewer Service Capacity

The 1990 General Plan EIR included within its scope the adoption of several infrastructure/public facilities master plans, including the 1987 Wastewater Collection System Master Plan. The sewer service area in the Master Plan included 6,000 acres of agricultural land beyond the 1990 General Plan boundary. This was identified as a potentially growth-inducing effect in the EIR, as implementation of the Master Plan would have exceeded the planned build-out of the General Plan. However, the 1987 Wastewater Collection System Master Plan was not adopted (City of

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5 The Stockton Urbanized Area was reclassified as being in attainment of federal CO standards in 1998.

Stockton, 2004b). Thus, the potential growth-inducing effects of excess sewer capacity did not occur. The RWCF currently has a dry weather capacity of 42 mgd, and is currently operating at about 35 mgd, or 80 percent of dry weather capacity. Neither the RWCF nor the collection system can sustain growth beyond the projected General Plan build-out (City of Stockton, 2004b).

Utilities: Electricity, Gas, Telephone, and Cable TV

Consumption of Non-renewable Fossil Fuels

New development creates additional demand for electricity and natural gas. Natural gas is a non-renewable fossil fuel, and most electricity is generated through the consumption of non-renewable fossil fuels. This is identified as a potentially significant environmental impact. Conservation measures, including but not limited to compliance with Title 24 standards, are included in the General Plan EIR. The impact after mitigation would be significant and unavoidable.

Aesthetics

Aesthetic Impacts Due to Loss of Rural Pastoral Views

The 1990 General Plan EIR discusses four categories of aesthetic impacts: change in views on the urban fringe, the view along major highways, the visual relationship between new development and neighboring land uses and streetscape, and the visual environment within the existing urban area. The General Plan EIR includes policies to promote land use compatibility and aesthetic quality. Despite these measures, the loss of rural pastoral views on the urban fringe was determined to be a significant and unavoidable impact.

LESS THAN SIGNIFICANT IMPACTS

The following impacts were found in the 1990 General Plan EIR to be either less than significant, or reduced to a less than significant level with mitigation.

Land Use

Four impacts related to land use were found to be potentially significant: compatibility issues between residential, commercial and industrial uses; compliance with LAFCO policies related to municipal services and preservation of prime agricultural lands; potential conflict with the San Joaquin County General Plan Land Use Element; and potential conflict with the San Joaquin County Airport Land Use Plan. However, the Stockton General Plan EIR includes policies and implementation measures that would mitigate these impacts to less than significant.

Housing

The potential for the General Plan to designate an inadequate supply of developable land for all housing types or otherwise constrain the development of housing was a significant impact. Lack of land supply would lead to decreased availability and affordability of housing units. The General Plan contains several policies and programs to expand the supply of housing for all income groups and special needs populations. The impact was determined to be less than significant after mitigation.

Topography, Geology, and Soils

Potential hazards to new and existing structures due to seismic hazards, and unstable or expansive soil types were found to be potentially significant. General Plan policies and implementation programs, including detailed soils testing and engineering analysis, reduce this impact to less than significant.

Biological Resources

In addition to the loss of habitat identified above, potentially significant biological impacts include loss of remaining Valley Oak trees, and impacts associated with construction of a “western beltway” road in the Delta west of the City. These impacts were reduced to less than significant by policies and programs (e.g., a heritage tree ordinance) to protect Valley Oak trees, and the elimination of the western beltway from the General Plan Circulation Element.

Transportation

In addition to the significant and unavoidable traffic congestion impacts described above, the 1990 General Plan EIR identified several other transportation impacts that could be mitigated. These impacts include: traffic impacts on surrounding land uses, insufficient public and non-motorized transportation, conflicts with rail traffic, land use compatibility issues related to Stockton Municipal Airport, and land use compatibility with the Port of Stockton. These impacts were reduced to less than significant after mitigation.

Water Supply and Quality

Potentially significant impacts related to water supply include groundwater overdraft, insufficient surface water supply, and inadequate infrastructure. Water quality impacts include saline intrusion and migration of pesticides in groundwater, and contamination from urban storm water runoff. General Plan policies and programs to address these impacts include the development of additional surface water supplies, a policy which would be furthered by implementation of the DWSP. This and other mitigation measures, including conservation and water infrastructure improvements, reduce these impacts to less than significant.

Wastewater Collection and Treatment

In addition to the growth inducement effects related to expansion of the wastewater system, several other potentially significant wastewater impacts are identified in the EIR. These include inadvertent discharge due to system overload; hydrogen sulfide issues in the collection system; construction impacts related to system expansion; and potential groundwater contamination.

These additional impacts were determined to be less than significant after mitigation as a result of various General Plan policies and Master Plan implementation programs.

Flood Control

A portion of the 1990 General Plan Area lies within the 100-year flood plain. This was found to be a potentially significant impact that could be reduced to less than significant through implementation of policies and programs to protect existing and future development.

Public Facilities and Services

The General Plan EIR identifies 17 potentially significant impacts related to the provision of municipal services. These services include solid waste disposal, law enforcement, fire protection and emergency services, school facilities, parks and recreation, utilities (electricity, gas, telephone, and cable TV), and library services. One of these impacts, the consumption of non-renewable resources related to energy consumption was found to be significant and unavoidable (see above). The other impacts were found to be less than significant after implementation of various General Plan policies and infrastructure/facilities programs.

Hazardous Materials

The potential for contamination of air, soil, and groundwater as a result of improper storage, transport, and use or disposal of hazardous materials was found to be a significant impact. Implementation of policies and program within the General Plan EIR were found to reduce this impact to less than significant.

Cultural Resources

The disturbance of undiscovered cultural resources as a result of construction in the future growth areas was identified as a potentially significant impact. The General Plan EIR includes standard mitigation measures for discovery and disturbance of cultural resources that reduce the level of impact to less than significant.

6.4.2 BEYOND 2015 – ADDITIONAL EFFECTS OF GROWTH-INDUCEMENT

The City is currently conducting a CEQA environmental review and preparing an EIR on its proposed General Plan update that will evaluate the environmental effects of planned growth and proposed land use changes within the COSMA through the 2035 planning horizon. This analysis is not yet available to summarize in this EIR, but it is reasonable to expect that future planned growth and development will have significant and perhaps significant unavoidable impacts similar to those described for the City's current 1990 General Plan. The following discussion reviews the potential significant impacts that could occur as a result of further growth and development within the COSMA.

Land Use

Conversion of agricultural land, including some prime farmland (as defined by FMMP), would occur as development beyond the 1990 FGAs takes place. These lands may be within or beyond the 1990 General Plan Area. The current 82,000-acre General Plan Area contains over 27,000 acres of agricultural land (Stockton MUD et al., 2003). By contrast, the study area for the 2005 General Plan update covers approximately 123,000 acres that contains approximately 75,500 acres of agricultural land [6] (Mintier & Associates and URS, 2005). At the county level, 64 percent of San Joaquin County is classified as Important Farmland (CDOC, 2002).

Biological Resources

In the Stockton area, much of the potential habitat is agricultural land. Therefore, the conversion of farmland typically corresponds to a loss in habitat. The City is adjacent to the primary zone of the Delta, a valuable biological resource. In addition, some riparian (Valley Oak) and grassland habitats occur in or near the City.

Transportation and Traffic

Increasing population and increased economic activity would produce an increase in traffic, which may cause additional road segments and intersections to operate at unacceptable LOS. Future transportation investments, including public transit, and an improvement in the regional jobs housing balance may help to reduce future traffic congestion.

Air Quality

The San Joaquin Valley is a non-attainment area for both ozone and PM_{10}. Future increases in vehicle miles traveled would contribute to ozone precursors in the air basin. Both mobile sources and area sources, such as construction sites, would contribute to additional PM_{10}. In the future, establishment of attainment standards for finer particulate matter $PM_{2.5}$ may add to the San Joaquin's air quality challenges. However, it is likely that continued improvements in mobile and stationary source control would improve regional air quality. A recent example is the removal of the nonattainment designation for CO in the Stockton area.

Noise

Exposure to noise, particularly roadway noise, was previously identified as a significant impact associated with urban development. Future development would likely involve noise issues resulting from roadways or possibly the airport. Mitigation measures may be possible through the placement and design of transportation facilities and residential development.

6 The study area is the planning area for the 2005 General Plan Update.

Public Facilities and Services

A population increase would bring a need for public services and facilities. Most of these facilities would be expanded according to infrastructure master plans and paid for through some combination of taxes, bonds, and development fees. Expansion of these facilities may in turn have environmental impacts. For example, as discussed above, the City's wastewater system would not support growth beyond the 2015 General Plan build-out. The availability of additional water supplies beyond 2015 would require expansion of the existing wastewater facilities. Other facilities and services include schools, parks, police and fire protection, solid waste management, and library services.

6.5 REFERENCES

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CHAPTER 7

ALTERNATIVES

CHAPTER 7

ALTERNATIVES

7.1 INTRODUCTION

7.1.1 CEQA REQUIREMENTS

An EIR must discuss alternatives to the proposed project in order to evaluate whether there are other means of achieving the project sponsor's basic goals and objectives while at the same time avoiding or reducing the environmental effects of the project. Section 15126.6(b) of the CEQA Guidelines states that an EIR:

> "... must identify ways to mitigate or avoid the significant effects that a project may have on the environment, the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or could be more costly."

Section 15126.6(f) of the CEQA Guidelines provides guidance on the extent of the alternatives analysis required:

> "The range of alternatives required in an EIR is governed by a "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. The range of feasible alternatives shall be selected and discussed in a manner to foster meaningful public participation and informed decision making."

As described under Section 15126.6 (d) of the CEQA Guidelines:

> "The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed."

This chapter addresses both alternative water supply options as well as alternative facility sites for the DWSP facilities. As required by CEQA, this analysis first considers which alternatives can meet most of the basic project objectives, and then to what extent those alternatives remaining can avoid or reduce the environmental impacts associated with the DWSP.

Section 15126.6(e)(1) of the CEQA Guidelines also requires that the No Project Alternative be addressed in this analysis. The purpose of evaluating the No Project Alternative is to allow decision-makers to compare the potential consequences of the proposed project with the consequences that would occur without implementation of the proposed project.

7.1.2 REVIEW OF DWSP PROJECT OBJECTIVES

As described in Chapter 2, the City's objectives for this project are:

- To replace declining and unreliable surface water supplies.
- To protect and restore groundwater resources.
- To provide adequate water supply to accommodate planned growth.

The primary purpose of the proposed DWSP is to provide a secure, reliable supplemental supply of water for the COSMA to meet current and future water needs while reducing dependence on groundwater.

During planning the City conducted a comprehensive feasibility study to evaluate potential sources of supplemental water supply to meet the long-term water needs for the COSMA (Stockton MUD et al, 2003). The City considered the following criteria to compare various supply alternatives on their ability to meet its long-term water supply needs (Stockton MUD et al., 2003):

- Relative Cost – cost of alternative supply relative to existing supply sources
- Supply Reliability – a measure of dry-year supply availability
- Degree of Control by Stockton MUD – the level of control Stockton MUD would have over the implementation of the alternative supply
- Potential Yield – the amount of "firm" yield does the supply alternative add to the overall water supply for the COSMA
- Delivered Water Quality – a relative measure of the treated water quality of the supply alternative delivered versus existing supplies
- Environmental Effects – observation of any environmental advantages and disadvantages

Each of these criteria was assigned a high, moderate, or low value to compare the relative benefits or constraints that might affect project suitability, desirability, and capability to meet project objectives. The comparison used in the feasibility study provided a basis for formulating a range of reasonable alternatives for consideration in this EIR.

7.1.3 REVIEW OF DWSP SIGNIFICANT ENVIRONMENTAL IMPACTS

The range of potential alternatives to be considered in an environmental impact analysis should include those alternatives that can avoid or substantially lessen one or more of the significant effects that would be generated with implementation of the proposed DWSP. Once a reasonable range of alternatives that can meet most of the basic project objectives is identified, these alternatives are evaluated for their ability to avoid or lessen the following impacts associated with the proposed project, which are summarized here.

Implementation of the DWSP would result in five significant unavoidable impacts for which there is either no mitigation available or for which, even with mitigation, there would remain a significant unavoidable impact. The DWSP would also result in environmental impacts that could be potentially significant, but would be reduced to less than significant with mitigation. Many of these impacts would only occur during construction activities (e.g., noise or traffic disruption), and therefore,, while they would be significant during construction, they would not be permanent impacts to the environment. For the majority of these impacts, there is feasible and well-tested mitigation that can be implemented to reduce these environmental impacts of the DWSP to less than significant. Following is a summary of the key DWSP impacts, discussed in detail in Chapters 3 through 6.

DWSP IMPACTS THAT ARE SIGNIFICANT UNAVOIDABLE (SU)

The potential significant impacts associated with the construction and operation of the DWSP that have been found to be significant unavoidable include:

- The permanent conversion of 56.02 acres of economically viable prime farmland, unique farmland or farmland of statewide importance to non-agricultural use, which would occur with the installation of the 160-mgd DWSP WTP and raw water pipeline appurtenant facilities.

- The long-term degradation of Delta scenic and visual resources found in the immediate vicinity of the DWSP intake facility.

- The introduction of light and/or glare at the DWSP intake facility and the WTP. These new sources of nighttime lighting would adversely affect local nighttime views during the life of the project.

- The short-term emission of air pollutants during DWSP construction including:

  – Generation of PM_{10} emissions (dust) from construction activities and equipment that would contribute to both project and cumulative emissions from other ongoing construction projects.

  – Generation of NO_x and ROG emissions from construction vehicles that would contribute to both project and cumulative emissions from other ongoing construction projects.

- The significant secondary effects associated with planned urban growth, as described in the 1990 Stockton General Plan and associated EIR, which implementation of the initial 30-

mgd DWSP would accommodate. Expansion of the DWSP in phases up to the ultimate 160-mgd WTP would be implemented as needed to support additional planned growth within the COSMA. Future planned growth is also expected to have some significant unavoidable environmental effects such as those associated with the current 1990 General Plan including : loss of agricultural land, loss of habitat, increased traffic and traffic congestion, air quality impacts, increased traffic noise, increased wastewater treatment demand, alteration of the region's visual character, and increased use of non-renewable fossil fuels (City of Stockton, 1990a, b).

DWSP IMPACTS THAT ARE LESS THAN SIGNIFICANT WITH MITIGATION (LSM)

Table ES-1 in the Executive Summary of this EIR presents a summary of DWSP impacts found to be significant, and the proposed mitigation measures that would avoid or minimize these potentially significant impacts. Provided below is a list of the key significant impacts that are identified for the proposed DWSP in Chapters 3, 4, 5, and 6 of this EIR.

Construction Impacts

Construction of the DWSP facilities would have significant impacts that would be mitigated to less than significant in the following areas:

- Access to land uses along the pipeline alignment including recreation facilities, commercial and emergency traffic, bicycle/pedestrian access
- Sedimentation and other contamination of surface and groundwater
- Release of fuels and hazardous materials
- Disturbance of contaminated soil and/or groundwater
- Loss of jurisdictional wetlands
- Impacts to special-status species, riparian and other sensitive habitats
- Noise emissions
- Reduce road capacity and parking
- Increase wear-and-tear on designated haul routes
- Increase traffic safety hazards
- Increase traffic management during pipeline construction
- Disrupt and conflict with utility services
- Damage cultural resources
- Stranding of fish during dewatering for construction of the intake facility

Operation Impacts

Operation of the DWSP facilities would have significant impacts that would be mitigated, upon adoption, to less than significant in the following areas:

- Access to recreation facilities
- Soil-related hazards, subsidence, and secondary seismic hazards
- Increased drainage flows
- Impacts to special-status species at the intake facility
- Air pollutant and noise emissions
- Release of fuels and hazardous materials
- Impingement and entrainment of fish and macroinvertebrates

7.2 WATER SUPPLY ALTERNATIVES

7.2.1 ALTERNATIVES IDENTIFICATION

Numerous water supply project options have been identified and considered by various water managers and purveyors in San Joaquin County over the past several years. As part of developing a water supply project to meet its objectives, the City evaluated several options before identifying the DWSP as the preferred alternative to pursue.

The feasibility study for the DWSP identified and evaluated several water supply alternatives and facility site options (Stockton MUD et al., 2003). As the City's objectives were formulated, the City consulted with other regional water managers to identify possible water supplies that historically were considered. This consultation led to the identification of a suite of possible concepts that were then assessed for their consistency with City objectives, needs, and constraints. In addition, as part of the CEQA process for this EIR, an additional review of water supply options being considered in the northern San Joaquin County region was conducted. The water supply options reviewed as possible alternatives to the DWSP included:

- SEWD Expanded Water Supply and Expanded WTP

- In-Delta Storage Project (former Delta Wetlands Project)

- Mokelumne River Regional Water Storage and Conjunctive Use Project (MORE WATER Project)

- Eastern Water Alliance Regional Water Supply Project using Freeport Regional Water Project Facilities

- Farmington Groundwater Recharge Program

- New Hogan Reservoir Re-Operations

- Other Local Water Supplies

- Water Transfers

- Aggressive Water Conservation
- Aggressive Water Recycling
- No Project Alternative

Each of these alternatives is described below. Table 7-1 summarizes their key characteristics in terms of amount and reliability of supply, water source and water rights, parties involved, and facilities needed. For most of these water supply alternatives, their description and location of facilities is limited to conceptual layout and preliminary planning, Site-specific information on environmental resources and potential impacts is not readily available for these alternatives at this time. Nonetheless, there is adequate information to evaluate the ability of these alternatives to meet the City's project objectives, and where appropriate, to assess potential environmental effects of implementing each of these alternatives in comparison to the DWSP.

Table 7-2 summarizes the ability of each of the water supply options to meet the City's basic project objectives. To meet the City's basic project objectives, the option must provide an adequate amount of reliable water for the COSMA to meet both its near- and long-term demands and goals for groundwater protection and enhancement.

As shown on Table 7-2 and described in the discussion of each alternative below, none of the water supply alternatives appears able to fully meet the City's project objectives; however, the In-Delta Storage Project has the greatest potential to achieve most of them. The In-Delta Storage Project differs from the proposed DWSP by adding a new diversion point(s) and providing surface storage on the Delta Islands. To function, the City would still need to build all the same DWSP facilities to re-divert the water stored by the In-Delta Storage Project for treatment and distribution, unless a conveyance pipeline is constructed to connect the Delta islands with the proposed DWSP facilities. This connection would still require the City to construct the proposed DWSP raw and treated pipelines and the WTP. Some of the other alternatives can meet the near-term water supply needs to replace the existing surface water supplies that are being cut back and to assist in reducing groundwater pumping in the near-term, but they can not meet the long-term water supply needs of the COSMA.

Although these alternatives do not provide adequate supply to meet the City's project objectives, they remain important and viable projects for the region to help develop supplemental water supplies. This analysis does not judge the value or merits of these alternatives as water supply options for other parties or purposes; however, it does conclude that they can not meet the City's basic project objectives for an adequate and reliable long-term water supply on their own. Each alternative is described and evaluated below.

TABLE 7-1
DESCRIPTION OF WATER SUPPLY ALTERNATIVES

Option	Overview	Source of Supply	Average Annual Supply	Dry Year Supply	Water Rights	Parties Involved	Facilities Needed	Source
In-Delta Storage Project	Divert Delta surface water to storage on two Delta islands – Webb Tract and Bacon Island for later release and re-diversion by the City of Stockton. Variation would directly connect Bacon Island with DWSP facilities with interconnecting pipeline.	Sacramento – San Joaquin Delta	178 TAF	21 TAF	No new water rights would be required by the City of Stockton. Water would be obtained from purchase/transfer of supplies diverted and stored under permits held by In-Delta Storage Project owner. (Assumes reinstatement of SWRCB Permit issued to Delta Wetland Properties)	The City of Stockton would enter in agreement with In-Delta facilities owner (i.e., Delta Wetland Properties).	In-Delta Storage Project facilities, including mitigation islands, would need to be constructed. City of Stockton would need to construct facilities to re-divert surface supplies for conveyance to the WTP. Interconnection pipeline to connect In-Delta Storage Project and City of Stockton facilities is an option.	DWR, 2003a DWR, 2004 MWH, 2004
Expanded SEWD Water Supply and WTP	SEWD would increase its water supplies by securing additional water from the Stanislaus and Calaveras Rivers. SEWD has existing supplies at about 90 TAF/year yield with a potential increase from new rights. MWH (2005) assumes 82,000 AF/year existing with no potential increase.	Stanislaus and Calaveras Rivers Water transfers with OID and SSJID	90 TAF	0 TAF	Existing contracts with Reclamation for Calaveras River and Stanislaus River water. Increase OID-SSJID Stanislaus River water transfer.	Depending on the source of supply, parties could include Reclamation, OID, SSJID, CACWD, SEWD, and/or City of Stockton.	Expand SEWD WTP from 60 to 90 mgd	MWH, 2005
MORE WATER Project	Wet-year water diversion project from the Mokelumne River to divert surplus water and store the majority with some diversion to direct use.	Mokelumne River	90 TAF	0 TAF	New water rights for diverting and storing supplies from the Mokelumne River would be required.	Mokelumne River Water and Power Authority, City of Lodi, City of Stockton.	Combination of facilities, depending on final configuration, including: New Mokelumne River diversion(s), new conveyance (2 mile tunnel and 10.8 miles of pipeline),and a new off-stream reservoir (200 TAF) on Duck Creek. Possible re-operation of existing Pardee, Camanche, and PG&E Project 137 Reservoirs.	HDR, 2004
Eastern Water Alliance Regional Water Supply Project	City of Stockton would use available capacity of the Freeport Regional Water Project diversion and conveyance facilities as allocated with other partners. Eastern Water Alliance would construct a new WTP.	Sacramento River or other sources located north of Delta	Portion of 110 TAF pipeline capacity	0 TAF	City of Stockton would amend an existing water rights application for area of origin supplies (Water Code 11460 et seq.) for changed point of diversion at FRWP intake. City of Stockton and willing seller would apply for water transfer permit with SWRCB or Reclamation, as applicable.	City of Stockton, Freeport Regional Water Authority, Eastern Water Alliance, willing sellers if the source is water transfer originating north of Delta.	Conveyance pipeline connecting the terminus of the planned FRWP Clay Station/Mokelumne River pipeline to a WTP located on Eight Mile Road. New WTP owned and operated by Eastern Alliance partners.	Boyle, 2004
Water Recycling	Wastewater from City of Stockton's RWCF would be conveyed for suitable urban landscaping and agricultural uses. Potable supplies unless otherwise used would be reallocated for M&I purposes.	Treated wastewater from City of Stockton RWCF	61 TAF	61 TAF	No new rights would be required. City of Stockton would reduce/eliminate use potential to redivert wastewater discharges as allowed by Water Code 1485.	City of Stockton, local agriculture operations, local industrial users	Distribution and storage facilities within COSMA and participating agricultural areas.	
New Hogan Reservoir Re-operation	Changing New Hogan Reservoir operations to reduce the current level of carryover storage maintained in the reservoir.	Calaveras River	25 TAF	Unknown	June 2000 designation of critical habitat for steelhead in Calaveras River will likely affect future reservoir operations and may reduce yield to support in-stream flow releases.	Reclamation, SEWD, CACWD, Corps	Expand SEWD WTP	SWRI, 2000
Farmington Groundwater Recharge Program	Increased groundwater recharge in eastern San Joaquin County using existing water rights / supplies.	Stanislaus and Calaveras Rivers	0 TAF	0 TAF	No new rights would be required– groundwater recharge of existing supplies. No water expected to be available for M&I use.	Corps, SEWD	Groundwater recharge facilities	CDM, 2001
Littlejohns Creek	Involves securing a right to divert water from Littlejohns Creek. Could be pursued by City of Stockton or SEWD.	Local run-off	10 TAF	0 TAF	New right required	City of Stockton, SEWD	Diversion and conveyance facilities. Expanded SEWD WTP or new City of Stockton WTP.	
Water Transfers	City of Stockton would acquire water through transfers with willing sellers located north and/or south of Delta. City of Stockton would still divert the transfer water from the Delta and require all the same facilities as proposed for the DWSP, unless agreement to wheel/exchange supplies with regional purveyors can be developed.	Sources located north and/or south of Delta	Unknown	Unknown	City of Stockton and the willing seller would apply for a water transfer permit with the SWRCB or Reclamation, as applicable.	City of Stockton, willing seller(s) located north and/or south of Delta	Possible diversion, conveyance, and treatment facilities similar to DWSP.	
Aggressive Water Conservation	Implementation of measures to further reduce water consumption beyond level achieved with City of Stockton's current water conservation program.	Conservation	11 TAF	11 TAF	No new water rights permit required.	City of Stockton	Construction of facilities may be required for implementation.	CALFED, 1999

TABLE 7-2
ABILITY TO MEET PROJECT OBJECTIVES

Alternative	Supply Available		Ability to Meet Project Objectives			Factors Affecting Ability to Meet Project Objective	Conclusion
	Average Annual	Dry Year	Replace Declining and Unreliable Surface Water Supplies	Protect and Restore Ground-Water Resources	Serve Planned Growth / Meet Future Needs		
In-Delta Storage Project	178 TAF	21 TAF	Partial	Yes	Yes	Surface storage could contribute to operational flexibility of DWSP by providing water source during Term 91 conditions. Dry year water supply reliability is very limited and would not meet the City needs. Project is subject to an ongoing legal challenge; existing permits may be subject to revocation. Project development costs are high when compared to other potential water sources.	While this alternative could theoretically meet most of the City's objectives, the lack of a dry-year supply greatly limits its reliability as a primary water supply. Combined with the reported high cost to construct and operate this alternative, it is concluded that this alternative would not meet the City's objectives.
Expanded SEWD Water Supply and WTP	90 TAF	0 TAF	No	Partial	No	The availability of water supplies beyond a planned 60 mgd WTP is speculative. Ongoing reallocation of Stanislaus and Calaveras River supplies limits availability for future M&I uses. Other sources of water, including longer-term water transfers from other entities, are not readily identifiable at this time.	This alternative will not provide a reliable water supply that can be identified at this time. While an expanded SEWD WTP up to 60 mgd would contribute to meeting the City's existing and future water demands, water supplies to support further expansion beyond 60 mgd have not been identified. Therefore, this alternative would not meet the City's objectives.
MORE WATER Project	90 TAF	0 TAF	No	Maybe	No	Water supplies developed from this alternative are highly unpredictable and unreliable; consisting of high-water events on the Mokelumne River. Water would be unavailable up to 25 percent of the time. Water diverted would not be carried over year-to-year; therefore, it would not be available for dry year conditions.	Water supply is too unreliable and not available for dry year conditions. This alternative cannot be relied upon to support future growth in the COSMA. Therefore, this alternative would not meet the City's objectives.
Eastern Water Alliance Regional Water Supply Project	Portion of 110 TAF Pipeline capacity	0 TAF	No	No	No	This alternative would provide conveyance capacity for up to 110 TAF/yr. Capacity would not be available in drier years. A water source, either securing a new water right or water transfer from north of Delta would be required. Water may be allocated among Alliance partners, limiting the volume of water available to the City.	The limited reliability of pipeline conveyance capacity limits this alternative's ability to meet City's objectives. Allocation among other Alliance partners would further reduce potential water volume available for M&I uses. Therefore, this alternative would not meet the City's objectives.
Aggressive Water Recycling	61 TAF	61 TAF	Partial	Partial	No	Recycling would be dependent upon identifying suitable uses of wastewater, including mix of agricultural, urban landscaping, and industrial uses. The volume of water developed would not meet the City's future water demand. Facilities to collect potable agricultural supplies for City use would need to be developed. Recycled water distribution systems would need to be developed.	Water volume would be limited to less than needed to meet future City water demand. New facilities would result in increased costs and potential construction related impacts. Willing agricultural users for wastewater need to be identified. Therefore, this alternative would not meet the City's objectives.
New Hogan Reservoir Re-Operation	25 TAF	Unknown	No	No	No	Downstream flow requirements for protecting special-status fish species in the Calaveras River may limit any supplies available to the City for M&I uses. Ongoing habitat conservation planning may allocate potential supplies for fish protection purposes.	The availability of supplies for City uses is speculative. Ongoing planning may allocate supplies for other environmental uses. Therefore, this alternative would not meet the City's objectives.
Farmington Groundwater Recharge Program	0	0	No	No	No	This alternative is intended to provide water for groundwater recharge in eastern San Joaquin County.	Water developed is not intended for M&I uses in the COSMA. Therefore, is alternative would not meet the City's objectives.
Littlejohns Creek	10 TAF	0	No	No	No	This alternative would provide limited supplies from local runoff. Supplies would not be reliable during dry periods.	Limited and unreliable supply potential would not meet COSMA demand and would not support future planned population growth. Therefore, this alternative would not meet the City's objectives.
Water Transfers	Unknown	Unknown	No	Yes	No	This alternative could potentially provide sufficient water if a willing seller is identified. Current water market has not demonstrated supplies for routine transfers with sufficient long-term supply to support future population growth. Water transfers originating north of Delta would require construction of DWSP facilities to capture flows from the Delta.	Potential willing sellers may be identified with sufficient supplies to meet the City's demand. Current water market has not demonstrated interest in routine transfers on a long-term basis. The City would need to install facilities to divert, convey, and treat transferred supplies from the Delta unless conveyed through other existing or planned facilities. Therefore, this alternative would not meet the City's objectives.
Aggressive Water Conservation	11 TAF	11 TAF	No	No	No	This alternative is capable of reducing future water demands but would not provide sufficient reduction to eliminate the need for new supplies. Feasibility of certain measures may depend on subsidies or incentives to encourage local investment.	Water volume is not sufficient to meet the City's future demand. Cost of implementation of this alternative is high compared to other alternatives. Therefore, this alternative would not meet the City's objectives.

7.2.2 IN-DELTA STORAGE FACILITIES ALTERNATIVE (DELTA WETLANDS FACILITIES)

DESCRIPTION

In July 1987, Delta Wetlands Properties, a privately owned firm, proposed the Delta Wetlands Project to divert water from the Delta and store it on two Delta islands: Webb Tract and Bacon Island. Water would then be released back to the Delta for subsequent re-diversion at the H. O. Banks Pumping Plant or Tracy Pumping Plant for export to south-of-Delta water users. Two other Delta islands, Holland Tract and Bouldin Island, would be managed for habitat conservation (and as mitigation of project impacts).

In February 2001, the SWRCB issued Delta Wetlands Properties a water rights permit, subject to meeting federal and state standards. The SWRCB approved water quality certification under Section 401 of the Clean Water Act on September 20, 2001. A Department of the Army permit for Section 404 of the Clean Water Act was approved by the Corps in 2002.

In 2001, the DWR and the CALFED Bay-Delta Program, with technical assistance from Reclamation, initiated a study to evaluate the Delta Wetlands Project and other in-Delta storage options that could contribute to the California Bay-Delta Program's water supply reliability and ecosystem restoration objectives. This study concluded that design modifications and further evaluations were needed before considering public ownership of the project. A feasibility study of the In-Delta Storage Project was completed in January 2004 (DWR, 2004).

At present, there are no specific plans to proceed with implementation of either storage facility envisioned by Delta Wetlands Properties or DWR. Discussions have been held recently by Delta Wetlands Properties with potential water users, but no decision to proceed has been announced. As a result of a 2004 court ruling, the water rights permit issued to Delta Wetlands Properties by the SWRCB was nullified (3rd District Court, 2004). On March 16, 2005, the California Supreme Court denied the petitions for review.

The In-Delta Storage Project studied by these agencies included use of Webb Tract and Bacon Island for water storage, and use of Holland Tract and Bouldin Island as habitat islands for impact mitigation. Figure 7-1 illustrates the location of the In-Delta Storage facilities in relation to the proposed DWSP. The In-Delta Storage Project design differs from the Delta Wetlands Project by inclusion of the following elements:

- New embankment design and four consolidated inlet and outlet structures;
- new project operations;
- resolving local water quality issues through field experimentation and modeling;
- revised habitat management plans; and
- detailed risk and economic analysis.

As envisioned by DWR, the In-Delta Storage facilities would include two integrated inlet and outlet facilities on each of the storage islands. These facilities would be used to control the diversion and release of water onto and off of the islands. Each of the integrated facilities would include fish screens, a transition pool, a mid-bay, and a pumping station. Gravity flow would be maximized for the flooding of the island and subsequent release of water back to the Delta. The pumping units could be used to completely drain the island storage reservoirs when necessary.

The description of facilities and operations vary between the two project concepts. As originally envisioned the Delta Wetlands Project would have a water storage capacity of 238 TAF and divert an average of 222 TAF of water (Corps, 2001). However, DWR assumed that a total of 217 TAF of storage would be installed. DWR concluded that the facility could yield a total long-term average annual water supply ranging from 124 to 136 TAF. Total average annual water supply improvements during dry periods ranged from 59 to 62 TAF (DWR, 2003a).

There are two concepts for using the In-Delta Storage Project for the City:

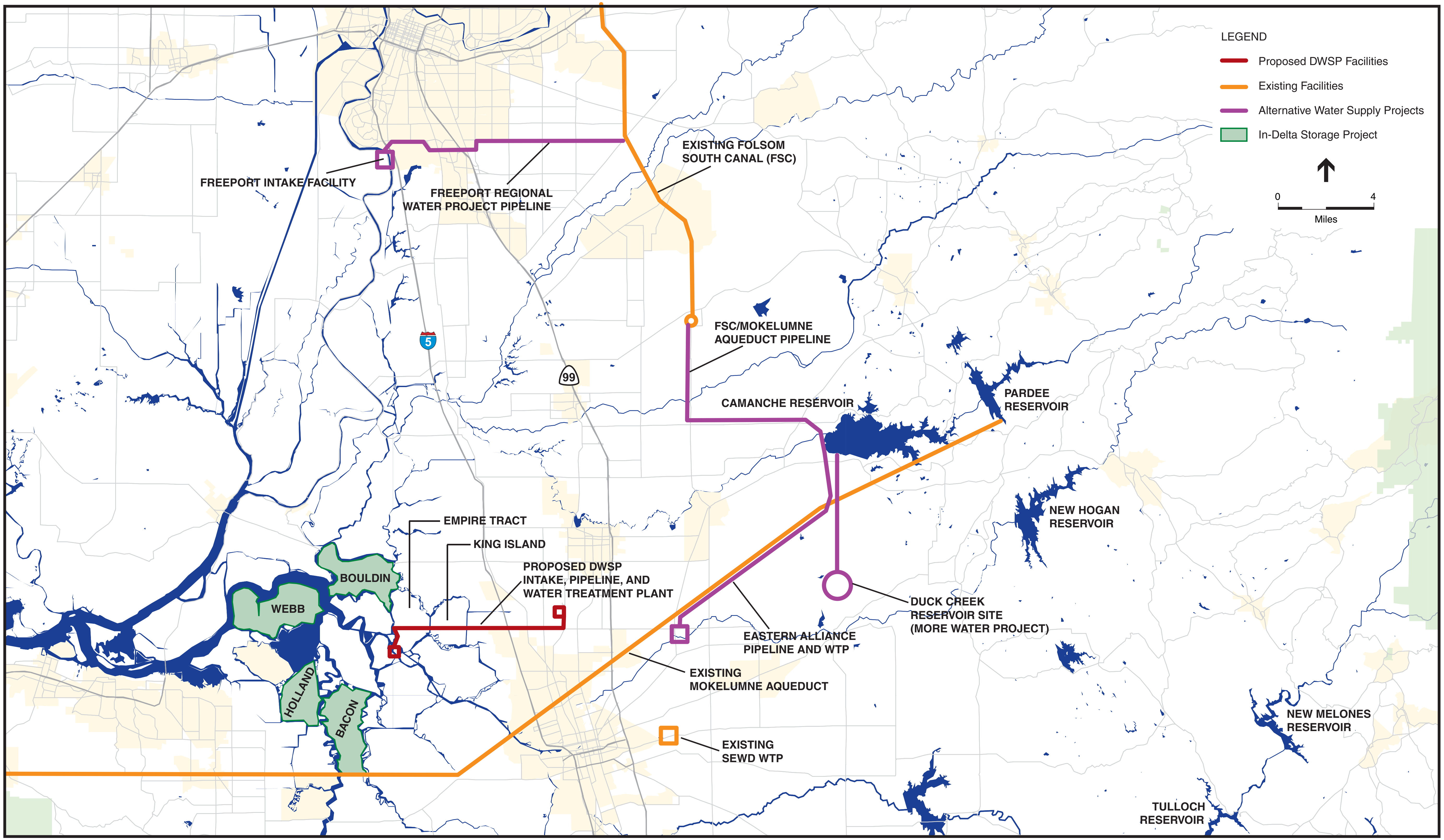
- Under the first concept, the In-Delta Storage Project facilities would supplement the proposed DWSP. The In-Delta storage facilities would operate in combination with the DWSP diversion facilities, wherein, water stored at the In-Delta Storage Project facilities would be released to the Delta for subsequent re-diversion by the proposed DWSP intake facility.

- Under the second concept a new pipeline would be constructed across the Delta waterways and San Joaquin River to connect the In-Delta Storage Project directly to the DWSP raw water pipeline. With this concept, water diverted by the In-Delta facilities would not need to be released to the Delta for subsequent re-diversion at the DWSP intake. Instead, water would be conveyed directly to the DWSP raw water pipeline for conveyance to the proposed DWSP WTP. The DWSP could still include a separate water intake located on Empire Tract, thereby maximizing the ability to divert surface water at different locations in the Delta. This concept would enhance the operational flexibility of the proposed DWSP by allowing available water to be withdrawn from storage during periods when restrictions may otherwise require reduced or curtailed water diversions at the proposed DWSP intake.

With the In-Delta Storage alternative, the City would need to establish a water purchase agreement with Delta Wetlands Properties or other owners of the In-Delta storage facilities for storage and delivery of water supplies. The City would assume no responsibility or ownership of the storage facilities. In the case where a direct connection is made between the In-Delta storage facilities and the DWSP, it could be expected that the City may own a part, if not all, of the conveyance pipeline.

ABILITY TO MEET PROJECT OBJECTIVES

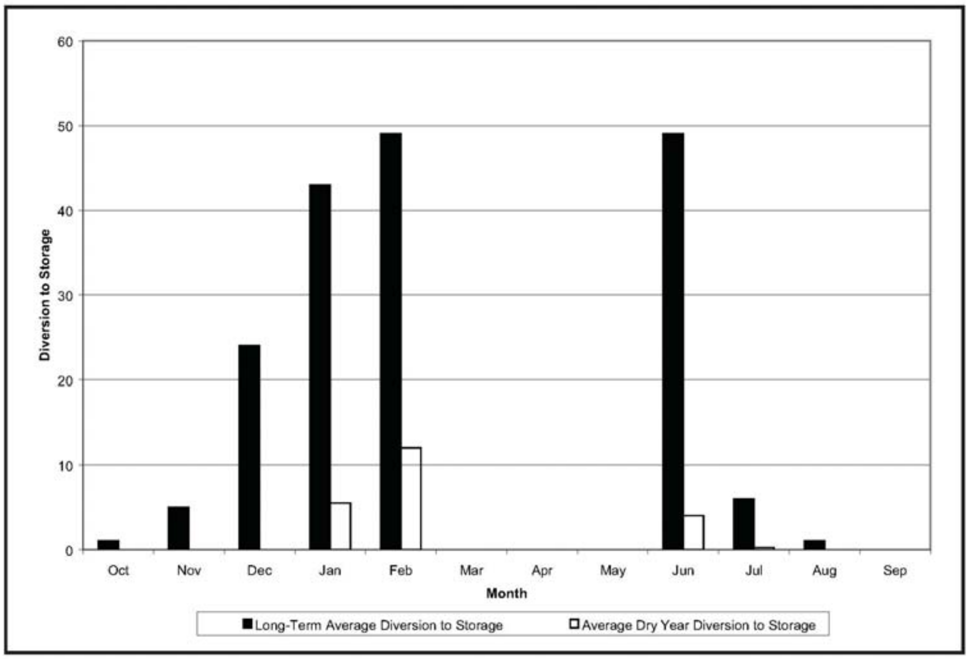
Implementation of this alternative would provide the City with a Delta water supply intake and storage reservoir capable of storing up to 238 TAF. Based on DWR studies (DWR, 2003b), the In-Delta Storage facilities would divert an average 178 TAF to storage. As shown in Figure 7-2, most of this diversion would occur from December through February and June. During the remaining months, only minor amounts of water would be available for diversion to In-Delta storage.



SOURCE: DeLorme Street Atlas USA, 2000; and Environmental Science Associates, 2005

Figure 7-1
Location of Existing Water Supply Facilities and Project Alternatives

The City would be able to withdraw supplies based on its M&I water demand pattern (MWH, 2005). Based on this pattern, the water volume stored would increase through February; decline until June when additional reservoir filling would occur; and then decline through September. Based on calculated long-term average flow conditions, the In-Delta storage facilities could divert and store sufficient water to meet City demands through 2050.



SOURCE: DWR, 2003b

Delta Water Supply Project / 200090-002

Figure 7-2
Average Water Diversions Available for In-Delta Storage Facilities

During dry periods, water available for diversion to In-Delta storage facilities would be limited to about 21 TAF (DWR, 2003b). This water would be available for storage primarily in January and February, with some supplies available in June. With limited diversions of about 21 TAF, the In-Delta Storage facilities would have an insufficient volume of water stored for the City's use during dry periods. The City's existing water demands could deplete the stored supplies by June; while at 2015 projected water demands, the supplies could be depleted by May.

A major assumption of this analysis includes the volume of stored water that is carried over from the previous water year. For purposes of this analysis, about 25 TAF was assumed to be carried over into October. If a higher volume (about 75 TAF) of carryover water was present in October, the In-Delta facilities could theoretically store sufficient water to meet the City's existing and 2015 dry-year water demands. However, the volume of water in storage would be drawn down to about 20 TAF. Because the minimum operational pool of the In-Delta storage facilities has not been defined, it may be found that stored water supplies could be depleted prior to onset of early winter diversions. Therefore, based on the assumed operations of the In-Delta storage facilities, there would be insufficient dry-period water supplies to meet the City's future water demands.

In order for these facilities to meet the City's objectives, additional dry-period supplies would be needed. These additional supplies would likely consist of the City's Section 1485 supplies that would be available during dry periods. The diversion of these supplies would occur at the proposed DWSP intake facility.

Based on this analysis, the In-Delta storage facilities would partially contribute to meeting the City's objectives. During normal and wet water years, In-Delta storage facilities would divert sufficient water supplies for release to meet the City's M&I water demands. However, in drier periods limited available water supplies would not be able to meet the City's future water demands. Additional water supplies, consisting of new surface water supplies and associated water rights or groundwater supplies, would need to be acquired.

As the City's water demand increases in the future, the ability of In-Delta storage to provide partial dry period supplies would decline. Water supplies stored in the In-Delta facilities would be consumed faster, requiring the City to use other supplies earlier in the year. Therefore, the In-Delta storage facilities would not contribute to achieving the City's objective of a reliable water supply in dry periods. Further, this alternative does not eliminate the need to construct and operate the DWSP, but rather adds the In-Delta Storage facilities on top of the proposed DWSP facilities. As a result, it would be a much more costly alternative.

ENVIRONMENTAL IMPACT COMPARISON WITH DWSP

Implementation of the In-Delta Storage Facilities Alternative would result in the inundation of Webb Tract and Bacon Islands. These Delta islands occupy 5,370 and 5,450 acres, respectively. This alternative has the potential to generate a series of environmental impacts that may be potentially significant or less than significant in severity. Based on DWR studies (DWR, 2003c), construction and operation of the In-Delta Storage facilities may result in impacts on biological resources on Webb Tract and Bacon Island, including:

- Potential impacts to 111 special-status plant species that have been observed occupying the exterior levees on the project islands.
- Potential impacts to habitat suitable for supporting giant garter snake, western pond turtle, nesting Swainson's hawks, greater sandhill cranes, loggerhead shrike, wintering tricolored blackbird, and foraging and roosting bats.
- Potential impacts to 10 recorded historical sites found within the Bacon Island Rural Historic District.
- Potential impacts associated with the presence of high levels of petroleum hydrocarbons at vehicle and farm maintenance facilities; and lower concentrations of other contaminants such as heavy metals, chlorinated pesticides, and organic solvents that were detected on multiple properties.

- Potential displacement of up to 80 acres of shallow water habitat found on the perimeters of Webb Tract and Bacon Island that would result from implementing levee protection measures.

- Displacement of 19,820 acres of designated farmland. About 10,820 acres would be removed from agricultural production with construction and operation of the Webb Tract and Bacon Island storage facilities. About 9,000 acres of farmland would be removed from agricultural production with establishment of the Holland Tract and Bouldin Island habitat management areas.

- Potential impacts to Delta water quality associated with discharges of water containing elevated concentrations of dissolved organic carbon (DOC). With stored water circulation measures applied, DOC standards would be exceeded at other major Delta water intakes by as much as one mg/L in wet and normal years, while rarely causing exceedence of standards by no more than 0.5 mg/L in drier years.

- Potential impacts to Delta water quality associated with increases in chloride at other major Delta water intakes. Although considered minor, with increases of about 2.5 percent, increased chloride at these intakes is considered less than significant.

- Potential impact to Delta water quality associated with discharges of water containing elevated concentrations of total trihalomethane (TTHM). While TTHM concentrations at other major Delta water intakes would not exceed the maximum standard of 64 µg/L, concentrations would increase by as much as 15 to 16 percent when compared to baseline conditions.

- Potential impacts to Delta water quality associated with discharges of water warmed while in storage and containing reduced dissolved oxygen levels could occur. Additional study would be needed to determine the extent and severity of this change to stored water quality.

It should be noted that the DWR studies, on which these conclusions are based, assumed a different stored-water discharge pattern from that which would be used by the City. As a result, changes to stored-water discharge quality could be different from that reported by DWR.

This alternative would not readily reduce potential impacts associated with the proposed DWSP. Because the proposed DWSP facilities would still need to be installed, the addition of In-Delta Storage facilities would result in additional environmental impacts.

With implementation of the In-Delta storage design concept, which would enable direct conveyance of stored water to the proposed DWSP facilities, the operational flexibility of the DWSP could be enhanced and enable water to be delivered to the City even if diversion restrictions for special-status species protection required short-term pumping curtailments.

As noted in this discussion, adding the In-Delta Storage facilities to the proposed DWSP facilities would result in a substantially larger impact area, exceeding over 10,000 acres; have direct and indirect potential effects on numerous biological resources, and potentially modify and degrade water quality of the Delta when compared to the proposed DWSP and the No Project Alternative.

7.2.3 EXPANDED SEWD WATER SUPPLY AND WTP ALTERNATIVE

DESCRIPTION

The existing SEWD WTP has a rated capacity of 45 mgd. However, from December through April, high turbidity inflows occasionally limit the volume of water being treated. It is assumed that with current plans the WTP would be expanded to treat up to 60 mgd. Expansion of the SEWD WTP and conveyance of water beyond 60 mgd would require obtaining additional supplies from either existing water rights holders or water contractors. This alternative evaluates the potential for SEWD to expand its WTP to 60 mgd in order to supply more water to COSMA for M&I use.

The viability of this alternative depends on the continued availability of surface water from the Stanislaus and Calaveras Rivers. Additional water may be available from other local sources, such as water obtained from new appropriative water rights on Littlejohns Creek. Such supplies would be subject to availability and consistency with the management objectives of the Farmington Groundwater Recharge Project.

SEWD contracted in 1983 with Reclamation for 75 TAF of interim water supply from the New Melones Unit of the CVP, to be delivered at Goodwin Dam on the Stanislaus River. In 1994, SEWD completed construction of the Farmington Canal Project, connecting Goodwin Dam to SEWD's WTP, providing SEWD access to the contract water. However, in the mid-1990s implementation of the CVPIA (Public Law 102-575) and other regulatory actions substantially reduced the volume of water SEWD could expect to be delivered under its New Melones Project contract, especially in dry years.

Pursuant to the New Melones Interim Plan of Operations (1997), SEWD and Central San Joaquin Water Conservation District (CSJWCD) may receive up to 90 TAF each year. Delivery to CSJWCD, with an annual contract amount of 80 TAF/year, has a higher priority. Therefore, it is assumed that SEWD is limited to 10 TAF/year of CVP water from New Melones Reservoir. Of CSJWCD's contract amount of 80 TAF/year of CVP water from New Melones Reservoir, 49 TAF is considered firm yield while the additional 31 TAF is delivered when available.

Additional water supply for SEWD also could possibly be available through purchases and transfers from other entities in the region. Water rights holders on the Stanislaus River could potentially make supplies available for an expanded SEWD WTP. An increased water transfer from OID and SSJID, on the order of an additional 30 TAF, is possible and could be delivered to the City through an expanded SEWD WTP. A long-term transfer of this volume would require expanding the WTP to 80 mgd, based on the planned capacity of 50 mgd. As discussed in Section 7.3, the ability to secure a long-term water transfer meeting the City's needs is speculative at this time. It is uncertain whether such a transfer would be available to support the expansion of the SEWD WTP.

Given the uncertainty regarding the availability of surface water supplies from the Stanislaus River, and the reduced supplies that may be available as a result of renewal of existing water transfer contracts, this alternative was analyzed assuming available water supplies could range from 10 TAF to 40 TAF, as shown in Table 7-3.

TABLE 7-3
SEWD ADDITIONAL SUPPLY ASSUMPTIONS

Scenario	SEWD WTP Capacity (mgd)	OID/SSJID Maximum Transfer Amount (TAF)	CVP Interim Contract Maximum Transfer Amount (TAF)
1	60	30	10
2	60	15	10
3	60	0	10

Source: MWH, 2005

ABILITY TO MEET PROJECT OBJECTIVES

Expanding the SEWD WTP would allow SEWD to deliver more water to the City when water is available. At times this would enable the City to reduce its near-term reliance on groundwater and increase usage of SEWD's available surface water supplies. At this capacity, the SEWD WTP would meet the City's water demands through the development of planned growth in 2015. Population growth within the City that occurs in excess of the 2015 planned level of development could not be served by this alternative. The excess demand would need to be served by another source and additional water treatment facilities.

Table 7-4 shows the volume of surface water supplies that the City could use at its existing level of demand. As shown, an average 55 TAF could be conveyed with this alternative while supplies would be limited to about 39 TAF during critical periods. The City's remaining needs would need to be met by available groundwater resources, averaging about 42 TAF and increasing to about 62 TAF in critical periods.

Using an average 55 TAF of surface supplies with implementation of this alternative would increase the City's surface water supply use by about 25 percent over existing conditions. This increase in surface water use would result in decreased groundwater use from an average 45 to 42 TAF, a seven percent reduction.

The reduced use of groundwater that would occur with implementation of this alternative would be consistent with the City's objective to protect and restore groundwater resources. However, the City's continued increases in water demand would eventually exceed the 60 mgd capacity of the SEWD WTP and would require the City to increase its use of groundwater resources.

TABLE 7-4
AVERAGE ANNUAL FLOWS FROM STANISLAUS AND CALAVERAS RIVERS – SEWD WTP EXPANSION ALTERNATIVE (TAF)

SEWD WTP Expansion Alternative		
Component	**Long-Term Average**	**Critical Periods**
Stanislaus River supply	30	20
Calaveras River supply	25	19
Total	**55**	**39**
Groundwater pumping		
M&I	30	49
Ag	12	13
Total	**42**	**62**

Source: MWH, 2005

Therefore, while this alternative would be consistent with the City's objective to protect and reduce groundwater pumping on a short-term basis, it would not be consistent with this objective once the City's water demand exceeds the planned 60 mgd capacity of the SEWD WTP.

Water supplies to be treated by a planned expanded SEWD WTP (up to 60 mgd) could be subject to substantial critical year reductions. Water supplies originating from the Stanislaus River would be reduced annually from an average 30 to 20 TAF in critical years, which would equal a 33 percent reduction in critical years. Water supplies originating from the Calaveras River would be reduced from an average annual supply of 25 to 19 TAF in critical years, which would represent a 24 percent reduction in critical years. Water supplies obtained to support expansion of the SEWD WTP beyond 60 mgd may prove to be even less reliable, if available at all, during dry periods. The inability to provide supplies during dry periods could prove to be a significant factor affecting the feasibility of this alternative.

Therefore, the water supplies that would be treated by this alternative would not have sufficient reliability to meet the City's objective to replace declining and unreliable water supplies. While these supplies may be considered reliable during normal and wetter water years, their limited availability during critical years would conflict with the City's project objectives.

ENVIRONMENTAL IMPACT COMPARISON WITH DWSP

Increasing water supplies from facilities located on the Stanislaus and Calaveras Rivers to the City would require a combination of water supplies, including continued delivery of up to 30 TAF from the OID/SSJID water transfer contract and up to 25 TAF of groundwater pumping. In addition, the existing SEWD WTP would need to be expanded from its existing 45 mgd capacity to 60 mgd or more. This expansion may require expanding the footprint of the WTP to include needed filtration and treatment facilities, and may additionally require construction of separate facilities at another location.

Because limitations on water availability would continue to be regulated by federal contracts, no significant impacts to aquatic resources or protected species are anticipated because they would be prevented by contract conditions. Dry-year water deliveries would be substantially eliminated because of anticipated instream flow requirements, which would consume water that would otherwise be available to the City.

7.2.4 MORE WATER PROJECT

DESCRIPTION

The Mokelumne River Regional Water Storage and Conjunctive Use Project (MORE WATER Project) is currently being studied by the Mokelumne River Water and Power Authority, with funding from the San Joaquin County Flood Control and Water Conservation District and the Cities of Lodi and Stockton. This project alternative would target diversion of surplus, wet-weather river flows. Preliminary studies identified five options to be carried forward for further investigation (HDR, 2004). These options include diversion from either Pardee Reservoir or Camanche Reservoir to off-stream storage, direct diversion, and use from the lower Mokelumne River using either existing or new diversion facilities, or re-operation of Pardee Reservoir, Camanche Reservoir, and Pacific Gas & Electric's upstream Project 137 reservoirs (a system of seven reservoirs with a combined storage of 220 TAF).

Two off-stream storage options require the construction of Duck Creek Reservoir located within the Calaveras River watershed near the divergence of the Calaveras River and Mormon Slough at Bellota. The facility would have a storage volume of up to 200 TAF and a total diversion capacity on the Mokelumne River of 1,620 cfs (1,000 cfs diversion to storage plus 620 cfs diversion for direct use). The reservoir would be drawn down each year to maximize the expected yield. Figure 7-1 shows the possible location of the MORE WATER Project facilities as envisioned to date. Water diverted from the Mokelumne River would be conveyed through a 10,000-foot long tunnel and then discharged to a 57,400-foot long pipeline (10.8 miles) where it would then be discharged to the proposed Duck Creek Reservoir (CDM, 2001).

Based on studies to date, up to 90 TAF could be developed for use in the immediate region. Initial project planning is ongoing with additional studies and environmental assessments planned for the next several years. No allocation of water supplies among the participating parties has been defined, but is can be assumed that the City would not receive the entire volume of water made available by this alternative, but would share the supply with the other project participants. Water developed by this alternative could be conveyed from Duck Creek Reservoir to the SEWD WTP either using natural stream courses or with a new dedicated pipeline. The supplies could then be distributed to the COSMA, groundwater recharge, or other users.

Construction of needed water storage facilities on the Mokelumne River and Duck Creek would alter existing riverine habitats. The acreage that may be inundated by these facilities would depend on their location, dam height, and design. The pipelines needed to convey the water supplies would also have temporary construction impacts on the environment.

The long-term average availability of floodwater is 90 TAF/year if no provisions are made to avoid existing hydropower generation impacts and 82 TAF/year if provisions are made to avoid hydropower generation impacts. Regardless of which option is implemented, the yield from this alternative would occur only on an intermittent basis. It is expected that the project would not be able to divert and store a substantial volume of water 20 percent of the time, because of senior water rights holders that would claim use of available supplies.

ABILITY TO MEET PROJECT OBJECTIVES

Because the MORE WATER Project is based on intermittent floodwater supplies that must be stored for subsequent use in dry periods, it would not readily meet the City's project objectives to replace existing unreliable water supplies, and restore groundwater resources. The implementation of this project would subject the City to infrequent dry periods in which all supplies would consist of stored water previously banked during wetter periods. Therefore, the City would be limited to a fixed volume of water to carryover a multi-year dry period.

Based on these reasons, the MORE WATER Project was eliminated from further consideration in this analysis. This conclusion does not judge the value or merits of this project as a water supply for other purposes or parties; however, it does conclude that the MORE WATER Project is not suitable for the City to rely on to meet the objectives defined for the proposed DWSP.

7.2.5 EASTERN WATER ALLIANCE REGIONAL WATER SUPPLY PROJECT USING FREEPORT REGIONAL WATER PROJECT FACILITIES

DESCRIPTION

The Eastern Water Alliance (Alliance) is composed of the North San Joaquin Water Conservation District, CSJWCD, and SEWD. The Alliance has proposed the construction of a regional water supply project that would integrate the Freeport Regional Water Project (FRWP) with proposed WTPs for the Cities of Stockton and Lodi. The objective of the project is to reduce treated water costs to EBMUD and the Cities of Stockton and Lodi, and to help relieve current groundwater overdraft through a groundwater recharge program.

This alternative would allow the Alliance to use the available capacity of the FRWP and Sacramento County. EBMUD and Sacramento County plan to construct and operate a new 185-mgd intake facility on the Sacramento River near the community of Freeport. The facility will include state-of-the-art fish screens, a proposed new pipeline to convey water east to the existing Folsom South Canal, new conveyance facilities to transport Sacramento River water for EBMUD from the southern end of the Folsom South Canal to EBMUD’s existing Mokelumne Aqueduct through which the water will be conveyed to the EBMUD service area. The pipeline from the Folsom South Canal to the Mokelumne Aqueduct will have a capacity of 100 mgd (FRWA, 2004).

As proposed by EBMUD and Sacramento County, the FRWP intake facilities would be available for conveying additional supplies during periods when EBMUD and/or Sacramento County were not using the facilities to their maximum capacity, in accordance with existing water service contracts and agreements. Up to 100 mgd of available capacity would be present when total storage in the EBMUD system is greater than 500 TAF as of April 1 (FRWA, 2004). Between 1977 and 2000, EBMUD experienced more than 500 TAF in storage on April 1 in 17 years or about 74 percent of the time (EBMUD, 2000). Therefore, the capacity to convey water to the City would be available about 74 percent of the time; during the remaining years, EBMUD would use the facilities for diverting and conveying its own water supplies.

In order to convey supplies from the FRWP, additional conveyance facilities would need to be installed to convey water supplies south of the Mokelumne Aqueduct to the vicinity of Eight Mile Road. The Alliance would construct a WTP to treat this supply prior to its introduction into the City’s water distribution system. The water supply availability for the Alliance and the City of Stockton would be based on using the excess conveyance capacity of the FRWP. Components of the proposed project would include (Boyle, 2004):

- Raw water pipeline from the FRWP terminal facility on the Folsom South Canal to an Alliance WTP,
- 100-mgd Alliance WTP and Pump Station,
- Groundwater pumping capacity to provide water to the City of Stockton in dry years when deliveries from the Alliance WTP may be curtailed, and a
- 42-inch treated water pipeline from the Alliance WTP to the City of Stockton.

The initial project proposal is for the Alliance to divert and treat about 33 TAF/year (30 mgd) through the Eastern Water Alliance Regional Water Supply Project. Figure 7-1 shows the general location of the planned FRWP facilities and the possible additional elements needed to convey the supplies to the City’s service area. Ultimately, capacity is available to convey up to about 112 TAF/year, assuming the pipeline operates at 100 percent capacity. A more reasonable estimate of potential supplies from the FRWP is about 100 TAF/year or less due to curtailments resulting from maintenance, shut-downs, or other operational constraints.

The lack of conveyance capacity in drought years would result in increased groundwater extraction in the COSMA compared to the DWSP and an earlier phasing of an ASR program to prevent groundwater overdraft.

In order to implement this alternative, the Alliance would also need to acquire a suitable water supply that would be diverted from the Sacramento River. The use of the City’s area of origin water right (Water Code Section 11460 et seq.) could provide the basis for a water right using the FRWP as a point of diversion. The area of origin water right may be subject to Term 91 conditions preventing the diversion of water when CVP and SWP storage facilities release water to the Delta.

Another water source option for this alternative consists of water obtained under a new water right filed by San Joaquin County in 1990 (SWRCB Application No. 29657). It was estimated that an average annual yield of about 44 TAF/year could be diverted and conveyed to San Joaquin County through the FRWP facilities. With a capacity of about 200 mgd, the project could convey an average annual volume of 72 TAF/year (Williamson, 2003; NSJCGBA, 2004).

The Alliance would also need to obtain approval to use the FRWP facilities to convey the supplies to the Alliance's service area, either independently or with other Alliance participants. In addition, the Alliance would need to acquire a right-of-way for the connecting pipeline with the EBMUD facilities on the Mokelumne River.

Finally, the Alliance would need to develop an ASR program or surface storage facility to carryover supplies through dry periods. As previously shown, the City would need to access these stored supplies when the FRWP facilities would not be available for conveying water supplies, about 25 percent of the time.

ABILITY TO MEET PROJECT OBJECTIVES

This alternative was eliminated from further consideration because this project would not contribute to the City's project objectives to replace existing unreliable water supplies nor would it provide sufficient supplies to support planned growth.

Even though the Alliance partners have not allocated the potential supplies for this alternative among themselves, it can be reasonably assumed that the City would not receive the full capacity of this alternative but would rather share the available supply with other project participants.

Because of the unreliable conveyance capacity, water supplies substantially greater than that immediately needed by the City would have to be diverted and stored for use in dry periods. The City's projected 2015 water demand would require 30 TAF or about 90 percent of the 33 TAF that would be available from the initial Alliance Project operation. This would only allow an average of 3 TAF to be stored for dry periods while eliminating supplies to other Alliance partners. As the City's demand continues to increase to 2050 levels, the City's projected need for an additional 126 TAF/year would exceed the entire 112 TAF/year potential conveyance capacity of this alternative. No provisions for conveying additional water to be stored for dry periods would be made. Even less water would be available for the City's use if other Alliance partners receive a portion of the delivered supplies.

Therefore, this alternative would not be able to provide sufficient water supplies capable of meeting the City's dry-year near- and long-term needs, let alone the demands of other Alliance partners. Because of its low reliability, there would only be limited opportunity to reserve water in storage for use in dry-year periods. Additional supplies would be needed to augment this alternative in order to meet the City objectives.

This conclusion does not judge the value of the FRWP facilities to convey water supplies to San Joaquin County. The use of these facilities may prove feasible for other uses and parties that do not require high water supply reliability. However, because the City's objective is to establish a reliable water supply, the use of the FRWP facilities and installation of conveyance pipeline and storage facilities is not considered feasible for the City's purposes.

7.2.6 FARMINGTON GROUNDWATER RECHARGE PROGRAM

DESCRIPTION

The Farmington Groundwater Recharge Program is a joint federal (Corps) and local (SEWD and other agencies) investigation to determine the potential for groundwater recharge in eastern San Joaquin County. Overdraft in the eastern San Joaquin groundwater basin is approximately 150,000 AF/year (CDM, 2001).

The purpose of the Program is to help alleviate groundwater overdraft and associated saline intrusion. The Program is scheduled to be implemented over a 10-year time frame and reach a long-term recharge rate of 35,000 AF/year (Stockton MUD et al., 2003). Some projects developed under the Program could be within the COSMA, although no specific groundwater management and facilities plans have been developed to date.

ABILITY TO MEET PROJECT OBJECTIVES

Because the Farmington Groundwater Program has been developed with the primary objective to protect the groundwater resources of eastern San Joaquin County, it is not intended to provide a source of water for meeting existing and planned projected growth within the COSMA. This project has been eliminated from further consideration in this document because this project would not contribute to the City's project objectives to replace existing unreliable water supplies sufficient to meet existing and planned future water demands.

7.2.7 NEW HOGAN RESERVOIR REOPERATIONS

DESCRIPTION

New Hogan Reservoir is currently operated to maintain relatively high carryover storage. It is estimated that re-operating the reservoir to allow greater drawdown could increase long-term average yield to SEWD by approximately 25,000 AF/year (SWRI, 2000). However, the June 2000 designation of the Calaveras River and Mormon Slough below New Hogan Reservoir as critical habitat for Central Valley steelhead may affect future operations of the reservoir. The Corps will be evaluating its reservoir operations for New Hogan as part of the consultation process with NOAA Fisheries under the Endangered Species Act.

