Section 3 Affected Environment & Environmental Consequences

This section identifies the potentially affected environment involved with the Proposed Action and No Action Alternatives in addition to environmental trends and conditions that currently exist.

3.1 Water Resources

3.1.1 Affected Environment

Surface Water

For the purposes of the effect analysis, baseline conditions are described as the existing environment, and the existing environment is defined as the conditions during the past five years. The five-year average allocation of CVP water supplies delivered to the water contractors is described in Table 3-1. It lists maximum deliveries of CVP water on a yearly basis for agriculture purposes from 2004 to 2008. The five-year average is 69 percent of contract amounts for agriculture. The annual contract amounts for the districts is 1,800,000 AF, thus the baseline supply is 1,368,000 AF.

As a result of the expected dry year, the 2009 water allocation for agricultural SOD contractors is anticipated to be zero. A refined allocations determination will be made in February and adjustments will continue to be made as the contract year progresses and the hydrology and pumping capabilities dictate.

5-YEAR CVP ALLOCATION PERCENTAGES	
Year	Percent Ag Allocation
2004	70
2005	85
2006	100
2007	50
2008	40
5-Year Average	69

Table 3-1 Average Allocation of Contract Amounts

CVP Facilities

The DMC, the second largest of the CVP waterways, was completed in 1951. It includes a combination of both concrete-lined and earth-lined sections and is about 117 miles in length. It carries water southeasterly from the Jones Pumping Plant, located near Tracy, California, into the DMC along the west side of the San Joaquin Valley for distribution to refuges, irrigation districts, and cities. The canal transports water to the Mendota Pool. The DMC is divided into the upper and lower portions. The dividing point is Check 13 near Santa Nella, California. Check 13 is the intake to the O'Neill Forebay and SLR which are connected to the SWP. Capacity in

the DMC is restricted by the physical limitations of the canal and the pumping limits of the Jones Pumping Plant (Reclamation 2007). The Mendota Pool is the terminus for the DMC (Check 21) and is located at the confluence of the SJR and the North Fork of the Kings River, approximately 50 miles west of the City of Fresno.

The DMC provides for the transport of water through the central portion of California's Central Valley and acts as a hub around which the CVP and SWP revolve. The DMC is part of the Delta Division facilities of the CVP. The Delta Division facilities transfer water from the Sacramento River to bolster irrigation supplies to lands formerly dependent on water from the SJR or groundwater. The facilities also provide for the transport of water through both the Sacramento-SJR and the San Francisco Bay-Delta Estuary and for the delivery of water to CVP and SWP contractors in the San Joaquin Valley and Southern California SWP contractors (Reclamation 2007).

Banta-Carbona Irrigation District Pre-1914 Water Rights Supplies and Diversion Location

BCID's primary supply of water is its pre-1914 water rights on the SJR. Historically, BCID has used all of its pre-1914 water rights in order to irrigate lands within the district. CVP water is used as a supplemental supply only when (1) peak demands require more water than can be pumped under BCID's pre-1914 rights, or (2) when low water levels in the SJR prevent BCID from pumping the water to which it is entitled under its pre-1914 rights.

BCID has engaged in an active water conservation effort to reduce water losses through evaporation in open ditches and water losses through seepage in unlined ditches and canals. BCID has lined 7.5 miles of canal with concrete and replaced 39 miles of open ditch with concrete pipe. BCID has estimated that these improvements have cut water losses through conveyance facilities from about 23 percent, resulting in approximately 8,250 AF of conserved water annually. Of the 8,250 AF saved from seepage and evaporation, 3,250 AF is used at peak delivery times to deliver water to crops that otherwise would not have been able to receive deliveries due to limited pumping capacity. The remaining 5,000 AF is water conserved at times other than at peak irrigation demand and hence is available for transfer at those times.

While BCID has consistently exercised its pre-1914 rights, over the years, it has begun decreasing water use as a result of the conservation efforts described above. These conservation actions have allowed BCID to reduce its pre-1914 diversions by 5,000 AF per year (AF/y). As allowed by federal, state, and local law, BCID's conserved water is deemed to have been beneficially used.

The SJR generally flows in a northward direction in the Proposed Action area and the screened BCID diversion canal extends from the river to the southwest approximately 6,000 feet to BCID Pumping Station #1. BCID uses a multiple lift system. An intake canal 1-¼ miles long brings water from the SJR (at mile post 67.5 left) to pump station #1 at Kasson Road.

Patterson Irrigation District

The lands served by PID have been continuously irrigated since the early 1900's. As a pre-1914 water rights holder PID has the authority and right under California law to divert what water is needed as long as it is put to beneficial use. The current Main Canal peak capacity is 200 cfs. The irrigation season for PID occurs from March through September. PID seldom diverts water from October through February.

PID receives water from the DMC to supplement their SJR pre-1914 right water supply. The DMC water supplies include a 6,000-AF delivery per year from a water rights settlement contract and a CVP water service contract for 16,500 AF/y. The total volume of 22,500 AF equates to a flow of approximately 50 cfs if the supply was received consistently from April through October; however, the actual quantities available to PID are dependent on annual rainfall totals. The supplemental supplies from the DMC are primarily used to blend with river diversion water to improve water quality during early crop stages as the canal water is of better quality than the river water. (Reclamation 2007).

Byron Bethany Irrigation District

The district's CVP water supply is for irrigation and M&I purposes; however, only a portion of the district's CVP supply is subject to Reclamation's M&I water shortage policy. Under agreements with the City of Tracy, the district provides raw water for treatment and final delivery back to lands within the district's boundaries. BBID's water needs are 10,000 AF.

West Stanislaus Irrigation District

WSID was formed in 1920; the first water delivers to the district were made in 1929. Water deliveries have increased form 12,000 AF the first year to a maximum of 113,000 AF in 1984. Water from the SJR is conveyed through a mile-long unlined gravity canal to the first pumping plant where water is lifted 35 feet into the concrete lined main canal. A total of six pumping plants lift water to an elevation of 165 feet above sea level. Water is diverted from the main canal to laterals that run north and south. In 1920, all water supply to the district was diverted from the SJR. After the construction of Friant Dam and the diversion of SJR water to the southern SJV, the quality of water diverted from SJR declined. Litigation from west-side riparian water districts resulted in the provision of federal water deliveries from the Delta to offset these water quality problems. In 1953, the district signed a contract for 20,000 AF of water, this was increased to 50,000 AF in 1976. WSID has diverted up to 66,000 AF from turnouts at mile 31.31 and 38.13 along the DMC.

San Joaquin River Exchange Contractors

The Exchange Contractors consist of CCID, Columbia Canal Company, Firebaugh Canal Water District, and San Luis Canal Company (Figure 3-1). The Exchange Contractors hold historic water rights to the SJR. Their service area is located on the west side of the SJR Valley. In exchange for the regulation and diversion of the SJR at Millerton Lake (Friant Division), Reclamation agreed to supply water to the Exchange Contractors from the CVP's Delta supply. The Exchange Contractors provide water delivery to over 240,000 acres of irrigable land on the west side of the SJV, spanning a distance roughly from the town of Mendota in the south to the town of Crows Landing in the north. Conveyance and delivery systems generally divert water from the CVP's DMC and Mendota Pool, convey water to customer delivery turnouts and at times discharge to tributaries of the SJR. Deliveries include conveyance of water to wildlife areas.

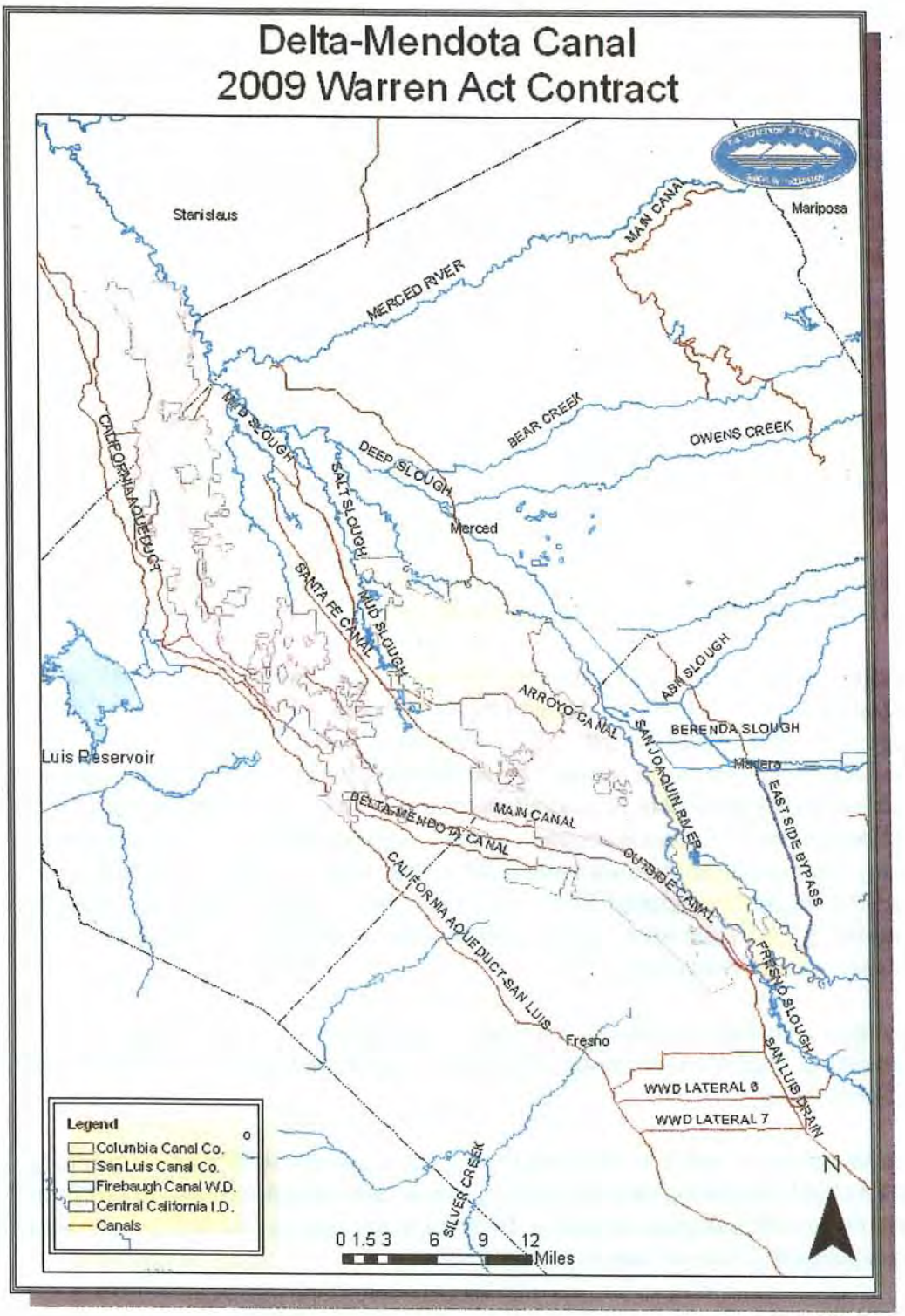

Figure 3-1 Exchange Contractors' Service Area

Mendota Pool

Mendota Pool is a re-regulating reservoir for more than 1 million AF of CVP water pumped from the Delta and delivered by the DMC. The Mendota Pool is impounded by Mendota Dam, which

is owned and operated by Central California Irrigation District (CCID). Currently, Mendota Pool is sustained by the inflow from the DMC, which typically conveys 2,500 to 3,000 cfs to the Mendota Pool during the irrigation season. SJR water is only conveyed to the Mendota Pool during periods of flood flow. Mendota Pool extends over 5 miles up the SJR Channel and over 10 miles into Fresno Slough and varies from less than one hundred to several hundred feet wide. Water depth varies but averages about 4 feet. Mendota Pool contains approximately 8,000 AF of water and has a surface area of approximately 2,000 acres when full. It is the largest body of ponded water in the San Joaquin Valley basin floor.

