

RECLAMATION

Managing Water in the West

Draft Environmental Assessment

Two-Year Exchange Agreements and/or Warren Act Contracts for Conveyance of Groundwater in the Delta-Mendota Canal – Contract Years 2012 through 2014 (March 1, 2012 – February 28, 2014)

EA-12-005



U.S. Department of the Interior
Bureau of Reclamation
Mid Pacific Region
South-Central California Area Office
Fresno, California

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Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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List of Acronyms and Abbreviations

AF	AF
AF/y	AF per year
APE	area of potential effects
BCID	Banta-Carbona Irrigation District
BBID	Byron Bethany Irrigation District
BO	Biological Opinion
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CCID	Central California Irrigation District
CDFG	California Department of Fish and Game
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
DMC	Delta-Mendota Canal
DPWD	Del Puerto Water District
DSA	Direct Service Area
DWR	California Department of Water Resources
EA	Environmental Assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
Exchange Contractors	San Joaquin River Exchange Contractors
FWCA	Fish & Wildlife Coordination Act
GHG	Greenhouse gases
ITA	Indian Trust Assets
MBTA	Migratory Bird Treaty Act
Mendota WA	Mendota Wildlife Area
Mg/L	milligram per liter
M&I	municipal and industrial
MOU	Memorandum of Understanding
MP	Milepost
MSWD	Mercy Springs Water District
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
O ₃	ozone
NAAQS	National Ambient Air Quality Standards
NO ₂	nitrogen dioxide
Pacheco	Pacheco Water District
Panoche	Panoche Water District
Pb	Lead

PID	Patterson Irrigation District
PM _{2.5}	particulate matter 2.5
PM ₁₀	particulate matter 10
Project	Central Valley Project
PWD	Panoche Water District
Reclamation	Bureau of Reclamation
SIP	State Implementation Plan
SJV	San Joaquin Valley
SJVAB	San Joaquin Valley Air Basin
San Joaquin River	San Joaquin River
SLC	San Luis Canal
SLDMWA	San Luis & Delta-Mendota Water Authority
SLWD	San Luis Water District
SO ₂	sulfur dioxide
SOD	south-of-Delta
SWP	California State Water Project
TDS	total dissolved solids
WWD	Westlands Water District
USFWS	United States Fish and Wildlife Service

Section 1 Introduction

The Bureau of Reclamation (Reclamation) proposes to issue Exchange Agreements and/or Warren Act contracts to requesting Central Valley Project (CVP) contractors within the Delta Division and San Luis Unit to convey groundwater in federal water facilities.

1.1 Background

The San Luis & Delta-Mendota Water Authority (SLDMWA), on behalf of seven of its member agencies, has requested approval of two-year Exchange Agreements and/or Warren Act contracts to pump groundwater into the Delta Mendota Canal (DMC) for delivery to contractors during the period March 1, 2012 through February 28, 2014, (Contract Years 2012-2013). The Warren Act (Act as of February 21, 1911, CH. 141, (36 STAT. 925)) authorizes the Reclamation to negotiate agreements to store or convey Non-Project Water when excess capacity is available in federal facilities. Section 14 of the Reclamation Project Act of 1939 allows for contracts for exchange or replacement of water, water rights Section 3408(c) of P.L. 102-575, Title 34, Central Valley Project Improvement Act (CVPIA) allows for the exchange, impoundment, storage, carriage, and delivery of CVP and Non-Project Water for domestic, municipal, industrial, fish and wildlife, and any other beneficial purpose.

1.2 Purpose and Need

California has experienced severe droughts in recent years that have reduced water supplies to many water districts. South-of-Delta (SOD) CVP water service contractors experienced reduced water supply allocations in 2007, 2008, and 2009 due to hydrologic conditions and/or regulatory constraints. Though 2010 and 2011 had above normal rainfall, these CVP contractors received only 45 percent of their full CVP contract supply in 2010 and 80% in 2011. The hydrologic conditions for 2012 have been dry and SOD CVP contractors may get only 30 % of their contract water supply. Operations of the Federal Jones Pumping Plant would continue to be limited due to the various constraints on Delta operations, which would reduce available CVP contract supplies. SOD CVP contractors thus need additional supplies to avoid shortages for their customers.

1.3 Reclamation's Legal and Statutory Authorities and Jurisdiction Relevant to the Proposed Federal Action

Several Federal laws, permits, licenses and policy requirements have directed, limited or guided the National Environmental Policy Act analysis and decision making process of this Environmental Assessment (EA) and include the following:

- Reclamation States Emergency Drought Relief Act – Section 102 of the Reclamation States Emergency Drought Relief Act of 1991 provides for use of Federal facilities and contracts for temporary water supplies, storage and conveyance of Non-Project Water inside and outside project service areas for municipal and industrial (M&I), fish and wildlife and agricultural uses.
- Reclamation States Emergency Drought Relief Act - Section 305 of 1991, enacted March 5, 1992 (106 Stat. 59), also authorizes Reclamation to utilize excess capacity to convey Non-Project Water.
- San Joaquin County Groundwater Export Ordinance Number 401.4 - San Joaquin County has adopted an ordinance, 401.4 Section 5-8100 of Title 5 of the Ordinance Code of San Joaquin

County, which requires a permit to extract and export groundwater for use outside of the county. This ordinance is hereby incorporated by reference into the Proposed Action.

- Contracts for Additional Storage and Delivery of Water – Central Valley Project Improvement Act (CVPIA) of 1992, Title 34 (of Public Law 102-575), Section 3408, Additional Authorities (c) authorizes the Secretary of the Interior to enter into contracts pursuant to Reclamation law and this title with any Federal agency, California water user or water agency, State agency, or private nonprofit organization for the exchange, impoundment, storage, carriage, and delivery of CVP and Non-Project Water for domestic, municipal, industrial, fish and wildlife, and any other beneficial purpose, except that nothing in this subsection shall be deemed to supersede the provisions of section 103 of Public Law 99-546 (100 Stat. 3051). The CVPIA is incorporated by reference.
- Water Quality Standards – Reclamation requires that the operation and maintenance of CVP facilities shall be performed in such manner as is practical to maintain the quality of raw water at the highest level that is reasonably attainable. Water quality standards and monitoring requirements are established by Reclamation to ensure that imported Non-Project Water does not negatively impact existing water quality conditions. These standards are updated periodically. See Appendix B for the current monitoring plan and standards for conveyance of non-project water in the Delta-Mendota Canal.
- Title XXXIV CVPIA, October 30, 1992, Section 3405(a).
- Reclamation Reform Act, October 12, 1982.
- Reclamation’s Interim Guidelines for Implementation of Water Transfers under Title XXXIV of Public Law 102-575 (Water Transfer), February 25, 1993.
- Reclamation and United States Fish and Wildlife Service (USFWS) Regional, Final Administrative Proposal on Water Transfers, April 16, 1998.
- Reclamation’s Mid-Pacific Regional Director’s Letter entitled “Delegation of Regional Functional Responsibilities to the Central Valley Project (CVP) Area Offices – Water Transfers”, March 17, 2008.
- Warren Act - Act as of February 21, 1911, CH. 141, (36 STAT. 925) authorizes the Bureau of Reclamation (Reclamation) to negotiate agreements to store or convey Non-Project Water when excess capacity is available in federal facilities.
- February 3, 2012 letter from the San Joaquin River Exchange Contractors Authority.

1.4 Scope

This EA has been prepared to examine the potential impacts on environmental resources as a result of No Action Alternative of not conveying Non-Project Water in federal facilities and the Proposed Action of conveying Non-Project Water in federal facilities.

The following districts are considered in this EA in the effects analysis and could potentially participate in this Proposed Action (Also see Figure 1-1):

- Banta-Carbona Irrigation District (BCID)
- Del Puerto Water District (DPWD)
- Mercy Springs Water District (MSWD)
- Pacheco Water District (PWD)
- Panoche Water District (Panoche)
- San Luis Water District (SLWD)
- West Stanislaus Irrigation District (WSID)

1.5 Resources Eliminated from Further Analysis

Reclamation analyzed the affected environment of the Proposed Action and No Action Alternative and has determined that there is no potential for direct, indirect, or cumulative effects to the following resources:

- **Cultural Resources:** There would be no impacts to cultural resources as a result of implementing the Proposed Action or No Action Alternative. The Proposed Action would facilitate the flow of water through existing facilities to existing users. No new construction or ground disturbing activities would occur as part of the Proposed Action. The pumping, conveyance, and storage of water would be confined to existing wells, pumps, and CVP facilities. These activities have no potential to cause effects to historic properties pursuant to 36 CFR Part 800.3(a)(1).
- **Global Climate:** Neither the Proposed Action or No Action Alternative would involve physical changes to the environment or construction activities and therefore, would not impact global climate change. However, global climate change is expected to have some effect on the snow pack of the Sierra Nevada and the run off regime. 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.

As there would be no impact to the resources listed above as a result of the Proposed Action or the No Action alternative, they will not be considered further.

1.6 Resources Requiring Further Analysis

This EA will analyze the affected environment of the Proposed Action and No Action Alternative in order to determine the potential direct, indirect, and cumulative effects to the following resources:

- Water Resources
- Geologic Resources
- Land Use
- Biological Resources
- Indian Sacred Sites
- Indian Trusts Assets
- Environmental Justice
- Socioeconomic Resources
- Air Quality

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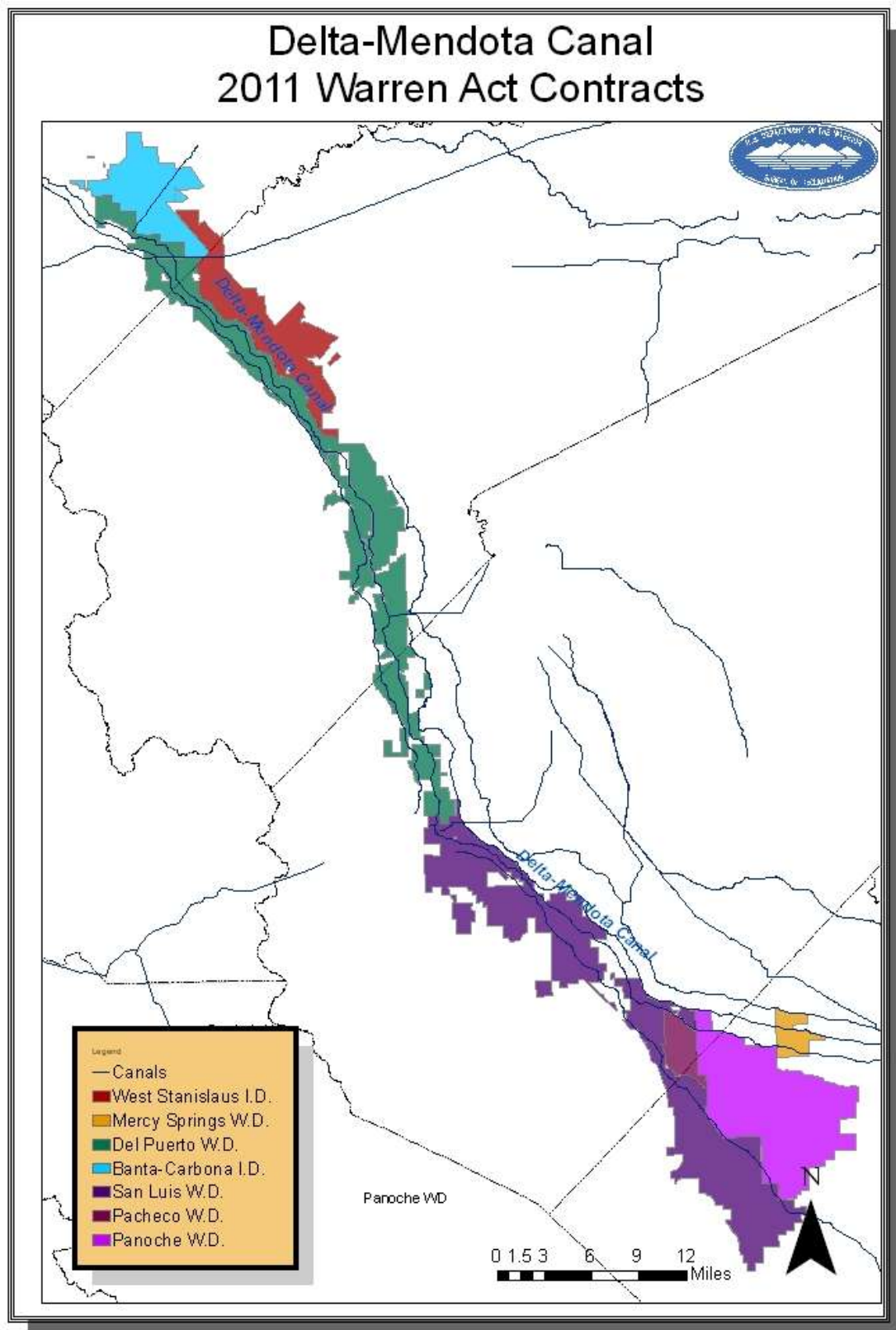


Figure 1-1 General Location Map

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Section 2 Alternatives Including the Proposed Action

This EA considers two possible actions: the No Action Alternative and the Proposed Action. The No Action Alternative reflects future conditions without the Proposed Action and serves as a basis of comparison for determining potential effects to the human environment.

2.1 No Action Alternative

The No Action Alternative consists of the continuation of deliveries of CVP water supply in accordance with the terms and conditions of the applicable districts' CVP water service contracts. Reclamation would not issue two-year Exchange Agreements and/or two-year Warren Act contracts to requesting CVP contractors within the Delta Division and San Luis Unit for the next two contract years. The districts could still pump groundwater for local use, but would not be authorized to pump the groundwater into the DMC for conveyance to other areas.

2.2 Proposed Action

Reclamation proposes to issue two-year Exchange Agreements and/or two-year Warren Act contracts to requesting CVP contractors within the Delta Division and San Luis Unit. The term would be March 1, 2012 through February 28, 2013 for pumping and conveyance, and March 1, 2012 through February 29, 2014 for storage in San Luis Reservoir (SLR) and conveyance from the SLR.

Reclamation has capped the Proposed Action at 50,000 acre-feet (AF) for all the districts combined participating in the DMC Pump-in Program. That is to say, the total amount of groundwater pumped into the DMC would not exceed that 50,000 AF. Conveyance and storage of Non-Project Water in CVP facilities would be subject to available capacity.

Table 2-1 is a list of the water districts that could potentially participate in this Proposed Action and the estimated pumping quantities.

Table 2-1 Warren Act Contract/Exchange Agreement Quantities for Pumping into DMC

District	Quantity for 2012 (AF)
Banta Carbona Irrigation District	5,000
Del Puerto Water District	10,000
West Stanislaus Irrigation District	3,000
San Luis Water District	10,000
Panoche Water District	10,000
Pacheco Water District	6,000
Mercy Springs Water District	6,000
Total	50,000

Table 2-2 is a list of those districts that would require delivery of a portion of the 50,000 AF of Non-Project Water from the DMC to the San Luis Canal (SLC) via an exchange with Reclamation.

Table 2-2 Groundwater Pumping Requiring Exchange with Reclamation from the SLC

District	Quantity for 2012 (AF)
San Luis Water District	10,000
Panoche Water District	10,000
Pacheco Water District	6,000

2.2.1 Source of Non-Project Water

The source of the Non-Project Water would be groundwater pumped from privately owned wells directly into the DMC. The quantity of groundwater pumped into the DMC would be measured with flow-meters that would be read and calibrated by SLDMWA field staff. The district would then take out a like amount from turnouts on either the DMC or the SLC to be conveyed through their distribution systems for agricultural use to water users within the district.