The January 2001 Final Restoration Plan for the Anadromous Fish Restoration Program recommends implementing actions required to make all reasonable efforts to increase the natural production of anadromous fish in the Calaveras River. Proposed actions include supplementing flows with water acquired from willing sellers consistent with applicable guidelines or negotiating agreements to improve conditions for all life history stages of Chinook salmon, providing flows of suitable water temperatures for all salmonid life stages, facilitating passage of adult and juvenile salmonids at existing diversion dams and barriers, and screening all diversions to protect all life history stages of anadromous fish. (USFWS, 2001)

A Habitat Conservation Plan for the Calaveras River is currently being developed, but is not publicly available. No current agreement exists for maintaining water releases for fisheries purposes. Instream flow requirements recommended by the USFWS to facilitate doubling production of winter-run Chinook salmon vary from 50 to 225 cfs depending on the month and year type. These flows would substantially reduce water available for other uses.

ABILITY TO MEET PROJECT OBJECTIVES

Given the need to maintain instream flows for fish in the lower Calaveras River, the ability to aggressively re-operate New Hogan Reservoir for water supply purposes is uncertain. Therefore this alternative was not considered further.

7.2.8 OTHER LOCAL WATER SUPPLIES – LITTLEJOHNS CREEK

DESCRIPTION

Farmington Dam and flood control basin is located in the southeast of San Joaquin County and is built across Littlejohns Creek and Rock Creek (a tributary to Littlejohns Creek). Inflow to the flood control basin is predominantly from rainfall events and occurs mainly in the winter and spring. Annual inflow varies from zero (1977) to 219 TAF (1983). Littlejohns Creek is dry from June through October. The Farmington Groundwater Recharge/Seasonal Habitat Study Project (MWH, 2001a) has estimated that potentially 10 TAF/year could be available on average. Presently, neither the City nor other local entity holds a water right permit to divert flows that originate in the Littlejohns Creek watershed.

This alternative was eliminated from further consideration because of its limited water supply potential, inability to provide a reliable water supply, and limited potential to be operational by 2009.

7.2.9 WATER TRANSFERS

DESCRIPTION

Under this alternative concept, the City would assemble a series of water transfers (purchases) from willing sellers in sufficient quantity to meet future water demand rather than exercising its own new water right. Water could originate from owners/contractors either north or south of the Delta, depending on its reliability, availability, quality, and cost.

Short-term water transfers (i.e., less than one-year in duration) would not be practical for the City as a reliable water supply. The City would not be able to rely upon short-term water transfers other than as support for immediate or emergency needs. Short-term transfers have greatest value in meeting water deficiencies caused by drought, emergency shutdown of permanent water supplies, or other temporary circumstances.

Long-term transfers less than 20 years in length would have limited value to the City. While they would be able to support urban water demands in the City with extended reliability, their duration would not be long enough to support future population growth and development. As required by existing state law, certain future residential land developments must demonstrate adequate water supplies for at least 20 years in the future. Water transfers with durations less than twenty years would not be considered reliable for supporting future populations in the COSMA.

Longer-term water transfers greater than 20 years in length would have the greatest potential value to the City. Such transfers could involve numerous social and environmental issues, and therefore, have only been proposed on a limited basis in California. Issues including socioeconomic and biological effects of long-term agricultural land fallowing, groundwater effects, and possible impacts on third-party interests have been raised when long-term transfers have been considered.

The specific source and conveyance route that would be used to transfer water to the COSMA would directly affect the type of facilities needed. If transfer water were delivered through the City's existing water supply sources (i.e., from the Stanislaus River or Calaveras River via SEWD facilities), new facilities required would include water treatment, conveyance, and distribution systems. If transfer water were delivered directly from a new source, such as willing sellers in the Sacramento Valley, via the Delta, then the City would need to construct and operate an intake facility similar to that described for the proposed DWSP. The water treatment and distribution systems included in the DWSP would also need to be constructed. This alternative would only change the supply source or "ownership" of the water, but not the need for the DWSP facilities.

North of Delta Transfers

Several potential willing sellers located north of the Delta could provide water for transfer to the City. These parties include: Yuba County Water Agency, Glenn-Colusa Irrigation District, various members of the Sacramento Valley Water Users Association, and possibly other entities that would be willing to implement agricultural land fallowing or would be willing to sell available supplies that surplus to local demand. To date, no long-term annual water transfer agreements have been approved that would export supplies from north of the Delta for urban use elsewhere in the state. Transfers that have been implemented have been limited to short-term transfers or multi-year option purchases that enable supplies to be transferred if shortages are encountered and south of Delta pumping capacity is available.

Water originating north of the Delta potentially could be conveyed directly to the City's service area via the proposed FRWP facilities, as described for the Alliance Project Alternative above, or through possible exchanges with other water users or conveyance authorities that are willing to participate with the City.

Finally, water transfers could be conveyed to the COSMA by installing elements of the proposed DWSP. A new Delta intake structure, raw water pipeline, WTP, and treated water pipelines could be installed to divert transferred water from the Delta to the COSMA.

South of Delta Transfers

Transfers from willing sellers in the immediate region are possible. Long-term transfers similar to the existing SSJID/OID contract with the SEWD could be implemented to provide water supplies for use in the COSMA. At present, the SSJID/OID water transfer provides up to 30 TAF/year; however, the contract is set to expire in 2009 with possible renewal to 2019.

Other water transfers could be developed with SSJID and/or OID based on future agricultural water demands declining by about 33 TAF (NSJCGBA, 2004), or other supplies that may be acquired from upstream water users including Modesto Irrigation District, Turlock Irrigation District, Merced Irrigation District, or other parties willing to transfer water to the City on a willing seller basis.

ABILITY TO MEET PROJECT OBJECTIVES

This alternative was eliminated from further consideration in this analysis because short-term water transfers would not meet the City's objective to secure a reliable water supply. A long-term transfer capable of meeting the City's yearly needs for a period of up to 20 years and longer does not appear available in the existing water market. While two longer-term transfers to provide yearly supplies have been established (Imperial Irrigation District Water Conservation and Transfer Project and the San Joaquin River Exchange Contractors Water Authority Water Transfer), no long-term transfers have been proposed using supplies from the Sacramento River Basin or other Sierra watersheds.

A 20-year water transfer may be feasible; however, no willing sellers have demonstrated interest in the current water market. In addition, if the City were not able to contract a means to deliver water to its service area with other willing water purveyors, it could be required to install water diversion and conveyance facilities similar to the proposed DWSP and generate similar environmental consequences.

7.2.10 USE OF AGGRESSIVE WATER CONSERVATION AND RECYCLING

AGGRESSIVE WATER CONSERVATION

Description

This alternative would employ the use of water conservation methods to aggressively reduce water demand in the COSMA and minimize future demand increases as population and associated water use grow. If aggressive conservation is not capable of reducing future water demand to the degree necessary to avoid shortages, additional supplies would need to be acquired. For purposes of this analysis, it is assumed that additional water supplies would be obtained from the Delta.

CALFED's 1999 Draft Water Use Efficiency Program Plan provides estimates of water conservation efficiency for different water user segments (CALFED, 1999). These estimates are not considered targets or goals, but are presented as CALFED's understanding of the role that urban water conservation could play in the context of state-wide water management. The estimated water-use efficiencies that may potentially be achieved are described in Table 7-5.

Stockton MUD has implemented a water conservation program consistent with the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding (MOU). In addition to the 16 BMPs addressed in the MOU, the City has adopted a Water Conservation Ordinance with permanent water usage restrictions and a stringent dry year rationing program (Stockton MUD et al., 2003).

Several measures that would achieve the CALFED water use efficiencies include:

- Xeroscaping urban landscape – replacing existing urban landscaping plants with extremely low water consuming species
- Measures for commercial, industrial, and institutional (CII) uses, such as:
    - Enlarging the scope of CII water audits to include warehouses, correctional facilities, military bases, utility systems, and passenger terminals (largely ignored under current audit programs).
    - Developing incentive programs to obtain consistent, effective data at the water supplier level so they can understand the water needs of their CII customers.
    - Developing local programs that offer financial incentives, public recognition, technical information, or water rate adjustments.
    - Developing and enforcing local CII water use efficiency ordinances.

  - Implementing state and federal programs that offer financial and technical assistance directly to the CII users.

- Water system leakage reduction

TABLE 7-5
TARGET CALFED WATER CONSERVATION EFFICIENCIES

Water Use	Estimated Efficiency
Indoor Residential	Additional reduction to 55 gallons per capita per day in addition to that achieved by CUWCC BMPs.
Outdoor Residential	Additional reduction of 5 percent in addition to that achieved by CUWCC BMPs.
Commercial, Industrial, and Institutional	Additional reduction of 11 percent in addition to that achieved by CUWCC BMPs.
System Losses	No additional reduction beyond that achieved by BMPs set forth in CUWCC MOU.

Source: CALFED, 1999
CUWCC = California Urban Water Conservation Council

Assuming that the CALFED water use efficiency guidance can be achieved by 2020, water demand within the COSMA would be reduced by about 10 percent below levels that would be achieved with existing BMPs. This reduction would equal about 11 TAF/year by 2020. Table 7-6 presents the CALFED water conservation targets as applied to COSMA through 2020.

Ability to Meet Project Objectives

As shown in Table 7-6, even with implementation of aggressive conservation measures, the City would need to acquire a substantial volume of water to meet future demand and substantially reduce reliance on local groundwater. Therefore, it was concluded that conservation alone would not be capable of meeting the City's water supply needs. This conclusion does not judge the future use of conservation to improve water use efficiency. However, aggressive water conservation is not capable achieving a reliable water source sufficient for the City's existing and future demands.

In addition, it is recognized that several of the aggressive conservation measures would require subsidy or incentive for feasible implementation. Without such incentives, these measures may not be feasible for implementation without adversely affecting the economic vitality of the local community. CALFED and other participating agencies are continuing the implementation of the Water Use Efficiency Program and may establish future incentives for implementing measures that would otherwise prove infeasible at the local level of government.

TABLE 7-6
COMPARISON OF COSMA WATER DEMAND WITH AGGRESSIVE CONSERVATION (TAF)

	2005	2010	2015	2020
Current Projected Water Demand with BMP Conservation	73	79	85	98
Projected Water Demand with Aggressive Conservation	73	73	78	87

WATER RECYCLING

Description

Implementing a water recycling program would not produce potable water supplies. Recycling has the potential to reduce the use of potable supplies by using recycled water for certain specific, non-potable uses. Stockton MUD has considered establishing a water recycling program where treated wastewater from the RWCF would be stored and used for non-potable uses such as landscape and median irrigation, agricultural supply, industrial supplies. The City completed a Recycled Water Market Evaluation that indicated that up to 61 TAF per year of recycled water could be available for recycled uses at the build-out of the 55-mgd RWCF (Carollo Engineers, 1996). The City determined that the market for recycled water in the Stockton area, including agricultural uses, could support this level of water recycling. However, the study indicated that there is a lack of widespread support for a recycled water program among area farmers because of concerns regarding the limited number of crops that could use recycled water.

If a large-scale recycling alternative were implemented, facilities would be required to store treated effluent during the wet season when irrigation and agricultural demand is low. In addition, an extensive network of recycled water distribution lines would need to be installed throughout the COSMA to deliver the water for urban landscape or agricultural reuse.

Ability to Meet Project Objectives

Because there is no readily available commercial use for recycled water and other potential future uses would require the installation of storage and conveyance facilities, the use of recycled water was not considered further in this analysis. This conclusion does not judge the value of implementing a water recycling program to promote water use efficiency. However, such a program would not have sufficient commercial value to be considered as a feasible alternative water supply project at this time.

It should be noted that water recycling of the City's treated effluent would reduce the water supply available to the City under Water Code Section 1485, proposed for use in the DWSP. The difference between this alternative and the proposed DWSP is that recycling would put the available treated effluent to a direct use, while displacing or substituting potable supplies currently being used, whereas the DWSP would divert potable water from the Delta equal to the wastewater discharge.

7.3 ALTERNATIVE DWSP FACILITY SITES

7.3.1 ALTERNATIVE DWSP DELTA DIVERSION SITES

During preceding planning and feasibility studies of potential surface water diversion concepts capable of serving the City, several alternative diversion sites were identified. These alternative diversion sites included:

- Little Connection Slough
- Honker Cut
- San Joaquin River at Wright Elmwood Tract

Figure 7-3 shows the location of these alternative diversion sites in relation to the location of the proposed DWSP.

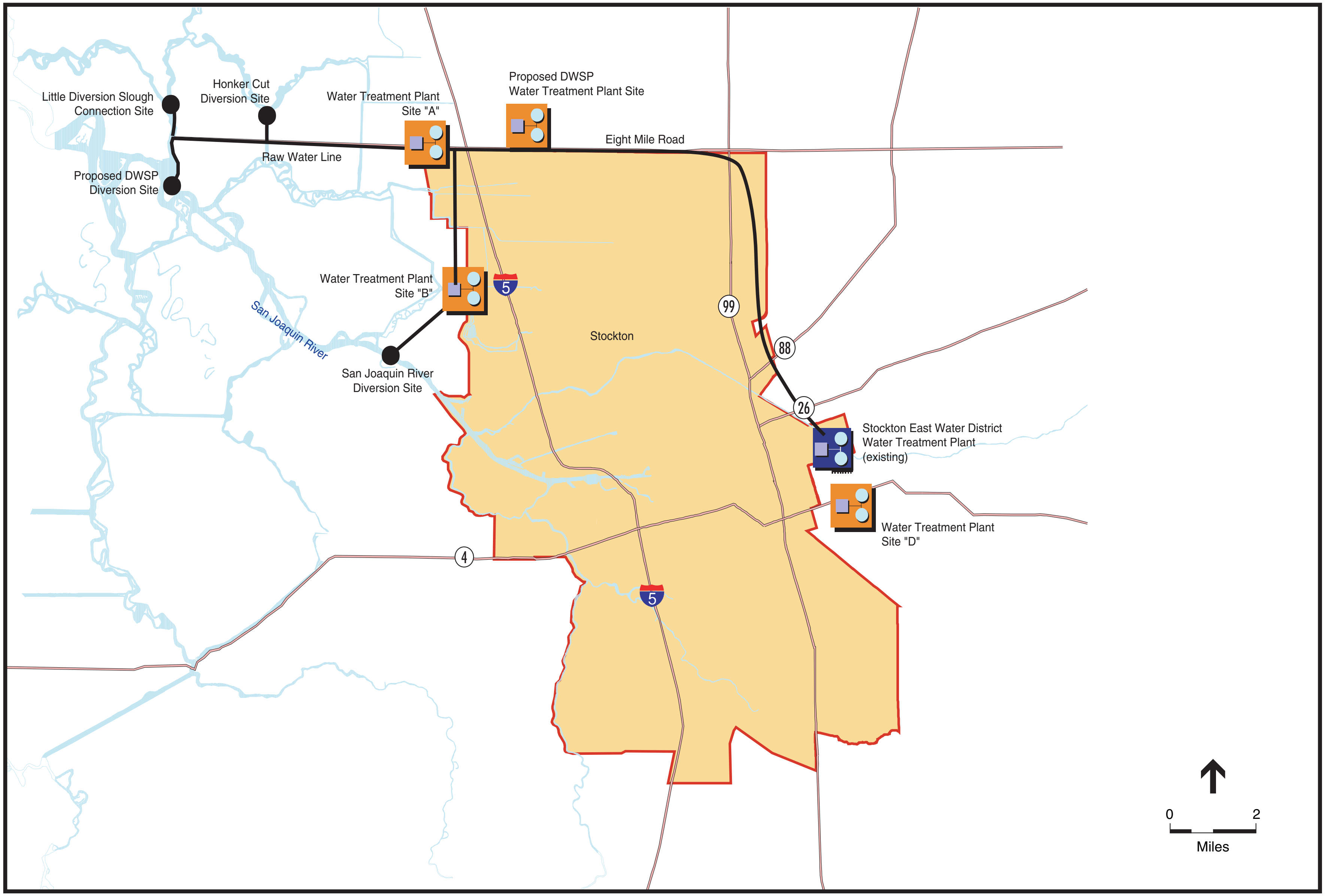
Each of these alternatives is briefly described below along with the basis for eliminating them from further detailed consideration in this EIR. The alternative sites were evaluated for key environmental issues including fisheries, land use, biological resources (wetlands and protected species), and cultural resources. In addition, each diversion location went through a preliminary design and operations evaluation that included screening requirements, water quality, and maintenance issues Additional information can be found in Stockton MUD et al., 2003.

LITTLE CONNECTION SLOUGH DIVERSION SITE

This alternative diversion site is located about two miles north of the proposed DSWP intake site on the western side of Empire Tract on Little Connection Slough. This waterway is a tributary connection to the San Joaquin River separating Empire Tract from Venice Island.

Little Connection Slough is a relatively shallow water body with a bottom profile ranging from four to 20-feet deep. The deepest area is located about 160 feet offshore. The slough is subject to low surface water velocities and high rates of sedimentation of fine bedload materials. Water quality at this site is similar to the proposed DSWP diversion site; however, the site is susceptible to higher algal concentrations that could adversely affect the taste of drinking water.

This diversion site was not preferred because of the substantially greater construction area and operating costs required with development of this alternative. Additional construction would also be needed to build an intake capable of operating in shallow water while satisfying intake approach velocities and/or depth of withdrawal requirements for fish protection, and installation of a more distant offshore intake. Additional operating costs associated with annual sediment dredging were also considered during the feasibility study.



SOURCE: Stockton MUD et al., 2003; and Environmental Science Associates, 2005

Figure 7-3
Alternative Diversion and Water Treatment Plant Sites

HONKER CUT

This site is located on the western side of King Island on Honker Cut. This site is the shallowest of the alternative diversion sites, with a maximum depth to nine feet. While water quality at this site is relatively good, it is subject to higher algal concentrations that could adversely affect the taste of drinking water.

This site was eliminated because of the shallow water conditions which would limit design flexibility, requiring longer intake facilities, and would result in additional costs when compared to the proposed DWSP diversion site and other alternatives.

SAN JOAQUIN RIVER AT WRIGHT ELMWOOD TRACT

This alternative site is located the furthest upstream on the San Joaquin River. The site is subject to poorer water quality conditions compared to the other alternative diversion sites, which are influenced by freshwater inflows in the Sacramento River. This site exhibits high algal concentrations that could potentially affect the taste of drinking water, higher turbidity and specific conductance, and higher concentrations of other constituents and metals.

The bottom profile at this site shows this site having a shallow zone extending about 350 feet offshore. A deeper zone, about 35 feet deep, is located adjacent to the shallow zone.

This site was eliminated because the shallow zone limits design flexibility and the ability to comply with screen velocity criteria for fish protection. In addition, the poor water quality exhibited at this site may pose additional treatment requirements and greater potential for consumer complaints.

7.3.2 ALTERNATIVE DWSP WATER TREATMENT PLANT SITES

Figure 7-3 shows the location of the proposed DWSP WTP site and three alternative WTP sites. Each of these alternatives is briefly described below along with the basis for eliminating them from further detailed consideration in this EIR. The alternative sites were evaluated for key environmental issues including fisheries, land use, biological resources (wetlands and protected species), and cultural resources. Sites A and B were also evaluated for engineering feasibility. Additional information can be found in Stockton MUD et al. (2003).

SITE A

Site A is located along Eight Mile Road, approximately 0.5 mile west of I-5, in the northwestern corner of the City’s service area. Site A is located close to the Delta within the floodplain in areas of poor soils and high groundwater. Although Site A has no environmental constraints that would make WTP siting infeasible; however it would involve the loss of prime farmland. In addition, construction of foundations and treatment facilities would require special construction considerations making this alternative more difficult and costly to build and maintain. Because of the site constraints found at this location, this alternative was found to be less preferable than the proposed WTP location.

SITE B

Site B is located on the former City wastewater treatment plant site on Wright Tract along Fourteen Mile Slough in the western central area of the City. Like Site A, Site B is located close to the Delta in areas of poor soils, high groundwater, and potential flooding. Therefore, construction of the treatment facilities would require special construction considerations to protect the WTP from flooding and adequately support heavy hydraulic structures, and may require re-pumping to avoid excessive deep excavation making this alternative more difficult and costly; not only to build, but also to maintain.

Although Site B does not appear to have any environmental constraints that make WTP siting infeasible, construction of the treatment facilities would require special construction considerations making this alternative more difficult and costly to build and maintain. Because of the site constraints found at this location, this alternative was found to be less preferable than the proposed WTP location

SITE D

Site D is located at the existing SEWD WTP, in the eastern central area of the City's service area. This option would involve expansion of the existing plant. Costs associated with Site D are the highest due to the need for a much longer pipeline to transfer surface water from any of the diversion locations to the site. From an environmental perspective, Site D does not appear to have any environmental constraints that would make WTP siting infeasible; however, it could involve the loss of prime farmland if additional acreage is required beyond the existing SEWD property. Therefore, due to the associated cost and potential impacts to prime farmland, Site D was not selected.

7.3.3 RAW WATER PIPELINE ALTERNATIVES

Several alternative raw water conveyance pipeline routes were considered during the feasibility study that would connect the various alternative diversion sites discussed in Section 7.3.1 with the proposed WTP. To the degree available, pipeline routes were aligned along existing public rights-of-way. Direct routes rather than existing rights-of-way were considered; however, they were eliminated from further consideration with the intent of minimizing displacement of commercial agricultural lands, avoiding conflict with existing agricultural production, property layout, and other features such as canals or ditches that could support wetland features.

Different pipeline sizes were considered as part of the project planning effort. Different pipeline configurations including various multiple pipe layouts using multiple sizes were also considered. Factors considered in the selection of an optimum pipeline diameter and number of pipelines included minimum water velocity to prevent sedimentation, capacity to optimize investment before installing additional capacity, and optimizing the need for surface right-of-way.

7.4 NO PROJECT ALTERNATIVE

7.4.1 DESCRIPTION

Pursuant to Section 15126.6(e)(2) of the CEQA Guidelines, the No Project Alternative shall:

> "…discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time the environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services."

With implementation of the No Project Alternative, the City would rely on a combination of existing surface and local groundwater sources to meet existing and future M&I water demand. The City currently operates 29 groundwater extraction wells that supply about 45 percent of the City's needs. The remaining 55 percent of the City's water supplies are from surface water sources delivered by the SEWD (NSJCGBA, 2004).

As the City continues to experience population growth, in accordance with its adopted 1990 General Plan, additional groundwater pumping would be implemented to meet future water demand. Build-out of the 1990 General Plan in approximately 2015 would result in a water demand of about 85 TAF/year. Based on existing projections, water demand could reach 178 TAF/year by about 2050.

Surface water supplies from SEWD can range from about 100 TAF/year in a wet year to 30 TAF/year in a critical year (Stockton MUD et al., 2003). Supplies from SEWD may be subject to further reductions as upstream water users increase demands. Future water deliveries to the City could be substantially less than current volumes, because the availability of actual supplies to the City would be dependent on upstream user demands, annual hydrology, and other water storage projects that may be implemented.

The estimated safe yield of the aquifer beneath the COSMA is about 50 TAF/year (Stockton MUD et al., 2003). The safe yield is the volume of water that can be extracted without further decreases in groundwater elevation. Exceeding this limit could prevent stabilizing groundwater elevations in the area. By 2015, the combination of reduced surface water supplies, limiting groundwater pumping to the safe yield, and dry hydrologic conditions could result in water supply shortages on the order of 23 TAF/year (Stockton MUD et al., 2003).

To meet projected demands in the absence of developing a new water supply, the City could increase groundwater pumping through existing facilities and construct new groundwater facilities north and east of the COSMA. In addition, the City could enforce stricter water demand reductions above and beyond the current measures adopted in its Urban Water Management Plan (Stockton MUD, 2000).

The potential for long-term gains from urban water conservation measures within the COSMA is limited. Following the last drought, demands within the COSMA have largely hardened, reflecting the effects of existing conservation measures. These measures are reflected in the low unit water demand factors used to develop demand projections. The City has adopted by ordinance a dry-year rationing program that specifies deep mandatory reductions in the event of water supply shortages. DWSP planning has assumed a five percent reduction in demand in dry years and a 10 percent reduction in critical years.

SEWD's interim CVP contract has a maximum contract entitlement of 75 TAF/year from New Melones Reservoir, as available. However, under the New Melones Interim Plan of Operations (IPO), deliveries can be curtailed to 10 TAF/year. According to the IPO, SEWD receives no water from New Melones in a dry year, and only receives water in moderate or wetter years. In fact, this year's allocation is only 10 TAF. Although intended to be a short-term plan, the interim plan continues to be the guiding criterion for allocating New Melones storage (Reclamation, 2004). The 1980 Record of Decision (ROD) authorizes water use outside the defined Stanislaus River Basin only after in-basin demands have been met. Therefore, acquisition of dry-year supplies from the Stanislaus River above the current level is speculative.

New Hogan Reservoir is currently operated to maintain relatively high carryover storage. It has been estimated that re-operating the reservoir to allow greater drawdown could increase long-term average yield to SEWD by approximately 25 TAF/year (SWRI, 2000). However, the June 2000 designation of the Calaveras River and Mormon Slough, below New Hogan Reservoir, as critical habitat for Central Valley steelhead may affect future operations of the reservoir. The Corps will be evaluating its reservoir operations for New Hogan as part of the consultation process with NOAA Fisheries.

Existing water transfers from OID and SSJID are scheduled to terminate in 2009 with the possibility of an extension to 2019. The 30 TAF/year that is provided to the City would be subject to termination or reduced volume if the City is unsuccessful in renegotiating a water transfer agreement with these suppliers. It is speculative to conclude whether these supplies would remain available for the City's use after the 2019 contract end date.

7.4.2 ABILITY TO MEET PROJECT OBJECTIVES

Selection of the No Project Alternative would prohibit the City from installing a new surface water intake facility and developing Delta surface water supplies in accordance with Water Code Section 1485 and applicable area of origin statutes. In order to meet its existing and future water demands, the City would be obligated to increase its reliance on groundwater and other surface water supplies. As shown in Table 7-7, the City would continue to rely on surface supplies to provide an average 44 TAF annually; while groundwater would continue to provide an average 27 TAF annually for M&I purposes. In critical periods, surface water use would decline to about 38 TAF and groundwater usage would increase to about 36 TAF.

By 2015, use of surface supplies would reach an average 46 TAF annually, and groundwater usage would increase to an average 39 TAF annually, an eight percent increase. As urban land uses in the COSMA continues to grow beyond 2015, average surface water supplies would slowly decline to about 38 TAF annually. In critical years, surface supplies would decline even further to about 19 TAF. As a result of the decline of available surface supplies, groundwater use

TABLE 7-7
AVERAGE ANNUAL FLOWS FOR THE NO PROJECT ALTERNATIVE (TAF)

	Existing Conditions		**2015 Cumulative No Project Conditions**		**2050 Cumulative No Project Conditions**	
	Long-Term Average	**Dry Periods**	**Long-Term Average**	**Dry Periods**	**Long-Term Average**	**Dry Periods**
DWSP Delta diversion						
Section 1485 water	0	0	0	0	0	0
Area of Origin water	0	0	0	0	0	0
Total (less ASR)	**0**	**0**	**0**	**0**	**0**	**0**
SEWD WTP						
Stanislaus River supply (less 5% loss)	30	20	18	11	0	0
Calaveras River supply	14	17	28	18	38	19
Total	**44**	**38***	**46**	**28***	**38**	**19**
Groundwater pumping						
M&I	27	36	39	60	140	166
Ag	18	19	12	13	0	0
Total	**45**	**55**	**51**	**73**	**140**	**166**
Riparian agriculture diversions	12	13	5	6	0	0
COSMA deliveries						
M&I	71	74	85	88	178	184
Agriculture	30	32	17	18	0	0
Total	**101**	**106**	**103***	**107***	**178**	**184**
Groundwater ASR	0	0	0	0	0	0
Regional Wastewater Control Facility	29	30	35	35	73	74

* Totals may not accurately reflect the calculated sums due to rounding.
Source: MWH, 2005.

would increase to an average of 140 TAF annually, increasing up to 166 TAF annually in dry periods.

The increased reliance on groundwater that would result from implementing the No Project Alternative to meet existing and future demand would not be consistent with the City's objectives to (1) replace declining and unreliable surface water supplies, or (2) protect and restore groundwater resources. Implementation of the No Project Alternative would require the City to continue existing levels of groundwater use and embark on a program of increased groundwater extraction.

As noted in Chapter 5, Groundwater Resources, portions of San Joaquin County, including areas within the COSMA are subject to substantial overdraft of groundwater supplies. This has resulted in declining groundwater elevations and intrusion of saline water from the Delta. The continued reliance on groundwater and further increases in groundwater use would conflict with the City's objectives and act to further reduce available groundwater supplies and create worse groundwater quality conditions than are currently found in the region.

7.4.3 ENVIRONMENTAL IMPACT COMPARISON WITH DWSP

Under the No Project Alternative, the City would not construct or operate the DWSP facilities. Therefore, no construction-related environmental impacts, which would otherwise take place with implementation of the proposed DWSP, would occur under the No Project Alternative.

As discussed in Chapters 3, 4, and 5 of this EIR, implementation of the proposed DWSP would generate several potential environmental impacts that would be reduced to less than significant with implementation of suitable mitigation. Although these impacts would be less than significant, some minor level of environmental degradation would nonetheless take place. Selection of the No Project Alternative would avoid generating even minor environmental impacts that would otherwise occur with implementation of the proposed DWSP.

Selection of the No Project Alternative would avoid four of the five significant unavoidable impacts anticipated with implementation of the proposed DWSP. These impacts consist of the displacement of 56.02 acres of important farmland, the degradation of Delta scenic and visual resources from the intake facility, the introduction of nighttime light from the intake facility, and air pollutants during construction that would contribute to cumulative PM_{10}, NO_x, and ROG emissions. The No Project alternative would avoid the facility siting, construction and operation impacts of the proposed DWSP. Instead, the No Project Alternative would involve construction of additional groundwater wells and pipelines. Construction of these facilities would result in some environmental impacts but not of the same magnitude of the DWSP facilities. One exception could be the need to eventually develop a treatment plant to treat groundwater prior to distribution if water quality concerns increase. In addition, under the No Project Alternative, it is likely that the City would continue to work with SEWD to try to increase the supply it could make available to the City.

It is expected that under the No Project Alternative, the City would increase its use of groundwater, increase conservation and drought rationing requirements, and pursue through SEWD supplemental water supplies in order to secure adequate supplies to support its the community's planned growth. Development under Stockton's General Plan is expected to continue and the No Project Alternative would continue to have growth inducement potential with the significant and significant unavoidable secondary effects of growth, similar to the DWSP.

Adverse groundwater conditions already exist in the region and are projected to occur in future years with or without the DWSP (CDM, 2005). If the DWSP is not implemented, future conditions would only deteriorate compared to existing conditions (refer to Chapter 5, Groundwater Resources). As described in Chapter 5, in both 2015 and 2050, higher groundwater levels would occur with the DWSP as compared to the No Project Alternative (CDM, 2005). Therefore, future groundwater conditions would be worse without the DWSP

Selection of the No Project Alternative would result in the City's continued reliance on a combination of surface and groundwater supplies. As previously noted, about 45 percent of the City water supplies are composed of groundwater (Stockton MUD et al., 2003). With selection of the No Project Alternative, greater reliance would be place on groundwater supplies as the City's water demand increases.

In about 2015, groundwater extractions would reach about 51 TAF annually (39 TAF for M&I purposes). This amount is approximately equal to the safe yield of the aquifer underlying this portion of San Joaquin County. Continued increases in water demand after 2015 would exceed the 50 TAF firm yield of the local groundwater supplies, resulting in lowering local groundwater elevations, depleting available supplies, and possibly reducing groundwater quality by promoting the intrusion of higher saline water into the aquifer.

Groundwater extraction could reach 73 TAF during critical periods that take place around 2015. This level of groundwater extraction would be about 30 percent greater than in normal and wetter years because of the lack of available surface water supplies in dry periods. The anticipated change in local groundwater levels and potential reduction in groundwater quality is considered a significant adverse impact of the No Project Alternative.

As City water demand continues to increase, greater reliance on groundwater will increase. By 2050, it is estimated that groundwater extractions will reach 140 TAF annually. This equals 2.8 times the maximum firm yield of the local groundwater supplies. This further change in local groundwater elevations has a greater potential for reducing groundwater quality. This change is also considered a significant adverse impact of the No Project Alternative.

Selection of the No Project Alternative would not preclude the City from planning and developing another water supply project at a future date. The consideration of other water supply projects, however, would be subject to a separate environmental impact analysis addressing other possible proposed projects.

7.5 REFERENCES

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CHAPTER 8

OTHER CEQA ISSUES

CHAPTER 8
OTHER CEQA ISSUES

8.1 CUMULATIVE IMPACT SUMMARY

8.1.1 INTRODUCTION

An EIR must discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable," meaning that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects (CEQA Guidelines Section 15130[a]). Cumulative impacts of the proposed DWSP facilities are discussed in Section 3.12, Cumulative Impacts.

Cumulative impacts associated with hydrologic, hydrodynamic, water quality, and fisheries are addressed separately in Chapter 4, Delta Water Resources and Fisheries. Cumulative impacts associated with groundwater resources are addressed in Chapter 5, Groundwater Resources. No significant cumulative impacts were identified for Delta water resources, fisheries, or groundwater resources.

Below is a summary of potentially significant cumulative impacts for proposed DWSP facilities and feasible mitigation measures.

8.1.2 CUMULATIVE IMPACTS

The installation of the proposed DWSP facilities would contribute to two potential cumulative impacts. Implementation of the DWSP would contribute to the cumulative loss of important farmland in San Joaquin County (Impact CUM-1). This cumulative impact would be mitigated to less than significant with the implementation of Mitigation Measure LU-5b.

Construction activities associated with the proposed DWSP facilities would generate cumulatively considerable levels of PM_{10} and ozone precursor (ROG and NO_x) emissions to the SJVAB (Impact CUM-2). The City shall implement appropriate SJVAPCD enhanced additional control measures (Mitigation Measure CUM-2).

8.2 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

8.2.1 INTRODUCTION

CEQA Section 21100(b)(2) and CEQA Guidelines Section 15126.2(b) require that any significant and unavoidable effect on the environment must be identified. In addition, Section 15093(a) of the CEQA Guidelines allows the decision-making agency to determine if the benefits of a Proposed Project outweigh the unavoidable adverse environmental impacts of implementing the project. The City can then approve a project which may have unavoidable adverse impacts if it prepares and adopts a “Statement of Overriding Considerations” setting forth the specific reasons for making this judgment. For each of the unavoidable adverse impacts, the City must prepare and adopt a Statement of Overriding Considerations if the City approves the project.

8.2.2 UNAVOIDABLE ADVERSE IMPACTS

LAND USE, RECREATION AND AESTHETIC RESOURCES

The construction of the WTP would result in the conversion of 56 acres of important farmland (Impact LU-5). As discussed in Section 3.2, Land use, Recreation, and Aesthetic Resources, available mitigation measures would reduce the impact on important farmland, but not to less than significant. The direct impact is therefore significant and unavoidable. The DWSP also would contribute to a significant and unavoidable cumulative loss of important farmland in San Joaquin County (Impact CUM-1).

The construction of the intake facility in the Delta would create several significant visual impacts, including damaging scenic resources within a scenic route (Impact LU-12), degradation of the existing visual quality (Impact LU-13), and the creation of a substantial new source of nighttime light in the Delta (Impact LU-14). Although the design of the facility and outdoor lighting would attempt to lessen the visual effect of the intake facility, these impacts would not be reduced to less than significant. Therefore, visual impacts related to the intake facility would be significant and unavoidable.

8.3 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES WHICH WOULD RESULT FROM THE PROPOSED PROJECT SHOULD IT BE IMPLEMENTED

CEQA Section 21100(b)(2) and CEQA Guidelines Section 15126.2(c) require that an EIR identify significant irreversible environmental changes caused by implementation of the project. CEQA Guidelines Section 15127 limits the types of projects subject to this provision. The DWSP does not require a general plan amendment or LAFCO resolution. In addition, this EIR is not intended to fulfill the requirements of the National Environmental Policy Act (NEPA). Therefore, Guidelines Section 15126.2(c) does not apply to the DWSP EIR.

8.4 EFFECTS NOT FOUND TO BE SIGNIFICANT

As required by CEQA, this EIR focuses on expected significant or potentially significant environmental effects (CEQA Guidelines Section 15143). An Initial Study was prepared for the Proposed Project to identify issues to be evaluated in this EIR (Appendix A). The following potential impacts were eliminated during the scoping phase:

- Loss of availability of a known mineral resource
- Conflicts with an airport land use plan
- Displacement of substantial numbers of existing housing units or population
- Change in air traffic patterns

Impacts that were analyzed in this EIR and found to be significant or potentially significant, and the proposed mitigation measures that would avoid or minimize potential impacts are summarized in Table ES-1, Executive Summary, and described fully in Chapter 3, Environmental Analysis, Chapter 4, Delta Water Resources and Fisheries, and Chapter 5, Groundwater Resources.

CHAPTER 9

EIR AUTHORS AND PERSONS CONSULTED

CHAPTER 9

EIR AUTHORS, CONSULTANTS, AND PERSONS CONSULTED

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Air Quality	Asavari Devadiga / Paul Miller
Geology, Soils, and Seismicity	Clint Meyer
Biological Resources	Thomas Leeman / Mary Pakenham-Walsh
Noise	Asavari Devadiga / Paul Miller
Hazardous Materials / Public Health	Halle Morrison / Crystal Spurr
Transportation and Traffic	Lesley Albert / Jack Hutchison
Public Services & Utilities / Energy	Asavari Devadiga
Cultural Resources	Barry Scott / Dean Martorana
Cumulative Impacts	Brian Grattidge
Delta Water Resources and Fisheries	Michele Stern
Groundwater Resources	Michele Stern
Growth Inducement Potential & Secondary Effects of Growth	Brian Grattidge /Leslie Moulton
Alternatives Analysis	Richard Hunn / Leslie Moulton
Other CEQA Issues	Brian Grattidge
Technical Review	Leslie Moulton / Michele Stern/ Linda Huff
Graphics	Thomas Wyatt
GIS	Chris Ball
Word Processing	Deborah Jew

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Jonathan Goetz, Supervising Engineer
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James Borchardt, Vice-President
Jeff Lodge, Supervising Engineer
William Worrall, Project Engineer
Andrew Draper, Supervising Engineer
Anna Frock, Engineer
Rebecca Fedak, Engineer

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CDM

R. Paul Hossain, Water Resources Engineer

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Charles Hanson, Principal

PUBLIC OUTREACH

Buethe Public Relations

Judith Buethe

PERSONS CONSULTED

List of people and organizations consulted are provided in the references at the end of each section.

Appendix

STOCKTON DELTA WATER SUPPLY PROJECT

Program Environmental Impact Report
State Clearinghouse No. 2003112060

Prepared for:
City of Stockton

April 2005

CITY OF STOCKTON

Stockton
All-America City
2004
1999

In association with
MWH

ESA

APPENDIX A

NOTICE OF PREPARATION (NOP)
AND COMMENTS ON THE NOP

CITY OF STOCKTON
NOTICE OF PREPARATION

November 14, 2003

To: (See attached list)

From: Lead Agency
City of Stockton
c/o Community Development Dept.
Planning Division
425 North El Dorado Street
Stockton, CA 95202-1997

SUBJECT: **NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT PURSUANT TO PUB. RES. CODE SEC. 21080.4 AND CAL. CODE OF REGULATIONS TITLE 14, SEC 15082(a) FOR DELTA WATER SUPPLY PROJECT**

The City of Stockton will be the Lead Agency and will prepare a Draft Environmental Impact Report (EIR) for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project.

The project description, location and the probable environmental effects are contained in the attached materials. A copy of the Initial Study is ☒ is not ☐ attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice. We respectfully request that you return your comments to the above-noted Lead Agency address by December 16, 2003. If no comments are received by the date indicated, it will be assumed that the document is acceptable.

If you have any questions regarding this matter, please contact David Stagnaro, Senior Planner at (209) 937-8266.

PROJECT TITLE: Delta Water Supply Project
EIR FILE #: 5-03 DISCRETIONARY APPLICATION NO.(S): ______
APPLICANT: City of Stockton Municipal Utilities Department
PROJECT DESCRIPTION/LOCATION: The project will consist of a surface water diversion facility with fish screens on the San Joaquin River, new pipelines to convey the raw water to a new water treatment facility located just north of the City of Stockton Metropolitan Area, and treated water transmission pipelines to deliver water to the City's existing water distribution system. The project will also include a groundwater recharge program. Treated surface water will be injected into the groundwater aquifer for storage until needed later, when it will be pumped or "recovered" from the groundwater aquifer for use. Project sites will include lands located within the Delta both on and near the San Joaquin River (Stockton Deep Water Ship Channel).

In addition to the 30-day comment period, on Monday, December 8, 2003, the City will hold two public scoping sessions to provide information and to hear comments and suggestions regarding the scope and content of the EIR. The scoping sessions will be from 3:00 to 5:00 p.m. and from 6:30 to 8:30 p.m. Both sessions will be held in the Stewart-Hazelton Meeting Room at the Cesar Chavez Central Library, 605 North El Dorado Street, Stockton, CA 95202.

JAMES E. GLASER, DIRECTOR
COMMUNITY DEVELOPMENT DEPARTMENT

By ______________________
David Stagnaro, Senior Planner

Date: 11-12-03

JEG:DJS:MSS

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AFFIDAVIT OF MAILING AND POSTING

I declare that on 11-13-03, I deposited in the United States mail facilities in the City of Sacramento, State of California, a true copy of the above Notice of Preparation (NOP) with any attachments, with the postage thereon prepaid, addressed to each public agency and other interested parties on the attached distribution list. A copy of the NOP has also been mailed or delivered to the San Joaquin County Clerk who is required to post said NOP for a period of 30 days in accordance with Public Resources Code Section 21092.3.

Michele S Stern
Signature

DEPUTY PROJECT MANAGER
ENVIRONMENTAL SCIENCE ASSOCIATES
Title

DECEMBER 16, 2003
Posting Period Ending Date

Form A

Notice of Completion and Environmental Document Transmittal

SCH # ______________

Mail to: **State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 916/445-0613**

Project Title: Delta Water Supply Project

Lead Agency: City of Stockton

Contact Person: David Stagnaro

Street Address: 345 N. El Dorado Street

Phone: (209) 937-8598

City: Stockton

Zip: 95202

County: San Joaquin

Project Location:

County: San Joaquin

City/Nearest Community: Stockton

Cross Streets: east and west of I-5 and north of Eight Mile Road

Zip Code:

Total Acres: Various

Assessor's Parcel No: Various

Section:

Twp.

Range:

Base:

Within 2 Miles: State Hwy #: 12 and 99

Waterways: San Joaquin River (Stockton Deep Water Channel)

Airports: Lodi

Railways: Union Pacific Railroad

Schools: Bear Creek High School, Plaza Robles Continuation High School, Delta Sierra Middle School, Elkhorn Elementary School, John Muir Elementary School, Creekside Elementary School, Wagner Holt Elementary School, Oakwood Elementary School, Kennedy Elementary School, Colonial Heights Elementary School.

Document Type:

CEQA:
- ☒ NOP
- ☐ Early Cons
- ☐ Neg Dec
- ☐ Draft EIR
- ☐ Supplement/Subsequent EIR (Prior SCH No.) ______
- ☐ Other ______

NEPA:
- ☐ NOI
- ☐ EA
- ☐ Draft EIS
- ☐ FONSI

Other:
- ☐ Joint Document
- ☐ Final Document
- ☐ Other ______

Local Action Type:

- ☐ General Plan Update
- ☐ General Plan Amendment
- ☐ General Plan Element
- ☐ Community Plan
- ☐ Specific Plan
- ☐ Master Plan
- ☐ Planned Unit Development
- ☐ Site Plan
- ☐ Rezone
- ☐ Prezone
- ☐ Use Permit
- ☐ Land Division (Subdivision, etc.)
- ☐ Annexation
- ☐ Redevelopment
- ☐ Coastal Permit
- ☐ Other ______

Development Type:

- ☐ Residential: Units ____ Acres ____
- ☐ Office: Sq. ft. ____ Acres ____ Employees ____
- ☐ Commercial: Sq. ft. ____ Acres ____ Employees ____
- ☐ Industrial: Sq. ft. ____ Acres ____ Employees ____
- ☐ Educational ______
- ☐ Recreational ______
- ☒ Water Facilities: Type Water Supply Facilities MGD 30
- ☐ Transportation: Type ______
- ☐ Mining: Mineral ______
- ☐ Power: Type ______ Watts ____
- ☐ Waste Treatment: Type ______
- ☐ Hazardous Waste: Type ______
- ☐ Other: ______

Funding (approx.):

Federal $ 0 State $ 0 Total $ 0

Project Issues Discussed in Document:

- ☒ Aesthetic/Visual
- ☒ Agricultural Land
- ☒ Air Quality
- ☒ Archeological/Historical
- ☐ Coastal Zone
- ☒ Drainage/Absorption
- ☐ Economic/Jobs
- ☐ Fiscal
- ☒ Flood Plain/Flooding
- ☐ Forest Land/Fire Hazard
- ☒ Geologic/Seismic
- ☐ Minerals
- ☒ Noise
- ☒ Population/Housing Balance
- ☒ Public Services/Facilities
- ☒ Recreation/Parks
- ☐ Schools/Universities
- ☐ Septic Systems
- ☐ Sewer Capacity
- ☒ Soil Erosion/Compaction/Grading
- ☒ Solid Waste
- ☒ Toxic/Hazardous
- ☒ Traffic/Circulation
- ☒ Vegetation
- ☒ Water Quality
- ☒ Water Supply/Groundwater
- ☒ Wetland/Riparian
- ☒ Wildlife
- ☒ Growth Inducing
- ☒ Landuse
- ☒ Cumulative Effects
- ☐ Other ______

Present Land Use/Zoning/General Plan Designation:

The San Joaquin County General Plan designates the diversion/intake site as Open Space, with surrounding land uses designated General Agriculture. It designates the water treatment plant site as General Agriculture, with surrounding land uses designated Residential to the south and General Agriculture to the north, west, and east.

Project Description:

The Proposed Project includes a water diversion facility with fish screens on the San Joaquin River, pipelines to convey the raw water to a new water treatment plant, and treated water transmission pipelines to deliver water to the City's existing water distribution system. The groundwater component will include groundwater injection and recovery wells to inject treated Delta surface water into the groundwater aquifer for later extraction.

REVIEWING AGENCIES CHECKLIST Form A, continued

KEY
S = Document sent by lead agency
X = Document sent by SCH
√ = Suggested distribution

_____ **Resources Agency**
_____ Boating & Waterways
_____ Coastal Commission
_____ Coastal Conservancy
_____ Colorado River Board
_____ Conservation
_____ Fish & Game
_____ Forestry & Fire Protection
_____ Office of Historic Preservation
_____ Parks & Recreation
_____ Reclamation Board
_____ S.F. Bay Conservation & Development Commission
_____ Water Resources (DWR)

Business, Transportation & Housing
_____ Aeronautics
_____ California Highway patrol
_____ CALTRANS District #_____
_____ Department of Transportation Planning (Headquarters)
_____ Housing & Community Development
_____ **Food & Agriculture**

Health & Welfare
_____ Health Services _____

State & Consumer Services
_____ General Services
_____ OLA (Schools)

Environmental Protection Agency
_____ Air Resources Board
_____ California Waste Management Board
_____ SWRCB: Clean Water Grants
_____ SWRCB: Delta Unit
_____ SWRCB: Water Quality
_____ SWRCB: Water Rights
_____ Regional WQCB # _____ (_____)

Youth & Adult Corrections
_____ Corrections

Independent Commissions & Offices
_____ Energy Commission
_____ Native American Heritage Commission
_____ Public Utilities Commission
_____ Santa Monica Mountains Conservancy
_____ State Lands Commission
_____ Tahoe Regional Planning Agency
Other _____

Public Review Period (to be filled in by lead agency)

Starting Date November 17, 2003 Ending Date December 16, 2003

Signature DR [signature] Date 11-12-03

Lead Agency (Complete if applicable): **City of Stockton**
Consulting Firm: Environmental Science Associates
Address: 225 Bush Street, Suite 1700
City/State/Zip: San Francisco, CA 94104
Contact: Leslie Moulton
Phone: (415) 962-8495

Applicant: Stockton Municipal Utilities Department
Address: 2500 Navy Drive
City/State/Zip: Stockton, CA 95206
Phone: (209) 937-8700

For SCH Use Only:
Date Received at SCH _____
Date Review Starts _____
Date to Agencies _____
Date to SCH _____
Clearance Date _____
Notes:

Delta Water Supply Project Distribution List (EIR5-03)

Nicky Stanke, Director
Cesar Chavez Library
605 N. El Dorado Street
Stockton, CA 95202

Jayne Williams
Stockton Intern City Attorney
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Gary Ingraham, Assistant City Manager
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Roger Storey, Deputy City Manager
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Administration Division
Community Development Department
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Stockton, CA 95202

Planning Division
Community Development Department
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Carl Eck, Fire Marshall
Stockton Fire Prevention Division
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Steven Pinkerton, Director
Stockton Housing and Redevelopment
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M. K. Troke Library
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Stockton, CA 95206

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22 E. Market Street
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Mark Herder, Chief
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Stockton Public Works Department
Development Services
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Operations and Maintenance Division
Stockton Public Works Department
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Solid Waste Division
Stockton Public Works Department
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Traffic-Engineering
Stockton Public Works Department
425 N. El Dorado Street
Stockton, CA 95202

Tech. Planning/Permit/Administration
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Permit Center (Kathy Tomura)
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Stockton, CA 95202

Jim Giottonini, Director
Stockton Public Works Department
Administration/Engineering
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San Joaquin Area Flood Control Agency
Stockton Public Works Department
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Stockton, CA 95202

Patrick Wright, Director
California Bay-Delta Authority
650 Capitol Mall, 5th Floor
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Federal Aviation Administration
831 Mitten Road
Burlingame, CA 94010

Rear Admiral Kevin Eldridge, Comm
11th Coast Guard District
Commander PCP Bldg. 42
Coast Guard Island
Alameda, CA 94501-5100

Delta Water Supply Project Distribution List (EIR5-03)

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United States Senate
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San Francisco, CA 94111

Honorable Dianne Feinstein
United States Senate
One Post Street, Suite 2450
San Francisco, CA 94104

Honorable Dennis Cardoza
U.S. House of Representatives
920 16th Street, Suite C
Modesto, CA 95354

Honorable John Doolittle
U.S. House of Representatives
2130 Professional Drive
Roseville, CA 95661

Honorable Richard Pombo
U.S. House of Representatives
2495 W. March Lane, Suite 104
Stockton, CA 95207

Mike Aceituno
National Marine Fisheries Service
650 Capitol Mall, Suite 8-300
Sacramento, CA 95814-4706

Gary Stern
Attn: PRD Division
National Marine Fisheries Service
777 Sonoma Avenue, Room 325
Santa Rosa, CA 95404-6512

Mike Finan, Chief
US Army Corps of Engineers
Reg Div, Sac/San Joaquin Delta Office
1325 "J" Street, Room 1480
Sacramento, CA 95814-2922

Long-Term Projects
Stockton Public Works Department
425 N. El Dorado Street
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Thomas Aiken, Area Manager
U.S. Bureau of Reclamation, Central CA
7794 Folsom Dam Road
Folsom, CA 95630-1799

John Keys, Commissioner
U.S. Bureau of Reclamation
1849 C Street, NW
Washington, DC 20240-0001

Mario J. Milani
US Dept. of Agriculture, NRCS
California State Office
430 G Street, #4164
Davis, CA 95616-4164

Tim Vendlinski
US EPA, Region 9
Wetland Section (WTR-8)
75 Hawthorne Street
San Francisco, CA 94105-3901

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U.S. Fish and Wildlife Service
4401 N. Fairfax Drive, HR-2000
Arlington, VA 22203-1610

Anne Badgley, Regional Director
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911 NE 11th Avenue
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Mark Littlefield, Chief
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Habitat Conser Div Wetlands Branch
2800 Cottage Way, Room W2605
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Dan Buford, Chief
U.S. Fish & Wildlife Service
Coastal Bay Delta Br, End Species Div
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Delta Water Supply Project Distribution List (EIR5-03)

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Admin./Engineering
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Terrence Dermody
San Joaquin County Counsel
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Facilities Planning
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Woodbridge, CA 95258

County Fire Warden
Delta Fire District
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Delta Water Supply Project Distribution List (EIR5-03)

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San Joaquin County Agricultural Comm
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Honorable Jack Sieglock
San Joaquin County Board of Sup
222 E. Weber Avenue, Rm. 701
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Honorable Victor Mow
San Joaquin County Board of Sup
222 E. Weber Avenue, Rm. 701
Stockton, CA 95202

Honorable Dario Marenco
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David Grilli
Reclamation District 2037
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Stockton, CA 95201-1461

David Grilli
Reclamation District 2041
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Toxic Substance Control Program Reg. 1
California Department of Health
10151 Croydon Way
Sacramento, CA 95827-2105

Director
California Department of Health Services
714 P Street, Room 1253
Sacramento, CA 95814

Public Water Supply Branch
California Department of Health Services
714 “P” Street, Rm. 692
Sacramento, CA 95814

Suzie Betzler
California Dept of Boating & Waterways
2000 Evergreen Street, Suite 100
Sacramento, CA 95815

Delta Water Supply Project Distribution List (EIR5-03)

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California State Highway Patrol
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Stockton, CA 95208

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California Department of Fish & Game
1416 Ninth Street
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Dante Nomellini
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Director
CalTrans-Environmental Branch B
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California Dept of Fish & Game, Reg 2
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Harold Willis
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Director
CalTrans District 10
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Frank Wernett
CA Dept of Fish & Game, Bay-Delta
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San Joaquin County Resource Conservation District
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Director
CalTrans-Planning
P. O. Box 942874
Sacramento, CA 94274-0001

Director
California Dept of Water Resources
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John Cadrett
San Joaquin Valley Air Poll Ctrl Dist
4230 Kiernan Avenue, Suite 130
Modesto, CA 95365

Director
Central Valley Regional Water Quality Control Board
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Sacramento, CA 95827-3098

Dale Will
California Land Conservation,
Contracts Section MS 24-03
802 “K” Street
Sacramento, CA 95214

Dr. Knox Mellon, SHPO
California Dept of Parks and Recreation
Office of Historic Preservation
P. O. Box 942896
Sacramento, CA 94296-0001

Debbie Sareeram, Deputy Director
California Department of Conservation,
801 “K” Street, MS 24-01
Sacramento, CA 95814

California Native Am Heritage Comm.
915 Capitol Mall, Rm. 364
Sacramento, CA 95814

Railroad Safety/Carriers Branch
California Public Utilities Commission
505 Van Ness
San Francisco, CA 94102

California Air Resources Board
1001 I Street
Sacramento, CA 95812

Paul Thayer, Executive Officer
State Lands Commission
100 Howe Avenue, Suite 100 So.
Sacramento, CA 95825-8202

State Reclamation Board
1416 9th Street, Room 1148
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STOCKTON DELTA WATER SUPPLY PROJECT
Notice of Preparation – Attachment 1

INTRODUCTION

Like many northern California communities, the City of Stockton Metropolitan Area (COSMA) is experiencing substantial growth and increasing water demands. The COSMA has a population of approximately 250,000, and meets its current municipal water demand with a combination of ground and surface water supplies. Some sources of water supply are temporary and must be replaced. In addition, regulatory pressures, increased water usage in neighboring areas, and saline intrusion affecting groundwater supplies are further eroding the City of Stockton's already limited water supplies.

With the adoption of the 1990 City's General Plan, the City sought firm surface water supplies. A water right application was submitted to the State Water Resources Control Board in January 1996, requesting an increasing amount of surface water starting from approximately 20,000 acre-feet per year (AF/year) in 2002 and increasing to 125,900 AF/year in 2050. The application specifies a Place of Use for the water that is coincident with the City's current General Plan Boundary (**Figure 1**), and included up to four possible points of diversion from the Delta.

In order to achieve public confidence in a Delta water supply, the City commissioned a two-year comprehensive feasibility study to evaluate potential sources of supplemental water supply to meet the long-term water needs for the COSMA (**Figure 1**). The City scoped this study to span across the three COSMA retail water providers: the City of Stockton Municipal Utilities Department (COSMUD), the California Water Service Company (CalWater), and San Joaquin County (through the Lincoln and Colonial Heights Maintenance Districts).

Alternatives for water supply that were considered by the City included: increased groundwater pumping, groundwater injection storage and recovery, joint groundwater banking program, groundwater recharge, increased purchases from Stockton East Water District (SEWD), recycled water, Delta water supply, surface water transfers from others, and additional water conservation.

As a result of the feasibility study, the Delta water supply stands out as the preferred supply for meeting the COSMA's projected unmet demand. Facilities recommended to utilize the Delta water supply include a new diversion/intake structure in the San Joaquin River, raw water conveyance facilities to a new water treatment plant (WTP), and transmission facilities conveying treated water to the north, central, and south COSMA distribution systems (**Figure 2**).

The Delta Water Supply Project will also include a groundwater recharge program. Treated surface water will be injected into the groundwater aquifer for storage until needed later, when it will be pumped or "recovered" from the groundwater aquifer for use. This type of groundwater program is often referred to as an Aquifer Storage and Recovery (ASR) program.

The Delta Water Supply Project will be developed in phases. A Program EIR will be prepared to analyze each phase in the long-term project. Project level analysis will be conducted for Phase 1 facilities. Upon completion and approval of the Project EIR, the City will be able to proceed with construction and operation of Phase 1 facilities.

Subsequent phases of the project will be analyzed at a program level that will frame the potential environmental effects and appropriate mitigation strategies. The City will conduct subsequent environmental review for future project phases as needed to evaluate their specific impacts.

EXISTING WATER SUPPLY FOR STOCKTON

The COSMA presently relies on both local groundwater and surface water supplies through SEWD from New Hogan and New Melones Reservoirs, located on the Calaveras River and the Stanislaus River, respectively, and interim water transfers from Oakdale Irrigation District (OID) and South San Joaquin Irrigation District (SSJID). In the early 1990s, the Central Valley Project Improvement Act (CVPIA) and other regulatory actions substantially reduced the amount of water SEWD could expect to be delivered under its New Melones Central Valley Project contract, especially in dry years.

SEWD holds contracts for up to 205,000 AF/year of surface water supplies; however, under various supply restriction and water year type conditions, actual current supply availability ranges from about 100,000 AF/year in a wet year to 30,000 AF/year in a critically dry year. In the future, surface water availability to SEWD is projected to decrease as water transfers with SSJID and OID expire in 2009, and as SEWD relinquishes some of the extra water it now receives from the New Hogan Reservoir system as demands increase within the Calaveras County Water District. By 2020, supply availability to SEWD from its current surface water supplies will be reduced to about 60,000 AF/year in a wet year and 22,000 AF/year in a critical dry year. By the year 2050, these same surface water sources could provide about 56,000 AF/year in a wet year and as little as 12,000 AF/year in a critical dry year.

Since the late 1970s, saline intrusion from the west has threatened groundwater quality in the COSMA especially in dry years when groundwater is used more heavily. Saline intrusion can degrade water quality, threaten the long-term productivity of the groundwater basin, and compromise the future of the basin as a source of municipal water supply. Based on these factors, reliance on groundwater alone to meet water demands is not feasible. Only through a proactive conjunctive management program with increased surface water supplies can groundwater continue to be an element of the COSMA's drinking water supply.

The sustainable, long-term pumping yield for regional groundwater is in the range of 0.75 to 1.0 AF/ac/year. For planning purposes in developing the City's future water supply conjunctive management program, the City has selected 0.6 AF/ac/year as a targeted long-term average groundwater yield. This level of withdrawal will allow for a sustainable yield from the groundwater basin. Applying this conservative groundwater yield factor, the City can safely plan on consistent average use of 40,000 AF/year from its local groundwater source.

PROJECTED WATER DEMAND

Over the past seven years, the COSMA's water demands have steadily increased from about 55,000 AF/year to the current demand of 65,000 AF/year; about 60 percent is supplied by surface water. Much of the increase in demand is due in large part to new development within the identified urban areas of the General Plan. Based on anticipated projected municipal water use, approximately 85,000 AF/year will be needed by about 2015. Projected municipal water use in the year 2050 is expected to be about 178,000 AF/year (Table 1).

Table 1
Projected Urban Water Demands

Year	Average Annual Demand (AF/year)	Maximum Day Demand (mgd)
2003	71,369	134
2004	72,439	136
2005	73,526	138
2006	74,629	140
2007	75,748	142
2008	76,885	144
2009	78,038	146
2010	79,208	149
2011	80,397	151
2012	81,603	153
2013	82,827	155
2014	84,069	158
2015	85,330	160
2020	98,575	185
2025	111,821	210
2030	125,066	234
2035	138,312	259
2050	177,900	334

Based on current water supplies and availability, the COSMA will face water supply shortfalls into the future (with or without new development). Assuming that the SSJID and OID temporary water supply contracts are not renewed between 2009 and 2019 and growth occurs, the City will need an average of 21,000 AF/year of supplemental water by 2015. If population growth continues at 1.9 percent per year, supplemental water needs could be 52,000 AF/year by 2030, and up to 95,000 AF/year in 2050 (**Figure 3**). **Figure 4** shows the near-term water demands representing build-out of the current General Plan urban land uses projected to occur by about 2015, and the long-term water demands representing a population growth of 1.9 percent per year up to the year 2050.

Long-term increases in groundwater pumping are infeasible because it would further exacerbate saline intrusion, degrading groundwater quality. To replace declines in the existing water supply, to support orderly planned growth in accordance with the City's General Plan, and to reduce pumping on the groundwater basin to sustainable levels, the COSMA will need more water.

DELTA WATER SUPPLY PROJECT

Securing a water supply from the Delta water supply appears to be the most feasible option to meet the COSMA's long-term water needs. The Delta Water Supply Project, which will divert surface water from the Delta, in conjunction with an Aquifer Storage and Recovery (ASR) program has been configured to meet the City's long-term water needs.

DELTA WATER RIGHTS AND AVAILABILITY

The unique location of the COSMA, within the legally-defined Delta and the area of origin, allows it to take advantage of several statutes benefiting water users within the Delta. To access water for the Delta Water Supply Project, the City submitted a water rights application to the State Water Resources Control Board (Board) on January 6, 1996. The City filed the water rights application to appropriate surplus Delta water and water subject to the following sets of statutes: California Water Code Section 1485 (related to the recapturing of discharged treated wastewater), California Water Code Section 11460 et seq. (area of origin provisions), and California Water Code Section 12200 et seq. (Delta Protection Act).

California Water Code Section 1485 can be summarized as follows: any municipality disposing of treated wastewater into the San Joaquin River may seek a water right to divert a like amount of water, less losses, from the river or Delta downstream of the point of the wastewater discharge. The City currently discharges approximately 35,000 AF/year of treated wastewater to the San Joaquin River. The City's discharge is projected to increase to approximately 50,000 AF/year in 2030 and approximately 73,000 AF/year in 2050.

Under California Water Code Section 11460 et seq., a water user in the area of origin can appropriate water that otherwise would be exported and receive a priority senior to the rights of the federal Central Valley Project (CVP) and the State Water Project (SWP). Diversion of water from the Delta under the area of origin is subject to various regulatory restrictions, including Term 91 conditions, which prohibit diversion by others at times when the SWP and/or CVP are required to release stored water from their reservoirs in excess of export diversions, project carriage water, and project in-basin deliveries. Under these conditions, the City would be allowed to divert water at times when Delta outflow is greater than regulatory minimum requirements.

While Section 1485 water depends on the discharge volume from the municipal wastewater treatment plant, the Delta outflow supply available under Section 11460 et seq. varies greatly by water year type. In many dry months and drought years, excess Delta outflow is limited. Based on 73 years of historical data, the majority of Delta outflow occurs in January through March, ranging up to 1,200,000 AF/year.