The Mendota Pool is located at the confluence of the SJR and Fresno Slough. The Mendota Pool receives water from the SJR, the Delta via the DMC, groundwater pumping from the Mendota Pool Pumpers, and intermittently from the Kings River drainage in the south via the James Bypass into Fresno Slough. Water from the Mendota Pool is diverted for a variety of agricultural, municipal, and habitat management uses. Mendota Wildlife Area (Mendota WA) receives water from the Mendota Pool via Fresno Slough, which is managed by CCID as a water conveyance facility. Gates and pumps divert water from Fresno Slough to Mendota WA.

In addition to Mendota WA, several CVP Settlement Contractors and San Joaquin River Exchange Contractors (Exchange Contractors) rely on Mendota Pool for water deliveries.

Water quality conditions in the Mendota Pool depend on inflows from the DMC, groundwater pumped into Mendota Pool by the Mendota Pool Group and, to a limited extent, SJR inflows (See Figure 3-2). Water quality in the SJR varies considerably along the river's length. Above Millerton Lake and downstream towards Mendota Pool, flows are infrequent, but the quality of water released from Friant Dam is generally excellent. The reach from Gravelly Ford to Mendota Pool (about 17 miles) is perennially dry except during flood control releases from Friant Dam. During the irrigation season, most of the water released from the Mendota Pool to the SJR and to irrigators is imported from the Delta via the DMC. This water has higher concentrations of TDS than water in the upper reaches of the SJR, and might be affected by runoff and seepage into the canal.

Panoche Creek, an ephemeral stream, also flows into Mendota Pool and, during high flows in the winter and spring, high concentrations of selenium have been brought into Mendota Pool via Panoche Creek flows.

An additional source of water in Mendota Pool is from adjacent land owners pumping well water into Mendota Pool and taking delivery of it in a more convenient location, at convenient timing (but within 60 days of pumping in) and at differing water quality. In 2007, these adjacent landowners pumped 7,423 AF into Mendota Pool.

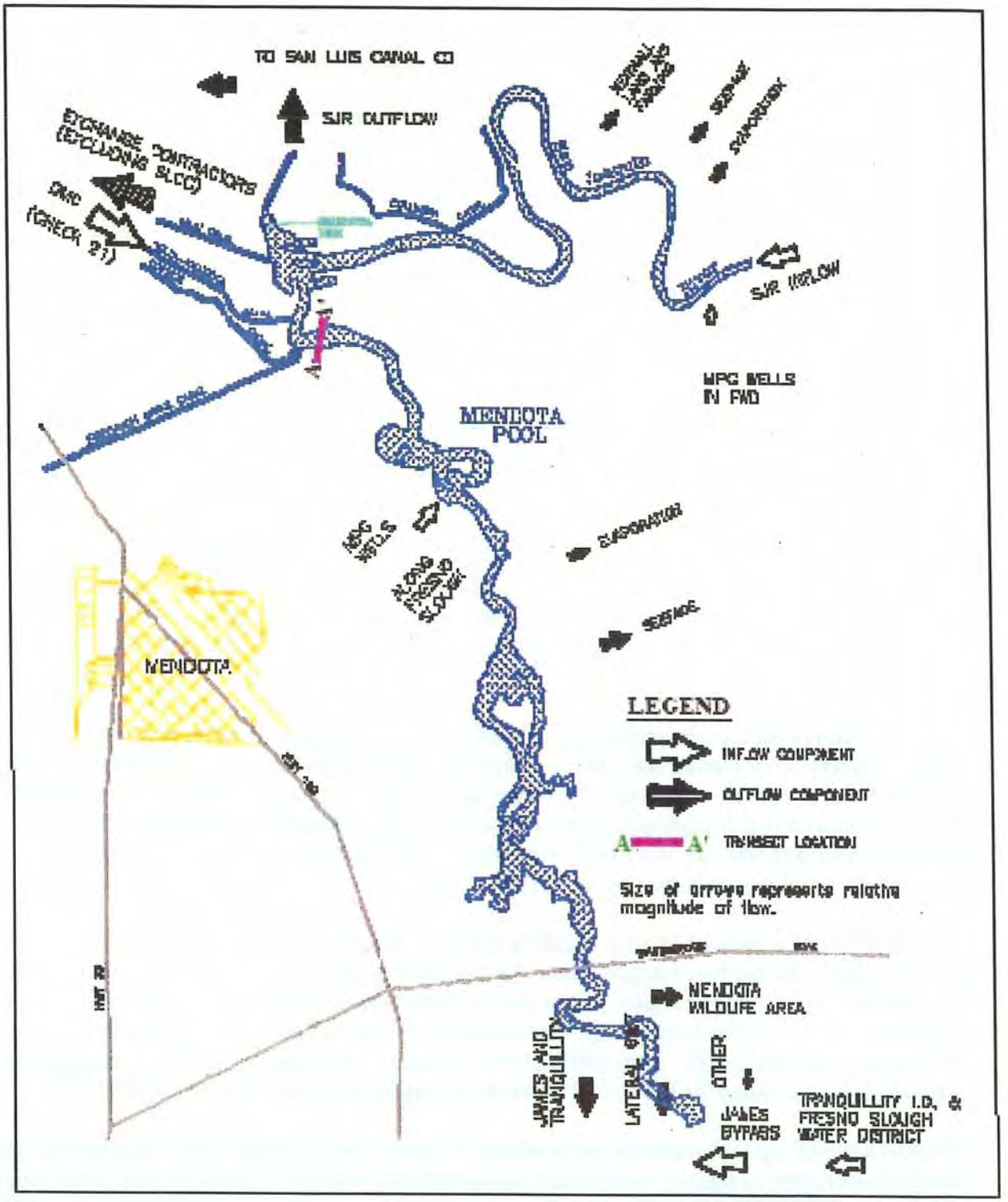

Figure 3-2 Mendota Pool

Groundwater Resources

Two primary hydrologic divisions of the San Joaquin Valley (SJV) are agreed upon by DWR, the State Board, and the U.S. Geological Survey: 1) the San Joaquin River Hydrologic Region

covering approximately 15,200 square miles and includes all of Calaveras, Tuolumne, Mariposa, Madera, San Joaquin, and Stanislaus counties, most of Merced and Amador counties, and parts of Alpine, Fresno, Alameda, Contra Costa, Sacramento, El Dorado, and San Benito counties; and 2) the Tulare Lake Hydrologic Region covering approximately 17,000 square miles and includes all of Kings and Tulare counties and most of Fresno and Kern counties (DWR 2003).

Groundwater quality conditions vary throughout the San Joaquin River Hydrologic Region. Salinity (expressed as TDS), boron, nitrates, arsenic, selenium, and mercury are parameters of concern for agricultural and municipal uses throughout the region. Of particular concern on the west side are TDS and selenium.

Groundwater zones commonly used along a portion of the western margin of the San Joaquin Valley have high concentrations of total dissolved solids, ranging from 500 mg/L to greater than 2,000 mg/L (Bertoldi et al. 1991). The concentrations in excess of 2,000 mg/L commonly occur above the Corcoran Clay layer. These high levels have impaired groundwater for irrigation and municipal uses in the western portion of the San Joaquin Valley.

High selenium concentrations in soils of the west side of the San Joaquin River Hydrologic Region are of great concern because of their potential to leach from the soil by subsurface irrigation return flow into the groundwater and into receiving surface waters. Selenium concentrations in shallow groundwater along the west side have been highest in the central and southern area south of Los Banos and Mendota with median concentrations of 10,000 to 11,000 micrograms per liter (Bertoldi et al. 1991).

Pumping, largely for crop irrigation has substantially affected groundwater in the San Joaquin Valley. Pumping has caused subsidence which has caused depressions to form and has altered regional groundwater flow patterns, recharge, and discharge. Annual groundwater pumping in the San Joaquin River Hydrologic Region exceeds recent estimates of perennial yield by approximately 200,000 AF. All of the sub-basins within the San Joaquin River Hydrologic Region have experienced some overdraft (DWR 2003).

According DWR Bulletin 118 (DWR 2003), groundwater provides approximately 30 percent of the total supply for the San Joaquin River Hydrologic Region. However, the amount of groundwater use within the region varies widely, both between different areas and from one year to the next. In WWD for example, groundwater has accounted for between 5 and 60 percent of total supply over the last 15 years, while in the Exchange Contractors' service area groundwater supplies have accounted for between 10 and 40 percent of the total over the last 10 years.

Much of the SJV aquifer system is in overdraft condition, although the extent of overdraft varies widely from region to region. In the San Joaquin Basin, overdraft conditions were estimated at approximately 224,000 AF, with groundwater pumping estimated at 3,520,000 AF under 1990 conditions. The Tulare Basin region has experienced a greater degree of overdraft, estimated at 630,000 AF, with groundwater pumping estimated at 5,190,000 AF for 1990 conditions. Groundwater pumping in the SJV varies seasonally. Most groundwater is withdrawn during the spring-summer growing season, although pumping in some areas may occur throughout the entire year. Currently, the Exchange Contractors are not in an overdraft condition with the exception of lands that lie in Madera County. No groundwater pumping for transfer would occur within Madera County.

In the southern region of the SJV, several conjunctive use projects are operating or are in proposal stages. The purposes of each project vary and include recharge of overdrafted basins using purchased surface water, cooperative banking concepts that rely on groundwater in dry years and surface water in wet years, and temporary storage of surface water entitlements for later withdrawal.

The western SJV region has drainage problems caused by shallow clay layers of low permeability that limit recharge to groundwater. In addition, elevated concentrations of salinity, selenium, and boron exist in the semi-perched aquifer zone due to leaching from naturally occurring saline deposits from the Coast Range and from accumulated salts in the root zones of irrigated cropland. The San Joaquin Valley Drainage Program, established in 1984, published its recommendations for managing the drainage problem in 1990 (SJVDP 1990), culminating in a Memorandum of Understanding (MOU) in 1991 that allows Federal and State agencies to coordinate activities for implementing the plan. East of the SJR, the valley is underlain by older sediments. The shallow groundwater quality is generally very good in this portion of the valley.

In the areas west of the SJR, unconfined groundwater generally flows from the southwest toward the northeast, although groundwater pumping and irrigation complicates and changes local flow directions with time. Aquifer response to pumping and irrigation is relatively rapid, resulting in local changes in groundwater flow direction as associated temporary cones of depression and recharge mounds form and dissipate.

The Groundwater Management Act of 1992 (AB 3030) applies to groundwater usage by the Exchange Contractors. This act establishes a voluntary program whereby local water agencies may establish programs for managing their groundwater resources. The Exchange Contractors adopted a Groundwater Management Plan in October 1997. (Exchange Contractors 1997). The plan commits the Exchange Contractors to keeping records of groundwater pumping and conducting periodic monitoring of groundwater levels and quality throughout their service area.

Fresno County regulates the extraction and transfer of groundwater within the county under Title 14, Chapter 3 of the Fresno County Ordinance Code. Fresno County and the Exchange Contractors have an MOU that exempts the Exchange Contractors from regulation of groundwater resources within Fresno County. Fresno County and the Exchange Contractors agree that agricultural production is vital to the county and that groundwater, used conjunctively with surface water, is essential for continued agricultural production. The MOU specifically exempts the Exchange Contractors from the newly adopted Title 14, Chapter 3 of the Fresno County Ordinance Code, in accordance with Section 14.03.05E of the code. Fresno County recognizes that the Exchange Contractors' management, protection, and control of groundwater resources are consistent with Title 14, Chapter 3; therefore, the MOU exempts the Exchange Contractors from this code requirement (Fresno County and Exchange Contractors 2001).

Generally, groundwater development in the Exchange Contractors' service area has not influenced shallow groundwater interaction with surface water bodies. The depth to shallow groundwater, less than 10 feet deep, has been monitored intensively since 1984. The Exchange Contractors report that no trend exists regarding a significant lowering of these groundwater levels during years of heavy pumpage (C. White pers. Comm. 2004).

The calculated change in groundwater storage, illustrated in Table 3-2, shows an average annual decrease of 3,546 AF over the 10-year period, representing approximately 0.31 percent of the total average yearly inflow of over 1,000,000 AF. It should be noted that the change in groundwater storage is not directly measured. It is calculated from the differences in groundwater elevations measured in a network of wells. Thus, the value must be considered an approximation. In this context, a difference of 0.31 percent is within the potential error in the calculation.