Those wells that require new testing would be tested in accordance with the requirements described in the 2012 Delta-Mendota Canal Pump-in Program Water Quality Monitoring Plan in Appendix B (2012 Monitoring Plan).

Any other wells within the spatial extent of this environmental analysis may be included in the program as long as they meet the water quality requirements specifically described in the 2012 Monitoring Plan. Note that addition of wells would not increase per district volume or total volume of non-project water that could be conveyed under this program.

All wells that are found to meet the requirements described in the Delta-Mendota Canal 2012 Water Quality Monitoring Program must have an exhibit C amendment in the contract prior to pumping.

2.2.2 Environmental Commitments/Requirements for the Proposed Action

Each district would be required to confirm that the proposed pumping of groundwater would be compatible with local groundwater management plans. Each district would be limited to pumping a quantity below the “safe yield” as established in their groundwater management plan, in order to prevent groundwater overdraft and avoid adverse impacts.

Water quality and monitoring requirements are established by Reclamation. These standards were established to protect water quality in federal facilities by ensuring that imported water does not impair existing uses or negatively impact existing water quality conditions. The 2012 Monitoring Plan will measure changes in the quality of water caused by the conveyance of groundwater during 2012. The plan has been prepared by Reclamation, in cooperation with the SLDMWA, and the San Joaquin River Exchange Contractors Water Authority (Exchange Contractors), with assistance from staff of BCID, DPWD, SLWD, and Panoche.

In 1995, the wells in the Lower DMC were grouped into four Management Areas in order to manage the pumping program. Subsidence from groundwater pumping occurred in Management Areas 2 and 3, resulting in subsidence to the canal and local facilities. As such, pumping in those two areas has been excluded in current program. In addition, pumping may be limited in the Los Banos area due to changes in groundwater levels in city wells alleged to be the result of non-project wells. A new groundwater study is due in Spring 2012. Reclamation would work with the City, Exchange Contractors, and San Luis Water District to prevent local problems.

The water would be used for irrigation purposes on established lands. There would be no new construction or excavation occurring as part of the Proposed Action. Pumping and conveyance would

occur within existing wells, meters, and pipes across DMC right-of-way, and existing water diversion and field delivery facilities.

No native or untilled land (fallow for three years or more) may be cultivated with the water involved with these actions. Most of the water would be used to sustain permanent crops (orchards, vineyards).

In addition to Reclamation's groundwater monitoring program requirements, conditions specified in the Environmental Commitment Program (Appendix A) and San Joaquin River Exchange Contractors' Water Authority letter would be complied with.

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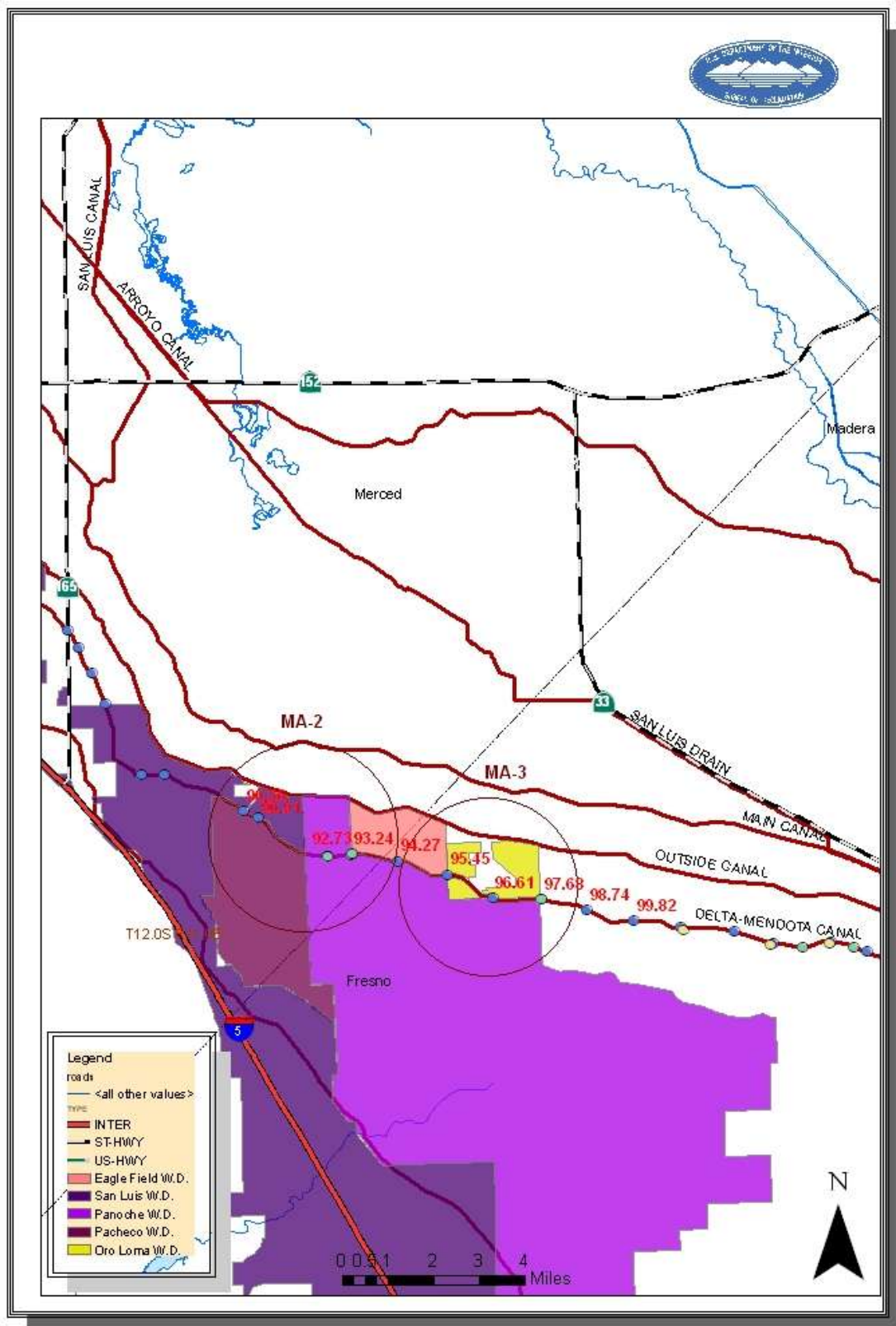


Figure 2-1 Well Management Areas 2 and 3

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Section 3 Affected Environment and Environmental Consequences

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

3.1 Water Resources

3.1.1 Affected Environment

Surface Water Resources

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 deliveries of CVP water on a yearly basis for agriculture purposes from 2007 to 2011. The five-year average is 49 percent of contract amounts for agriculture.

Table 3-1 5-Year CVP Allocation Percentages

Year	Allocation Percentage
2007	50
2008	40
2009	10
2010	45
2011	80
5-year Average	45
2012 Forecast	30

The annual contract amounts for the districts is 442,212 AF, thus the baseline supply is 198,995 AF (Table 3-2).

Table 3-2 Baseline Supply

Water District	Maximum Contract Amount	45 Percent of Contract Amount	30 percent of Contract Amount
Banta-Carbona Irrigation District	20,000	9,000	6,000
Del Puerto Water District	140,210	63,094	42,063
Mercy Springs Water District	2,842	1,279	853
West Stanislaus Irrigation District	50,000	22,500	15,000
Pacheco Water District	10,080	4,536	3,024
Panoche Water District	94,000	42,300	28,200
San Luis Water District	125,080	56,286	37,524
TOTAL	442,212	198,995	132,664

Banta-Carbona Irrigation District BCID is located in San Joaquin County just south of the City of Tracy and is adjacent to the DPWD to the southwest and the WSID to the southeast. The district's primary supply of water is its pre-1914 water rights on the San Joaquin River. Historically, the district uses all of its pre-1914 water rights in order to irrigate lands within the district. The district has a contract with Reclamation for 20,000 AF of CVP water. CVP water is used as a supplemental supply to the district's pre-1914 water supply for agricultural purposes.

Del Puerto Water District DPWD is primarily an agricultural district. DPWD irrigates 40,000 acres and its contract amount is 140,210 AF of CVP water. Currently, the only CVP supply used for M&I purposes is the one or two acre-foot per month of landscape water supplied to a small amount of acreage recently converted to commercial use. All remaining CVP supplies are used for agriculture.

Mercy Springs Water District Mercy Springs Water District (MSWD) is entirely an agricultural district. MSWD's current size is 3,618 acres and has a CVP contract supply of 2,842 AF. Across most of the district, salt tolerant pasture grasses and halophytes are grown with local drainage water under the Grassland Bypass Project.

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 CVP supply is their primary water supply although the district also has a surface water supply of Non-Project Water from the Central California Irrigation District (CCID). The district also owns one groundwater well but does not pump groundwater due to the quality problems.

Panoche Water District 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 current contract with Reclamation is for 94,000 AF per year. The contract service area is approximately 35,000 acres. PWD supplies about 50 AF of water per year for M&I purposes.

West Stanislaus Irrigation District WSID serves an area that is unincorporated and agricultural, located west of the San Joaquin River, northwest of the City of Patterson. The district includes the unincorporated communities of Westley, Grayson and Vernalis. A small portion of the district extends into San Joaquin County. WSID's current size is approximately 21,676 acres.

WSID provides its customers with irrigation water for agricultural purposes. This water is provided via several sources including WSID's pre-1914 water rights from the Tuolumne and San Joaquin Rivers, groundwater from four deep wells within WSID's boundaries, and importing water from the DMC as part of their CVP contract for 50,000 AF. WSID, under a water rights agreement, also sells their pre-1914 water rights water for irrigation purposes to 13 landowners, which includes approximately 2,203 irrigable acres outside its sphere of influence in the "White Lake" area (north of the unincorporated community of Grayson) [Stanislaus 2009].

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. SLWD's current size is approximately 66,218 acres and their CVP contract amount is 125,080 AF. 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.

CVP Facilities 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 convey water from the Delta to bolster irrigation supplies to lands formerly dependent on water from the San Joaquin River or groundwater. The facilities also provide for the transport of water through both the Sacramento-San

Joaquin River 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).

San Joaquin River Exchange Contractors The Exchange Contractors consist of Central California Irrigation District, Columbia Canal Company, Firebaugh Canal Water District, and San Luis Canal Company (Figure 3-1). The Exchange Contractors hold historic water rights to the San Joaquin River. Their service area is located on the west side of the San Joaquin Valley. In exchange for the regulation and diversion of the San Joaquin River 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 San Joaquin Valley, spanning a distance roughly from the town of Mendota in the south to the town of Crows Landing in the north. The Exchange Contractors in-district conveyance and delivery systems generally divert water from the DMC and Mendota Pool to convey water to their delivery turnouts. Deliveries include conveyance of water to wildlife areas.

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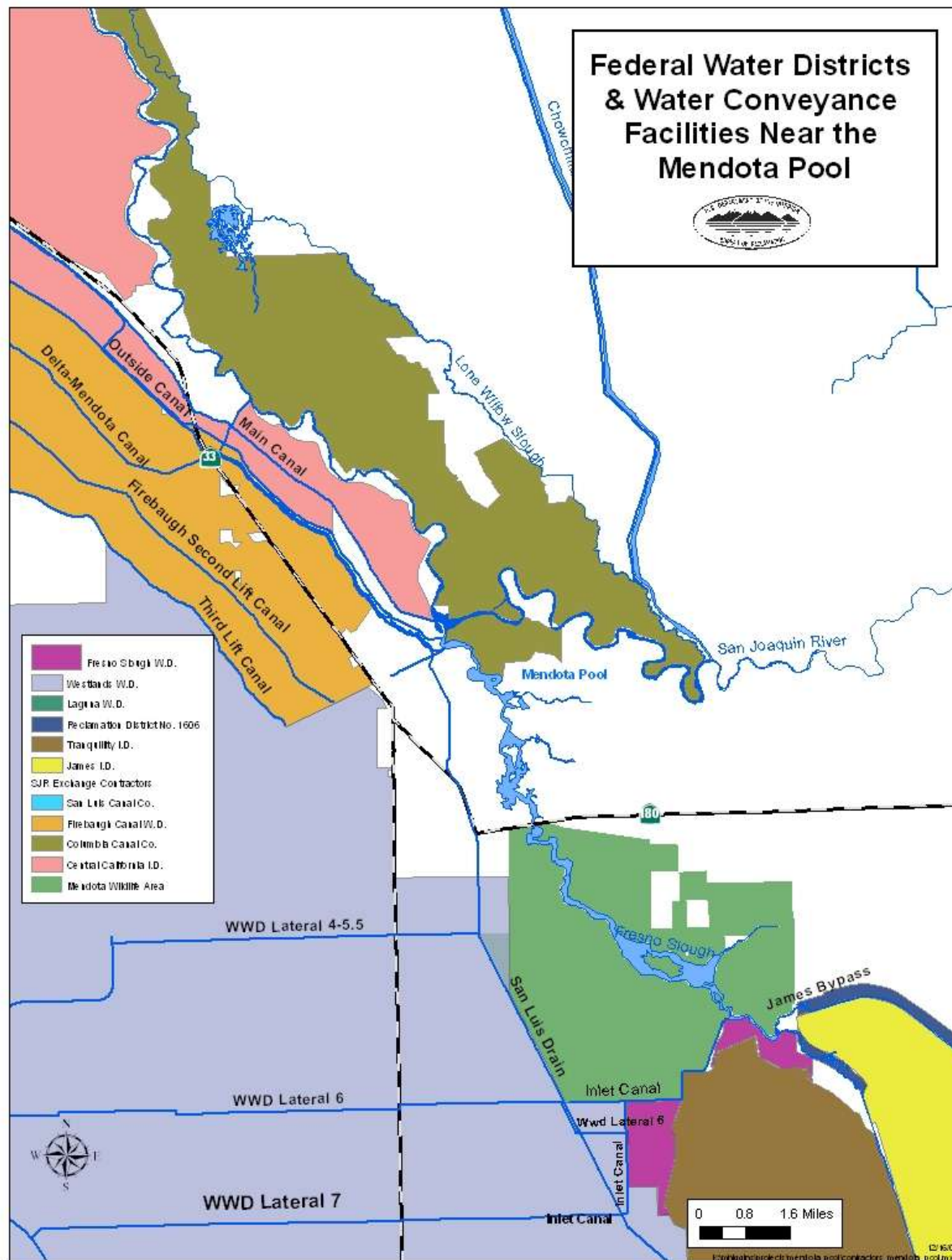


Figure 3-1 Federal Water District and Water Conveyance Facilities near the Mendota Pool

Mendota Pool The Mendota Pool is a regulating reservoir for water pumped from the Delta and delivered by the DMC. The Mendota Pool is impounded by Mendota Dam, which is owned and operated by CCID. Currently, Mendota Pool is sustained by the inflow from the DMC, which typically conveys 2,500 to 3,000 cubic feet per second (cfs) to the Mendota Pool during the irrigation season. A

lesser amount of water from the San Joaquin River enters Mendota Pool under the San Joaquin River Restoration Program; more enters during periods of flood flow from the San Joaquin River and Kings River. Mendota Pool extends over 5 miles up the San Joaquin River 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 due to siltation. 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 on the San Joaquin Valley basin floor.