The water rights application was accepted by the Board in October 1997, and publicly noticed in December 1997. The application requests increasing amounts of surface water (from approximately 20,000 AF/year in 2002 up to 125,900 AF/year in 2050) from up to four potential diversion points in the Delta. The requested Place of Use (POU) is coincident with the City's 1990 General Plan Boundary (**Figure 1**).

PROPOSED FACILITIES

The Delta Water Supply Project is proposed as a conjunctive use program that integrates surface water and groundwater management. The surface water component of the Delta Water Supply Project will include a water diversion/intake facility with fish screens on the San Joaquin River, new pipelines to convey the raw water to a new water treatment facility located just north of the COSMA, and treated water transmission pipelines to deliver water to the City's existing water distribution system. The groundwater component will include groundwater injection and recovery wells to inject treated Delta surface water into the groundwater aquifer underlying the COSMA, for later extraction during periods of restricted surface water supply. In Phase 1 of the project, the City proposes to implement a pilot program to test the feasibility of the ASR and better define the potential location of the injection/extraction wells.

Surface Water Component

Four potential Delta water diversion locations were evaluated relative to water quality and facility configurations as well as key environmental issues. Of these sites, diversion/intake site 1 located at the southwestern tip of Empire Tract on the San Joaquin River (Stockton Deep Water Channel) appears to provide the best source water quality, flexibility for siting the intake while meeting fish screening and velocity requirements, and design flexibility. **Figure 2** shows the location of the proposed intake site and the raw water conveyance alignment, which will parallel Eight Mile Road.

The Delta Water Supply Project will require new water treatment facilities with an ultimate capacity of 160 million gallons per day (mgd) or 491 AF per day. A minimum of 40 acres of land is required for the facilities. Four potential sites were evaluated (**Figure 5**). Based on key environmental issues, Site C, located approximately three miles east of Interstate 5 on the triangular tract made by Eight Mile Road, Davis Road, and the Union Pacific Railway Tracks, is most suitable for the facility (**Figure 5**). This site appears to have the least potential for affecting key environmental resources including land use, biological resources, cultural resources, flooding, and geological/soils hazards. Diversion/Intake site 1 connected by a raw water pipeline to the water treatment plant at Site C was used to evaluate the treated water conveyance system needs.

Large treated water conveyance pipelines are needed to convey water from the water treatment facility to the distribution system. The large existing pipelines originating from the SEWD treatment plant to serve the CalWater and the City's North System areas, and the planned construction of the South Stockton Aqueduct along the southeast side serving the City's South System areas provide significant capacity along the east side of the COSMA that can be used in the first phases of the Delta Water Supply Project. As shown on **Figure 6**, the needed pipelines begin at the treatment plant site and connect to the existing distribution system at several locations. The second pipeline, the South Stockton Aqueduct, extends south from the SEWD plant site to serve the City's South System area.

Groundwater Component

The Delta Water Supply Project is designed to optimize the existing supply provided to the City from SEWD and to make the maximum use of the City's groundwater resources in dry years. One goal of the City's proposed conjunctive water supply and resources management program that includes the Delta Water Supply Project is not to exceed, on average, the groundwater pumping target limit by fully using the existing SEWD WTP and by sizing the Delta Water Supply Project WTP facilities to meet the remaining needs. When water is available for diversion in excess of demand, additional water can be recharged to the groundwater through direct injection of treated surface water. Later, in dry periods, when surface water supplies are limited, stored groundwater will be pumped to meet demand. The result is that in some years, groundwater pumping will be less than the targeted pumping yield and in other years it will exceed the targeted yield, but on average, groundwater pumping will remain within the targeted yield and meet the long-term sustainable use levels needed to protect the basin resources.

For a groundwater injection program to be feasible, the aquifer has to provide sufficient storage capacity, transmissivity (rate at which water can move into and out of the aquifer), and compatibility with natural conditions. The optimum location of highest storage and transmissivity is found in the northeastern portion of the COSMA. Injection wells will be located east of the area in the City where there is poor groundwater quality to avoid degradation of the high quality surface water to be injected.

To initiate an Aquifer Supply and Recovery (ASR) system, a pilot program is initially planned for the project. The selected well will be screened in the appropriate aquifer strata and may require rehabilitation such as annular seals, backflush controls, and monitoring devices. The pilot testing will provide the necessary information to confirm the feasibility and make design decisions for the full scale project.

Phasing

The Delta Water Supply Project will be developed in phases and the treatment plant capacity will be expanded in increments to keep pace with demand as existing supplies are reduced and demand increases with growth over time.

Phase 1 (2010 to 2015) will be sized with a WTP capacity to treat and deliver up to 30 mgd of water (**Figure 7**). No groundwater injection is required at the beginning of Phase 1. However, by the end of Phase 1, a 10 mgd injection pilot program will be needed. The target date for operation of the Delta Water Supply Project WTP is 2009.

During Phase 2 (2015 to 2030), there will be an expansion of the WTP. By 2030, the WTP will be expanded to treat 110 mgd of water. Groundwater injection capacity will increase gradually as new wells are constructed. Injection capacity will increase from 10 mgd in 2015 to 42 mgd in 2030.

During Phase 3 (2031 to 2050), the WTP will be expanded to treat 160 mgd. Groundwater injection capacity will increase to 95 mgd.

CEQA PROCESS

The EIR will be prepared in compliance with CEQA, Public Resources Code Sec 21000 et seq., and the CEQA Guidelines, as amended. The City will be the lead agency for the CEQA process. In accordance with CEQA, the lead agency has the responsibility for the scope, content, and legal adequacy of the document.

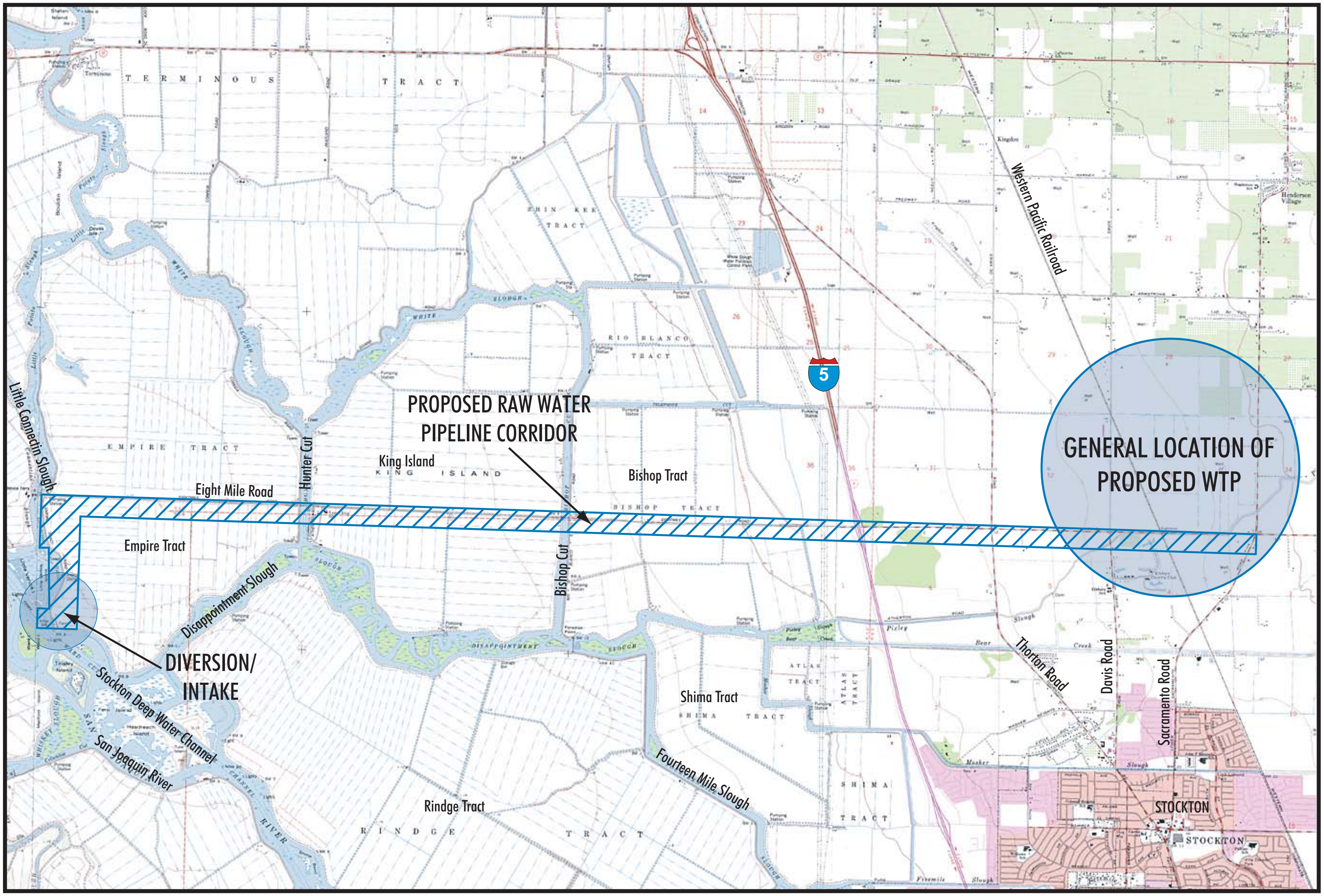
A Notice of Preparation (NOP) as required by CEQA will be sent to interested agencies to solicit their comments on the project. The NOP will include a project description, location of the project, alternatives, possible environmental impacts, and the date and time of known future meetings on the project. The scoping meeting(s) will provide other agencies the opportunity to bring to the attention of the lead agencies significant issues that should be included in the EIR. Agencies will have 30 days to tender their comments.

The draft EIR will incorporate public concerns associated with the project alternatives identified in the scoping process and will be distributed for at least 45-day public review and comment period. During this time, both written and verbal comments will be solicited on the adequacy of the document. The final EIR will address the comments received on the draft during public review and will be made available to all commenters on the draft EIR and anyone requesting a copy during the 45-day public review period. The final EIR will (1) provide a full and fair discussion of the proposed actions significant environmental impacts, and (2) inform the decision-makers and the public of reasonable measures and alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment.

The final step in the EIR process is certification of the EIR, which includes preparation of a Mitigation Monitoring and Reporting Plan and adoption of its findings, should the project be approved. A certified EIR indicates the following: (1) The document complies with CEQA; (2) the decision-making body of the lead agency reviewed and considered the final EIR prior to approving the project; and (3) the final EIR reflects the lead agency's independent judgment and analysis. In addition, a Notice of Determination (NOD) describing the project, its impacts and adopted mitigation, the environmental findings of the agency, and the location of copies for examination is filed with the county clerk. The expected schedule for the Delta Water Supply Project CEQA project is anticipated to be 18 months.

SOURCE: MWH and Environmental Science Associates, 2003

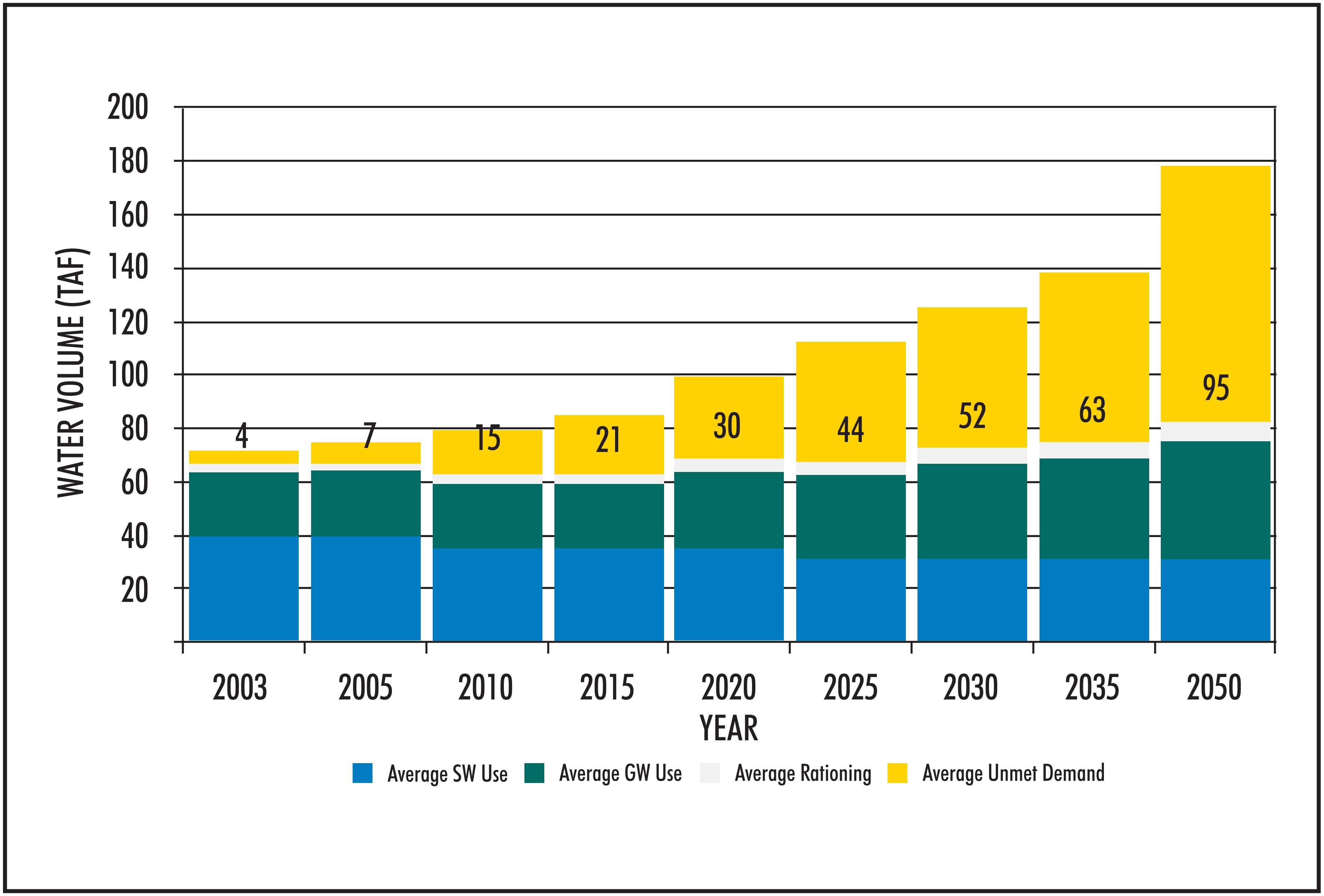
Figure 1
Water Right Application Place of Use/
City of Stockton General Plan Boundary



SOURCE: USGS 7.5 Minute Quadrangles (Bouldin Island, Terminous, and Lodi South); and Environmental Science Associates, 2003

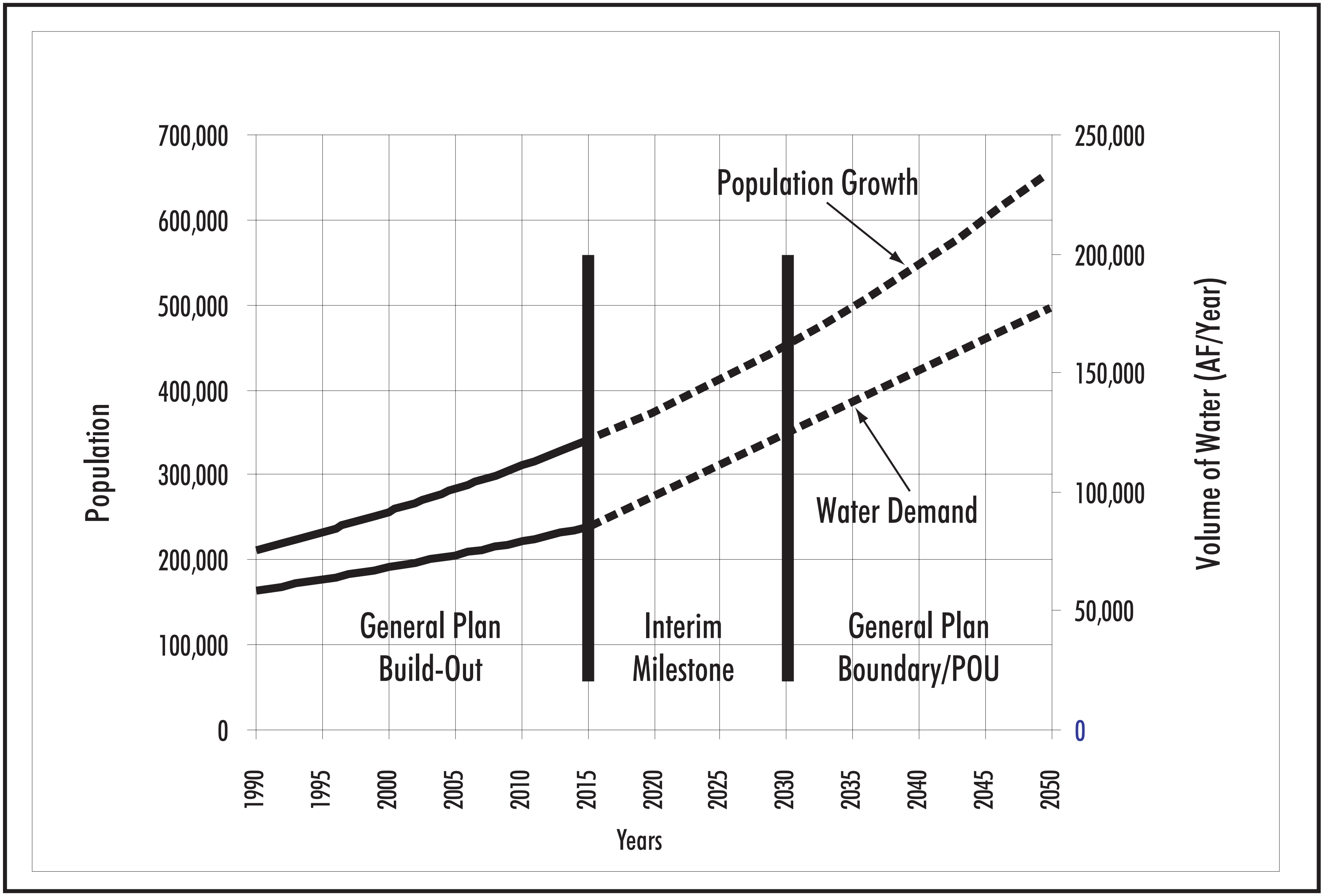
Delta Water Supply Project / 200090-002

Figure 2
Project Location



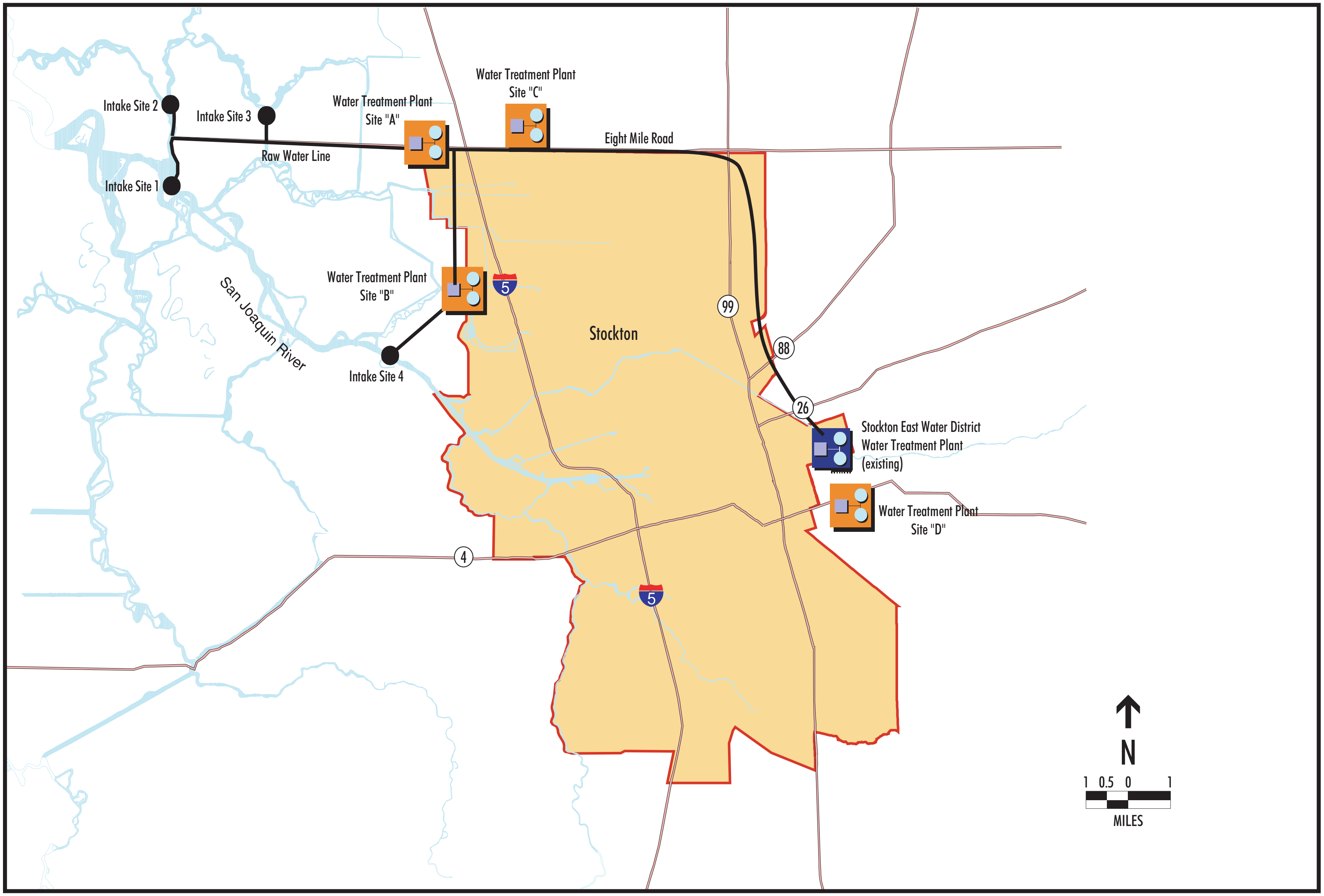
SOURCE: MWH and Environmental Science Associates, 2003

Figure 3
Summary of Average Unmet Water Demand



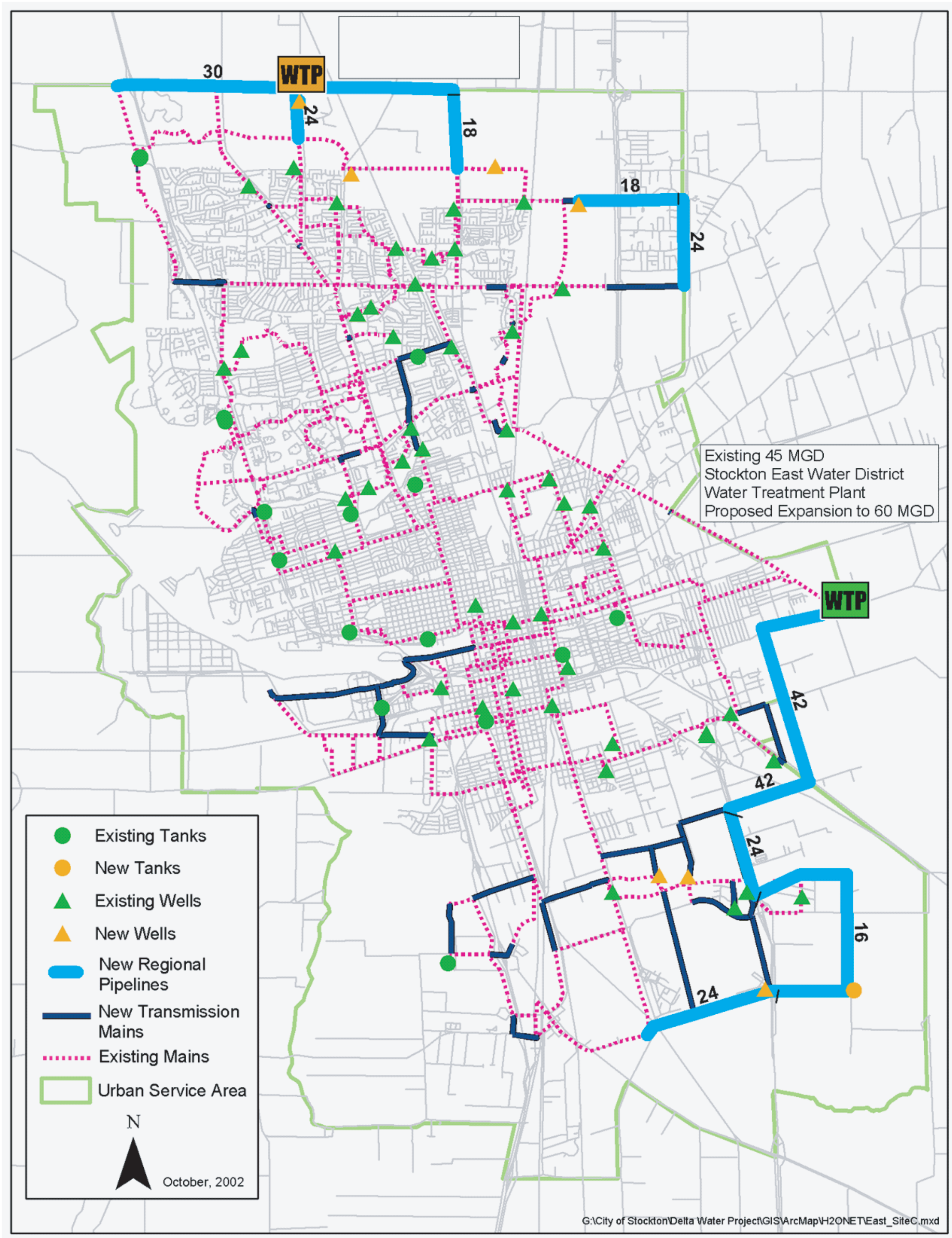
SOURCE: MWH and Environmental Science Associates, 2003

Figure 4
Population and Water Demand Projections



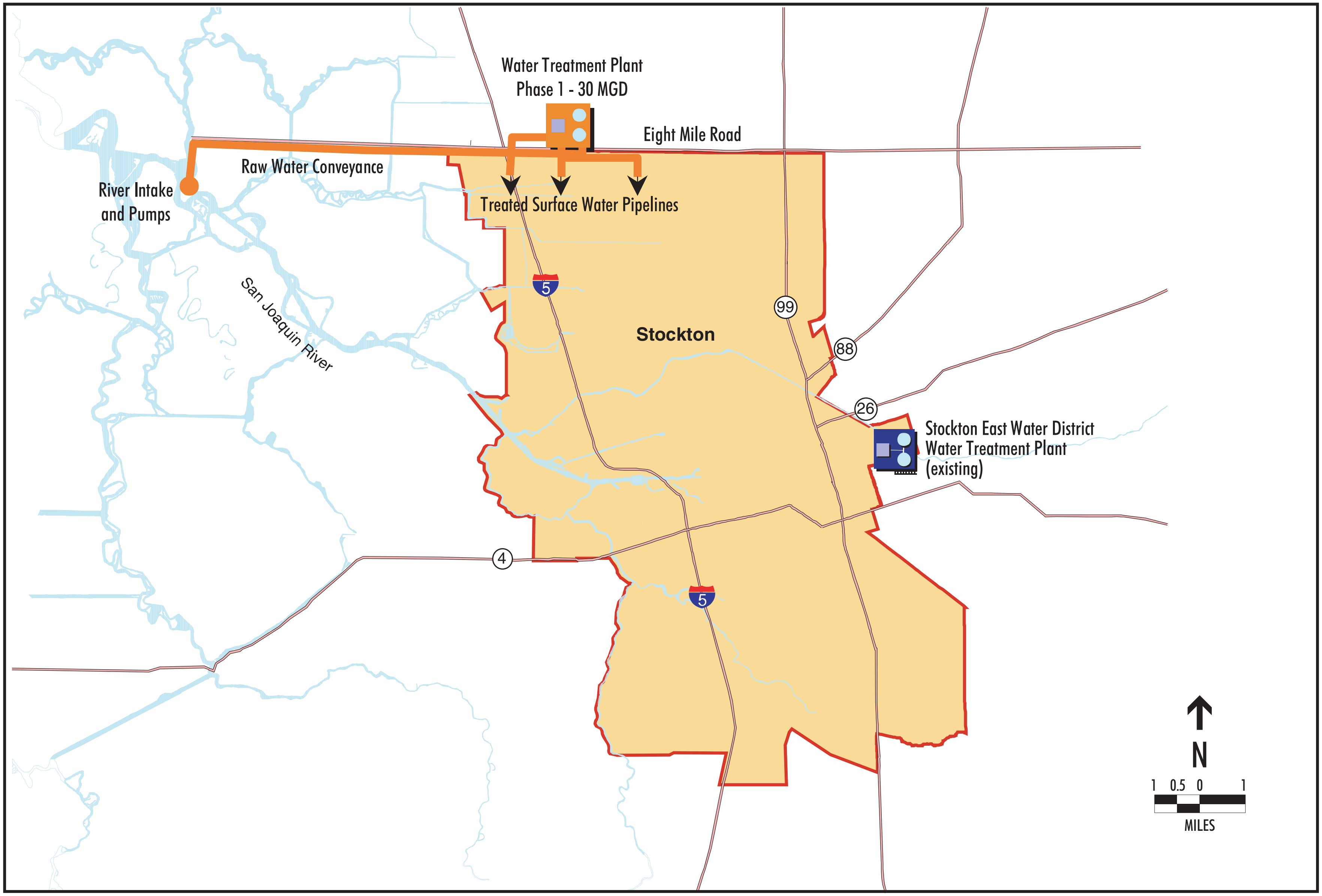
SOURCE: MWH and Environmental Science Associates, 2003

Figure 5
DWSP Diversion and Water Treatment Plant Sites



SOURCE: MWH and Environmental Science Associates, 2003

Figure 6
East Pipeline Alignment



SOURCE: MWH and Environmental Science Associates, 2003

Figure 7
Proposed Capital Facilities
Constructed in Phase 1 (2007 to 2010)

CITY OF STOCKTON
ENVIRONMENTAL INFORMATION AND INITIAL STUDY FORM
(Pursuant to Cal. Code of Regulations, Title 14, Sections 15063-15065)

INITIAL STUDY FILE NO: IS ____

EIR FILE NO: EIR 5-03

INITIAL STUDY FILING DATE: _____

LEAD AGENCY

City of Stockton
Community Development Dept.
Planning Division
345 North El Dorado Street
Stockton, CA 95202
(209) 937-8266

Note: *The purpose of this document is to describe the project, its environmental setting, any potentially significant adverse environmental impacts which may be caused by the project or which may affect the project site and/or surrounding area, and any mitigation measures which will be incorporated into the project. Please complete all applicable portions of Section A (General Information/Project Description) and as much of Section B (Project Site Characteristics) as possible. If a question is not applicable, then, respond with "N/A". After completing Sections A and B, please sign the certification following Section B and attach any supplemental documentation and exhibits as deemed necessary. The completed form and applicable fees should be filed at the above-noted Lead Agency address.* PLEASE TYPE OR PRINT IN DARK INK.

A. GENERAL INFORMATION/PROJECT DESCRIPTION *(Completed by Applicant)*

1. Project Title: Delta Water Supply Project

2. Property Owner(s): Various
   Address: Stockton, CA Zip _____ Phone (209) 937-8266

3. Applicant/Proponent: City of Stockton Municipal Utilities Department
   Contact Person: David Stagnaro, Senior Planner
   Address: 345 N. El Dorado Street, Stockton, CA Zip 95202 Phone (209) 937-8598

4. Consulting Firm: Environmental Science Associates Contact Person: Leslie Moulton
   Address: 225 Bush Street, Suite 1700, San Francisco, CA Zip 94104 Phone (415) 962-8495

5. Project Site Location:
   a. Address (if applicable) or Geographic Location: Lands located within the Delta both on and near the San Joaquin River (Stockton Deep Water Channel). The diversion will be located at the southwestern tip of Empire Tract on the San Joaquin River. The proposed intake site and the raw water conveyance alignment will parallel Eight Mile Road. The water treatment plant will be located approximately three miles east of Interstate 5 on the triangular tract made by Eight Mile Road, Davis Road, and the Union Pacific Railroad tracks (refer to Figure 2 in the NOP attachment).
   b. Assessor's Parcel Number(s): Various
   c. Legal Description *[Attach metes and bounds (bearings and dimensions) description and corresponding map(s) or list existing lots of record from recorded deed]*: _____

6. General Project Description: (*Describe the whole action, including later phases of the project and any secondary, support, or offsite features necessary for its implementation. Attach additional sheets if necessary*.)
   The surface water component of the Delta Water Supply Project (DWSP) will include a water diversion facility with fish screens on the San Joaquin River, new pipelines to convey the raw water to a water treatment facility located in the northern area of the City of Stockton Metropolitan Area (COSMA), and treated water transmission pipelines to deliver water to the City's existing water distribution system. The groundwater component will include groundwater injection and recovery wells to inject treated Delta surface water into the groundwater aquifer underlying the COSMA (refer to Figure 1 in the NOP attachment), for later extraction during periods of restricted surface water supply. (Phase 1 of the Proposed Project will include a pilot program that will test the feasibility of the Aquifer Storage and Recovery Program.) The DWSP will require new water treatment facilities with an ultimate capacity of 160 million gallons per day (mgd). Large treated water conveyance pipelines will be needed to convey water from the water treatment facility to the distribution system. The large existing pipelines originating from the SEWD treatment plant to serve the CalWater and the City of Stockton's North System areas, and the planned construction of the South Stockton Aqueduct along the southeast side serving the City of Stockton's

South System areas will provide significant capacity along the east side that can be used in the first phases of the DWSP. The needed pipelines will begin at the water treatment plant site and connect to the existing distribution system at several locations. The second pipeline, the South Stockton Aqueduct, will extend south from the SEWD plant site to serve the City of Stockton's South System area. Phase 1 (2010 to 2015) will be sized with a WTP capacity to treat and deliver up to 30 mgd of water (refer to Figure 7 in the NOP attachment). No groundwater injection is required at the beginning of Phase 1. However, by the end of Phase 1, a 10 mgd injection pilot program will be needed. The target date for operation of the DWSP water treatment plant (WTP) is 2009. During Phase 2 (2015 to 2030), there will be an expansion of the WTP. By 2030, the WTP will be expanded to treat 110 mgd of water. Groundwater injection capacity will increase gradually as new wells are constructed. Injection capacity will increase from 10 mgd in 2015 to 42 mgd in 2030. During Phase 3 (2031 to 2050), the WTP will be expanded to treat 160 mgd. Groundwater injection capacity will increase to 95 mgd.

7. Applications Currently Under City Review: NA

   File Number(s): _____

8. Other permits/reviews required by the City, County, State, Federal or other agencies for project implementation:

Agency:	Permits/Reviews:
U.S. Army Corps of Engineers	Clean Water Act Section 404 permit Rivers and Harborts Action Section 10 permit NEPA Review/Environmental Impact Statement
U.S. Fish and Wildlife Service	Federal Endangered Species Act Section 7 compliance
NOAA Fisheries	Federal Endangered Species Act Section 7 compliance
California Department of Fish & Game	State Endangered Species Act compliance Section 1601 Streambed Alteration Agreement
State Water Resources Control Board	State water right
California Reclamation Board	Encroachment permit
Central Valley Regional Water Quality Control Board	Clean Water Act Section 401 Water Quality Certification NPDES Construction Permit - Storm Water Pollution Prevention Plan
San Joaquin Valley Air Pollution Control District	Authority to Construct Permit to Operate
State Historic Preservation Office	National Historic Preservation Act Section 106
California Department of Health Services	Drinking Water Treatment Plant Permit
State Lands Commission	Lease Agreement
San Joaquin County	Encroachment Permit
City of Stockton	Encroachment Permit Building Permit

9. Describe proposed General Plan (GP) amendments and/or prezoning/rezoning (Zoning) requests, if applicable:

Existing GP Designation	Proposed GP Designation	Acres	Existing Zoning	Proposed Zoning	Acres
____	_____	_____	_____	_____	_____

10. Describe any site alterations which result from the proposed project: (*Address the amount and location of grading, cuts and fills, vegetation/tree removal, alterations to drainage, removal of existing structures, etc*.)
    The diversion/intake site with fish screens will be constructed in the San Joaquin River (Stockton Deep Water Channel) near the southwestern tip of Empire Tract (refer to Figure 2 in the NOP attachment). New pipelines to convey the raw water to a new water treatment facility will be constructed parallel to Eight Mile Road. The water treatment plant will be constructed north of the COSMA. Treated water transmission pipelines will be constructed to deliver water to the City's existing water distribution system (refer to Figure 7 in the NOP attachment). All of these will require cuts and fills. Details will be presented in the draft EIR.

11. Specific Project Description/Operational Characteristics:

a. Describe Proposed Commercial, Industrial, Institutional, and Recreational Uses (*all non-residential uses*): The Proposed Project will include development of infrastructure for the City of Stockton.

(1)

Proposed Land Use(s)	Zoning	Site Acreage	Structure Sq. Ft.	Required Parking	Parking Provided
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

(2) Describe project phasing (*location/timing*): The Delta Water Supply Project (DWSP) will be developed in phases and the treatment plant capacity will be expanded in increments to keep pace with reduced supplies and increased growth over time. The target date for operation of the DWSP WTP is 2009. Phase 1 (2010 to 2015) will be sized with a WTP capacity to treat and deliver up to 30 mgd of water. No groundwater injection is required at the beginning of Phase 1; however, by the end of Phase 1, a 10 mgd injection pilot program will be needed. During Phase 2 (2015 to 2030), there will be an expansion of the WTP. By 2030, the WTP will be expanded to treat 110 mgd of water. Groundwater injection capacity will increase gradually as new wells are constructed. Injection capacity will increase from 10 mgd in 2015 to 42 mgd in 2030. During Phase 3 (2031 to 2050), the WTP will be expanded to treat 160 mgd. Groundwater injection capacity will increase to 95 mgd.

(3) Days/Hours of operation: _____; Work shifts per day: _____

(4) Total number of employees: _____; Number of employees per work shift: _____

(5) Number of company vehicles/trucks: _____

(6) Estimated number of vehicle trip ends (TE) per day generated by project: Trucks _____ TE/Day; Passenger Vehicles, _____ TE/Day; Total, _____ TE/Day.

(7) Estimated maximum number of TE/Day based on proposed General Plan Designation: _____ TE/Day, and/or Proposed Zoning: _____ TE/Day

(8) Will land use-related noise produced on site exceed adopted noise standards (*i.e.: 45 Leq dB during nighttime or 55 Leq dB during daytime hours at nearest residential property line; 75 Lmax dB at nearest commercial property line; and/or 80 Lmax dB at nearest industrial property line*)?
Yes ☒ No ☐ If yes, describe sources and levels of noise: The pumps associated with the diversion/intake facility will produce noise as will water treatment plant operations. Noise will be generated during construction of the Proposed Project. This will be temporary and will follow noise ordinances of both the City of Stockton and San Joaquin County.

(9) Other operational or design characteristics: Additional traffic will be generated.

b. Describe Proposed Residential Land Uses: [*Check (✔) or specify applicable types]* NA
Conventional 1-F ☐, 2-F☐, or 3-F ☐; PURD ☐; Condominiums ☐; Townhouses ☐ Apartments ☐; Dormitory/Rooming/Boarding Houses ☐; Elderly Apartments ☐; Residential Care Facility ☐; Employee Housing ☐; Mobile Homes ☐; Motel/Hotel/B&B ☐; Extended Stay/Single Rm. Occupancy Facilities ☐; Other ☐

(1) Residential Land Use Summary:

Type of Unit	Zoning	Acreage	Proposed Units	Units/Acre	Max. Units Allowed	Max. Density
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

(2) Describe Project Phasing: _______

(3) Population Projection for Proposed Project: = _____
Projected Population Density (*Persons/Unit*): = _____

(4) Student Generation Projected for Proposed Project: = _____
Projected Student Density (*K-12 Students/Unit*): = _____

(5) Estimated total number of vehicle trip ends (TE) per day generated by proposed project: = _____

(6) Estimated maximum number of TE/Day based on proposed General Plan Designation: _____ TE/Day, and/or Proposed Zoning: _____TE/Day

12. Will the project generate any substantial short-term and/or long-term air quality impacts, including regional/cumulative contributions? Yes X No _____ If so, estimate the type and amount of emissions below *(e.g., tons per year of PM10, ROG, Nox, and CO)*:

   a. Construction Emissions: Temporary (Emission quantification will be presented in the draft EIR).
   b. Stationary Source Emissions: Emissions from the water treatment plant (Emission quantification will be presented in the draft EIR).
   c. Mobile Source Emissions: Increased vehicle trips to project facilities (Emission quantification will be presented in the draft EIR).

B. PROJECT SITE CHARACTERISTICS (*Completed by Applicant and/or Lead Agency, as applicable*):

1. Total Site Acreage (Ac.) (or) Square Footage (S.F.): Various Ac. for the WTP _____ S.F.

2. Ex. General Plan Designations | Acres | Ex. Zoning (*City or County*) | Acres
   Various | _____ | Various | _____

   The San Joaquin County General Plan designates the diversion/intake site as Open Space, with surrounding land uses designated General Agriculture, and designates the water treatment plant site as General Agriculture.

3. Identify and describe any specific plans, redevelopment areas, and/or other overlay districts/zones which are applicable to the project site: _____

4. Identify Existing On-Site Land Uses and Structures: Acres or Sq. Ft.:
   Water Treatment Plant will be placed on agricultural land. 40 acres

5. Prior Land Uses if Vacant: Agricultural

6. Describe any on-site and adjacent utility/infrastructure improvements and right-of-ways/easements: _____

7. Adjacent land uses, zoning and General Plan designations:

Adjacent Uses	Zoning (City or County)	General Plan Designations
North: See Below	Various	Various
South: See Below		
East: See Below		
West: See Below		

   Existing land uses at and around the diversion/intake site include recreation (e.g., fishing, boating, and other water-based activities) and agricultural activities. Herman and Helen's Marina is located north of the diversion/intake site.

   Existing land uses surrounding the water treatment plant site are designated Residential to the south and General Agriculture to the north, east, and west.

8. If site contains at least ten (10) acres of undeveloped and/or cultivated agricultural land, complete the following:

   During the development of the EIR, exact project sites will be selected for the water treatment plant, pipeline corridors, and the diversion/intake site. At that time the type of farmland will be determined and presented in the EIR.

   a. Is the land classified as "Prime Farmland" and/or "Farmland of Statewide Importance" (*as identified on the San Joaquin County "Important Farmland Map"*)? Yes _____ No _____
   b. Is the site under a Williamson Act Land Conservation Contract? Yes _____ No _____
   c. If the site is under contract, has a "Notice of Non-Renewal" been filed?
      Yes _____ No _____ If yes, when will the contract expire? Date: _____

9. Describe important on-site and/or adjacent topographical and water features:
   On-Site: The diversion/intake will be located in the San Joaquin River; additional information will be presented in the EIR.
   Adjacent: Will be presented in the draft EIR.

10. Describe any important on-site and/or adjacent vegetation/wildlife habitat:
   On-Site: The diversion/intake and water treatment plant sites are fairly disturbed due to agricultural and recreational activities; additional information will be presented in the draft EIR.

Adjacent: Will be presented in the draft EIR.

11. Describe any general and special status wildlife species known to inhabit the site or for which the site provides important habitat: Special-status animal species that could potentially be affected by installation of the intake structures include California black rail (Laterallus jamaicensis corturniculus), giant garter snake (Thamnophis gigas), great blue heron (Ardea herodias), and western pond turtle (Clemmys marmorata). Delta smelt (Hypomesus transpacificus), steelhead (Oncorhynchus mykiss), winter-run and spring-run chinook salmon (Oncorhynchus tshawytscha) occur seasonally within the area. Potential biological species associated with the construction of the water treatment plant and pipeline alignment would likely be limited to giant garter snake, Swainson's hawk (Buteo swainsoni), burrowing owl (Athene cunicularia), and valley oak woodlands.

12. Identify and describe any significant cultural resources on or near the site (*attach a "Records Search", "Site Survey", and/or other documentation, if applicable*): Will be presented in the draft EIR.

13. Identify and describe any on-site or nearby public health and safety hazards or hazardous areas (*attach a "Preliminary Site Assessment" and/or "Remediation Plan", if applicable*): Will be presented in the draft EIR.

14. Identify and describe any potentially hazardous geologic/soil conditions: Will be presented in the draft EIR.

15. Is any portion of the site subject to a 100-year flood? Yes X No _____ If so, what flood zone? 100-year flood zone of San Joaquin River.

16. Identify and describe, below, any existing and/or projected on-site ambient noise levels which exceed adopted noise standards (*plot noise contours on proposed tentative maps or on a site plan for the project, if applicable*):

    a. Do on-site ambient noise levels from existing land uses (locally regulated noise sources) located on-site or off-site exceed adopted noise standards? Yes _____ No X If so, describe: _____

    b. Does or will transportation-related noise exceed 60 dB Ldn at any exterior location or 45 dB Ldn at any interior location? ? Yes _____ No X If so, describe: _____

17. Indicate by checking (✔) whether the following public facilities/infrastructure, utilities, and services are presently or readily available to the project site and whether the proposed project can be adequately served without substantial improvements or expansion of existing facilities and services. If new or expanded/modified facilities or services are necessary, explain below.

		Yes	No	N/A
a.	Water supply/treatment facilities	☐	☐	☒
b.	Wastewater collection/treatment facilities	☐	☐	☒
c.	Storm drainage, flood control facilities	☒	☐	☐
d.	Solid waste collection/disposal/recycling services	☒	☐	☐
e.	Energy/communication services	☒	☐	☐
f.	Public/private roadway and access facilities	☒	☐	☐
g.	Public/private parking facilities	☐	☐	☒
h.	Other public/private transportation services (public transit, railway, water or air transport, etc.)	☐	☐	☒
i.	Fire and emergency medical services	☒	☐	☐
j.	Police/law enforcement services	☒	☐	☐
k.	Parks and recreation services	☐	☐	☒
l.	Library services	☐	☐	☒
m.	General government services	☐	☐	☒
n.	School facilities	☐	☐	☒

Explanation(s): _____

SIGNATURE (*Completed by Owner or Legal Agent*)

I certify, under penalty of perjury, that the foregoing is true and correct and that I am (*check one*):

☐ Legal property owner (*owner includes partner, trustee, trustor, or corporate officer*)
☒ Owner's legal agent, authorized project applicant, or consultant (*attach proof of consent to file on owner's behalf*)

Leslie Moulton
(*Signature*)

11-12-03
(*Date*)

Leslie Moulton, Environmental Science Associates
(*Type or Print Name and Title*)

C. <u>ENVIRONMENTAL SIGNIFICANCE CHECKLIST (*Completed by Lead Agency or Authorized Consultant - - Check (✔) Responses and Provide Supporting Documentation and References, as applicable]:)*</u>

- *In completing this Checklist, the Lead Agency shall evaluate each environmental issue based on the preceding Sections A and B of this Initial Study and shall consider any applicable previously-certified or adopted environmental analysis. The decision as to whether a project may have one or more significant effects shall be based on substantial evidence in light of the whole record before the Lead Agency. All answers must take into account the whole action involved, including offsite as well as onsite, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.*

- *Following each section of this Checklist is a subsection to incorporate environmental documentation and to cite references in support of the responses for that particular environmental issue. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources the Lead Agency cites (in parentheses) at the end of each section. This subsection provides (a) the factual basis for determining whether the proposal will have a significant effect on the environment; (b) the significance criteria or threshold, if any, used to evaluate each question; and (c) the new or revised mitigation measures and/or previously-adopted measures that are incorporated by reference to avoid or mitigate potentially significant impacts. Mitigation measures from Section D, "Earlier Analyses", may be cross-referenced. In addition, background and support documentation may be appended and/or incorporated by reference, as necessary. This section is required to support a "Mitigated Negative Declaration". If an Environmental Impact Report (EIR) will be prepared, this section shall provide an "EIR Scope of Work" in order to focus on issues to be addressed in the Draft EIR*

- *A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project site is not subject to flooding). A "No Impact" answer should be explained if it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).*

- *Once the lead agency has determined that a particular physical impact may occur, the checklist answers must indicate whether the impact is "Potentially Significant", "Less-than-Significant with Mitigation Incorporated", or "Less-than-Significant". "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant and mitigation measures to reduce the impact to a less-than-significant level have <u>not</u> been identified or agreed to by the project applicant. If there are one or more "Potentially Significant Impact" entries upon completing the Checklist, an Environmental Impact Report (EIR) is required.*

- *The "Less-than-Significant with Mitigation Incorporated" category applies when revisions in the project plans or proposals made, or agreed to, by the applicant would avoid or mitigate the effect(s) of the project to a point where, clearly, no significant adverse environmental effect would occur. The lead agency must describe the mitigation measures and briefly explain how they reduce the effect to a less-than-significant level. Upon completing the Checklist, if there is no substantial evidence in light of the whole record before the Lead Agency that the project, as revised, may have a significant effect on the environment, then, a "Mitigated Negative Declaration" shall be prepared.*

- *The Checklist shall incorporate references to common or comprehensive information sources [e.g., the City's General Plan, redevelopment plans, infrastructure master plans, zoning ordinance/development code(s), and related environmental documents, etc.] for potential regional (Citywide) and cumulatively considerable impacts. In addition, any prior site-specific environmental documents and/or related studies (e.g., traffic studies, geo-technical/soils reports, etc.) should be cited and incorporated by reference, as applicable. Reference to a previously prepared or outside document should, when appropriate, include a reference to the page or pages where the statement is substantiated. Referenced documents shall be available for public review in the City of Stockton Community Development Department, Planning Division, and El Dorado.*

- *Supporting Information Sources: A source list should be attached and other sources used and/or individuals contacted should be cited in the discussion.*

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
ENVIRONMENTAL SIGNIFICANCE CHECKLIST				
1. AESTHETICS - Would the project:				
a. Have a substantial adverse effect on a scenic vista?	☒	☐	☐	☐
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway?	☐	☐	☐	☒
c. Substantially degrade the existing visual character quality of the site and its surroundings?	☒	☐	☐	☐
Refer to 1a.				
d. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?	☐	☒	☐	☐

Supporting Documentation/References Cited:

a. Features associated with the proposed project, including the diversion structure and water treatment plant, will result in permanent changes to the visual and aesthetic character of the project sites. Pipeline facilities will result in short-term changes during construction but will not cause permanent visual alteration since they are buried. The diversion is proposed for location on a main delta channel which experiences significant recreational use and it is anticipated that any change to the rural character of the area will be highly visible. There also are a variety of rural residences in the area. Due to the potential sensitivity of the project area, a thorough analysis of potential visual and aesthetic issues to evaluate the potential change in visual character will be completed. This issue will be discussed in the EIR.

b. The Proposed Project will not damage scenic resources along a scenic highway.

c. See response for 1a.

d. The water treatment plant and the diversion/intake facility will be new sources of light in the project area. This issue will be discussed in the EIR. Mitigation will be incorporated into project design to eliminate the potential for significant impacts and may include the following:

- Exterior lighting will be of low-intensity used only where necessary for safety and security purposes.
- Installation of energy efficient or hooded light fixtures.
- Care will be taken during development of lighting plans to ensure that the pool of light stays on the project site and does not directly fall beyond the site.

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
2. AGRICULTURAL RESOURCES - In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation. Would the project:				
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-Agricultural use?	☒	☐	☐	☐
b. Conflict with existing zoning for agricultural use or conflict With a Williamson Act contract?	☒	☐	☐	☐
c. Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use?	☒	☐	☐	☐

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact

Supporting Documentation/References Cited:

a. Several potential sites in an area approximately three miles east of Interstate 5 on the triangular tract made by Eight Mile Road, Davis Road, and the Union Pacific Railroad tracks have been evaluated for the water treatment plant (WTP). These sites are all designated by the San Joaquin County General Plan as General Agriculture. As such, at least a portion of each site is located on Prime Farmland, according to the Farmland Mapping and Monitoring Program 2000 land use map. In addition, pipelines, which will be installed underground, will pass through agricultural lands. This issue will be discussed in the EIR.

b. The potential WTP sites and the pipeline corridors are designated by the San Joaquin County General Plan as General Agriculture. Portions of these sites are under Williamson Act contract. This issue will be discussed in the EIR.

c. The development of the Delta Water Supply Project could provide infrastructure for encouraging urban growth and development. This issue will be discussed in the EIR.

3. AIR QUALITY – When available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable Air quality plan?	☐	☒	☐	☐
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a non-attainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐
d. Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
e. Create objectionable odors affecting a substantial number of people?	☐	☒	☐	☐

Supporting Documentation/References Cited:

a. The DWSP is located within the San Joaquin Valley Air Basin, which does not meet state and federal health-based air quality standards for ozone and fine particulate matter (PM_{10}). The San Joaquin Valley Air Pollution Control District (SJVAPCD) is active in establishing and enforcing air pollution control rules and regulations in order to attain all state and federal ambient air quality standards and minimize public exposure to airborne toxins and nuisance odors. Dust and emissions from construction equipment, earth moving activities, increased traffic, and operation of the pumps at the diversion/intake facility will be the primary sources of air pollution from the DWSP. Air emissions will be generated during construction of the DWSP, which could increase criteria air pollutants, including PM_{10}.

To reduce these potential impacts to less-than-significant levels during construction, the City will incorporate specific dust control measures into construction contract documents that are consistent with SJVAPCD's revised Regulation VIII. This program may include, but not be limited to, the following measures:

- Water site prior to any construction, excavation or other earthmoving activities.
- Phase work to reduce the amount of disturbed surface area at any one time.
- Water, chemical/organic soil stabilizers/suppressants, or vegetative ground cover shall be used to control fugitive dust from all disturbed areas, including storage piles, which are not being actively used at the construction site.
- Water or chemical/organic soil stabilizers/suppressants shall be used to control fugitive dust from all unpaved roads on-site and all off-site unpaved access roads to the construction site.
- Applications of water or presoaking shall be performed to control fugitive dust from all land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities.
- Cover and wet all materials transported off-site or require all trucks to maintain at least six feet of freeboard from the top of the container.

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact

- Remove accumulated mud or dirt from adjacent public streets at least once every 24 hours during construction periods. (The use of dry rotary brushes is expressly prohibited, except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. The use of blower devices is also expressly forbidden.)
- Water or chemical soil stabilizers/suppressants shall be used to control fugitive dust after each addition of materials to or removal of materials from all storage piles.
- Limit the speed of all construction vehicles to 15 miles per hour on unpaved roads.
- Replant vegetation in disturbed areas as quickly as possible.

b. The DWSP could violate air quality standards and/or contribute substantially to an existing or projected air quality violation. Dust and emissions resulting from increased traffic, operation of the pumps at the diversion/intake facility, and from construction equipment will be the primary sources of air pollution from the DWSP.

Fugitive dust generated during construction activities will contribute to ambient particulate matter concentrations that could violate PM_{10} standards. Construction equipment and construction-worker commute vehicles will also generate criteria air pollutant emissions. Criteria pollutant emissions of reactive organic gases (ROG) and nitrogen oxides (NOx) from these emissions sources will incrementally add to regional atmospheric loading of ozone precursors during the construction period.

c. Construction emissions from the project will result in the generation of air pollutants in the project area and in the immediate vicinity that could incrementally add to cumulative emissions. The project will be built in three phases; each phase will last up to 18 months. However, construction activities will be short-term and temporary. Because the Proposed Project has the potential to induce substantial population growth by increasing the City of Stockton's water supply, the potential to increase air quality emissions as a secondary effect also exists. The increased potential growth is consistent with the place of use discussed in the current General Plan. This issue will be addressed in the EIR.

d. Air quality standards represent the level at which people can be exposed to pollutant levels before experiencing health impacts. At elevated levels, or prolonged exposure, ROG, NOx, and PM_{10} have various health effects associated with them. PM-10 can also cause a nuisance type impact. Fugitive dust generated by construction activities associated with the project may settle out on the roadways, residences and businesses located within the immediate vicinity of the project feature locations. This is considered a potentially significant impact that would be reduced to a less-than-significant level by implementation of mitigation measures.

e. No objectionable odors will be generated by the proposed WTP that will produce drinking water.

4. <u>BIOLOGICAL RESOURCES</u> - Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling hydrological interruption, or other means?	☒	☐	☐	☐
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy	☐	☒	☐	☐

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
or ordinance?				
f. Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☒	☐

Supporting Documentation/References Cited:

a. Results of biological monitoring within the central and southern portion of the Delta by the California Department of Water Resources (DWR) and CDFG, in addition to biological monitoring at the State Water Project (SWP) and Central Valley Project (CVP) water export facilities and fish salvage operations have documented the occurrence of delta smelt (*Hypomesus transpacificus*), steelhead (*Oncorhynchus mykiss*), winter-run and spring-run chinook salmon (*Oncorhynchus tshawytscha*) seasonally within the project area. Each of these species has been listed for protection as a threatened or endangered species under the Federal Endangered Species Act (FESA) and/or California Endangered Species Act (CESA). In addition, juvenile fall-run chinook salmon (fry and fingerling-smolt life stages) emigrating from the San Joaquin River tributaries will also be vulnerable to the diversion/intake facility, which will be located along the lower San Joaquin River. Methods for avoiding or minimizing the direct effects of diversion operations on the juvenile, sub-adult, and adult life stages of listed and non-listed fish species primarily rely on the design and operations of positive barrier fish screens.

Special-status animal species that could potentially be affected by installation of the diversion/intake facilities include California black rail (*Laterallus jamaicensis corturniculus*), giant garter snake (*Thamnophis gigas*), great blue heron (*Ardea herodias*), and western pond turtle (*Clemmys marmorata*). However, the diversion/intake site is considered to have low capability to support these species because of the limited presence of suitable habitat in the vicinity.

Special-status species that could potentially be affected by construction of the water treatment plant and the pipeline alignment will likely be limited to giant garter snake, Swainson's hawk (*Buteo swainsoni*), and burrowing owl (*Athene cunicularia*). Valley oak woodlands may also be affected. It is expected that potential impact to these resources from construction either can be avoided and/or mitigated to less than significant impact.

b. See response for 4a.

c. The diversion/intake facility will be constructed in the San Joaquin River. The intake structure will require a Section 10 permit (Rivers and Harbors Act) and a Section 404 permit (Clean Water Act) from the U.S. Army Corps of Engineers. It is expected that pipelines and diversion/intake structure construction will result in only limited impacts to wetlands and that a Nationwide Permit from the Corps will be adequate. A Lake and Streambed Alteration Agreement will be required by the California Department of Fish and Game (CDFG) for the diversion/intake structure, and in any areas of stream crossing/disruption. However, pipelines are expected to be installed with jack and bore techniques under streams/rivers and waterways.

d. See response for 4a.

e. Construction of the water treatment plant and pipelines could conflict with the San Joaquin County tree ordinance, which protects Native Oak Trees, Heritage Oak Trees, or Historical Oak Trees. If trees are removed during construction, they will be replaced at a ratio of three acorns or trees per tree removed, and will be maintained for a minimum of three years, as prescribed by the County.

f. The Proposed Project should not conflict with the San Joaquin County Multi-species Habitat Conservation and Open Space Plan (HCP) that was adopted by the San Joaquin Council of Governments on December 7, 2000. However, open space may be affected during construction of the water treatment plant and pipelines. If a conflict arises, the Proposed Project will provide mitigation as described in the HCP for impacts to sensitive biological resources and loss of habitat resulting from construction. A request will be made to the COG for the inclusion of the Proposed Project in the HCP.

5. CULTURAL RESOURCES - Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Cause a substantial adverse change in the significance Of a historical resource as defined in Section 15064.5?	☐	☒	☐	☐
b. Cause a substantial adverse change in the significance Of an archaeological resource pursuant to Section 15064.5?	☐	☒	☐	☐
c. Directly or indirectly destroy a unique pale ontological resource or site or unique geologic feature?	☐	☒	☐	☐

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
d. Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Supporting Documentation/References Cited:

a. There are no substantial cultural resource constraints affecting the water treatment site and associated pipeline alignment. However, based on existing data files from the Central California Information Center (CCIC), California State University Stanislaus (CSUS), Turlock, California, the project area was determined to have a moderate sensitivity for the possible discovery of historical resources, including prehistoric habitation remains, and historic occupation and agriculture-related features. The CICC recommends that prior to construction, a survey be conducted by a qualified archaeologist for the areas that have not been subject to previous survey. This issue will be discussed in the EIR.

b. See response for 5a.

c. See response for 5a.

d. See response for 5a.

6. GEOLOGY AND SOILS - Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
(1) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
(2) Strong seismic groundshaking?	☐	☐	☒	☐
(3) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
(4) Landslides?	☐	☐	☒	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c. Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d. Be located on expansive soil, as defined in Table 18-1-B of the California Building Code (1998), creating substantial risks to life or property?	☐	☐	☒	☐

Supporting Documentation/References Cited:

a. The Proposed Project will not result in exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death. Prior to final design and construction, a comprehensive subsurface geotechnical investigation will be prepared to evaluate the potential for unstable and corrosive soil conditions, shrinks/swell potential, liquefaction potential, and earthquake fault and related hazards. The Proposed Project will be designed and constructed to meet the most current seismic and geotechnical standards and will incorporate any mitigation measures identified in the subsurface geotechnical investigation to reduce the risk for substantial adverse effects, including the risk of loss, injury, or death. As a result, any remaining potential impacts are considered to be less-than-significant.

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact

b. During project construction, grading and other soil disturbing activities will introduce the potential for soil erosion. As a result a mitigation program will be instituted that may include, but not be limited to, the following measures:

- Restore Ground Surface and Topography**.** After pipelines are installed, compacted backfill will be placed and the ground surface shall be restored to its original condition and topography. In addition, soil stockpiled and replaced on-site following construction. In locations where construction will be within the 100-year floodplain, pre-construction grades shall be re-established and excess earth shall be removed.
- Require Soil Stockpiling and Disposal Standards**.** Temporary stockpiling of excavated or imported material will occur only in approved construction staging areas. Excess excavated soil shall be disposed of at an approved and/or properly permitted location. Temporary or permanent soil disposal stockpile areas will be outside of jurisdictional wetlands, riparian areas, and oak woodlands. Stockpiles that are to remain on the site through the wet season will be protected to prevent erosion and shall not be located within floodplain.
- Prepare Erosion and Sedimentation Control Plan. The City will prepare and implement an erosion and sedimentation control and revegetation plan. The plan shall included specific measures to accomplish erosion and sediment control, minimize removal of natural vegetation, particularly riparian vegetation.

With the implementation of the above mitigation measures, potential soil erosion and loss of topsoil impacts are considered to be less-than-significant.

c. See response for 6a.

d. See response for 6a.

7. HAZARDS AND HAZARDOUS MATERIALS - Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c. Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e. Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f. Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the Project area?	☐	☐	☐	☒
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where	☐	☒	☐	☐

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact

residences are intermixed with wildlands?

Supporting Documentation/References Cited:

a. Operation of water treatment plant will involve the routine transportation, use, or disposal of hazardous materials such as ferric chloride, sodium hypochlorite, and sodium hydroxide. It is anticipated that limited quantities of miscellaneous hazardous substances, such as gasoline, diesel fuel, hydraulic fluids, paint, and other similarly related materials will be brought onto the project site, used, and stored during the construction period. Mitigation will include the preparation of a hazardous materials management plan that will be implemented to ensure that that all contractors transport, store, handle and dispose of construction-related hazardous materials in a manner consistent with the relevant regulations and guidelines.

b. See response for 7a.

c. No schools are located within one-quarter mile of the proposed water treatment plant site. Therefore, the Proposed Project will not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within a quarter mile of an existing or proposed school. In addition and as discussed in the project description, all hazardous materials will be transported, stored and handled in a manner consistent with relevant regulations and guidelines. As a result, no impacts are anticipated.

d. A Phase 1 Environmental Assessment will be prepared to determine if there is a recognized environmental condition along the pipeline corridors or at the water treatment plant and diversion/intake sites. The findings of the Phase 1 will be issued and summarized in the EIR.

e. The site is not subject to regular overflight by aircraft. The Proposed Project is not located in an airport land use area; nor is it in the vicinity of a public or private airstrip that could potentially pose a hazard to future occupants. As a result, no impacts are anticipated.

f. See response for 7e.

g. The Proposed Project will not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. As a result, no impacts are anticipated.

h. The Proposed Project is located in agricultural areas where the risk of wildland fire is considered to be moderate and therefore has the potential to expose people or structures to a significant risk of loss, injury or death involving wildland fires. Mitigation will include a fire prevention program. In addition, during construction staging areas, welding areas, or areas slated for development using spark-producing equipment shall be cleared of dried vegetation or other materials that could serve as fire fuel. To the extent feasible, the contractor shall keep these areas clear of combustible materials in order to maintain a firebreak. Any construction equipment (vehicles, heavy equipment, chainsaws, etc.) that normally includes a spark arrester shall be equipped with an arrester in good working order.