Table 3-2 Groundwater Balance in the Exchange Contractors Service Area Overall Groundwater Balance, 1993-2002

Year	Total Inflows (acre-feet)	Total Outflows (acre-feet)	Groundwater Pumping (acre-feet)	Change in Groundwater Storage (acre-feet)
1993	1,205.765	1,236,292	136,388	-30,527
1994*	941,575	1,151,158	225,750	-209,580
1995	1,234,440	1,190,328	102,796	44,112
1996	1,301,032	1,201,994	121,050	99,038
1997	1,153,560	1,195,461	126,047	-49,242
1998	1,339,253	1,243,397	37,686	111,198
1999	959,686	1,090,646	99,964	-86,992
2000	1,102,669	1,,081,140	120,738	40,622
2001	1,084,402	1,074,070	134,212	6,105
2002	1,008,553	1,067,654	175,894	39,808
Average 1993-2002	1,133,094	1,153,214	128,053	-3,546

Source: Exchange Contractors 2003.
*Critically dry year (Reclamation 2004)

The long-term hydrographic record for the Exchange Contractors' service area was reviewed by Schmidt (CCID 1997). Schmidt's review shows that groundwater is in balance or is rising.

Regional Water Quality Monitoring Programs

Several monitoring programs are currently occurring in the vicinity of the Proposed Action (See Figure 3-3 for locations of monitoring sites.). These monitoring programs are being undertaken by Reclamation, Central Valley Regional Water Quality Control Board, United States Geological Survey, California Department of Fish and Game, SLDMWA, WWD, TID, and JID. A brief summary of these monitoring programs is provided in this section.

Reclamation Reclamation currently has three ongoing water quality monitoring programs along the DMC: sump monitoring, Warren Act pump-ins, and continuous selenium monitoring.

Sump Monitoring Reclamation has been monitoring a series of six sumps located between Russell Avenue at milepost (MP) 97.68 and Washoe Avenue at MP 110.12. This program has been ongoing since 1986. Monitoring frequencies and parameters measured have changed over time. Since 1998, the sumps have been sampled twice yearly for metals, common cations, and common anions. Selenium and electrical conductivity (EC) are measured weekly in all six

sumps. Water from these sumps is periodically discharged to the DMC. Reclamation is evaluating other methods for disposing of this sump water.

Warren Act Pump-Ins Reclamation requires the monitoring of water quality in wells that discharge directly into the DMC. Each well is sampled prior to entry into the program and subsequently every three years. Parameters measured include Title 22 metals and pesticides.

Selenium Monitoring A selenium monitoring program was initiated in July 2002. Daily composite samples for selenium and TDS are collected using an autosampler at three locations along the DMC: at the headworks (MP 3.5), Check 13 (O'Neill Forebay), and Bass Avenue (DMC terminus).

Drinking Water Quality A fourth program was initiated in November 2002 at the request of the California Department of Health Services. This program collects monthly samples from the DMC at McCabe Road near Check 13. The samples are analyzed for many constituents including alkalinity, total organic carbon, and coliforms.

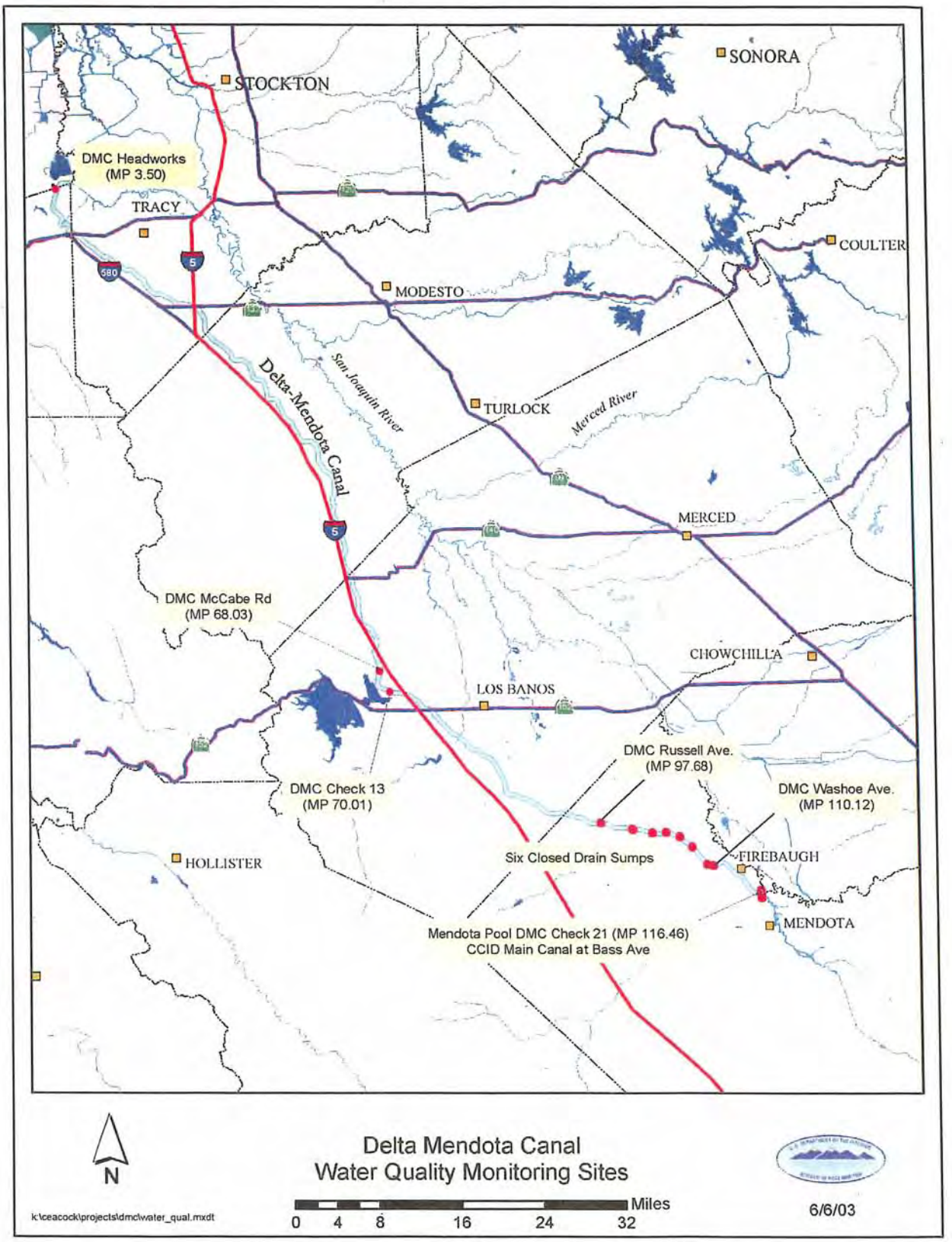

Figure 3-3 Water Quality Monitoring Sites

3.1.2 Environmental Consequences

No Action

Under the No Action Alternative, no Warren Act contracts would be issued to any San Luis Unit or Delta Division contractor. The DMC would continue to be used to provide CVP water to CVP contractors. Under the No Action Alternative, there would be no change to CVP facilities and operations. Therefore, no non-CVP water would be conveyed in the DMC. Local wells would provide supplemental water to adjacent fields. Under the No Action Alternative there would be less groundwater pumping as the water could not be conveyed to other parts of the districts resulting in less water supply to grow crops.

If BCID's conveyance of their pre-1914 water rights water is disapproved, the conserved BCID non-CVP water would go unused within BCID. This has no impact on BCID because, pursuant to federal, state, and local law, BCID's conserved water is deemed to have been beneficially used. (Reclamation 2008).

BBID conveyance of their pre-1914 water rights of 1,500 AF would not be approved. Additionally, PID and WSID pre-1914 water rights water would not be approved..

Transfers of Reclamation conveyed non-CVP water would not occur.

Proposed Action

Surface Water The Proposed Action would allow non-CVP water to be conveyed and stored in CVP facilities. This would allow non-CVP water to be delivered to other areas to supplement diminished CVP water supplies in 2009. No new facilities would be needed as a result of the Proposed Action. There would be no construction or modification to the DMC. The capacity of the facility would remain the same. The Proposed Action would not interfere with the normal operations of DMC nor would it impede any SWP or CVP obligations to deliver water to other contractors or to local fish and wildlife habitat. Furthermore, the Proposed Action would not interfere in the quantity or timing of diversions from the Sacramento-San Joaquin Bay Delta. CVP operations and facilities would not vary considerably under either alternative. Because the DMC and Mendota Pool are sources that the Exchange Contractors (Appendix A – approval letter) divert water from, they would be monitoring the water quality at Mendota Pool.

The additional non-CVP water conveyed in the DMC from BCID's and PID's pre-1914 water rights water supplies would allow supplemental non-CVP water supplies, up to 5,000 AF each, to irrigate crops. BCID's pre-1914 diversions from the SJR would remain within historic pre-conservation levels.

BBID would also be able to convey up to 1,500 AF of its pre-1914 water rights to irrigate crops.

In addition, WSID would be able to convey up to 2,000 AF of its pre-1914 water rights to irrigate crops.

Groundwater According to the California Department of Water Resources (DWR) Bulletin 118 (DWR 2003), groundwater provides approximately 30 percent of the total supply for the San Joaquin River Hydrologic Region. However, the amount of groundwater use within the region varies widely, both between different areas and from one year to the next. In WWD for example, groundwater has accounted for between 5 and 60 percent of total supply over the last 15 years,

while in the Exchange Contractors' service area groundwater supplies have accounted for between 10 and 40 percent of the total over the last 10 years.

The total available groundwater storage capacity from a depth of 20 feet to the base of the groundwater basin is about 42,400,000 af based on a total aquifer material volume of 579,900,000 af and an average specific yield of 7.3 percent (DWR 2003) This estimate was based on a study area that encompassed approximately 586,000 acres. Since the currently defined subbasin (San Joaquin Valley Subbasin) size is over 707,000 acres, the storage value mentioned above underestimates the total storage capacity for the subbasin as defined in Bulletin 118 – Update 2002.

The total quantity of groundwater that can be pumped into the DMC under the Proposed Action would be up to 50,000 AF, and that quantity would be divided among the San Luis Unit and Delta Division contractors. The amount of water pumped into the DMC would be credited to that district. Meaning, the quantity of groundwater pumped into the DMC would be delivered back into the district and used for irrigation purposes throughout the originating district. SOD CVP contractors that would enter into Warren Act contracts would also have the flexibility to transfer some of the groundwater that is pumped into the DMC to other SOD CVP contractors. It is not known at this time which contractors would be involved in the subject transfers, if any. Though some of the water used for irrigation would be used up by evapotranspiration and evaporation, some would also seep back into the ground. The Proposed Action is a way to get the groundwater into the district's distribution system for the benefit of all water users within the district's boundaries.

SLWD anticipates pumping up to 10,000 AF of groundwater water under the 2009 Warren Act contract; however, 8,000 AF would be from wells located outside SLWD's actual boundaries. The USGS (Brush et al. 2004) computed a water balance for a large portion of the study area as part of development of a groundwater flow model for Reclamation. Groundwater recharge estimates for many of the water districts for the project were computed as shown in Table 3-3. These estimates were computed over a time period spanning from 1972-2000, which includes a wide range of hydrologic conditions ranging from severe drought to flood. The proposed 2009 groundwater pumping expressed as a percentage of estimated annual recharge is less than average annual recharge in all cases where we have data. In fact, for all the districts in the model domain with the exception of Pacheco, the proposed pumpage is less than 50 percent of the annual recharge which allows for a significant factor of safety which likely addresses possible cumulative impacts of other regional groundwater pumping. The differences in the quantity of pumpage as compared to recharge are such that it is reasonable to assume that the proposed 2009 pumpage would not significantly add to groundwater basin overdraft.

Furthermore, it is reasonable to assume that for the districts that we do not have data for, that the similarities in climate, geology, topography, soils, cropping patterns and water use practices, that groundwater recharge conditions would be similar, and that the effects of pumping would be similar in these districts.

Table 3-3 Estimated Annual Groundwater Recharge as compared to proposed 2009 Warren Act groundwater pumping quantities.