Water quality conditions in the Mendota Pool depend on inflows from the DMC, groundwater pumped into Mendota Pool from local wells and, to a limited extent, San Joaquin River inflows (Figure 3-2). Water quality in the San Joaquin River varies considerably along the river's length. Between Friant Dam and the Mendota Pool, the quality of water is generally excellent ($\text{TDS} < 50 \text{ mg/L}$). During the irrigation season, most of the water in the Mendota Pool San Joaquin River is imported from the Delta via the DMC. This water has higher concentrations of TDS ($\text{TDS} > 300 \text{ mg/L}$).

An additional source of water into Mendota Pool comes from adjacent land owners pumping groundwater water into Mendota Pool and taking delivery from it off the SLC via an exchange with Reclamation, at convenient timing (but within 30 days of pumping in) and at differing water quality.

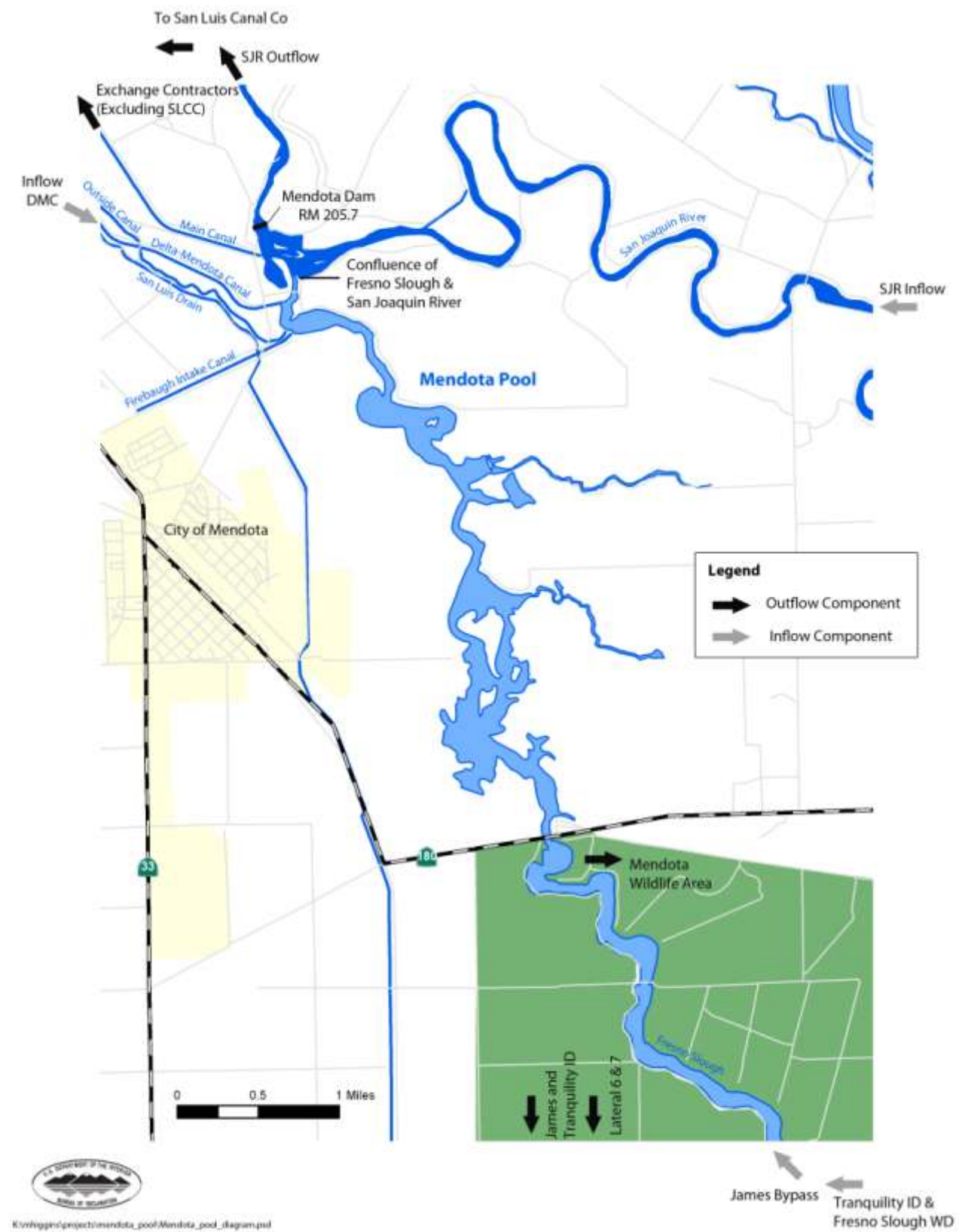


Figure 3-2 Mendota Pool

Groundwater Resources

Two primary hydrologic divisions of the San Joaquin Valley 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 TDS, ranging from 500 milligrams per liter (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 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).

According to DWR Bulletin 118 (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. All of the sub-basins within the San Joaquin River Hydrologic Region have experienced some overdraft (DWR 2003).

In the southern region of the San Joaquin Valley, 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 San Joaquin Valley 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 San Joaquin River, 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 San Joaquin River, 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.

AB 3030 (California Water Code Section 10750 et seq.) allows certain defined existing local agencies to develop a groundwater management plan in groundwater basins defined in DWR Bulletin 118. The groundwater management plan 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 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).

The calculated change in groundwater storage, illustrated in Table 3-3, 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 3-3 Groundwater Balance in the Exchange Contractors Service Area 1993-2002

Year	Total Inflows (AF)	Total Outflows (AF)	Groundwater Pumping (AF)	Change in Groundwater Storage (AF)
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 Groundwater Monitoring Programs Several monitoring programs are currently occurring in the vicinity of the Proposed Action. These monitoring programs are being undertaken by Reclamation, Central Valley Regional Water Quality Control Board, U.S. Geological Survey, California Department of Fish and Game (CDFG), SLDMWA, WWD, Tulare Irrigation District, and James Irrigation District. A brief summary of these monitoring programs is provided in this section. In

addition, several counties have adopted groundwater management plans and/or ordinances (see Table 3-4) [Central Valley Regional Water Quality Control Board 2009].

Most groundwater management ordinances restrict out-of-county groundwater uses. Some groundwater management plans specify trigger levels for groundwater levels in the Subbasin management objectives (BMOs) to prevent overdraft or other water quality problems. However, in many cases, there are no mechanisms to address the non-compliance with the BMOs. The current groundwater ordinances, AB 3030 groundwater management plans, and local BMO activities, which were intended for localized groundwater management, appear not to be well suited for implementing regional groundwater management. These limitations can hinder the effectiveness of conjunctive management in the State (DWR 2009).

Table 3-4 Groundwater Basins, Ordinances, and Districts

County	Subbasin Name	Ordinance	Districts overlying County & Subbasin
SAN JOAQUIN VALLEY HYDROLOGIC BASIN			
Madera	Madera Subbasin ² , Chowchilla Subbasin, Delta-Mendota ³	Yes. Title 13, Water and Sewers, 13.100.050, Ord. 573B § 1(part), 2001. ¹ Requires permit to export groundwater.	None but Delta-Mendota also underlies Fresno, Stanislaus, and Merced Counties. So, there is a connection.
Fresno	Delta-Mendota ³	Yes.	San Luis WD, Panoche WD
San Joaquin	Tracy Subbasin ⁴	Yes.	Byron Bethany ID, West Stanislaus ID, Banta Carbona ID, Del Puerto WD
Stanislaus	Delta-Mendota ³	Groundwater management Plan	West Stanislaus ID, Del Puerto WD
Merced	Delta Mendota ³	No.	Del Puerto WD, San Luis WD, Pacheco WD, Panoche WD
TULARE LAKE BASIN HYDROLOGIC REGION			
Kings	Tulare Lake Subbasin ⁵	No.	Westlands DD #1
Fresno	Madera Subbasin ²	No.	San Luis WD, Panoche WD, Pacheco WD, Mercy Springs WD, Westlands DD #1
SACRAMENTO VALLEY GROUNDWATER BASIN			
Contra Costa	Solano Subbasin	No.	Northwestern part of Byron Bethany ID
¹ Madera County 2009. ² Madera County has adopted an ordinance to provide regulatory control over exporting of groundwater, groundwater banking, and importing of groundwater for the purpose of groundwater banking. ³ Fresno County has a Groundwater Management Ordinance restricting the extraction and transfer of groundwater outside of the County. It requires that the groundwater resources of Fresno County be protected from harm resulting from extraction and transfer of groundwater for use on lands outside the county and consequential transfer of surface water outside of the county due to extraction. A County-issued permit is required for groundwater transfer, directly or indirectly, outside of the County, unless the action is exempted or a permit first obtained. ⁴ San Joaquin County adopted a groundwater management ordinance in 1996 and an amendment in 2000, regarding extraction and exportation of groundwater from San Joaquin County. The ordinance requires that a permit be obtained for use of extracted groundwater outside the County boundaries. ⁵ There are no known pertinent ordinances or regulations that affect groundwater in the Tulare Lake Subbasin.			

The SLDMWA adopted an AB3030 Northern groundwater management plan. The plan participants are composed of the Byron Bethany ID, Banta-Carbona ID, City of Tracy, Del Puerto WD, Patterson WD, San Joaquin County FC&WCD, West Side ID, and West Stanislaus ID. SLDMWA also prepared a Groundwater Management Plan for the Southern Agencies in the Delta-Mendota Canal Service Area and the following districts are participants: Pacheco WD, Panoche WD, Eagle Field WD, Oro Loma WD, Widren WD, Mercy Springs WD, Broadview WD and San Luis WD.

The groundwater pumping under the Groundwater Pump-in Program for the last 10 years (Table 3-5) shows that groundwater pumping has increased substantially beginning with drought year 2008. It also

correlates with the pumping curtailments that began in 2007 in response to Federal Judge Oliver Wanger's Delta Smelt Interim Remedy Order.

Table 3-5 Past Groundwater Pumping Under the Groundwater Pump-in Program

CVP District	2011*	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
BCID	0	817	2,756	1,273	0	0	0	0	0	0	0
BBID	0	0	1,038	0	0	0	0	0	0	0	0
DPWD	0	1,871	7,061	2,029	0	0	0	100	0	0	123
MSWD	0	0	6,584	0	0	0	0	0	0	0	0
Pacheco	0	0	4,370	0	0	0	0	0	0	0	0
Panoche	5104	8,199	5,663	7,184	744	0	0	0	0	0	0
SLWD	874	2,392	5,040	2,909	999	0	0	660	765	2766	3048
WSID	0	0	0	0	0	0	0	0	0	0	0
TOTAL											
10-YR Total											
Data based on contract year (March through February) deliveries											
Non-CVP pumped quantities are in AF											
*2011 data retrieved through December 2011											

Sump Monitoring Reclamation operates six sumps located beside the DMC between Russell Avenue at MP 97.68 and Washoe Avenue at MP 110.12. The sumps drain adjacent farmland and this water has been pumped into the canal since 1952. Though the volume is very low (less than 2 cfs), the water in each sump contains toxic concentrations of selenium. Reclamation has been monitoring each sump since 1987. Since 1998, the sumps have been sampled twice yearly for boron and mercury. Selenium and electrical conductivity are measured weekly in all six sumps. In 2009, Reclamation committed \$500,000 for the design and construction of a pipeline to connect the sumps and end their discharge into the canal. Reclamation is in negotiations with Panoche Drainage District to treat and dispose of the sump water.

Selenium Monitoring A selenium monitoring program was initiated in July 2002. Daily composite samples of water are measured for selenium and TDS using autosamplers at three locations along the DMC and at the head of the CCID Main Canal.

Drinking Water Quality A fourth program was initiated in November 2002 at the request of the California Department of Health Services. Reclamation 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.

3.1.2 Environmental Consequences

No Action

Under the No Action Alternative, no Exchange Agreements or Warren Act contracts would be issued to any San Luis Unit or Delta Division contractor. No groundwater would be pumped into the DMC. 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. Under the No Action Alternative water districts could continue to pump groundwater to irrigate adjacent crops. Effects from groundwater overdraft would continue.

Proposed Action

Surface Water: The Proposed Action would allow groundwater to be conveyed and stored in CVP facilities when excess capacity is available. This would allow the ground water to be delivered to other areas to supplement diminished CVP water supplies in 2012 and 2013. No new facilities would be constructed as a result of the Proposed Action. There would be no construction or modification to the DMC and 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 from which the Exchange Contractors divert water, they would be monitoring the water quality at Mendota Pool.

Groundwater: The total quantity of groundwater that can be pumped into the DMC under the Proposed Action would be limited to 50,000 AF, and that quantity would be divided among the San Luis Unit and Delta Division contractors listed in Table 2-1. However, each district would be limited to pumping a quantity below the "safe yield" as established in the groundwater management plan, in order to prevent groundwater overdraft and avoid adverse impacts. Safe yield is defined as the amount of groundwater that can be continuously withdrawn from a basin without adverse impact. The amount of water pumped into the DMC would be credited to that district. The quantity of groundwater pumped into the DMC by a district would then be delivered back into the district and used for irrigation purposes throughout the originating district. Though some of the water used for irrigation would be used up by evapotranspiration, some would also seep back into the ground.

Additionally, 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 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. The 2012 Monitoring Plan 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. The groundwater monitoring implemented as part of the Proposed Action would provide specific and detailed information about the effects of groundwater pumping in the area.

These findings indicate that there would be no adverse impact to water resources resulting from the Proposed Action.

Cumulative Impacts

Because the Proposed Action would not involve construction or modification or interfere with operations, there would be no cumulative impacts to existing facilities or other contractors. Because pumping would be restricted to below the safe yield, there would not be cumulative impacts to groundwater. Because groundwater quality would be monitored throughout the year, there would be no cumulative impacts to water quality involving water delivered through the DMC.

3.2 Geologic Resources

3.2.1 Affected Environment

Regional Subsidence

Land subsidence in the San Joaquin Valley has been studied extensively in the past by the USGS and DWR. A State-Federal committee on subsidence was formed in the early 1950's that measured subsidence until 1970. By 1970, 5,200 square miles in the San Joaquin Valley had subsided more than 1 foot. Between 1926 and 1970, a maximum of 29.7 feet of subsidence was measured at a point southwest of Mendota. The compacting forces caused by groundwater level decline squeezed more than 15.6 million AF of water out of San Joaquin Valley sediments during the same period.

There are two types of land subsidence due to withdrawal of groundwater resources; elastic and inelastic. Elastic subsidence is not permanent and is largely reversible, if water levels recover to above historic low levels. Inelastic subsidence is permanent and occurs when water is removed from a confined aquifer for the first time, and is sometimes referred to as virgin subsidence. Between the mid-1920's to about 1980 the San Joaquin Valley experienced inelastic, non-recoverable subsidence.

The most recent reports on land subsidence in the San Joaquin Valley were completed by R.L. Ireland of the USGS in 1986 and Arvey A. Swanson of DWR in 1995. Ireland (1986) states that "*Land subsidence to groundwater withdrawal in the San Joaquin Valley that began in the mid-1920's and reached a maximum of 29.7 feet in 1981 has been halted by the importation of surface water through major canals and the California Aqueduct in the 1950's through 1970's.*" This was evident because large scale regional subsidence had halted, but smaller-scale local subsidence continued in many areas.

3.2.2 Environmental Consequences

No Action

Under the No Action Alternative, no Exchange Agreements or Warren Act contracts would be issued. No groundwater would be pumped into the DMC, however water districts could continue to pump groundwater to irrigate adjacent crops potentially contributing to overdraft.