8. HYDROLOGY AND WATER QUALITY - Would the project:	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements?	☐	☒	☐	☐
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (E.G., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite?	☐	☒	☐	☐

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?	☐	☒	☐	☐
e. Create or contribute runoff water that would exceed the Capacity of existing or planned stormwater drainage Systems or provide substantial additional sources of polluted runoff?	☐	☒	☐	☐
f. Otherwise substantially degrade water quality?	☐	☒	☐	☐
g. Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard Delineation map?	☐	☐	☐	☒
h. Place structures within a 100-year flood hazard area that would impede or redirect floodflows?	☐	☒	☐	☐
i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j. Contribute to inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

Supporting Documentation/References Cited:

a. Construction activities could result in temporary, minor, and highly localized soil erosion and waste discharge issues. As a result, the following mitigation measures would be implemented to reduce impact to less-than-significant.

- Limit in-stream work.
- In-stream sediment curtains.
- Locate spoil and staging areas away from surface waters.
- Locate Equipment and Materials Away from Surface Waters.
- Restore ground surface and topography.
- Require soil stockpiling and disposal standards.
- Prepare Erosion and Sedimentation Control Plan.

Operational effects of the Delta water diversion on other Delta water users will be analyzed in the EIR.

b. The primary objectives for the Proposed Project include the protection and restoration of groundwater supplies. The Proposed project will include a groundwater recharge pilot program. Treated surface water will be injected into the groundwater aquifer for storage until needed later, when it will pumped or "recovered" from the groundwater aquifer for use. This type of groundwater program is often referred to as an Aquifer Storage and Recovery (ASR) program. The Proposed Project will benefit groundwater resources.

c. The Proposed Project could alter the existing drainage pattern of the proposed facility sites in a manner that will result in substantial erosion or siltation on- or off-site. However, by restoring ground surface and topography, these impacts are less-than significant.

d. The construction of the water treatment plant and pump building at the diversion/intake site will result in changes to the existing drainage at those sites. It will also result in a substantial decrease in the water infiltration capacity at these sites due to an increase in the amount of impervious surface. However through mitigative measures, these impacts are less-than significant.

e. See response for 8d.

f. See response for 8a.

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact

g. The Proposed Project will not redirect flood flows or otherwise place housing within a 100-year flood hazard area. No impacts are anticipated.

h. The diversion/intake facility will be located within a 100-year flood hazard area of the San Joaquin River.

i. The Proposed Project will not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of a failure of a levee or dam. No impacts are anticipated.

j. Because the Proposed Project is not located near the ocean or any large water bodies, risks associated with a seiche or tsunami are not anticipated. In addition, the project sites is essentially level, with minimal hazards from mudflows. No impacts are anticipated.

9. LAND USE AND PLANNING - Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Physically divide an established community?	☐	☐	☐	☒
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☒	☐
d. Result in land use/operational conflicts between existing and proposed on-site or off-site land uses?	☐	☒	☐	☐

Supporting Documentation/References Cited:

a. The Proposed Project will not physically divide an established community. The San Joaquin County General Plan designates the diversion/intake site as Open Space, with surrounding land uses designated General Agriculture. The General Plan designates the water treatment plant site as General Agriculture, with surrounding land uses designated Residential to the south and General Agriculture to the north, west, and east.

b. A change in zoning will be required for the Proposed Project. However, the change will be consistent with the San Joaquin General Plan.

c. The Proposed Project should not conflict with the San Joaquin County Multi-species Habitat Conservation and Open Space Plan (HCP) that was adopted by the San Joaquin Council of Governments on December 7, 2000. However, open space may be affected during construction of the water treatment plant and pipelines. If a conflict arises, the Proposed Project will provide mitigation as described in the HCP for impacts to sensitive biological resources and loss of habitat resulting from construction.

d. The Proposed Project will result in the conversion of agricultural lands into project lands. In addition, Delta waters will be converted from recreational uses to project uses. Navigation in the San Joaquin River (Stockton Deep Water Channel) may be affected by the diversion/intake facility.

10. MINERAL RESOURCES - Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

Supporting Documentation/References Cited:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact

a. The Proposed Project will not be located on sites that are identified as a significant source of mineral resources. As a result, the Proposed Project will not result in the loss of availability of known classified MRZ-2 by the State geologist that would be of value to the region and the residents of the state. Therefore, no impacts are anticipated.

b. The San Joaquin General Plan does not identify any locally important mineral resources or recovery sites in the Proposed Project sites. Further, as discussed in 10a, the Proposed Project will be unlikely to result in the loss of availability of a mineral resource deposit that has been identified as a mineral resource of value. Therefore, no adverse impacts are anticipated. No mitigation is required.

11. NOISE - Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Expose persons to or generate noise levels in excess of Standards established in a local general plan or noise Ordinance or applicable standards of other agencies?	☐	☒	☐	☐
b. Expose persons to or generate excessive groundborne Vibration or groundborne noise levels?	☐	☒	☐	☐
c. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
d. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e. Be located within an airport land use plan area, or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f. Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Supporting Documentation/References Cited:

a. The Proposed Project has the potential to generate noise during the construction phase through use of equipment and additional construction vehicle trips. As a result, the following mitigation measures will be implemented to reduce impact to less-than-significant.

- Construction activities will be limited to the least noise-sensitive times in sensitive areas (7:00 a.m. to 7:00 p.m., Monday through Friday).
- The contractor will select staging areas as far as feasibly possible from sensitive receptors.
- The contractor will maintain all construction equipment with manufacturer's specified noise-muffling devices.
- Unnecessary idling of internal combustion engines will be prohibited.
- All stationary noise-generating construction equipment such as air compressors will be located as far as possible from homes and businesses.

Operation of the Proposed Project will also generate noise. This issue will be discussed in the EIR.

b. See response for 11a.

c. Operation of the water treatment plant and the diversion/intake facility will increase the ambient noise levels above existing levels without the project. Mitigation will be discussed in the EIR.

d. See responses for 11a and 11c.

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact

e. The Proposed Project is not located within an airport land use plan or within two miles of a public airport or public use airport. Therefore, no impacts are anticipated.

f. The Proposed Project is not within the vicinity of a private airstrip. Therefore, no impacts are anticipated.

12. POPULATION AND HOUSING - Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	☒	☐	☐	☐
b. Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c. Displace a substantial number of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Supporting Documentation/References Cited:

a. The Proposed Project has the potential to induce substantial population growth indirectly by increasing the City of Stockton's water supply. This issue will be addressed in the EIR.

b. The Proposed Project will not result in displacing substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere. Therefore, no impacts are anticipated.

c. The Proposed Project will not displace substantial numbers of people necessitating the construction of replacement housing elsewhere. Therefore, no impacts are anticipated.

13. PUBLIC SERVICES - Would the project:

a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
(1) Fire protection?	☐	☒	☐	☐
(2) Police protection?	☐	☒	☐	☐
(3) Schools?	☐	☒	☐	☐
(4) Parks?	☐	☒	☐	☐
(5) Other public facilities?	☐	☒	☐	☐

Supporting Documentation/References Cited:

a. The Proposed Project will not generate a significant demand for services. However, increased demand for services will be addressed as a potential of secondary growth effects in the EIR.

14. RECREATION - Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial	☐	☒	☐	☐

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
physical deterioration of the facility would occur or be accelerated?				
b. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☒	☐	☐

Supporting Documentation/References Cited:

a. The Proposed Project will have no direct effect on increasing the use of recreational facilities. However, it has the potential to induce substantial population growth by increasing the City of Stockton's water supply, which has the potential to increase the use of existing neighborhood and regional parks or other recreational facilities. This issue will be addressed in the EIR.

b. The Proposed Project will have no direct effect on the need for additional need for recreational facilities. However, it has the potential to induce substantial population growth by increasing the City of Stockton's water supply, which has the potential to require an expansion or new recreational facilities. This issue will be addressed in the EIR.

15. TRANSPORTATION/TRAFFIC - Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?	☐	☒	☐	☐
b. Cause, either individually or cumulatively, exceedance of a level-of-service standard established by the county congestion management agency for designated roads or highways?	☐	☒	☐	☐
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d. Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e. Result in inadequate emergency access?	☐	☐	☒	☐
f. Result in inadequate parking capacity?	☐	☐	☒	☐
g. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☒	☐

Supporting Documentation/References Cited:

a. Construction activities of the Proposed Project will temporarily generate a slight increase in local traffic due to construction related worker trips and truck movements to and from construction sites. However, these impacts are expected to be less-than-significant. Because the Proposed Project has the potential to induce substantial population growth by increasing the City of Stockton's water supply, the potential to increase traffic as a secondary effect also exists. The increased potential growth is consistent with the place of use discussed in the current General Plan. This issue will be addressed in the EIR.

b. Potential traffic-related impacts of the Proposed Project will also be assessed under future cumulative conditions in the EIR.

c. The Proposed Project is not located in the vicinity of a public or private airstrip and will not affect existing air traffic patterns. Therefore, no impacts are anticipated.

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact

d. The Proposed Project does not propose to make changes to roadways that will create road hazards or alter design features developed to mitigate such hazards. Therefore, no impacts are anticipated.

e. Construction activities of the Proposed Project could have the potential to create temporary inadequacies in emergency access to the residents on local roadways. However, this impact will be mitigated by the preparation of a traffic control plan. As a result, impacts are anticipated to be less-than-significant.

f. Project-related construction activities will require additional parking for workers and equipment on a temporary basis. However, temporary parking and staging areas will be designated to satisfy these needs. As a result, no significant impacts are anticipated.

g. Alternative transportation is not part of the Proposed Project, nor is the project expected to create conditions that conflict with adopted policies supporting alternative transportation. Therefore no impacts are anticipated.

16. UTILITIES AND SERVICE SYSTEMS - Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☒	☐	☐
c. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or would new or expanded entitlements be needed?	☐	☒	☐	☐
e. Result in a determination by the wastewater treatment Provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☒	☐	☐
g. Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

Supporting Documentation/References Cited:

a. The Proposed Project will not exceed wastewater treatment requirements of the Central Valley Regional Water Quality Control Board. Therefore, no impacts are anticipated.

b. The Proposed Project involves the construction of a new water treatment facility. The Proposed Project will not directly require the construction of wastewater treatment facilities. However, because the Proposed Project has the potential to induce population growth by increasing the City of Stockton's water supply, the potential to need additional wastewater treatment facilities as a secondary effect also exists. The increased potential growth is consistent with the place of use discussed in the current General Plan. This issue will be addressed in the EIR.

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact

c. The Proposed Project will not directly require additional or expanded stormwater conveyance facilities that will cause significant adverse environmental effects. As a result, potential impacts to storm drain facilities as a result of the Proposed Project/ are considered to be less-than-significant. No mitigation is required.

d. The purpose of the Proposed Project is to provide water supplies. This issue will be addressed in the EIR.

e. The Proposed Project will not generate any significant additional demands for wastewater treatment. Therefore, no significant impacts are anticipated.

f. Construction of the Proposed Project will not directly generate a significant amount of solid wastes. Operation of the water treatment plant will generate residuals (solid wastes). These materials will be collected and placed in sludge lagoons. Dried sludge will then be hauled off-site for disposal. This issue will be discussed in the EIR.

g. The Proposed Project will comply with all relevant federal, state, and local statutes and regulations related to solid waste. Therefore, no impacts are anticipated.

17. OTHER ISSUE(S) - Would the project:

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Result in, contribute to, or substantially affect other environmental issues(s)? If so, specify below and evaluate:				
(1)	☐	☐	☐	☒

Supporting Documentation/References Cited:

18. MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b. Does the project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☒	☐	☐	☐
c. Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Supporting Documentation/References Cited:

a. The Proposed Project would have the potential to degrade the quality of the environment, through the reduction in habitat for certain wildlife species. These impacts will be thoroughly analyzed in the EIR. Cumulative impacts to wildlife species and mitigation measures will be provided according in the EIR.

b. Impacts that would be cumulatively considerable during construction/operation and with future population growth for the City of Stockton will be analyzed in the EIR. These impacts include, but are not limited to, air quality, water quality, transportation, noise, agriculture, recreation, biological resources, and existing infrastructure.

c. The Proposed Project could have substantial indirect impacts on the resident population by supporting an increase in the population that would result in an increased demand for public services and facilities. These potential service-oriented impacts will be evaluated in the EIR.

	Potentially Significant Impact	Less than Significant w/Mitigation Incorporated	Less-than-Significant Impact	No Impact

D. EARLIER ANALYSIS *(Completed by Lead Agency or Authorized Consultant)*: *{ If not applicable, check* (✔) *here* ☒ *}*

Earlier analyses may be used where, pursuant to the tiering, Program EIR, or other CEQA process, one or more effects have been adequately analyzed in an earlier EIR or Initial Study/Negative Declaration [Section 15063(c)(3)(D) of the State CEQA Guidelines]. The previously-certified or adopted environmental document(s) and any applicable adopted mitigation measures, CEQA "Findings", statements of overriding consideration, and mitigation monitoring/reporting programs are incorporated by reference, as cited below, and discussed on attached sheet(s) to identify the following:

(a) Earlier Analysis Used – Identify earlier analyses that adequately address project impacts and that are available for review at the City of Stockton Community Development Department, Planning Division 345 N. El Dorado Street, Stockton, CA:

Initial Study/Negative Declaration File No.: _____ Title: _____
State Clearinghouse No.: _____

Final EIR File No.: _____ Title: _____
State Clearinghouse No.: _____

Other Environmental Document No. _____ Title: _____
State Clearinghouse No.: _____

(b) Impacts Adequately Addressed - - Identify which effects from the above Checklist (Section C) were within the scope of, and adequately analyzed in, an earlier document pursuant to applicable legal standards.

(c) Mitigation Measures - - For effects that are "Less than Significant with Mitigation Incorporated," specify whether any applicable mitigation measures are incorporated or refined from the earlier document to address site-specific conditions for the project.

(d) CEQA Findings, Statements of Overriding Consideration, and Mitigation Monitoring/Reporting Programs - - Indicate whether applicable previously adopted CEQA Findings, overriding considerations, and mitigation monitoring/reporting provisions have been relied upon and incorporated into the proposed project, pursuant to Sections 15150 (Incorporation by Reference) and 15152(f)(3) (Tiering) of the State CEQA Guidelines.

ENVIRONMENTAL ISSUE:	Adequately Addressed By Earlier Analysis	Earlier Mitigation/Findings/ Monitoring Incorporated	Not Applicable
1. AESTHETICS	☐	☐	☐
2. AGRICULTURAL RESOURCES	☐	☐	☐
3. AIR QUALITY	☐	☐	☐
4. BIOLOGICAL RESOURCES	☐	☐	☐
5. CULTURAL RESOURCES	☐	☐	☐
6. GEOLOGY AND SOILS	☐	☐	☐
7. HAZARDS AND HAZARDOUS MATERIALS	☐	☐	☐
8. HYDROLOGY AND WATER QUALITY	☐	☐	☐
9. LAND USE AND PLANNING	☐	☐	☐
10. MINERAL RESOURCES	☐	☐	☐
11. NOISE	☐	☐	☐
12. POPULATION AND HOUSING	☐	☐	☐
13. PUBLIC SERVICES	☐	☐	☐
14. RECREATION	☐	☐	☐
15. TRANSPORTATION/TRAFFIC	☐	☐	☐
16. UTILITIES AND SERVICE SYSTEMS	☐	☐	☐
17. OTHER ISSUE(S):	☐	☐	☐
18. MANDATORY FINDINGS OF SIGNIFICANCE	☐	☐	☐

E. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED [*Completed by Lead Agency or Authorized Consultant* - -Check (✔), as applicable]:

The environmental factors checked below would potentially be affected by this project (i.e., the project would involve at least one impact that is a "Potentially Significant Impact"), as indicated in the preceding Checklist (Section C) and the Earlier Analysis (Section D):

☒ Aesthetics	☒ Agricultural Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☒ Geology/Soils
☒ Hazards and Hazardous Materials	☒ Hydrology/Water Quality	☐ Land Use/Planning
☐ Mineral Resources	☒ Noise	☒ Population/Housing
☒ Public Services	☒ Recreation	☒ Transportation/Traffic
☒ Utilities/Service Systems	☐ Other Issue(s) (See Section C)	☒ Mandatory Findings of Significance

F. REFERENCES CITED AND PERSONS CONSULTED *(Completed by Lead Agency or Authorized Consultant):*

_____
_____
_____

Authority: Public Resources Code Sections 21083 and 21087.
Reference: Public Resources Code Sections 21080(c), 21080.1, 21080.3, 21082.1, 21083, 21083.3, 21093, 21094, 21151; *Sundstrom v. County of Mendocino*, 202 Cal. App. 3d 296 (1988); *Leonoff v. Board of Supervisors*, 222 Cal. App. 3d 1337(1990).

G. DETERMINATION [*Completed by Lead Agency - -*Check (4), as applicable]:

On the basis of this initial evaluation and on substantial evidence in light of the whole record before the Lead Agency:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project could have a significant effect on the environment, however, there will not be a significant effect in this case because revisions to the project have been made by or agreed to by the project proponent (see attached Mitigation Agreement). A ☐ MITIGATED NEGATIVE DECLARATION or ☐ ADDENDUM to a MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT (EIR), is required. A ☒ Project EIR; ☐ Staged EIR; or ☐ Program EIR will be prepared.

Phase I will be addressed at the project level; phases II-IV will be addressed at the program level.

☐ I find that the proposed project MAY have an impact on the environment that is "potentially significant" or "potentially significant unless mitigated" but at least one effect: (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards and (2) has been addressed by mitigation measures based on the earlier analysis, as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT (EIR) is required, but it must analyze only the effects that remain to be addressed. A ☐ Subsequent EIR; ☐ Supplement to an EIR; or ☐ Addendum to an EIR will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or MITIGATED NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or MITIGATED NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the project, nothing further is required. Specifically, the environmental documentation for the proposed project is provided by the document(s) identified in Section D. above.

(Pursuant to the State and City Guidelines for Implementation of CEQA, the determination of the Community Development Director may be appealed to the City Planning Commission by submitting a written appeal with the applicable fee to the Community Development Department within ten (10) calendar days following this date of the determination.)

JAMES E. GLASER, DIRECTOR
COMMUNITY DEVELOPMENT DIRECTOR

By: ______________________ (Signature of Planner)

Date: 11-12-03 (Date of Determination)

David Stagnaro, Senior Planner
(Name and Title of Planner – Typed or Printed)

NOP COMMENTS

For

DELTA WATER SUPPLY PROJECT

Comment Period Ending December 16, 2003

CONTRA COSTA
WATER DISTRICT

1331 Concord Avenue
P.O. Box H20
Concord, CA 94524
(925) 688-8000 FAX (925) 688-8122

December 16, 2003

RECEIVED
DEC 17 2003
CITY OF STOCKTON
PERMIT CENTER/PLANNING DIVISION

Mr. David Stagnaro
City of Stockton
c/o Community Development Department
Planning Division
425 North El Dorado Street
Stockton, CA 95202-1997

Subject: Contra Costa Water District Comments on the Notice of Preparation for the City of Stockton's Delta Water Supply Project

Dear Mr. Stagnaro:

Contra Costa Water District (CCWD) appreciates this opportunity to comment on the Notice of Preparation of a draft environmental impact report for the City of Stockton's Delta Water Supply Project. The Delta Water Supply Project is a conjunctive use program that includes diversion, conveyance, and treatment facilities with an ultimate capacity of 160 million gallons per day, and an aquifer storage and recovery program.

CCWD is a publicly owned water supply agency serving municipal and industrial water to about 450,000 people in central and eastern Contra Costa County, with a vital interest in protecting the quality and reliability of its Delta water supply. A description of CCWD's facilities and operations is attached.

CCWD supports efforts to enhance water supply reliability, but these efforts must not degrade the quality or reduce the reliability of the water supply that CCWD diverts from the Delta. The following issues should be fully addressed in the environmental documentation for the Delta Water Supply Project:

- CCWD holds water rights to divert water from the Sacramento-San Joaquin Delta, and by virtue of the location of its service area is entitled to the same protections under the Delta Protection Act and area of origin statutes as other in-Delta water users. CCWD requests that the EIR acknowledge that the proposed Project's diversions of water by the City of Stockton, other than water rediverted under Water Code Section 1485, are junior to the rights held by CCWD.

- The EIR must clarify which diversions by the City of Stockton will be subject to Term 91. CCWD is a Central Valley Project contractor and has an interest in protecting the reliability of its CVP water supply, including in particular releases from CVP storage to meet Delta water quality standards.

- Project impacts to the drinking water quality for CCWD, Metropolitan Water District of Southern California, Santa Clara Valley Water District, and other urban water users that rely on the Delta for their water supply must be analyzed. The environmental documentation must include analysis of water quality variations at CCWD's Delta intakes and the quality of water delivered to CCWD's customers, with a discussion of any resultant increase in public health risks, the reduction of CCWD's water supply reliability because Los Vaqueros Reservoir cannot be filled or filling is delayed, impairment of the taste of the water that CCWD delivers to its customers, and other related impacts to CCWD. Significant impacts on water quality can occur even when Bay-Delta water quality standards are not exceeded.

- Water quality impacts must be analyzed and disclosed as monthly averages for the full 1922-1994 simulation period used for analyzing other Bay-Delta projects. The data should be provided for CCWD's three Delta intakes (Rock Slough at Pumping Plant #1, Old River at the Highway 4 crossing and Mallard Slough), and at the compliance locations for the State Water Resources Control Board's Water Quality Control Plan (Banks Pumping Plant, Tracy Pumping Plant, Jersey Point, Emmaton, Collinsville, Chipps Island, and Roe Island). The last three locations are linked to CCWD's ability to fill Los Vaqueros Reservoir under its Delta smelt biological opinion.

- In particular, the EIR must analyze the water quality impacts resulting from the proposed increased releases from the Stockton waste water treatment plant and any corresponding impacts from the reduced dilutions resulting from the subsequent downstream diversion.

- Adverse impacts on Delta water quality can produce even larger impacts on the quality of water delivered by CCWD to its customers. CCWD requests that modeling data for the Project be provided to CCWD in advance of the Draft EIR so CCWD can analyze the impacts of any Delta water quality degradation on the quality of water delivered to its customers. Degradation of Delta water quality can directly impact operation of CCWD's Los Vaqueros Reservoir by:
    1. Requiring CCWD to release more blending water to mitigate for higher salinities in the water diverted by CCWD from the Delta;
    2. Reducing the availability of high quality water for diversion by CCWD to fill Los Vaqueros Reservoir;
    3. Degrading the quality of blending water stored in Los Vaqueros Reservoir;
    4. Reducing the amount of blending water and emergency water supply available for CCWD in Los Vaqueros Reservoir; and
    5. Causing CCWD to use up its blending water earlier, so that CCWD will be forced to deliver unblended high salinity water directly from the Delta more frequently and/or for longer periods of time.

- The environmental documentation must disclose modeling results for end of month storage, monthly flow, and exports for the key Central Valley and Delta reservoirs, waterways and project facilities over the full 1922-1994 simulation period used for other

Bay-Delta projects. Of particular importance is the availability of surplus flow for filling Los Vaqueros Reservoir under CCWD's Los Vaqueros water rights (SWRCB Decision 1629).

- Any adverse water quality impacts must be avoided or mitigated. The environmental documentation must disclose how this will be achieved. Such mitigation could involve bundling with other CALFED projects that are being implemented in a similar time frame.

- Impacts on Bay-Delta fisheries and other Delta ecosystem impacts must be fully analyzed and disclosed. Protection of the Bay-Delta ecosystems is one of CCWD's obligations and key interests.

In addition, the project must be consistent with and contribute to the CALFED commitment to continuous water quality improvement, either as an individual project or packed with other related projects in the same general vicinity. To ensure that the CALFED Program is implemented in a balanced way, water supply, water quality and ecosystem restoration projects must move forward together.

Again, CCWD appreciates this opportunity to comment. If you have any questions, please contact me at (925) 688-8187.

Sincerely,

Richard A. Denton
Water Resources Manager

RAD/JWQ

Attachment: Contra Costa Water District facilities and operations

CCWD OPERATIONS AND FACILITIES

The Contra Costa Water District ("CCWD") serves approximately 450,000 people throughout central and eastern Contra Costa County. Its customers also include 9 major industries, 36 smaller industries and businesses, and 50 agricultural users. The mission of the Contra Costa Water District is to strategically provide a reliable supply of high quality water at the lowest cost possible, in an environmentally responsible manner.

CCWD operates raw water distribution facilities, water treatment plants, and treated water distribution facilities. CCWD supplies raw and treated water to Antioch, Clayton, Concord, Diablo Water District (serving Oakley), Pittsburg, Southern California Water Company (serving Bay Point), Martinez, and parts of Brentwood, Pleasant Hill and Walnut Creek.

The treated water service area for CCWD encompasses all or part of the cities of Concord, Clayton, Clyde, Pleasant Hill, Walnut Creek, Martinez, and Port Costa. Treated water for this service area is provided from the District's Bollman Water Treatment Plant in Concord. The Bollman facility is a 75 MGD conventional plant recently upgraded to include ozonation. CCWD also supplies treated water to the Diablo Water District ("DWD"), which serves customers in Oakley from the Randall-Bold Water Treatment Plant, jointly owned by CCWD and DWD. That plant is a 40 MGD direct/deep-bed filtration plant and utilizes both pre- and post-ozonation to provide a high quality drinking water to the customers in its service area.

CCWD is dependent on the Delta for its water supply. The Contra Costa Canal and the Los Vaqueros Project (completed in 1998) make up CCWD's principal water supply and delivery system. CCWD diverts unregulated flows and regulated flows from storage releases from Shasta, Folsom, and Clair Engle reservoirs into the Sacramento River as a contractor of the United States Bureau of Reclamation's ("Reclamation") Central Valley Project ("CVP"). Under Water Service Contract I75r-3401 (amended) with Reclamation, CCWD can divert and re-divert up to 195,000 acre-feet annually ("AFA") of water from Rock Slough and the Old River intake. Currently, CCWD uses between 125,000 and 140,000 AFA. CCWD can also divert up to 26,780 AFA of water from Mallard Slough under its own water rights (Water Rights License No.3167 and Permit No.19856). Some CCWD customers have additional sources of water. The City of Antioch has a water rights permit to divert water from the lower San Joaquin River. Pittsburg, Brentwood, and DWD all have wells that can provide a portion of their needs.

CCWD has obtained its water supply from the Delta since 1940. Delta water is subject to large variations in salinity and mineral concentrations. The Delta is also vulnerable to many anthropogenic and natural sources of water quality degradation. Degradation in water quality is objectionable to many CCWD customers, costly to all residential and industrial users, and a health risk for some individuals. The most recent federal drinking water regulations implemented in December 1998 impose stringent limits on disinfection by-products in treated water, making it difficult to achieve the required pathogen inactivation while minimizing disinfection by- product formation. Bromide and Total Organic Carbon (TOC) are the significant constituents in Delta water that affect CCWD's ability to meet disinfection by product standards. Currently, CCWD's primary means of ensuring that disinfection by-product standards are met in the treated water is to ensure that bromide and TOC levels in the source water from the Delta are maintained below certain levels. Chlorides are monitored as an indicator of bromide and TOC levels. CCWD watches chloride levels in the Delta and adjusts operations to meet water quality goals in the source water to keep chlorides at an acceptable level. Bromide and TOC are not the only constituents of concern. Pathogens, nutrients, and other constituents contribute to the challenges of meeting regulations for treated water using Delta water as the source.

Contra Costa Water District is committed to supplying its customers with the highest quality water practicable and providing all reasonable protection of the supply from any known or potential source of contamination. CCWD Resolution No. 88-45 states in part that:

"CCWD is committed to reducing the concentration of sodium and chloride in the District's water, thereby reducing household and landscape irrigation concerns and industrial and manufacturing costs caused by the fluctuating sodium and chloride level of CCWD's Delta source...."

In May 1987, CCWD's Board of Directors adopted water quality objectives for water distributed within its service area. The acceptable concentration levels for sodium and chloride were established at 50 milligrams per liter (mg/l) and 65 mg/l, respectively. In 1988, the voter-constituents of CCWD approved the issuance of bonds to finance a $450 million water quality and reliability project known as the Los Vaqueros Project. The primary purposes of the Los Vaqueros Project are to improve the quality of water supplied to CCWD customers and minimize seasonal quality changes, and to improve the reliability of the emergency water supply available to CCWD. The Los Vaqueros Project consists of a reservoir with 100,000 acre-feet of storage, a new point of diversion at Old River, south of the Highway 4 crossing, which operates in conjunction with the current Rock Slough diversion point, plus associated water conveyance and delivery facilities, pumping plants, and other facilities.

On June 2, 1994, the State Water Resources Control Board issued Decision 1629 which gives CCWD additional rights to divert and store water for beneficial uses. The State Board subsequently issued Water Rights Permits No. 20749 and 20750 for filling Los Vaqueros Reservoir from the new intake at Old River and diversion and storage of the water of Kellogg Creek. These rights are in addition to the contractual rights to divert and store water furnished through the CVP. Construction of the reservoir began in September 1994 and was completed in January 1998. Diversion from the Old River intake for delivery to CCWD's service area began in the summer of 1997. On January 28, 1999, the first filling of Los Vaqueros Reservoir to 100,000 acre-feet was completed. Up to 95,850 AFA may be diverted for storage between November 1 of each year to June 30 of the succeeding year under Water Rights Permit No. 20749.

A key to successful performance of the Los Vaqueros Project is the District's ability to fill and continue to refill the reservoir from Old River with high quality water at times when it is available, typically late winter through early summer, and to use that water for blending when salinity at the District's Delta intakes exceeds the 65 mg/L chloride goal, generally late summer through early winter. Any increase in Delta salinity caused by new Bay-Delta projects will increase the demand on blending water from the reservoir and affect the availability of high quality water for refilling. The District and its 450,000 customers will be impacted through higher pumping costs to replace the extra blending water that is released and through the additional treatment costs, increased corrosion and health effects of delivering higher salinity water. This erodes the $450 million investment CCWD's customers have made in the Los Vaqueros Project.

CITY COUNCIL
LARRY D. HANSEN, Mayor
JOHN BECKMAN
Mayor Pro Tempore
EMILY HOWARD
SUSAN HITCHCOCK
KEITH LAND

CITY OF LODI

CITY HALL, 221 WEST PINE STREET
P.O. BOX 3006
LODI, CALIFORNIA 95241-1910
(209) 333-6714
FAX (209) 333-6842

H. DIXON FLYNN
City Manager
SUSAN J. BLACKSTON
City Clerk
RANDALL A. HAYS
City Attorney

RECEIVED
CITY OF STOCKTON
PERMIT CENTER/PLANNING DIVISION

December 8, 2003

David Stagnaro, Senior Planner
City of Stockton, Community Development Department, Planning Division
425 North El Dorado Street
Stockton, CA 95202-1997

SUBJECT: DELTA WATER SUPPLY – RESPONSE TO NOTICE OF PREPARATION

Dear Mr. Stagnaro:

The City of Lodi has received and reviewed the Notice of Preparation for an Environmental Impact Report regarding the Delta Water Supply Project. On the whole, the City of Lodi is supportive of ground water recharge projects. However, there are some aspects of the project that could impact Lodi that an EIR should address. Specifically, it is our opinion that the EIR should address the following areas:

1. Page 5, Surface Water Component, states that four (4) potential sites were evaluated and Site "C" was the preferred alternative. Further analysis of the sites should be given so that the public can be informed of the criteria for site selection. Given these lack of information, the preparation of an EIR seems per functionary at best.

2. Page 14, Hydrology and Water Quality, an area that needs evaluation are the present tidal flows and potential impacts to the delta resulting from the project. The disruption of eastern portion of the San Joaquin Delta that is subject to tidal influences could impact the City of Lodi. The flow of water in Bishop Cut and other channels adjacent to the proposed point of intake are subject to flood and ebb tides. This tidal nature of flow results in a reversal in the direction of flow approximately four times per day. Since these flows are usually not of equal magnitude, the imbalance results in a "net flow" of water past any given point. This net flow provides the basis for carriage and dilution of wastewater and storm discharges to the Delta.

The City of Lodi discharges treated wastewater to Bishop Cut/White Slough via Dredger Cut. Due to lack of dilution in Dredger Cut, the City is planning to relocate its discharge to Bishop Cut to take advantage of higher net flows. However our modeling efforts to date indicate that available dilution will be minimal. We are in the process of installing a flow meter in Bishop Cut at 8-Mile Road to verify model results.

The City is concerned that the proposed intake location will further reduce net flows in Bishop Cut under various Delta flow conditions, which will result in increased discharge requirements (and hence cost) on the City from the Regional Water Quality Control Board. Similarly, the City is concerned that the presence of a major drinking water intake downstream of the City's discharge point will also result in costly discharge requirements.

3. Page 16, Land Use and Planning, Question 9B, from our information the preferred project site is under jurisdiction of San Joaquin County. The property is currently designated as General Agriculture (AG) by the San Joaquin County 2010 General Plan. The General Agriculture (AG) Zone is established to preserve agricultural lands for the continuation of commercial agricultural enterprises. This zone is intended to implement the General Agriculture land use category of the General Plan. Likewise, the property is zoned as General Agriculture, minimum parcel size of 40 acres (AG40). The General Agriculture (AG) Zone is established to preserve agricultural lands for the continuation of commercial agricultural enterprises. Clearly the project is not an agricultural activity and is being undertaken to accommodate urban growth. The County 2010 General Plan Update, Basic Value #1 is to protect agricultural land. Thus, it would seem that this topic needs further evaluation by the Draft Environmental Impact Report.

4. Page 16, Land Use and Planning, Question 9D, the initial study states that the project impact to potential land use conflicts would be less than significant if mitigation measures are incorporated into the project. However, no discussion is given as to why this was checked and the direction as to what type of mitigation will be considered by the Draft Environmental Impact Report. Also noteworthy is that the water in the delta serves many purposes, one of which is recreational. Thus, this topic should be further evaluated by the Draft Environmental Impact Report.

5. Page 19, Transportation/Traffic, Question 15A, further analysis of the long term traffic impact of the project needs and specific mitigation measures need to be evaluated as part of this project.

Thank you for the opportunity to comment on the Notice of Preparation of an Environmental Impact Report for the Delta Water Supply Project. If you have any questions or comments regarding this matter, please call me at (209) 333-6711 or email me at jhightower@lodi.gov.

Cordially,

J.D. Hightower
City Planner

EAST BAY
MUNICIPAL UTILITY DISTRICT

December 10, 2003

David Stagnaro, Senior Planner
City of Stockton
Community Development Department
Planning Division
425 North El Dorado Street
Stockton, CA 95202-1997

Dear Mr. Stagnaro:

Re: Notice of Preparation of a Draft Environmental Impact Report -- Delta Water Supply Project, Stockton

East Bay Municipal Utility District (EBMUD) appreciates the opportunity to review the Notice of Preparation of a Draft Environmental Impact Report for the Delta Water Supply Project in Stockton. EBMUD has the following comments.

The intake structure should be located away from where Little Connection Slough enters the South Delta in order to reduce the risk of entraining juvenile salmonids from the Mokelumne River that are migrating downstream through the Mokelumne River forks. Appropriate measures to alleviate groundwater overdraft and potentially diminishing surface supplies are recommended.

If you have any questions concerning this response, please contact Marie A. Valmores, Senior Civil Engineer, Water Service Planning, at (510) 287-1084.

Sincerely,

for WRK

William R. Kirkpatrick
Manager of Water Distribution Planning

WRK:NJR:sb
sb03_335.doc

DJS

State Water Contractors

455 Capitol Mall, Suite 220 • Sacramento, CA 95814-4409
John C. Coburn General Manager (916) 447-7357 • FAX 447-2734

December 16, 2003

City of Stockton
Community Development Dept.
Planning Division
345 North El Dorado Street
Stockton, CA 95202

Re: SWC comments on Notice of Preparation for City of Stockton Delta Water Supply Project

We have reviewed the City of Stockton's Notice of Preparation for the Delta Water Supply Project (DWSP). The City of Stockton is proposing the DWSP to provide supplemental water to meet their total water supply needs.

The State Water Contractors (SWC) is an organization representing 27 public water agencies operating within California who contract with the California Department of Water Resources (DWR) for water supplies from the State Water Project (SWP). The SWP supply delivered through the Sacramento-San Joaquin Delta constitutes a significant portion of the supplies available to SWC members. As a result, the SWC is very interested in matters affecting the quantity and quality of water supplies in the Delta.

The Notice of Preparation identifies potentially significant impacts on Delta Biological Resources that will be a concern. The SWC recommend that the City of Stockton perform a thorough evaluation of the potential impacts on fisheries in the Delta, along with potential water quality impacts in Delta waterways, including the Stockton Deep Water Ship Channel.

If there are any questions on these SWC comments, please contact me at (916) 447-7357.

Sincerely,

John C. Coburn
General Manager

cc: Member Agencies
Director Linda Adams, DWR

SAN JOAQUIN COUNTY

MOSQUITO & VECTOR CONTROL DISTRICT

JOHN R. STROH
MANAGER

December 12, 2003

City of Stockton
C/o Community Development Department
Planning Division
425 North El Dorado Street
Stockton, CA 95202-1997

Re: Delta Water Supply Project

To whom it may concern,

San Joaquin County Mosquito and Vector Control District (the District) has reviewed the City of Stockton's NOP for the proposed Delta Water Supply Project. The District does not have any comments re: the proposed project at this time, however, if the scope of the project were to be changed, including the potential use of passive groundwater recharge facilities, we would certainly want to be involved in the planning process.

Do not hesitate to contact me at 982-4675 if you have any questions or need additional information.

Sincerely,

John R. Stroh

John R. Stroh
Manager

7759 SOUTH AIRPORT WAY, STOCKTON, CALIFORNIA 95206-3918
(209) 982-4675 • FAX (209) 982-0120

SAN JOAQUIN COUNTY
COMMUNITY DEVELOPMENT DEPARTMENT

1810 E. HAZELTON AVE., STOCKTON, CA 95205-6232
PHONE: 209/468-3121 FAX: 209/468-3163

December 8, 2003

City of Stockton
Community Development Department
Planning Division
345 N. El Dorado Street
Stockton, CA 95202
Attn: David Stagnaro

Dear Mr. Stagnaro:

SUBJECT: NOTICE OF PREPARATION OF DRAFT ENVIRONMENTAL IMPACT REPORT FOR DELTA WATER SUPPLY PROJECT:

Thank you for sending the Notice of Preparation for the above referenced project to San Joaquin County. The San Joaquin County Community Development Department has reviewed the Notice of Preparation of EIR and requests a copy of the Draft EIR when it is available.

Sincerely,

Leanne Mueller

Leanne Mueller
Associate Planner

Law Offices Of

HAKEEM, ELLIS & MARENGO

A Professional Law Corporation

Michael D. Hakeem
Albert M. Ellis
Renée M. Marengo
Peter W. Manion
Stephen B. Ardis
S. Dean Ruiz

3414 Brookside Road
Suite 100
Stockton, CA 95219-1751
TEL 209 474-2800
FAX 209 474-3654

December 15, 2003

DEC 15 2003

HAND DELIVERED

JAMES A. GLASER
COMMUNITY DEVELOPMENT DIRECTOR
CITY OF STOCKTON
425 N. El Dorado Street
Stockton, CA 95202-1997

RE: NOTICE OF PREPARATION ("NOP") OF A DRAFT ENVIRONMENTAL IMPACT REPORT PURSUANT TO PUB. RES. CODE SEC. 21080.4 AND CAL. CODE OF REGULATIONS TITLE 14, SEC 15082(a) FOR DELTA WATER SUPPLY PROJECT

Dear Mr. Glaser:

As you know, our office represents John Verner, Dan Casey and Russ Munson relative to the Mariposa Lakes Project which recently filed applications with the City of Stockton for a General Plan Amendment, Rezoning, Annexation and Development Agreement. In connection therewith, we are also processing an Environmental Impact Report. In reviewing the NOP, we have confirmed that the Mariposa Lakes Project is in the place-of-use area.

This correspondence is intended as a response to the NOP as set forth above. Pursuant to the California Code of Regulations, Title 14, Chapter 3, and specifically section 15131, concerning the required evaluation of cumulative impacts, we want to insure that the City's consultant includes the Mariposa Lakes Project as a "probable future project" given the information that an application for entitlement(s) has been filed and is currently being processed.

For your convenience, I enclose a copy of the Land Use Plan which also includes the acreage, dwelling units per acre and total units for each of the respective land use classifications. Please provide the enclosure and any other particulars from the application documents for your consultant's consideration of the Mariposa Lakes Project and for inclusion in the environmental evaluation. If further information is desired, please do not hesitate to call. Thank you for your time and attention to this matter.

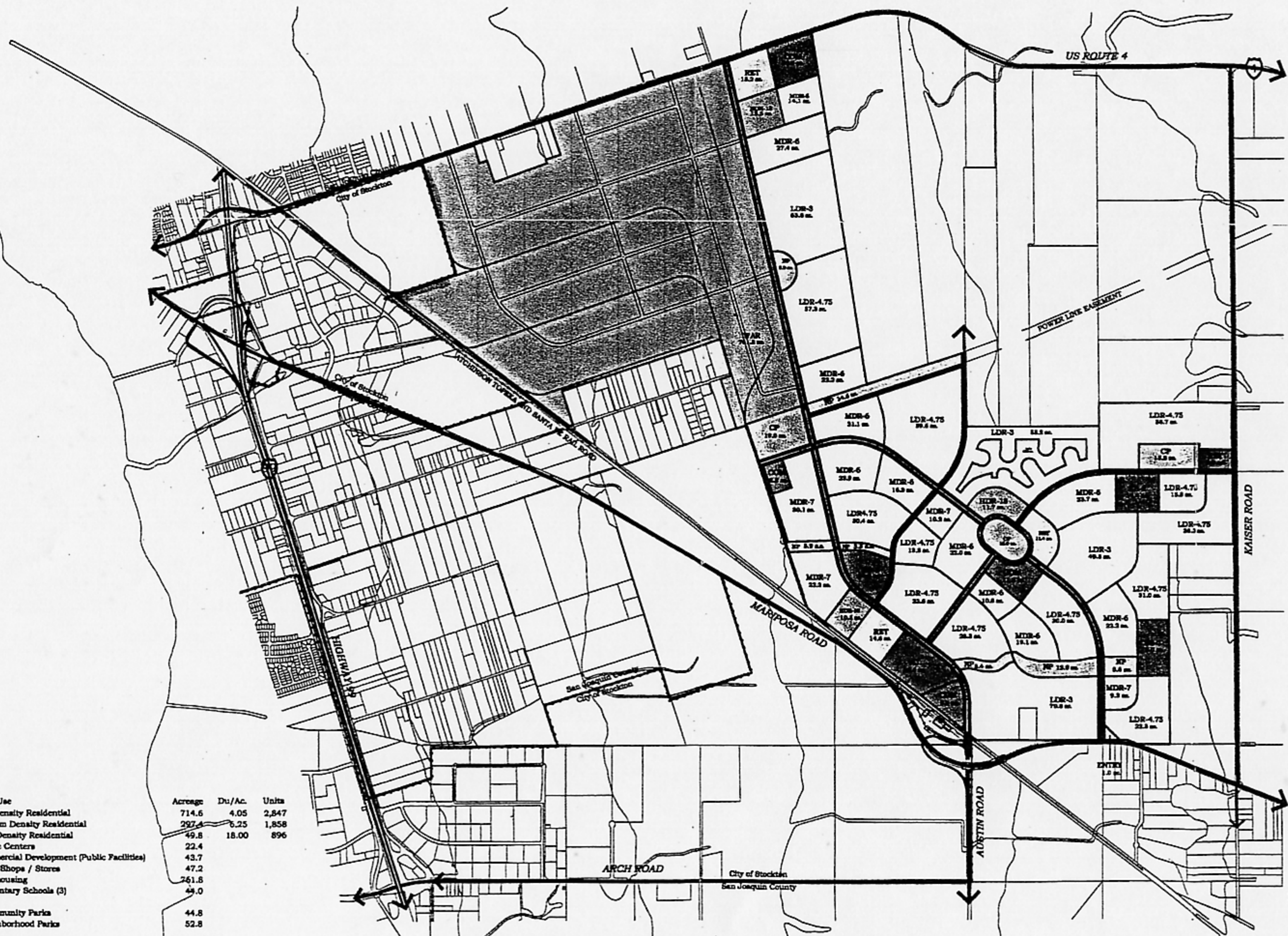
Very truly yours,

HAKEEM, ELLIS & MARENGO
A Professional Corporation

By: ______________________
MICHAEL D. HAKEEM

MDH:em

Enclosure



Legend

Key	Land Use	Acreage	Du/Ac.	Units
LDR	Low Density Residential	714.6	4.05	2,847
MDR	Medium Density Residential	297.4	6.25	1,858
HDR	High Density Residential	49.8	18.00	896
VC	Village Centers	22.4		
COM	Commercial Development (Public Facilities)	43.7		
RET	Retail Shops / Stores	47.2		
WAR	Warehousing	261.8		
	Elementary Schools (3)	44.0		
	Parks			
CP	Community Parks	44.8		
NP	Neighborhood Parks	52.8		
	Entry Statement at Mariposa	1.0		
	Major Arterial Rights of Way	46.2		
	Totals	2,125.7 Acres		5,600
	Lakes (Open Space)	22.2		

* All areas are gross acreages

Mariposa Lakes

Stockton, California

Land Use Plan

SCALE IN FEET

0 1000 2000 3000

Septermber 5, 2003

LAND PLANNER / LANDSCAPE ARCHITECT

Randall Planning and Design, Inc.
1475 N. Broadway Suite 290
Walnut Creek, California 94596

CIVIL ENGINEER

Thompson-Hysell Engineers, Inc.
1016 12th Street
Modesto, California 95354

CALIFORNIA **URBAN WATER** AGENCIES

December 16, 2003

RECEIVED

CITY OF STOCKTON
PERMIT CENTER/PLANNING DIVISION

City of Stockton
C/o Community Development Department
Planning Division
Attn: David Stagnaro
425 North El Dorado Street
Stockton, CA 95252-1997

SUBJECT: Notice of Preparation, Draft EIR for Delta Water Supply Project

Dear Mr. Stagnaro:

This is in reply to the City's November 14, 2003 Notice of Preparation regarding preparation of a draft environmental impact report regarding the proposed new water supply intake on the San Joaquin River.

We are an organization that represents many of California's most prominent urban water utilities. To that end, we reinforce the need for the environmental impact report prepared on this project to evaluate the potential impacts to both in-Delta channel water quality as well as populations of key fish species – particularly those that are currently of concern with regard to existing Delta diversions.

We appreciate a recent meeting with City representatives briefing us on the proposed project, and are impressed with the thoroughness of evaluations and studies to date. We understand the need for an urban water utility to strengthen long-term reliability of its water supplies. We look forward to participating in the future review process.

Thank you for the opportunity to comment.

Sincerely,

S Macaulay

Steve Macaulay, Executive Director
California Urban Water Agencies

cc: Mr. Arthur Godwin, McDonough Holland & Allen
Mr. Mark Madison, City of Stockton
CUWA Board of Representatives

HERUM CRABTREE BROWN
Attorneys At Law

RECEIVED
DEC 17 2003
CITY OF STOCKTON
PERMIT CENTER/PLANNING DIVISION

FAX COVER SHEET

This is a confidential communication and is not to be delivered to or read by any person other than the addressee. Facsimile transmission is not intended to waive the attorney-client privilege or any other privilege.

TO: DAVID STAGNARO
KEVIN KAUFFMAN

FAX NUMBER: (209) 937-8893
(209) 948-0423

FROM: JEANNE M. ZOLEZZI

DATE TRANSMITTED: December 16, 2003

FILE NUMBER: 1026-044

DOCUMENT: Letter with comments on Notice of Preparation of Draft EIR.

COMMENTS: ___ Confidential ___ Urgent ___ Please Sign and Return

___ Please Reply ___ Please Handle _X_ For Your Information

We are transmitting **3** pages. Please call us immediately at (209) 472-7700 if any part of this transmission failed or was not clear.

Original Transmittal will **not** follow: _X_

Original transmittal will follow by: _____ Mail _____ Other

If this transmission is received by anyone other than the addressee, the recipient is requested to call the sender collect at (209) 472-7700, and to immediately return this document to Herum Crabtree Brown by United States mail. Herum Crabtree Brown guarantees return postage.

2291 West March Lane Suite B100 Stockton, CA 95207
·Tel 209.472.7700 ·Fax 209.472.7986 ·Modesto Tel 209.525.8444
A Professional Corporation

HERUM CRABTREE BROWN
Attorneys At Law

Jeanne M. Zolezzi
jzolezzi@herumcrabtree.com

December 16, 2003

VIA FACSIMILE

Mr. David Stagnaro
City of Stockton Community Development Department
425 North El Dorado Street
Stockton, California 95202-1997

Re: Stockton East Water District/City of Stockton/Delta Diversion

Dear David:

The following comments are made on behalf of the Stockton East Water District (SEWD) to the Notice of Preparation of a Draft Environmental Impact Report for the Delta Water Supply Project.

EXISTING WATER SUPPLY FOR STOCKTON [Page 2]

Page 2 of the NOP provides a summary of existing water supplies, including those held by SEWD. These figures are not entirely accurate, and we would like to work with the City to insure that the Draft Environmental Impact Report (DEIR) being prepared contains accurate information on existing water rights.

DELTA WATER SUPPLY PROJECT

DELTA WATER RIGHTS AND AVAILABILITY [Page 4]

At page 4 the statement is made that:

> "Diversion of water from the Delta under the area of origin is subject to various regulatory restrictions, including Term 91 conditions, which prohibit diversion by others at times when the SWP and/or CVP are required to release stored water from their reservoirs in excess of export diversions, project carriage water, and project in-basin deliveries."

This is not accurate. While the City of Stockton may have voluntarily agreed to subject any water right permit issued pursuant to its application to the restrictions of Term 91, the diversion of water from the Delta under area of origin claims is not generally subject to Term 91. This situation should be fully explored in the DEIR.

2291 West March Lane Suite B100 Stockton, CA 95207
• Tel 209.472.7700 • Fax 209.472.7986 • Modesto Tel. 209.525.8444
A Professional Corporation

Surface Water Component [Page 5]

While we acknowledge that there are many factors for determining the location of any new water treatment facility for the Delta Water Supply Project, one of the factors to be considered should be the groundwater recharge contributed by the treatment facilities. Others include recommended full development of the SEWD drinking water treatment facilities, and at least joint use of the proposed East Bay Municipal Utilities District water treatment plant facility, to be located East of COSMA.

Groundwater Component [Page 5]

Current design of the Delta Water Supply Project includes direct injection of treated surface water for underground storage. The statement is made that:

> "The optimum location of highest storage and transmissivity is found in the northeastern portion of the COSMA. Injection wells will be located east of the area in the City where there is poor groundwater quality to avoid degradation of the high quality surface water to be injected."

The NOP further indicates that a pilot program is initially planned to initiate the Aquifer Supply and Recovery (ASR) system.

SEWD is currently implementing the Farmington Groundwater Recharge and Seasonal Habitat Program in conjunction with the US Army Corps of Engineers pursuant to congressional authorization. Pilot recharge testing has taken place, a demonstration project has been completed, and SEWD is now implementing Phase 1 of the Program. Much work has been and will be completed regarding the locations within SEWD best suited to introduce recharge in order to recharge the groundwater basin and repel saline intrusion.

The work being undertaken by the City of Stockton should be closely coordinated with the Program work in order to insure consistency and avoid duplication.

We look forward to working with the City of Stockton in developing the feasibility of this project.

Very truly yours,

JEANNE M. ZOLEZZI
Attorney-at-Law

JMZ:rl

cc: Mr. Kevin Kauffman, Stockton East Water District

\\nt_oas\prolaw\documents\1026-044\JMZ\34068.doc

State of California—Health and Human Services Agency
Department of Health Services

California Department of Health Services

DIANA M. BONTÁ, R.N., Dr. P.H.
Director

ARNOLD SCHWARZENEGGER
Governor

December 5, 2003

David Stagnaro
City of Stockton
345 N. El Dorado Street
Stockton, CA 95202

RESPONSE TO THE NOTICE OF PREPARATION

Re: Delta Water Supply Project SCH# 2003112060.

This letter is in response to the Notice of Preparation of draft Environmental Impact Report (EIR), received by the Department from your agency on December 3, 2003 for the Delta Water Supply Project. After reviewing the notice, the Department has the following comments.

City of Stockton presently relies on both groundwater and surface water supplies through SEWD from New Hogan and New Melones Reservoirs. The amount of water available to SEWD from these alternate surface water supplies is anticipated to be substantially reduced in the near future. Therefore, Delta water supply project is essential to meet the existing and future water demands of the City of Stockton. The Department supports the City of Stockton's Delta water supply project.

If you have any questions or comments, please contact me at (209) 948-3816.

Joseph O. Spano

Joseph O. Spano, P.E.
District Engineer
Drinking Water Field Operations Branch
Stockton District

cc: State Clearinghouse

A:\Response to NOP 1203 (Delta Water Project)

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse

Gray Davis
Governor

Tal Finney
Interim Director

Notice of Preparation

November 13, 2003

To: Reviewing Agencies

Re: Delta Water Supply Project
SCH# 2003112060

Attached for your review and comment is the Notice of Preparation (NOP) for the Delta Water Supply Project draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

David Stagnaro
City of Stockton
345 N. El Dorado Street
Stockton, CA 95202

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Associate Planner, State Clearinghouse

Attachments
cc: Lead Agency

NOP Distribution List

County: San Joaquin

SCH# 2003112060

Resources Agency

- [x] **Resources Agency**
  Nadell Gayou
- [x] **Dept. of Boating & Waterways**
  Suzi Betzler
- [ ] **California Coastal Commission**
  Elizabeth A. Fuchs
- [ ] **Colorado River Board**
  Gerald R. Zimmerman
- [x] **Dept. of Conservation**
  Roseanne Taylor
- [ ] **California Energy Commission**
  Environmental Office
- [ ] **Dept. of Forestry & Fire Protection**
  Allen Robertson
- [ ] **Office of Historic Preservation**
  Hans Kreutzberg
- [x] **Dept of Parks & Recreation**
  B. Noah Tilghman
  Environmental Stewardship Section
- [x] **Reclamation Board**
  Lori Buford
- [ ] **Santa Monica Mountains Conservancy**
  Paul Edelman
- [ ] **S.F. Bay Conservation & Dev't. Comm.**
  Steve McAdam
- [x] **Dept. of Water Resources**
  Resources Agency
  Nadell Gayou

Fish and Game

- [ ] **Dept. of Fish & Game**
  Scott Flint
  Environmental Services Division
- [ ] **Dept. of Fish & Game 1**
  Donald Koch
  Region 1
- [x] **Dept. of Fish & Game 2**
  Banky Curtis
  Region 2
- [ ] **Dept. of Fish & Game 3**
  Robert Floerke
  Region 3
- [ ] **Dept. of Fish & Game 4**
  William Laudermilk
  Region 4
- [ ] **Dept. of Fish & Game 5**
  Don Chadwick
  Region 5, Habitat Conservation Program
- [ ] **Dept. of Fish & Game 6**
  Gabrina Gatchel
  Region 6, Habitat Conservation Program
- [ ] **Dept. of Fish & Game 6 I/M**
  Tammy Allen
  Region 6, Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Game M**
  Tom Napoli
  Marine Region

Other Departments

- [ ] **Food & Agriculture**
  Steve Shaffer
  Dept. of Food and Agriculture
- [ ] **Dept. of General Services**
  Robert Sleppy
  Environmental Services Section
- [x] **Dept. of Health Services**
  Wayne Hubbard
  Dept. of Health/Drinking Water

Independent Commissions, Boards

- [x] **Delta Protection Commission**
  Debby Eddy
- [ ] **Office of Emergency Services**
  John Rowden, Manager
- [ ] **Governor's Office of Planning & Research**
  State Clearinghouse

____

- [x] **Native American Heritage Comm.**
  Debbie Treadway
- [ ] **Public Utilities Commission**
  Ken Lewis
- [x] **State Lands Commission**
  Jean Sarino
- [ ] **Tahoe Regional Planning Agency (TRPA)**
  Lyn Barnett

Business, Trans & Housing

- [x] **Caltrans - Division of Aeronautics**
  Sandy Hesnard
- [ ] **Caltrans - Planning**
  Ron Helgeson
- [ ] **California Highway Patrol**
  Lt. Julie Page
  Office of Special Projects
- [ ] **Housing & Community Development**
  Cathy Creswell
  Housing Policy Division

Dept. of Transportation

- [ ] **Dept. of Transportation 1**
  Mike Eagan
  District 1
- [ ] **Dept. of Transportation 2**
  Don Anderson
  District 2
- [ ] **Dept. of Transportation 3**
  Jeff Pulverman
  District 3
- [ ] **Dept. of Transportation 4**
  Tim Sable
  District 4
- [ ] **Dept. of Transportation 5**
  David Murray
  District 5
- [ ] **Dept. of Transportation 6**
  Marc Birnbaum
  District 6
- [ ] **Dept. of Transportation 7**
  Stephen J. Buswell
  District 7
- [ ] **Dept. of Transportation 8**
  Linda Grimes,
  District 8
- [ ] **Dept. of Transportation 9**
  Gayle Rosander
  District 9
- [x] **Dept. of Transportation 10**
  Tom Dumas
  District 10
- [ ] **Dept. of Transportation 11**
  Bill Figge
  District 11
- [ ] **Dept. of Transportation 12**
  Bob Joseph
  District 12

Cal EPA

Air Resources Board

- [ ] Airport Projects
  Jim Lerner
- [ ] Transportation Projects
  Kurt Karperos
- [ ] Industrial Projects
  Mike Tollstrup

- [ ] **California Integrated Waste Management Board**
  Sue O'Leary
- [x] **State Water Resources Control Board**
  Jim Hockenberry
  Division of Financial Assistance
- [x] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [x] **State Water Resouces Control Board**
  Mike Falkenstein
  Division of Water Rights
- [ ] **Dept. of Toxic Substances Control**
  CEQA Tracking Center

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- [ ] **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- [ ] **RWQCB 3**
  Central Coast Region (3)
- [ ] **RWQCB 4**
  Jonathan Bishop
  Los Angeles Region (4)
- [x] **RWQCB 5S**
  Central Valley Region (5)
  - [ ] **RWQCB 5F**
    Central Valley Region (5)
    Fresno Branch Office
  - [ ] **RWQCB 5R**
    Central Valley Region (5)
    Redding Branch Office
- [ ] **RWQCB 6**
  Lahontan Region (6)
  - [ ] **RWQCB 6V**
    Lahontan Region (6)
    Victorville Branch Office
- [ ] **RWQCB 7**
  Colorado River Basin Region (7)
- [ ] **RWQCB 8**
  Santa Ana Region (8)
- [ ] **RWQCB 9**
  San Diego Region (9)
- [ ] **Other** ______________________

Document Details Report
State Clearinghouse Data Base

SCH#	**2003112060**
Project Title	Delta Water Supply Project
Lead Agency	Stockton, City of

Type **NOP** Notice of Preparation

Description The Proposed Project includes a water diversion facility with fish screens on the San Joaquin River, pipelines to convey the raw water to a new water treatment plant, and treated water transmission pipelines to deliver water to the City's existing water distribution system. The groundwater component will include groundwater injection and recovery wells to inject treated Delta surface water into the groundwater aquifer for later extraction.

Lead Agency Contact

Name David Stagnaro
Agency City of Stockton
Phone 209-937-8598 *Fax*
email
Address 345 N. El Dorado Street
City Stockton *State* CA *Zip* 95202

Project Location

County San Joaquin
City Stockton
Region
Cross Streets East and West of I-5 and north of Eight Mile Road
Parcel No. Various
Township *Range* *Section* *Base*

Proximity to:

Highways 12 and 99
Airports Lodi
Railways UPRR
Waterways San Joaquin River (Stockton Deep Water Channel)
Schools 2 High Sch, 1 Mid. Sch, 7 Elem. Sch
Land Use The San Joaquin County General Plan designates the diversion/intake site as Open Space, with surrounding land uses designated General Agriculture. It designated the water treatment plant site as General Agriculture, with surrounding land uses designated Residential to the south and General Agriculture to the north, west, and east.

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Drainage/Absorption; Flood Plain/Flooding; Geologic/Seismic; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Wildlife; Growth Inducing; Landuse; Cumulative Effects

Reviewing Agencies Resources Agency; Department of Boating and Waterways; Department of Conservation; Department of Parks and Recreation; Reclamation Board; Department of Fish and Game, Region 2; Department of Water Resources; Department of Health Services; Delta Protection Commission; Native American Heritage Commission; State Lands Commission; Caltrans, Division of Aeronautics; Caltrans, District 10; State Water Resources Control Board, Division of Loans and Grants; State Water Resources Control Board, Division of Water Quality; State Water Resources Control Board, Division of Water Rights; Regional Water Quality Control Bd., Region 5 (Sacramento)

Date Received 11/13/2003 *Start of Review* 11/13/2003 *End of Review* 12/12/2003

Note: Blanks in data fields result from insufficient information provided by lead agency.

California Regional Water Quality Control Board

Central Valley Region

Robert Schneider, Chair

Terry Tamminen
Secretary for Environmental Protection

3443 Routier Road, Suite A, Sacramento, California 95827-3003
(916) 255-3000 • Fax (916) 255-3015
http://www.swrcb.ca.gov/rwqcb5

Arnold Schwarzenegger
Governor

3 December 2003

Mr. David Stagnaro
City of Stockton
345 N. El Dorado Street
Stockton, CA 95202

REQUEST FOR COMMENTS, CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA), CITY OF STOCKTON, DELTA WATER SUPPLY PROJECT, SAN JOAQUIN COUNTY

As a Responsible Agency, as defined by CEQA, we have reviewed the Request for Comments received in our office on 11 November 2003 for the Delta Water Supply Project. Based on our review, we have the following comments regarding the proposed project.

Stormwater

A NPDES General Permit for Storm Water Discharges Associated with Construction Activities, Order No. 99-08-DWQ is required when a project involves clearing, grading, disturbances to the ground, such as stockpiling, or excavation. On March 10, 2003 as part of the new Phase II storm water regulations, all construction activity that disturbs one acre or greater or is part of a larger common plan of development or sale will require a construction storm water permit. A Construction Activities Storm Water General Permit must be obtained prior to construction.

For more information, please visit the storm water website at:
http://www.swrcb.ca.gov/stormwtr.

Water Quality Certification

There may be impacts to jurisdictional waters of the United States. Section 404 of the Clean Water Act (covering, dredging, or filing of Waters of the United States, including wetlands) requires avoidance of wetlands or Waters of the State to the maximum extent practicable. Second, the remaining impacts must be minimized. Finally, the remaining unavoidable adverse impacts to the wetlands or Waters of the State must be mitigated. Mitigation will be preferably in-kind and on-site, with no net destruction of habitat value. A Section 401 Water Quality Certification from the Regional Board is required for all 404 Nation wide permits.

Regional Board Staff are unable to offer more specific comment at this time. However, we have attached a copy of our General Comments, which discuss the Regional Board's area of responsibility, and which should help guide you in the preparation of further CEQA documentation.

If you have any questions, please contact Pat Gillum at (916) 255-3397 or the address above.