					Proposed

Model Subarea	Acres	Estimated Annual GW Recharge [1] (ft)	Estimated Annual GW Recharge (Acre-ft)	Proposed 2009 GW Pumpage (Acre-ft)	2009 GW Pumpage (% of Annual Recharge)
Pacheco	4,760	0.75	3,570	3000	84
Panoche DD[2]	49,400	0.98	48,412	19,000[2]	39
San Luis	25,600	0.81	20,736	10,000	48
WWD - D	110,400	0.95	104,880	5,000	5
WWD - S	107,200	0.68	72,896	5,000	7

DD-Drainage District
D – Deep groundwater level
S – Shallow groundwater level
[1] Brush et al. 2004.
[2] Includes Mercy Springs, Oro Loma, and Panoche Water Districts.

Groundwater overdraft is a complex issue that needs additional study; however, the Proposed Action when compared to the volume stored in the aquifer is a small quantity.

Water Quality Water in each well must meet water quality standards prior to approval for conveyance, and the monitoring of groundwater quality would continue throughout the contract water year. If a well to be used for pumping water into the DMC does not meet the water quality standards, the district could not pump water from that well into the DMC under the Warren Act contract. The Warren Act contract provides for routine testing of each well by Reclamation and SLDMWA to confirm that the groundwater still meets standards. The contract also allows the Contracting Officer to stop a well that fails to meet standards. Reclamation and SLDMWA staff would monitor salinity in the canal to identify degradation caused by the groundwater, and would work with the SLDMWA and districts to modify or restrict pumping to improve water quality.

Because of the rigorous advance testing required and frequent monitoring of the well pumping in the DMC and Mendota Pool by both Reclamation and the Exchange Contractors, the probable dilution in the canal, as well as restrictions required as part of the Proposed Action there will be a minor degradation of water quality in the DMC and Mendota Pool that will not exceed requirements.

Climate Change Climate change refers to changes in the global or a regional climate over time. Global climate change is expected to have some effect on the snow pack of the Sierra Nevadas and the run off regime. Current data are not yet clear on the hydrologic changes and how they will affect the SJV. Water allocations are made dependent on hydrologic conditions and environmental requirements. Since Reclamation operations and allocations are flexible, any changes in hydrologic conditions due to global climate change would be addressed within Reclamation's operation flexibility and therefore water resource changes due to climate change would be the same with or without the Proposed Action.

3.2 Land Use

3.2.1 Affected Environment

Byron Bethany Irrigation District

BBID is primarily agricultural. BBID's current size is 2,700 acres and its major crops are pasture. Since 1990, approximately 500 acres of land have been converted to M&I use. Since the 1990s, approximately 1,500 acres of land have been converted to M&I use. It is possible that as Tracy and San Joaquin County continue to develop, the amount of CVP water used for M&I purposes could increase. By 2005, a portion of Tracy Hills was annexed into BBID (City of Tracy 2007).

The water allocated for converted land would continue to be used to serve the new land use through the City of Tracy water supply system. It is possible that as Tracy continues to grow, the amount of CVP water used for M&I purposes could increase. It is also possible that the anticipated growth could result in some areas currently within the district being detached and annexed by the City of Tracy. BBID has informed Reclamation of its plan to transfer a portion of its CVP supply to the City of Tracy by 2025.

Row crops produced within the district are primarily alfalfa. Permanent crops include almond and cherries. There is also some dry farming in the district. Typical irrigation methods include primarily furrow and border irrigation and sprinklers.

Banta-Carbona Irrigation District

Banta-Carbona Irrigation District (BCID) is entirely an agricultural district and does not supply or intend to supply any water for M&I use. BCID extends from the City of Tracy to the San Joaquin-Stanislaus County line near the town of Vernalis. BCID's current size is 14,000 acres and its water needs are 47,000 AF. The major crops are primarily almonds and walnuts, with smaller amounts of apricots, apples, and vineyards.

As the City of Tracy and the Interstate 5 corridor continue to grow, attachments and detachments would continue. Also, new areas that may require water for M&I purposes would be detached from the district. Currently, a few parcels within the district are targeted for detachment and would be annexed to the City of Tracy. This detachment process has been on-going in the district. Whenever a new urban expansion is planned, the land is automatically deleted from district boundaries. BCID has assigned 5,000 AF/y through an assignment of its CVP supply to the City of Tracy. Therefore, while vulnerable to development pressures along the Interstate 5 corridor, BCID is expected to remain an entirely agricultural district.

The district was considered built-out in 1968 following underground pipeline completion made possible with funds from a PL 84-984 federal assistance loan. As the City of Tracy continues to expand, some of these existing facilities will be abandoned. Currently, some portions of the district's distribution system remain unused. When an area is detached from the district, the water that was used to serve the land remains with the district.

There are about 600 to 700 landowners in the district; however, there are only 60 to 70 water customers since not all landowners farm their land. Some lease their land to others who farm larger areas. Major crops being produced within the district include both row crops (cannery tomatoes, dry beans, alfalfa, and a small quantity of melons) and permanent crops (primarily

almond, with smaller amounts of walnuts, apricots, peaches, and apples). Also, some areas have been planted with grapes over the last few years. Irrigation methods include furrow, border flooding, drip tape, siphon pipe and sprinklers on row crops, and drip and micro-sprinklers on permanent crops.

Del Puerto Water District

Del Puerto Water District (DPWD) is primarily an agricultural district. DPWD irrigates 40,000 acres and its water needs are 131,000 AF. Currently, the only CVP supply used for M&I purposes is the one acre-foot of water supplied to the city landfill each month for dust suppression. All remaining CVP supplies are used for agriculture.

Despite the urban sprawl in the area resulting from the growth of Patterson and Tracy and along the Interstate 5 corridor, DPWD would like to continue to remain primarily an agricultural district. DPWD does not intend to increase the amount of CVP water used for M&I purposes.

There are about 170 water users in the district. More than 30 different crops have been grown commercially in the district over the years. Principal crops grown include row crops (cannery tomatoes, alfalfa, large limas, and dry beans). However, almost half of the agricultural production in the district is permanent crops (almonds, apricots, and walnuts). Typical irrigation methods in the district include primarily furrow irrigation for row crops and sprinkler, sprinkler with less frequent use of drip, and micro-misters for permanent crops. Historically, areas of the district have remained fallow during the growing season (Reclamation 2005).

Eagle Field Water District

Eagle Field Water District is located about 14 miles northwest of Firebaugh and roughly 3 miles east of U.S. Interstate Highway 5. The district encompasses approximately 1,438 acres and is an entirely agricultural district. The district is not located near any urban centers and has not been experiencing pressure to convert land from agriculture to M&I uses.

San Luis Water District

SLWD is located on the western side of the San Joaquin Valley near the City of Los Banos, in both Merced and Fresno Counties. Construction of the DMC in the 1950s sparked major development of farmland in the SJV that led to the formation of SLWD in January 1951. SLWD's current size is approximately 66,218 acres.

SLWD's current distribution system consists of 52 miles of pipelines, 10 miles of lined canals, and 7.5 miles of unlined canals. About 20,000 acres within the district, referred to as the Direct Service Area (DSA), receive water from 39 turnouts on the DMC and 23 turnouts on the SLC. The DSA is located almost primarily in Merced County. In addition to the DSA, three improvement districts are also served through distribution systems branching off the SLC. Both Improvement Districts 1 and 2 are primarily located within Fresno County; Improvement Distrct 3 is located primarily in Merced County. The current population within SLWD is approximately 700, with most individuals residing in the community of Santa Nella, located in the extreme northern portion of the district.

The southern section of the district located in Fresno County is primarily agricultural. The land is planted with either row crops, including cotton and melons, or permanent crops, including

primarily almonds. In recent years, some parcels in this area of the district have not been farmed because they are of marginal quality or have high water costs or drainage problems.

Although water deliveries by the SLWD historically have been almost exclusively used for agricultural use, substantial development in and around the cities of Los Banos and Santa Nella have resulted in a shift of some water supplies to M&I use. The SLWD currently supplies approximately 800 AF/yr to approximately 1,300 homes and businesses. M&I demands within the district are expected to increase.

M&I use primarily occurs in the northern section of the district, which is located in Merced County. It is anticipated that the conversion from agricultural use to M&I use will occur mostly in this section of the district. Approximately 10,000 acres identified as potential development locations are currently in the planning stages within Merced County and the district. Much of the land targeted for M&I development is currently unused for irrigated agriculture.

Pacheco Water District

The Pacheco Water District's (Pacheco) current size is 4,000 total acres. Pacheco was formed in 1953 for the purpose of obtaining a CVP water supply. Pacheco entered into a long-term contract with Reclamation for 10,080 AF of water supply from the DMC and SLC. Pacheco's agricultural demand is 11,000 AF. Pacheco's CVP supply is their primary water supply though the district also has a surface water supply from the CCID. The district also owns one groundwater well but does not pump groundwater due to the poor quality of the underlying groundwater.

Panoche Water District

PWD began receiving its first CVP supply water from the Friant Dam of the SJR in 1947 under an interim contract. On August 16, 1955, the PWD entered into a long-term water service contract with Reclamation. This contract provided for the delivery to the PWD of 93,988 AF of water per year from the DMC. PWD's agricultural demands are 106,772 AF. The contract service area is approximately 35,000 acres. The major crops are field crops.

When the PWD's contract with Reclamation became effective, most crops and land developments came to rely on better quality surface water rather than groundwater. The surface water supply was to supplement the groundwater being used. With the exception of drought conditions, almost no groundwater has been utilized in the Panoche.

There are approximately 300 full-time residents living in the PWD service area. This population is comprised primarily of farm labor residents working on adjacent farms. This population has remained virtually the same for over 10 years and is not anticipated to grow due to any non-farming circumstances. PWD supplies about 50 AF of water per year for M&I purposes. PWD does not have any industrial use customers. There is some domestic use which is incidental to agriculture.

Oro Loma Water District

Located in northwestern Fresno County, Oro Loma Water District (OLWD) participates in the agricultural economy of the western San Joaquin Valley. OLWD's current size is 1,095 acres. OLWD is entirely an agricultural district with only one landowner. Because it is located in a rural area away from major development pressures, the conversion from agricultural to M&I uses

is unlikely. The crops typically produced in the district include rice, and historically, some of the land has also been farmed with cotton (Reclamation 2005).

Mercy Springs Water District

Mercy Springs Water District (MSWD) is entirely an agricultural district. MSWD's current size is 3,618 acres. Because it is located in a rural area away from major development pressures, the conversion from agricultural to M&I uses is unlikely. The crops typically produced in the district include cotton and alfalfa. All administrative functions for the district are currently being provided by PWD. Also, most of the district has been acquired by the Panoche Drainage District for use as a regional drainage management facility on which subsurface drain water is applied to salt-tolerant crops. The CVP contract supply for this area has been assigned to WWD. Administrative functions for MSWD are performed by PWD (Reclamation 2005).

Patterson Irrigation District

Patterson Irrigation District (PID) is located near the City of Patterson, in Stanislaus County, California along SJR, between the Merced and Tuolumne Rivers. PID's service area extends about 8 miles long (east-west) and three miles wide (north-south). PID's existing surface water pumping plant is located on the western bank of the SJR, approximately 3.5 miles east of the City of Patterson and just over a quarter mile north of West Main Street. Irrigated lands served by PID total approximately 13,500 acres and include a variety of orchard and row crops. The existing division facility is bounded by agricultural properties to the west and south, the SJR to the east, and a recreational area/boat ramp to the north. (Reclamation 2007).

West Stanislaus Irrigation District

West Stanislaus Irrigation District is approximately 22,502 acres in size and is an agricultural district. Although some land within the district is zoned for industrial use, there are currently no known development plans. It is also the district's policy to remain solely an agricultural district and it requires that any M&I users detach from the district.

Westlands Water District

WWD covers almost 950 square miles of prime farmland between the California Coast Range and the trough of the SJV in western Fresno and Kings Counties. It averages 15 miles in width and stretches 70 miles in length from Mendota on the north to Kettleman City on the south. Interstate 5 is located near WWD's western boundary. Nearly all land within the current WWD service area was at one time farmed using groundwater. The first deliveries of CVP water from the SLC to WWD began in 1968.