Proposed Action

The 2012 Monitoring Plan (Appendix B) includes measures to ensure that overdraft and resulting subsidence does not occur from the Proposed Action. Measures include:

- All districts participating in the 2012 DMC Pump-in Program must provide the depth to groundwater in every well before pumping into the DMC commences;
- Though most of the wells are privately owned, the Districts must provide access to each well for Reclamation and Authority staff;
- All compliance monitoring data collected by the Authority would be entered into worksheets and presented each week to Reclamation via e-mail. Reclamation would review the data to identify potential changes in the local aquifer that could lead to overdraft or subsidence;
- Groundwater measurements have been collected by the Authority since May 1995. The current depth to groundwater in each well would be compared to the measured depths. If the current depth exceeds the maximum measured depth, Reclamation would recommend that the District stop pumping from that well until the depth of water recovers to an agreed depth, such as the median observed depth.

These measures would ensure that overdraft and resulting subsidence does not occur from the Proposed Action.

Cumulative Impacts

Cumulative impacts resulting in overdraft and/or subsidence would be avoided because pumping would cease if current depth exceeds the maximum measured depth.

3.3 Land Use

3.3.1 Affected Environment

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.

Whenever a new urban expansion is planned, the land is deleted from district boundaries. Attachments and detachments are expected to continue as the City of Tracy and the Interstate 5 corridor continue to grow. Currently, a few parcels within the district are targeted for detachment and would be annexed to the City of Tracy. 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.

Del Puerto Water District

DPWD is primarily an agricultural district. DPWD irrigates 40,000 acres and its water needs are 131,000 AF/y. 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. There are about 170 water users in the district and more than 30 different crops have been grown commercially in the district over the years.

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.

Mercy Springs Water District

MSWD is approximately 3,390 acres in size, of which 3,336 acres are irrigable. MSWD is entirely an agricultural district. 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 (Reclamation 2005b).

Pacheco Water District

PWD's current size is approximately 4,730 acres in size, of that 4,242 acres are irrigated.

Panoche Water District

Panoche is approximately 38,000 acres in size, of which approximately 37,000 acres are irrigated.

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 San Joaquin Valley that led to the formation of SLWD in January 1951. SLWD's current size is approximately 66,218 acres.

The southern section of the district located in Fresno County is primarily agricultural. 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.

West Stanislaus Irrigation District

WSID irrigates approximately 22,500 acres of cropland through 84 miles of laterals and sublaterals. Although Delta water typically is of better quality than San Joaquin River water WSID typically diverts its maximum allocation from the San Joaquin River, largely on account of the lower cost (San Joaquin River Dissolved Oxygen Technical Working Group 2002).

3.3.2 Environmental Consequences

No Action

Under the No Action Alternative, no Exchange Agreements or Warren Act contracts would be issued that would allow this Non-Project Water to be conveyed and stored in CVP facilities. In the event of a dry year, there could be some adverse impacts to crops if supplemental supplies of water are not found. According to SLDMWA (Mizuno personal communication 2009), under the No Action Alternative an estimated total of 30,000 acres (DPWD – 11,000 acres, SLWD – 8,000 acres, and PWD – 11,000 acres) of additional land could be fallowed.

Proposed Action

There would be no impacts to land use resulting from the Proposed Action. The Proposed Action would utilize CVP water to help district agricultural lands remain in production, and to convey Non-Project 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-Project 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 development.

Cumulative Impacts

Because the Proposed Action would not involve construction or other land disturbance, and because the Proposed Action supports current land use, there would be no cumulative adverse impacts to land use.

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 Wildlife Area (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 Level 2 and Level 4 water supplies:

- 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.

At 12,425 acres, Mendota WA is the largest publicly owned and managed wetland in the San Joaquin Valley. 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.

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 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

CVP water is typically conveyed to Mendota WA using the DMC and Mendota Pool. Mendota Pool floods a portion of San Joaquin River 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 the 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.

Detailed baseline habitat information was provided in EA/FONSI-08-98, *Approval of One-Year Temporary Warren Act Contracts for the Conveyance of Non-CVP Water in the Delta-Mendota Canal*, EA-08-98, February, 27, 2009 and is hereby incorporated by reference. That information will not be repeated here. The habitats associated with the Proposed Action area include non-native grassland, agricultural, valley foothill riparian, alkali desert scrub, ruderal, and freshwater emergent wetlands.

The following list (Table 3-6) was obtained on February 16, 2012, by accessing the USFWS Database (Document Number 120216063459). The list is for the following USGS quadrangles, which overlapped the districts in the San Luis Unit and Delta Division: Broadview Farms, Charleston School, Chounet Ranch, Crows Landing, Dos Palos, Hammonds Ranch, Howard Ranch, Laguna Seca Ranch, Los Banos, Los Banos Valley, Newman, Orestimba Peak, Ortigalita Peak NW, Oxalis, Patterson, San Luis Dam, Solyo, Tracy, Vernalis, Volta, and Westley. Reclamation also queried the California Natural Diversity Database (CNDDDB), and combined the USFWS and CNDDDB information with information in Reclamation’s files to create the table.

Table 3-6 Threatened and Endangered Species List

Species	Status	Habitat	*Occurrence in the Study Area
PLANTS			
Large-flowered fiddleneck (<i>Amsickia grandiflora</i>) Critical habitat	FE, CE	Cismontane woodland, valley and foothill grassland in various soils.	Possible. In undisturbed areas of San Joaquin County.
San Joaquin woolly-threads (<i>Monolopia congdonii</i>)	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. CNDDDB records indicate extant populations occur within Fresno County.
INVERTEBRATES			
Vernal pool tadpole shrimp (<i>Lepidurus packardii</i>) 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. CNDDDB records indicate that this species is presumed extant.
Vernal pool fairy shrimp (<i>Branchinecta lynchi</i>) 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. CNDDDB records indicate that this species is presumed extant in Stanislaus, Contra Costa, and San Joaquin Counties.
Longhorn fairy shrimp (<i>Branchinecta longiantenna</i>) Critical habitat	FE	Endemic to the eastern margin of the central coast mountains in vernal pools.	Present. Vernal pool habitats within the study area may support populations of this species. CNDDDB records indicate that this species is presumed extant.
Conservancy fairy shrimp (<i>Branchinecta conservatio</i>) 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 National Forest in Ventura County.	Present. Vernal pool habitats within the study area may support populations of this species. CNDDDB records indicate that this species is presumed extant.
Valley elderberry longhorn beetle (<i>Desmocerus californicus dimorphus</i>)	FT	Lives in elderberry shrubs of California's Central Valley and Sierra Foothills with stems one inch or greater in diameter at ground level.	Present. The host plant for this species is common throughout the region. CNDDDB records indicate that this species is presumed extant.
FISH			
Southern Distinct Population of North	FT	Anadromous and highly marine-oriented; spawns mainly in	Absent. No natural waterways within the species' range would

Species	Status	Habitat	*Occurrence in the Study Area
American green sturgeon (<i>Acipenser medirostris</i>)		Sacramento River. No evidence of occurrence in San Joaquin River system. Juveniles salvaged in South Delta pumping plants in summer.	be affected by the proposed action.
Delta smelt (<i>Hypomesus transpacificus</i>)	FT, CE	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 would be affected by the proposed action.
Central Valley steelhead (<i>Oncorhynchus mykiss</i>)	FT	Anadromous species; spawns in cold waters.	Absent. No natural waterways within the species' range would be affected by the proposed action.
Chinook salmon – Central Valley spring-run (<i>Oncorhynchus tshawytscha</i>)	FT, CT	Anadromous species; spawns in cold waters.	Absent. No natural waterways within the species' range would be affected by the proposed action.
Chinook salmon Sacramento River winter-run (<i>Oncorhynchus tshawytscha</i>)	FE, CE	Anadromous species; spawns in cold waters.	Absent. No natural waterways within the species' range would be affected by the proposed action.
AMPHIBIANS			
California tiger salamander (<i>Ambystoma californiense</i>) Critical habitat	FT, CT	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 stockpounds occur in the region. Rodent burrows are common along the fringes of agricultural areas.
California red-legged frog (<i>Rana draytonii</i>)	FE, CSC	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.
REPTILES			
Blunt-nosed leopard lizard (<i>Gambelia sila</i>)	FE, CE	Resident of sparsely vegetated alkali and desert scrub habitats in areas of low topographic 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.
Giant garter snake (<i>Thamnophis gigas</i>)	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			
Least Bell's vireo (<i>Vireo bellii pusillus</i>)	FE, CE	Neotropical migrant that nests in parts of California; uses riparian areas with a dense understory and will forage up to 300' away in upland areas	Unlikely. Has been detected in recent years on the San Joaquin River National Wildlife Refuge west of Modesto.
MAMMALS			
Riparian woodrat (<i>Neotoma fuscipes riparia</i>)	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 (<i>Sylvilagus bachmani</i>)	FE, CE	Habitat for the riparian brush rabbit consists of riparian communities	Possible. Only occurs in Stanislaus and San Joaquin

Species	Status	Habitat	*Occurrence in the Study Area
<i>riparius</i>)		dominated by willow thickets (<i>Salix</i> spp.), California wild rose (<i>Rosa californica</i>), Pacific blackberry (<i>Rubus vitifolius</i>), wild grape (<i>Vitis californica</i>), Douglas' coyote bush (<i>Baccharis douglasii</i>) and various grasses. A captive breeding program is in place in certain locations along the San Joaquin River.	Counties along the Stanislaus and San Joaquin Rivers.
Giant kangaroo rat (<i>Dipodomys ingens</i>)	FE, CE	San Joaquin River Annual grassland on gentle slopes of generally less than 10o, with friable, sandy-loam soils. However, most remaining 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 (<i>Vulpes macrotis mutica</i>)	FE, CT	Annual grasslands or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing, and suitable prey base.	Present. CNDDB records indicate that this species is presumed extant in Fresno, Merced, Stanislaus and San Joaquin Counties.
Fresno kangaroo rat (<i>Dipodomys nitratoides exilis</i>)	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 species historical range. However, the most likely areas that the species might still occur are the Alkali Sink Ecological Reserve, Madera Ranch, and some nearby areas of privately owned lands, which are outside of the Proposed Action Area.

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

Definitions of Occurrence Indicators:

- 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 reasonably be expected 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 expected to occur there except, perhaps, as a transient.
- Absent: Species not observed on the study 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 Endangered
- CT: State Threatened

Federally Listed Species

Giant Garter Snake USFWS published a proposal to list the giant garter snake as an endangered species on December 27, 1991 (USFWS 1991) (56 FR 67046). The Service reevaluated the status of the snake before adopting the final rule, which was listed as a threatened species on October 20, 1993 (USFWS 1993) (58 FR 54053).

Endemic to wetlands in the Sacramento and San Joaquin valleys, the giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals, rice fields and the adjacent uplands (USFWS 1999).

Giant garter snakes formerly occurred throughout the wetlands that were extensive and widely distributed in the Sacramento and San Joaquin Valley floors of California (Fitch 1940; Hansen and Brode 1980; Rossman and Stewart 1987). The historical range of the snake is believed to have extended from the vicinity of Chico, in Butte County, southward to Buena Vista Lake, near Bakersfield, in Kern County (Fitch 1940; Fox 1948; Hansen and Brode 1980; Rossman and Stewart 1987). Early collecting localities of the giant garter snake coincide with the distribution of large flood basins, particularly riparian marsh or slough habitats and associated tributary streams (Hansen and Brode 1980). Loss of habitat due to wetlands reclamation, agricultural activities and flood control have extirpated the snake from the southern one third of its range in former wetlands associated with the historic Buena Vista, Tulare, and Kern lake beds (Hansen 1980; Hansen and Brode 1980).

Other Federally Listed Species Vernal pool tadpole shrimp, Vernal pool fairy shrimp, Longhorn fairy shrimp, and Conservancy fairy shrimp require vernal pool habitats. The host plant for the Valley elderberry longhorn beetle is common throughout the region.

California tiger salamander, California red-legged frog, and blunt-nosed leopard lizard, riparian woodrat, riparian brush rabbit, giant kangaroo and San Joaquin kit fox could potentially be within the Proposed Action area.

3.4.2 Environmental Consequences

No Action

Under the No Action Alternative, this Non-Project Water would not be conveyed or stored in CVP facilities. There would be no impacts to biological resources since conditions would remain the same as existing conditions. Reclamation is unaware of any projects expected to occur within the time frame addressed in this EA that would impact these resources.

Proposed Action

There would be no impacts to biological resources as a result of the Proposed Action. Most of the habitat types required by species protected by the Endangered Species Act (ESA) do not occur in the Proposed Action 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 to birds protected by the Migratory Bird Treaty Act (MBTA). Due to the fact that the Exchange Agreement and/or Warren Act contract related water would not reach streams containing listed fish species, there would be no effects 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 concentrations or levels identified as toxic or of concern (e.g., CVRWQCB 1998; Reclamation 2004b; USFWS and NMFS 2000; USFWS 2008). Daily water quality monitoring, with the requirement of pumps ceasing if water quality objectives are exceeded, however, would avoid such 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 would be no more than a day or two and would not cause any adverse effect because of the extremely short duration before the water quality standards are returned to the target levels.

There would be no adverse effects to the giant garter snake due to groundwater overdraft, because of the restrictions in groundwater pumping for each district.

The short duration of the water availability, the requirement that no native lands be converted without consultation with USFWS, and the stringent requirements for water quality would preclude any impacts to wildlife, whether federally listed or not.

Cumulative Impacts

As the Proposed Action is not expected to result in any direct or indirect impacts to biological resources, there would be no cumulative impacts.

3.5 Indian Sacred Sites

Executive Order 13007 requires Federal land managing agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites. “Sacred Sites” means any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian Tribe, or Indian individual determined to be an appropriate authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion.

Both alternatives involve the conveyance of water through existing facilities for established agricultural and M&I uses. Under both the No Action and Proposed Action alternatives, neither restriction of access to nor adverse effects to the physical integrity of any sacred sites would occur. As such, there would be no direct, indirect, or cumulative impacts to Indian sacred sites as a result of either the No Action or Proposed Action alternatives.

3.6 Indian Trust Assets

Indian trust assets (ITA) are legal interests in assets that are held in trust by the United States Government for federally recognized Indian tribes or individuals. The trust relationship usually stems from a treaty, executive order, or act of Congress. The Secretary of the interior is the trustee for the United States on behalf of federally recognized Indian tribes. “Assets” are anything owned that holds monetary value. “Legal interests” means there is a property interest for which there is a legal remedy, such a compensation or injunction, if there is improper interference. Assets can be real property, physical assets, or intangible property rights, such as a lease, or right to use something. ITA cannot be sold, leased or otherwise alienated without United States’ approval. Trust assets may include lands, minerals, and natural resources, as well as hunting, fishing, and water rights. Indian reservations, rancherias, and public domain allotments are examples of lands that are often considered trust assets. In some cases, ITA may be located off trust land.

Reclamation shares the Indian trust responsibility with all other agencies of the Executive Branch to protect and maintain ITA reserved by or granted to Indian tribes, or Indian individuals by treaty, statute, or Executive Order.

3.6.1 Affected Environment

There are no tribes possessing legal property interests held in trust by the United States in the water involved with this action, nor is there such a property interest in the lands designated to receive the water proposed in this action.

3.6.2 Environmental Consequences

No Action

Under the No Action Alternative there would be no impacts to ITA as there are none in the study area.

Proposed Action

This action would have no adverse effect on ITA.

Cumulative Impacts

This action would have no adverse cumulative effect on ITA.