GEORGE D. DAY, P.E., Unit Chief
Stormwater and Water Quality Certification Unit

California Regional Water Quality Control Board

Central Valley Region

Robert Schneider, Chair

Sacramento Main Office
Internet Address: http://www.swrcb.ca.gov/rwqcb5
3443 Routier Road, Suite A, Sacramento, California 95827-3003
Phone (916) 255-3000 • FAX (916) 255-3015

Storm Water

A NPDES General Permit for Storm Water Discharges Associated with Construction Activities, NPDES No. CAS000002, Order No. 99-08-DWQ is required when a site involves clearing, grading, disturbances to the ground, such as stockpiling, or excavation that results in soil disturbances of at least one acre of total land area. Construction activity that involves soil disturbances on construction sites of less than one acre and is part of a larger common plan of development or sale also requires a permit. A Construction Activities Storm Water General Permit must be obtained prior to construction. Failure to obtain a permit may result in an enforcement action.

Wetlands and/or stream course alteration

Section 401 of the federal Clean Water Act requires any project that impacts waters of the State (such as streams and wetlands) to file a 401 Water Quality Certification application with this office. The applicant must certify the project will not violate state water quality standards. Projects include, but are not limited to, stream crossings, modification of stream banks or stream courses, and the filling or modification of wetlands. If a U.S. Army Corp of Engineers (ACOE) permit is required for the project, then Water Quality Certification must be obtained prior to initiation of project activities. The proponent must follow the ACOE 404(b)(1) Guidance to assure approval of their 401 Water Quality Certification application. The guidelines are as follows:

1. **Avoidance** (Is the project the least environmentally damaging *practicable* alternative?)
2. **Minimization** (Does the project minimize any adverse effects to the impacted wetlands)
3. **Mitigation** (Does the project mitigate to assure a no net loss of functional values?)

If, after avoidance and minimization guidelines are considered and wetland impacts are still anticipated:

- determine functional losses and gains (both permanent and temporal; both direct and indirect)
- conduct adequate baselines of wetland functions including vegetation, wildlife, hydrology, soils, and water quality
- attempt to create/restore the same wetland type that is impacted, in the same watershed
- work with a regional context to maximize benefits for native fish, wildlife, vegetation, as well as for water quality, and hydrology
- use native species and materials whenever possible
- document all efforts made to avoid the minimize adverse wetland impacts

- be prepared to develop performance criteria and to track those for between 5 to 20 years
- be prepared to show project success based on achieving wetland functions
- if the project fails, be prepared to repeat the same process (via financial assurance), with additional acreage added for temporal losses
- specify how the mitigation project will be maintained in perpetuity and who will be responsible for the maintenance

If the project includes in-stream construction such as dredging, rip rap installation, or the construction of piers or bridge footings, then the proponent is required to comply with the following:

1. The Discharger shall notify the Board in writing of the start of any in-water activities.

2. Except for activities permitted by the U.S. Army Corps under §404 of the Clean Water Act, soil, silt, or other organic materials shall not be placed where such materials could pass into surface water or surface water drainage courses.

3. The discharge of petroleum products or other excavated materials to surface waters is prohibited.

4. Activities shall not cause turbidity increases in surface waters to exceed:

   (a) where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU;
   (b) where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent;
   (c) where natural turbidity is between 50 and 100 NTUs, increase shall not exceed 10 NTUs;
   (d) where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

   Except that these limits will be eased during in-water working periods to allow a turbidity increase of 15 NTU over background turbidity as measured in surface waters 300 feet downstream from the working area. In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

5. Activities shall not cause settleable matter to exceed 0.1 ml/l in surface waters as measured in surface waters 300 feet downstream from the project.

6. Activities shall not cause visible oil, grease, or foam in the work area or downstream.

7. All areas disturbed by project activities shall be protected from washout or erosion.

8. In the event that project activities result in the deposition of soil materials or creation of a visible plume in surface waters, the following monitoring shall be conducted immediately upstream and 300 feet downstream of the work site and the results reported to this office within two weeks:

Parameter	*Unit*	*Type of Sample*	*Frequency of Sample*
Turbidity	**NTU**	**Grab**	Every 4 hours during in water work
Settleable Material	**ml/l**	**Grab**	Same as above.

9. The Discharger shall notify the Board immediately if the above criteria for turbidity, settleable matter, oil/grease, or foam are exceeded.

10. The Discharger shall notify the Board immediately of any spill of petroleum products or other organic or earthen materials.

11. The Discharger shall comply with all Department of Fish and Game 1600 requirements for the project.

Dewatering Permit

The proponent may be required to file a Dewatering Permit covered under Waste Discharge Requirements General Order for Dewatering and Other Low Threat Discharges to Surface Waters Permit, Order No. 5-00-175 (NPDES CAG995001) provided they do not contain significant quantities of pollutants and are either (1) four months or less in duration, or (2) the average dry weather discharge does not exceed 0.25 mgd:

a. Well development water
b. Construction dewatering
c. Pump/well testing
d. Pipeline/tank pressure testing
e. Pipeline/tank flushing or dewatering
f. Condensate discharges
g. Water Supply system discharges
h. Miscellaneous dewatering/low threat discharges

San Joaquin Valley
Air Pollution Control District

December 16, 2003

David Stagnaro
City of Stockton
Community Development Department
425 North El Dorado Street
Stockton, Ca 95202

SUBJECT: NOTICE OF PREPARATION–DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE DELTA WATER SUPPLY PROJECT.

Dear Mr. Stagnaro:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the proposed project and offers the following comments:

The San Joaquin Valley's air quality has been designated nonattainment by the EPA and by the Air Resources Board (ARB) for ozone and fine particulate matter (PM-10). The Federal Clean Air Act (CAA) and the California Clean Air Act require areas that are designated nonattainment to reduce emissions until standards are met.

The District recommends that the air quality section of the EIR have four main components. **Section one** should provide a description of the regulatory environment and existing air quality conditions impacting the San Joaquin Valley. **Section two** should provide estimates of existing emissions and projected pollutant emissions related to any increases in population, vehicle use, and construction activities along with an analysis of the effects of these increases. **Section three** should identify and discuss all existing District regulation that apply to the project. **Section Four** should identify and discuss all feasible mitigation measures which, after implementation, will reduce the air quality impacts generated by this project. Mitigation measures are emission reduction beyond those required in section three.

David L. Crow
Executive Director/Air Pollution Control Officer

Northern Region Office
4230 Kiernan Avenue, Suite 130
Modesto, CA 95356-9322
(209) 557-6400 • FAX (209) 557-6475

Central Region Office
1990 East Gettysburg Avenue
Fresno, CA 93726-0244
(559) 230-6000 • FAX (559) 230-6061
www.valleyair.org

Southern Region Office
2700 M Street, Suite 275
Bakersfield, CA 93301-2373
(661) 326-6900 • FAX (661) 326-6985

Section 1: *description of the regulatory environment and existing air quality conditions of the San Joaquin Valley.*

The District has several sources of information available to assist with the existing air quality and regulatory environment section of the EIR. The District's ***Guide for Assessing and Mitigating Air Quality Impacts*** (GAMAQI) contains discussions regarding the existing air quality conditions and trends of the San Joaquin Valley Air Basin, including those pollutants of particular concern: ozone, PM-10, and carbon monoxide. In addition, it provides an overview of the regulatory environment governing air quality at the federal, state, and regional levels.

Section 2: *projected pollutant emissions generated during the construction and operational phases of the project.*

The growth-inducing and cumulative impacts analyses should take into consideration the existing and planned development both within the project area and in the surrounding areas. The District recommends using a regional transportation model to generate vehicle activity used to calculate motor vehicle emissions associated with large projects. If a regional transportation model is not available, the District recommends the use of the URBEMIS 2002 modeling program to estimate project emissions. Additional guidance is provided in the GAMAQI.

Additionally, the EIR should quantify emissions that are individually small but cumulatively significant sources of pollution. This includes, but is not limited to, emissions from natural gas combustion for space and water heating and emissions from gas-powered lawn and garden maintenance equipment. URBEMIS 2002 may also be used to quantify these emissions.

As the projects are considered for approval the applicant and the City should consider the toxic risk associated with diesel-fueled engines and vehicles. The California Air Resources Board has issued a report entitled **Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles** (October 2000). Appendix VII of the report provides several risk characterization scenarios, which may serve as a starting point for estimating risks from diesel engine emissions. The District will work with applicants to review appropriate methodology for estimating toxic risk.

Section 3: District Rules and Regulations

Current District Rules and Regulation should be addressed in this section, it would also be appropriate to discuss proposed rules that are being developed. Current Rules and Regulation as well as those being developed are available on the Districts web site at www.valleyair.org. Additionally, as individual projects are prepared it is strongly encouraged that the applicants contact the District for any updates. The following is a list of rules, which may apply to this project (this list may not be all inclusive):

- The construction phase of this project can generate emissions from the movement of soil, use of heavy equipment, bulk materials handling, asphalt paving and other related activities. As a result, this project is subject to District Regulation VIII (Fugitive Dust Prohibitions). The purpose of Regulation VIII is to reduce the amount of fine particulate matter (PM-10) entrained into the ambient air from man-made sources. The attached Compliance Assistance Bulletin highlights many of the requirements contained within Regulation VIII. The Compliance Assistance Bulletin is not meant to be all-inclusive, but it can be a useful compliance aid in the field and office alike. Regulation VIII continues to be updated, applicants can find the most current version on the District's web page at www.valleyair.org.

- One of the issues that will arise in conjunction with the proposed demolition is compliance with the National Emission Standards for Hazardous Air Pollutants (NESHAPS). Specifically, the primary air pollutant of concern is asbestos. To ascertain whether this project is subject to NESHAPS, the project applicant is advised to review the enclosed *Asbestos - Compliance Assistance Bulletin*, dated December 1994. Brian Dodds is the Northern Region's District contact for the program and is available should you need further assistance.

- District Rule 4103 regulates the burning of agricultural material. Agricultural material may not be burned if the land use is converting from agriculture to nonagricultural purposes. In the event that the project burns agricultural material, it would be in violation of Rule 4103 and be subject to District enforcement action.

Section 4: ***mitigation measures.***

Mitigation measures must be included in the DEIR that reduce the emissions of reactive organic gases (ROG), nitrogen oxides (NO_X), CO, and PM-10 to the maximum extent feasible. Site design and building construction measures that would reduce air quality impacts should be included. In addition, Transportation Control Measures (TCM) should be stressed to the maximum extent feasible. To reduce the reliance on the single occupancy vehicle and encourage the use of alternative modes of transportation thereby improving the air quality in the San Joaquin Valley, the District encourages the incorporation of pedestrian oriented development (POD) and transit oriented development (TOD) strategies into the General Plan. Specific goals, policies, and programs regarding POD and TOD can be found in the District's guidance document titled **Air Quality Guidelines for General Plans**. This document and other resource materials are available from the District upon request.

As a result of the Valley's nonattainment status, the District strongly recommends that the project applicants and the City of Stockton implement all feasible mitigation measures to reduce the amount of ozone precursors that will result from the buildout of this plan. Please note that some of these measures may already exist as City development standards. The following is a list of potential mitigation measures, the list is not meant to be all-inclusive, and the District encourages new and innovative ideas.

- Incorporate a compressed workweek schedule where feasible.
- Encourage creation of on-site employee cafeterias and eating areas.
- The pipeline corridor may provide for future bike path or pedestrian trail.
- Prior to the issuance of construction contracts the City of Stockton should perform a review of new technology, as it relates to heavy-duty equipment, to determine what if any advances in emission reduction are available for use. It is anticipated that in the near future both NOx and PM10 control equipment will be available. The District would be available for consultation on this process.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.
- Install wheel washer for all exiting trucks, or wash off all trucks and equipment leaving the site.
- Install wind breaks at windward sides of construction areas.
- All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operation are occurring. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting t limit the visible dust emissions.)
- Use alternative fuel construction equipment.
- Limit the hours of operation of heavy-duty equipment and/or the amount of equipment in use.

- Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set).

- Curtail construction during periods of high ambient pollutant concentrations; this may include ceasing of construction activity during the peak-hour of vehicular traffic on adjacent roadways (Days declared as Spare the Air Days by the District).

- Air Quality impact fees should be developed to help fund additional air quality mitigation measure to further reduce air quality impacts.

Thank you for the opportunity to comment. If you have any questions, please feel free to contact me at (209) 557-6400.

Sincerely,

John Cadrett
Environmental Planner
Northern Region

APCD REF # 20030606

Enclosure
C: file

San Joaquin Valley
Air Pollution Control District

COMPLIANCE ASSISTANCE BULLETIN

September 2002

(Update from June 2002)

Fugitive Dust Control at Construction Sites

Regulation VIII, Fugitive PM10 Prohibitions, of the District's Rules and Regulations regulates activities that generate fugitive dust. Fugitive dust is emitted to the air from open ground or caused by activities such as excavation, transporting bulk materials, or travel on unpaved surfaces. "PM10" is a term applied to small sized particulate matter - microscopic dust particles - in the air. The San Joaquin Valley currently exceeds the air quality standards for particulate matter. It is for this reason that the District adopted Regulation VIII in 1993. Significant amendments to Regulation VIII were adopted in 2001 and became effective May 15, 2002. The following dust control and administrative requirements are applicable at construction sites:

Visible Dust Emissions (VDE). Visible dust emissions may not exceed 20% opacity during periods when soil is being disturbed by equipment or wind at any time. Dust control may be achieved by means of applying water before and during earth work and on traffic areas, phasing work to limit dust, and setting up wind fences to limit wind blown dust. VDE opacity of 20% means the amount of dust that would obstruct the view of an object by 20%.

Soil stabilization. Soil stabilization is required at any construction site after normal working hours and on weekends and holidays. This requirement also applies to inactive construction areas such as phased projects where disturbed land is left unattended. Applying water to form a visible crust on the soil is an effective method for stabilizing a disturbed surface area. Long-term methods include applying dust suppressants or establishing vegetative cover. Restricting vehicle access from the area will help to maintain a stabilized surface. Information regarding stabilization standards and test methods are in Rule 8011 – *General Requirements*.

Carryout and Trackout. These requirements are found in Rule 8041 – *Carryout and Trackout*. Carryout and trackout are materials adhered to vehicle tires and transport vehicles carried from a construction site and deposited onto a paved public road. Should carryout and trackout occur, it must be cleaned up at least daily, and immediately if it extends more than 50 feet from the exit point onto a paved road. The recommended clean-up methods include manually sweeping, sufficiently wetting the area prior to mechanical sweeping to limit VDE or using a PM10-efficient street sweeper. A blower device, or dry sweeping with any mechanical device other than a PM10-efficient street sweeper is prohibited.

Northern Region Office
4230 Kiernan Avenue, Suite 130
Modesto, CA 95356-9321
(209) 557-6400 ♦ FAX (209) 557-6475

Central Region Office
1990 East Gettysburg Avenue
Fresno, CA 93726-0244
(559) 230-6000 ♦ FAX (559) 230-6062

Southern Region Office
2700 "M" Street, Suite 275
Bakersfield, CA 93301-2370
(661) 326-6900 ♦ FAX (661) 326-6985

Haul Roads. Dust control is required on all haul roads and unpaved vehicle and equipment traffic areas at construction sites, per Rule 8021 – *Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities*.

Storage Piles and Bulk Materials. The handling, storage, and transportation requirements for bulk materials are found in Rule 8031 – *Bulk Materials*. These requirements include: applying water as materials are handled, stabilizing or covering stored materials, and installing wind barriers to limit VDE. Limiting vehicle speed, loading haul trucks with a freeboard six inches or greater, covering haul trucks, or applying water to the top of the load are options for reducing VDE from vehicle transportation of bulk materials.

Demolition. Wetting of the exterior of a building to be demolished is required. Demolition debris and the area around the demolition must also be controlled to limit VDE. Cleaning up carryout and trackout must be completed according to Rule 8041. Demolition activities are also subject to the District's asbestos rule, Rule 4002 – *National Emission Standards for Hazardous Air Pollutants*.

Dust Control Plans. For large construction projects, Rule 8021 requires the owner or contractor to submit a Dust Control Plan to the District for approval at least 30 days prior to commencing construction activities. This requirement applies to projects that include 40 or more acres of disturbed surface area or will involve moving more than 2,500 cubic yards per day of material on at least three days during the project.

Record keeping. All sites subject to the regulation that employ dust control measures must keep records for each day any dust controls are used. The District has developed record keeping forms for water application, street sweeping, and for "permanent" controls such as applying long term dust palliatives, vegetation, ground cover materials, paving, or other durable materials. Pursuant to Rule 8011, records must be kept for one year after the end of dust generating activities.

Exemptions. Activities in areas above 3,000 feet elevation are exempt from all Regulation VIII requirements. The following exemptions in Rule 8021 apply to construction activities:

- Blasting activities
- Maintenance and remodeling of existing buildings if the addition is less than 50% of the size of the existing building or 10,000 square feet. These activities, however, are subject to the District's asbestos rule, Rule 4002.
- Additions to single family dwellings
- Mowing, disking or other weed control on sites less than ½ acre.

Nuisance. Whether or not the construction activity is exempt from the Regulation VIII requirements, any activity that creates fugitive dust must not cause a nuisance, per Rule 4102 - Nuisance. Therefore, it is important to monitor the dust generating activities and, if necessary, plan for and implement the appropriate dust control measures to limit the public's exposure to fugitive dust.

This is a basic summary of Regulation VIII as it applies to the construction industry. For more information contact the Compliance Division of the District office nearest to you.

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT
Compliance Assistance Bulletin- December, 1994
Asbestos Synopsis

Asbestos Demolition/Renovation Summary:

Prior to any renovation or demolition of a facility

Inspect: Conduct an asbestos inspection of the site before:

~Any renovation which 160 sq. ft. of building materials, or 260 linear feet of pipe insulation will be disturbed, or

~Any demolition of a facility with or without asbestos-containing materials

Notify: Submit an asbestos notification form for any regulated renovation or demolition, 10 working days before the activity.

Fees: Fees must be paid to the District with the notification for all regulated renovations and demolitions.

Demolition Release Form: Prior to any demolition, you must have completed a demolition release form. Upon its approval by the District this signed form may be used as proof (needed by the building official) of compliance with, or exemption from, the NESHAP notification requirements.

Submit this form to the building department with your application for a demolition permit.

Applicability

Facilities subject to the NESHAP (regulated facilities) include all commercial buildings, apartments with more than 4 units, other structures and non-portable equipment. Single family dwellings may be exempt, but only on a case by case basis.

Demolitions subject to the NESHAP (regulated demolitions) are demolitions of facilities described above, whether or not asbestos is present.

Regulated renovation applies to any activity in which 160 sq. ft. of regulated asbestos-containing building materials or 260 linear feet of asbestos-containing pipe insulation is disturbed at a regulated facility.

Asbestos Notification and Inspection Requirements

Definitions

Facilities:	Facilities subject to the rule include "all structures, installations, buildings and equipment, except for single family dwellings and apartments with four or fewer dwelling units." Single family dwellings and apartments are also subject to the regulation if: ~There is more than one building at a site being renovated or demolished. or ~The building had been used for, or is being removed for a commercial or public use, or is to be used as a training burn exercise.
Demolition:	In addition to the total destruction of a structure, demolitions include "the removal of any structural load-bearing member from a facility together with any related handling operations or the intentional burning of a building: (training burns conducted by a fire fighting agency). Also, the separation of a structure from its foundation prior to relocation is a demolition.
Renovation:	Altering a facility or one or more facility components in any way, including the stripping or removal of regulated asbestos-containing material (RACM) from a facility component. Renovations include all activities in which asbestos could be disturbed at a regulated facility, including the clean up and removal of debris from buildings which have burned.

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT
Compliance Assistance Bulletin- December, 1994
Asbestos Synopsis

Definitions, Continued	
Regulated Asbestos-Containing Materials (RACM) Include:	(1) Friable asbestos-containing material (ACM). (2) Category 1 nonfriable ACM in poor condition and "has become friable" or that has or will be subjected to sanding, grinding, cutting, or abrading. (3) Category II nonfriable ACM that has a high probability of becoming, or as become, crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation.
Friable Asbestos-Containing Material (ACM):	Any material containing more than 1 percent asbestos, as determined by Polarized Light Microscopy (PLM) testing, which, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.
Category I nonfriable ACM:	Any asbestos-containing packings, gaskets, resilient floor coverings, and asphalt roofing products containing more than 1 percent asbestos as determined by PLM testing.
Category II nonfriable ACM:	Any asbestos-containing materials, excluding Category 1 ACM, containing more than 1 percent asbestos as determined by PLM testing, which when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Inspection: done by, or under the direction of a Cal-OSHA certified consultant prior to:

- Any regulated demolition.
- Any renovation activity in which more than 160 sq. ft. of any building material or 260 linear feet of pipe insulation will be disturbed. An inspection is not required if the material to be disturbed is stipulated to be asbestos-containing and will be removed in accordance with the NESHAP.

Inspection Report Must Include:

- A schematic showing the location of all tested materials.
- The following data for all asbestos-containing materials:
  1. The amount and description of each material.
  2. Percent asbestos content.
  3. Whether or not the material is friable.

Notification: An asbestos notification must be submitted to the District at least 10 working days prior to:

1. Any regulated demolition.
2. Any renovation in which more than 160 sq. ft. or 260 linear ft. of RACM will be disturbed.

A copy of the Asbestos Inspection Report must be included with the Notification.

Notification will not be considered complete, nor will the 10 working day notice period begin until all required information and fees have been submitted to the District.

Fees: District Rule 3050 requires that nonrefundable asbestos fees be received along with asbestos job notifications. Fees must be paid for regulated asbestos abatement projects and regulated demolition projects, whether or not asbestos is present.

Demolition Release Form: The California Health and Safety Code requires that the city or county building official have proof of compliance with, or exemption from, the asbestos notification requirement before he or she issues a demolition permit.

After the District has received a demolition notification and is satisfied that the NESHAP notification requirements have been complied with, the District will issue a Demolition Release Form to the person who submitted the notification.

Recycle and Waste Disposal: The asbestos notification must also identify any building materials which will be recycled after removal from a project. The name of the recycling contractor and location of such activity must be identified.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

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

1-1-04-SP-0365

December 8, 2003

Mr. David Stagnaro
Senior Planner
City of Stockton
Municipal Utilities Department
345 N. El Dorado Street
Stockton, California 95202

Subject: Species List for Delta Water Supply Project, San Joaquin County, California

Dear Mr. Stagnaro:

We are sending the enclosed list (Enclosure A) in response to your November 12, 2003, notice. The list covers the following U.S. Geological Survey 7½ minute quad or quads: Stockton East and Stockton West Quads.

Please read *Important Information About Your Species List* (enclosed). It explains how we made the list and describes your responsibilities under the Endangered Species Act. Please contact Dan Buford at (916) 414-6625, if you have any questions about the attached list or your responsibilities under the Endangered Species Act. For the fastest response to species list requests, address them to the attention of Species Lists at this address. You may fax requests to 414-6712 or 414-6713. You may also email them to harry_mossman@fws.gov.

Sincerely,

Daniel Buford

for Lori Rinek
Acting Deputy Assistant Field Supervisor

Enclosures

TAKE PRIDE IN AMERICA

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. If you requested your list by quad name or number, that is what we used. Otherwise, we used the information you sent us to determine which quad or quads to use.

Animals

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. Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents. 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. We have also included either a county species list or a list of species in nearby quads. We recommend that you check your project area for these plants. Plants may exist in an area without ever having been detected there.

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 enclosed *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species*. The results of your surveys should be published in any environmental documents prepared for your project.

State-Listed Species

If a species has been listed as threatened or endangered by the State of California, but not by us nor by the National Marine Fisheries Service, it will appear on your list as a Species of Concern. *However you should contact the California Department of Fish and Game for official information about these species.* Call (916) 322-2493 or write Marketing Manager, California Department of Fish and Game, Natural Diversity Data Base, 1416 Ninth Street, Sacramento, California 95814.

Your Responsibilities Under the Endangered Species Act

All plants and animals identified as *listed* on Enclosure A are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the *take* of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal. 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. Such consultation would result in a *biological opinion* 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 mitigates for the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the mitigation 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. Maps and 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).

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.

Your list may contain a section called *Species of Concern*. This term includes former *category 2 candidate species* and other plants and animals of concern to the Service and other Federal, State and private conservation agencies and organizations. Some of these species may become candidate species in the future.

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, candidate and special concern species in your planning, this should not be a problem. We also continually strive to make our information as accurate as possible. Sometimes we learn that a particular species has a different range than we thought. This should not be a problem if you consider the species on the county or surrounding-quad lists that we have enclosed. If you have a long-term project or if your project is delayed, please feel free to contact us about getting a current list. You can also find out the current status of a species by going to the Service's Internet page: *www.fws.gov*

GUIDELINES FOR CONDUCTING AND REPORTING BOTANICAL INVENTORIES FOR FEDERALLY LISTED, PROPOSED AND CANDIDATE PLANTS
(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

   a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species

   b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name

   c. survey dates and survey methodology(ies)

   d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made

   e. a comprehensive list of all vascular plants occurring on the project site for each habitat type

   f. current and historic land uses of the habitat(s) and degree of site alteration

   g. presence of target species off-site on adjacent parcels, if known

h. an assessment of the biological significance or ecological quality of the project site in a local and regional context

5. If target species is(are) found, report results that additionally include:

   a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project

   b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

   c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports.

   d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than three years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

9. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

ENCLOSURE A

Endangered and Threatened Species that May Occur in or be Affected by
Projects in the Area of the Following California Counties
Reference File No. 1-1-04-SP-365
December 8, 2003

SAN JOAQUIN COUNTY

Listed Species

Mammals

San Joaquin kit fox, *Vulpes macrotis mutica* (E)

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E)

riparian brush rabbit, *Sylvilagus bachmani riparius* (E)

Birds

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)

Critical habitat, Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS

Critical habitat, delta smelt, *Hypomesus transpacificus* (T)

Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

delta smelt, *Hypomesus transpacificus* (T)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

Invertebrates

Conservancy fairy shrimp, *Branchinecta conservatio* (E)

Critical habitat, vernal pool invertebrates, (X)

longhorn fairy shrimp, *Branchinecta longiantenna* (E)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

vernal pool tadpole shrimp, *Lepidurus packardi* (E)

Plants

Critical habitat, large-flowered fiddleneck, *Amsinckia grandiflora* (E)

Critical habitat, vernal pool plants, (X)

Greene's tuctoria (=Orcutt grass), *Tuctoria greenei* (E) *

large-flowered fiddleneck, *Amsinckia grandiflora* (E) palmate-bracted bird's-beak, *Cordylanthus palmatus* (E) *

succulent (=fleshy) owl's-clover, *Castilleja campestris ssp. succulenta* (T)

Proposed Species

Amphibians

California tiger salamander, *Ambystoma californiense* (PT)

Candidate Species

Birds

Western yellow-billed cuckoo, *Coccyzus americanus occidentalis* (C) *

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C) NMFS

Critical habitat, Central Valley fall/late fall-run chinook, *Oncorhynchus tshawytscha* (C) NMFS

green sturgeon, *Acipenser medirostris* (C)

Species of Concern

Mammals

Merced kangaroo rat, *Dipodomys heermanni dixoni* (SC)

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

long-legged myotis bat, *Myotis volans* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

Birds

Aleutian Canada goose, *Branta canadensis leucopareia* (D)

American bittern, *Botaurus lentiginosus* (SC)

American peregrine falcon, *Falco peregrinus anatum* (D)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

California thrasher, *Toxostoma redivivum* (SC)

Lawrence's goldfinch, *Carduelis lawrencei* (SC)

Lewis' woodpecker, *Melanerpes lewis* (SC)

Nuttall's woodpecker, *Picoides nuttallii* (SLC)

Swainson's hawk, *Buteo Swainsoni* (CA)

bank swallow, *Riparia riparia* (CA)

black rail, *Laterallus jamaicensis coturniculus* (CA)

ferruginous hawk, *Buteo regalis* (SC)

greater sandhill crane, *Grus canadensis tabida* (CA)
little willow flycatcher, *Empidonax traillii brewsteri* (CA)
loggerhead shrike, *Lanius ludovicianus* (SC)
long-billed curlew, *Numenius americanus* (SC)
marbled godwit, *Limosa fedoa* (SC)
mountain plover, *Charadrius montanus* (SC)
oak titmouse, *Baeolophus inornatus* (SLC)
olive-sided flycatcher, *Contopus cooperi* (SC)
red-breasted sapsucker, *Sphyrapicus ruber* (SC)
rufous hummingbird, *Selasphorus rufus* (SC)
tricolored blackbird, *Agelaius tricolor* (SC)
western burrowing owl, *Athene cunicularia hypugaea* (SC)
white-faced ibis, *Plegadis chihi* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)

Reptiles

California horned lizard, *Phrynosoma coronatum frontale* (SC)
San Joaquin coachwhip (=whipsnake), *Masticophis flagellum ruddocki* (SC)
northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
silvery legless lizard, *Anniella pulchra pulchra* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)
western spadefoot toad, *Spea hammondii* (SC)

Fish

Kern brook lamprey, *Lampetra hubbsi* (SC)
Pacific lamprey, *Lampetra tridentata* (SC)
Sacramento splittail, *Pogonichthys macrolepidotus* (SC)
longfin smelt, *Spirinchus thaleichthys* (SC)
river lamprey, *Lampetra ayresi* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)
California linderiella fairy shrimp, *Linderiella occidentalis* (SC)
Midvalley fairy shrimp, *Branchinecta mesovallensis* (SC)
Sacramento anthicid beetle, *Anthicus sacramento* (SC)
curved-foot hygrotus diving beetle, *Hygrotus curvipes* (SC)
moestan blister beetle, *Lytta moesta* (SC)
molestan blister beetle, *Lytta molesta* (SC)

Plants

Boggs Lake hedge-hyssop, *Gratiola heterosepala* (CA)

Hoover's cryptantha, *Cryptantha hooveri* (SLC)

Lemmon's jewelflower, *Caulanthus coulteri var lemmonii* (SLC)

Livermore tarplant, *Deinandra bacigalupii* (SC)

Mason's lilaeopsis, *Lilaeopsis masonii* (SC)

San Joaquin spearscale (=saltbush), *Atriplex joaquiniana* (SC) *

Suisun Marsh aster, *Aster lentus* (SC)

alkali milk-vetch, *Astragalus tener var. tener* (SC) *

big tarplant, *Blepharizonia plumosa ssp. plumosa* (SC) *

caper-fruited tropidocarpum, *Tropidocarpum capparideum* (SC) *

delta coyote-thistle (=button-celery), *Eryngium racemosum* (CA) *

delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)

heartscale, *Atriplex cordulata* (SC) *

interior California (Hospital Canyon) larkspur, *Delphinium californicum ssp. interius* (SC)

showy (=golden) madia, *Madia radiata* (SC) *

slough thistle, *Cirsium crassicaule* (SC)

valley sagittaria (=Sanford's arrowhead), *Sagittaria sanfordii* (SC)

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.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	Other species of concern to the Service.
(SLC)	*Species of Local Concern*	Species of local or regional concern or conservation significance.
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
NMFS	NMFS species	Under jurisdiction of the National Marine Fisheries Service. Contact them directly.
*	*Extirpated*	Possibly extirpated from the area.
**	*Extinct*	Possibly extinct
	Critical Habitat	Area essential to the conservation of a species.

ENCLOSURE A

Endangered and Threatened Species that May Occur in
or be Affected by Projects in the Selected Quads Listed Below
Reference File No. 1-1-04-SP-365
December 8, 2003

QUAD: 461B STOCKTON EAST

Listed Species

Mammals

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *

riparian brush rabbit, *Sylvilagus bachmani riparius* (E) *

San Joaquin kit fox, *Vulpes macrotis mutica* (E)

Birds

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Critical habitat, delta smelt, *Hypomesus transpacificus* (T)

delta smelt, *Hypomesus transpacificus* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T) NMFS

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

vernal pool tadpole shrimp, *Lepidurus packardi* (E)

Proposed Species

Amphibians

California tiger salamander, *Ambystoma californiense* (PT)

Candidate Species

Fish

green sturgeon, *Acipenser medirostris* (C)

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C) NMFS

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)
greater western mastiff-bat, *Eumops perotis californicus* (SC)
small-footed myotis bat, *Myotis ciliolabrum* (SC)
long-legged myotis bat, *Myotis volans* (SC)
Yuma myotis bat, *Myotis yumanensis* (SC)
San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)
western burrowing owl, *Athene cunicularia hypugaea* (SC)
Aleutian Canada goose, *Branta canadensis leucopareia* (D)
Swainson's hawk, *Buteo Swainsoni* (CA)
ferruginous hawk, *Buteo regalis* (SC)
Lawrence's goldfinch, *Carduelis lawrencei* (SC)
Vaux's swift, *Chaetura vauxi* (SC)
mountain plover, *Charadrius montanus* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)
little willow flycatcher, *Empidonax traillii brewsteri* (CA)
prairie falcon, *Falco mexicanus* (SC)
American peregrine falcon, *Falco peregrinus anatum* (D)
greater sandhill crane, *Grus canadensis tabida* (CA)
loggerhead shrike, *Lanius ludovicianus* (SC)
Lewis' woodpecker, *Melanerpes lewis* (SC)
long-billed curlew, *Numenius americanus* (SC)
Nuttall's woodpecker, *Picoides nuttallii* (SLC)
white-faced ibis, *Plegadis chihi* (SC)
rufous hummingbird, *Selasphorus rufus* (SC)

Reptiles

silvery legless lizard, *Anniella pulchra pulchra* (SC)
northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)
California horned lizard, *Phrynosoma coronatum frontale* (SC)

Fish

river lamprey, *Lampetra ayresi* (SC)
Kern brook lamprey, *Lampetra hubbsi* (SC)
Pacific lamprey, *Lampetra tridentata* (SC)
Sacramento splittail, *Pogonichthys macrolepidotus* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Midvalley fairy shrimp, *Branchinecta mesovallensis* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

molestan blister beetle, *Lytta molesta* (SC)

QUAD: 462A STOCKTON WEST

Listed Species

Mammals

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *

riparian brush rabbit, *Sylvilagus bachmani riparius* (E) *

Birds

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Critical habitat, delta smelt, *Hypomesus transpacificus* (T)

delta smelt, *Hypomesus transpacificus* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T) NMFS

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

vernal pool tadpole shrimp, *Lepidurus packardi* (E)

Plants

palmate-bracted bird's-beak, *Cordylanthus palmatus* (E) *

Proposed Species

Amphibians

California tiger salamander, *Ambystoma californiense* (PT)

Candidate Species

Fish

green sturgeon, *Acipenser medirostris* (C)

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C) NMFS

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

western burrowing owl, *Athene cunicularia hypugaea* (SC)

Aleutian Canada goose, *Branta canadensis leucopareia* (D)

Swainson's hawk, *Buteo Swainsoni* (CA)

ferruginous hawk, *Buteo regalis* (SC)

Lawrence's goldfinch, *Carduelis lawrencei* (SC)

Vaux's swift, *Chaetura vauxi* (SC)

mountain plover, *Charadrius montanus* (SC)

white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

prairie falcon, *Falco mexicanus* (SC)

American peregrine falcon, *Falco peregrinus anatum* (D)

greater sandhill crane, *Grus canadensis tabida* (CA)

loggerhead shrike, *Lanius ludovicianus* (SC)

marbled godwit, *Limosa fedoa* (SC)

Lewis' woodpecker, *Melanerpes lewis* (SC)

long-billed curlew, *Numenius americanus* (SC)

Nuttall's woodpecker, *Picoides nuttallii* (SLC)

white-faced ibis, *Plegadis chihi* (SC)

rufous hummingbird, *Selasphorus rufus* (SC)

California thrasher, *Toxostoma redivivum* (SC)

Reptiles

silvery legless lizard, *Anniella pulchra pulchra* (SC)

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Fish

river lamprey, *Lampetra ayresi* (SC)
Kern brook lamprey, *Lampetra hubbsi* (SC)

Pacific lamprey, *Lampetra tridentata* (SC)

Sacramento splittail, *Pogonichthys macrolepidotus* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Sacramento anthicid beetle, *Anthicus sacramento* (SC)

Midvalley fairy shrimp, *Branchinecta mesovallensis* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

molestan blister beetle, *Lytta molesta* (SC)

Plants

alkali milk-vetch, *Astragalus tener var. tener* (SC) *

San Joaquin spearscale (=saltbush), *Atriplex joaquiniana* (SC) *

delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)

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.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(SLC)	*Species of Local Concern*	Species of local or regional concern or conservation significance.
(MB)	*Migratory Bird*	Migratory bird
NMFS	NMFS species	Under the jurisdiction of the National Marine Fisheries Service. Contact them directly.
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
(*)	*Extirpated*	Possibly extirpated from this quad.
(**)	*Extinct*	Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.

APPENDIX B

CALIFORNIA AGRICULTURE LESA WORKSHEETS

NOTES

Calculation of the Land Evaluation (LE) Score

Part 1. Land Capability Classification (LCC) Score:

(1) Determine the total acreage of the project.
(2) Determine the soil types within the project area and enter them in **Column A** of the **Land Evaluation Worksheet** provided on page 2-A.
(3) Calculate the total acres of each soil type and enter the amounts in **Column B**.
(4) Divide the acres of each soil type (**Column B**) by the total acreage to determine the proportion of each soil type present. Enter the proportion of each soil type in **Column C**.
(5) Determine the LCC for each soil type from the applicable Soil Survey and enter it in **Column D**.
(6) From the LCC Scoring Table below, determine the point rating corresponding to the LCC for each soil type and enter it in **Column E**.

LCC Scoring Table

LCC Class	**I**	**IIe**	**IIs,w**	**IIIe**	**IIIs,w**	**IVe**	**IVs,w**	**V**	**VIe,s,w**	**VIIe,s,w**	**VIII**
Points	**100**	**90**	**80**	**70**	**60**	**50**	**40**	**30**	**20**	**10**	**0**

(7) Multiply the proportion of each soil type (**Column C**) by the point score (**Column E**) and enter the resulting scores in **Column F**.
(8) Sum the LCC scores in **Column F**.
(9) Enter the LCC score in box <1> of the **Final LESA Score Sheet** on page 10-A.

Part 2. Storie Index Score:

(1) Determine the Storie Index rating for each soil type and enter it in **Column G**.
(2) Multiply the proportion of each soil type (**Column C**) by the Storie Index rating (**Column G**) and enter the scores in **Column H**.
(3) Sum the Storie Index scores in **Column H** to gain the Storie Index Score.
(4) Enter the Storie Index Score in box <2> of the **Final LESA Score Sheet** on page 10-A.

Land Evaluation Worksheet

Land Capability Classification (LCC) and Storie Index Scores

A Soil Map Unit	B Project Acres	C Proportion of Project Area	D LCC	E LCC Rating	F LCC Score	G Storie Index	H Storie Index Score
101	6	0.11	IIs	80	9	57	6
226	50	0.89	IIIw	60	53	31	28
Totals	56	(Must Sum to 1.0)		***LCC Total Score***	62	***Storie Index Total Score***	34

101 Acampo Sandy Loam } Irrigated
226 Rioblanco Clay Loam }

Site Assessment Worksheet 1.

Project Size Score

	I LCC Class I - II	J LCC Class III	K LCC Class IV - VIII
	6		
		50	
Total Acres	6	50	
Project Size Scores	0	60	

Highest Project Size Score 60

NOTES

Calculation of the Site Assessment (SA) Score

Part 1. Project Size Score:.

(1) Using **Site Assessment Worksheet 1** provided on page 2-A, enter the acreage of each soil type from **Column B** in the **Column - I, J or K** - that corresponds to the LCC for that soil. (Note: While the Project Size Score is a component of the Site Assessment calculations, the score sheet is an extension of data collected in the Land Evaluation Worksheet, and is therefore displayed beside it).
(2) Sum **Column I** to determine the total amount of class I and II soils on the project site.
(3) Sum **Column J** to determine the total amount of class III soils on the project site.
(4) Sum **Column K** to determine the total amount of class IV and lower soils on the project site.
(5) Compare the total score for each LCC group in the Project Size Scoring Table below and determine which group receives the highest score.

Project Size Scoring Table

Class I or II		Class III		Class IV or Lower	
Acreage	Points	Acreage	Points	Acreage	Points
>80	100	>160	100	>320	100
60-79	90	120-159	90	240-319	80
40-59	80	80-119	80	160-239	60
20-39	50	60-79	70	100-159	40
10-19	30	40-59	60	40-99	20
10<	0	20-39	30	40<	0
		10-19	10		
		10<	0		

(6) Enter the **Project Size Score** (the highest score from the three LCC categories) in box <3> of the **Final LESA Score Sheet** on page 10-A.

NOTES

Part 2. Water Resource Availability Score:

(1) Determine the type(s) of irrigation present on the project site, including a determination of whether there is dryland agricultural activity as well.

(2) Divide the site into portions according to the type or types of irrigation or dryland cropping that is available in each portion. Enter this information in **Column B** of **Site Assessment Worksheet 2. - Water Resources Availability**.

(3) Determine the proportion of the total site represented for each portion identified, and enter this information in **Column C**.

(4) Using the Water Resources Availability Scoring Table, identify the option that is most applicable for each portion, based upon the feasibility of irrigation in drought and non-drought years, and whether physical or economic restrictions are likely to exist. Enter the applicable Water Resource Availability Score into **Column D**.

(5) Multiply the Water Resource Availability Score for each portion by the proportion of the project area it represents to determine the weighted score for each portion in **Column E**.

(6) Sum the scores for all portions to determine the project's total Water Resources Availability Score

(7) Enter the Water Resource Availability Score in box <4> of the **Final LESA Score Sheet** on page 10-A.

Site Assessment Worksheet 2. - Water Resources Availability

A	B	C	D	E
Project Portion	Water Source	Proportion of Project Area	Water Availability Score	Weighted Availability Score (C x D)
1	Calwater	1	100	100
2				
3				
4				
5				
6				
		(Must Sum to 1.0)	***Total Water Resource Score***	100

Water Resource Availability Scoring Table

Option	Non-Drought Years			Drought Years			WATER RESOURCE SCORE
	RESTRICTIONS			RESTRICTIONS			
	Irrigated Production Feasible?	Physical Restrictions ?	Economic Restrictions ?	Irrigated Production Feasible?	Physical Restrictions ?	Economic Restrictions ?	
1	YES	NO	NO	YES	NO	NO	100
2	YES	NO	NO	YES	NO	YES	95
3	YES	NO	YES	YES	NO	YES	90
4	YES	NO	NO	YES	YES	NO	85
5	YES	NO	NO	YES	YES	YES	80
6	YES	YES	NO	YES	YES	NO	75
7	YES	YES	YES	YES	YES	YES	65
8	YES	NO	NO	NO	-- --	-- --	50
9	YES	NO	YES	NO	-- --	-- --	45
10	YES	YES	NO	NO	-- --	-- --	35
11	YES	YES	YES	NO	-- --	-- --	30
12	Irrigated production not feasible, but rainfall adequate for dryland production in both drought and non-drought years						25
13	Irrigated production not feasible, but rainfall adequate for dryland production in non-drought years (but not in drought years)						20
14	Neither irrigated nor dryland production feasible						0

NOTES

Part 3. Surrounding Agricultural Land Use Score:

(1) Calculate the project's Zone of Influence (ZOI) as follows:

(a) a rectangle is drawn around the project such that the rectangle is the smallest that can completely encompass the project area.

(b) a second rectangle is then drawn which extends one quarter mile on all sides beyond the first rectangle.

(c) The ZOI includes all parcels that are contained within or are intersected by the second rectangle, less the area of the project itself.

(2) Sum the area of all parcels to determine the total acreage of the ZOI.

(3) Determine which parcels are in agricultural use and sum the areas of these parcels

(4) Divide the area in agriculture found in step (3) by the total area of the ZOI found in step (2) to determine the percent of the ZOI that is in agricultural use.

(5) Determine the Surrounding Agricultural Land Score utilizing the Surrounding Agricultural Land Scoring Table below.

Surrounding Agricultural Land Scoring Table

Percent of ZOI in Agriculture	Surrounding Agricultural Land Score
90-100	100
80-89	95
70-79	90
65-69	85
60-64	80
55-59	70
50-54	60
45-49	50
40-44	40
35-39	30
30-34	20
20-29	10
<19	0

(5) Enter the Surrounding Agricultural Land Score in box <5> of the **Final LESA Score Sheet** on page 10-A.

Site Assessment Worksheet 3.

Surrounding Agricultural Land and Surrounding Protected Resource Land

A	B	C	D	E	F	G
Zone of Influence					Surrounding Agricultural Land Score (From Table)	Surrounding Protected Resource Land Score (From Table)
Total Acres	Acres in Agriculture	Acres of Protected Resource Land	Percent in Agriculture (A/B)	Percent Protected Resource Land (A/C)		
680	680	440	1.0	0.65	100	85

NOTES

Part 4. Protected Resource Lands Score:

The Protected Resource Lands scoring relies upon the same Zone of Influence information gathered in Part 3, and figures are entered in Site Assessment Worksheet 3, which combines the surrounding agricultural and protected lands calculations.

(1) Use the total area of the ZOI calculated in Part 3. for the Surrounding Agricultural Land Use score.

(2) Sum the area of those parcels within the ZOI that are protected resource lands, as defined in the California Agricultural LESA Guidelines.

(3) Divide the area that is determined to be protected in Step (2) by the total acreage of the ZOI to determine the percentage of the surrounding area that is under resource protection.

(4) Determine the Surrounding Protected Resource Land Score utilizing the Surrounding Protected Resource Land Scoring Table below.

Surrounding Protected Resource Land Scoring Table

Percent of ZOI Protected	Protected Resource Land Score
90-100	100
80-89	95
70-79	90
65-69	85
60-64	80
55-59	70
50-54	60
45-49	50
40-44	40
35-39	30
30-34	20
20-29	10
<20	0

(5) Enter the Protected Resource Land score in box <6> of the **Final LESA Score Sheet** on page 10-A.

NOTES

Final LESA Score Sheet

Calculation of the Final LESA Score:

(1) Multiply each factor score by the factor weight to determine the weighted score and enter in Weighted Factor Scores column.
(2) Sum the weighted factor scores for the LE factors to determine the total LE score for the project.
(3) Sum the weighted factor scores for the SA factors to determine the total SA score for the project.
(4) Sum the total LE and SA scores to determine the Final LESA Score for the project.

	Factor Scores	Factor Weight	Weighted Factor Scores
LE Factors			
Land Capability Classification	<1> 62	0.25	15
Storie Index	<2> 34	0.25	8
LE Subtotal		***0.50***	23
SA Factors			
Project Size	<3> 60	0.15	9
Water Resource Availability	<4> 100	0.15	15
Surrounding Agricultural Land	<5> 100	0.15	15
Protected Resource Land	<6> 85	0.05	4
SA Subtotal		***0.50***	43
		Final LESA Score	66

For further information on the scoring thresholds under the California Agricultural LESA Model, consult Section 4 of the Instruction Manual.

APPENDIX C

SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROPOSED PROJECT AREA

APPENDIX C

SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROPOSED PROJECT AREA

The "Likelihood for Project to Impact" category is defined as follows:

Unlikely: The project area and/or immediate vicinity do not support suitable habitat for a particular species. Project area is outside of the species known range.

Low Potential: The project area and/or immediate vicinity only provide limited habitat for a particular species. In addition, the known range for a particular species may be outside of the project area.

Medium Potential: The project area and/or immediate vicinity provide suitable habitat for a particular species.

High Potential: The project area and/or immediate vicinity provide ideal habitat conditions for a particular species.

Common Name *(Scientific Name)*	**Listing Status Federal/ State/CNPS**	**Habitat and Range**	**Potential for Project to Affect**	**Rationale**
Federal and State Listed Species				
Invertebrates				
Vernal pool fairy shrimp *(Branchinecta lynchi)*	FT/--/--	Vernal pools and valley grassland swales.	Unlikely	No vernal pool habitat in project area.
Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*	FT/--/--	Central Valley region in association with blue elderberry. Prefers to lay eggs in elderberries two to eight inches in diameter.	Unlikely	No elderberry shrubs in or within 100 feet of project area.
Vernal pool tadpole shrimp *(Lepidurus packardi)*	FE/--/--	Vernal pools and swales in Sacramento Valley.	Unlikely	No vernal pool habitat in project area.
Fish				
Delta smelt *(Hypomesus transpacificus)*	FT/ST/--	Sacramento-San Joaquin Delta, Suisun Bay, Carquinez Straight, and San Pablo Bay.	Likely	Occurs in Delta. Project area in Critical Habitat.
Central Valley steelhead *(Oncorhynchus mykiss)*	FT/--/--	Spawning in the Sacramento and San Joaquin Rivers and associated tributaries.	Likely	Occurs in Delta.

Common Name *(Scientific Name)*	Listing Status Federal/ State/CNPS	Habitat and Range	Potential for Project to Affect	Rationale
Central Valley spring-run chinook salmon *(Oncorhynchus tshawytscha)*	FT/ST/--	Spawning in the Sacramento and San Joaquin Rivers and associated tributaries.	Likely	Occurs in Delta.
Winter run chinook salmon *(Oncorhynchus tshawytscha)*	FE/SE/--	Spawning in Sacramento River below Keswick Dam. Juveniles spend 5 to 9 months in the river and Sacramento-San Joaquin Estuary before entering the ocean.	Likely	Occurs in Delta.
Reptiles				
Giant garter snake *(Thamnophis couchi gigas)*	FT/ST/--	Marshes, streams, and sloughs of Central Valley.	Medium	Wetland ditches, other perennial wetland habitats, and adjacent uplands (for winter estivation) in project area. Recorded within project right of way in 1980 and within five miles of project in 1996.
Amphibians				
California tiger salamander *(Ambystoma californiense)*	FPT/CSC/--	Annual grasslands and grassy understory of hardwood habitats; need underground refuges (e.g., ground squirrel burrows) and seasonal water sources for breeding.	Unlikely	No suitable habitat in project area.
California red-legged frog *(Rana aurora draytonii)*	FT/CSC/--	Lowlands/foothills near permanent water source of deep water; prefers shorelines with dense vegetation.	Unlikely	Presumed extirpated from valley floor.
Birds				
Swainson's hawk *(Buteo swainsoni)*	--/ST/--	Breeds in trees and large shrubs in riparian areas and oak savannahs adjacent to foraging areas such as grasslands, alfalfa, grain fields which support rodent populations.	High for foraging and nesting	At least one nest active in project right of way within last four years. Numerous records within five miles of project.
Greater sandhill crane (nesting and wintering) *(Grus canadensis tabida)*	--/ST/--	Open habitats, shallow lakes, and emergent wetlands. In winter uses dry grasslands and croplands near wetlands.	Medium	Project area provides winter foraging habitat, but is outside of breeding range.
Bald eagle *(Haliaeetus leucocephalus)*	FT/--/--	Ocean shorelines, lake margins, and river courses for both nesting and wintering. Not recorded nesting in Delta.	Unlikely	Occasional winter visitor to region, and only a minor amount of potential foraging habitat would be disturbed.

Common Name *(Scientific Name)*	Listing Status Federal/ State/CNPS	Habitat and Range	Potential for Project to Affect	Rationale
Bank swallow *(Riparia riparia)*	--/ST/--	Restricted to isolated places where fine-textured or sandy, vertical bluffs or riverbanks are available in which to dig burrows in colonies.	Unlikely	No suitable nesting habitat in project area.
Mammals				
Riparian woodrat *(Neotoma fuscipes riparia)*	FE/CSC/--	Inhabits riparian areas along San Joaquin, Stanislaus, and Tuolumne Rivers. Prefer areas with mix of brush and trees. Needs suitable nesting sites in trees, snags, or logs.	Unlikely	No suitable habitat in project area.
Riparian brush rabbit *(Sylvilagus bachmani riparius)*	FE/CSC/--	Riparian areas on San Joaquin River in northern Stanislaus County. Prefers dense thickets of wild rose, willows, and blackberries.	Unlikely	No suitable habitat in project area.
San Joaquin kit fox *(Vulpes macrotis mutica)*	FE/ST/--	Annual grasslands or grassy open stages with scattered shrubby vegetation. Needs loose-textured sandy soils for burrowing.	Unlikely	Project area is outside species range.
Plants				
Succulent (=fleshy) owl's clover *(Castilleja campestris succulenta)*	FT/SE/List 1B	Vernal pool habitat of lower foothills and grasslands of eastern San Joaquin Valley.	Unlikely	No vernal pools in project area.
Palmate-bracted bird's beak *(Cordylanthus palmatus)*	FE/SE/List 1B	Valley foothill introduced grasslands on alkaline soils with poor drainage. Known from six occurrences.	Unlikely	No alkali soils in project area.
Delta button-celery *(Eryngium racemosum)*	FSC/SE/List 1B	Vernally moist clay depressions, often in riparian scrub and streamside thickets.	Unlikely	No vernal-mesic depressions in project area.
Colusa grass *(Neostapfia colusana)*	FPT/SE/List 1B	Vernal pool associate.	Unlikely	No vernal pools n project area.
Greene's tuctoria *(Tuctoria greenei)*	FE/SR/List 1B	Vernal pool associate.	Unlikely	No vernal pools in project area.

Common Name *(Scientific Name)*	Listing Status Federal/ State/CNPS	Habitat and Range	Potential for Project to Affect	Rationale
Candidate and Other Special-Status Species				
Invertebrates				
Antioch dunes anthicid beetle *(Anthicus antiochensis)*	FSC/--/--	Sandy substrates near rivers.	Unlikely	No sandy habitats in project area.
Sacramento anthicid beetle *(Anthicus sacramento)*	FSC/--/--	Two locations (sand dunes) along lower Sacramento River in Sacramento and Solano counties.	Unlikely	No sandy habitats in project area.
Midvalley fairy shrimp *(Branchinecta mesovallensis)*	FSC/--/--	Lifecycle restricted to vernal pools.	Unlikely	No vernal pools in project area.
California linderiella (*Linderiella occidentalis*)	FSC/--/--	Lifecycle restricted to vernal pools.	Unlikely	No vernal pools in project area.
Fish				
Green sturgeon *(Acipenser medirostris)*	FC/CSC/--	Adults and juveniles occur and spawn predominantly throughout the upper Sacramento River. No documentation of spawning in the San Joaquin River.	Likely	Occurs in the Delta.
River lamprey *(Lampetra ayresi)*	FSC/CSC/--	Lower Sacramento and San Joaquin Rivers and from the Russian River.	Unlikely	Uncommon; populations in decline.
Kern brook lamprey *(Lampetra hubbsi)*	FSC/CSC/--	Reaches of the Merced River, Kaweah River, Kings River, and San Joaquin River.	Unlikely	Species thinly scattered throughout San Joaquin drainage and isolated from one another.
Pacific lamprey *(Lampetra tridentata)*	FSC/--/--	Upper drainages of Sacramento-San Joaquin system; below Friant Dam on San Joaquin River.	Unlikely	Coastal streams.
Central Valley fall/late fall-run chinook salmon	FC/CSC/--	Spawning in the Sacramento and San Joaquin Rivers and associated tributaries.	Likely	Occurs in the Delta.
Sacramento splittail *(Pogonichthys macrolepidotus)*	FSC/CSC/--	Slow-moving sections of rivers and sloughs; in the Delta and Suisun Marsh they congregate in dead-end sloughs.	Likely	Occurs in the Delta.
Longfin smelt *(Spirinchus thaleichthys)*	FSC/CSC/--	In the Sacramento-San Joaquin estuary adults and juveniles can be found in water ranging from nearly pure sea water to completely fresh water.	Likely	Occurs in the Delta.

Common Name *(Scientific Name)*	Listing Status Federal/ State/CNPS	Habitat and Range	Potential for Project to Affect	Rationale
Reptiles				
Silvery legless lizard *(Anniella pulchra pulchra)*	FSC/--/--	Sandy or loose soils under sparse vegetation from Contra Costa County to Mexican border.	Unlikely	Project area outside of species' range.
Northwestern pond turtle *(Clemmys marmorata marmorata)*	FSC/CSC/--	Rivers and streams, especially with some canopy cover and basking sites.	Medium	Project area provides suitable habitat. Recorded within 0.3 miles of project alignment.
Southwestern pond turtle *(Clemmys marmorata pallida)*	FSC/CSC/--	Rivers and streams, especially with some canopy cover and basking sites.	Medium	Project area provides suitable habitat. Recorded within 0.3 miles of project alignment.
California horned lizard *(Phrynosoma coronatum frontale)*	FSC/CSC/--	Inhabits variety of habitats, usually lowlands along sandy washes with scattered low bushes. In areas for sunning, bushes for cover, patches of loose soil for burial. Must have abundant ants and other insects.	Unlikely	No suitable habitat in project area.
Amphibians				
Foothill yellow-legged frog *(Rana boylii)*	FSC/--/--	Fast-moving rivers and streams in chaparral, forests, and woodlands.	Unlikely	No suitable habitat in project area.
Western spadefoot *(Scaphiopus hammondii)*	FSC/CSC/--	Primarily found in grasslands; also found in hardwood woodlands; vernal pools are essential for breeding and egg-laying.	Unlikely	No suitable habitat in project area.
Birds				
Tricolored blackbird *(Agelaius tricolor)*	FSC/CSC/--	Nomadic resident of Sacramento-San Joaquin Valley and low foothills; nests colonially in vicinity of fresh water, marshy areas. Colonies prefer heavy growths of cattails and tules.	Low	Limited suitable habitat in vicinity of project.
Aleutian Canada goose *(Branta canadensis leucopareia)*	FD/--/--	Winter resident in Central Valley. Grazes in open fields near water.	Medium	Agricultural fields within project area provide potential habitat.
Ferruginous hawk (wintering) *(Buteo regalis)*	FSC/CSC/--	Inhabits open grasslands, low foothills and desert scrub. Eats mainly lagomorphs, and other small mammals; also birds, amphibians, and reptiles.	Low	Relatively little foraging habitat in project right of way.

Common Name *(Scientific Name)*	**Listing Status Federal/ State/CNPS**	**Habitat and Range**	**Potential for Project to Affect**	**Rationale**
Lawrence's goldfinch (nesting) (*Carduelis lawrencei)*	FSC/--/--	Dry grassy slopes with weed patches, chaparral, and open woodlands; nests in trees or shrubs.	Unlikely	Project site is outside of species' breeding range.
Vaux's swift (nesting) *(Chaetura vauxi)*	FSC/CSC/--	Nests in large hollow trees in coniferous forests, and forages widely, especially over riparian areas and open water.	Unlikely	Project site is outside of species' breeding range.
Mountain plover *(Charadrius montanus)*	FC/CSC/--	Winters in Central California on bare dirt fields and short grasslands. No nesting records in California.	Medium	Project area provides potential foraging habitat within species' winter range.
American peregrine falcon *(Falco peregrinus anatum)*	FD/--/--	Forages in marshes and grasslands. Nesting habitat includes high, protected cliffs and ledges near water.	Low	No nesting habitat in project area; minor amount of potential foraging habitat would be disturbed.
White-tailed kite (*Elanus leucurus)*	FSC/SFP/--	Forages in open plains, farmland, grasslands and prairies; typically nests in trees.	Medium.	Species may nest in vicinity of project.
Little willow flycatcher *(Empidonax trailii brewsteri)*	FSC/--/--	Nests in dense riparian cover from 600 to 2,500 m elevation. Migrant in project area.	Unlikely.	Project site is outside of species' breeding range.
Loggerhead shrike *(Lanius ludovicianus)*	--/CSC/--	Nests in dense shrubs and brush near open foraging areas such as grasslands.	Med	Species may nest and forage in project area.
Lewis' woodpecker *(Melanerpes lewis)* (nesting)	FSC/--/--	Breeds in deciduous and coniferous habitats on east slope of Coast Ranges and in Sierra Nevada.	Unlikely	Project is outside of species' breeding range.
Long-billed curlew (nesting) (*Numenius americanus)*	FSC/CSC/--	Forages along lakes, marshes, mudflats and sandy beaches. Nests in prairies and plains.	Unlikely.	Project site is outside of species' breeding range.
White-faced ibis *(Plegadis chihi)*	FSC/--/--	Historically nested around Los Banos in freshwater wetland areas; presently no individuals breeding in San Joaquin Valley and only a few breeding individuals in northern Sacramento Valley.	Unlikely.	Project is outside of species' breeding range.
Rufous hummingbird (migratory) (*Selasphorus rufus)*	FSC/--/--	Riparian areas, open woodlands, chaparral and other areas rich with nectar producing flowers.	Low	Project provides limited foraging opportunities for migrating hummingbirds.
California thrasher *(Toxostoma redivivum)*	FSC/--/--	Uses dense chaparral habitats and associated riparian areas	Unlikely	Project is outside of species' breeding range.

Common Name ***(Scientific Name)***	**Listing Status Federal/ State/CNPS**	**Habitat and Range**	**Potential for Project to Affect**	**Rationale**
Western burrowing owl *(Speotyto hypugea cunicularia)*	FSC/CSC/--	Inhabits open, dry annual or perennial grasslands and scrublands characterized by low-growing vegetation. Subterranean nester dependent upon burrowing mammals, specifically California ground squirrel.	Medium	Species recorded breeding <1.3 miles south of project right of way. Eastern portion of project contains potentially suitable breeding habitat.
Mammals				
Pacific western big-eared bat *(Corynorhinus (=Plecotus) townsendii townsendii)*	FSC/	Forages over grasslands and roosts in buildings, caves, and rock crevices in relatively arid woody and brushy uplands near water. No identified roosting sites in project area.	Unlikely	No breeding habitat in project area.
Greater western mastiff-bat *(Eumops perotis californicus)*	FSC/CSC/--	Forages over grasslands and roosts in caves and rock crevices. No identified roosting sites in project area.	Unlikely	No breeding habitat in project area.
Small-footed myotis bat *(Myotis ciliolabrum)*	FSC/--/--	Forages over grasslands and roosts in buildings, caves, and rock crevices in relatively arid woody and brushy uplands near water. No identified roosting sites in project area.	Unlikely	No breeding habitat in project area.
Long-legged myotis bat *(Myotis volans)*	FSC/--/--	Forages over grasslands and chaparral and roosts in trees, caves, buildings, and rock crevices.	Unlikely	No breeding habitat in project area.
Yuma myotis bat *(Myotis yumanensis)*	FSC/--/--	Forages over open water and streams and roosts in trees, buildings, caves, and rock crevices. No identified roosting sites in project area.	Unlikely	No breeding habitat in project area.
San Joaquin pocket mouse *(Perognathus inornatus inornatus)*	FSC/CSC/--	Typically found in open grasslands and blue oak savannas; need friable (i.e., sandy) soils.	Unlikely	No suitable habitat in project area.
Pacific western big-eared bat *(Plecotus townsendii townsendii)*	FSC/CSC/--	Mesic habitats, roosting in caves, mines, tunnels, and buildings.	Low	Limited breeding habitat in project area.

Common Name *(Scientific Name)*	Listing Status Federal/ State/CNPS	Habitat and Range	Potential for Project to Affect	Rationale
Plants				
Suisun Marsh aster *(Aster lentus)*	--/--/List 1B	Brackish and freshwater marshes.	High	Project area contains potentially suitable habitat. Recorded <0.25 miles from project right of way in 2000. Especially likely to occur in tidally-influenced areas.
Recurved larkspur *(Delphinium recurvatum)*	--/--/List 1B	Valley foothill grasslands on alkaline soils, cismontane woodlands.	Unlikely	No alkali soils in project area.
Rose mallow *(Hibiscus lasiocarpus)*	--/--/List 2	Associated with freshwater marshes.	High	Project area contains potentially suitable habitat. Recorded within 0.3 miles of project area. Especially likely to occur in tidally-influenced areas.
Diamond-petaled poppy *(Eschscholzia rhombipetala)*	--/--/List 1B	Valley foothill grasslands on clay soils. Presumed extinct.	Low	Annual grasslands in project area regularly disturbed by agricultural activities.
Delta tule pea *(Lathyrus jepsonii* var. *jepsonii)*	--/--/List 1B	Both tidal freshwater and brackish marshes in Central and San Joaquin Valleys and in Bay Area.	High	Project area contains potentially suitable habitat. Recorded within five miles of project area. Especially likely to occur in tidally-influenced areas.
Legenere *(Legenere limosa)*	--/--/List 1B	Vernal pool associate.	Unlikely	No vernal pools in project area.
Mason's lilaeopsis *(Lilaeopsis masonii)*	--/SR/List 1B	Brackish or freshwater marshes, streambank scrub. Only known to island systems of Delta.	High	Project area contains potentially suitable habitat. Recorded <2 miles from project right of way. Especially likely to occur in tidally-influenced areas.
Delta mudwort (*Limosella subulata)*	--/--/2	Generally under wet conditions in tidal freshwater-marsh habitats, 0–9 feet in elevation.	High	Project area contains potentially suitable habitat. Recorded approx. Two miles from project right of way. Especially likely to occur in tidally-influenced areas.
Eel-grass pondweed *(Potamogeton zosteriformis)*	--/--/2	Marshy freshwater habitats from 0 – 1,860 meters.	Medium	Project area contains potentially suitable habitat. Recorded within five miles of project area.