Currently, WWD's district boundaries encompass 604,000 acres with an irrigable acreage of 567,800 acres. WWD provides water via gravity water service and pumping from the SLC depending on location. More than 60 different crops are grown commercially in WWD. The cropping patterns have changed over the years depending upon water availability, water quality, the agricultural economy and market factors. The acreage trend is toward planting of vegetable and permanent crops while cotton and grain acreage have decreased.

The current population within the WWD is approximately 50,000. The major community entirely within WWD is Huron. Three Rocks and Five Points are smaller communities within WWD. The communities of Firebaugh, Mendota, Kerman, Tranquillity, San Joaquin, Lemoore, and Stratford lie just outside WWD's eastern edge.

CVP water in the district is used for both agricultural and M&I uses. The majority of CVP supply is used in agriculture, and of the almost 800 water users in the district, approximately 600 are agricultural users and approximately 180 are M&I users. Unlike many other key growing areas of California, urbanization is not a direct threat to productivity. WWD's M&I deliveries include cities and governmental agencies; however, none of this water is treated by WWD before its distribution. Current M&I deliveries are estimated to be approximately 2,000 AF/yr and account for only a small percentage of WWD's CVP supplies.

WWD's permanent distribution system consists of 1,034 miles of closed, buried pipeline that conveys CVP water from the San Luis and Coalinga Canals and 7.4 miles of unlined canal that conveys CVP water from the Mendota Pool. The area served by the system encompasses approximately 88 percent of the irrigable land in WWD, including all land lying east of the SLC.

Of the gross 613,100 acres in WWD, approximately 570,000 acres are classified as irrigable. Water is delivered throughout WWD via 1,034 miles of underground pipelines, virtually eliminating seepage and evaporation losses in the distribution system. All water is metered at the point of delivery through more than 3,200 agricultural and 250 M&I meter locations. WWD contains three water service areas; these areas, referred to as priority areas, receive varying amounts of available water supply.

No Action Alternative

Under the No Action Alternative, no Warren Act contracts would be issued that would allow non-CVP water to be conveyed and stored in CVP facilities. No conveyance of BBID's, BCID's, PID's, or WSID's pre-1914 water rights water would occur. Reclamation anticipates a dry year. In the dry year, there could be some adverse impacts to crops if supplemental supplies of water are not found. Under the No Action Alternative an estimated total of 20,000 acres of additional land would be fallowed. Districts could attempt to purchase other sources of water or construct new facilities; however, no sources of additional water are known and construction would likely not be completed in time to meet district needs.

Proposed Action

The Proposed Action would utilize blended groundwater and surface water to allow district agricultural lands to remain in production, and to transfer DMC water to other receiving areas to support existing farmlands and minimize the potential for fallowing agricultural land. No new lands would be cultivated with this water. The conveyance of the non-CVP water through CVP facilities would not contribute to changes in land use. The Proposed Action would not increase or decrease water supplies that would result in additional homes to be constructed and served. The approval to be covered under this EA would be for 2009 and would be limited to use of this non-CVP water with no resulting land use changes.

Conveyance of additional sources of Pre-1914 water rights of non-CVP water would be used to meet the needs of existing land uses and would not result in land use changes.

The Proposed Action would have a beneficial effect on land use as an estimated 20,000 acres of agricultural land would not be fallowed.

3.3 Geology

3.3.1 Affected Environment

The vicinity of Mendota is underlain by an upper alluvium to a depth of 450 feet below ground surface (bgs). The alluvium is made up of four clay layers that consist of basin, floodplain, lacustrine, and marsh deposits. Few wells derive water from basin deposits, which are exposed along Fresno Slough. The lacustrine and marsh deposits in the subsurface are mostly impermeable, and in some cases restrict the vertical movement of water. The Corcoran Clay (E-clay) underlies the western third of the subbasin. The top of the E-clay is at about 450 feet bgs at Mendota WA and approximately 55 feet thick. Above the E-clay, the A-clay is less widespread than the E-clay, but averages 80 feet deep, acting as a local confining bed in parts of the Mendota Pool area. The C-clay also lies above the E-clay, but is less extensive than the A-clay or the E-clay. The construction of many large-diameter wells with screens above and below the E-clay has rendered it locally ineffective as a confining unit.

Subsidence of 29 feet has been measured in the City of Mendota, indicating significant inelastic aquifer compaction. More severe subsidence has occurred in areas southwest of Mendota. The Exchange Contractors are continuously monitoring subsidence, water levels, and compaction at two extensometers located near the Mendota Pool at the intersection of Russell Avenue and the DMC. Since 1957, about 5 feet of land subsidence has been measured. Future subsidence is possible in the upper and lower aquifers, where confined conditions are present.

Similar geologic and aquifer formations exist beneath the districts. Subsidence has occurred historically in these areas as well. In the area of Checks 16, 17 and 18 along the DMC the ground surface level dropped one foot due to subsidence between 1994 and 1996. This subsidence interferes with gravity flow in distributions system in the area.

No Action Alternative

Under the No Action Alternative, no groundwater would be pumped into the DMC. Wells would be used to irrigate adjacent fields to supplement diminished CVP water supplies. However, high levels of groundwater pumping would occur throughout the districts due to the low surface water allocation and therefore there would be subsidence related impacts to geologic formations.

Proposed Action

Land subsidence caused by excessive pumping of groundwater in the project area is well documented (Bull and Miller1975, California Department of Water Resources 1998a, Poland et al. 1975). Some of the negative impacts of land subsidence can include: (1) damage to canals, highways, buildings, and well casings, (2) changes in groundwater and surface water flow patterns, and (3) declines in aquifer storage capacity. Larson et al. (2001) performed a study predicting the optimal safe groundwater yield and land subsidence for a large portion of the project area using a calibrated numerical simulation model. They used integrated numerical groundwater and land subsidence models to simulate land subsidence caused by groundwater overdraft. Their models were calibrated using subsidence measurements and hydrologic data from 1971 to 1988 (Figure 3-3). They used the models to estimate maximum potential groundwater withdrawals for various water budget sub-areas in the project area without causing unrecoverable land subsidence over a simulation period of 30 years.

For the present analysis, proposed 2009 groundwater pumping quantities are compared to historic pumping estimates and subsidence data observed during drought conditions prevalent in the study area from 1991-1994 (Table 3-4). The proposed 2009 groundwater pumpage, expressed as a percentage of annual pumpage during the 1991-94 drought period ranges from 4 to 109 percent for the various model subareas.

Table 3-4 Estimated Annual Groundwater Pumpage during the Drought (1991-94) as compared to proposed 2009 Warren Act groundwater pumpage quantities.

Model Subarea	Acres	Estimated Annual GW Pumpage during Drought (1991-94)[1] (ft)	Estimated Annual GW Pumpage during Drought (1991-94)[1] (ft)	Proposed 2009 GW Pumpage (Acre-ft)	Proposed 2009 GW Pumpage (as % of 1991-94 Drought Pumpage)
Pacheco	4,760	0.90	4,284	3,000	70
Panoche DD[2]	49,400	0.43	21,242	19,000[2]	89
San Luis	25,600	0.36	9,216	10,000	109
WWD - D	110,400	1.26	139,104	5,000	4
WWD - S	107,200	1.14	122,208	5,000	4

DD - Drainage District
D – Deep groundwater level
S – Shallow groundwater level
[1] Computed from data compiled by Brush and others, (2005).
[2] Includes Mercy Springs, Oro Loma, and Panoche Water Districts.

Figure 3-3 shows observed and simulated land subsidence at two extensometer locations in the project area. The monitoring data at both sites show similar historic trends in that the rate of land subsidence at the monitoring sites increased dramatically from about 1965 to 1980. As surface water was imported into the basin in the 1970's, subsidence rates decreased until the late 1980's when rates increased slightly due to pumping associated with prolonged drought conditions from 1987 to 1994 in the region. Note that pumping in the project area during drought conditions from 1991 to 1994 did not significantly increase land subsidence at these monitoring sites.

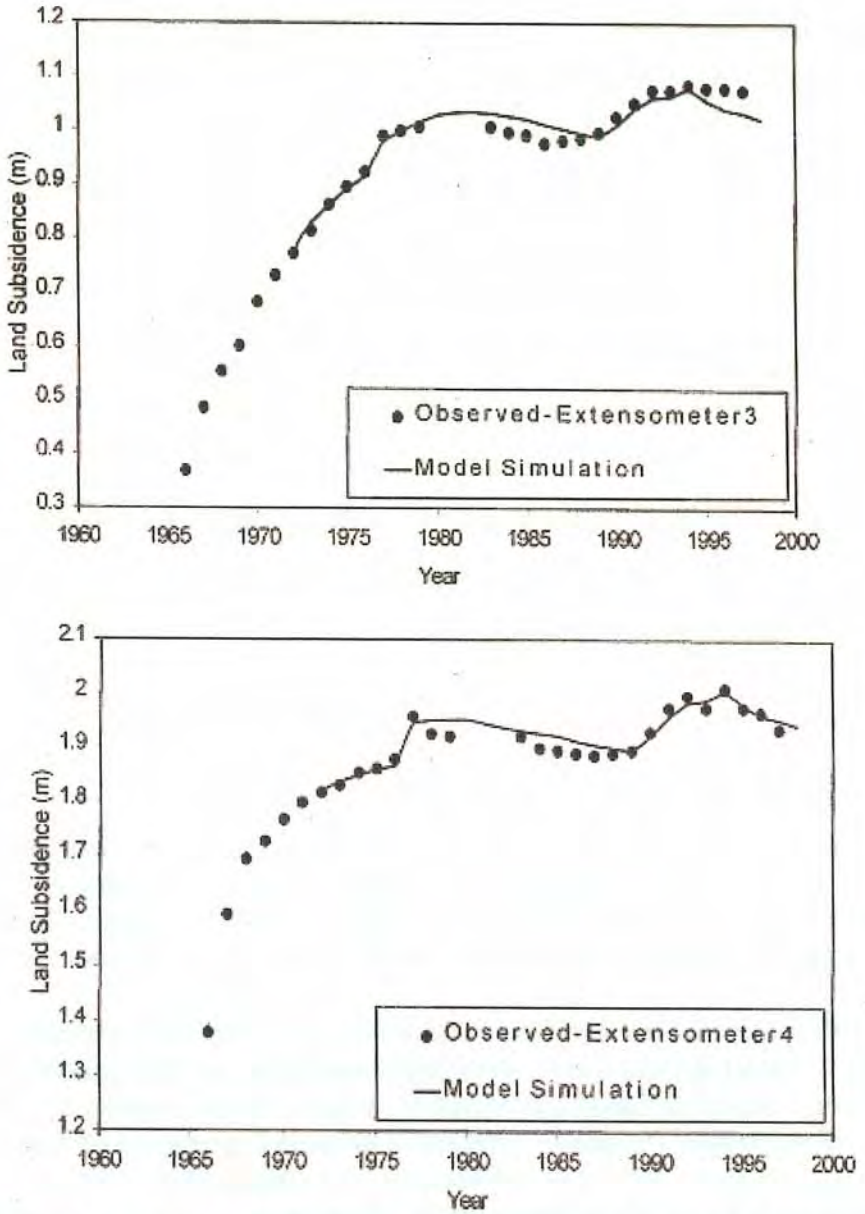

Figure 3-4 Observed and simulated land subsidence at two extensometer locations in the project area (from Larson and others, 2001).

Estimates of groundwater recharge quantities in the project area indicate that the proposed groundwater pumping quantities should not contribute greatly to long term groundwater basin overdraft. At this point there is insufficient data to determine the impact of the Proposed Action on subsidence. In the context of all the likely groundwater pumping that is going on in 2009, (see Water Resources Section) the additional 50,000 AF that would be added due to this project is small and therefore any additional subsidence caused by the Proposed Action would be similarly small.

3.4 Biological Resources

3.4.1 Affected Environment

Central Valley Refuges

Section 3406(d) of the CVPIA requires the Secretary of Interior to provide reliable year-round water supplies of suitable quality, meeting peak seasonal needs, to maintain and improve wetland habitat areas on certain refuges in the Central Valley of California in the National Wildlife Refuge System, State wildlife management areas, and Grassland Resource Conservation District.

These refuges include Mendota WA which is located in the San Joaquin Valley, 30 miles west of Fresno, California. Under normal operating conditions, water is delivered to Mendota WA via gravity flow and pumping from Mendota Pool at Fresno Slough.