3.7 Environmental Justice

Executive Order 12898 (February 11, 1994) mandates Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

3.7.1 Affected Environment

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.

3.7.2 Environmental Consequences

No Action

Under the No Action Alternative, Reclamation would not approve of Exchange Agreements or Warren Act contracts under this Pump-in Program. The districts could continue to pump their groundwater however there could be a minor adverse affect to migrant workers if water shortages occur.

Proposed Action

An Exchange Agreement or Warren Act contract would allow the water districts to use their Non-Project Water for irrigation in their service area. The availability of this water could help maintain agricultural production and farm worker employment. Therefore implementing the Proposed Action would not cause any harm to minority or disadvantaged populations within the Proposed Action area.

Cumulative Impacts

There would be no adverse cumulative impacts to minority and low-income populations as a result of the Proposed Action.

3.8 Socioeconomic Resources

3.8.1 Affected Environment

The agricultural industry significantly contributes to the overall economic stability of the San Joaquin Valley. The CVP allocations each year allow farmers to plan for the types of crops to grow and to secure loans to purchase supplies. The economic variances may include fluctuating agricultural prices, insect infestation, changing hydrologic conditions, increased fuel and power costs.

3.8.2 Environmental Consequences

No Action

Reclamation would not approve Exchange Agreements or Warren Act contracts to convey and store Non-Project Water in CVP facilities. Non-Project Water could still be pumped and distributed to other areas to supplement the diminished CVP water supply. However, this could increase costs to the districts to distribute to other areas. Demand for local labor and farm supplies would be reduced. Under the No Action Alternative, there could be temporary impacts to socioeconomic resources due to potential fallowing of farmland. However, this could change with the hydrological conditions.

Proposed Action

Under the Proposed Action, participating districts could convey and store Non-Project Water in CVP facilities to supplement their CVP water supply. The Warren Act contracts would allow the Non-Project Water to be distributed to sustain permanent crops. This would help maintain agriculture in this agricultural area.

Cumulative Impacts

There would be no adverse cumulative impacts to socioeconomic resources as a result of the Proposed Action. The Proposed Action could result in a stronger local agricultural economy during the program timeframe.

3.9 Air Quality

Section 176 (C) of the Clean Air Act [CAA] (42 U.S.C. 7506 (C)) requires any entity of the federal government that engages in, supports, or in any way provides financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) required under Section 110 (a) of the Federal CAA (42 U.S.C. 7401 [a]) before the action is otherwise approved. In this context, conformity means that such federal actions must be consistent with SIP's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards and achieving expeditious attainment of those standards. Each federal agency must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements would, in fact conform to the applicable SIP before the action is taken.

On November 30, 1993, the EPA promulgated final general conformity regulations at 40 CFR 93 Subpart B for all federal activities except those covered under transportation conformity. The general conformity regulations apply to a proposed federal action in a non-attainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutant caused by the Proposed Action equal or exceed certain *de minimis* amounts thus requiring the federal agency to make a determination of general conformity.

3.9.1 Affected Environment

The Proposed Action area lies within the San Joaquin Valley Air Basin (SJVAB) under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). The pollutants of greatest concern in the San Joaquin Valley are carbon monoxide (CO), ozone (O₃), O₃ precursors such as volatile organic compounds (VOC), inhalable particulate matter between 2.5 and 10 microns in diameter (PM₁₀) and particulate matter less than 2.5 microns in diameter (PM_{2.5}). The SJVAB has reached Federal and State attainment status for CO, nitrogen dioxide (NO₂), and sulfur dioxide (SO₂). Although Federal attainment status has been reached for PM₁₀ the State has not and both are in non-attainment for O₃ and PM_{2.5} (Table 3-7). There are no established standards for nitrogen oxides (NO_x); however, NO_x does contribute to NO₂ standards (SJVAPCD 2011).

Table 3-7 San Joaquin Valley Attainment Status

Pollutant	California Attainment Status	National Attainment Status
O ₃	Nonattainment	Nonattainment
CO	Attainment	Attainment
NO ₂	Attainment	Attainment
SO ₂	Attainment	Attainment
PM ₁₀	Nonattainment	Attainment
PM _{2.5}	Nonattainment	Nonattainment

Source: CARB 2012; SJVAPCD 2012a; 40 CFR 93.153

Table 3-8 lists the kinds of pumps that could be used under the Pump-in Program for the participating districts.

Table 3-8 District Pumps

Water District	Pump Type	Horsepower
Banta-Carbona Irrigation District	New diesel & Natural gas engine with gear head	300
Del Puerto Water District	13 electric pumps and one diesel engine that meets the EPA Tier 3 requirement.	N/A
San Luis Water District	Electric Pumps	N/A
Panoche Water District	Electric Pumps	N/A
Pacheco Water District	Electric Pumps	N/A
Mercy Springs Water District	Electric Pumps	N/A
West Stanislaus Irrigation District	Three Diesel Pumps	390 Each

Table 3-9 lists the de minimis thresholds for the San Joaquin Valley Air Basin.

Table 3-9 San Joaquin Valley General Conformity de minimis Thresholds

San Joaquin Valley Air Basin			
Pollutant	Federal Status	de minimis (Tons/year)	de minimis (Pounds/day)
VOC/ROG (as an ozone precursor)	Nonattainment serious 8-hour ozone	50	274
NO _x (as an ozone precursor)	Nonattainment serious 8-hour standard	50	274
PM ₁₀	Attainment	100	548
CO	Attainment	100	548

Sources: SJVAPCD 2012a; 40 CFR 93.153

3.9.2 Environmental Consequences

No Action

Under the No Action Alternative, Reclamation would not issue two-year Exchange Agreements and/or Warren Act contracts to requesting CVP contractors within the Delta Division and San Luis Unit for the 2012 contract year ending February 28, 2013. Participating contractors could continue to pump groundwater for their use.

Proposed Action

The Proposed Action would allow Non-Project Water to be conveyed and stored in CVP facilities. This would allow Non-Project Water to be delivered to areas in the districts to supplement diminished CVP

water supplies in 2012. No new facilities would be needed as a result of the Proposed Action that would cause emissions from construction activities.

The majority of pumps to convey the water under the Proposed Action are electric. These pumps would not emit pollutants at the pump; the source of the pollutants originates at the power plant. Power plants are permitted based on their maximum operating potential. The additional electricity would not result in the power plant exceeding operating capacity, and, thus, the applicable emissions permit. A majority of power is derived from fossil fuel combusted at power plants to generate electricity. CO₂ is the primary pollutant emitted as a result of the oxidation of the carbon in the fuel. NO_x and PM₁₀ are also emitted.

Air quality emissions for the Proposed Action are well below the de minimis thresholds for the SJVAPCD (Table 3-10); therefore, there would be no air quality impacts associated with this Proposed Action.

Table 3-10 Proposed Action Calculated Emissions

Calculated Proposed Action Emissions			
Pollutant	Federal Status	de minimis (Tons/year)	Project emissions (Tons/year)
VOC/ROG (as an ozone precursor)	Nonattainment serious 8-hour ozone	50	18.1
NO _x (as an ozone precursor)	Nonattainment serious 8-hour standard	50	3.2
PM ₁₀	Attainment	100	Not Calculated
CO	Attainment	100	Not Calculated

Sources: SJVAPCD 2012b; 40 CFR 93.153

Cumulative Impacts

All emissions result in a cumulative increase in pollutants within the air basin however emissions from the Proposed Action are well below the de minimis standards and therefore cannot be considered a significant cumulative impact.

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Section 4 Consultation and Coordination

4.1 Public Review Period

Reclamation intends to provide the public with an opportunity to comment on the Draft Finding of No Significant Impact and Draft EA between March 14 and April 14, 2012.

Before including your name, address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we would be able to do so.

4.2 Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.)

The Fish and Wildlife Coordination Act (FWCA) requires that Reclamation consult with fish and wildlife agencies (federal and state) on all water development projects that could affect biological resources. The amendments enacted in 1946 require consultation with the Service and State fish and wildlife agencies “whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever, including navigation and drainage, by any department or agency of the United States, or by any public or private agency under Federal permit or license”. Consultation is to be undertaken for the purpose of “preventing the loss of and damage to wildlife resources”.

The Proposed Action does not involve any new impoundment or diversion of waters, channel deepening, or other control or modification of a stream or body of water as described in the statute, but only the movement of Non-Project Water through existing CVP facilities. Therefore the FWCA does not apply.

4.3 Endangered Species Act (16 U.S.C. § 1531 et seq.)

Section 7 of the Endangered Species Act requires Federal agencies, in consultation with the Secretary of the Interior and/or Commerce, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species.

The Proposed Action would have no effect to threatened or endangered species or designated critical habitats, based on the lack of construction and the implementation of stringent water quality standards.

4.4 National Historic Preservation Act (16 U.S.C. § 470 et seq.)

The NHPA of 1966, as amended (16 U.S.C. 470 et seq.), requires that federal agencies give the Advisory Council on Historic Preservation an opportunity to comment on the effects of an undertaking on historic properties, properties that are eligible for inclusion in the National Register. The 36 CFR Part 800 regulations implement Section 106 of the NHPA.

Section 106 of the NHPA requires federal agencies to consider the effects of federal undertakings on historic properties, properties determined eligible for inclusion in the National Register. Compliance with Section 106 follows a series of steps that are designed to identify interested parties, determine the APE, conduct cultural resource inventories, determine if historic properties are present within the APE, and assess effects on any identified historic properties.

No construction, new land use, or new ground disturbing activities would occur as a result of the Proposed Action. Therefore, the proposed action has no potential to affect historic properties (36 CFR 800.3(a)(1)).

4.5 Migratory Bird Treaty Act (16 U.S.C. § 703 et seq.)

The MBTA implements various treaties and conventions between the United States and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the Act, the Secretary of the Interior may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg would be allowed, having regard for temperature zones, distribution, abundance, economic value, breeding habits and migratory flight patterns.

The Proposed Action would have no effect on birds protected by the MBTA, based on the lack of construction and the implementation of stringent water quality standards.

4.6 Executive Order 11988 – Floodplain Management and Executive Order 11990 – Protection of Wetlands

Executive Order 11988 requires Federal agencies to prepare floodplain assessments for actions located within or affecting flood plains, and similarly, Executive Order 11990 places similar requirements for actions in wetlands.

This action would not adversely affect floodplains or wetlands because it does not involve ground disturbance.

4.7 Clean Water Act (33 U.S.C. § 1251 et seq.)

Section 401 of the Clean Water Act [CWA] (33 U.S.C. § 1311) prohibits the discharge of any pollutants into navigable waters, except as allowed by permit issued under sections 402 and 404 of the CWA (33 U.S.C. § 1342 and 1344). If new structures (e.g., treatment plants) are proposed, that would discharge effluent into navigable waters, relevant permits under the CWA would be required for the project applicant(s). Section 401 requires any applicant for an individual U. S. Army Corps of Engineers dredge and fill discharge permit (Section 404) to first obtain certification from the state that the activity associated with dredging or filling would comply with applicable state effluent and water quality standards. This certification must be approved or waived prior to the issuance of a permit for dredging and filling.

No activities such as dredging or filling of wetlands or surface waters would be required for implementation of the Proposed Action, therefore permits obtained in compliance with CWA are not required.

Section 5 List of Preparers and Reviewers

Chuck Siek M.A., Supervisory Natural Resources Specialist, SCCAO

Michael C. S. Eacock, Natural Resources Specialist, SCCAO

Shauna McDonald, Wildlife Biologist, SCCAO

Scott Williams M.A., Archaeologist, MP-153

Patricia Rivera, ITA, MP-400

Valerie Curley, Supervisory Repayment Specialist, SCCAO

M. Cathy James, Repayment Specialist, SCCAO

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Section 7 Appendices

Appendix A Environmental Commitment Program

This form must accompany all Federal discretionary action approvals that require compliance with the National Environmental Policy Act and other applicable environmental laws.

Environmental Document¹: 12-005

On January 14, 2011 the President's Council on Environmental Quality (CEQ) issued guidance for Federal agencies to implement, monitor and evaluate environmental commitments identified in Environmental Assessments and Environmental Impact Statements completed for compliance with the National Environmental Policy Act (NEPA). This guidance also pertains to Categorical Exclusions when environmental commitments have been identified in order to meet the requirements for exclusion.

The Bureau of Reclamation's NEPA Handbook provides guidance on the establishment of an Environmental Commitment Program (ECP) to meet the CEQ guidance. The ECP is a system designed to implement, monitor and evaluate the environmental commitments identified in the NEPA document. These commitments fall under one or more of the following categories:

1. Commitments where no construction or ground disturbance is involved

These commitments are typically associated with water transfers, exchanges, Warren Act contracts and similar actions.

Required ☒ Not Required ☐

2. Commitments where construction or ground disturbance is involved

These commitments are typically associated with short-term construction impacts resulting from modifications to Federal facilities or modifications to non-Federal facilities where there is a Federal nexus such as Federal funds or approvals.

Required ☐ Not Required ☒

3. Long-term commitments

These commitments are typically associated with larger construction or ground disturbing activities where impacts to resources such as wetlands, special status species habitat or water quality may occur that require long-term mitigation and monitoring.

Required ☐ Not Required ☒

Note: If the "Not Required" boxes are checked on all three commitment categories, no further action is required. If any of the required boxes are checked please refer to the following Environmental Commitment table for a summary of the commitments required for environmental compliance. Please direct any questions or comments regarding the Environmental Commitment Program to:

Chuck Siek, Supervisory Natural Resources Specialist
Department of Interior, Bureau of Reclamation
1243 "N" Street, Fresno, CA 93721
(559) 487-5138 email at csiek@usbr.gov

¹ Environmental Document types include: Categorical Exclusion, Environmental Assessment/Finding of No Significant Impact and Environmental Impact Statement/Record of Decision

Environmental Commitment Table

South-Central California Area Office

Environmental Document: 12-005

Project proponent(s) are to contact Natural Resource Specialist named above if any commitments have not or may not be complied with.

Failure to notify would result in non-compliance with NEPA.