Common Name *(Scientific Name)*	**Listing Status Federal/ State/CNPS**	**Habitat and Range**	**Potential for Project to Affect**	**Rationale**
Sanford's arrowhead *(Sagittaria sanfordii)*	--/--/List 1B	Assorted shallow, freshwater habitat associate.	Medium	Project area contains potentially suitable habitat.
Marsh skullcap (*Scutellaria galericulata)*	--/--/2	Wet meadow and marsh habitats.	Medium	Project area contains potentially suitable habitat. Recorded from within five miles of project right of way.
Blue skullcap (*Scutellaria lateriflora)*	--/--/2	Wet meadow and marsh habitats.	Medium	Project area contains potentially suitable habitat. Recorded from vicinity of project right of way.
Caper-fruited tropidocarpum *(Tropidocarpum capparideum)*	--/--/List 1A	Alkaline hills of introduced grasses. Presumed extinct.	Unlikely	Project area does not contain potentially suitable habitat.

STATUS CODES
Federal
FE = Endangered
FT = Threatened
FPE = Proposed Endangered
FPT = Proposed Threatened
FC = Candidate
FSC = Federal Special Concern Species

State
SE = Endangered
ST = Threatened
SR = Rare
SFP = Fully Protected
CSC = California Special Concern Species

California Native Plant Society
List 1B = Plants rare, threatened, or endangered in California and elsewhere
List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere
List 3 = Plants about which we need more information--a review list
List 4 = Plants of limited distribution--a watch list

APPENDIX D

MEASURES TO MINIMIZE IMPACTS – INCIDENTAL TAKE MINIMIZATION MEASURES

5.2 MEASURES TO MINIMIZE IMPACTS - INCIDENTAL TAKE MINIMIZATION MEASURES

As noted in the preceding overview, efforts to minimize impacts to SJMSCP Covered Species are species-based emphasizing the implementation of Incidental Take Minimization Measures aimed at averting the actual killing or injury of individual SJMSCP Covered Species on Open Space lands being Converted to non-Open Space uses.

The following Incidental Take Minimization Measures represent the best management practices known at the time of adoption of the SJMSCP. These measures may be refined throughout the life of the Plan, pursuant to the SJMSCP's Adaptive Management Plan (see Section 5.9.4), in response to positive or negative results found in the application of these methods as identified in the SJMSCP's Monitoring Plan (see Sections 5.9.2 and 5.9.3) or to reflect improvements and new discoveries in methods of Incidental Take Minimization or other biological factors. Incidental Take Minimization Measures for the SJMSCP are described, in detail, in Section 5.2.4. Procedures for determining when these measures apply to projects are described as follows:

5.2.1 ESTABLISHING CONDITIONS OF PROJECT APPROVAL RELATED TO INCIDENTAL TAKE MINIMIZATION MEASURES

5.2.1.1 Review Process and Condition Format

Plan Participants shall forward Advisory Agency Notices to the Joint Powers Authority (JPA), as required by Section 8.1.3.2, at the beginning of a discretionary project's application review process. The JPA shall respond, in writing, to the Plan Participants in accordance with the SJMSCP stating that either:

A. No Incidental Take Minimization Measures are necessary for the project; or,

B. Incidental Take Minimization Measures are necessary for the project. The JPA shall list the applicable Incidental Take Minimization Measures in the written response.

Plan Participants shall attach Incidental Take Minimization Measures, in accordance with Sections 5.2.3 and 5.2.4 of the SJMSCP, as conditions of project approval as provided by the JPA and including the substance of the following text to be included as part of the conditions of project approval or as an attachment to conditions of project approval:

> "In reliance on the Section 10(a)(1)(B) Permit issued by the United States Fish and Wildlife Service and the Section 2081(b) Incidental Take Permit issued by the California Department of Fish and Game, the <u>[City/County of   ]</u> has <u>[select one: issued a(n)/approved a(n)]</u> <u>[identify entitlement as appropriate: e.g., Conditional Use Permit/Site Development Permit/Subdivision Map/Parcel Map, etc.]</u> to <u>[name of Project Proponent/Applicant/Landowner]</u>, its successors, agents and assigns pursuant to the "Implementation Agreement for the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan" which will allow <u>[name of Project Proponent/Applicant/Landowner]</u>, its successors, agents and assigns to construct, operate and maintain the Project commonly known as <u>[name specific Project and cite document containing project description as approved by local jurisdiction]</u> and located on <u>[list parcel numbers and/or attach map]</u>

which may result in a legally permitted Incidental Take of the SJMSCP Covered Species in accordance with and subject to the terms and conditions of the [identify entitlement as appropriate: e.g., Conditional Use Permit/Site Development Permit/Subdivision Map/Parcel Map, etc.]. This Certification applies only to activities on the subject parcel(s) which are carried out in full compliance with [identify entitlement as appropriate: e.g., Conditional Use Permit/Site Development Permit/Subdivision Map/Parcel Map, etc.], Section 10(a)(1)(B) Permit and Section 2081(b) Incidental Take Permit conditions."

5.2.1.2 Time Limits for JPA Review of Discretionary Projects

The JPA shall provide the written response required pursuant to Section 5.2.1.1 to Plan Participants within the following time periods commencing with the receipt of an Advisory Agency Notice from Plan Participants:

A. For projects 40 acres or less in size, written response will be provided by the JPA to the Plan Participants within 30 calendar days;

B. For projects of greater than 40 acres the JPA shall provide written responses to the Plan Participants within 60 calendar days;

C. For projects requiring an environmental impact report for other than biological reasons, time limits shall be extended to allow for surveys of SJMSCP Covered Plant Species during optimal blooming seasons.

Extensions of these time limits may be granted with the approval of the Project Proponent.

5.2.1.3 Completion of Incidental Take Minimization Measures-Responsibilities of the Project Proponent

Incidental Take Minimization Measures shall be completed prior to Site Disturbance (normally prior to grading) as indicated in the conditions of project approval. Some Incidental Take Minimization Measures will be carried out during project construction. The cost of implementing Incidental Take Minimization Measures is the responsibility of the Project Proponent. The JPA is responsible for costs and implementation of relocation efforts as approved by the Permitting Agencies and as determined necessary through preconstruction surveys.

The following paragraphs summarize the JPA's procedure for assessing the applicability of Incidental Take Avoidance Measures for individual projects.

5.2.2 PRECONSTRUCTION SURVEYS

5.2.2.1 Overview

There are four categories of preconstruction surveys necessary to the implementation of the SJMSCP:

A. Preconstruction surveys to verify vegetation types affected by the project and to determine if SJMSCP Covered Species are present and, if present, attaching Incidental Take Minimization Measures as conditions of project approval for individual projects (see Section 5.2.2.5 for survey methodologies and Section 5.2.2.4 for special provisions for conducting plant surveys). These preconstruction surveys shall be conducted in the field when a project is located on suitable habitat for one or more of the SJMSCP Covered Species;

B. Preconstruction surveys conducted prior to (or, for some Incidental Take Minimization Measures, during) ground-disturbing activities to determine if SJMSCP Covered Species have been successfully relocated and/or to determine if other Incidental Take Minimization Measures have been implemented, as specified in the conditions of project approval; and

C. Preconstruction surveys, conducted in compliance with current U.S. Fish and Wildlife Service protocols, to determine the presence or absence of Conservancy and/or longhorn fairy shrimp within vernal pools or other wetlands located southwest of I-580 in the *Southwest Zone* unless complete avoidance of vernal pools and/or wetlands is achieved in compliance with SJMSCP Section 5.5.9.

D. Preconstruction surveys conducted pursuant to the protocol established in Section 5.2.2.5(A-C) for:

- Large-flowered fiddleneck southwest of the 900 foot contour line in the *Southwest Zone* southwest of I-580;
- Showy madia in the *Southwest Zone*;
- Hospital canyon larkspur in the *Southwest Zone*;
- Diamond-petaled poppy in the *Southwest Zone*;
- Greene's tuctoria in the *Vernal Pool Zone*;
- Succulent owl's clover in the *Vernal Pool Zone*;
- Legenere in the *Vernal Pool Zone*;
- Delta button celery in the *Central Zone* in S(Scrub) vegetation types;
- Sanford’s arrowhead in the *Central Zone* in W3, W4 and all I and R vegetation types; and

! Slough thistle in the *Central and Central/Southwest Transition Zones* in W4, R, R2, R3, R4 or R5 vegetation types–in particular where R touches or transitions to W.

The costs of conducting preconstruction surveys described in paragraphs A, B, and D, above, are calculated in the administrative costs for the SJMSCP and are included in funding estimates. The JPA shall conduct preconstruction surveys described in the paragraphs A, B, and D, above, at no additional cost to the Project Proponent. Preconstruction surveys required pursuant to paragraph C, above, are the responsibility of the Project Proponent.

5.2.2.2 Time Limits for Conducting JPA Preconstruction Surveys

The JPA shall conduct preconstruction surveys to determine the necessity of establishing Incidental Take Minimization Measures as conditions of project approval, as described above in 5.2.2.1(A and D) within the following time periods commencing from the date of receipt of Advisory Agency Notices from the Plan Participants except as provided in Section 5.2.2.5(B):

A. For projects of 40 acres or less, surveys shall be conducted within 30 calendar days

B. For projects of greater than 40 acres surveys shall be conducted within 60 calendar days,

C. For projects requiring an environmental impact report, the time limits shall be extended to allow for surveys for SJMSCP Covered Plant Species during optimal blooming seasons.

The JPA shall conduct preconstruction surveys prior to ground-disturbing activities to determine if SJMSCP Covered Species have been successfully relocated and/or to determine if other Incidental Take Minimization Measures have been implemented as specified in the conditions of project approval, as described above in Section 5.2.2.1(B), within two working days from the date that the JPA receives written or oral notice that the Project Proponent is ready to begin Site Disturbances except as provided in Sections 5.2.2.4(D) and 5.2.2.5(D) and 5.2.2.5 (E). Extensions of these time limits may be granted with the approval of the Project Proponent.

While the time limits for responding to Advisory Agency Notices remain as described above, actual preconstruction survey time limits do not apply for the following:

A. For projects proposed within potential habitat for the following plant species: large-flowered fiddleneck (*Amsinckia grandiflora*); succulent owl's clover (*Castilleja campestris* ssp. *succulenta*) Greene's tuctoria (*Tuctoria greenei*), Delta button celery (*Eryngium racemosum*), Diamond-petaled California poppy (*Escholzia rhombipetala*), showy madia (*Madia radiata*), slough thistle (*Cirsium crassicaule*), legenere (*Legenere limosa*), Hospital Canyon larkspur (*Delphinium californicum* ssp. *interius*), and Sanford's arrowhead (*Sagittaria sandfordii*). For these plant species, preconstruction surveys shall occur based on blooming periods for the plants and in accordance with the provisions of Section 5.2.2.5(B) unless otherwise approved pursuant to Section 5.2.2.5(C), unless full avoidance of all potential suitable habitat for the species occurs pursuant to Sections 5.5.9

(F) for narrowly distributed plant species or unless no kill/no Conversion of occupied habitat limits are lifted pursuant to Section 5.5.2.1; and

B. For projects proposed within potential habitat for the longhorn fairy shrimp and Conservancy fairy shrimp. Preconstruction surveys for these species shall be in accordance with current USFWS survey protocols unless full avoidance of all potential habitat for these species occurs pursuant to Section 5.5.9(B) or unless no kill/no Conversion of occupied habitat limits are lifted pursuant to Section 5.5.2.7.

5.2.2.3 Determining the Necessity for Site Visits as Part of Preconstruction Surveys

To assist in its assessment of the necessity for Incidental Take Minimization Measures, the JPA shall consult the *SJMSCP GIS Database* or other sources (e.g., current reports from Permitting Agency field personnel; published results of field surveys conducted by, or on behalf of, Permitting Agencies or other local, state or federal agencies; the SJMSCP Biological Analysis; or other sources that provide information related to the location of SJMSCP Covered Species), if necessary, to determine the likelihood for disturbing an SJMSCP Covered Species or Natural Land area (in particular vernal pools or other wetlands) based on information indicating known species occupation sites, vegetation types present and the potential for the site to be occupied by a species given the vegetation types and species needs. If insufficient information exists to make a determination, the JPA shall conduct a preconstruction survey to assess the likelihood of the occurrence of an SJMSCP Covered Species or any Natural Lands located within the project area. It is anticipated that preconstruction surveys occurring on the project site will occur on the majority (perhaps up to 90%) of project sites. Preconstruction surveys at the project site will always occur when suitable habitat is present or potentially present for one or more of the SJMSCP Covered Species. The estimated 10% of projects which are unlikely to require a preconstruction survey include, for example, infill areas within well-developed urban centers with extensive ground disturbance and extensive paving.

5.2.2.4 Special Provisions for Conducting Preconstruction Surveys for Plants

Since plants permanently occupy a given site (and therefore cannot easily be avoided by timing construction to avoid breeding seasons) and some plants may only be seasonally identified during sometimes brief blooming seasons, special provisions have been included in the SJMSCP for conducting pre-construction surveys for plants to ensure that Incidental Take Minimization Measures can be undertaken.

SJMSCP Covered Plant Species in San Joaquin County are located primarily on Natural Lands outside the boundaries of proposed development areas anticipated over the next 50 years as illustrated in the following maps located at the back of the SJMSCP:

! *SJMSCP Planned Land Use Map* - Illustrates boundaries of proposed development areas for the next 50 years.

! San Joaquin County Habitat Map Conservation and Open Space Plan Maps - Distribution of Existing Vegetation Habitat Types in San Joaquin County. Provides overview of the locations of Natural Lands, Natural Lands which are Wetlands, High and Low Habitat Value Agricultural Lands, and Urban Lands.

- ! San Joaquin County Habitat Map Conservation and Open Space Plan Maps - Species Occurrence. This map provides an overview of the distribution of SJMSCP Covered plants, birds, mammals, amphibians, reptiles, and invertebrates.

These three maps illustrate that **most SJMSCP Covered Plant Species, with few exceptions (e.g., Delta slough thistle, Delta button celery and vernal pool species), are located almost exclusively on Natural Lands located outside of proposed development boundaries**.

Further, based upon development patterns over the past 30± years and the fact that proposed development will occur primarily on highly disturbed and cultivated lands (Agricultural Habitat Lands) while most SJMSCP Covered Plant Species occur on Natural Lands, only minimal impacts are anticipated for most SJMSCP Covered Plant Species. In fact, **there is a much higher likelihood that most SJMSCP Covered Plant Species will be protected than they will be subject to Incidental Take under the SJMSCP.**

The following factors further support these conclusions:

- ! ***Southwest Zone.*** This area consists primarily of grasslands (Natural Lands). Virtually no development (except for some minor mineral resource development and urbanization concentrated along I-580--see the *SJMSCP Proposed Land Use Map* at the back of the SJMSCP) is proposed in this zone.

  While nearly devoid of proposed development, the following SJMSCP Covered Plant Species are located almost exclusively in the *Southwest Zone* and the likelihood of protecting these species within SJMSCP Preserves established for the San Joaquin kit fox are much higher than the likelihood of disturbing these species through SJMSCP Permitted Activities: Large-flowered fiddleneck (*Amsinckia grandiflora*), hospital canyon larkspur (*Delphinium californicum* ssp. *interius*), showy madia (*Madia radiata*) and recurved larkspur (*Delphinium recurvatum*). Alkali milk-vetch (*Astragalus tener* var. *tener*), brittlescale (*Atriplex depressa*), Mt. Hamilton coreopsis (*Coreopsis hamiltonii*), diamond-petaled California poppy (*Eschscholzia rhombipetala*), mad-dog skullcap (*Scutellaria lateriflora*), Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*), and caper-fruited tropidocarpum (*Tropidocarpum capparideum*) also have their potential habitat in the *Southwest Zone*, although no known occurrences of these species exist in this zone. Similarly, heartscale (*Atriplex cordulata*) was found historically in the *Southwest Zone*, but has no current records identifying occupied habitat in the County. These species would be protected in the same manner as the other four plant species known to occur in the *Southwest Zone* should they be discovered over the life of the Plan.

  In addition, ensuring that no disturbance will occur to the most narrowly distributed of these species, the SJMSCP Permits prohibit kill of individuals and conversion of occupied habitat for the large-flowered fiddleneck, diamond-petaled California poppy, showy madia and Hospital canyon larkspur unless special findings have been made upon consultation with the Permitting Agencies in accordance with the criteria established in Section 5.5.2.1. Special provisions for pre-construction surveys to ensure identification of these species are included in Section 5.2.2.5(B).

- ***Primary Zone of the Delta*.** SJMSCP Covered Plant Species located in the *Primary Zone of the Delta* are well-documented due to extensive surveys undertaken in this zone by state and federal agencies often associated with the management of water resources in the Sacramento/San Joaquin Delta. In addition, the Delta Protection Act places strict limits on urban development and other SJMSCP Permitted Activities within the *Primary Zone of the Delta*. Therefore, SJMSCP Covered Plant Species in the *Primary Zone of the Delta* are both highly protected by state legislation and are easily located due to extensive study of this region and, as with the *Southwest Zone*, the likelihood of protecting SJMSCP Covered Plant Species within Preserves established for the California black rail and Valley elderberry longhorn beetle is much higher than the likelihood that SJMSCP Covered Plant species in the *Primary Zone of the Delta* will be subject to Incidental Take pursuant to the SJMSCP. The following plants occur almost exclusively in the *Primary Zone of the Delta*: Suisun marsh aster (*Aster lentus*), California hibiscus (*Hibiscus lasiocarpus*), Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), Mason's lilaeopsis (*Lilaeopsis masonii*), Delta mudwort (*Limosella subulata*) and Sanford's arrowhead (*Sagittaria sanfordii*).

  As previously noted, to ensure that no disturbance will occur to narrowly distributed species, the SJMSCP Permits prohibit kill of individuals and conversion of occupied habitat for Sanford's arrowhead unless special findings have been made upon consultation with the Permitting Agencies in accordance with the criteria established in Section 5.5.2.1. 5.5.2.1. Special provisions for pre-construction surveys to ensure identification of this species are included in Section 5.2.2.5(B).

- ***Vernal Pool Zone.*** The Conversion of up to 5,000 acres of vernal pool grasslands to orchards and vineyards, permitted pursuant to a pending U.S. Army Corps of Engineers Federal Clean Water Act Section 404 permit, or equivalent (as described in SJMSCP Section 5.6), is the primary activity anticipated to impact SJMSCP Covered Plant Species associated with vernal pools. This 5,000 acres of vernal pool grasslands contains approximately 707 acres of vernal pools (actual wetted surface area). Of the SJMSCP Covered Plant Species associated with vernal pools, only three are known to occur in San Joaquin County: succulent owl's clover (*Castilleja campestris* ssp. *succulenta*), Boggs Lake hedge-hyssop (*Gratiola heterosepala*), and legenere (*Legnere limosa*). The remaining plants have been proposed for coverage due to historical records of the species which are presumed extirpated within the County. The primary emphasis of the SJMSCP with respect to these presumed extirpated species is the potential reintroduction on an experimental basis as part of vernal pool creation efforts to be undertaken by the SJMSCP. These species are: Greene's tuctoria (*Tuctoria greenei*), Hoover's calycadenia (*Calycadenia hooveri*), bristly sedge (*Carex comosa*), and Red Bluff dwarf rush (*Juncus leiospermus*). In addition, due to their rarity, special protocols are required pursuant to Section 5.2.2.5(B) for conducting preconstruction surveys for Greene's tuctoria, legenere and the succulent owl's clover to protect against inadvertent take (i.e., kill of individuals or conversions of occupied habitat) of these species if these species are more widely distributed in the County than anticipated. Therefore, the SJMSCP includes special provisions for locating populations of the rarest of the vernal pool plant species and provides a potential for reintroducing populations for several extirpated vernal pool species in San Joaquin County.

As previously noted, to ensure that no disturbance will occur to narrowly distributed species, the SJMSCP Permits prohibit kill of individuals and conversion of occupied habitat for succulent owl's clover, Greene's tuctoria, and legenere unless special findings have been made upon consultation with the Permitting Agencies in accordance with the criteria established in Section 5.5.2.1.

! ***Central Zone.*** Most SJMSCP Permitted Activities will occur within the *Central Zone*. While the majority of the Central Zone is composed of cultivated lands (i.e., Agricultural rather than Natural Lands), some Natural Lands associated with riparian corridors exists in this zone. These riparian corridors are associated with two plant species: the slough thistle (*Cirsium crassicaule*), and the Delta button-celery (*Eryngium racemosum*). In addition, Sanford's arrowhead is known to occur in this zone.
As previously noted, to ensure that no disturbance will occur to narrowly distributed species, the SJMSCP Permits prohibit kill of individuals and conversion of occupied habitat for Sanford's arrowhead, slough thistle and Delta button celery unless special findings have been made upon consultation with the Permitting Agencies in accordance with the criteria established in Section 5.5.2.1. 5.5.2.1. Special provisions for pre-construction surveys to ensure identification of this species are included in Section 5.2.2.5(B).

! All *SJMSCP Index Zones*. Based upon development proposals considered by local jurisdictions over the past 25 years, SJMSCP Planners conclude that new non-agricultural developments occurring on Natural Lands (the most likely location for SJMSCP Covered Plant Species) are almost always large developments which require long (i.e., often one year) review processes and preparation of environmental impact reports. Therefore, planners conclude, given the distribution of the SJMSCP Covered Plant Species and Natural Lands in San Joaquin County, approximately 95% of the SJMSCP Permitted Activities which will involve SJMSCP Covered Plant species will involve an environmental review process providing ample time (i.e., at least one year) to conduct both preconstruction surveys during optimal blooming seasons for SJMSCP Covered Plants and to implement appropriate mitigation measures (e.g., seed collections). The exception to this generalization is the Conversion of vernal pool grasslands to orchards and vineyards which is not subject to an environmental review process undertaken by local jurisdictions, but is normally subject to a Section 404 permit review process instead (thereby extending the project review period by a period of time similar to that of an environmental review and allowing for additional survey time).

! All *SJMSCP Index Zones*. In addition to SJMSCP restrictions against kill and Conversion of occupied habitat for ten of the SJMSCP's most narrowly distributed plant species (and, in fact true for all other non-plant SJMSCP Covered Species), two mechanisms are included in the SJMSCP to allow a reevaluation of the procedure for assessing impacts resulting from SJMSCP Permitted Activities (including impacts to SJMSCP Covered Plants) should development patterns within San Joaquin County shift from the patterns described above in paragraphs A-E change:

1. A requirement for permitting SJMSCP Covered Activities which are unmapped on the *SJMSCP Planned Land Use Map* as described in

SJMSCP Section 3.4; and

2. A requirement for a Major Plan Amendment (Section 8.8.5) to change the urban boundaries as indicated on the *SJMSCP Planned Land Use Map* if that total changes to the boundaries exceed the 5,000 acre annexation allocation provided pursuant to Section 8.2.1(10).

Based on these factors, preconstruction surveys for SJMSCP Covered Plants within the various *SJMSCP Index Zones* shall

A. Be conducted pursuant to the protocols established in Section 5.2.2.5 (A-C) for large-flowered fiddleneck (*Amsinckia grandiflora*); succulent owl's clover (*Castilleja campestris* ssp. *succulenta*) Greene's tuctoria (*Tuctoria greenei*), Delta button celery (*Eryngium racemosum*), Diamond-petaled California poppy (*Escholzia rhombipetala*), showy madia (*Madia radiata*), slough thistle (*Cirsium crassicaule*), legenere (*Legenere limosa*), Hospital Canyon larkspur (*Delphinium californicum* ssp. *interius*), and Sanford's arrowhead (*Sagittaria sandfordii*). No kill and no Conversion of occupied habitat for these species is permitted pursuant to the SJMSCP unless the findings of Section 5.5.2.1 are made with the concurrence of the Permitting agencies; or

B. Be undertaken for SJMSCP Covered Plants excluded from the preceding paragraph (A) during the discretionary project's application review process to provide ample opportunities to identify plants during the blooming seasons. The presence of SJMSCP Covered Plant Species can be determined on a project site well in advance of project construction, (with nearly no risk of a new SJMSCP Covered Plant Species moving in before construction), through reviewing the *SJMSCP GIS Database* and other current information sources and, when necessary, by conducting pre-construction surveys. Through this process, the JPA shall conduct pre-construction surveys during appropriate blooming seasons in areas of known SJMSCP Covered Plant Species occurrences or if the area's characteristics are likely to support SJMSCP Covered Plant Species.

C. If SJMSCP Covered Plant Species are identified and will not be fully avoided pursuant to provisions in Section 5.5.9, then seed collection may be undertaken by the JPA if the TAC recommends that such salvage has a high likelihood of resulting in a conservation benefit for the species and construction schedules permit, well in advance of project construction. Seed collection or other identified mitigation measures may occur immediately after or even before project approval with the consent of the landowner.

If SJMSCP Covered Species are identified by preconstruction surveys or are strongly suspected to be present based on the vegetation or habitat types present or if a Natural Land type is present, the JPA shall identify, in writing to the Plan Participant, the Incidental Take Minimization Measures applicable to the project and attach these as conditions of project approval per the procedure described in 5.2.1. All SJMSCP Covered Species identified by the JPA shall be recorded on both California Natural Diversity Database (CNDDB) and *SJMSCP GIS Database* forms, as needed.

When the JPA determines that an SJMSCP Covered Species does or may occur on a particular project site after completing the preceding process, the JPA will conduct a preconstruction survey prior to ground-disturbing activities to verify that the appropriate Incidental Take Minimization Measures have been implemented to protect individual SJMSCP Covered Species.

The following table shall be used to guide the timing of preconstruction surveys for SJMSCP Covered Plant Species when required as described in the preceding paragraphs. The blooming periods established in Table 5.2-1 represent the widest possible blooming season as compiled from: 1) *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California*, February, 1994; 2) *CEQA-Defined Or Endangered Plants Currently Known to Occur Along the Waterways of the Sacramento-San Joaquin Delta*, B. Baba, CDFG Region 2, 1994; and 3) *A California Flora and Supplement* by Philip A. Munz; University of California Press, 1973 combined edition. All survey periods may be modified pursuant to the provisions of 5.2.2.5(B)(ii) and 5.2.2.5(C) or, based on updated scientific information evaluated and approved by the JPA with the by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC.

TABLE 5.2-1
SURVEY WINDOWS FOR SJMSCP COVERED PLANT SPECIES

SJMSCP COVERED PLANT SPECIES	BLOOMING PERIOD/SURVEY PERIOD
Large flowered fiddle-neck (*Amsinckia grandiflora*)	April-May
Suisun Marsh Aster (*Aster lentus*)	Late May through November
Alkali milk-vetch (*Astragalus tener* var. *tener*)	March - June
Heartscale (*Atriplex cordulata*)	May - October
Brittlescale (*Atriplex depressa*)	May - October
Hoover's calycadenia (*Calycadenia hooverii*)	July - September
Bristly sedge (*Carex comosa*)	May - September
Succulent owl's clover (*Castilleja campestris* ssp. *succulenta* fmr. *Orthocarpus succulentus*)	April - May
Slough thistle (*Cirisium crassicaule*)	May - August
Mt. Hamilton coreopsis (*Coreopsis hamiltonii*)	March - May
Hospital canyon larkspur (*Delphinium californicum* ssp. *interius*)	April - June
Recurved larkspur (*Delphinium recurvatum*)	March - May
Delta button celery/Delta coyote thistle (*Eryngium racemosum*)	June - October
Diamond-petaled poppy/Diamond-petaled California Poppy (*Eschscholzia rhombipetala*)	March - June
Bogg's lake hedge hyssop (*Gratiola heterosepala*)	April - June
California hibiscus (*Hibiscus lasiocarpus*)	August-September
Red Bluff dwarf rush (*Juncus leiospermus* var. *leiospermus*)	March - May
Delta tule pea (*Lathyrus jeponsii* var. *jepsonii*)	May - September

Legenere (*Legenere limosa*)	May - June
Mason's lilaeopsis (*Lilaeopsis masonii*)	April - October
Delta mudwort (*Limosella subulata*)	May - August
Showy madia (*Madia radiata*)	March - May
Sanford's arrowhead (*Sagittaria sanfordii*)	May - October
Mad-dog skullcap (*Scutellaria lateriflora*)	May - September
Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*)	May - September
Caper-fruited tropidocarpum (*Tropidocarpum capparideum*)	March - April
Greene's tuctoria (*Tuctoria greenei*)	May - July

5.2.2.5 Preconstruction Survey Methodologies

A. Preconstruction survey methodologies, for preconstruction surveys undertaken in compliance with Section 5.2.2.1(A, Band D) and 5.2.2.2 through 5.2.2.4, and addressing all SJMSCP Covered Species, except as provided in paragraph B, below, shall be of sufficient scope, duration, and intensity to determine the need (or lack of a need) for attaching Incidental Take Minimization Measures as conditions of project approval, obtain a gross determination of habitats present on the site, any species-specific information as may be readily obtained, and the relation of the site to surrounding land uses. Specific methodologies shall be formulated by the JPA with the concurrence of the Permitting Agencies' representatives on the JPA's Technical Advisory Committee (TAC) within one year of issuance of the SJMSCP's associated state and federal permits. Methodologies shall be consistent with the SJMSCP's budget for conducting preconstruction surveys. While qualified biologists shall routinely perform preconstruction surveys, methodologies should avoid approaches which may actually harm or harass individual species thereby requiring time-consuming acquisitions of Section 10(a)(1)(A) permits for those conducting surveys except as otherwise required in 5.2.2.5(F) for the riparian brush rabbit. Methodologies developed will include provisions for assuming the presence of certain SJMSCP Covered Species under circumstances where timing of preconstruction surveys to coincide with the presence of the SJMSCP Covered Species may be prohibitively expensive or result in project delays except as otherwise provided in 5.2.2.5 (B-G) for full avoidance species (large flowered fiddleneck, succulent owl's clover, Greene's tuctoria, Delta button celery, diamond petaled poppy, showy madia, slough thistle, legenere, Hospital Canyon larkspur, Sanford's arrowhead, riparian brush rabbit, riparian woodrat, longhorn fairy shrimp, Conservancy fairy shrimp).

To ensure consistency over time, development of survey methodologies by the JPA and TAC as specified above shall include development of a standardized form to be used in conducting pre-construction surveys. While specific information to be collected is not designated by the Plan, the following data types are recommended:

1. Size of the project site;

2. Site configuration;

3. Adjacent land uses;

4. Habitat types present and acreages of each;

5. Presence of Covered Species on the site as determined by the SJMSCP GIS Database and preconstruction surveys;

6. Overall habitat quality;

7. Presence of exotic, non-native, or invasive vegetation;

8. Presence of roads and other disturbances on or adjacent to the project site;

9. Presence and distance to the nearest permanent Open Space;

10. Presence of any pest or predatory animals on the site; and

11. Any special habitat features on the site (e.g., wetlands, nest trees, dens or burrows, intermittent or perennial streams, unique plants etc.). The JPA and/or the relevant participating jurisdiction shall be informed of any Incidental Take Minimization needs identified, and such requirements shall be made a part of any development permits issued by that jurisdiction, as appropriate (see Section 5.2.1).

B. Preconstruction surveys for the large-flowered fiddleneck (*Amsinckia grandiflora*); succulent owl's clover (*Castilleja campestris* ssp. *succulenta*) Greene's tuctoria (*Tuctoria greenei*), Delta button celery (*Eryngium racemosum*), Diamond-petaled California poppy (*Escholzia rhombipetala*), showy madia (*Madia radiata*), slough thistle (*Cirsium crassicaule*), legenere (*Legenere limosa*), Hospital Canyon larkspur (*Delphinium californicum* ssp. *interius*), and Sanford's arrowhead (*Sagittaria sandfordii*) conducted pursuant to Section 5.2.2.1(D) shall, in addition to the requirements in paragraph A,:

i. Be conducted in coordination with a site visit to one of the local reference populations of the species, if available (i.e., permission is required for entry onto private lands), to assess the appearance of the species, its preferred habitat, and if the population is blooming in the vicinity during preconstruction surveys. As of the Effective Date of the SJMSCP, reference sites exist in San Joaquin County for large-flowered fiddleneck (public and private land), diamond-petaled poppy (public land) and succulent owl's clover (public land), legenere and Sanford's arrowhead. No known reference sites exist for Greene's tuctoria, Delta button celery, showy madia, slough thistle or Hospital Canyon larkspur in San Joaquin County as of the Effective Date of the SJMSCP. In the absence of reference sites, the JPA may rely upon species information provided orally either: 1) by species experts consulted from the TAC or, in the absence of such experts, species experts contacted outside of the TAC; or

2) By reports received from area biologists regarding the activities (i.e., blooming periods) of the nearest known locations of Greene's tuctoria, Delta button celery, showy madia, slough thistle or Hospital Canyon larkspur located outside of San Joaquin County.

ii. Except as otherwise provided in this paragraph, surveys shall be conducted during the optimum blooming period for the species as indicated in Table 5.2-1. Up to three site visits will be undertaken to confirm that preconstruction surveys have been undertaken during the blooming period for this species. However, if preconstruction surveys are conducted at the same time as reference populations of this species are known to be blooming in the vicinity for populations inhabiting similar habitats with similar microclimates and the species is not found to be present on the proposed project site, then additional preconstruction survey visits are unnecessary. If approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC, the timing of preconstruction surveys may be modified (i.e., the length of survey windows may be reduced) on a case-by-case based upon the TAC's assessment of the season's weather patterns (which may have affected blooming cycles) and the likelihood of species occurrences on a particular site given the specifics of the site's topography, existing land uses, aspect, slope, presence of competing vegetation, soils or other related factors which may have modified the blooming cycle for the species;

iii. If found, the surveyors shall prepare a detailed map indicating the location of the species; describe and photograph (color prints with negatives or color slides) the surrounding habitat including photo reference points, if available; describe adjacent hydrological conditions which may be affecting the population, if applicable; describe the species phenology and microhabitat; record an estimate of the number of individuals of the species per unit area; identify areas of high, medium and low density of the species; provide an estimate the acres of occupied habitat; describe potential threats to the population; and prepare and submit a California Native Species Field Survey Form and submit the form(s) to the Natural Diversity Database.

C. For all SJMSCP Covered Plants, if approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC, the timing of preconstruction surveys for SJMSCP Covered Plants may be modified (i.e., the length of survey windows may be reduced) on a case-by-case based upon the TAC's assessment of the season's weather patterns (which may have affected blooming cycles) and the likelihood of species occurrences on a particular site given the specifics of the site's topography, existing land uses, aspect, slope, presence of competing vegetation, soils or other related factors which may have modified the blooming cycle for the species.

D. As required in Section 5.2.4.25, preconstruction surveys for the San Joaquin kit fox shall be conducted two calendar weeks to thirty calendar days prior to commencement of ground disturbance for projects located within the *Southwest Zone* or *Southwest/Central Transition Zone*. Surveys shall be conducted by qualified biologists. When surveys identify potential dens (potential dens are defined as burrows at least four inches in diameter which open up within two feet), potential den entrances shall be dusted for three calendar days to register track of any San Joaquin kit fox present.

E. Preconstruction surveys for the longhorn fairy shrimp and Conservancy fairy shrimp (potentially occurring within the *Southwest Zone*) shall be conducted in compliance with USFWS published survey protocols in effect at the time of the surveys.

F. Preconstruction surveys for the riparian brush rabbit shall be conducted in compliance with *Survey Methods for Riparian Brush Rabbits* (D.F. Williams, P.A. Kelly-San Joaquin Endangered Species Recovery Program) until and unless the USFWS publishes revised survey protocols. These preconstruction surveys require a special 10(a)(1)(A) permit for the individuals undertaking the surveys.

G. For all SJMSCP Covered Species, preconstruction surveys may be waived based upon a review by the TAC and concurrence by the Permitting Agencies if all potential suitable habitat for SJMSCP Covered Species will be fully avoided pursuant to Section 5.5.9.

H. For projects that impact vernal pool grasslands, preconstruction surveys shall collect information, as described in Section 5.9.4.12 that will be used to evaluate future adjustments of the vernal pool caps (e.g., total acreage of permitted Conversion permitted by the Take permits, annual limits on Conversion of vernal pool grasslands). Specifically, these surveys shall incorporate items from Section 5.9.4.12 (A)(1-6) in preconstruction survey protocols.

5.2.3 INCIDENTAL TAKE MINIMIZATION - OVERVIEW OF PROCESS

Section 10(a)(1)(B) of the Federal Endangered Species Act and Section 2081(b) of the California Endangered Species Act allows the Incidental Take of Covered Species only if Incidental Take Minimization Measures are adopted to minimize the impacts to Covered Species and impacts to Covered Species are mitigated. The following addresses Incidental Take Minimization Measures for all SJMSCP Covered Species. SJMSCP Section 5.5 describes additional measures which may be undertaken in lieu of SJMSCP compensation requirements and in addition to these Incidental Take Minimization Measures. These additional measures have an objective of entirely eliminating impacts of Take to SJMSCP Covered Species (i.e., “full avoidance”).

5.2.3.1 Incidental Take Minimization Strategy and Expectations for All SJMSCP Covered Species

The success of the SJMSCP in minimizing impacts to SJMSCP Covered Species, through the implementation of Incidental Take Minimization Measures, is based on the following expectations, presented in the order of their importance:

A. Project Proponents will provide sufficient time when planning for project review and construction schedules as necessary for the implementation of Incidental Take Minimization Measures adequate to avoid the actual Take of SJMSCP Covered Species for most projects undertaken pursuant to the SJMSCP except as otherwise provided in Section 5.2.3.2;

B. Incidental Take Minimization Measures will be identified at the earliest possible opportunity in the project review process by the JPA according to the schedule established in Section 5.2.1.

C. In addition to establishing applicable Incidental Take Minimization Measures, the JPA shall provide an option to a Project Proponent for entirely avoiding impacts to SJMSCP Covered

Species and their habitat on the project site through project redesign pursuant to SJMSCP Section 5.5.9. Wherever complete avoidance of all impacts is successfully achieved on a project site pursuant to the requirements of SJMSCP Section 5.5.9, the SJMSCP Permittees are not responsible for providing compensation pursuant to the requirements of the SJMSCP.

D. Alternatively, the JPA shall pursue acquisition of Preserve lands which are consistent with the Preserve design criteria of the SJMSCP (Section 5.4.4) on project sites where high quality occupied habitat and/or where SJMSCP Covered Species of very limited distribution are present and landowners are willing sellers.

E. The JPA and Permittees will work with Project Proponents to ensure, and to document in accordance with Section 5.9.3.2, that identified Incidental Take Minimization Measures are properly implemented (or other alternatives are pursued as described in C and D above), as prescribed by the SJMSCP, to avoid the actual Take of SJMSCP Covered Species for most projects undertaken pursuant to the SJMSCP;

F. If the Project Proponent has implemented Incidental Take Minimization Measures in accordance with the SJMSCP, and SJMSCP Covered Species remain, reappear, or appear for the first time on the project site despite the proper implementation of Incidental Take Minimization Measures, then the following shall occur:

    1. Relocation will be pursued at the discretion of the Permitting Agencies and only under rare circumstances according to the procedures and subject to the criteria established in Section 5.2.5.

    2. When relocation is not undertaken (as is expected in the majority of cases), then killing of individuals and Conversion of occupied habitat of the SJMSCP Covered Species may occur unless otherwise prohibited by the SJMSCP.

G. Pursuant to the Migratory Bird Treaty Act (16 USC 703-711), it is unlawful at any time, by any means or in any manner to pursue, hunt, take, capture, kill, attempt to take, capture, or kill any migratory bird, any part, nest, or eggs of any such bird is defined as Take. All SJMSCP Covered Bird Species are subject to the Migratory Bird Treaty Act. Because the SJMSCP is based on the more stringent, federal standard for "Take" pursuant to the ESA which includes modification of habitat, Incidental Take Permits for SJMSCP Covered Bird Species are included in the SJMSCP, to allow for the Conversion of habitat for SJMSCP Covered Bird Species with appropriate creation of compensatory habitat for these species. To fulfill the requirements of the Migratory Bird Treaty Act, however, the Incidental Take Minimization Measures of the SJMSCP for all SJMSCP Covered Bird Species must result in no Take, as Take is defined by the MBTA, of SJMSCP Covered Bird Species. The Incidental Take Minimization Measures in Section 5.2.4 have been designed to avoid Take, as Take is defined by the MBTA, of SJMSCP Covered Bird Species.

H. The golden eagle is the only SJMSCP Covered Species subject to the provisions of the Bald and Golden Eagle Protection Act (U.S.C. Sections 668-668d). Take of individual golden eagles is prohibited by the Bald and Golden Eagle Protection Act. However, because the

SJMSCP is based on the more stringent, federal standard for "Take" pursuant to the ESA which includes modification of habitat, Incidental Take Permits for the golden eagle are included in the SJMSCP, to allow for the Conversion of habitat for the golden eagle with appropriate creation of compensatory habitat for this species. To fulfill the requirements of the Bald and Golden Eagle Protection Act, however, the Incidental Take Minimization Measures of the SJMSCP for the golden eagle have been designed to avoid Take, as Take is defined by the BGEPA, of golden eagles as described in Section 5.2.4.21.

5.2.3.2 Exceptions to Section 5.2.3.1

It is the intent of the JPA and the Permitting Agencies to encourage Project Proponents to retain biological features (e.g., nest trees, roosting sites, wetlands) in project design where the retention of such features may provide chances for the long-term survival of SJMSCP Covered Species at the short-term expense of the SJMSCP Covered Species. Therefore, where Project Proponents have agreed to a request by the JPA to retain biological features for the long-term, in the manner prescribed by the JPA, then the JPA and Permitting Agencies agree that the Project Proponent may proceed with the project's construction schedule even though that construction schedule may result in short-term disturbances (including Take) to SJMSCP Covered Species as a result of retaining biological features.

In addition, it is recognized that unanticipated conditions may arise which make it infeasible to comply with the Incidental Take Minimization strategy established in Section 5.2.3.1.

When a Project Proponent determines that it is infeasible to implement the Incidental Take Minimization Measures as established by the SJMSCP, then the Project Proponent may petition the JPA to consider granting an exception to the Incidental Take Minimization Measures. The Project Proponent shall include in his or her request a detailed description of the compelling reason or reasons for granting such a petition including all necessary documentation to support the request and describing what factors caused the Project Proponent inability to comply with the Incidental Take Minimization Measure or measures.

The JPA may amend or suspend some or all Incidental Take Minimization Measures, with the concurrence of the Permitting Agencies' representatives on the TAC, for a particular project based upon the following findings:

1. It is not possible to implement the Incidental Take Minimization Measures (e.g., the landowner does not own land on one side of a stream and therefore cannot provide 200' buffers on both sides of a stream); and

2. The proposed alternative Incidental Take Minimization Measure(s) reduces the effects of Take at least as much as or more than the SJMSCP's established Incidental Take Minimization Measure(s); or

3. The proposed alternative(s) provide greater chances for the long-term survival of an SJMSCP Covered Species at the expense of limited, short-term biological losses (e.g., retaining a nest tree on a construction site rather than removing the nest tree resulting in reduced fledgling success during the project construction phase, but producing multiple generations of successful fledglings in the nest tree over the long-term); or

4. The provisions of Section 5.2.2.5(B)(ii) or 5.2.2.5(C) apply.

Failure to plan ahead on the part of the Project Proponent, when such planning was within the control of the Project Proponent, shall not be grounds for granting an exception under these provisions.

All exceptions granted for Incidental Take Minimization Measures pursuant to this Section also shall be reported in the SJMSCP Annual Report to the Permitting Agencies as described in Section 5.9.1.

5.2.4 INCIDENTAL TAKE MINIMIZATION MEASURES FOR SJMSCP COVERED SPECIES RECEIVING INCIDENTAL TAKE COVERAGE PURSUANT TO ESA AND CESA AND MITIGATION MEASURES FOR SJMSCP COVERED SPECIES RECEIVING CEQA COVERAGE

5.2.4.1 Valley Elderberry Longhorn Beetle (VELB)

In areas with elderberry bushes, as indicated by the *SJMSCP Vegetation Maps* or per a preconstruction survey identification or other sources indicated in Section 5.2.2.3, the following shall occur:

A. If elderberry shrubs are present on the project site, a setback of 20 feet from the dripline of each elderberry bush shall be established.

B. Brightly colored flags or fencing shall be placed surrounding elderberry shrubs throughout the construction process.

C. For all shrubs without evidence of VELB exit holes which cannot be retained on the project site as described in A and B, above, the JPA shall, during preconstruction surveys, count all stems of 1" or greater in diameter at ground level. Compensation for removal of these stems shall be provided by the JPA within SJMSCP Preserves as provided in *SJMSCP Section 5.5.4(B)*.

D. For all shrubs with evidence of VELB exit holes, the JPA shall undertake transplanting of elderberry shrubs displaying evidence of VELB occupation to VELB mitigation sites during the dormant period for elderberry shrubs (November 1 - February 15). For elderberry shrubs displaying evidence of VELB occupation which cannot be transplanted, compensation for removal of shrubs shall be as provided in *SJMSCP Section 5.5.4 (C)*.

5.2.4.2 Moestan and Molestan Blister Beetle

The biology of these species is poorly known, but the species are presumed to be extant and may be discovered in annual grasslands, foothill woodlands or saltbush (Atriplex) scrub which remain in patches within the historical occupation site of these species. Therefore, if discovered on a project site and prior to ground disturbance, Incidental Take Minimization Measures shall be formulated by the TAC and approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC in accordance with the SJMSCP's Adaptive Management Plan (Section 5.9.4).

5.2.4.3 Ciervo Aegialian Scarab Beetle

This species is presumed to be extirpated, because its habitat, sand dunes, have been destroyed in the County. However, if rediscovered on a project site and prior to ground disturbance, Incidental Take Minimization Measures shall be formulated by the TAC and approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC in accordance with the SJMSCP's Adaptive Management Plan (Section 5.9.4).

5.2.4.4 Vernal Pool Plants and Vernal Pool Invertebrates

Full avoidance of succulent owl's clover, legenere, Greene's tuctoria, longhorn fairy shrimp and Conservancy fairy shrimp is required by the SJMSCP in accordance with the full avoidance measures in Section 5.5.9. For all other vernal pool plants and vernal pool invertebrates:

A. Filling vernal pools shall be delayed until pools are dry and samples from the top layer of vernal pools soils are collected. Soil collections shall be sufficient to include a representative sample of plant and animal life present in the pools by incorporating seeds, cysts, eggs, spores and similar inoculum.

B. Collected soils shall be dried and stored in pillow cases labeled with the date and location of soils collected. Soils will be deposited with the JPA. The JPA shall retain the soils in a cool, dry area and shall be responsible for providing soils to vernal pool construction managers for inoculating newly created vernal pools on Preserve lands.

C. Preconstruction surveys, conducted in compliance with U.S. Fish and Wildlife Service protocols [as required in Section 5.2.2.5(E)] approved and in place at the time the surveys are conducted, shall be conducted to determine the presence or absence of Conservancy and/or longhorn fairy shrimp within vernal pools or other wetlands located southwest of I-580 in the *Southwest Zone* unless avoidance of vernal pools and/or wetlands is achieved in compliance with SJMSCP Section 5.5.9.

5.2.4.5 California Tiger Salamander and Western Spadefoot Toad in Association with Projects that Require a Permit Pursuant to Section 404 of the Federal Clean Water Act

Incidental Take Minimization Measures apply to known California tiger salamander occurrences. All required minimization measures will be prescribed through technical assistance provided to the U.S. Army Corps of Engineers by the U.S. Fish and Wildlife Service of Nationwide and standard permitting within the SJMSCP Permit Area, concurrent with formal consultations conducted for listed vernal pool species, or through the JPA with the concurrence of the Permitting Agencies' representatives on the TAC. The approach to impact minimization measures outlined in this section of the SJMSCP for California tiger salamander will provide the framework for Corps 404 permit streamlining described further in SJMSCP Section 5.6.1. Specific measures for impact minimization will be based on the framework provided in the SJMSCP. The JPA intends that the SJMSCP will provide an option for project applicants to meet some or all of the compensation requirements assessed as part of the 404 regulatory process for California tiger salamander, should this species become federally listed.

The measures will be based on the need to avoid and minimize impacts to breeding, feeding, and sheltering behaviors of California tiger salamander (See SJMSCP Chapter 2), and will include, but not be limited to, consideration of the following: a) effects to aquatic habitat, including retaining pools and maintaining appropriate pool hydrology to enable successful metamorphosis of larvae to occur, but which does not foster non-native aquatic predators; b) retention of small mammal burrows and other suitable estivation habitat (e.g., underground holes, cracks, or niches) in adjacent uplands; c) maintenance of open habitat between breeding ponds and estivation sites (e.g., roads and other linear barriers) can increase mortality or even prevent migrations and dispersal significantly increasing harm to and mortality of salamanders); d) siting replacement wetland habitat, whenever possible, within approximately 1.5 miles of other known breeding sites.

In potential California tiger salamander habitat, projects shall survey according to the current protocol approved by the TAC and the Permitting Agencies. If salamanders are detected, Incidental Take Minimization Measures shall be applied.

5.2.4.6 California Tiger Salamander, Western Spadefoot Toad - in Association with Projects that Do Not Require a Federal Clean Water Act Section 404 Permit

To minimize impacts and Take of California tiger salamander, the following measures should be implemented for SJMSCP Covered Activities not requiring a Federal Clean Water Act Section 404 Permit:

A. Retain known breeding sites.

B. In potential California tiger salamander habitat, projects shall survey according to the current protocol approved by the TAC and the Permitting Agencies' representatives on the TAC. If salamanders are detected, Incidental Take Minimization Measures shall be applied.

C. If a proposed project intends to eliminate aquatic habitat (including wetlands, ponds, springs and other standing water sources), and create a new, on-site habitat, then the newly created habitat shall be created and filled with water prior to dewatering and destroying the pre-existing habitat. Dewatering and relocation of aquatic habitats on-site should occur when the water source is dry under natural conditions, or otherwise outside of the full breeding season for tiger salamanders (December to June) to allow larvae to metamorphose and migrate to upland habitat.

D. If a proposed project intends to eliminate aquatic habitat including wetlands, ponds, springs and other standing water sources, and will not create a new, on-site habitat, then dewatering should occur prior to commencement of construction and other Site Disturbing Activities. Dewatering and relocation of aquatic habitats should occur outside of the time period when adult salamanders are breeding (approximately December to February).

E. Apply those other measures that are utilized to minimize impacts and Take of the California tiger salamander that are developed as described in 5.2.4.5 above. Those other measures will address: a) effects to aquatic habitat, including retaining pools and maintaining appropriate pool hydrology to enable successful metamorphosis of larvae to occur, but which does not foster non-native aquatic predators; b) retention of small mammal burrows and other suitable estivation habitat (e.g., underground holes, cracks, or niches) in adjacent uplands; c) maintenance of open habitat between breeding ponds and estivation sites (e.g., roads and other linear barriers can increase mortality or even prevent migrations and dispersal significantly increasing harm to and mortality of salamanders); d) siting replacement wetland habitat, whenever possible, within approximately 1.5 miles of other known breeding sites.

5.2.4.7 Red-Legged Frogs and Foothill Yellow-Legged Frogs

Red-legged frogs and foothill yellow-legged frogs occur in the creeks and wetlands in foothill areas. Red-legged frogs and foothill yellow-legged frogs do not occur on the valley floor. Therefore, the following Incidental Take Minimization Measures apply to the eastern foothills (primarily in the *Vernal Pool Zone*) and the *Southwest Zone* only where new development is proposed on parcels with creeks, rivers or wetlands, especially ponds:

A. A 300 foot setback, incorporating both riparian vegetation and uplands, shall be provided on both sides of creeks and on all sides of wetlands (for a total of 600 feet in setbacks) occupied by red-legged frogs or yellow-legged frogs identified through pre-construction surveys conducted by the JPA or documented in the *SJMSCP GIS Database*. These 300' setbacks shall be measured horizontally from the top of the bank and shall extend the entire length of the stream (or other linear wetlands) within the boundaries of the project site. These setbacks may be reduced by the TAC with the concurrence of the Permitting Agencies' representative on the TAC if the reduction: 1) does not affect habitat (e.g., the stream becomes piped and travels underground) or 2) the reduction will not result in an adverse impact to the species or reduction in the biological values of the habitat. Setbacks shall maintain existing vegetation free of disturbance and be free of new construction, new wells, storage or parking of equipment or materials, and other activities which compact or disturb soils or vegetation or which could introduce contaminants into the aquatic habitat. Setbacks shall be delineated by flagging or brightly colored temporary fencing during the construction process. Setbacks shall be indicated on final maps and include a map note referencing prohibitions within the setbacks. For entitlements which do not include a map, the condition shall be enforced through the recordation of an easement referencing prohibitions within the setback. The JPA may approve alternative methods of enforcing the provisions of the setback with the concurrence of the Permitting Agency representatives on the TAC.

B. Water quality within creeks and wetlands inhabited by red-legged frogs or foothill yellow-legged frogs shall be maintained through implementation of appropriate erosion control measures to reduce siltation and contaminated runoff from project sites (e.g., by maintaining vegetation within buffers and/or through the use of hay bales, filter fences, vegetative buffer strips, or other accepted equivalents).

C. Construction and other ground disturbances shall be prohibited within established setbacks. The use of insecticides, herbicides, rodenticides and pesticides within established setbacks shall occur in accordance with U.S. Environmental Protection Agency guidelines (Appendix A) addressing the use of these materials in occupied California red-legged frog habitat and, if applicable, any additional requirements as established by the San Joaquin County

Agricultural Commissioner.

D. All on-site construction personnel shall be given instruction regarding the presence of listed species and the importance of avoiding impacts to these species and their habitats.

E. Setbacks shall be marked by brightly colored fencing or flagging throughout the construction process.

F. Setbacks shall be permanently preserved as recorded easements. Easements shall be indicated on recorded maps, whenever projects involve parcel or subdivision maps.

Proposals by Project Proponents to implement either of the following Incidental Take Minimization Measures requires the review and approval of the JPA with the concurrence of the Permitting Agencies' representatives on the TAC:

G. If a proposed project intends to eliminate aquatic habitat including wetlands, ponds, springs and other standing water sources, and create a new, on-site habitat, then the newly created habitat shall be created and filled with water prior to dewatering and destroying the pre-existing habitat. Dewatering and relocation of aquatic habitats should occur outside of the breeding season for red-legged frogs (approximately January through May) and foothill yellow-legged frogs (approximately March through May) when this schedule can be accommodated without resulting in project delays.

H. If a proposed project intends to eliminate aquatic habitat including wetlands, ponds, springs and other standing water sources, and will not create a new, on-site habitat, then dewatering should occur prior to commencement of construction and other Site Disturbing Activities. Dewatering and relocation of aquatic habitats should occur outside of the breeding season for red-legged frogs (approximately January through May) and foothill yellow-legged frogs (approximately March through May) when this schedule can be accommodated without resulting in project delays.

Pursuant to Section 5.5.5, SJMSCP Preserve lands acquired to offset impacts to the red-legged frog or yellow-legged frog must have occupied habitat for the red-legged frog or yellow-legged frog of at least equal habitat value as determined by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC.

5.2.4.8 Giant Garter Snake

A. Full avoidance of giant garter snake known occupied habitat is required in compliance with Section 5.5.9 (C) for the following SJMSCP Covered Activities with the potential to adversely affect the GGS and which have not been mapped: golf courses; religious assembly; communications services; funeral; internment services; public services - police, fire and similar; projects impacting channel or tule island habitat; major impact projects including landfills, hazardous waste facilities, correctional institutions and similar major impact projects; recreational trails and campgrounds, recreational outdoors sports clubs; utility services, museums and similar facilities. Known occupied habitat for the giant garter snake is that area west of I-5 on Terminous Tract, Shin Kee Tract, White Slough Wildlife Area, and Rio Blanco Tract. New sites identified during the life of the SJMSCP as confirmed habitat sites for the giant garter snake shall be considered known occupied sites for the purposes of this section.

B. For areas with potential giant garter snake habitat, the following is required. Potential GGS habitat elements are described in SJMSCP Section 2.2.2.2 and exist in the *Primary Zone of the Delta* and the Central Zone contiguous with known occupied habitat in the White Slough area north to the San Joaquin/Sacramento County line and south to Paradise Cut; in the Central Zone east of Stockton in Duck Creek, Mormon Slough, Stockton Diverting Canal, Little John's Creek, Lone Tree Creek, and French Camp Slough (wherever habitat elements are present); and the Southern Centerl Zone and Southwest/ Central Transition Zone including the area east of J4 from the Alameda-San Joaquin County Line to Tracy and area south of Tracy and east of Interstate 580 to the east edge of Agricultural Habitat Lands east of the San Joaquin River.

1. Construction shall occur during the active period for the snake, between May 1 and October 1. Between October 2nd and April 30th, the JPA, with the concurrence of the Permitting Agencies' representatives on the TAC, shall determine if additional measures are necessary to minimize and avoid take.

2. Limit vegetation clearing within 200 feet of the banks of potential giant garter snake aquatic habitat to the minimal area necessary.

3. Confine the movement of heavy equipment within 200 feet of the banks of potential giant garter snake aquatic habitat to existing roadways to minimize habitat disturbance.

4. Prior to ground disturbance, all on-site construction personnel shall be given instruction regarding the presence of SJMSCP Covered Species and the importance of avoiding impacts to these species and their habitats.

5. In areas where wetlands, irrigation ditches, marsh areas or other potential giant garter snake habitats are being retained on the site:

   a. Install temporary fencing at the edge of the construction area and the adjacent wetland, marsh, or ditch;

   b. Restrict working areas, spoils and equipment storage and other project activities to areas outside of marshes, wetlands and ditches; and

   c. Maintain water quality and limit construction runoff into wetland areas through the use of hay bales, filter fences, vegetative buffer strips, or other accepted equivalents.

6. If on-site wetlands, irrigation ditches, marshes, etc. are being relocated in the vicinity: the newly created aquatic habitat shall be created and filled with water prior to dewatering and

destroying the pre-existing aquatic habitat. In addition, non-predatory fish species that exist in the aquatic habitat and which are to be relocated shall be seined and transported to the new aquatic habitat as the old site is dewatered.

7. If wetlands, irrigation ditches, marshes, etc. will not be relocated in the vicinity, then the aquatic habitat shall be dewatered at least two weeks prior to commencing construction.

8 Pre-construction surveys for the giant garter snake (conducted after completion of environmental reviews and prior to ground disturbance) shall occur within 24 hours of ground disturbance.

9. Other provisions of the *USFWS Standard Avoidance and Minimization Measures during Construction Activities in Giant Garter Snake Habitat* shall be implemented (excluding programmatic mitigation ratios which are superceded by the SJMSCP's mitigation ratios).

5.2.4.9 San Joaquin Whipsnake, California Horned Lizard

These species are of very limited distribution within the County, primarily isolated locations outside of anticipated development areas within the *Southwest Zone*. Therefore, if discovered on a project site and prior to ground disturbance, Incidental Take Minimization Measures shall be formulated by the TAC and approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC in accordance with the SJMSCP's Adaptive Management Plan (Section 5.9.4).

5.2.4.10 Pond Turtles

When nesting areas for pond turtles are identified on a project site, a buffer area of 300 feet shall be established between the nesting site (which may be immediately adjacent to wetlands or extend up to 400 feet away from wetland areas in uplands) and the wetland located near the nesting site. These buffers shall indicated by temporary fencing if construction has or will begin before nesting periods are ended (the period from egg laying to emergence of hatchlings is normally April to November).

5.2.4.11 Swainson's Hawk

The Project Proponent has the option of retaining known or potential Swainson's hawk nest trees (i.e., trees that hawks are known to have nested in within the past three years or trees, such as large oaks, which the hawks prefer for nesting) or removing the nest trees.

If the Project Proponent elects to retain a nest tree, and in order to encourage tree retention, the following Incidental Take Minimization Measure shall be implemented during construction activities:

> If a nest tree becomes occupied during construction activities, then all construction activities shall remain a distance of two times the dripline of the tree, measured from the nest.

If the Project Proponent elects to remove a nest tree, then nest trees may be removed between September 1 and February 15, when the nests are unoccupied.

These Incidental Take Minimization Measures are consistent with the provisions of the Migratory Bird Treaty Act as described in Section 5.2.3.1(G).

5.2.4.12 California Black Rail

A. Prohibit construction or similar activities on channel or tule islands (I,I2), fresh emergent wetlands (W7), and arroyo willow thickets (R4), within the Primary Zone of the Delta until a preconstruction survey determines that the island is unoccupied by the California black rail.

B. In cases where project approvals may result in an increase in boating or jet skiing near known breeding sites for this species during the breeding season (e.g., proposals including new marinas), a condition of project approval shall be attached to require the location of the new marinas no closer than 200 feet from known breeding site when such sites are or have been occupied by breeding California black rails within the past three years. In addition, approaches into and out of new marinas shall be posted by the Project Proponent (as a condition of project approval) or, if otherwise designated by law, by a local, state or federal agency (e.g., the Division of Boating and Waterways) "no wake speed" within 300 feet of occupied breeding sites for the California black rail during breeding season. Information related to the breeding season for California black rails is sparse, but the breeding season for the California black rail is believed to extend from February 1st through August 30th. Therefore, requirement for "no wake speed" into and out of new marinas due to the presence of breeding California black rails is not required from September 1 through January 30th.

These Incidental Take Minimization Measures are consistent with the provisions of the Migratory Bird Treaty Act as described in Section 5.2.3.1(G).

5.2.4.13 Bank Swallow and Yellow-Billed Cuckoo

If the JPA discovers nesting bank swallows or nesting yellow-billed cuckoos during preconstruction surveys or from other sources, construction avoidance areas shall be enforced for a distance of 300 feet from the nest sites until young bank swallows or yellow-billed cuckoos have fledged and left the nesting site.

These Incidental Take n Measures are consistent with the provisions of the Migratory Bird Treaty Act as described in Section 5.2.3.1(G).

5.2.4.14 Aleutian Canada Goose and Greater Sandhill Crane

Under normal conditions, the Aleutian Canada goose and greater sandhill crane are found foraging in fields that are flooded, newly disced, cut, or irrigated during the fall migration of waterfowl along the Pacific Flyway. These two species are highly mobile while they forage and can easily relocate to nearby foraging sites in the event of a disturbance to the foraging field. The risk of actually killing or harming (Taking) one of these species during SJMSCP Permitted Activities is therefore nearly non-existent. The threat to these species is more closely associated with removing habitat in sufficient quantities to create adverse impacts to populations of these species--an impact addressed by the SJMSCP through acquisition and enhancements of habitat (see Sections 5.4.4 and 5.4.6). Therefore, Incidental Take Minimization Measures for the Aleutian Canada goose and the greater sandhill crane are not included in the SJMSCP and this is considered to be consistent with the provisions of the Migratory Bird Treaty Act.

5.2.4.15 Burrowing Owls

The presence of ground squirrels and squirrel burrows are attractive to burrowing owls. Burrowing owls may therefore be discouraged from entering or occupying construction areas by discouraging the presence of ground squirrels. To accomplish this, the Project Proponent should prevent ground squirrels from occupying the project site early in the planning process by employing one of the following practices:

A. The Project Proponent may plant new vegetation or retain existing vegetation entirely covering the site at a height of approximately 36" above the ground. Vegetation should be retained until construction begins. Vegetation will discourage both ground squirrel and owl use of the site.

B. Alternatively, if burrowing owls are not known or suspected on a project site and the area is an unlikely occupation site for red-legged frogs, San Joaquin kit fox, or tiger salamanders:

The Project Proponent may disc or plow the entire project site to destroy any ground squirrel burrows. At the same time burrows are destroyed, ground squirrels should be removed through one of the following approved methods to prevent reoccupation of the project site. Detailed descriptions of these methods are included in Appendix A, *Protecting Endangered Species, Interim Measures for Use of Pesticides in San Joaquin County*, dated March, 2000:

1. **Anticoagulants.** Establish bait stations using the approved rodenticide anticoagulants Chlorophacinone or Diphacinone. Rodenticides shall be used in compliance with U.S. Environmental Protection Agency label standards and as directed by the San Joaquin County Agricultural Commissioner.