The quantity, quality, and timing of water deliveries to refuges identified in CVPIA are in accordance with parameters specified in Reclamation's Report on Refuge Water Supply Investigations, Central Valley Hydrologic Basin, California and the San Joaquin Basin Action Plan/Kesterson Mitigation Action Plan Report, which were incorporated by reference into CVPIA. The reports specified the following two primary levels of water supplies:

- Level 2
- Level 4

Level 2 water supply is identified as a firm, average historical annual water supply required to manage for minimal wetlands maintenance and wildlife habitat development. Level 2 water generally comes from CVP yield. Level 4 water supply is identified as the amount of water required to manage for optimal wetlands and wildlife habitat development.

To implement the refuge water supply provisions of CVPIA, Reclamation entered into a contract, titled "Contract Between the United States and State of California for Water Supply to Los Banos, Volta, North Grasslands and Mendota Wildlife Areas, January 19, 2001" otherwise referred to as "Water Supply Contract", with the California Department of Fish and Game II-1 (CDFG) providing for firm CVP water deliveries to the wildlife areas owned/managed by CDFG within the San Joaquin Basin. Consistent with the Water Supply Contract, the following is the breakout for Level 2 and incremental level allocations from the total Full Level 4 water allocation of 29,650 af for Mendota WA:

- Level 2 = 27,594 AF/y
- Incremental Level 4 = 2,056 AF/y

Mendota WA is located in the SJV of California, approximately 30 miles west of Fresno, California. At 12,425 acres, Mendota WA is the largest publicly owned and managed wetland in the SJV. Established between 1954 and 1966, the wildlife area is adjacent to Fresno Slough and the 900-acre Alkali Sink Ecological Reserve. Approximately 8,300 acres of wetlands are maintained at Mendota WA, including almost 6,800 acres of seasonal wetlands. Mendota WA is owned and managed by CDFG.

CVP water is typically conveyed to Mendota WA using the DMC, and Mendota Pool. Mendota Pool floods a portion of SJR and Fresno Slough. Water is subsequently pumped from Fresno Slough to Mendota WA and also conveyed from Fresno Slough to Mendota WA by gravity flows. Mendota WA is dependent on gravity flows from Fresno Slough to provide water deliveries to approximately 3,000 acres of wetlands adjacent to both west and east sides of the slough. Fresno Slough is allowed to backflow (gravity flow) through certain water control structures onto Mendota WA. Currently, there are no other existing means to facilitate water delivery to those specific 3,000 wetland acres. Mendota WA is also dependent on adequate water level at Fresno Slough to facilitate pumping that serves many areas of Mendota WA as well.

Vegetation Types and Wildlife Habitat

The habitats associated with the proposed action area include non-native grassland, agricultural, valley foothill riparian, alkali desert scrub, ruderal, and fresh emergent wetlands. The following discussion describes vegetation types, plants, and animals located in and adjacent to the Proposed Action area. The districts fall in and overlap the following counties: Kings, Fresno, Merced, Stanislaus and San Joaquin Counties.

Non-native Grassland Since settlement of the lands of the study area by the Europeans, perennial bunch grasses that once dominated the region have largely been replaced by annuals, whose seeds arrived in livestock feed and in the fur of imported animals. Today, grasses that comprise this habitat include wild oat *(Avena sativa),* medusa head *(Teinatherum caput-medusae),* ripgut *(Bromus diandrus),* soft chess *(Bromus hordeaceus)* and Mediterranean barley *(Hordeum marinum* ssp. *gussonianum).* Common forbs included common bindweed *(Convolvulus arvensis),* red-stemmed filaree *(Erodium cicutarium),* yellow star thistle *(Centauria solstitialis),* and black mustard *(Brassica nigra).* Low lying areas that typically pond water during heavy rainstorms, and for a short time thereafter may include fiddle dock *(Rumex pulcher)* and curly dock *(Rumex crispus).* In addition, a considerable number of native spring-flowering forbs occur during winters of average to above average rainfall. These typically include Eastwood's fiddleneck *(Amsinckia eastwoodia),* baby blue-eyes *(Nemophila menziesii),* red maids *(Calandrinia ciliate),* fringe-pod *(Thysanocarpus curvipes),* and other native forbs. Non-native grassland provides important habitat to many terrestrial vertebrates. Grassland habitat values of the study area vary. Most grasslands under private ownership possess low intrinsic value to native wildlife compared to original conditions; however, those that are lightly grazed may in fact exhibit a relatively high level of terrestrial vertebrate species richness and abundance. The highest quality grassland habitats for wildlife typically occur on the wildlife refuges, where lands are managed to support native species such as tule elk *(Cervus nannodes),* San Joaquin antelope squirrel (*Ammospermophilus nelsoni*), and San Joaquin kit fox *(Vulpes macrotis mutica*).

Common species of reptiles and amphibians in the non-native grassland habitats include western fence lizards *(Sceloporus occidentalis),* southern alligator lizards (*Elgaria multicarinata*), and gopher snakes *(Pituophis melanoleucus*). The latter two typically forage for small mammals. Resident and migratory birds forage and reproduce in non-native grassland habitats. Resident songbirds include the Western Meadowlark *(Sturnella neglecta)* and the Mourning Dove *(Zeniada macroura).* Western King Birds *(Tyrannus verticalis)* are commonly seen foraging from fences and utility lines during spring and summer. Savannah Sparrows (*Passerculus sandwichensis*) and Western Meadowlarks may build their nests directly on the ground. Seeds

produced by annual grasses also provide food for migrating and wintering songbirds, such as Lesser Goldfinches (*Carduelis psaltria)* and White-crowned Sparrows (*Zonotrichia leucophrys*). American Crows (*Corvus brachyrhinchos*) and European Starlings (*Sturnus vulgaris)* forage in grasslands and are among the most conspicuous of the songbirds.

Diurnally active raptors that forage in grassland habitats include the Red-tailed Hawks (*Buteo jamaicensis),* Red-shouldered Hawks (*B. lineatus*), Swainson's Hawks (*B. swainsonii*), Ferruginous Hawks (*B. regalis*), Black-shouldered Kites (*Elanus leucurus),* Northern Harriers (*Circus cyaneous*), and American Kestrels (*Falco sparvarius*). Nocturnally active raptors include Barn Owls (*Tyto alba*), Short-eared Owls (*Asio flammeus*), and Burrowing Owls (*Athene cunicularia),* which seek cover in abandoned ground squirrel burrows and often perch conspicuously at the entrance to their burrows during the day.

Small mammals include Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Spermophilus beecheyi*), and black-tailed hare (*Lepus californicus*). The California vole (*Microtus californicus*), western harvest mouse (*Reithrodontomys megalotis*), and ornate shrew (*Sorex ornatus*) are common residents. These small mammals attract a variety of predators, including various snakes and raptors as previously discussed, and also mammals. Coyotes (*Canis latrans*), red foxes (*V. vulpes*), and badgers (*Taxidea taxus*) are also common mammalian predators of non-native grasslands. The San Joaquin kit fox also forages in this habitat and modifies the burrows of California ground squirrels for denning.

Several bat species forage over grassland habitats in the region, chiefly for flying insects. These include, but are not limited to Brazilian free-tailed bats (*Tadarida brasiliensis*), California myotis (*Myotis californicus*), Townsend's western big-eared bat (*Plecotus townsendii townsendii*), and spotted bat (*Euderma maculata*). Pallid bat (*Antrozous pallidus*) also forages over grasslands in the region for hard-shelled insects including Jerusalem crickets, which it picks up from the ground.

Alkali Desert Scrub Alkali desert scrub is generally characterized by a dominance of chenopods (members of the Chenopodiaceae family) or other halophytes, and exists in two distinct phases: xerophytic (drought-tolerant plants) and halophytic (salt-tolerant plants). In the study area, alkali desert scrub plant communities occur at low elevations in the western SJV.

The xerophytic phase is represented by open stands of widely spaced, low (0.8 foot) to moderately high (7 feet) grayish, spiny, and small-leaved shrubs and subshrubs. Allscale (*Atriplex polycarpa*), fourwing saltbush (*A. canescens*), Parry saltbush (*A. parryi*), shadscale (*A. confertifolia),* and big saltbush (*A. lentiformis*) are common shrubby saltbush species of this phase. Other important shrubs include bud sagebrush (*Picrothammus desertorum*), Mexican tea (*Chenopodium ambrosoides*), Fremont dalea (*Psorothamnus fremontii*), and creosote bush (*Larrea tridentata*). Cheesebush (*Hymenoclea salsola*), alkali goldenbush (*Isocoma acradenia*), and honeysweet tidestromia (*Tidestromia oblongifo/ia*) are common subshrubs in this phase. Forbs and grasses that characterize this phase include Torrey blazing star (*Mentzelia torreyi*), kidney-leaved buckwheat (*Eriogonum reniforme*), and apricot globemallow (*Sphaeraclea ambigua ssp. ambigua*).

Closely spaced, not very woody, and more or less succulent plants that tolerate periodic flooding characterize the halophytic phase. This phase generally does not exceed a height of 3.3 feet.

Common shrub and subsbrubs found in this phase include arrow weed (*Pleurocoronis pluriseta*), greasewood (*Sarcobatus vermiculatus*), alkali goldenbush (*Isocoma acradenia*), kochia (*Kochia californica*), iodine bush (*Allenrolfea occidentalis*), and alkali rubber rabbitbrush (*Chrysothamnus nauseosus*). Common forbs and grasses are alkali heath (*Frankenia salina*), alkali weed (*Cressa truxillensis*), alkali heliotrope (*Heliotropium curassavicus*), arrow-grass (*Triglochin concinna*), yerba mansa (*Anemopsis californica*), and alkali sacaton (*Sporobolus airoides*).

Reptiles, such as side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis sp.*), and western rattlesnake (*Crotalus viridis*), are commonly observed in alkali desert scrub habitat.

Common birds that forage or nest in alkali desert scrub include Greater Roadrunner (*Geococcyx californianus*), Mourning Dove, Blue-gray Gnatcatcher (*Polioptila caerulea*), Common Raven (*Corvus corax*), Sage Sparrow (*Amphispiza belli*), White-crowned Sparrow (*Zonotrichia leucophrys*), House Finch (*Carpodacus mexicaus*), American Goldfinch (*Carduelis tristis*), and Lesser Goldfinch.

Common mammals include Botta's pocket gopher, California ground squirrel, desert cottontail (*Sylvilagus auduboni*), deer mouse (*Peromyscus maniculatis*), California vole, Heermann's kangaroo rat (*Dipodomys heermanni*), black-tailed hare, striped skunk, badger, and coyote. A number of bats also forage in this environment including Yuma myotis (*Myotis yumanensis*), spotted bat, California myotis, and Townsend's western big-eared bat.

Giant Garter Snake The giant garter snake (*Thamnophis gigas*) is federally and state listed as threatened. Giant garter snakes are endemic to the Central Valley of California. They hibernate in subterranean retreats and typically emerge to forage and breed in April dependent on local weather conditions. Upon emergence, they utilize small mammal burrows, crevices, and other surface objects for nocturnal retreats. Typically, males will begin to search for mates immediately upon emergence from hibernation, and a secondary breeding season has been known to occur during September. Females are viviparous and bear 10 to 46 young from late July to early September in hidden sites such as densely vegetated riparian zones or in organic matter near streams. Young tend to seek refuge in dense cover immediately after birth where they absorb the yolk sac before foraging on their own. Breeding potential is reached at about 3 years for males and 5 years for females.

Giant garter snakes are highly aquatic and the diet reflects this mode of life. Typical prey includes carp, minnows, mosquitofish, Pacific tree frogs, and bullfrogs. Historically they preyed upon thick-tailed chub (Gila crassicauda, now extinct) and the California red-legged frog (which has been extirpated from the Central Valley floor.

Ideal habitat would be characterized as having dense emergent vegetation for escape from predation, deep and shallow pools of water (which persist throughout the seasonal cycle of activity) in which to forage and seek cover, open areas along the margins to allow for basking, and upland habitat with access to structures suitable for hibernation and escape from flooding. Rice fields often possess these very requirements and are therefore readily utilized by this species.