To be completed by Reclamation Supervisory Natural Resource Specialist-Chuck Siek (559) 487-5138						To be completed by [proponent]		
Resource	Commitment Category ²	Summary of Environmental Commitments ³	Timeframe for Implementation ⁴	Verification of Compliance ⁵ Water Resources verification POC is Chris Eacock		[Proponent] Point of Contact ⁶	Verification of Compliance (Authorizing Official) <u>Contact information to be provided by the Project Manager</u>	
				Initials	Date		Initials	Date
Water Resources	1	<p>Initial Analysis: All districts participating in the 2012 DMC Pump-in Program must provide the following information about each well to Reclamation prior to pumping groundwater into the DMC:</p> <ul style="list-style-type: none"> - the location of each well, pumping rate, and point of discharge DMC; - complete water quality analyses (Table 5 or 6 Water Quality Monitoring Plan) - the depth to groundwater in every well before pumping into the DMC commences. <p>Though most of the wells are privately owned, the Districts must provide access to each well for Reclamation and SLDMWA staff.</p> <p>All water samples must be sampled and preserved according to established protocols in correct containers. Analyses should be conducted by laboratories that have been approved by Reclamation, listed in Table 7 Water Quality Monitoring Plan. Reclamation staff would review the analytical results and notify the District which wells may pump into the DMC in 2012.</p> <p>Specific details are discussed in the 2012 Delta-Mendota Canal Pump-in Program Water Quality Monitoring Plan.</p>	Life of the program					

²List category numbers checked on first page

³ Summarize environmental commitments from environmental document completed for action

⁴ List when environmental commitments must start/end

⁵ Verification by Reclamation that all environmental commitments have been implemented and a summary report has been completed as required

⁶ Proponent point of contact may be the individual responsible for a specific commitment or the Authorizing Official responsible for overall environmental compliance

To be completed by Reclamation Supervisory Natural Resource Specialist-Chuck Siek (559) 487-5138						To be completed by [proponent]		
Resource	Commitment Category ²	Summary of Environmental Commitments ³	Timeframe for Implementation ⁴	Verification of Compliance ⁵ Water Resources verification POC is Chris Eacock		[Proponent] Point of Contact ⁶	Verification of Compliance (Authorizing Official) <u>Contact information to be provided by the Project Manager</u>	
				Initials	Date		Initials	Date
Water Quality	1	Compliance Monitoring in accordance with the Water Quality Monitoring Plan including: <ul style="list-style-type: none"> • Daily Salinity • Weekly Monitoring • Selenium Monitoring • Depth to Groundwater • Data Compilation and Review • Specific details are discussed in the 2012 Delta-Mendota Canal Pump-in Program Water Quality Monitoring Plan. 	Life of the program					
General	1	<ul style="list-style-type: none"> • The water would be used for beneficial purposes and in accordance with Federal Reclamation law and guidelines, as applicable; • Use of the water would comply with all federal, state, local, and tribal law, and requirements imposed for protection of the environment and Indian Trust Assets; • The water would be used within the permitted place of use; • No land conversions would occur as a result of the Proposed Action; No water would be used to place untilled or new lands into production or cause current agricultural lands to be fallowed.	Life of Program					

Existing environmental documents: Reclamation would continue to require compliance with all commitments imposed by existing environmental documents, such as Biological Opinions and Programmatic Agreements.

Funding: The project proponent is responsible for all direct costs to implement, monitor and evaluate the environmental commitments described in the following table. The project proponent is also responsible for the costs incurred by Reclamation staff to monitor and evaluate the environmental commitments.

Appendix B

Delta-Mendota Canal 2012 Water Quality Monitoring Program

RECLAMATION

Managing Water in the West

2012 Delta-Mendota Canal Pump-in Program Water Quality Monitoring Plan



U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
South-Central California Area Office

Revised: 06 Feb 2012

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

List of Abbreviations and Acronyms

Authority	San Luis and Delta-Mendota Water Authority
°C	degrees Celsius
DMC	Delta-Mendota Canal
DMC Headworks	DMC Milepost 2.5, Jones Pumping Plant
DMC Check 13	DMC Milepost 70, O'Neill Forebay
DMC Check 20	DMC Milepost 111, near Firebaugh
DMC Check 21	DMC Milepost 116, terminus at Mendota Pool
COC	chain of custody
CVP	Central Valley Project
DFG	California Department of Fish and Game
EC	electrical conductivity, $\mu\text{S}/\text{cm}$
Exchange Contractors	San Joaquin River Exchange Contractors Water Authority
°F	degrees Fahrenheit
mg/L	milligrams per liter, equivalent to parts per million
QA	Quality Assurance
QC	Quality Control
QCO	Quality Control Officer
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
Regional Board	California EPA, Central Valley Regional Water Quality Board
TDS	Total dissolved solids, mg/L
USGS	U.S. Geological Survey
$\mu\text{g}/\text{L}$	micrograms per liter, equivalent to parts per billion
$\mu\text{S}/\text{cm}$	microSiemens per cm, salinity in water

2012 Delta-Mendota Canal Pump-in Program Water Quality Monitoring Plan

Introduction

The overall supply of Central Valley Project (CVP) water has been reduced by drought and restrictions on pumping from the Sacramento-San Joaquin Delta. Under the Warren Act of 1911, Reclamation may execute temporary contracts to convey non-project water in excess capacity in federal irrigation canals. In 2012, Reclamation proposes to execute temporary contracts with water districts to convey groundwater in the Delta-Mendota Canal (DMC) subject to the monitoring and reporting requirements outlined in this document.

Estimated 2012 Warren Act Contract Quantities

District	Acre-feet
Banta Carbona ID	5,000
Del Puerto WD	10,000
West Stanislaus ID	3,000
San Luis WD	10,000
Panoche WD	10,000
Pacheco WD	6,000
Mercy Springs WD	6,000
Total	50,000

This document describes the plan for measuring the changes in the quality of water in the DMC caused by the conveyance of groundwater during 2012, plus changes in groundwater elevation to estimate subsidence. Various agencies will use these data to determine the water quality conditions in the DMC, Mendota Pool, and wetlands water supply channels, and physical condition of local groundwater resources.

This document has been prepared by the U.S. Department of the Interior, Bureau of Reclamation (Reclamation), in cooperation with the San Luis & Delta-Mendota Water Authority (Authority), and the San Joaquin River Exchange Contractors Water Authority (Exchange Contractors), with assistance from staff of Banta Carbona Irrigation District, Del Puerto Water District, San Luis Water District, and Panoche Water District. This monitoring plan will be conducted by staff of Reclamation, the Authority, and Water Districts and will complement independent monitoring by other Federal, State, and private agencies.

Several sampling techniques will be used to collect samples of water, including real-time, grab, and composite. The techniques used at each location are summarized in Section 3.

Continuous measurement of specific conductance (salinity) will be recorded at four stations in the canal using sondes connected to digital data loggers. The data will be averaged every 15 minutes, sent via satellite to the California Data Exchange Center where it will be posted in the Internet as preliminary data:

<http://cdec.water.ca.gov/queryDaily.html>

Central Valley Operations Office will post the daily average salinity measurements on its website:

<http://www.usbr.gov/mp/cvo/wqrpt.html>

The real-time data will be collected by Reclamation and used in a mass balance to calculate and predict water quality conditions along the DMC. The calculated results will be reported to various agencies, and compared with independent field measurements collected by the Reclamation, the Exchange Contractors, US Geological Survey, and California EPA Central Valley Regional Water Quality Control Board (Regional Board).

Based on available funding, Reclamation will operate autosamplers at four locations along the DMC and Mendota Pool that will collect daily composite samples for measurement of selenium and salinity.

Reclamation and the Regional Board will collect grab samples from various locations in the watershed to measure selenium and many other parameters.

Reclamation will use these data to assess changes in water quality and groundwater conditions caused by the 2012 DMC Pump-in Program, and will implement the terms and conditions of the 2012 Warren Act Contracts, exchange agreements, and the 2012 Letter from the Exchange Contractors to Reclamation (Appendix 1).

Background

The Delta Division of the federal Central Valley Project (CVP) delivers water to almost a million acres of farmland in the San Joaquin Valley of California. The CVP is also the sole source of clean water for state and federal wildlife refuges and many private wetlands in Fresno, Merced, San Joaquin, and Stanislaus Counties.

The source of water for the Division is delta of the Sacramento and San Joaquin Rivers. This water is suitable in quality for irrigation and wetlands. The region is regularly affected by droughts that reduce the supply of water. Environmental regulations also restrict the operation of the Jones Pumping Plant to divert water from the Delta. The salinity of water in the Delta is highly variable due to the influence of tides and outflow of river water.

The Delta-Mendota Canal (DMC) carries CVP water to farms, communities, and wetlands between Tracy and Mendota. The 116 mile canal is operated and maintained by the San Luis and Delta-Mendota Water Authority (Authority) under contract with

Reclamation. Inflows of tailwater and subsurface water add contaminants to the DMC. The conveyance of groundwater may further degrade the quality of water in the canal.

The districts and refuges in the Delta Division use groundwater to supplement their contractual supply from the CVP. Three Delta Division districts also have riparian rights to water in the San Joaquin River. These other supplies of groundwater and riparian water are called “Non-Project Water” because they have not been appropriated by the United States for the purposes of the CVP.

The Warren Act of 1911⁽¹⁾ authorizes Reclamation to execute temporary contracts to impound, store, and carry water in federal irrigation canals when excess capacity is available. Such contracts will be negotiated by Reclamation with Delta Division water districts to allow the introduction of non-project water into the DMC to supplement the supply of CVP water to help farmers deliver enough water to irrigate and sustain valuable permanent crops like grapes, citrus, and deciduous fruit, and to sustain the local multi-billion dollar farming economy.

The quality of local groundwater is variable and must be measured to confirm that there will be no harm to downstream water users when the non-project water is pumped into the DMC. Reclamation has developed a set of standards for the acceptance of non-project water in the DMC based on the requirements of downstream water users.

In 2012, environmental regulations and climate change continue to reduce the supply of surface water for the Central Valley Project. Water managers now must depend on groundwater to supplement surface water for irrigation. However, continuous pumping of groundwater can quickly reduce local aquifers and can cause irreversible damage to facilities through subsidence.

Reclamation will require information about each source of groundwater and more monitoring of the aquifer to measure overdraft, prevent subsidence, and determine the feasibility of continuing this program in the future. Staff from the Authority and water districts will be required to take regular measurements of depth to groundwater, pump rates, and in-stream salinity measurements.

This Monitoring Plan will ensure that monitoring data will measure any changes in the quality of CVP water in the DMC and Mendota Pool, and assess impacts on local aquifers.

Monitoring Mission and Goals

The mission of this monitoring program is to produce physical measurements that will determine the changes in the quality of the water in canal caused by the conveyance of groundwater during 2012. The data will be used to implement the terms of the 2012 Warren Act Contracts and exchange agreements, and to ensure that the quality of CVP water is commensurate with the needs and expectations of water users.

¹ Act of February 21, 1911, ch. 141, 36 Stat. 925

The monitoring program will also deal with changes to groundwater resources to identify and prevent long-term problems to local aquifers and facilities.

Program Goals

The general goals of monitoring are:

- Evaluate the quality of water in each well, and
- Confirm that the blend of CVP water and groundwater is suitable for domestic, agricultural, and wetlands uses.
- Provide reliable data for regulation of the 2012 DMC Pump-in Program to prevent contamination problems
- Provide measurements of groundwater dynamics (depth, recharge) to identify overdraft and subsidence

Study Area

The Study Area for this program encompasses the Delta-Mendota Canal from Tracy to Mendota, and the Mendota Pool. The canal is divided into two reaches in relation to the O'Neill Forebay and the connection to the State Water Project.

Water Quality Standards

Non-project water must meet the standards listed in Tables 6 and 7. The lists have been developed by Reclamation to measure constituents of concern that would affect downstream water users. In particular, the concentration of selenium in any pump-in water shall not exceed 2 µg/L, the limit for the Grasslands wetlands water supply channels specified in the 1998 Basin Plan.² The salinity of each source of pump-in water shall not exceed 1500 mg/L TDS. The other constituents are mainly agricultural chemicals listed in the California Drinking Water Standards (Title 22)³.

² California Regional Water Quality Control Board, Central Valley Region, Fourth Edition of the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins.
http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr.pdf

³ California Code of regulations, Title 22. The Domestic Water Quality and Monitoring Regulations specified by the State of California Health and Safety Code (Sections 4010 4037), and Administrative Code (Sections 64401 et seq.), as amended.
<http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Lawbook/dwregulations-06-24-2010.pdf>

Water Quality Monitoring Plan

In-stream Monitoring

The quality of water in the DMC will be measured at the locations listed in Tables 1, 2, and 3.

Reclamation will operate and maintain the real-time stations listed in Table 1. Based on available funding, Reclamation will continue to collect water samples at the sites listed in Table 2 under the DMC Water Quality Monitoring Program. Reclamation will be responsible for the costs of sampling and analysis of water sampled from the DMC under this monitoring program.

Table 3 is a list of places along the canal near clusters of wells that could pump into the canal under this program. If the real-time monitoring is not sufficient to identify in-stream changes in quality caused by the addition of groundwater, Reclamation may require weekly measurements at the checks listed in Table 3 to determine local effects from groups of wells. For example, if the quantity of CVP water in the canal is limited, Reclamation will require detailed monitoring to identify the individual and cumulative changes in water quality caused by the addition of groundwater.

Table 1. Real-Time Monitoring Stations

Location	Operating Agency	Parameters	Frequency	Remarks
DMC Headworks Milepost 3.5	CVO	EC	Real-time	CDEC Site: DMC
DMC Check 13 Milepost 70	CVO	EC	Real-time	CDEC site : ONI
DMC Check 20 Milepost 111	CVO	EC	Real-time	CDEC site : DM2
DMC Check 21 Milepost 116.5	CVO	EC	Real-time	CDEC site : DM3

Key: CDEC: California Data Exchange Center CVO: Central Valley Operations Office

Table 2. Water Quality Monitoring Stations

Location	Operating Agency	Parameters	Frequency	Remarks
DMC Headworks Milepost 3.46	Reclamation	EC, selenium	Daily composite	Autosampler
DMC at McCabe Rd Milepost 68	Reclamation	Various	Monthly	Grab sample
DMC Check 13 Milepost 70	Reclamation	EC, selenium	Daily composite	Autosampler
DMC at Russell Ave Milepost 97.7	Reclamation	EC, selenium, boron, mercury	Monthly	Grab sample
DMC at Telles Farm Bridge Milepost 100	Reclamation	EC, selenium	Monthly	Grabs sampler
DMC at Washoe Ave Milepost 110.1	Reclamation	EC, selenium, boron, mercury	Monthly	Grab sample
DMC Check 21 Milepost 116.5	Reclamation	EC, selenium	Daily composite	Autosampler
CCID Main Canal at Bass Ave	Reclamation	EC, selenium	Daily composite	Autosampler

Key: Reclamation: MP-157 Environmental Monitoring Branch

Note: Frequency may be reduced at Headworks and Check 13 in 2012.

Table 3. In-Stream Monitoring Stations (Optional)

Location	Responsible Agency	Parameters	Frequency	Remarks
DMC Check 2 Milepost 16.2	SLDMWA	EC	Weekly	Field measurement
DMC Check 3 Milepost 20.6	SLDMWA	EC	Weekly	Field measurement
DMC Check 6 Milepost 34.4	SLDMWA	EC	Weekly	Field measurement
DMC Check 7 Milepost 38.7	SLDMWA	EC	Weekly	Field measurement
DMC Check 9 Milepost 48.6	SLDMWA	EC	Weekly	Field measurement
DMC Check 12 Milepost 64.0	SLDMWA	EC	Weekly	Field measurement
DMC Check 16 Milepost 85.1	SLDMWA	EC	Weekly	Field measurement
DMC at Telles Bridge Milepost 100.9	SLDMWA	EC	Weekly	Field measurement

Key: SLDMWA: San Luis and Delta-Mendota Water Authority

Wellhead Monitoring

Initial Analysis

All districts participating in the 2012 DMC Pump-in Program must provide the following information about each well to Reclamation prior to pumping groundwater into the DMC:

- the location of each well, pumping rate, and point of discharge into the DMC;
- complete water quality analyses (Table 5 or 6)⁴
- the depth to groundwater in every well before pumping into the DMC commences.

Though most of the wells are privately owned, the Districts must provide access to each well for Reclamation and Authority staff.

All water samples must be sampled and preserved according to established protocols in correct containers. Analyses should be conducted by laboratories that have been approved by Reclamation, listed in Table 7. Each sample of well water must be sampled and analyzed at the expense of the well owner. Reclamation staff will review the analytical results and notify the District which wells may pump into the DMC in 2012.

Compliance Monitoring

Daily Salinity

Mean daily salinity of water in the DMC will be assessed with the sensors along the canal that report real-time data to CDEC, listed in Table 1. Reclamation and the Authority will monitor daily changes in salinity along the canal.