2. **Zinc Phosphide.** Establish bait stations with non-treated grain 5-7 calendar days in advance of rodenticide application, then apply Zinc Phosphide to bait stations. Rodenticides shall be used in compliance with U.S. Environmental Protection Agency label standards and as directed by the San Joaquin County Agricultural Commissioner.

3. **Fumigants.** Use below-ground gas cartridges or pellets and seal burrows. Approved fumigants include Aluminum Phosphide (Fumitoxin, Phostoxin) and gas cartridges sold by the local Agricultural Commissioner's office. NOTE: Crumpled newspaper covered with soil is often an effective seal for burrows when fumigants are used. Fumigants shall be used in compliance with U.S. Environmental Protection Agency label standards and as directed by the San Joaquin County Agricultural Commissioner.

4. **Traps.** For areas with minimal rodent populations, traps may be effective for eliminating rodents. If trapping activities are required, the use of , shall be consistent with all applicable laws and regulations.

If the measures described above were not attempted or were attempted but failed, and burrowing owls are known to occupy the project site, then the following measures shall be implemented:

C. During the non-breeding season (September 1 through January 31) burrowing owls occupying the project site should be evicted from the project site by passive relocation as described in the California Department of Fish and Game's Staff Report on Burrowing Owls (Oct., 1995)

D. During the breeding season (February 1 through August 31) occupied burrows shall not be disturbed and shall be provided with a 75 meter protective buffer until and unless the TAC, with the concurrence of the Permitting Agencies' representatives on the TAC; or unless a qualified biologist approved by the Permitting Agencies verifies through non-invasive means that either: 1) the birds have not begun egg laying, or 2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. Once the fledglings are capable of independent survival, the burrow can be destroyed.

These Incidental Take Minimization Measures are consistent with the provisions of the Migratory Bird Treaty Act as described in Section 5.2.3.1(G).

5.2.4.16 Colonial Nesting Birds (Tricolored Blackbird, Black-Crowned Night Heron, Great Blue Heron)

Acquisition of colonial nesting sites for these species is a high priority of the SJMSCP. Project Proponents shall be informed of avoidance measures which eliminate compensation requirements for disturbance of colonial nesting areas in project design, as described in Section 5.5.9. If the Project Proponent rejects acquisition and avoidance, pursuant to Section 5.5.9, then the following Incidental Take Minimization Measure shall apply:

A setback of 500 feet from colonial nesting areas shall be established and maintained during the nesting season for the period encompassing nest building and continuing until fledglings leave nests. This setback applies whenever construction or other ground-disturbing activities must begin during the nesting season in the presence of nests which are known to be occupied. Setbacks shall be marked by brightly colored temporary fencing.

These Incidental Take Minimization Measures are consistent with the provisions of the Migratory Bird Treaty Act as described in Section 5.2.3.1(G).

5.2.4.17 Ground Nesting or Streamside/Lakeside Nesting Birds (Northern Harrier, Horned Lark, Western Grebe, Short-Eared Owl)

A setback of 500 feet from nesting areas shall be established and maintained during the nesting season for the period encompassing nest building and continuing until fledglings leave nests. This setback applies whenever construction or other ground-disturbing activities must begin during the nesting season in the presence of nests which are known to be occupied. Setbacks shall be marked by brightly colored temporary fencing.

These Incidental Take Minimization Measures are consistent with the provisions of the Migratory Bird Treaty Act as described in Section 5.2.3.1(G).

5.2.4.18 Birds Nesting in Isolated Trees or Shrubs Outside of Riparian Areas (Sharp-Shinned Hawk, Yellow Warbler, Loggerhead Shrike

A setback of 100 feet from nesting areas shall be established and maintained during the nesting season for the period encompassing nest building and continuing until fledglings leave nests. This setback applies whenever construction or other ground-disturbing activities must begin during the nesting season in the presence of nests which are known to be occupied. Setbacks shall be marked by brightly colored temporary fencing.

These Incidental Take Minimization Measures are consistent with the provisions of the Migratory Bird Treaty Act as described in Section 5.2.3.1(G).

5.2.4.19 Birds Nesting Along Riparian Corridors (Cooper's Hawk, Yellow-Breasted Chat, Osprey, White-Tailed Kite)

A. For white-tailed kites, preconstruction surveys shall investigate all potential nesting trees on the project site (e.g., especially tree tops 15-59 feet above the ground in oak, willow, eucalyptus, cottonwood, or other deciduous trees), during the nesting season (February 15 to September 15) whenever white-tailed kites are noted on site or within the vicinity of the project site during the nesting season.

B. For the Cooper's hawk, yellow-breasted chat, osprey and white-tailed kite, a setback of 100 feet from nesting areas shall be established and maintained during the nesting season for the period encompassing nest building and continuing until fledglings leave nests. This setback applies whenever construction or other ground-disturbing activities must begin during the nesting season in the presence of nests which are known to be occupied. Setbacks shall be marked by brightly colored temporary fencing.

These Incidental Take Minimization Measures are consistent with the provisions of the Migratory Bird Treaty Act as described in Section 5.2.3.1(G).

5.2.4.20 Bell's Sage Sparrow, Snowy Egret, Prairie Falcon, American White Pelican, Double-Crested Cormorant, White-Faced Ibis, Long-billed Curlew

These species either establish nests outside of anticipated development areas or are currently unknown to nest within the County. However, if a nest for one of these species is discovered on a project site, Incidental Take Minimization Measures shall be formulated prior to ground disturbance by the TAC and approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC in accordance with the SJMSCP's Adaptive Management Plan (Section 5.9.4).

These Incidental Take Minimization Measures are consistent with the provisions of the Migratory Bird Treaty Act as described in Section 5.2.3.1(G).

5.2.4.21 Golden Eagle

When a site inspection indicates the presence of a nesting golden eagle, a setback of 500 feet from the nesting area shall be established and maintained during the nesting season (normally approximately February 1 - June 30) for the period encompassing nest building and continuing until fledglings leave nests. This setback applies whenever construction or other ground-disturbing activities must begin during the nesting season in the presence of nests which are known to be occupied. Setbacks shall be marked by brightly colored temporary fencing.

These Incidental Take Minimization Measures are consistent with the provisions of the Migratory Bird Treaty Act as described in Section 5.2.3.1(G) and are consistent with the provisions of the Bald and Golden Eagle protection act as described in Section 5.2.3.1(H).

5.2.4.22 Ferruginous Hawk, Mountain Plover, Merlin, Long-Billed Curlew

These species currently do not nest in the County and are not expected to nest in the County over the life of the Plan. Therefore, in the highly unlikely event that one of these species is found nesting on a project site, Incidental Take Minimization Measures shall be formulated prior to ground disturbance by the TAC and approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC in accordance with the SJMSCP's Adaptive Management Plan (Section 5.9.4).

Incidental Take Minimization Measures adopted pursuant to Section 5.9.4 shall be consistent with the provisions of the Migratory Bird Treaty Act as described in Section 5.2.3.1(G)

5.2.4.23 Riparian Brush Rabbit

A. Occupied Habitat. Kill of individual riparian brush rabbits and Conversion of occupied habitat for the riparian brush rabbit is prohibited by the SJMSCP unless the provisions of SJMSCP Section 5.5.2.7 have been met. Full avoidance of the riparian brush rabbit is required in areas of known occupied riparian brush rabbit habitat in accordance with Section 5.5.9(I). Known occupied habitat for the riparian brush rabbit is: the vegetation types R, R2, R3, R4, R5, S, SG, D, W, W2, W3, W4, W5 and W9 (unlined) located within Caswell State Park and along the adjoining Stanislaus River; and surrounding Stewart Tract including Paradise Cut and the adjacent Union Pacific Railroad Company right-of-way on Stewart Tract, Old River adjacent to Stewart Tract, and the San Joaquin River as it bounds Stewart Tract. Additional populations of the riparian brush rabbit identified after the Effective Date of the SJMSCP Permits by the JPA or the Permitting Agencies shall become known occupied riparian brush rabbit habitat.

B. Potential Habitat. Conversion of Potential habitat for the riparian brush rabbit is prohibited by the SJMSCP unless: 1) the provisions of Paragraph C (below) apply; 2) the provisions of SJMSCP Section 5.5.2.7 have been met; or 3) a survey, conducted pursuant to the protocol established in *Survey Methods for Riparian Brush Rabbits* (by D.F. Williams and P.A. Kelly - San Joaquin Valley Endangered Species Recovery Planning Program) is undertaken and proves absence for this species. If absence is established by the survey, then the incidental take minimization measures for riparian habitat, established in SJMSCP Section 5.2.4.31 shall apply.

Potential riparian brush rabbit habitat is: the vegetation types R, R2, R3, R4, R5, S, SG, D, W, W2, W3, W4, W5 and W9 (unlined) located along the Stanislaus River downstream of Highway 99 to the junction with the San Joaquin River and riparian habitat along the San Joaquin River downstream of the mouth of the Stanislaus River north to and including Tom Paine Slough and Paradise Cut to the Southern Pacific railroad right-of-way.

C. Limited Take. Incidental Take of up to three acres of potential riparian brush rabbit habitat may occur pursuant to the SJMSCP for projects which meet all of the following criteria:

A. SJMSCP Covered Activities excluding residential, commercial or industrial development and aggregate mining.
B. Impact less than .25 acres of habitat on a per-project basis; and
C. Result in no harm, injury, or harassment of individual brush rabbits

5.2.4.24 Riparian Woodrat

A. Occupied Habitat. Kill of individual riparian woodrats and Conversion of occupied habitat for the riparian woodrat is prohibited by the SJMSCP unless the provisions of SJMSCP Section 5.5.2.7 have been met. Full avoidance of the riparian woodrat is required in areas of known occupied riparian brush rabbit habitat in accordance with Section 5.5.9(I). Occupied habitat for the riparian woodrat includes the vegetation types R, R2, R3, R4, R5, S, SG, D, W, W2, W3, W4, W5 and W9 (unlined) surrounding Caswell Park along the Stanislaus River and extending along the Stanislaus River west from Caswell Park to the confluence of the Stanislaus River with the San Joaquin River in San Joaquin County. Additional populations of the riparian woodrat identified after the Effective Date of the SJMSCP Permits by the JPA or the Permitting Agencies shall become known occupied riparian woodrat habitat.

B. Potential Habitat. Conversion of Potential habitat for the riparian woodrat is prohibited by the SJMSCP unless: 1) the provisions of Paragraph C (below) apply; 2) the provisions of SJMSCP Section 5.5.2.7 have been met; or 3) a survey, conducted pursuant to the protocol established in *Survey Methods for Riparian Brush Rabbits* (by D.F. Williams and P.A. Kelly - San Joaquin Valley Endangered Species Recovery Planning Program) is undertaken and proves absence for this species. If absence is established by the survey, then the incidental take minimization measures for riparian habitat, established in SJMSCP Section 5.2.4.31 shall apply.

Potential habitat for the riparian woodrat is the same as that for the riparian brush rabbit.

C. Limited Take. Incidental Take of up to three acres of potential riparian woodrat habitat may occur pursuant to the SJMSCP for projects which meet all of the following criteria:

A. SJMSCP Covered Activities excluding residential, commercial or industrial development and aggregate mining.
B. Impact less than .25 acres of habitat on a per-project basis; and
C. Result in no harm, injury or harassment of individual riparian woodrats

5.2.4.25 San Joaquin Kit Fox

Preconstruction surveys shall be conducted two calendar weeks to thirty calendar days prior to commencement of ground disturbance for projects located within the *Southwest Zone* or *Southwest/Central Transition Zone*. Surveys shall be conducted by qualified biologists. When surveys identify potential dens (potential dens are defined as burrows at least four inches in diameter which open up within two feet), potential den entrances shall be dusted for three calendar days to register track of any San Joaquin kit fox present. If no San Joaquin kit fox activity is identified, potential dens may be destroyed. If San Joaquin kit fox activity is identified, then dens shall be monitored to determine if occupation is by an adult fox only or is a natal den (natal dens usually have multiple openings). If the den is occupied by an adult only, the den may be destroyed when the adult fox has moved or is temporarily absent. If the den is a natal den, a buffer zone of 250 feet shall be maintained around the den until the biologist determines that the den has been vacated. Where San Joaquin kit fox are identified, the provisions of the U.S. Fish and Wildlife Service's published *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* shall apply (except that preconstruction survey protocols shall remain as established in this paragraph). These standards include provisions for educating construction workers regarding the kit fox, keeping heavy equipment operating at safe speeds, checking construction pipes for kit fox occupation during construction and similar low or no-cost activities.

It is possible that the Permitting Agencies could discover the San Joaquin kit fox within the eastern foothills of San Joaquin County, (this potential range in the eastern foothills would most likely coincide approximately with the boundaries of the *Vernal Pool Zone*, excluding that area of the *Vernal Pool Zone* located in the northern portion of San Joaquin County). San Joaquin kit fox also may move within the *Primary Zone of the Delta* west of Old River. The TAC shall work with the USFWS to prepare an abbreviated survey protocol for these areas in the *Vernal Pool Zone* and *Primary Zone of the Delta* within one year of issuance of SJMSCP Permits pursuant to SJMSCP Sections 5.2.2.1 through 5.2.2.4.

Protocols for conducting pre-construction surveys for the San Joaquin kit fox shall be updated in accordance with the SJMSCP Adaptive Management Plan to reflect changes to the *Standardized Recommendations for Protection of the San Joaquin kit fox Prior to or During Ground Disturbance*.

5.2.4.26 American Badger, Ringtail Cat

If occupied dens are located on a project site for either of these species, then dens shall be monitored to determine if occupation is by an adult badger or ringtail only or is a natal den. If the den is occupied by an adult only the den may be destroyed when the adult has moved or is temporarily absent. If the den is a natal den, a buffer zone of 200 feet shall be maintained around the den until the JPA biologist determines that den has been vacated.

5.2.4.27 Berkeley Kangaroo Rat, San Joaquin pocket mouse

These species are located primarily in the Southwest Zone outside of anticipated development areas. However, if these species are discovered on a project site, Incidental Take Minimization Measures shall be formulated by prior to ground disturbance the TAC and approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC in accordance with the SJMSCP's Adaptive Management Plan (Section 5.9.4).

5.2.4.28 Bats (All)

A. Prior to the nursery season indicated in the following table for these species, nursery sites shall be sealed.

TABLE 5.2-2
OCCUPATION SITES AND NURSERY SEASONS FOR SJMSCP COVERED BATS

Bat Species	Preferred Occupation Site	Nursery Season
Greater western mastiff bat	Cliff or rock crevice (usual), tree or snag (occasionally)	April - September
Small-footed myotis	Cave, adit, cliff, rock crevice, building	May - August
Long-eared myotis	Cave, adit, tree, snag	May - August
Fringed myotis	Cave, adit, cliff, rock crevice, building	May - August
Long-legged myotis	Cave, adit, cliff, rock crevice, tree, snag, building	May - August
Red bat	tree, snag, cave (occasionally)	May - August
Yuma myotis	Cave, adit, cliff, rock crevice, structure, cistern, bridge, tree, snag	May - August
Pale big-eared bat	Cave, adit, cliff, rock crevice, structure, cistern, bridge	May - August
Pacific western big-eared bat (aka Townsend's western big-eared bat)	Cave, adit, cliff, rock crevice, structure, cistern, bridge	April - August

B. Seal hibernation sites, prior to the hibernation season (November through March) when hibernation sites are identified on the project site. Alternatively, grating may be installed as described in 5.5.9(E)(1).

C. When colonial roosting sites which are located in trees or structures must be removed, removal shall occur outside of the nursery and/or hibernation seasons and shall occur during dusk and/or evening hours after bats have left the roosting site unless otherwise approved pursuant to Section 5.2.3.2.

<u>5.2.4.29</u> <u>Plants</u>

I. Complete avoidance of plant populations on site is required for the following plant species in accordance with the identified measures in Section 5.5.9(F):

Large-flowered fiddleneck, succulent owl's clover, legenere, Greene's tuctoria, diamond-petaled poppy, Sanford's arrowhead, Hospital Canyon larkspur, showy madia, Delta button celery, Slough thistle.

II If one of the following SJMSCP Covered Plant Species is identified by the JPA on a project site, the following mitigation measures are required:

A. For widely distributed plant species: Mason's lilaeopsis, California hibiscus, Suisun marsh aster, Delta tule pea, Delta mudwort:

Attempt acquisition. If the plant population is considered healthy by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC, then the parcel owner shall be approached to consider selling a conservation easement including a buffer area as prescribed in Section 5.4.4 and sufficient to maintain the hydrological needs of the plants. Alternatively, the landowner may be approached to consider land dedication in-lieu of paying SJMSCP development fees. If the Project Proponent is not agreeable to acquisition , then compensation shall be as prescribed in SJMSCP Section 5.3.1.

B. For plants of moderate distribution: Bogg's lake hedge hyssop:

1. **Attempt acquisition.** If the plant population is considered healthy by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC, then the parcel owner shall be approached to consider selling a conservation easement including a buffer area as prescribed in Section 5.4.4 and sufficient to maintain the hydrological needs of the plants. Alternatively, the landowner may be approached to consider land dedication in-lieu of paying SJMSCP development fees. If the Project Proponent is not agreeable to acquisition, compensation shall be as prescribed in SJMSCP Section 5.3.1.

2. **Seed Collection.** If the landowner rejects acquisition , then the JPA, with the concurrence of the Permitting Agencies' representatives on the TAC, shall undertake seed collections from the populations prior to destruction if seed collection is determined to be feasible, beneficial and/or appropriate by the TAC.

C. For narrowly distributed plant species: Hoover's calycadenia, Red Bluff dwarf rush, bristly sedge, alkali milk vetch, heartscale, brittlescale, Mt. Hamilton coreopsis, mad-dog skullcap, Wright's trichocoronis, caper-fruited tropidocarpum, and recurved larkspur:

1. **Attempt acquisition.** If the plant population is considered healthy by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC , then the parcel owner shall be approached to consider selling a conservation easement including a buffer area as prescribed in Section 5.4.4 and sufficient to maintain the hydrological and ecological (e.g., account for weed control, buffers, inclusion of pollinators) needs of the plants. Alternatively, the landowner may be approached to consider land dedication in-lieu of paying SJMSCP development fees.

2. **Consultation.** If the landowner rejects acquisition of the population, then the JPA shall, with the concurrence of the Permitting Agencies' representatives on the TAC, determine the appropriate mitigation measures (e.g., seed collection) for each plant population based upon the species type, relative health and abundance.

<u>5.2.4.30</u> <u>SJMSCP Covered Fish</u>

Impacts to fish are addressed under the SJMSCP primarily through Incidental Take Minimization Measures; SJMSCP Permitted Activities are not expected to significantly alter habitats of SJMSCP Covered Fish Species

Incidental Take Minimization Measures for SJMSCP Covered Fish are the same as those included for protection of riparian habitats in SJMSCP Section 5.2.4.31, except that, pursuant to Section 5.7(5) for Aggregate Mining Activities, Project Proponents are required to consult with Permitting Agencies on a case-by-case basis during the SMARA permitting process to design minimization measures to reduce the effects of stranding of the SJMSCP Covered Fish Species during mining activities.

<u>5.2.4.31</u> <u>Riparian Habitats and Other Non-Vernal Pool Wetlands</u>

For the purposes of implementing Incidental Take Minimization Measures, riparian habitats and "other non-vernal pool wetlands" shall be considered to be those habitats mapped on the *SJMSCP Vegetation Maps* as D (drainage ditch), R (Great Valley riparian forest), R2 (Great Valley Valley oak riparian forest), R3 (Great Valley cottonwood riparian forest), R4 (Arroyo willow thicket), S (Great Valley riparian scrub), S2 (Elderberry savannah), W (River or deep water channel - greater than 200 feet wide), W2 (Tributary stream - 100 to 200 feet wide), W3 (Creek - 20 to 100 feet wide), W4 (dead-end slough), W9 (Canal - if not cement lined), I (channel island), I2 (tule island and mud flat), W5 (freshwater lake or pond), W7 (freshwater emergent wetland).

The compensation requirements of the SJMSCP shall be triggered when the project design disturbs portions of the project site located within 100 feet of the outer edge of the driplines of riparian vegetation. For the purposes of accounting pursuant to the Annual Report (Section 5.9.1), Open Space Conversion acreage subject to the SJMSCP shall be calculated from the point at which a development extends into the 100 foot buffer to the centerline of the subject drainage (other than a river). For rivers, lakes, or ponds, Incidental

Take shall be calculated from the edge of the 100 foot buffer zone to the edge of the riparian vegetation as it extends into the river, lake, or pond.

For projects affecting riparian habitats:

A. Require appropriate erosion control measures (e.g., hay bales, filter fences, vegetative buffer strips or other accepted equivalents) to reduce siltation and contaminated runoff from project sites.

B. Retain emergent (rising out of water) and submergent (covered by water) vegetation.

C. Retain vegetation as practical within the constraints of the proposed development as determined by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC. Rapidly sprouting plants, such as willows, should be cut off at the ground line and root systems left in tact, when removal is necessary.

D. Locate roadways and other facilities perpendicular, rather than adjacent, to waterways to reduce the total riparian area disturbed wherever practical within the constraints of the proposed development as determined by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC.

E. Locate bridge and road footings outside of high water zones and riparian habitats wherever practical within the constraints of the proposed development as determined by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC.

F. Provide construction buffers of at least 100 feet throughout the construction process. Construction buffers of 300 feet (on both sides of riparian corridors, for a total of 600 feet) are required when the red-legged frog or foothill yellow-legged frog occupy the project site. These 300' setbacks shall be measured horizontally from the top of the bank and shall extend the entire length of the stream (or other linear wetlands) within the boundaries of the project site. These setbacks may be reduced by the TAC with the concurrence of the Permitting Agencies' representative on the TAC if the reduction: 1) does not affect habitat (e.g., the stream becomes piped and travels underground) or 2) the reduction will not result in an adverse impact to the species or reduction in the biological values of the habitat. This buffer area should be marked with stakes, fencing or other materials which will be visible to construction workers, including heavy equipment operators.

   These buffers may be reduced on a case-by-case basis by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC.

5.2.5 SPECIES RELOCATION

Relocation efforts often provide uncertain results, are frequently costly, and may result in project delays. Therefore, as described in Section 5.2.3.1(F), relocation will be used only in very rare circumstances and under the conditions and procedures described in the following sections.

5.2.5.1 Relocation Before Construction/Ground Disturbance Begins

If an SJMSCP Covered Species is identified by the JPA during a preconstruction survey before construction activities begin, the JPA shall, with the concurrence of the Permitting Agencies' representatives on the TAC, , determine whether the individual plants or animals shall be relocated to Preserves or other areas to minimize Incidental Take. The responsibility for relocating SJMSCP Covered Species from a project site shall be that of qualified biologists approved by the Permitting Agencies' representatives on the TAC or biologists already holding appropriate permits and working on behalf of the JPA.

The CDFG, or qualified biologists approved by the CDFG or biologists already holding appropriate permits, may relocate a non-federally-listed SJMSCP Covered Species at any time prior to ground disturbing activities. For federally-listed SJMSCP Covered Species, the CDFG, USFWS, or qualified biologists approved by the Permitting Agencies' representatives on the TAC, may relocate a federally-listed SJMSCP Covered Species prior to ground disturbing activities pursuant to authority to perform relocation of federally-listed SJMSCP Covered Species granted pursuant to the federal SJMSCP Permits. Property owners shall be notified of relocation efforts.

Relocation efforts involving SJMSCP Covered Bird Species shall be consistent with the Migratory Bird Treaty Act.

5.2.5.2 Relocation After Construction/Ground Disturbance Begins or is Completed

If an SJMSCP Covered Species is discovered after construction activities begin, or after construction is completed, the Project Proponent, project manager, or other interested persons immediately shall notify the JPA who, in turn shall notify CDFG's and USFWS's representatives on the TAC. These Permitting Agency TAC representatives, in consultation with the JPA, shall determine if relocation is necessary or beneficial pursuant to Sections 5.2.5.4 and 5.2.5.5 and, if required, identify a qualified biologist to undertake the relocation. Authority to perform relocations of federally-listed SJMSCP Covered Species is granted pursuant to the federal SJMSCP Permits. Property owners shall be notified of relocation efforts.

Relocation efforts involving SJMSCP Covered Bird Species shall be consistent with the Migratory Bird Treaty Act.

5.2.5.3 Non-Delay of Projects for Relocation

Neither the CDFG, USFWS, nor qualified biologists approved by these agencies (including biologists approved from the JPA) shall delay the start of or any subsequent project activity for more than 48 hours (two working days), from the time the Permitting Agencies' representatives on the TAC receive notification from the JPA to relocate an SJMSCP Covered Species unless additional time is granted by the Project Proponent. The CDFG and USFWS representatives on the TAC may, at any time, waive the option to relocate SJMSCP Covered Species from a project site.

5.2.5.4 Decision to Relocate a Species or Not to Relocate a Species

The ultimate decision to relocate or not to relocate a species shall be made by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC. The decision shall be based upon the best scientific knowledge available including the following considerations:

A. The biological status of the species and the biological benefits or value to the species that would occur as a result of relocation, including whether or not relocated individuals would be likely to return to the site, or

B. The numbers of the species are extremely limited, or

C. The likelihood that a relocated species will survive in a new location, or

D. The availability of alternative, suitable, habitat for the species, or

E. The relative time and cost associated with the species relocation in comparison to the biological benefits realized, or

F. The existence of well-established techniques which predict success.

5.2.5.5 Examples of Possible Circumstances Under Which Relocation or Salvaging Efforts May be Undertaken

As described in Section 5.2.3.1(F), relocation will be considered only after properly implemented Incidental Take Minimization Measures have failed to remove SJMSCP Covered Species from a project site and Take is the only viable remaining option. The following is an example of when relocation efforts may be an appropriate option to Take:

Plants. If the parcel owner rejects offers to purchase a conservation easement or dedicate land in-lieu of fee payments, and the subject plant is not a full avoidance plant, then the following may be considered:

Seed collection from a representative sampling of the plant specimens. The JPA with the concurrence of the Permitting Agencies' representatives on the TAC shall either identify appropriate locations within SJMSCP Preserves to attempt to raise plants from seeds or appropriate agencies will be contacted and the seeds shall be given to those agencies for archival, educational, or experimental(i.e., attempting to grow the species) purposes. In all cases, prior to planting seeds from and SJMSCP Covered Plant Species which have been properly collected and stored uner the auspices of the JPA, the JPA shall consult with the TAC and the Permitting Agencies on a case-by-case basis to review the current information available regarding the subject species and follow the appropriate protocols for planting the seeds in appropriate areas.

5.3 MEASURES TO MITIGATE IMPACTS

As noted above, mitigation for the loss of habitat of the SJMSCP Covered Species as a result of SJMSCP Permitted Activities takes a habitat-based approach which emphasizes the establishment, enhancement and management-in-perpetuity of Preserves composed of a single vegetation type or association of vegetation types (a habitat) upon which discrete groups of SJMSCP Covered Species rely. Preserves will normally be located outside of designated existing and planned urban boundaries predominantly on productive agricultural lands located throughout the County. The purchase of easements from landowners willing to sell urban development rights will be the primary method of acquiring Preserves. Once acquired, Preserve lands shall be enhanced by the JPA to increase the quality of habitats on Preserves and, subsequently, to encourage occupation of a Preserve site by SJMSCP Covered Species or increase the populations of existing SJMSCP Covered Species on Preserves. Enhancements on the majority of the SJMSCP Preserves shall be tailored to encourage the continued productive agricultural use of Preserve lands by landowners provided that such agricultural use is compatible with achieving continued successful reproduction, feeding, and sheltering, or are expected to be able to achieve these activities, of SJMSCP Covered Species as stated in Section 5.4.8.1(F).

To ensure that SJMSCP Permitted Activities will not result in jeopardy to SJMSCP Covered Species, the SJMSCP also establishes, as part of the mitigation component of its conservation strategy: (1) limits to the number of acres of Natural Lands which may be Converted from Open Space use (Section 5.5.1); (2) limits to the number of acres of occupied and/or potential habitat that may be converted for selected SJMSCP Covered Species including narrowly distributed plants (Section 5.5.2); (3) special conservation and mitigation requirements for the San Joaquin kit fox, Valley elderberry longhorn beetle, California red-legged frog, valley oak woodlands, and vernal pools (Sections 5.5.3 through 5.5.7); and (4) mitigation emphasizing changes in project design for linear projects which may create barriers to dispersal for SJMSCP Covered Species or other plants, fish, or wildlife (Section 5.5.8).

In addition, the SJMSCP provides an alternative mitigation approach which allows complete avoidance of SJMSCP Covered Species and habitats through the implementation of measures established in Section 5.5.9 in which compensation is not required where the provisions of Section 5.5.9 are implemented.

The following describes the methods and approaches adopted for the SJMSCP for acquiring and establishing Preserves, enhancing Preserves, and monitoring and managing Preserves in perpetuity; the limits established by the SJMSCP for specific species, Conversions of Agricultural Habitat Lands and Natural Lands; and alternative methods of mitigating impacts under the SJMSCP.

5.3.1 SJMSCP COMPENSATION REQUIREMENTS

Section 4.1 of the SJMSCP provides the compensation requirements for Open Space Conversions summarized as follows:

TABLE 5.3-1: SJMSCP COMPENSATION RATIOS

HABITAT TYPE CONVERTED FROM OPEN SPACE USE	REQUIRED COMPENSATION RATIO	DESCRIPTION
Agricultural Habitat Lands	1:1	One acre of Preserve acquired, enhanced and managed in perpetuity for each acre of habitat Converted from Open Space use.
Natural Lands - Non-Wetlands (e.g., oak woodlands)	3:1	Three acres of Preserve acquired, enhanced and managed in perpetuity for each acre of habitat Converted from Open Space use.
Natural Lands - Vernal Pools within *Vernal Pool Zone*	2:1 Preservation plus 1:1 Creation (3:1 total)	Create one acre of habitat and preserve two acres of existing habitat for each acre Converted from Open Space use--resulting in three total acres of Preserve. Preserves include both wetted surface area and upland grasslands surrounding vernal pools and protecting their watersheds. Creation component shall emphasize restoration of pre-existing vernal pools, wherever feasible.
Natural Lands - Wetlands Other than Vernal Pools	At least 1:1 Creation Plus 2:1 Preservation (3:1 total)	SJMSCP may: (1) create one acre habitat, preserve two existing acres of habitat; (2) create two acres habitat, preserve one acre existing habitat; or (3) create three acres of habitat, preserve zero acres of existing habitat. All options result in three acres of Preserve.

5.3.2 METHODS BY WHICH INDIVIDUALS PROVIDE MITIGATION PURSUANT TO THE SJMSCP

Individuals seeking coverage under the SJMSCP may undertake one or a combination of two or more of the following three options to provide compensation pursuant to the SJMSCP:

A. Pay the appropriate fee as indicated in Section 7.4.1; or
B. Dedicate, as conservation easements or fee title, or in-lieu dedications (as specified in Sections 5.3.2.2 and 5.3.2.3, herein); or
C. Purchase approved mitigation bank credits as specified in Section 5.3.2.4.
D. Propose an alternative mitigation plan, consistent with the goals of the SJMSCP and equivalent in biological value to options A, B or C, above, subject to approval by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC.

5.3.2.1 Fees

As described in Section 7.4.1, individuals opting for coverage under the SJMSCP may pay a fee. The fee structure under the SJMSCP is:

A. $750 per acre for Conversion of Multi-Purpose Open Space Lands,

B. $1,500 per acre for Conversion of Agricultural Habitat Lands and Natural Lands (except for vernal pools); and,

C. $30,000 per acre for the wetted surface area of vernal pools and $5,000 per acre for the upland grasslands surrounding vernal pools. The SJMSCP assumes a 12% wetted surface area for vernal pool grasslands. This translates into an overall average cost per acre for vernal pool grasslands of $8,000 per acre.

5.3.2.2 In-Lieu Land Dedications

Private individuals receiving Incidental Take coverage pursuant to the SJMSCP may, in-lieu of fee payments, offer suitable land for dedication. Dedications shall be approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC. In-lieu lands shall meet minimum parcel sizes designated in the SJMSCP Preserve design descriptions or, if smaller, should be adjacent to an existing Preserve which, in combination with in-lieu lands, meets Preserve size minimums. In-lieu lands shall include an endowment payment (equal to the management endowment and administration costs of land acquisitions as prescribed in Sections 7.2.3 and 7.2.4) to ensure the management of the dedicated land in perpetuity. Dedicated land may be lands on-site or off-site from the project location owned by the Project Proponent. Conservation easements (or fee title) for owner-dedicated lands, referencing the JPA or another suitable agency or organization as easement or fee title holder, shall be recorded with the office of the County Recorder. Easements shall be consistent with the requirements of California Civil Code Section 815.3 which specifies those who are qualified to hold conservation easements.

5.3.2.3 Timing of Fee Payments, In-Lieu Dedications or Mitigation Banking

Under the normal permitting process implemented by local government jurisdictions in San Joaquin County, ground disturbance (including grading) may occur prior to the local government jurisdiction's issuance of a Building Permit. For example, once a *tentative* subdivision map to create new residential lots is approved by a local government agency (e.g., the City of Tracy's City Council or the San Joaquin County Board of Supervisors) with conditions, the Project Proponent must fulfill many of the project conditions (e.g., constructing new roads or installing water or sewer lines) before gaining approval of a *final* subdivision map. Once the final subdivision map is completed, new residential lots may be sold to the general public. Once a newly created subdivision lot is purchased, the new owner of the lot normally applies for a Building Permit to construct a new home on the newly created subdivision lot.

However, different development projects may undergo variations in this permitting process (e.g., Project Proponents may receive only Building Permits for small projects which address both building and grading activities, but Project Proponents are not required to secure Grading Permits due to the relatively small amounts of dirt being moved by the project). The majority of development projects in San Joaquin County require Building Permits during at least one phase of the development process. Many of San Joaquin County's largest projects also require Grading Permits. Therefore, given this variation in the types of permits which may be issued at varying times during the development process, the following provisions shall be implemented 1) to address the variations in the types of permits required, and timing of the acquisition of those permits, for the various development projects in San Joaquin County, 2) to provide a uniform approach amongst the local government agencies for timing the collection of fees or requiring purchases of mitigation banking credits, 3) to provide maximum flexibility for developers to finance their projects without creating adverse impacts to SJMSCP Covered Species, and 4) to ensure that compensation will occur pursuant to the SJMSCP by using familiar permitting procedures already used by local government agencies:

For so long as the 350-acre jump-start (Section 8.6) remains in place, the timing of compensation pursuant to the SJMSCP shall be as follows:

A. <u>Collection of Fees/Purchase of Mitigation Banking Credits for Projects Less Than or Equal to 350 Acres in Size (projects equivalent in size or smaller than the jump-start):</u> collection of fees or purchase of banking credits will occur prior to or at the time of issuance of Building Permits so long as Site Disturbance without compensation (i.e., grading or vegetation removal has occurred with or without permits, but Building Permits have not yet been issued) does not exceed 500 acres total at any time during the term of the SJMSCP for SJMSCP Permitted Activities undertaken by project proponents opting for coverage pursuant to the SJMSCP. When Site Disturbances without compensation pursuant to this provision reaches 500 acres total, then the JPA and Permittees shall require the fee collections or purchase of banking credits for projects less than or equal to 350 acres in size to occur pursuant to the same schedule as required for projects exceeding 350 acres as described in paragraph B.

B. <u>Collection of Fees/Purchase of Mitigation Banking Credits for Projects Exceeding 350 Acres:</u> collection of fees for land acquisition or purchase of banking credits will occur either:

1. Prior to issuance of a Grading Permit (or prior to Ground Disturbance if no Grading Permit is required) ; or,

2. The Project Proponent may bond for payment of the applicable SJMSCP fees prior to the issuance of a Grading Permit (or prior to the commencement of Ground Disturbance if no Grading Permit is required). Bonds posted pursuant to this provision shall be released, to the extent possible, after full project buildout and after all appropriate fees have been paid with respect to each building permit associated with the project. Provisions for releasing portions of the bond as buildout progresses may be established on a case-by-case basis upon request of the Project Proponent Only bonds issued by a bond surety admitted in California by the California Department of Insurance will be accepted unless otherwise approved by the JPA with the concurrence of the Permitting Agencies.

C. <u>Collection of Fees/Purchase of Mitigation Banking Credits for Conversion of Vernal Pool Grasslands to Orchards and Vineyards</u> shall occur prior to ground disturbance.

D. <u>Land Dedications in Lieu of Fee Payments or in Lieu of Mitigation Banking Regardless of Project Size</u>: Shall occur prior to ground disturbing activities (i.e., prior to the issuance of a Grading or Building Permit, whichever occurs first) unless an extension is requested, in writing to the JPA, by the Project Proponent and granted to a date certain by the TAC, with the concurrence of the Permitting Agencies' TAC representative, based upon the following findings:

1) The time extension will not jeopardize the proper functioning of SJMSCP, and

2) The time extension will not adversely affect any SJMSCP Covered Species.

The TAC, with the concurrence of the Permitting Agencies' TAC representative, may impose conditions on the time extension as necessary to provide assurances to the JPA that the Project Proponent shall provide compensation pursuant to the SJMSCP consistent with the requirements of the SJMSCP.

If the 350-acre jump-start ceases to exist, then the provisions of paragraph B shall apply for all SJMSCP Permitted Activities, regardless of size and regardless of the compensation method selected (i.e., fees, land dedications in-lieu of fee payments, or purchase of mitigation banking credits).

5.3.2.4 Mitigation Banking

The SJMSCP anticipates using two categories of mitigation banks:

A. **SJMSCP Mitigation Banks.** The SJMSCP anticipates enhancing and/or restoring vernal pool lands in excess of those required for compensation under the SJMSCP. This excess may be sold as mitigation or compensation "credits" to individuals not covered by the SJMSCP and in need of vernal pool mitigation lands. The SJMSCP may consider establishing other types of mitigation banks during the life of the Plan, as deemed necessary.

B. **Private Mitigation Banks.** A private property owner may establish a mitigation bank on all or a portion of his or her property for one or more SJMSCP Covered Species. A Project Proponent needing that particular habitat type for mitigation for a project elsewhere may then pay the property owner or "bank operator" to permanently manage the enhanced property for SJMSCP Covered Species. Private mitigation banks shall be consistent with the SJMSCP Preserve selection criteria (Section 5.4.4) and shall be approved by appropriate state and federal agencies pursuant to applicable state and federal guidelines for mitigation banks and other applicable policies, laws and regulations. Credits purchased from private mitigation banks must be for habitats which already are existing as protected lands within the mitigation bank Preserves prior to the purchase of credits (i.e shall not be purchased from mitigation banks which intend to create protected lands in the future).

Land banks used to offset impacts to wetlands must comply with Federal Register Notice: November 28, 1995, Vol. 60, No. 228, Federal Guidance for the Establishment, Use and Operation of Mitigation Banks, and other applicable polices, laws, and regulations. All mitigation banks, whether SJMSCP banks or private mitigation banks, shall be reviewed and approved by the Permitting Agencies prior to use. Aerial photographs indicating the condition of habitat lands, prior to undertaking habitat enhancements for banking, shall be used when establishing baseline conditions for mitigation banks unless otherwise approved by the Permitting

Agencies.

5.3.3 METHODS BY WHICH THE JPA PROVIDES MITIGATION PURSUANT TO THE SJMSCP

The JPA shall use monies collected for the SJMSCP, as described in Section 7.4, for acquisition of Preserve lands, enhancement of Preserve lands, monitoring and management of Preserve lands in perpetuity, and administration of the SJMSCP. The following describes the criteria, methods and process for selecting, designing, managing and monitoring Preserve lands.

The SJMSCP's JPA shall normally acquire Preserve lands in one of four ways:

A. Acquisition of conservation easements from willing sellers;

B. Outright purchase of land (fee title purchase) from willing sellers;

C. Acceptance of a land dedication in-lieu of fee payments as described in Section 5.3.2.2; or,

D. Acceptance of land dedicated as a gift or charitable donation.

The proportion of lands acquired as conservation easements versus those acquired in fee title is flexible pursuant to the SJMSCP. However, since a primary goal of the SJMSCP is to preserve productive agricultural use that is compatible with the SJMSCP’s biological goals as stated in SJMSCP Section 5.4.8.1(F), most of the SJMSCP Preserve lands will be acquired through the purchase of easements in which landowners retain ownership of the land and continue to farm the land. It is envisioned that the approximate ratio of conservation easements to fee title lands under the SJMSCP, at the end of 50 years, will be 90% conservation easements to 10% fee title ownership of Preserve lands.

5.3.3.1 Conservation Easements

Most SJMSCP Preserve lands shall be protected and managed through the purchase of conservation easements. Conservation easements shall be negotiated with and tailored to each individual property owner and to each parcel under consideration to meet both the needs of the landowner and the biological goals of the SJMSCP Covered Species as stated in SJMSCP Section 5.4.8.1(F). Conservation easements shall be purchased from willing sellers only. Easement language shall be reviewed and approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC prior to finalizing easement acquisition transactions. Once standardized easement language has been approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC, review and approval by the TAC, including the Permitting Agencies and the Permitting Agencies' representatives on the TAC, is no longer required except when deviations from pre-approved easement provisions are proposed. Permitting Agencies' representatives on the TAC shall have 60 calendar days to approve or deny deviations from pre-approved easement provisions commencing from the date of receipt of a written request for approval from the Joint Powers Authority.

Appendix H contains one pre-approved (i.e., template) easement and four sample easements. Landowners and the JPA may use the template easement without further review from the Permitting Agencies. Sample easements contained in Appendix H provide flexibility for landowners and the JPA and reflect concepts that may be considered in preparing individual easements pursuant to the SJMSCP which differ from the SJMSCP's pre-approved easement. When deviating from the template easement format, landowners and the JPA, and TAC will work together to formulate easement language suitable to the needs of the SJMSCP program and the landowner. Additional template easement formats may be added to the SJMSCP subject to the approval of the JPA, with the concurrence of the Permitting Agencies' representatives on the TAC, based upon alternative easements developed with landowners throughout the life of the Plan. Approval of new easement language require written approval from the Permitting Agencies' representatives on the TAC (approval of meeting minutes by a Permitting Agency TAC representative for a meeting attended by that representative shall be deemed to be written approval).

Easements shall be recorded with the San Joaquin County Recorder's Office and should, at a minimum, address:

A. Preservation and enhancement of wildlife values within the easement area.

B. Maintenance of the agricultural or other beneficial Open Space use of the easement area and identification of uses compatible with the SJMSCP, which acknowledges the need to allow flexible and profitable agricultural enterprise.

C. The procedures and circumstances for terminating and replacing easements consistent with the provisions of Section 5.3.3.6.

D. Provide neighboring land protections for land/landowners in the vicinity of SJMSCP Preserves consistent with the neighboring land protection provisions summarized in Section 5.3.3.4.

E. Address the maintenance of water rights by landowners on rangelands or other agricultural lands acquired for Preserves while providing easement holders with the ability to use water on Preserves. The quality and quantity of water granted to easement holders should be sufficient to: (a) maintain the hydrology of existing wetlands and riparian areas targeted for preservation, and, (b) should be sufficient to maintain newly created and/or enhanced wetlands and riparian areas on the Preserves.

F. Establish which enhancement and/or management activities shall be undertaken and/or maintained by the landowner and which shall be provided and/or maintained by the Joint Powers Authority, or other grantee holding the easement.

G. Remedies for noncompliance with easement provisions.

H. Specify the entity that will hold the conservation easement. Landowners shall indicate their preferences for easement dedications. The SJMSCP anticipates that, in addition to the JPA, local, state and federal public and private entities and non-profits shall be available to accept easement dedications. Easements shall be consistent with the requirements of California Civil Code Section 815.3 which specifies those who are qualified to hold conservation easements.

I. Specify the agency responsible for enforcing the conditions of the conservation easement (e.g., the JPA and/or Permitting Agencies)

J. Address remedies for illegal trash dumping by third parties (i.e., which is not the fault of either the landowner or easement holder) and remedies against other violators of the terms of the easement.

K. Require the Preserve landowner to adhere to the terms of the Preserve Management Plan, reference the existence of the Preserve Management Plan and describe where to obtain copies of the Preserve Management Plan.

L. Identify encumbrances, liens, or other items of title that might interfere with the integrity of the easement.

M. Maintenance of permanent water within ditches (e.g., rice farming) where such preservation provides biological values necessary for the Preserve, as described in Section 5.4.8.5(B).

N. When applicable, as described in Section 5.4.8.5(C)(3), limitations on the construction of trails and road crossings through Oak Woodland Preserves smaller than 250 acres in size.

O. Accessibility to the parcel by emergency personnel as established in Section 5.9.4.9.

5.3.3.2 Fee Title

The JPA shall acquire some Preserve lands in fee title(i.e., through outright purchase). Lands shall be acquired through the purchase of fee title from willing sellers only. Lands purchased in fee title shall normally be those which require a greater level of enhancement than those acquired through conservation easements (e.g., the acquisition of vernal pool grasslands for the creation of vernal pools which may significantly alter land and, therefore, require a change in regular agricultural production methods). Lands held in fee title as SJMSCP Preserves shall be protected as Preserve lands through the use of appropriate covenants. Lands acquired in fee title may be leased-back to farmers to maintain productive agricultural use, where agricultural use is compatible with the Preserve design goals as determined by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC. Alternatively, the JPA may purchase lands in fee title, place easements on those lands and re-sell these lands, with easements. Easements placed on lands using this method allows the JPA to regain a portion of monies spent on acquisition to make additional land acquisitions--a component of the SJMSCP funding plan used by major lands trusts and described in more detail in Section 7.4.2.5.

5.3.3.3 In-lieu Land Dedications and Acceptance of Gifts or Donations

The JPA may accept lands dedicated by individuals in lieu of fee payments as described above in Section 5.3.2.2. The JPA also may accept gifts or donations of land for Preserves. When the JPA receives lands as gifts or donations, the JPA will normally earmark monies set aside for land acquisition which would otherwise have been spent on the acquisition of the gifted lands for enhancement activities and for investment for long-term management of the gifted lands. Alternatively, if not otherwise prohibited by the terms of the gift, the JPA may sell gifted lands to generate monies for the acquisition of higher priority Preserve lands.

5.3.3.4 Neighboring Land Protections

The following provisions apply only within the context of the overall conservation strategy of the SJMSCP and should not be viewed independently of the overall SJMSCP.

When SJMSCP Preserves are established and managed for the SJMSCP Covered Species pursuant to the SJMSCP, either through purchase of conservation easements, fee title acquisition, or other means, landowners near or adjacent to Preserves may be concerned about the potential impacts to their own land use activities. For example, a landowner may be concerned that federally or state listed SJMSCP Covered Species (or that unlisted SJMSCP Covered Species which may become listed during the 50-year term of the Plan) inhabiting the SJMSCP Preserve lands may colonize or use their lands and that the landowner's routine and ongoing agricultural activities or mining activities meeting the requirements of Section (A)(2)(F) below could be restricted as a result. To address these concerns, the SJMSCP offers neighboring land protections for all SJMSCP Covered Species (both listed and unlisted), as discussed below.

Except as provided for in (A)(2) below, routine and ongoing agricultural activities on Agricultural Lands and lands identified for aggregate mining use by local general plans and meeting the requirements established in Section (A)(2)(F) below, within one-half mile of the boundary of any lands established by the JPA as Preserves under the SJMSCP will be covered for Incidental Take of SJMSCP Covered Species (listed and unlisted) that come to inhabit such lands after the Preserves are established. Moreover, Agricultural Lands and lands identified for aggregate mining use by local general plans and meeting the requirements established in Section (A)(2)(F) within ten miles of the boundary of any lands established by the JPA as Preserves under the SJMSCP will be covered for Incidental Take of foraging Swainson's hawks. Details addressing the extension of neighboring land protections are described below.

A. Elements

1. Lands Covered by Neighboring Land Protections. At the election of the neighboring landowner, Agricultural Lands and lands identified for aggregate mining use by local general plans and meeting the requirements established in Section (A)(2)(F) within one-half mile of the boundary of any lands established as SJMSCP Preserves under the SJMSCP, either through purchase of a conservation easement, purchase of fee title, or other means, will be covered for Incidental Take of SJMSCP Covered Species under the SJMSCP's associated Section 10(a)(1)(B) and Section 2081(b) permits, for any such SJMSCP Covered Species after establishment of the SJMSCP Preserves. Additionally, those with Agricultural Lands and lands identified for aggregate mining use by local general plans and meeting the requirements established in Section (A)(2)(F) within 10 miles of the boundary of any lands established as SJMSCP Preserves and that are managed for Swainson's hawks shall be covered for the Incidental Take of foraging Swainson's hawks. Exemptions to this coverage are listed below.

2. Exceptions. Exceptions to coverage for neighboring land protections discussed below may be modified (i.e., removed) by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC if the neighboring landowner voluntarily undertakes biological surveys approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC and such surveys indicate absence of SJMSCP Covered Species. The JPA will undertake, at its own expense,

surveys of neighboring lands to establish the absence of large-flowered fiddleneck, diamond petaled California poppy, showy madia, Hospital Canyon larkspur in the *Southwest Zone;* Greene's tuctoria, legenere and succulent owl's clover in the *Vernal Pool Zone;* Delta button celery, Sanford's arrowhead, slough thistle in the Central and Central/Southwest Transition Zones as necessary to extend neighboring land protections, if requested and approved by the landowner.

Except as otherwise provided for in the preceding paragraph, the following are excluded from neighboring land protections:

A. Individuals or populations of SJMSCP Covered Species present on neighboring lands prior to the establishment of SJMSCP Preserves and the natural habitat features (e.g., nest trees) which support known individuals or populations of SJMSCP Covered Species.

B. SJMSCP Covered Fish Species (See Table 2.2.2). Because fish species occupy specific streams and rivers and do not limit themselves to distinct boundaries within streams and rivers, revegetation of an existing streamside to create an SJMSCP Preserve benefitting SJMSCP Covered Fish will not encourage SJMSCP Covered Fish to newly occupy neighboring lands--instead, revegetation for the benefit of SJMSCP Covered Fish simply enhances their existing occupied habitat. In addition, the SJMSCP will establish only nine acres of Preserves which could support SJMSCP Covered Fish--all of which will be part of or immediately adjacent to existing streams and rivers already inhabited by those SJMSCP Covered Fish--again, with no potential to create new impacts to neighboring lands because SJMSCP Covered Fish Species already exist throughout the waterways which constitute the neighboring lands.

C. Lands containing G, G2, BL, BCN, or O/G habitats as mapped on the *SJMSCP Vegetation Maps* **and** which are located southwest of I-580 within the *Southwest Zone* shall be considered to be occupied by the San Joaquin kit fox (see areas located southwest of I-580 and labeled "core conservation area" or "buffer area" in Appendix G). This assumption is based upon the biological analysis of species distributions as presented in the *Biological Analysis: San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP)* prepared for the San Joaquin Council of Governments by Toyon Environmental Consultants, Inc., August 15, 1996. That study considered all known mapped locations of the San Joaquin kit fox available as of the date of publication, the *Recovery Plan for Upland Species of the San Joaquin Valley, California*[15] and consultations with representatives from the California Department of Fish and Game and the U.S. Fish and Wildlife Service.

D. Vernal pools since the presence of vernal pools outside of SJMSCP Preserves cannot be considered to be related to or caused by the presence of vernal pools on SJMSCP Preserves. SJMSCP Covered Vertebrate Species which inhabit non-vernal pool habitats on neighboring lands (e.g., California tiger salamander and western spadefoot toad) are covered by

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15 *Recovery Plan for Upland Species of the San Joaquin Valley, California*, U.S. Department of the Interior, Fish and Wildlife Service, Region 1, September 30, 1998

neighboring land protections; SJMSCP Covered Plant Species are covered unless specifically exempted by paragraph E below. SJMSCP Covered Vernal Pool Crustacean Species (e.g., vernal pool fairy shrimp, vernal pool tadpole shrimp, Conservancy fairy shrimp, longhorn fairy shrimp) are assumed to occupy vernal pool habitat on neighboring lands and are exempted from neighboring land protections unless surveys, conducted pursuant to current U.S. Fish and Wildlife Service protocols and paid for by the JPA, are conducted and establish that these species are absent from the vernal pools on neighboring lands.

E. Coverage for large-flowered fiddleneck, diamond-petaled California poppy, showy madia, Hospital Canyon larkspur in the *Southwest Zone;* Greene's tuctoria, legenere and succulent owl's clover in the *Vernal Pool Zone;* Delta button celery, Sanford's arrowhead, slough thistle in the *Central* and *Central/Southwest Transition Zones* when these plants are present on an SJMSCP Preserve prior to the extension of neighboring land protections. The JPA will undertake, at its own expense, surveys of neighboring lands to establish the absence of these SJMSCP Covered Plant Species as necessary to extend neighboring land protections, if requested and approved by the landowner.

F. Lands identified for aggregate mining use by local general plans which have not received a final approval (i.e., issuance of a conditional use permit or similar entitlement by a local jurisdiction) to commence aggregate mining as of the SJMSCP's Effective Date are exempt from Section 5.3.3.4 and are subject to the requirements of the SJMSCP, including compensation requirements, as established in Section 5.7 of the SJMSCP. Lands identified for aggregate mining use by local general plans which are in active use as of the SJMSCP's Effective Date qualify to receive neighboring land protections to protect ongoing aggregate mining activities provided baseline biological studies have been completed as provided below in Section(3)(B).

G. Special provisions exist for the extension of neighboring land protections for the following uses: wholesale nurseries, agricultural processing, farm labor camps, small animal raising, animal feeding and sales, or trucking facilities. Lands upon which these uses are existing as of the date of a Preserve acquisition pursuant to the SJMSCP are covered by neighboring land protections. However, Conversion of a land use from an existing routine and ongoing agricultural activity on neighboring land *after* establishment of an SJMSCP Preserve to one of these uses, suspends neighboring land protections. Similarly, expansion of one of these existing uses onto lands not previously used for one of these purposes *after* establishment of an SJMSCP Preserve also suspends neighboring land protections on that portion of the land upon which expansion has occurred. Neighboring land protections shall be re-established for these uses after mitigation measures to offset identified impacts (including impacts to biological resources) are completed in conjunction with the acquisition of a discretionary entitlement as currently required by the San Joaquin County Code and pursuant to the notification procedures established below in paragraph 4 and subject to all other exceptions in Section 5.3.3.4(a)(2).

H. Special provisions exist for the extension of neighboring land protections to orchards and vineyards and other crops. Lands upon which orchards and/or vineyards are existing as of the date of a Preserve acquisition pursuant to the SJMSCP are covered by neighboring land protections. However, Conversion of a land use from an existing routine and ongoing agricultural activity on neighboring land *after* establishment of an SJMSCP Preserve to an orchard or a vineyard or other crop which results in the Conversion of vernal pool grassland or Other Waters of the United States, suspends neighboring land protections. Similarly, expansion of orchards and/or vineyards and other crops onto lands not previously used for orchards and/or vineyards or other crops *after* establishment of an SJMSCP Preserve which results in the Conversion of vernal pool grasslands or Other Waters of the United States also suspends neighboring land protections on that portion of the land upon which expansion has occurred. Neighboring land protections shall be re-established for orchards and vineyards and other crops which Convert vernal pool grasslands or Other Waters of the United States after mitigation measures to offset identified impacts (including impacts to biological resources) are completed in conjunction with the acquisition of a Section 404 permit and/or streambed alteration permit and pursuant to the notification procedures established below in paragraph 4 and subject to all other exceptions in Section 5.3.3.4(a)(2). Conversion of Agricultural Lands to orchards and/or vineyards or other crops on neighboring lands which do *not* result in the Conversion of vernal pool grasslands or Other Waters of the United States and either existing during the establishment or occurring after the establishment of SJMSCP Preserves, are covered by neighboring land protections.

I. Known occupied habitat for the giant garter snake, riparian brush rabbit and riparian woodrat as defined in Section 5.2.4.23, 5.2.4.24, and 5.2.4.8.

J. The extension of neighboring land protections does not confer special authorization allowing the Conversion of Natural Lands on neighboring lands. Similarly, the extension of neighboring land protections to neighboring lands does not restrict the Conversion of Natural Lands on neighboring lands which was permitted prior to the extension neighboring land protections and is consistent with local, state and federal regulations.

3. <u>Establishing Presence of SJMSCP Covered Species on Neighboring Lands Prior to Preserve Establishment.</u>

A. <u>Agricultural Lands.</u> Presence of SJMSCP Covered Species on Neighboring Lands shall be established by the JPA in conjunction with establishing a new SJMSCP Preserve. The JPA, in consultation with the TAC, shall identify those portions of neighboring lands which are excluded from neighboring land protections pursuant to the preceding provisions based on the *SJMSCP GIS Database* and windshield surveys or other suitable means not requiring access to neighboring lands unless the landowner expressly grants access for survey purposes.

B. <u>Aggregate Lands.</u> Pre-existing baseline surveys of the project site are required for aggregate land to establish the presence or absence of SJMSCP Covered Species located on the parcel prior to the existence of SJMSCP Preserves. Pre-existing baseline surveys of the project site prepared by landowners will be reviewed by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC to determine if existing baseline surveys of the site provide sufficient information for extending neighboring land protections to lands identified for aggregate mining use by local general plans and meeting the requirements established in Section (A)(2)(F). If pre-existing baseline surveys of the site are unavailable or were found to be deficient (e.g., due to age, protocols used, timing of study, coverage), then the presence of SJMSCP Covered Species on lands identified for aggregate mining use by local general plans and meeting the requirements established in Section (A)(2)(F) shall be established by the landowner seeking neighboring land protections through the preparation of a baseline biological survey of the site approved by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC. The surveys shall be supplemented by the *SJMSCP GIS Database*.

4. Notification and Acceptance of Protections. To ensure that adequate records of those property owners protected by these neighboring land protections are maintained, that landowners are in agreement with the terms of coverage, and that the owners of such protected properties are notified of the rights and obligations of these provisions, the following shall occur:

Prior to the approval by the JPA of new SJMSCP Preserve acquisitions, the JPA shall send a letter by certified mail, return receipt requested, to each neighboring landowner located within 1/2 mile of the proposed SJMSCP Preserve (or within 10 miles of a proposed SJMSCP Preserve to be managed for Swainson's hawks). The letter will explain the SJMSCP and the coverage under the Incidental Take Permits being offered to the landowner with respect to Agricultural Lands and lands identified for aggregate mining use by local general plans and meeting the requirements established in Section (A)(2)(F) within one-half mile of the boundary of an SJMSCP Preserve (or 10 miles of an SJMSCP Preserve managed for Swainson's hawks, for the Incidental Take of foraging Swainson's hawks). For lands identified for aggregate mining use by local general plans and meeting the requirements established in Section (A)(2)(F), instructions for preparing baseline biological surveys shall be included. For Agricultural Lands, the letter will identify any individuals or populations of SJMSCP Covered Species or areas within the neighboring lands which would not be covered under the Incidental Take permits pursuant to provisions in paragraph 2, above, and attach a detailed map showing all areas included and any areas excluded from coverage. Additionally, the letter will request that the landowner provide a purchaser or lessee of the property notice of the neighboring land protections so that a purchaser or lessee can obtain Incidental Take coverage as described herein. The letter will be accompanied by a "Certificate of Inclusion" to be signed by the landowner and returned to the JPA (in a self-addressed, stamped envelope provided by the JPA to the landowner) if the landowner elects coverage under the JPA's Incidental Take Permits. A sample letter and Certificate of Inclusion are included in Appendix W of this Plan. If the landowner does not return the Certificate of Inclusion, the JPA will follow-up with the landowner until the JPA determines that the landowner accepts or declines the neighboring land protections. Certificates of Inclusion for lands identified for aggregate mining use by local general plans and meeting the requirements established in Section (A)(2)(F) shall be accepted by the JPA after landowners prepare or submit acceptable baseline biological surveys in accordance with Provision 3B, above. Pursuant to exception 2(G) Conversion of land use from an existing agricultural practice to one or more of the uses listed in Section 2(G), suspends neighboring land protections. The following land use activities require a discretionary entitlement pursuant to the San Joaquin County Code: wholesale nurseries, agricultural processing, farm labor camps, small animal raising, animal feeding and sales, or trucking facilities. When such a Conversion occurs, the local jurisdiction shall notify the JPA through an Advisory Agency letter during the environmental review process for the discretionary entitlement. In response, the JPA shall follow the same process described in this Section for notifying (including the preparation of an exhibit map) and certifying landowner participation in the neighboring land protections after mitigation for the discretionary entitlement has been completed for the wholesale nursery, agricultural processing use, farm labor camp, small animal raising use, animal feeding and sales use, or trucking facility. For those landowners already participating in the neighboring land protections program who undertake a Conversion of their existing land use to wholesale nurseries, agricultural processing, farm labor camps, small animal raising, animal feeding and sales, or trucking facilities , the JPA shall provide the same notification except that, in addition, the notification will explain any revisions to the existing neighboring land protections, include a revised the exhibit map for the neighboring land protections (if necessary) and include a revised Certificate of Inclusion for the neighboring landowner's signature.

Pursuant to exception 2(H) Conversion of Vernal Pool Grasslands or Other Waters of the United States to orchards and/or vineyards or other crops after the establishment of SJMSCP Preserves suspends neighboring land protections. When such a Conversion occurs, and a Section 404 Permit is required, the JPA shall keep in contact with the landowner and the agency issuing the Section 404 Permit to determine when the Section 404 Permit has been issued. In response to verification of issuance of the Section 404 Permit, the JPA shall follow the same process described in this Section for notifying (including the preparation of an exhibit map) and certifying landowner participation in the neighboring land protections after mitigation for the Section 404 Permit is completed. For those landowners already participating in the neighboring land protections program who undertake a Conversion of their existing land use to an orchard and/or vineyard or other crop which results in the Conversion of Vernal Pool Grasslands or Other Waters of the United States, the JPA shall provide the same notification except that, in addition, the notification will explain any revisions to the existing neighboring land protections, include a revised the exhibit map for the neighboring land protections (if necessary) and include a revised Certificate of Inclusion for the neighboring landowner's signature.

5. Record Keeping. The JPA shall maintain a record of all letters, return receipts and Certificates of Inclusion sent to neighboring landowners and all signed Certificates of Inclusion and return receipts returned by the landowners, and shall provide a map in each Annual Report (Section 5.9.1) depicting which lands are covered by neighboring land protections and which lands declined protection. The JPA shall retain all baseline biological surveys prepared by landowners seeking neighboring land protections for lands identified for aggregate mining use by local general plans and meeting the requirements established in Section (A)(2)(F).

6. Compliance with Local, State and Federal Regulations. Incidental Take authorized by these neighboring land provisions and the SJMSCP's associated state and federal permits is limited to Incidental Take that occurs on Agricultural Lands and lands identified for aggregate mining use by local general plans and meeting the requirements established in Section (A)(2)(F). Participating landowners retain their responsibility for compliance with other applicable federal, state, or local regulations.

7. Violations and Enforcement. If the JPA becomes aware of a violation or potential violation of the neighboring land protection provisions, the JPA shall determine whether there is a potential violation and, if appropriate, send a notice of potential non-compliance to the landowner and forward a copy of the notice to the U.S. Fish and Wildlife Service and the California Department of Fish and Game detailing the potential violation and including supporting documentation, if available. The notice shall

be in the form of a letter informing the landowner of the potential violation and identifying the steps necessary to remedy the potential violation. The letter shall also state that, if the landowner does not remedy the potential violation, he or she will no longer be protected by the terms of the neighboring land provisions and may be subject to enforcement actions from the U.S. Fish and Wildlife Service pursuant to Section 9 of the Endangered Species Act (ESA) and from the California Department of Fish and Game pursuant to Section 2080 of the California Endangered Species Act (CESA). Nothing in this paragraph restricts or otherwise limits independent investigation by the USFWS of suspected or alleged unauthorized violations of the ESA.