Historically, the species probably ranged throughout the central valley near major rivers and tributaries where spring and summer flooding had occurred, and in freshwater marshes and larger flood basins. The exact distribution is not known but is thought to have included the valley floor from Buena Vista Lake in Kern County, north to near Gridley in Butte County. Current distribution is limited to 13 separate populations: Butte basin, Colusa basin, Sutter basin, American basin, Yolo basin/Willow slough, Yolo basin/Liberty farms, Sacramento basin, Badger creek/Willow creek, Caldoni Marsh, East Stockton Diverting Canal and Duck Creek, North and South Grasslands Waterfowl Easement areas ((U.S. Fish and Wildlife easements, Merced Co.), Mendota State Wildlife Area, and Burrell/Lanare. Unfortunately, these populations are isolated from one another and stochastic events as well as genetic processes may prove to be major threats to the giant garter snake's continued existence (ESRP 2009).

Agricultural Habitats Agricultural communities within the study area are very diversified and almost half of the irrigated acreage in the San Joaquin region is planted with grains, hay, and pasture. Orchards are planted on about 30 percent of the irrigated acres; cotton and vegetables are each planted on about 10 percent.

Many of the natural habitats in the Central Valley have been largely replaced by agricultural habitats. Six agricultural types were identified in the project area: pasture, orchard-vineyard, row crops, and cotton. The intensive management of agricultural lands, including disking, grazing, crop rotation, and the use of chemicals, has significantly reduced the value of these habitats for wildlife. However, many wildlife species have adapted to particular crop types and now use them for foraging and nesting. Compared to other agricultural crops, rice and grain crops are considered of high value for wildlife because waste grain is important to foraging wildlife species and flooded rice fields provide habitat similar to some natural wetlands. Compared to rice and grains, pasture and row crops provide moderate-quality habitat because of their limited cover and foraging opportunities. Orchard-vineyard and cotton crops generally provide low-quality wildlife habitat because of frequent disturbance resulting in limited foraging opportunities and lack of cover. However, orchards are slightly more valuable for kit foxes.

Pasture Pasture habitat consists of irrigated and unirrigated lands dominated by grasses and legumes. The vegetation composition of pastures varies with management practices, affecting the abundance and composition of wildlife. Irrigated pastures provide foraging and roosting opportunities for many shorebirds and wading birds, including Black-bellied Plover (*Pluvialis squatarola*), Killdeer (*Charadrius vociferous*), Long-billed Curlew (*Numenius americanus*), and White-faced Ibis (*Plegadis chihi*). Lightly grazed, unirrigated pasture provides forage for seed-eating birds and small mammals when the seeds ripen. Alfalfa grown in irrigated pastures provides high-quality foraging habitat for rodents. Ground nesting birds, such as Ring-necked Pheasant (*Phasianus colchicus*), various waterfowl (*Anas sp.*), and Western Meadowlark (*Sturnella neglecta*), occupy pasture habitat if adequate residual vegetation is present. Small mammals occupying pasture habitat include California voles, Botta's pocket gophers, and California ground squirrels. They in turn provide forage for such raptors as Red-tailed Hawks, Black-shouldered Kites, and Prairie Falcons (*F. mexicanus*) among others, as well as mammalian predators such as red fox, coyote, badger, long-tailed weasel (*Mustella frenata*), and striped skunk.

Orchard-Vineyard Orchard-vineyard habitat consists of cultivated fruit or nut-bearing trees and grapevines. This habitat is planted in a uniform pattern and intensively managed. Understory

vegetation is usually sparse; however, in some areas, grasses are allowed to grow between vineyard rows to reduce erosion. Wildlife species associated with vineyards include the deer mouse, mourning dove, and black-tailed hare. The nut crop from orchards provides feed for American Crow, Western Scrub Jay (*Aphelocoma californica*), Northern Flicker (*Colaptes auratus),* and California ground squirrel. The fruit crops from orchards provide additional food for Yellow-billed Magpies (*Pica nuttalli*), American Robin (*Turdus migratorius)*, Northern Mockingbird (*Mimus polyglottos*), Black-headed Grosbeak (*Pheucticus melanocephalus*), gray squirrel (*Sciurus griseus*), raccoon (*Procyon lotor*), and mule deer (*Odocoilius hemionus*). As with all of the agricultural habitats, use of this habitat by bats would be dependent on insect availability which is limited by the use of pesticides.

Row Crops Row crops include tomatoes, sugar beets, and melons. Intensive management and the use of chemicals to control pests in row crops limit their use by wildlife. Rodent species that forage in row crops include the California vole, deer mouse, and California ground squirrel. These rodent populations are preyed on by Swainson's Hawks, Red-tailed Hawks, American Kestrels and Black-shouldered Kites as well as the mammalian predators, red fox, coyote, long-tailed weasel, striped skunk, and raccoon. Use of this habitat by bats would be dependent on insect availability which is limited by the use of pesticides.

Cotton Cotton is of limited value to wildlife because of the intensive management of this crop and the use of chemicals to control pests and disease. Mourning Doves and house mice are found in this crop type. During irrigation when vegetation is short and sparse, additional wildlife, including American Robins, White-crowned Sparrows, and European Starlings may forage for invertebrates. Predators that occasionally use this environment include Swainson's Hawks, Red-tailed Hawks, American Kestrels and Black-shouldered Kites as well as red fox, coyote, long-tailed weasel, striped skunk, and raccoon. Use of this habitat by bats would be dependent on the insect availability which is limited by the use of pesticides.

Threatened and Endangered Species

The following list was obtained on January 16, 2009, by accessing the U.S. Fish and Wildlife Database: http://www.fws.gov/sacramento/es/spp_lists/auto_list_form.cfm (Document Number 090116122852). The list is for the following USGS quadrangles, which overlapped the districts in the San Luis Unit and Delta Division: Stratford, Westhaven, Kettleman City, Huron, Guijarral Hills, Avenal, La Cima, Coalinga, Burrel, Vanguard, Lemoore, Five Points, Westside, Harris Ranch, Calflax, Tres Pecos Farms, Lillis Ranch, Domengine Ranch, San Joaquin, Helm, Tranquility, Coit Ranch, Levis, Chaney Ranch, Chounet Ranch, Tumey Hills, Monocline Ridge, Firebaugh, Oxalis, Dos Palos, Hammonds Ranch, Broadview Farms, Charleston School, Ortigalita Peak NW, Laguna Seca Ranch, Los Banos Valley, Volta, Los Banos, Howard Ranch, San Luis Dam, Crows Landing, Patterson, Orestimba Peak, Westley, Brush Lake, Vernalis, Tracy, and Midway.

PLANTS

Species	Status	Habitat	*Occurrence In the Study Area
Large-flowered fiddleneck (*Amsickia grandiflora*) Critical habitat	FE, CE	Cismontane woodland, valley and foothill grassland in various soils.	**Possible**. In undisturbed areas of San Joaquin County.
palmate-bracted bird's-beak (*Cordylanthus palmatus*)	FE, CE	Chenopod scrub, valley and foothill grassland. Restricted to seasonally-flooded, saline-alkali soils in lowland plains and basins at elevations of less than 155 meters (500 feet). Within these areas, palmate-bracted birds-beak grows primarily along the edges of channels and drainages, with a few individuals scattered in seasonally-wet depressions, alkali scalds (barren areas with a surface crust of salts), and grassy areas.	**Possible**. Some suitable habitat may be present in the southwestern portion of the study area.
San Joaquin woolly-threads (*Monolopia congdonii*)	FE	Chenopod scrub, valley and foothill grasslands. This species is found only in the southern San Joaquin Valley and surrounding hills. It grows on neutral to subalkaline soils. On the San Joaquin Valley floor, it typically is found on sandy or sandy loam soils.	**Present**. CNDDB records indicate extant populations occur within Fresno County.
California jewelflower (*Caulanthus californicus*)	FE, CE	Known populations of Calfiornia jewelflower occur in nonnative grassland, upper sonoran subshrub scrub, and cismontane juniper woodland and scrub communities. Historical records suggest that it also occurred in the valley saltbush scrub community in the past. Populations have been reported from subalkaline, sandy loam soils at elevations of approiximately 240 to 2,950 feet. The natually-occurring populations known to exist today are distributed in three concentrations: (1) Santa Barbara Canyon, (2) the Carrizo Plain, and (3) the Kreyenhagen Hills in Fresno County.	**Present**. CNDDB records indicate that this species is extant within Kreyenhagen Hills of Fresno County.

Invertebrates

Species	Status	Habitat	*Occurrence in the Study Area
Vernal pool tadpole shrimp (*Lepiderus packardi*) Critical habitat	FE	The vernal pool tadpole shrimp is currently distributed across the Central Valley of California and in the San Francisco Bay area. Inhabits highly turbid vernal pools.	**Present**. Vernal pool habitats within the study area may support populations of this species. CNDDB records indicate that this species is presumed extant.

Vernal pool fairy shrimp (*Branchinecta lynchi*) Critical habitat	FT	Primarily found in vernal pools, may use other seasonal wetlands.	**Present**. Although very little remains of the vast acreages of vernal pool habitat that once occurred in the region, some vernal pool habitats are still present. CNDDB records indicate that this species is presumed extant in Stanislaus, Contra Costa, and San Joaquin Counties.
Longhorn fairy shrimp (*Branchinecta longiantennal*) Critical habitat	FE	Endemic to the eastern margin of the central coast mountains in seasonally astatic grassland vernal pools.	**Present**. Vernal pool habitats within the study area may support populations of this species. CNDDB records indicate that this species is presumed extant.
Conservancy fairy shrimp (*Branchinecta conservation*) Critical habitat	FE	Vernal pool habitats. The species is currently known from several disjunct populations: the Vina Plains in Tehama County, south of Chico in Butte County, the Jepson Prairie Preserve and surrounding area in Solano County, Sacramento National Wildlife Refuge in Glenn County, Mapes Ranch west of Modesto, San Luis National Wildlife Refuge and the Haystack Mountain/Yosemite Lake area in Merced County, and two locations on the Los Padres Naitonal Forest in Ventura County.	**Present**. Vernal pool habitats within the study area may support populations of this species. CNDDB records indicate that this species is presumed extant.
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	FT	Lives in mature elderberry shrubs of California's Central Valley and Sierra Foothills.	**Present**. The host plant for this species is common throughout the region. CNDDB records indicate that this species is presumed extant.

Fish

Species	Status	Habitat	*Occurrence in the Study Area
green sturgeon (*Acipenser medirostris*)	FT	Anadromous and highly marine-oriented; spawns mainly in Sacramento River. No evidence of occurrence in San Joaquin River system. Juveniles salvaged in South Delta pumping plants in summer.	**Absent**. No natural waterways within the species' range will be affected by the proposed action.
Delta smelt (*Hypomesus transpacificus*)	FT	Endemic to the Delta. Found in San Joaquin River up to Mossdale in some years and in Sacramento River up to Rio Vista where salinity is 2-7 ppt.	**Absent.** No natural waterways within the species' range will be affected by the proposed action.
Central Valley Steelhead (*Oncorhynchus mykis*)	FT	Anadromous species in cold waters.	**Absent**. No natural waterways within the species' range will be affected by the proposed action.

Chinook Salmon - Sacramento River winter-run (*Oncorhynchus tshawytsch*)	FE	Spawns in Sacramento River system, but more restricted distribution than Central Valley spring-run.	**Absent.** No natural waterways within the species' range will be affected by the proposed action.