Weekly Monitoring

Reclamation may require weekly measurements of salinity along the DMC if the real-time sensors are not sufficient to identify changes. If necessary, Reclamation will direct the Authority to measure the EC of water in the canal at the places listed in Table 3. These sites are located downstream from clusters of wells that could pump into the DMC. In addition, Reclamation may also direct Authority staff to measure the EC of the water in each active well

The weekly volume of groundwater pumped into the DMC from each well will be measured by the Authority and sent to Reclamation at the end of each week.

Selenium Monitoring

Reclamation will continue to measure selenium in the canal and Mendota Pool with autosamplers listed in Table 2. Reclamation may collect random samples of water from

⁴ Note: Laboratory analyses of water in each well may be measured within three years

various active wells; the cost of these selenium tests will be borne by Reclamation. Based on available funds, Reclamation may also measure boron in the canal and wells.

Depth to Groundwater

The Authority will to measure the depth to groundwater in each active well quarterly. Table 8 is a summary of measurements collected by the Authority since May 1995. The current depth to groundwater in each well will be compared to the depths listed in Table 8. If the current depth exceeds the maximum depth observed in Table 8, then Reclamation will advise the District to stop pumping from that well until the depth of water in the well recovers to an agreed depth, such as the median observed depth.

Data Compilation and Review

All compliance monitoring data collected by the Authority (i.e., flow/ EC/depth of groundwater in each active well, flow/EC in the DMC) will be entered into worksheets and presented each week to Reclamation via e-mail. Reclamation will review the data to identify changes in the quality of water in the canal and in individual wells, and potential changes in the local aquifer that could lead to overdraft or subsidence.

Water Quality Monitoring Parameters and Data Management

The following sections describe the parameters for real-time and laboratory measurement of water quality, as well as methods for quality control, data management, and data reporting.

Real-Time Water Quality Monitoring Parameter

Reclamation and the Central Valley Operations Office have sensors along the DMC that measure salinity and temperature of water. These continuous measurements are posted on the Internet in real-time.

Salinity

Salinity is a measure of dissolved solids in water. It is the sum weight of many different elements within a given volume of water, reported in milligrams per liter (mg/L) or parts per million (ppm). Salinity is an ecological factor of considerable importance, influencing the types of organisms that live in a body of water. Also, salinity influences the kinds of plants and fish that will grow in a water body. Salinity can be estimated by measuring the electrical conductivity (EC) of the water.

Central Valley Operations Office (CVO) uses this conversion factor for estimating Total Dissolved Solids (TDS) from EC:

$$\text{TDS (mg/L)} = \text{EC } (\mu\text{S/cm}) * 0.618 + 16$$

Sampling For Laboratory Analyses of Water Quality

The following sections describe constituents for laboratory analyses of water quality, as well as methods for water quality sampling and chain of custody documentation.

Constituents

Table 5 and 6 are lists of constituents to be measured at in each well that will pump into the DMC during 2012. Parameters include selenium, mercury, boron, nutrients, and other compounds that cannot be measured with field sensors. Table 7 is a list of laboratories whose sampling and analytical practices have been approved by Reclamation.

Sampling methods

Grab samples will be collected in a bucket or bottle from the point of discharge into the canal. Samples of canal water should be collected mid-stream from a bridge or check structure. Grab samples should be poured directly into sample bottles appropriate to the analyses. This technique is for samples collected weekly or less frequently. The analytical laboratory will specify the sample volume, type of bottle, need for preservative, and special handling requirements. Reclamation may train field staff on proper sample collection and handling.

Time composite samples will be collected from the DMC by Reclamation using an autosampler. Daily composite samples will consist of up to eight subsamples taken per day and mixed into one sample. Weekly composite samples will consist of seven daily subsamples mixed into one sample.

Chain of Custody documentation

Chain of custody (COC) forms will be used to document sample collection, shipping, storage, preservation, and analysis. All individuals transferring and receiving samples will sign, date, and record the time on the COC that the samples are transferred.

Laboratory COC procedures are described in each laboratory's Quality Assurance Program Manual. Laboratories must receive the COC documentation submitted with each batch of samples and sign, date, and record the time the samples are transferred. Laboratories will also note any sample discrepancies (e.g., labeling, breakage). After generating the laboratory data report for the client, samples will be stored for a minimum of 30 days in a secured area prior to disposal.

Chain of Custody documentation

Chain of custody (COC) forms will be used to document sample collection, shipping, Quality control (QC) is the overall system of technical activities that measure the attributes and performance of a process, item, or service against defined standards to verify that stated requirements are met.

Quality assurance (QA) is an integrated system of management activities involving, planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the customer.

QA objectives will be used to validate the data for this project. The data will be accepted, rejected, or qualified based on how sample results compare to established acceptance criteria.

The precision, accuracy, and contamination criteria will be used by the QCO to validate the data for this project. The criteria will be applied to the blind external duplicate/split, blank, reference, or spiked samples submitted with the production samples to the analytical laboratories by the participating agencies to provide an independent assessment of precision, accuracy, and contamination.

Laboratories analyze their own QC samples with the client's samples. Laboratory QC samples, including laboratory fortified blanks, matrix spikes, duplicates, and method blanks, assess precision, accuracy, and contamination. Laboratory QC criteria are stated in the analytical methods or determined by each laboratory. Since internal control ranges are often updated in laboratories based on instrumentation, personnel, or other influences, it is the responsibility of the QCO to verify that these limits are well documented and appropriately updated during system audits. The preferred method of reporting the QC results is for the laboratory to provide a QC summary report with acceptance criteria for each QC parameter of interest.

For water samples, the QCO will use a statistical program to determine if current concentrations for parameters at given sites are consistent with the historical data at these sites. A result is determined to be a historical outlier if it is greater than 3 standard deviations from the average value for the site. The presence of an outlier could indicate an error in the analytical process or a significant change in the environment.

Samples must be prepared, extracted, and analyzed within the recommended holding time for the parameter. Data may be qualified if the sample was analyzed after the holding time expires.

Completeness refers to the percentage of project data that must be successfully collected, validated, and reported to proceed with its intended use in making decisions.

Constraints with regard to time, money, safety, and personnel were some of the factors in choosing the most representative sites for this project. Monitoring sites have been selected by considering the physical, chemical, and biological boundaries that define the system under study.

Sites also were selected to be as representative of the system as possible. However, Reclamation will continue to evaluate the choice of the sites with respect to their representativeness and will make appropriate recommendations to the Contracting Officer given a belief or finding of inadequacy.

Comparability between each agency's data is enhanced through the use of Standard Operating Procedures that detail methods of collection and analysis. Each agency has chosen the best available protocol for the sampling and analyses for which it is responsible based on the agency's own expertise. Audits performed by the QCO will

reinforce the methods and practices currently in place and serve to standardize techniques used by the agencies.

Chain of Custody documentation

Chain of custody (COC) forms will be used to document sample collection, shipping, Real-Time Data – Raw data from field sensors, must be identified as preliminary, subject to change

Provisional Data - Data that have been reviewed by the collecting agency but may be changed pending re-analyses or statistical review

Laboratory Data – Data produced by the laboratory following laboratory QA/QC protocols

Chain of Custody documentation

Chain of custody (COC) forms will be used to document sample collection, shipping, In-stream data will be collected by Reclamation. Routine measurements of flow, EC, and depth of groundwater in each well will be collected by the Authority and sent to Reclamation each week.

Reclamation will compile these data in a water balance model developed by Reclamation, the Authority, and Exchange Contractors to predict the change in salinity in the canal with the addition of groundwater.

Real-time data will be used to monitor day-to-day patterns and assess actual conditions. The real-time data will be posted in regular e-mail messages to the districts and Authority. Reclamation will compile all flow, water quality, and groundwater data into a final report for future reference.

Chain of Custody documentation

Chain of custody (COC) forms will be used to document sample collection, shipping, and handling.

Water Quality Requirements

Each week, Reclamation staff will use the real-time salinity measurements (Table 1) and optional weekly in-stream measurements (Table 3) to monitor and determine the changes in salinity in the DMC, and determine if the groundwater pump-ins have caused these changes. Reclamation staff will compile other water quality data collected for this program and by others do evaluate changes in the canal.

Reclamation and the Authority will allow groundwater to be pumped into the DMC if such water does not cause the concentration of important constituents in the canal to exceed certain thresholds listed in Tables 4a and 4b. The 2012 Exchange Contractors letter will have further conditions for the lower portion of the canal.

Table 4a. Maximum Allowable Concentration of Seven Constituents in the Upper DMC (between Jones Pumping Plant and Check 13)

Constituent	Monitoring Location	Maximum concentration in the DMC
Arsenic	McCabe Road	10 µg/L
Boron	McCabe Road	0.7 mg/L
Nitrates as N	McCabe Road	45 mg/L
Selenium	Check 13	2 µg/L
Specific conductance (EC)	Check 13	1,200 µS/cm
Sulfates	McCabe Road	250 mg/L
Total Dissolved Solids*	Check 13	800 mg/L

*Calculation: $\text{TDS (mg/L)} = \text{EC (}\mu\text{S/cm)} \times 0.618 + 16$

Reclamation will direct the Districts to stop pumping groundwater into the upper DMC if the concentration of any of these constituents in the canal exceed the maximum allowable concentrations listed in Table 4a.

Table 4b. Maximum Allowable Concentration of Three Constituents in the Lower DMC

Constituent	Monitoring Location	Maximum concentration in the DMC
Selenium	Check 21	2 µg/L
Daily Change in TDS	Checks 13 – 20	Less than 30 mg/L
Total Dissolved Solids*	Check 20	450 mg/L

Reclamation will direct the Districts to stop pumping groundwater into the lower DMC if any of the parameters listed in Table 4b are exceeded.

Reclamation will continue to monitor the effects of the six sumps near Firebaugh that pump subsurface groundwater into the canal. Note: the sumps are located downstream of the proposed wells listed in Table 8.

Reclamation reserves the right to modify this monitoring program at any time to change.

Revised: 06 Feb 2012 SCC-107

**Table 5. Water Quality Standards for Acceptance of Groundwater into the Upper Delta-Mendota Canal
Jones Pumping Plant to Check 13 (O'Neill Forebay)**

							Recommended
Constituent	Units	Maximum Contaminant Level		Detection Limit for Reporting		CAS Registry Number	Analytical Method
Primary							
Aluminum	mg/L	1	(1)	0.05	(2)	7429-90-5	EPA 200.7
Antimony	mg/L	0.006	(1)	0.006	(2)	7440-36-0	EPA 200.8
Arsenic	mg/L	0.01	(1)	0.002	(2)	7440-38-2	EPA 200.8
Barium	mg/L	1	(1)	0.1	(2)	7440-39-3	EPA 200.7
Beryllium	mg/L	0.004	(1)	0.001	(2)	7440-41-7	EPA 200.7
Boron	mg/L	0.7	(16)			7440-42-8	EPA 200.7
Cadmium	mg/L	0.005	(1)	0.001	(2)	7440-43-9	EPA 200.7
Chromium	mg/L	0.05	(1)	0.01	(2)	7440-47-3	EPA 200.7
Lead	mg/L	0.015	(9)	0.005	(8)	7439-92-1	EPA 200.8
Mercury	mg/L	0.002	(1)	0.001	(2)	7439-97-6	EPA 245.1
Nickel	mg/L	0.1	(1)	0.01	(2)	7440-02-0	EPA 200.7
Nitrate (as NO3)	mg/L	45	(1)	2	(2)	7727-37-9	EPA 300.1
Nitrate + Nitrite (sum as nitrogen)	mg/L	10	(1)				EPA 353.2
Nitrite (as nitrogen)	mg/L	1	(1)	0.4	(2)	14797-65-0	EPA 300.1
Selenium	mg/L	0.002	(13)			7782-49-2	EPA 200.8
Thallium	mg/L	0.002	(1)	0.001	(2)	7440-28-0	EPA 200.8
Secondary							
Chloride	mg/L	250	(7)			16887-00-6	EPA 300.1
Copper	mg/L	1	(10)	0.05	(8)	7440-50-8	EPA 200.7
Iron	mg/L	0.3	(6)			7439-89-6	EPA 200.7
Manganese	mg/L	0.05	(6)			7439-96-5	EPA 200.7
Molybdenum	mg/L	0.01	(11)			7439-98-7	EPA 200.7
Silver	mg/L	0.1	(6)			7440-22-4	EPA 200.7
Sodium	mg/L	69	(15)			7440-23-5	EPA 200.7
Specific Conductance	µS/cm	2,200	(7)				SM 2510 B
Sulfate	mg/L	250	(7)			14808-79-8	EPA 300.1
Total Dissolved Solids	mg/L	1,500	(7)				SM 2540 C
Zinc	mg/L	5	(6)			7440-66-6	EPA 200.7
Radioactivity							
Gross Alpha	pCi/L	15	(3)	3	(3)		SM 7110C
Organic Chemicals							
Atrazine	µg/L	1	(4)	0.5	(5)	1912-24-9	EPA 508.1
Bentazon	µg/L	18	(4)	2	(5)	25057-89-0	EPA 515
Carbofuran	µg/L	18	(4)	5	(5)	1563-66-2	EPA 531.1-2
Chlordane	µg/L	0.1	(4)	0.1	(5)	57-74-9	EPA 505
Chlorpyrifos	µg/L	0.025	(14)			2921-88-2	EPA 8141
2,4-D	µg/L	70	(4)	10	(5)	94-75-7	EPA 515.1-4
Diazinon	µg/L	0.16	(14)			333-41-5	EPA 507
Dibromochloropane (DBCP)	µg/L	0.2	(4)	0.01	(5)	96-12-8	EPA 504.1
Endrin	µg/L	2	(4)	0.1	(5)	72-20-8	EPA 505
Ethylene Dibromide (EDB)	µg/L	0.05	(4)	0.02	(5)	206-93-4	EPA 504.1
Glyphosate	µg/L	700	(4)	25	(5)	1071-83-6	EPA 547
Heptachlor	µg/L	0.01	(4)	0.01	(5)	76-44-8	EPA 505
Heptachlor Epoxide	µg/L	0.01	(4)	0.01	(5)	1024-57-3	EPA 505
Lindane	µg/L	0.2	(4)	0.2	(5)	58-89-9	EPA 505
Methoxychlor	µg/L	30	(4)	10	(5)	72-43-5	EPA 505
Molinate	µg/L	20	(4)	2	(5)	2212-67-1	EPA 525.2
2, 4, 5-TP (Silvex)	µg/L	50	(4)	1	(5)	93-72-1	EPA 515.1-4
Simazine	µg/L	4	(4)	1	(5)	122-34-9	EPA 508.1
Thiobencarb	µg/L	70	(4)	1	(5)	28249-77-6	EPA 525.2
Toxaphene	µg/L	3	(4)	1	(5)	8001-35-2	EPA 505

**Table 5. Water Quality Standards for Acceptance of Groundwater into the Upper Delta-Mendota Canal
Jones Pumping Plant to Check 13 (O'Neill Forebay)**

Sources:

Title 22. The Domestic Water Quality and Monitoring Regulations specified by the State of California Health and Safety Code (Sections 4010-4037), and Administrative Code (Sections 64401 et seq.), as amended.