8. <u>Revisions.</u> Neighboring land protection provisions may be revised through the SJMSCP's Minor Revision process (see Section 8.8.3), as necessary, as new options are made available (e.g., alternative options may become available through adoption and/or implementation of new legislation or alternative methods as may be proven effective in other plans).

9. <u>Extending Neighboring Land Protections After Expiration of the SJMSCP Permits.</u> The JPA is responsible for establishing a long-term program to extend neighboring land protections past the 50-year term of the SJMSCP Permits. It is the intent of the JPA that neighboring land protections shall exist for so long as SJMSCP Preserves exist (i.e., in perpetuity).

   In establishing this program, the JPA shall consider: 1) extending the SJMSCP Permits as provided in Section 8.3; 2) existing programs including California's SB231 (Fish and Game Code Section 2086, et seq.) addressing the accidental take of species in the course of agricultural activities, 3) pursuing legislation at the state and federal levels to provide neighboring land protections past the expiration of the SJMSCP Permits; and/or 4) other options as may be identified by the JPA, TAC, or other stakeholders. The option(s) selected by the JPA shall provide a permanent solution for addressing the extension of neighboring land protections past the expiration of the SJMSCP Permits.

   The JPA shall commence pursing legislation and all other available options no later than 6 months after the SJMSCP's Effective Date. To ensure the successful completion of this program, the following is required:

   I. No fee title acquisitions may be undertaken by the JPA until a mechanism for providing neighboring land protections past the expiration of SJMSCP Permits is in place so long as the JPA remains in compliance with all the elements of the SJMSCP , including funding and maintaining the Plan's overall conservation strategy except for the following circumstances: 1) the acceptance of gifted lands, 2) for reasons of biological necessity (defined as circumstances involving listed species of low distribution which require unique habitats) as determined by the JPA with the concurrence of the Permitting Agency representatives on the TAC (e.g., to acquire the last remaining riparian brush rabbit habitat); and 3) the acquisition of Preserve lands which do not border qualifying neighboring lands (e.g., are entirely surrounded by other public lands). Consistent with SJMSCP Section 7.5.2.4, should any funding shortfall occur as a result of this provision, the JPA shall recognize its responsibility for providing sufficient funding as necessary to meet its obligations pursuant to the SJMSCP and will use its authorities to correct funding shortfalls.

   II. The Technical Advisory Subcommittee (See Section 5.4.7.2 for composition of this

Subcommittee) shall evaluate, annually, whether the JPA has made sufficient progress in extending neighboring land protections past the expiration of the SJMSCP Permits as provided in this Section.

If the TAC Subcommittee determines that sufficient progress has been made by the JPA in extending neighboring land protections past the expiration of the SJMSCP Permits, then no further action is necessary until the next annual TAC Subcommittee meeting held pursuant to this section.

If the TAC Subcommittee determines that the JPA has failed to make sufficient progress in extending neighboring land protections past the expiration of the SJMSCP Permits the TAC Subcommittee shall forward its findings to the JPA.

If the JPA concurs with the findings of the TAC Subcommittee, then the JPA shall suspend acquisition of Preserves for a period determined by the TAC Subcommittee, but not to exceed 24 months, so long as the JPA remains in compliance with its requirements for Preserve acquisitions pursuant to Section 5.4.1.2. The JPA may resume Preserve acquisition activities any time during the suspension period after receiving a recommendation from the TAC Subcommittee and a finding by the JPA that the JPA has made/is making sufficient progress towards establishing neighboring land protections past the expiration of the SJMSCP Permits.

If, at the end of the Preserve acquisition suspension period established by the TAC Subcommittee, the TAC Subcommittee again finds that 1) insufficient progress has been made by the JPA towards extending neighboring land protections past the expiration of the SJMSCP Permits and 2) that there is no likelihood that the JPA will be able to make progress towards extending neighboring land protections past the expiration of the SJMSCP Permits; then the TAC subcommittee shall recommend to the JPA that the JPA complete acquisition of Preserves as necessary to fulfill its current obligations pursuant to the SJMSCP and thereafter suspend the SJMSCP program until and unless neighboring land protections can be secured past the expiration of the SJMSCP Permits.

In response to the recommendations of the above TAC Subcommittee, the JPA shall hold a properly-noticed public hearing to consider the recommendations of the TAC Subcommittee within 45 days of receiving the recommendations of the TAC Subcommittee. Notifications for the public hearing shall be distributed to those entities identified in Section 5.3.3.5(A)(2-4). If the JPA decides that termination of the SJMSCP Program is necessary, procedures for termination shall be carried out in compliance with Section 14.1 of the Implementation Agreement.

III. The TAC Subcommittee shall be responsible for reviewing the sufficiency and permanence of the solution(s) established in the preceding paragraphs. The recommendations of the TAC Subcommittee shall be forwarded to the JPA for their consideration. Prior to making a determination that a solution has been established for providing neighboring land protections, the JPA shall hold a properly-noticed public hearing. Notifications for the public hearing shall, at a minimum, be distributed to those entities identified in Section 5.3.3.5(A)(2-4).

IV. If:

- ! The SJMSCP Permits terminate before a solution for providing neighboring land protections past the expiration of the SJMSCP Permits has been found and

- ! An adverse disruption of routine and ongoing agricultural activities occurs on neighboring land to the detriment of the neighboring landowner as a result of an SJMSCP Preserve and due to the lack of neighboring land protections,

Then the JPA shall be responsible for relocating the SJMSCP Covered Species creating the impact on the neighboring land subject to the approval of the Permitting Agencies. This provision does not apply to neighboring lands which are currently protected by, or have declined participation in, an existing and ongoing neighboring land protection program as established pursuant to the SJMSCP.

10. Monitoring. Monitoring of the impacts associated with Neighboring Land Protections by the JPA, including provisions for adjusting the distribution and composition of mitigation Preserves provided to offset impacts associated with Neighboring Land Protections (see Section B, below) are established in SJMSCP Section 5.9.3.7.

B. Mitigation Provided by JPA for the Extension of Neighboring Land Protections.
The extension of neighboring land protections could result in Incidental Take or accidental loss of individuals of certain SJMSCP Covered Species on neighboring lands due to isolated deficiencies in the *SJMSCP GIS Database*, inability to enter neighboring lands prior to extending neighboring land protections, and due to the potentially wide range of some species. Based on these considerations, the potential for Incidental Take or accidental loss of individuals of SJMSCP Covered Species resulting from the extension of neighboring land protections would likely be limited to the following SJMSCP Covered Species in the following locations:

- ! Valley elderberry longhorn beetle in the *Primary Zone of the Delta*;

- ! Giant garter snake in the *Primary Zone of the Delta*; and

- ! Vernal pool vertebrates located primarily in the *Vernal Pool Zone* and in the *Southwest Zone* – in particular, the California tiger salamander;

- ! California horned lark in the *Vernal Pool Index Zone*;

- ! Northern harrier throughout the County;

- ! Pond turtle throughout the County; and

- ! Red-legged frogs in the *Southwest* and *Vernal Pool Index Zones*.

1. Mitigation - 600 Acres of Neighboring Land Preserves. Because some limited Take to or accidental loss of individuals of identifiable SJMSCP Covered Species may occur as a result

of extending neighboring land protections, the JPA shall provide the following mitigation intended to offset potential impacts to the Valley elderberry longhorn beetle, giant garter snake, California horned lark, northern harrier, red-legged frogs, pond turtle, vernal pool vertebrates and other SJMSCP Covered Species:

A. In addition to, and as part of, the Vernal Pool Preserves established pursuant to the SJMSCP to offset impacts from SJMSCP Permitted Activities listed in Section 8.2.1, incorporate 250 more acres of Vernal Pool Preserve. This additional Preserve acreage shall be established within the *Vernal Pool Zone* and shall be composed of existing vernal pools including enhancements which benefit the tiger salamander pursuant to the Preserve criteria established in Sections 5.4.4.3(B), 5.4.6.4(2-9) and 5.4.8.4(A) and targeting occupied habitat for the northern harrier and California horned lark as indicated in the *SJMSCP GIS Database*;

B. In addition to, and as part of, Preserves established pursuant to the SJMSCP to offset impacts from SJMSCP Permitted Activities listed in Section 8.2.1, incorporate 25 more acres of Valley elderberry longhorn beetle (VELB) habitat in the *Southwest Zone*, *Central Zone* or *Primary Zone of the Delta* pursuant to the criteria established in current USFWS VELB guidelines for planting elderberry and associated under story and the guidelines established in SJMSCP Sections 5.4.4.1(A)(A1)(5-8 and 10), 5.4.4.1(A)(A2)(3,5,6,&7), 5.4.4.2(C)(1,5 & 6), 5.4.4.4(A1)(8-10), 5.4.4.4(B)(7-9), 5.4.6.2(A)(4), 5.4.6.3(A)(2-4), 5.4.6.3(C)(2 & 3), 5.4.6.5(A)(2,7,10,11,13,14,18), 5.4.6.5(B)(3 & 6), 5.4.8.2(A), 5.4.8.3(C)(1-3,5,6), 5.4.8.5(A)(2-5, 10), and 5.4.8.5(B)(1,2,4,6);

C. In addition to, and as part of, Preserves established pursuant to Section 5.4.4.4(B) to offset impacts from SJMSCP Permitted Activities listed in Section 8.2.1, incorporate 150 more acres of giant garter snake Preserve. This additional Preserve acreage shall be established within the *Primary Zone of the Delta* or within the *Central Zone* near the *Primary Zone of the Delta* pursuant to the Preserve criteria established in Sections 5.4.4.4(B), 5.4.6.5(B) and 5.4.8.5(B);

D. In addition to, and as part of, Preserves established pursuant to Section 5.4.4.2(C) and 5.4.4.4(C) and to offset impacts from SJMSCP Permitted Activities listed in Section 8.2.1, incorporate 40 more acres of Preserve benefitting the pond turtle and red-legged frog. This additional Preserve acreage shall be established within the *Central Zone*, *Southwest Zone* or near the *Primary Zone of the Delta* pursuant to the Preserve criteria established in Sections 5.4.4.2(C), 5.4.4.4(C), 5.4.6.3(C), 5.4.6.5(C), 5.4.8.3(C), and 5.4.8.5(C); and

E. In addition to the 465 acres of Neighboring Land Preserves to be established above, allocate an additional 135 acres of Preserves. This contingency acreage shall be used for other species which may be identified over the life of the Plan as requiring mitigation to offset impacts associated with the extension of neighboring land protections. Preserve design for this contingency and targeted species shall be established through the SJMSCP's Adaptive Management Program by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC.

F. Preserves established to offset impacts associated with neighboring land protections shall be acquired, enhanced, managed and administered by the JPA and shall be funded pursuant to the SJMSCP Funding Plan included in Table 7.4-1 and as described in Section 7.4. Costs of acquiring, enhancing, managing and administering SJMSCP Neighboring Land Preserves have been calculated and are included in total cost estimates for the SJMSCP (see Table 7.2.5-2).

2. <u>Schedule for Establishing Neighboring Land Preserves.</u> Compensation acreages described above to offset potential impacts occurring from the provision of Neighboring Land Protections shall be established in conjunction with, and at approximately the same rate as, the establishment of SJMSCP Preserves provided to offset impacts from SJMSCP Permitted Activities listed in Section 8.2.1.

Except as otherwise provided in this paragraph, and so long as the provision of 600 acres of Neighboring Land mitigation lands are deemed sufficient to offset impacts to SJMSCP Covered Species by the Permitting Agencies, one additional acre of SJMSCP Preserve shall be created for every 167 acres of SJMSCP Preserve established. If the SJMSCP Monitoring Plan establishes that impacts to SJMSCP Covered Species on neighboring lands are less than anticipated pursuant to the monitoring process established in Section 5.9.3.7, the JPA, with the concurrence of the Permitting Agencies' representatives on the TAC may refine this compensation ratio. Pursuant to this provision, the JPA may refine the compensation ratio to no less than one acre of compensation for every 200 acres. If the SJMSCP Monitoring Plan establishes that impacts to SJMSCP Covered Species on neighboring lands are more than anticipated pursuant to the monitoring process established in Section 5.9.3.7, then a Major Amendment will be required as described below in paragraph 3.

In addition, the distribution and composition of the Preserves established to offset Neighboring Land Protections may be revised by the JPA with the concurrence of the Permitting Agencies' representatives on the TAC if the monitoring program established in Section 5.9.3.7 finds that impacts projected in Section C, below, are more or less than projected for a particular SJMSCP Covered Species (i.e., If monitoring finds that more Neighboring Lands are occupied or potentially occupied by VELB than are occupied or potentially occupied by Northern harriers, then more of the 600 acres of Neighboring Land Preserves may be established to benefit VELB and less acres would be acquired and enhanced to benefit Northern harriers).

Should the SJMSCP terminate prior to its 50-year term, Neighboring Land Preserves shall be established in proportion to the SJMSCP Preserves required at the date of Plan termination.

3. <u>Major Plan Amendment Contingency.</u> A Major Plan Amendment (Section 8.8.5) shall be required for the SJMSCP to extend Neighboring Land Protections to new parcels not already covered by Neighboring Land Protections should the SJMSCP Biological Monitoring Plan

identify the need for more than 600 acres of Neighboring Land Preserves to offset impacts resulting from neighboring land protections pursuant to the process established in Section 5.9.3.7.

C. Background

1. Establishing the Half-Mile Distance for Neighboring Land Protections

Landowner protections for the Incidental Take of SJMSCP Covered Species for a distance of one-half mile (2,640') from SJMSCP Preserves is based on buffers established to protect SJMSCP Covered Species from impacts of nearby land use activities (i.e., on neighboring lands) pursuant to the SJMSCP Biological Analysis and other plant, fish and wildlife management plans. Logically, these buffers, determined to be sufficient to protect SJMSCP Covered Species from impacts on neighboring lands should, conversely, protect neighboring lands from impacts associated with SJMSCP Covered Species.

Designated protection buffers for those SJMSCP Covered Species addressed in functioning plant, fish and/or wildlife management plans are:

SJMSCP Biological Analysis/SJMSCP Section 5.4.4

Roosting Mastiff bat	.2 mile (1,000')
California Red-legged Frog	.1 mile (600')
Southwest Zone grassland plant species	.1 mile (500')

Tuolumne County Wildlife Handbook - 1987[16]

All distances are maximum distances from active nests during nesting

Golden Eagle	.5 mile
Prairie falcon	.5 mile
Osprey	.5 mile
Rookeries (Great blue heron, Great egret)	.25 mile
Cooper's hawk	.25 mile
Sharp-shinned hawk	.25 mile
Northern harrier	.25 mile
Black-shouldered kite	.25 mile
Burrowing owl	.1 mile (600')
Yellow-breasted chat	.08 mile (200' both sides of riparian areas)
Double-crested cormorant	.06 mile (300')

16 Tuolumne County Wildlife Project, 1987; Prepared by Holton Associates -- Stephen L. Granholm, Ph.D. for the Tuolumne County Community Development Department; Adopted November 2, 1987 Tuolumne County Board of Supervisors Resolution #303-87.

The preceding represents a range of designated protection buffers ranging between .06 mile and .5 mile.

The largest protection buffer established in plant, fish, or wildlife management plans, .5 mile, was designated as the protection radius for neighboring land protections for the following reasons:

A. The protection of productive Agricultural Lands--both for the preservation of plants, fish and wildlife and San Joaquin County's economy--is an essential element of the SJMSCP. The adoption of the maximum .5 mile neighboring land protection radius will ensure the protection of agricultural uses within the County and may provide an incentive to landowners to maintain some existing natural lands within isolated portions of these Agricultural Lands in their natural state. In turn, this protection of agricultural uses in the County has, and will continue to, ensure the protection of both Open Spaces in San Joaquin County and the protection of SJMSCP Covered Species which rely on agricultural Open Spaces.

B. Of the established buffers, the largest buffers are assigned to birds, especially raptors. Of the 97 SJMSCP Covered Species 32%, more than any other species class, are birds. The most abundant SJMSCP Covered Species are, in fact, some of the raptor species which are estimated to occupy more than 500,000 acres of land in San Joaquin County--most of it Agricultural Land.[17] With this distribution, it is likely that at least one SJMSCP Covered Bird Species will occur on the majority of SJMSCP Preserves. Therefore, the adoption of the .5 mile radius for neighboring land protections is an accurate reflection both of the types of SJMSCP Covered Species expected to occur on SJMSCP Preserves and, therefore, the distance necessary to protect neighboring lands from potential impacts of SJMSCP Covered Species on SJMSCP Preserves.

2. <u>Establishing the Ten-Mile Distance for Incidental Take of Foraging Swainson's Hawks Neighboring Land Protections</u>

Landowner protections for the Incidental Take of foraging Swainson's hawk, for a distance of 10 miles from the boundaries of SJMSCP Preserves, is based on the following:

! Radio telemetry studies undertaken by the California Department of Fish and Game to "investigate the habitats, movements, and habitat-use relationships of the Swainson's hawk in the Central Valley" show that the Swainson's hawk forages up to 18 miles from its nest site (Estep, 1989).[18]

! The California Department of Fish and Game, relying on studies by Estep (see preceding

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17 SJMSCP Biological Analysis, Table 8-4.

18 Estep, J.A. 1989. Biology, movements and habitat relationships of the Swainson's hawk in the Central Valley of California, 1986-87. California Department of Fish and Game, Nongame Bird and Mammal Section Report. 53 pp. See pages 20-23 for telemetry findings.

footnote) and Babcock[19], have established guidelines for identifying and assessing impacts and developing mitigation to offset the impacts of development on the Swainson's hawk pursuant to the California Environmental Quality Act.[20] As stated on page 1 of these guidelines:

> *"This report also includes 'model' mitigation measures which have been judged consistent with polices, standards and legal mandates of the Legislature and Fish and Game Commission."*
>
> *"Implementation of mitigation measures consistent with this report are intended to help achieve the conservation goals for the Swainson's hawk and should complement multi-species habitat conservation planning efforts currently underway."*

! The California Department of Fish and Game guidelines establish a 10-mile foraging radius management zone extending from Swainson's hawk nests based upon the following, as stated on page 2 of the guidelines:

> *"The ten mile radius standard is the flight distance between active (and successful) nest sites and suitable foraging habitats as documented in telemetry studies (Estep 1989, Babcock 1993). Based on the ten mile foraging radius, new development projects which adversely modify nesting and/or foraging habitat should mitigate the project's impacts to the species. The ten mile foraging radius recognizes a need to strike a balance between the biological needs of reproducing pairs (including eggs and nestlings) and the economic benefit of development(s) consistent with Fish and Game Code Section 2053."*

In response to these guidelines, the California Department of Fish and Game requires mitigation for private development projects for impacts to Swainson's hawk foraging habitats located within 10 miles of active (defined in the study as those nests used during one or more of the last 5 years) Swainson's hawk nests. Based upon the California Department of Fish and Game's studies and practice, the SJMSCP planners conclude that the Swainson's hawk regularly and successfully use foraging habitat located within 10 miles of active Swainson's hawk nests. Therefore, it can be anticipated that Swainson's hawks which are attracted to and establish nests within SJMSCP Preserves, can be expected to forage a distance of up to 10 miles from SJMSCP Preserves which are managed for the Swainson's hawk. Therefore, neighboring land protections for Incidental Take

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19 Babcock, K.W. 1993. Home range and habitat analysis of Swainson's hawks in West Sacramento. Michael Brandman Associates report prepared for the Southport Property Owner's Group, City of West Sacramento, CA. 21 pp.

20 California Department of Fish and Game, Staff report regarding mitigation for impacts to Swainson's hawks (*Buteo swainsoni*) in the Central Valley of California, distributed to division chiefs and regional managers of the California Department of Fish and Game by Boyd Gibbons, November 8, 1994. 14 pps.

of foraging Swainson's hawks extend 10 miles from the boundaries of SJMSCP Preserves that are managed for the Swainson's hawk.

3. Evaluating Potential Impacts Associated with Neighboring Land Protections and Establishing Mitigation

TABLE 5.3-2
ESTIMATE OF MAXIMUM POTENTIAL ACREAGE PROVIDED NEIGHBORING LAND PROTECTIONS WITH A POTENTIAL FOR TAKE

Acres	Description
734,500	Total acres of Agricultural Lands in San Joaquin County = 721,500 acres Total acres mineral resource lands = 13,000 acres (10,000 maximum to be used in 50 years) Total lands with potential to receive neighboring land protections: 734,500 acres Source: *SJMSCP GIS Database* (i.e., mapped from aerial photos)
-110,754	At least two-thirds of the Primary Zone of the Delta located within San Joaquin County will not contain SJMSCP Preserves due to potential for levee breaks and flooding of Preserves (Section 5.4.4.) Therefore, neighboring land protections will not extend to lands in approximately two-thirds of the Delta due to the absence of Preserves. The Primary Zone of the Delta is 487,625 acres with 50,000 acres of waterways. 38% of the Primary Zone (185,298 acres) is in San Joaquin County. 185,298 acres, less 38% of the 50,000 acres of waterways (19,000 acres) equals 166,298 acres of lands in the Delta in San Joaquin County. At least two-third of the 166,298 acre of Delta in San Joaquin County, or 110,754 acres, excludes Preserves and is not subject to neighboring land protections. Source: *Land Use Plan and Resource Management Plan for the Primary Zone of the Delta*, Delta Protection Commission, February 23, 1995.
-147,107	Acreage of orchards and vineyards in San Joaquin County. This monoculture and associated clean farming practices will not support SJMSCP Covered Species. Therefore, take of SJMSCP Covered Species is not anticipated in orchards and vineyards.
-30,000	SJMSCP Preserves will not be established adjacent to urban fringes (approx. 1/2 mile radius from the urban boundaries established pursuant to local general plans) due to the high prices of these lands and because species on such Preserves could be adversely impacted by neighboring urban land uses. Therefore, these lands will not be subject to neighboring land use protections.
-100,841	Acreage of SJMSCP Preserves. Not subject to neighboring land protections.
345,798	Potential maximum acreage of land receiving neighboring land protections with a potential for take of SJMSCP Covered Species.

A maximum of 345,798 acres of land in San Joaquin County could receive neighboring land protections (regardless of the ultimate configuration of SJMSCP Preserves) also support activities which have a potential for take of SJMSCP Covered Species. These lands subject to neighboring land protections are primarily Agricultural Lands used for row and field crops and grasslands used for dryland grazing. Due to monoculture (the cultivation of semi-permanent crops such as orchards and vineyards) and associated clean farming practices (the use of pesticides and rodenticides, and the removal of habitat features, to exclude insects and plants or wildlife), an additional 147,107 acres of Agricultural Lands used for orchards and vineyards are eligible for neighboring land protections, but are not expected to support SJMSCP Covered Species.

To evaluate the potential level of Incidental Take occurring on up to 345,798 acres of neighboring lands, SJMSCP Planners first evaluated the nature of impacts occurring on these neighboring lands. Planners concluded that the scope and character of take on neighboring lands resulting from agricultural activities (e.g., planting and harvesting of row and field crops and cattle grazing) is distinctly different from Incidental Take occurring on property as a result of SJMSCP Permitted Activities. Specifically, Take occurring as a result of SJMSCP Permitted Activities (i.e., primarily urban development) generally erases most or all habitat values with minimal or no Open Space remaining.

In contrast, agricultural activities on neighboring lands encourages habitation by, and preserves Open Spaces for, many of the SJMSCP Covered Species. The majority of SJMSCP Covered Species in San Joaquin County occupy and depend on Agricultural Lands and the agricultural activities occurring on those lands.

For example, the Swainson's hawk relies heavily on certain row and field crops (e.g., alfalfa, hay, tomatoes, beets) which encourage insects and rodents and provide the primary food source for this SJMSCP Covered Species during nesting. Later, discing these fields scatters insects and injures rodents to provide additional food for the Swainson's hawk which is frequently found following tractors as seasonal crops are plowed back into the soil. Northern harriers and white-tailed kites are also found foraging along with the Swainson's hawk. Later, wheat and similar crops are flooded to avoid burning and to assist in returning organic matter to soils. Migrating waterfowl along the Pacific Flyway and resident waterfowl, including the Aleutian Canada goose, white-faced ibis, greater sandhill crane, and snowy egret, flock to these flooded field by the hundreds and sometimes thousands to rest and refuel. Irrigation of row and field crops, accomplished through a system of permanent man-made ditches, provides habitat for the giant garter snake. Northern harrier, merlin, ferruginous hawks and prairie falcon are often found foraging on open grasslands used for grazing cattle. California horned lark, loggerhead shrike, burrowing owl, golden eagle, San Joaquin kit fox, San Joaquin whipsnake, California horned lizard and approximately seven SJMSCP Covered Plants also occupy these lands side-by-side with grazing cattle. The long-billed curlew has also been seen to frequent these lands as well as row and field crops. The preservation of dryland grazing lands in San Joaquin County also preserves Open Space occupied by vernal pools--especially in eastern San Joaquin County. The maintenance of these vernal pools as Open Space as a result of agricultural use, rather than the Conversion of these Open Spaces to urban uses, preserves habitat for the California tiger salamander, spadefoot toad, succulent owl's clover, Bogg's Lake hedge hyssop, bristly sedge, vernal pool fairy shrimp and multiple other SJMSCP Covered Species.

In short, unlike Permitted Activities, which adversely affect plants, fish, or wildlife, the use and management of Agricultural Lands within San Joaquin County complements the plant, fish and wildlife conservation strategy in the SJMSCP. 345,798 of the 492,905 acres of neighboring lands which could potentially qualify for neighboring land protections would also qualify as SJMSCP Preserve lands with minor changes to existing agricultural practices (e.g., primarily the addition of enhancements such as added fencing around vernal pools, planting additional vegetation within riparian corridors and establishing hedgerows).

Because the use and management of Agricultural Lands is largely beneficial to Covered Species, the potential for take on Agricultural Lands neighboring SJMSCP Preserves is evaluated differently than take resulting from Permitted Activities. Take resulting from Permitted Activities and the Conversion of Open Space habitats to non-Open Space use are measured in the SJMSCP in terms of acres of Converted habitat. Conversely, take potentially resulting from agricultural activities occurring on neighboring lands, is measured by identifying and evaluating the specific activities that are likely to be undertaken on neighboring lands and by assessing and quantifying the impacts of those activities on SJMSCP Covered Species. To accomplish this, SJMSCP Planners first evaluated the nature of activities which are undertaken on neighboring lands which might result in take of SJMSCP Covered Species, then identified those SJMSCP Covered Species which might be subject to Incidental Take as a result of these activities. Then, the potential for neighboring land protections to minimize and mitigate Incidental Take of SJMSCP Covered Species on neighboring lands was compared with the potential negative impacts to determine the nature of the overall effect of neighboring land protections on SJMSCP Covered Species. Finally, where appropriate, mitigation to compensate for identified impacts was established.

Despite the overall benefits of most agricultural practices to SJMSCP Covered Species in San Joaquin County, SJMSCP Planners carefully evaluated existing agricultural practices associated with row and field crop agriculture and dryland grazing to determine how or if Incidental Take of SJMSCP Covered Species could occur and, if so, from what specific activities. Planners concluded that the following agricultural practices--all of which currently occur on neighboring lands in San Joaquin County--could result in Incidental Take of SJMSCP Covered Species:

- ! <u>Vegetation removal.</u> This activity may eliminate potential or occupied habitat for SJMSCP Covered Species;
- ! <u>Vegetation trampling by cattle.</u> This activity may degrade potential or occupied habitat for SJMSCP Covered Species;
- ! <u>Discing and plowing, operations of vehicles and machinery.</u> This activity may disturb potential or occupied habitat for SJMSCP Covered Species and may kill or injure individuals;
- ! <u>Conversion of vernal pool grasslands.</u> This activity is normally undertaken during land preparation for orchards and vineyards and may remove potential or occupied habitat for SJMSCP Covered Species; and
- ! <u>Conversion to intensive agricultural uses.</u> This activity normally Converts row and field crop-type uses to intensive uses requiring permanent removal of vegetation (e.g., dairies, nurseries, feed lots, processing plants) which may remove potential or occupied habitat for SJMSCP Covered Species.
- ! <u>Maintenance of stock ponds and livestock water pipelines.</u> This activity may temporarily eliminate potential or occupied habitat and kill or injure individuals.

Next, SJMSCP Planners evaluated the habits and distribution of each of the SJMSCP Covered Species to determine which SJMSCP Covered Species are vulnerable to Incidental Take on neighboring lands due to these identified activities. Planners determined that:

! Invertebrates. The SJMSCP Covered fairy and tadpole shrimp are confined to their vernal pools and wetland habitats. Distribution of these species in San Joaquin County is accomplished primarily by waterfowl moving between vernal pools. Therefore, Incidental Take of these species requires the destruction, or fill, of vernal pools on neighboring lands. However, destruction or fill of vernal pools is excepted from neighboring land protections and, therefore, Incidental Take of these species resulting from the extension of neighboring land protections is not anticipated. Similarly, the curved-foot diving beetle is confined to its wetland habitat and Incidental Take of this species would require the destruction, or fill, of wetlands on neighboring lands. Again, destruction or fill of jurisdictional wetlands are excepted from neighboring land protections and, therefore, Incidental Take of this species resulting from the extension of neighboring land protections is not anticipated.

The Ciervo aegilian scarab beetle occupies sand dune habitat. No such habitat exists on lands which might qualify for neighboring land protections. Therefore Incidental Take of this species is not anticipated as a result of extending neighboring land protections.

There are no known occurrences of either the moestan or molestan blister beetles in San Joaquin County. Therefore, the potential take of these species on neighboring lands is not anticipated.

The distribution of the Valley elderberry longhorn beetle is well-documented along the San Joaquin County's rivers. While pre-existing (i.e., on neighboring lands prior to the establishment of SJMSCP Preserves) individuals and populations of this species along County rivers are excepted from neighboring land protections, data establishing distribution of this species in the Primary Zone of the Delta is sparse. Therefore, the potential exists for some take of this species in the Primary Zone of the Delta on neighboring lands should vegetation removal occur on neighboring lands as part of ongoing agricultural practices.

! Fish. Fish are excepted from neighboring land protections, therefore Incidental Take of fish resulting from the extension of neighboring land protections is not anticipated.

! Plants SJMSCP Covered Plant Species occurring in the *Vernal Pool Zone* (e.g., succulent owl's clover, Boggs Lake hedge-hyssop, legenere, Hoover's calycadenia, bristly sedge and Red Bluff dwarf rush) are closely associated with the boundary between the wetted surface area and the upland grasslands associated with vernal pools. Like the fairy and tadpole shrimp, these species are largely confined to their vernal pools and wetland habitats. Therefore, Incidental Take of these species requires the destruction, or fill, of vernal pools on neighboring lands. As noted, destruction and/or fill of vernal pools is excepted from neighboring land protections and, therefore, Incidental Take of these species resulting from the extension of neighboring land protections is not anticipated. Because of their extreme rarity, however, the SJMSCP neighboring land protections except Greene's tuctoria (currently unknown in the County), legenere, and succulent owl's clover from protections if these species are found on SJMSCP Preserves lands near neighboring lands prior to the extension of neighboring land protections. The JPA will undertake, at its own expense, surveys of neighboring lands to establish the absence of these species as necessary to extend neighboring land protections, if requested and approved by the landowner.

SJMSCP Covered Plant Species occurring in the *Central Zone* are the slough thistle and the Delta button celery. Cattle-grazing does not occur in this zone which is primarily characterized by the planting and harvesting of row and field crops. These two species are normally found along riparian corridors located outside of boundaries used for the planting and harvesting of row and field crops. While take of these species on neighboring lands is not anticipated, because of their extreme rarity, , the SJMSCP neighboring land protections except these two species from protections if these species are found on SJMSCP Preserves lands near neighboring lands prior to the extension of neighboring land protections. The JPA will undertake, at its own expense, surveys of neighboring lands to establish the absence of these species as necessary to extend neighboring land protections, if requested and approved by the landowner.

SJMSCP Covered Plant species occurring in the *Primary Zone of the Delta* (e.g., Suisun marsh aster, California hibiscus, Delta tule pea, Mason's lilaeopsis, Delta mudwort and Sanford's arrowhead) are well-documented in the *SJMSCP GIS Database* with 599 occurrence records gathered through extensive state and federally-funded studies of the Delta in recent years. Pre-existing (i.e., on neighboring lands prior to the establishment of SJMSCP Preserves) individuals and populations of these species are excepted from neighboring land protections. Because of the extensive knowledge of their distribution, Incidental Take of Suisun marsh aster, California hibiscus, Delta tule pea, Mason's lilaeopsis, Delta mudwort and Sanford's arrowhead on neighboring lands is not anticipated. While take of Sanford's arrowhead on neighboring lands is not anticipated, because of its extreme rarity, the SJMSCP neighboring land protections except this species from protections if these species are found on SJMSCP Preserves lands near neighboring lands prior to the extension of neighboring land protections. The JPA will undertake, at its own expense, surveys of neighboring lands to establish the absence of this species as necessary to extend neighboring land protections, if requested and approved by the landowner.

SJMSCP Covered Plant Species occurring in the *Southwest Zone* (e.g., large-flowered fiddleneck, hospital canyon larkspur, showy madia, recurved larkspur, alkali milk-vetch, brittlescale, Mt. Hamilton coreopsis, diamond-petaled California poppy, mad-dog skullcap, Wright's trichochoronis, heartscale, brittlescale and caper-fruited tropidocarpum) are primarily associated with grasslands where the primary agricultural activity is cattle-grazing. There are no known occurrences of alkali milk vetch, heartscale, brittlescale, Mt. Hamilton coreopsis, recurved larkspur, showy madia, mad-dog skull cap and wright's trichochoronis and only one occurrence of hospital canyon larkspur (which would be included within Preserve boundaries) in the County. Therefore, no Incidental Take of these species on neighboring lands is anticipated. All known locations of diamond-petaled poppy occur on federally-owned lands (Lawrence Livermore Lab Site #300) outside of the jurisdiction of the SJMSCP. The remaining plant species have continued to persist in relative harmony with cattle grazing, therefore, take of these species is not anticipated on neighboring lands. Because of their extreme rarity, however, the SJMSCP neighboring land protections except large-flowered fiddleneck, , diamond-petaled poppy, showy madia, Hospital Canyon Larkspur from protections if these species are found on SJMSCP Preserves lands near neighboring lands prior to the establishment of SJMSCP Preserves. The JPA will undertake, at its own expense, surveys of neighboring lands to establish the absence of these species as necessary to extend neighboring land protections, if requested and approved by the landowner.

- <u>Mammals</u> The distribution of the San Joaquin kit fox is well-documented in the *SJMSCP GIS Database* within the *Southwest Zone*. However, this species can travel quickly over many miles and could wander from SJMSCP Preserves through neighboring lands as it travels the corridor between its northernmost and southernmost population centers located outside of San Joaquin County. Because cattle-grazing is the primary agricultural activity on these neighboring lands and the kit fox currently co-exists successfully with cattle in the *Southwest Zone*, Incidental Take of the San Joaquin kit fox due to cattle-grazing activities in this zone is not anticipated. However, given the limited numbers of San Joaquin kit fox, the SJMSCP errs on the side of caution and excepts grasslands in the *Southwest Zone* located along the San Joaquin kit fox corridor from neighboring land protections.

  The red bat, small-footed myotis, long-eared myotis, fringed myotis, long-legged myotis, Yuma myotis, greater western mastiff bat, pale big-eared bat and Pacific western big-eared bat are also highly mobile and can easily fly away to safety when faced with plows, discs, cows or vegetation-disturbing activities undertaken on neighboring lands. Colonial roosting sites and nurseries for these species are located out of harm's way (i.e., are not located on the ground) where they might be susceptible to destruction from plows and discs or cattle during agricultural activities occurring on neighboring lands. Therefore, Incidental Take of the SJMSCP Covered Bat Species on neighboring lands is not anticipated.

  Badgers are confined to the *Southwest Zone* where they currently co-exist with cattle-grazing activities with no known adverse effect. Therefore, Incidental Take of the badger on neighboring lands is not anticipated. Finally, the Berkeley kangaroo rat also occupies the *Southwest Zone* grasslands side-by-side with cattle. The single known occurrence of take of this species occurred as a result of a road kill. Therefore, Incidental Take of this species on neighboring cattle-grazing lands is not anticipated.

  Ringtail cats primarily inhabit riparian areas and brushy or wooded areas. Row and field crops are generally grown outside of these areas. Although some limited cattle grazing might occur in grasslands associated with wooded areas, cattle are not known to pose a threat to this highly mobile species. The agricultural activity most likely to impact this species is the clearing of vegetation for an intensive agricultural use such as establishing a nursery. Such activities (i.e., Conversions of lands to nurseries) are excepted from neighboring land protections pursuant to the definition of routine and ongoing agricultural activities (see Chapter 10). Therefore, Incidental Take of this species is not anticipated.

  The known occupied habitat for the riparian brush rabbit is Caswell State Park near Ripon and near Stewart Tract. The riparian woodrat is known from Caswell Park and a second location on the Stanislaus River. Should the JPA acquire Preserve lands for either of these species, it would likely include those lands occupied by the riparian woodrat or riparian brush rabbit . These two species require a relatively narrow list of habitat types that are not well-distributed in the county. It is likely that the two species already would either already occupy neighboring lands or would be unlikely to occupy the neighboring lands due to a lack of preferred habitat on adjacent lands. Therefore, Take of these species is not anticipated.

! <u>Birds</u> The majority of SJMSCP Covered Bird Species are highly mobile and can easily escape plows and discs and relocate to Preserves or other nearby lands in the face of discing, plowing, cattle, or vegetation-disturbing activities undertaken on neighboring lands. This mobility protects most of the SJMSCP Covered Bird Species except for those SJMSCP Covered Bird Species which are ground nesters. These species include burrowing owls (which nest in ground cavities), California horned larks and northern harriers (both of which are always or sometimes ground nesters). Burrowing owls currently nest successfully in the presence of cattle as demonstrated in the eastern grasslands of Joaquin County. However, plowing necessary to plant row crops normally eliminates many potential burrowing owls nesting cavities within those portions of neighboring lands which would be subject to plowing or discing, therefore Incidental Take of this species is not anticipated.

Northern harriers and California horned larks also may establish nests on the ground. Unlike burrowing owls, however, northern harriers and horned larks might establish nests within row and field crops or above-ground within the midst of grazing cattle. Hence, nests for this species could be destroyed by normal discing and plowing practices or by cattle grazing. Therefore, some loss of individuals of these two species is anticipated on neighboring lands as a result of agricultural practices on neighboring lands. This loss of individuals is very limited and currently occurs on agricultural lands as a result of existing agricultural practices. It is important to note that this loss of individuals occurs accidently and will continue to occur accidently on neighboring lands with or without the provision of neighboring land protections. However, with neighboring land protections, compensation to offset this accidental loss of individuals will be provided.

Remaining SJMSCP Covered Bird Species fall into three general categories: 1) Those which do not nest in San Joaquin County (e.g., Aleutian Canada goose, snowy egret); 2) Those located in Delta where neighboring lands are open waterways which are not subject to neighboring land protections (e.g., California black rail); or 3) SJMSCP Covered Bird Species have well-documented nesting locations within the *SJMSCP GIS Database* (e.g., Swainson's hawk, egret and heron rookeries). Since pre-existing (i.e., on neighboring lands prior to the establishment of SJMSCP Preserves) individuals and populations of this species are excepted from neighboring land protections, Incidental Take of those species with well-documented nest locations is not anticipated.

! <u>Reptiles.</u> As with the Berkeley Kangaroo rat, the San Joaquin whipsnake and California horned lizard also occupy the *Southwest Zone* grasslands side-by-side with cattle without identified impacts. Therefore, Incidental Take of these species on neighboring cattle-grazing lands is not anticipated.

Giant garter snakes primarily inhabit ditches within flooded fields. The snake may leave ditches and enter row and field crops and may be killed or injured during discing and plowing operations. However, the known occupation site for these species are quite small and the extension of neighboring land protections within the known occupation site is prohibited. Therefore, Incidental Take of this species is possible on neighboring lands, however, that Take is anticipated to be confined to potential habitat for the species.

Pond turtles may leave riparian habitats and venture into upland grasslands, especially for egg-laying. Therefore, some take of this species due to trampling by cattle is possible on neighboring lands.

- Amphibians. The California tiger salamander may range into uplands up to 3,000 feet from wetland habitats and may exist throughout the County. Given the limited mobility of this species to escape moving vehicles or equipment, or cattle, and the vulnerability of eggs and larvae to dewatering of aquatic habitat, there is a potential for take of this species on neighboring lands.

  The spadefoot toad also may be susceptible to trampling cattle as it ventures outside of vernal pool habitats into upland grasslands. However, because there are only two known occupation sites for this species, both of which are anticipated to become part of large SJMSCP Preserves (300 acres) with significant buffers, it is unlikely that neighboring lands will ever host this species. Therefore, Incidental Take of this species not anticipated on neighboring lands.

  Like the spadefoot, take of yellow-legged frogs due to trampling by cattle is possible, but the yellow-legged frog exists in only three known locations in the County. Again, it is anticipated that these locations will become part of 320-acre Preserves established for the San Joaquin kit fox within the Southwest Zone. Therefore, the likelihood of these species venturing onto neighboring lands is so minimal as to be nearly non-existent and take of this species on neighboring lands is not anticipated.

  Finally, red-legged frogs are also of limited distribution in the County and potentially subject to trampling by cattle on neighboring lands. However, unlike the yellow-legged frog and spadefoot, these species may occur on linear Preserves that, while provided with minimum 600-foot buffers, lack the extensive hundred-acre buffers that protect yellow-legs and spadefoots. Therefore, some Incidental Take of this species, known to travel up to 1,000 feet from wetlands, is possible on neighboring lands.

In summary, planners found the potential for limited Incidental Take or accidental loss of individuals of the following SJMSCP Covered Species on neighboring lands primarily due to trampling by cattle with some accidental loss of individuals resulting from operation of vehicles and machinery : California tiger salamander, red-legged frog, valley elderberry longhorn beetle, giant garter snake (potential habitat), pond turtle, northern harrier, and the California horned lark. An evaluation of the potential levels of Incidental Take or accidental loss of individuals which might occur to these species finds (all estimates are for the life of the SJMSCP unless otherwise specified):

- Valley elderberry longhorn beetle (VELB). Take of this species on neighboring lands is anticipated only in the Primary Zone of the Delta. However, SJMSCP Preserves will not be established on at least two-thirds of lands in the Primary Zone of the Delta. In addition, activities which could potentially impact this species (e.g., removal of riparian vegetation for planting row and field crops) are unnecessary for many agricultural practices undertaken on lands in the Delta since such activities may undermine levees and create the threat of flooding. Some limited removal of elderberry shrubs could occur along ditches, canals, and levees for flood control, however, these are normally removed long before the elderberry shrubs achieve the 1" at ground level preferred by the Valley elderberry longhorn beetle–therefore, only limited Take is anticipated due to such activities. Given the limitations of Preserve activities in the Delta and that few elderberries would require removal to allow for planting and harvesting of row and field crops, it is estimated that perhaps 75 elderberry shrubs could be removed on neighboring lands and, given the rarity of the valley elderberry longhorn beetle and its preference for mature elderberries, it is estimated that one-third of these shrubs (25 shrubs) removed in the Primary Zone of the Delta may host the VELB.

- Tiger salamander. It is believed that the California tiger salamander may be one of the most widely distributed of the SJMSCP Covered Species in San Joaquin County. Its reliance on rodent burrows, however, make it less likely to occur on at least some farms which adopt clean farming practices which eliminates many rodents and, therefore, available burrows for this species within row and field crops, thereby reducing its potential for take within row and field crops. However, while Conversion of the wetland habitats of this species are excepted from neighboring land protections, within dryland grazing areas, this species still may be trampled by cattle grazing in and around vernal pools, be struck on roads by vehicles, killed or injured by operation of equipment during plowing or discing, or be killed by dewatering of stock ponds when eggs or larvae are present. This take may be reduced somewhat because the tiger salamander is likely to move outside of its wetland areas and into unprotected uplands mostly during the cooler night hours when both farmers and cattle may be less active. Given these considerations, it is estimated that 30-50 individuals of this species may be subject to Incidental Take on neighboring lands.

- Northern harrier. Based on reports of nest destruction received from time to time by the local Audubon Society, it is anticipated that between one and two nests are destroyed each year within the County accidentally due to existing agricultural practices. This same level of loss of nests is, therefore, anticipated to occur on neighboring lands.

- California horned lark. The horned lark favors nesting areas which have minimal or no grass. This is not the preferred location for cattle which favor "greener" pastures. This potentially contributes to protecting horned lark nests from trampling by cattle. Similarly, the horned lark is unlikely to favor planted crop lands with extensive vegetation. Instead, the species is more likely to find a barren area to scrape out a nesting site somewhat removed from the field's planting area. Given these limiting factors and the relatively limited distribution of this species in comparison to the northern harrier, it is estimated that no more than one dozen nests could be partially or wholly disturbed accidentally by cattle as a result of activities on neighboring lands.

- Red-legged frog. Analysis of the impacts to this species are based on on-going studies of the red-legged frog. These studies indicate that the species will venture into upland grasslands adjacent to wetland habitats up to 1,000 feet. The SJMSCP requires buffers of 600 feet consistent with the distances that the majority of red-legged frogs travel from wetlands areas (longer distances increase jeopardy of desiccation and other risks). Therefore, red-legged frogs face the potential to be trampled by grazing cattle for a distance of 400 feet around the perimeter of SJMSCP Preserves (the difference between the minimum buffer requirement for SJMSCP Preserves and the maximum known distance that these species can travel from occupation sites). Given the limited distribution of this species (eight occupied sites in the County) and that cattle are not widely prevalent in San Joaquin County, it is estimated that up to one dozen individuals of the species may both 1) travel more than 600 feet from their wetland habitats and outside of SJMSCP Preserves and 2) face trampling within the relatively narrow 400-foot boundary between Preserves and neighboring lands occupied by scattered cattle dispersed over hundreds of acres on neighboring lands.

- ! Pond turtle. The same evaluation pertaining to red-legged frogs also pertains to the pond turtle. However, this species is much more widely distributed than the red legged frog with nearly 37 occupation sites and 171 individual occurrences found in the *SJMSCP GIS Database*. In addition, trampling of these species by cattle, while it might be considered "harassment" of the individual, does not presume that this species will be killed or even injured. Due to its protective shell, many pond turtles which may be subject to trampling from cattle are likely to survive by drawing themselves into their shell. The trampling of the turtle's eggs by cattle, however, is more likely to result in take of this species. While an unlikely occurrence given the relatively few cattle in San Joaquin County, it is estimated that up to six turtle nests may be damaged by trampling.

- ! Giant garter snake. Given the limited distribution of this species in the County (only eight occupied sites) and prohibition of Take on known occupied habitat for the species when the species is present on neighboring lands prior to establishment of an SJMSCP Preserve, the requirements of the SJMSCP Preserve strategy to acquire occupied giant garter snake sites and the snake's relatively good mobility, injury to this species would have to occur as a result of a coincidence between the snake leaving an occupied ditch at the same time as the farmer is plowing a nearby field, or due to ground disturbance while snakes are hibernating during their inactive period. Given the rarity of this species, it is anticipated that Take of this species on neighboring lands will be limited to Take of potential habitat for the species with some limited kill of individuals.

Finally, SJMSCP Planners evaluated the potential benefits to SJMSCP Covered Species of extending neighboring land protections. In contrast to the preceding impacts, neighboring land protections are anticipated to result in improved habitat for all SJMSCP Covered Species due to the following:

- ! Neighboring land protections will encourage neighboring land enhancements for SJMSCP Covered Species. Many local landowners do not plant trees within riparian corridors or plant hedgerows, and are reluctant to forego the use of rodenticides and pesticides and to adopt similar plant, fish and wildlife-friendly practices that would provide habitat and food for SJMSCP Covered Species because they fear that attracting these species to their land will invite prosecution under the state and federal endangered species acts. These fears of prosecution and the economic hardship that would result if agricultural practices were prohibited reduce the use of plant, fish and wildlife-friendly practices by landowners who would otherwise like to attract and sustain plants, fish and wildlife on their land. With assurances against prosecution, it is anticipated that an increased number of local landowners will pursue these activities and enhance properties for SJMSCP Covered Species. SJMSCP Planners already have been approached by a local farmer to provide neighboring land protections for the primary purpose of allowing the farmer to enhance riparian vegetation on neighboring lands.

- Neighboring land protections remove perceived disincentives for maintaining existing habitats and foregoing destructive agricultural practices on neighboring lands. In addition to encouraging the creation or enhancement of plant, fish and wildlife habitat by landowners who wish to manage their land actively for plants, fish and wildlife, the landowner protection provisions will also assure other landowners that there is no need to remove or exclude plant, fish and wildlife habitat. Many landowners in San Joaquin County perceive the need to remove existing habitat (e.g., oak trees within fields, riparian vegetation, vernal pools) for SJMSCP Covered Species out of fear that the habitat will attract these species and create legal obstacles to the continuing operations of their farms pursuant to the state and federal endangered species acts. While these landowners may not wish to manage their lands actively to attract and sustain plants, fish and wildlife, they are likely to allow habitat within their land to remain and thrive if the perceived disincentive for doing so is removed.

In short, it is anticipated that neighboring land protections will remove the fear of prosecution for landowners, will encourage both active and passive management of neighboring lands for SJMSCP Covered Species and will result in a potential **increase** in habitat values on neighboring lands throughout the County.

Although the effects of agricultural practices on neighboring lands are balanced strongly in favor of protecting and encouraging the survival of SJMSCP Covered Species as a group, certain practices occurring on neighboring lands could result in Incidental Take or accidental loss of limited numbers of California tiger salamander, red-legged frog, valley elderberry longhorn beetle, giant garter snake (potential habitat), pond turtle, northern harrier, and the California horned lark. To offset the potential impacts to these species on neighboring lands, the SJMSCP requires the establishment of 600 acres of Preserves. This 600 acre total is adopted based on the minimum Preserve sizes established by the SJMSCP's Biological Analysis of species needs as necessary to support a population of those SJMSCP Covered Species which may be impacted by activities occurring on neighboring lands as follows:

- Valley elderberry longhorn beetle - 25 Acres. The SJMSCP requires the establishment of 25 Preserve acres to offset potential impacts to this species on neighboring lands. Section 5.4.4.1(A) establishes the Preserve size for riparian habitats in the Delta as 20 acres. With take estimated to be approximately 25 occupied elderberry shrubs, this total is increased slightly to 25 acres to provide compensation at the ratio of one acre of Preserve for every VELB-occupied elderberry shrub removed on neighboring lands.

- California tiger salamander, California horned lark, northern harrier - 250 Acres. Consistent with the habitat approach of the SJMSCP, the SJMSCP requires the establishment of 250 Preserve acres to offset potential impacts to these species on neighboring lands. Section 5.4.4.3(B) establishes the minimum Preserve acreage necessary to support a population mix including these species to be 250 acres.

- Giant garter snake and pond turtle - 150 Acres. Consistent with the habitat approach of the SJMSCP, the SJMSCP requires the establishment of 150 Preserve acres to offset potential impacts to these species on neighboring lands. Section 5.4.4.4(B) establishes the minimum

Preserve acreage necessary to support a population of this species mix to be 145 acres (2-3 miles with 400 foot buffer). The Preserve size of three miles was used in establishing this mitigation and the 145-acres is rounded up to require 150 acres of Preserve to offset potential impacts to these species occurring on neighboring lands.

! Red-legged frog and pond turtle - 40 Acres. The SJMSCP requires the establishment of 40 Preserve acres to offset potential impacts to this species on neighboring lands. Section 5.4.4.2(C) establishes the minimum Preserve acreage necessary to support a population this species to be 18 acres (.25 mile with a 600 foot buffer) and, pursuant to Section 5.4.4.4(C), up to 40 acres. Given the rarity of this species, the larger Preserve size of 40 acres is used to offset potential impacts to this species occurring on neighboring lands.

The required Preserve acreages for the preceding totals 465 acres. An additional 135 acres is included in the Plan to allow for increasing these compensation requirements if the monitoring plan established pursuant to Section 5.9.3.7 determines that impacts on neighboring lands are exceeding estimates or are having unanticipated effects on SJMSCP Covered Species.

D. Revisions to Neighboring Land Protection Provisions

The following changes to neighboring land protection provisions shall be accomplished through the minor amendment process described in Section 8.8.4 and require a public hearing:

Changes to Neighboring Land Protections with the potential to increase restrictions on routine and ongoing agricultural activities on neighboring lands or to reduce the level of protections afforded to neighboring lands pursuant to Section 5.3.3.4 as that Section is adopted on the Effective Date and excluding those changes listed in Section 8.8.3 (23-26). Plan amendments undertaken pursuant to this paragraph shall be approved or denied only after the JPA: 1) notifies the Permittee Cities allowing 30 days for the Permittee Cities to provide input; 2) notifies San Joaquin County (whether or not that entity is a Permittee) and allows 30 days for San Joaquin County to provide input; and 3) after the JPA holds a properly notice public hearing prior to taking a final action. Public hearing notices pursuant to this section shall be made at least 30 days in advance of the public hearing.

The following changes to neighboring land protection provisions shall be accomplished through the minor revisions process as established in Section 8.8.3.

! Modifying neighboring land protection exceptions (to extend neighboring land protection coverage to a neighboring land) based on biological survey data pursuant to Section 5.3.3.4,

! Establishing the contents/protocols for biological surveys undertaken to remove exceptions pursuant to neighboring land protections pursuant to Section 5.3.3.4 (to extend neighboring land protection coverage to a neighboring land),

! Establishing the need and Preserve design criteria for the 135 acres allocated for neighboring land protection Preserve lands pursuant to Section 5.3.3.4,

! Adjusting compensation ratios for neighboring land preserves from 1:167 (1 acre for every

167 acres of Preserves established) to not less than 1:200,

Neighboring land protection provisions, except as otherwise provided in paragraph (B)(3) above and within this Section, may be revised through the Adaptive Management Plan, as necessary and to the extent feasible, as new options are made available (e.g., alternative options may become available through adoption and/or implementation of new legislation or alternative methods as may be proven effective in other plans).

5.3.3.5 Notification of Non-Preserve Landowners/Interested Persons of New Preserve Acquisitions

A. In conjunction with JPA hearings to consider approval of new Preserve acquisitions, and in addition to the notification requirements described in Section 5.3.3.4(B) for neighboring land protections, the JPA shall:

1. Provide written notice to all landowners located within one-half (1/2) mile and extending to include an additional distance encompassing the next two parcels located outside of the 1/2 mile radius surrounding the proposed new SJMSCP Preserve site (i.e., all landowners with all or portions of parcels located within 1/2 mile of the proposed Preserve shall receive written notice **and** all parcels adjacent to the noticed parcels located within 1/2 mile shall receive notice **and** all parcels adjacent to the parcels adjacent to the 1/2 mile radius also shall receive written notification) of the proposed Preserve to be considered for acquisition at upcoming hearings; and

2. A notice shall be sent to the San Joaquin Farm Bureau, local jurisdictions and interested stakeholders as described in Section 5.4.1.4; and

3. Publish a public notice in a countywide circulation newspaper.

B. Notices shall include:

1. The Assessor's Parcel Numbers to be considered for addition to the SJMSCP Preserve System;

2. A general description of the parcel location sufficient for the general public to recognize the location of the proposed Preserve (normally an address or cross streets to be included);

3. The date, time and location of the hearing;

4. An address and deadline for submitting written comments for those unable to attend the hearing;

5. An address and phone number for obtaining additional information;

6. Bold lettering stating that parcel owners are responsible for providing notice to lessees of lands which may be affected by the JPA's decision.

C. Timing of Notifications shall be consistent with Sections 5.4.1.3 and 5.4.1.4.

5.3.3.6 Termination and Replacement of Easements by Preserve Landowners

The Preserve landowner may request that the JPA consider termination and replacement of a conservation easement on land within the SJMSCP Preserve system except for lands held by the California Department of Fish and Game which may be prevented by California law from undertaking such land exchanges. The JPA may approve a landowner's request for termination and replacement of an easement, subject to concurrence of the Permitting Agencies' representatives on the TAC, if:

1. The landowner provides a replacement easement of equivalent or better habitat value to the easement which is being terminated. The JPA shall determine, subject to the concurrence of the Permitting Agencies' representatives on the TAC, whether or not a replacement easement provides an equivalent or better habitat value to that of the easement being replaced; and

2. The replacement easement is obtained and recorded and a Preserve Management Plan is developed as discussed in SJMSCP Section 5.4.7.1, prior to termination of the existing easement.

The Permitting Agencies' representative on the TAC shall respond to the JPA's request for concurrence within 60 calendar days, to the maximum extent feasible, providing that the JPA submits sufficient documentation upon which the Permitting Agencies' representative on the TAC may base his or her decision.

Upon receiving concurrence from the Permitting Agencies' representatives on the TAC, the JPA may proceed with termination and replacement of an easement.

APPENDIX E

GUIDELINES FOR ASSESSING THE EFFECTS OF PROPOSED PROJECTS ON RARE, THREATENED, AND ENDANGERED PLANTS AND NATURAL COMMUNITIES

Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities

State of California
THE RESOURCES AGENCY
Department of Fish and Game
December 9, 1983
Revised May 8, 2000

The following recommendations are intended to help those who prepare and review environmental documents determine **when** a botanical survey is needed, **who** should be considered qualified to conduct such surveys, **how** field surveys should be conducted, and **what** information should be contained in the survey report. The Department may recommend that lead agencies not accept the results of surveys that are not conducted according to these guidelines.

1. Botanical surveys are conducted in order to determine the environmental effects of proposed projects on all rare, threatened, and endangered plants and plant communities. Rare, threatened, and endangered plants are not necessarily limited to those species which have been "listed" by state and federal agencies but should include any species that, based on all available data, can be shown to be rare, threatened, and/or endangered under the following definitions:

A species, subspecies, or variety of plant is "endangered" when the prospects of its survival and reproduction are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, or disease. A plant is "threatened" when it is likely to become endangered in the foreseeable future in the absence of protection measures. A plant is "rare" when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.

Rare natural communities are those communities that are of highly limited distribution. These communities may or may not contain rare, threatened, or endangered species. The most current version of the California Natural Diversity Database's List of California Terrestrial Natural Communities may be used as a guide to the names and status of communities.

2. It is appropriate to conduct a botanical field survey to determine if, or to the extent that, rare, threatened, or endangered plants will be affected by a proposed project when:

a. Natural vegetation occurs on the site, it is unknown if rare, threatened, or endangered plants or habitats occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
b. Rare plants have historically been identified on the project site, but adequate information for impact assessment is lacking.

3. Botanical consultants should possess the following qualifications:

a. Experience conducting floristic field surveys;
b. Knowledge of plant taxonomy and plant community ecology;
c. Familiarity with the plants of the area, including rare, threatened, and endangered species;
d. Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
e. Experience with analyzing impacts of development on native plant species and communities.

4. Field surveys should be conducted in a manner that will locate any rare, threatened, or endangered species that may be present. Specifically, rare, threatened, or endangered plant surveys should be:

a. Conducted in the field at the proper time of year when rare, threatened, or endangered species are both evident and identifiable. Usually, this is when the plants are flowering.

When rare, threatened, or endangered plants are known to occur in the type(s) of habitat present in the project area, nearby accessible occurrences of the plants (reference sites) should be observed to determine that the species are identifiable at the time of the survey.

b. Floristic in nature. A floristic survey requires that every plant observed be identified to the extent necessary to determine its rarity and listing status. In addition, a sufficient number of visits spaced throughout the growing season are necessary to accurately determine what plants exist on the site. In order to properly characterize the site and document the completeness of the survey, a complete list of plants observed on the site should be included in every botanical survey report.

c. Conducted in a manner that is consistent with conservation ethics. Collections (voucher specimens) of rare, threatened, or endangered species, or suspected rare, threatened, or endangered species should be made only when such actions would not jeopardize the continued existence of the population and in accordance with applicable state and federal permit requirements. A collecting permit from the Habitat Conservation Planning Branch of DFG is required for collection of state-listed plant species. Voucher specimens should be deposited at recognized public herbaria for future reference. Photography should be used to document plant identification and habitat whenever possible, but especially when the population cannot withstand collection of voucher specimens.

d. Conducted using systematic field techniques in all habitats of the site to ensure a thorough coverage of potential impact areas.

e. Well documented. When a rare, threatened, or endangered plant (or rare plant community) is located, a California Native Species (or Community) Field Survey Form or equivalent written form, accompanied by a copy of the appropriate portion of a 7.5 minute topographic map with the occurrence mapped, should be completed and submitted to the Natural Diversity Database. Locations may be best documented using global positioning systems (GPS) and presented in map and digital forms as these tools become more accessible.

5. Reports of botanical field surveys should be included in or with environmental assessments, negative declarations and mitigated negative declarations, Timber Harvesting Plans (THPs), EIR's, and EIS's, and should contain the following information:

a. Project description, including a detailed map of the project location and study area.
b. A written description of biological setting referencing the community nomenclature used and a vegetation map.
c. Detailed description of survey methodology.
d. Dates of field surveys and total person-hours spent on field surveys.
e. Results of field survey including detailed maps and specific location data for each plant population found. Investigators are encouraged to provide GPS data and maps documenting population boundaries.
f. An assessment of potential impacts. This should include a map showing the distribution of plants in relation to proposed activities.
g. Discussion of the significance of rare, threatened, or endangered plant populations in the project area considering nearby populations and total species distribution.
h. Recommended measures to avoid impacts.
i. A list of all plants observed on the project area. Plants should be identified to the taxonomic level necessary to determine whether or not they are rare, threatened or endangered.
j. Description of reference site(s) visited and phenological development of rare, threatened, or endangered plant(s).
k. Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms.
l. Name of field investigator(s).
m. References cited, persons contacted, herbaria visited, and the location of voucher specimens.

APPENDIX F

FISH RESCUE AND RELOCATION PLAN

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FISH RESCUE AND RELOCATION PLAN

Construction of the proposed Delta Water Supply Project (DWSP) intake facility and positive barrier fish screens would require construction of a temporary cofferdam and dewatering of an area approximately 6,000 square feet in the lower San Joaquin River. Construction of the cofferdam would allow dredging of the site and construction of the fish screens in the dry. The seasonal schedule for cofferdam installation is dependant on both river stage and permit constraints. Fish inhabiting the San Joaquin River, within the area where dewatering would occur, are vulnerable to stranding and loss. These fish species include juvenile Chinook salmon, steelhead, Delta smelt, and a variety of other resident and migratory species. As part of the proposed DWSP, a fish rescue and relocation effort would be performed, under the direct supervision of a qualified fisheries biologist, to remove and relocate fish from the area to be dewatered.

A sheet pile cofferdam would be constructed around the area to be dewatered. Portable pumps would be used to dewater the cofferdam area. The dewatering pumps would be used to reduce water depths within the cofferdam to a depth of approximately 1.5 to two feet to allow for fish rescue. The fish rescue would be performed by a team with four fisheries biologists and/or field technicians. Fish would be captured using a backpack electroshocker, 1/4-inch beach seine, and handheld dip nets. Fish collection efforts would continue within the area until multiple pass collections document depletion of the fish population. Immediately after collection, fish would be placed in aerated five gallon buckets and/or coolers filled with river water, identified and counted, and transported to a location outside of the cofferdam for release back into the lower San Joaquin River.

Specific efforts will be made to reduce collection and handling stress, minimize the time that fish are held in the buckets, and minimize handling stress during processing and release. Chemical additives may be used in the holding buckets to reduce potential bacterial infection. Salmonids and Delta smelt will be preferentially collected and released to further reduce handling time and stress.

After completion of the initial fish rescue effort, dewatering of the cofferdam would continue while two qualified fisheries biologists remain on-site to observe and monitor conditions within the dewatered area and capture and relocate any fish remaining within the area to be dewatered.

The fish rescue and relocation would be performed in accordance with standard terms and conditions of the California Department of Fish and Game (CDFG) scientific collection permit and requirements, if any. National Marine Fisheries Service (NOAA Fisheries) will be notified regarding the potential incidental collection of Chinook salmon and steelhead and U.S. Fish and Wildlife Service (USFWS) regarding incidental collection of Delta smelt under the Federal Endangered Species Act. The CDFG, NOAA Fisheries, and USFWS will be notified a minimum of 48 hours in advance of the fish rescue and relocation. Results of the rescue and relocation effort will be documented in a brief letter report submitted to the CDFG, NOAA Fisheries, and USFWS.