Amphibians & Reptiles

Species	Status	Habitat	*Occurrence in the Study Area
California tiger salamander (*Ambystoma californiense*) Critical habitat	FT	Found primarily in annual grasslands; requires vernal pools for breeding and rodent burrows for refuge.	**Possible**. Suitable breeding habitats in the form of vernal pools and stockponds occur in the region. Rodent burrows are common along the fringes of agricultural areas.
California red-legged frog (*Rana aurora draytonii*) Critical habitat	FE	Red-legged frogs require aquatic habitat for breeding but also use a variety of other habitat types including riparian and upland areas. Adults often utilize dense, shrubby or emergent vegetation closely associated with deep-water pools with fringes of cattails and dense stands of overhanging vegetation such as willows.	**Present**. Documented as extant within the project area.
Blunt-nosed leopard lizard (*Gambelia sila*)	FE, CE	Resident of sparsely vegetated alkali and desert scrub habitats in areas of low topographich relief. They seek cover in mammal burrows, under shrubs or structures such as fence posts; they do not excavate their own burrow.	**Present**. Documented as extant within Fresno County.
Alameda whipsnake (*Masticophis lateralis euryxanthus*)	FT	Restricted to valley foothill hardwood habitat of the coast ranges between Monterey and San Francisco Bay. Species inhabits south-facing slopes and ravines where shrubs form a vegetative mosaic with trees and grasses.	**Absent**. The study area is outside of the known range of this species.
giant garter snake (*Thamnophis gigas*)	FT, CT	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches.	**Possible**. Documented as extant within Fresno, Merced and San Joaquin Counties.

Birds

Species	Status	Habitat	*Occurrence in the Study Area
California condor (*Gymnogyps californianus*)	FE	Require vast expanses of open savannah, grasslands, and foothill chaparral in mountain ranges of moderate altitude. Deep canyons containing clefts in the rocky walls provide nest sites. Forages up to 100 miles from roost/nest.	**Absent**. The study area in outside of the known range of this species.

Mammals

Species	Status	Habitat	*Occurrence in the Study Area
Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*)	FE	Current occurrences are limited to scattered, isolated areas. In the southern San Joaquin Valley this includes the Kern National Wildlife Regue, Delano, and other scattered areas within Kern County.	**Possible**. CNDDB records indicate that populations (now possibly extirpated) have been detected in the southern portion of WWD. Detections were made at Tumbleweed Park on Lemoore Naval Air Station in the 1990's. Their present status is unknown. Extant populations may still be present in other parts of Westlands.
riparian woodrat (*Neotoma fuscipes riparia*)	FE, CSC	Well-developed riparian habitats along the San Joaquin and Stanislaus Rivers.	**Possible.** Only occurs in Stanislaus and San Joaquin Counties along the Stanislaus and San Joaquin Rivers.
riparian brush rabbit (*Sylvilagus bachmani riparius*)	FE, CE	Habitat for the riparian brush rabbit consists of riparian communiteis dominated by willow thickets (*Salix spp.*), California wild rose (*Rosa californica*), Pacific blackberry (*Rubus vitifolius*), wild grape (*Vitis californica*), Douglas' coyote bush (*Baccharis douglasii*) and various grasses. A captive breeding program is in place in certain locations along the San Joaquin River.	**Possible.** Only occurs in Stanislaus and San Joaquin Counties along the Stanislaus and San Joaquin Rivers.
giant kangaroo rat (*Dipodomys ingens*)	FE, CE	Annual grassland on gentle slopes of generallly less than 10°, with friable, sandy-loam soils. However, most remainng populations are on poorer, marginal habitats which include shrub communities on a variety of soil types and on slopes up to about 22°.	**Possible**. Some suitable habitats may be present in the southern portion of the study area.
San Joaquin kit fox (*Vulpes macrotis mutica*)	FE, CT	Annual grasslands or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing, and suitable prety base.	**Present**. CNDDB records indicate that this species is presumed extant in Fresno, Merced, Stanislaus and San Joaquin Counties.

Fresno kangaroo rat (*Dipodomys nitratoides exilis*)	FE, CE	Prefers arid, alkaline plains with sparse vegetation, where it consumes seeds of annuals and shrubs, including saltbush. There are no known populations within the circumscribed historical geographic range in Merced, Madera, and Fresno Counties. A single male Fresno kangaroo rat was captured twice in autumn 1992 on the Alkali Sink Ecological Reserve, west of Fresno.	**Unlikely**. The study area occupies part of this pecies historical range. However, the absense of detections since 1992 in spite of intense survey efforts suggets that it may now be extinct.

*Adapted from CNDDB, 2009 and USFWS list for project area USGS quadrangles.

DEFINITIONS OF OCCURRENCE INDCATORS

Present: Species observed on the study area at time of field surveys or during recent past.

Likely: Species not observed on the study area, but it may reasonaly be exptected to occur there on a regular basis.

Possible: Species not observed on the study area, but it could occur there from time to time.

Unlikely: Species not observed on the study area, and would not be exptected to occur there except, perhaps, as a transient.

Absent: Species not observed on the stuy area, and precluded from occurring there because habitat requirements not met.

LISTING STATUS CODES

FE: Federally Endangered

FT: Federally Threatened

FD: Federally Delisted

CE: State Endanged

CT: State Threatened

CSC: Calfiornia Species of Concern

Table 3-5 Threatened and Endangered Species List

3.4.2 Environmental Consequences

No Action

Under the No Action Alternative, no non-CVP water would be conveyed or stored in CVP facilities. There would be no impacts to biological resources since conditions would remain the same as existing conditions.

Proposed Action

There would be no impacts to biological resources. Most of the habitat types required by species protected by the ESA do not occur in the project area. The Proposed Action would not involve the conversion of any land fallowed and untilled for three or more years. The Proposed Action also would not change the land use patterns of the cultivated or fallowed fields that do have some value to listed species or birds protected by the Migratory Bird Treaty Act (MBTA). Due to the fact that the Warren Act related water would not reach streams containing listed fish species, there would be no affects to these species. No critical habitat occurs within the area affected by the Proposed Action and so none of the primary constituent elements of any critical habitat would be affected.

Potential effects to giant garter snakes would be expected only if the water quality parameters exceed identified as toxic or of concerns (e.g., CVRWQCB 1998, USBR 2004b, CCR 2009). Daily water quality monitoring, with the requirement of pumps ceasing if water quality objectives are exceeded, however, would avoid effects to the species. A brief "lag time" between detection of the exceedance (and the resultant shutting down of pumps) and the subsequent reduction in contaminant concentration will be no more than a day or two and would

not cause any effect over the extremely short duration before the water quality standards are returned to the target levels.

Transfers may occur between contractors within the same geographical areas to conduct annual transfers. It is not known at this time which, if any, transfers would occur. Future water transfers must comply with the ESA.

The short duration of the water availability, the requirement that no native lands be converted without consultation with U.S. Fish and Wildlife Service (Service), and the stringent requirements for transfers under applicable laws would preclude any impacts to wildlife, whether federally listed or not.

3.5 Socioeconomic Resources

3.5.1 Affected Environment

The San Joaquin Valley economic region had 1,227,200 jobs in 2002, an increase of 227,300 from 1990. Government, federal, state and local, the largest employer in the economic region, totaled 254,600 jobs. Agriculture, forestry and fishing ranked second with 177,000 jobs. Retail trade came in third with 131,000 jobs and manufacturing was fourth with 109,900 jobs. Health care and social assistance ranked fifth with 107,300 jobs and accommodations and food services followed with 78,900 jobs. Construction and administrative and waste services contributed another 114,400 to the total, and transportation and warehousing and other services provided 75,600.

During the 12-year period (1990-2002) the San Joaquin Valley regional economic base grew by 227,320 net new jobs, All-government led the San Joaquin Valley economic region in job growth by adding 56,700 jobs to the economic region's job base. Health care and social assistance was second adding 34,900 jobs followed by retail trade which added 22,400, and accommodations and food services which added 21,600 jobs. Administrative and waste services contributed 20,900 jobs, and transportation and warehousing added 15,000 jobs. Construction contributed another 13,300 jobs. Two of the San Joaquin Valley's traditional industries, manufacturing and agriculture added only 11,300 and 700 to the total, respectively, and other services added 9,100 (California Regional Economies Project 2004).

The California Department of Finance develops population and ethnicity estimates and projections at the county level. The Hispanic community makes up a large portion of the regional population. It is estimated that over 40 percent of the regional population was identified as Hispanic in 2002.

3.5.2 Environmental Consequences

No Action

Reclamation would not approve Warren Act contracts to convey and store non-CVP water in CVP facilities. Non-CVP water could not be distributed to other areas to supplement the diminished CVP water supply. The economic viability of the area is based on agricultural productivity. Socioeconomic resources would be adversely affected by the reduction of farm operations due to reduced water supplies. Farmers may not be able to get production loans. Some fields would not be planted and permanent crops would be stressed. Demand for local

labor and farm supplies would be reduced. Under the No Action Alternative, there would be adverse impacts to socioeconomic resources due to fallowing of 20,000 acres.

Proposed Action

Under the Proposed Action, participating districts could convey and store non-CVP water in CVP facilities to supplement their CVP water supply. Since water supply allocations may be reduced to lower than 40 percent, districts must find supplemental supplies in order to sustain agricultural production. The 2009 Warren Act contracts would allow blended non-CVP water to be distributed to sustain up to 20,000 acres of permanent crops.

3.6 Environmental Justice

3.6.1 Affected Environment

Executive Order 12898, dated February 11, 1994, requires Federal agencies to ensure that their actions do not disproportionately impact minority and disadvantaged populations. The population of some small communities typically increases during late summer harvest. The market for seasonal workers on local farms draws thousands of migrant workers, commonly of Hispanic origin from Mexico and Central America.

3.6.2 Environmental Consequences

No Action

Under the No Action Alternative, Reclamation would not approve a Warren Act contract. Without the use of Reclamation's facilities for conveyance, new facilities may have to be constructed or other sources of water found. It is not known at this time what those facilities or sources would be. Current demand for local labor would be reduced with the No Action Alternative.

Proposed Action

Implementing the Proposed Action would not cause any harm to minority or disadvantaged populations within the Proposed Action area. A Warren Act contract would allow the water districts to use their non-CVP water for irrigation in their service area. The availability of this water would help maintain agricultural production and local employment if 2009 is a dry year.

3.7 Cumulative Impacts

Reclamation's action would be allowing non-CVP water to be conveyed in the DMC and stored in the SLR. Subsequent actions are beyond Reclamation's approval and authority. Reclamation has made Warren Act contracts available in previous years when excess capacity was available. Most likely in 2009, more Districts will be requesting Warren Act contracts since it may be a dry year and groundwater is needed to supplement the reduced CVP supply. This is a one-year action, and the cumulative amount the districts are limited to under this Proposed Action is 50,000 AF. However, Districts can request a Warren Act contract separate from this Proposed Action for up to 10,000 AF of non-CVP water, but this action would be analyzed in a separate environmental document. Additionally, in accordance with the Warren Act, Reclamation would continue to make these contracts available to requesting districts in future years, given that each district meets present and future requirements for Warren Act contracts.

At a later date, SLDMWA may also request Warren Act contracts for up to 10,000 AF for each of their districts for a combined total of up to 90,000 AF in water year 2009. This action would require further environmental analysis.

Agricultural run-off and groundwater pump-in would have cumulative water quality effects to the Mendota Pool; however, the Contracting Officer would terminate conveyance should water quality exceed State water quality standards.

There is an existing well located on a farmland that DPWD desires to use to discharge groundwater into the DMC at milepost 32.35L. Reclamation is proposing to issue a permit to DPWD which would allow them to install a 6-inch pipeline from their well, which would eventually terminate over the DMC. The well currently meets all water quality standards as required by Reclamation, and would be required to maintain those standards under the Proposed Action. Construction would begin as soon as the permits are issued and would last approximately two weeks.

Marvin Meyers also has an approved water banking program that is planning to pump into the Pool in 2009. Use of CVP water in Mr. Meyer's groundwater bank was analyzed in an EA dated May 9, 2005 entitled "Meyers Farm Water Banking Project" and more information on the project can be found in that analysis. Mr. Meyers plans to pump 4,922 AF into the Pool in 2009. This year they are going to pump:

February	372 AF
March	659 AF
April	638 AF
May	659 AF
June	638 AF
July	659 AF
August	659 AF
September	638 AF

The Meyers banked water is of relatively high quality and would not contribute to water quality degradation in Mendota Pool.

Adjacent landowner pumping contributes lower quality groundwater in Mendota Pool. Overall, however, after considering all sources of water quality impacts to Mendota Pool, the constituent concentrations due to the Proposed Action are small changes for a brief period of time and would not approach water quality screening criteria.

The cumulative effects of groundwater pumping and continued application of irrigation water to agricultural lands would contribute to the current groundwater overdraft conditions. Continued trends in groundwater elevations and subsidence are expected to continue with or without the Proposed Action.