- | | |
|--------------------------------------|------------------------------------|
| (1) Title 22, Table 64431-A (mg/L) | (6) Title 22, Table 64449-A (mg/L) |
| (2) Title 22, Table 64432-A (mg/L) | (7) Title 22, Table 64449-B (mg/L) |
| (3) Title 22, Table 64442 (pCi/L) | (8) Title 22, Table 64678-A (mg/L) |
| (4) Title 22, Table 64444-A (mg/L) | (9) Title 22, Section 64678 (d) |
| (5) Title 22, Table 64445.1-A (mg/L) | (10) Title 22, Section 64678 (e) |

[California Drinking Water Regulations Sep 2011](http://www.cdph.ca.gov/certific/drinkingwater/Documents/Lawbook/dwregulations-2011-09-22.pdf)

<http://www.cdph.ca.gov/certific/drinkingwater/Documents/Lawbook/dwregulations-2011-09-22.pdf>

California Regional Water Quality Control Board, Central Valley Region, Fourth Edition of the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins.

- (13) Basin Plan, Table III-1 (ug/L) (selenium in Grasslands water supply channels)
(14) Basin Plan, Table III-2A (ug/L) (chlorpyrifos & diazinon in San Joaquin River from Mendota to Vernalis)

[Sacramento & San Joaquin River Basin Plan 2009](http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr.pdf)

http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr.pdf

Ayers, R. S. and D. W. Westcot, *Water Quality for Agriculture*, Food and Agriculture Organization of the United Nations - Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985).

- (15) Ayers, Table 1 (mg/L) (sodium)

- (16) Ayers, Table 21 (mg/L) (boron)

[Water Quality Standards for Agriculture 1985](http://www.fao.org/DOCREP/003/T0234E/T0234E00.HTM)

<http://www.fao.org/DOCREP/003/T0234E/T0234E00.HTM>

revised: 10 Jan 2012 SCC-107

**Table 6. Water Quality Standards for Acceptance of Groundwater into the lower Delta-Mendota Canal
Check 13 (O'Neill Forebay) To Check 21 (Mendota Pool)**

Constituent	Units	Maximum Contaminant Level		CAS Registry Number	Recommended Analytical Method
Bicarbonate	mg/L	61	(5)	71-52-3	SM 2320 A
Boron	mg/L	0.7	(3)	7440-42-8	EPA 200.7
Calcium	mg/L	80	(5)	7440-70-2	EPA 200.5
Chloride	mg/L	40	(5)	189689-94-9	EPA 300.1
Chlorpyrifos	µg/L	0.025	(2)	2921-88-2	EPA 8141
Chromium, total	µg/L	50	(1)	7440-47-3	EPA 200.7
Diazinon	µg/L	0.16	(2)	333-41-5	EPA 507
Hardness	mg/L				calculated
Magnesium	mg/L	16	(5)	7439-95-4	EPA 200.5
Mercury	µg/L	2	(1)	7439-97-6	EPA 245.1
Molybdenum	µg/L	10	(3)	7439-98-7	EPA 200.7
Nickel	µg/L	100	(1)	7440-02-0	EPA 200.7
Nitrate (as NO ₃)	mg/L	45	(1)	7727-37-9	EPA 300.1
Nitrite (as nitrogen)	mg/L	1	(1)	14797-65-0	EPA 300.1
pH	units	5.0 - 7.0	(5)		EPA 150.1
Potassium	mg/L	4.5	(5)	7440-09-7	EPA 200.5
SAR		<2	(5)		calculated
Selenium	µg/L	2	(2)	7782-49-2	EPA 200.8
Sodium	mg/L	69	(3)	7440-23-5	EPA 200.7
Specific Conductance	µS/cm	1,230	(4)		SM 2510 B
Sulfate	mg/L	250	(1)	14808-79-8	EPA 300.1
Total Dissolved Solids	mg/L	800	(4)		SM 2540 C

(1) Title 22. The Domestic Water Quality and Monitoring Regulations specified by the State of California Health and Safety Code (Sections 4010-4037), and Administrative Code (Sections 64401 et seq.), as amended.

(2) California Regional Water Quality Control Board, Central Valley Region, Fourth Edition of the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins. Table III-2A

(3) Ayers, R. S. and D. W. Westcot, *Water Quality for Agriculture*, Food and Agriculture Organization of the United Nations - Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985).

(4) Second Amended Contract for Exchange of Waters, No 11r-1144, Article 9. Quality of Substitute Water.

(5) Spectrum Analytic, Inc. Guide to Interpreting Irrigation Water Analysis. Washington C.H., Ohio
http://www.spectrumanalytic.com/support/library/rf/A_Guide_to_Interpreting_Irrigation_Water_Analysis.htm

revised 11/23/2009 SCC-107

Table 7. Approved Laboratory List for the Mid-Pacific Region Environmental Monitoring Branch

APPL Laboratory	<u>Address</u>	908 North Temperance Avenue, Clovis, CA 93611
	<u>Contact</u>	Diane Anderson (Project Manager) or Cynthia Clark
	<u>P/F</u>	(559) 275-2175 / (559) 275-4422
	<u>Email</u>	danderson@applinc.com; cclark@applinc.com
	<u>Methods</u>	<i>Approved for inorganic and organic parameters in water and soil</i>
Basic Laboratory	<u>Address</u>	2218 Railroad Avenue Redding, CA 96001 USA
	<u>Contact</u>	Nathan Hawley, Melissa Hawley, Ricky Jensen
	<u>P/F</u>	(530) 243-7234 / (530) 243-7494
	<u>Email</u>	nhawley@basiclab.com (QAO), mhawley@basiclab.com (PM), sthomas@basiclab.com (quotes) poilar@basiclab.com (sample custody), khawley@basiclab.com (sample custody)
	<u>CC Info</u>	nhawley@basiclab.com, Jennifer Rawson (ext. 203 - invoices) Reanalysis requests need to always be addressed to Melissa Hawley and CC'd to Nathan Hawley Quotes address to Sabrina Thomas and cc Nathan Hawley
	<u>Methods</u>	<i>Approved for inorganic/organic parameters</i>
Block Environmental Services	<u>Address</u>	2451 Estand Way Pleasant Hill, CA 94523 USA
	<u>Contact</u>	David Block
	<u>P/F</u>	(925) 682-7200 / (925) 686-0399; (925) 382-9760 Cell
	<u>Email</u>	dblock@blockenviron.com
	<u>Methods</u>	<i>Approved for Toxicity Testing</i>
California Laboratory Services	<u>Address</u>	3249 Fitzgerald Road Rancho Cordova, CA 95742
	<u>Contact</u>	Scott Pieters
	<u>P/F</u>	(916) 638-7301 / (916) 638-4510
	<u>Email</u>	scott@californialab.com (p.m.), janet@californialab.com (QA)
	<u>Methods</u>	<i>Approved for inorganic, organic, and microbiological parameters.</i>
Caltest Analytical Laboratory	<u>Address</u>	1885 N. Kelly Rd. Napa, CA 94558
	<u>Contact</u>	Mike Hamilton
	<u>P/F</u>	(707) 258-4000/(707) 226-1001
	<u>Email</u>	Mike_Hamilton@caltestlabs.com ; info@caltestlabs.com
	<u>Methods</u>	<i>Approved for inorganic parameters</i>
Dept. of Fish & Game - WPCL	<u>Address</u>	2005 Nimbus Road Rancho Cordova, CA 95670 USA
	<u>Contact</u>	David B. Crane - Laboratory Director Patty Bucknell - Inorganic Chemist Gail Chow - QA Manager + re-analysis requests (916) 358-2840
	<u>P/F</u>	(916) 358-2858 / (916) 985-4301, Sample Receiving: (916) 358-0319 Scott or Mary
	<u>Email</u>	dcrane@ospr.dfg.ca.gov; pbucknell@ospr.dfg.ca.gov; gcho@ospr.dfg.ca.gov
	<u>Methods</u>	<i>Approved only for metals analysis in tissue, organics pending</i>
Fruit Growers Laboratory	<u>Address</u>	853 Corporation Street Santa Paula, CA 93060 USA
	<u>Contact</u>	David Terz, QA Director
	<u>P/F</u>	(805) 392-2024 / (805) 525-4172
	<u>Email</u>	davidt@fglinc.com
	<u>Methods</u>	<i>Approved for all inorganic and organic parameters in drinking water and general physical analysis in soils.</i>

Table 7. Approved Laboratory List for the Mid-Pacific Region Environmental Monitoring Branch

Montgomery Watson/Harza Laboratories	<u>Address</u>	750 Royal Oaks Drive Ste. 100 Monrovia, CA 91016 USA
	<u>Contact</u>	Bradley Cahoon and Rita Reeves (Project Managers - Sacramento), Linda Geddes* (Project Manager - Monrovia) *Work with Linda after samples arrive at laboratory
	<u>P/F</u>	(916) 418-8358, (626) 386-1100, Linda - (626) 386-1163, Rita cell 916-996-5929
	<u>Email</u>	Bradley.Cahoon@us.mwhglobal.com, linda.geddes@mwhglobal.com
	<u>CC Info</u>	cc. Rita on all communications to Bradley.
	<u>Methods</u>	<i>Approved for all inorganic, organic, and radiochemistry parameters in drinking water</i>
Moore Twining Laboratories, Inc.	<u>Address</u>	2527 Fresno Street Fresno, CA 93721 USA
	<u>Contact</u>	Julio Morales (PM), Maria Manuel (QA Officer), Sample Control (Bottle Orders), Juli Adams (Lab Director); Lisa Montijo (Assistant PM)
	<u>P/F</u>	(559) 268-7021 / (559) 268-0740
	<u>Email</u>	juliom@mooretwinning.com; mariam@mooretwinning.com; julia@mooretwinning.com; lisam@mooretwinning.com
	<u>Methods</u>	<i>Approved for COD by SM5220D and general chemistry including boron analysis (not TOC)</i>
Olson Biochemistry Laboratories	<u>Address</u>	SDSU: Box 2170, ACS Rm. 133 Brookings, SD 57007 USA
	<u>Contact</u>	Nancy Thiex, Laboratory Director
	<u>P/F</u>	(605) 688-5466 / (605) 688-6295
	<u>Email</u>	Nancy.Thiex@sdstate.edu
	<u>CC Info</u>	For re-analysis: contact Zelda McGinnis-Schlobohm and Nancy Anderson Zelda.Schlobohm@SDSTATE.EDU, Nancy.Anderson@SDSTATE.EDU For analysis questions only: just CC. Nancy Anderson
	<u>Methods</u>	<i>Approved for boron, selenium, and molybdenum analyses (except boron in soil; Olson does not have the capability)</i>
Sierra Foothill Laboratory, Inc.	<u>Address</u>	255 Scottsville Blvd, Jackson, CA 95642
	<u>Contact</u>	Sandy Nurse (Owner) or Dale Gimble (QA Officer)
	<u>P/F</u>	(209) 223-2800 / (209) 223-2747
	<u>Email</u>	sandy@sierrafoothilllab.com, CC: dale@sierrafoothilllab.com
	<u>Methods</u>	<i>Approved for all inorganic parameters, microbiological parameters, acute and chronic toxicity.</i>
TestAmerica	<u>Address</u>	880 Riverside Parkway West Sacramento, CA 95605 USA
	<u>Contact</u>	Linda Laver
	<u>P/F</u>	(916) 374-4362 / (916) 372-1059 fax
	<u>Email</u>	Linda.Laver@TestAmericaInc.com
	<u>Methods</u>	<i>Approved for all inorganic parameters and hazardous waste organics. Ag analysis in sediment, when known quantity is present, request 6010B</i>
Western Environmental Testing Laboratories	<u>Address</u>	475 East Greg Street # 119 Sparks, NV 89431 USA
	<u>Contact</u>	Erin Pfau (Client Services), Andy Smith (Lab Drctr)
	<u>P/F</u>	(775) 355-0202 / (775) 355-0817
	<u>Email</u>	erinp@wetlaboratory.com, andy@wetlaboratory.com
	<u>Methods</u>	<i>Approved for inorganic parameters (metals, general chemistry) and coliforms.</i>

revised: 2/14/2011

Table 8. Summary of Depth to Groundwater in Wells Beside the Delta-Mendota Canal (feet)
May 1995 - Dec 2011

DMC Milepost	Max	Min	Average	Median	Recent	Count
12.37L	327.8	164.2	230.7	226.0	240.0	53
12.69L	244.8	207.5	224.7	223.0	213.0	53
12.75R	295.0	212.0	249.6	253.0	253.0	52
13.31L	275.8	210.0	227.9	223.5	210.0	52
14.26R	268.5	225.0	239.2	238.0	227.0	52
15.11R	264.0	200.0	241.1	244.0	260.0	53
21.25L	156.0	106.0	122.0	116.0	132.0	51
21.86L	130.0	89.6	108.7	108.0	107.0	53
22.77R	170.0	39.2	134.8	135.0	135.0	53
23.41L	254.0	141.0	191.8	189.5	174.0	53
30.43R	169.8	121.8	145.0	145.8	143.0	53
30.43L	191.0	102.0	126.1	124.2	191.0	53
31.60L	277.0	110.1	213.8	231.8	133.0	53
33.71L	198.6	130.9	164.3	167.9	136.0	53
35.73R	287.0	146.8	165.2	160.6	181.0	53
36.01L	290.0	137.2	203.9	185.5	256.0	51
36.80L	204.0	111.0	154.4	153.0	153.0	52
37.10L	277.0	158.0	192.3	191.0	173.0	52
37.32L	200.0	150.8	165.3	161.7	164.0	52
37.58L	170.0	127.8	145.9	141.2	146.0	52
45.78R	121.0	83.0	99.7	97.1	102.0	52
48.97L	130.0	71.0	96.7	94.5	71.0	48
48.96LNEW	101.0	88.0	95.0	96.0	101.0	8
51.66L	141.2	86.4	107.9	106.0	92.0	52
58.28L	69.0	27.0	44.4	43.1	52.0	51
60.06R	95.0	37.6	67.0	67.2	73.0	51
66.71L	54.0	19.8	36.4	34.1	40.0	51
78.31L	49.3	21.9	29.3	27.9	28.0	60
79.13R	111.8	57.8	82.8	87.8	57.8	60
79.13L	87.8	63.3	72.2	68.8	87.8	8
79.60L	83.2	52.9	65.3	63.0	59.6	60
80.03L	80.0	16.0	35.8	35.5	37.4	60
80.03R	143.5	73.0	108.4	122.8	73.0	9
80.62R	100.2	47.8	61.9	59.8	57.0	60
80.62L	69.0	19.4	43.6	43.0	41.3	60
81.08-R	72.5	55.1	60.5	58.1	56.5	8
83.08-R	64.9	37.6	46.3	43.0	44.1	35
83.67-L	71.6	12.0	25.0	23.4	24.2	35
90.18R	201.3	103.9	138.5	132.4	129.8	60
90.19L1	218.5	98.9	145.3	137.4	145.5	60
90.19L2	190.0	72.0	131.7	124.5	118.8	60
90.39R	212.0	105.0	138.7	133.8	134.6	60

Table 8. Summary of Depth to Groundwater in Wells Beside the Delta-Mendota Canal (feet)
May 1995 - Dec 2011

DMC Milepost	Max	Min	Average	Median	Recent	Count
90.60L	192.0	28.7	136.5	132.0	131.5	60
90.61R	198.0	104.0	137.1	132.7	132.5	60
90.91L	285.9	93.2	143.8	136.1	127.1	60
91.15L	287.7	97.4	138.0	129.3	129.3	60
91.36L	217.0	11.3	103.0	118.9	11.3	60
91.57R	222.2	91.8	134.2	128.0	131.2	60
91.68R	219.6	99.2	142.1	138.9	167.5	60
91.77R	172.2	96.0	127.1	124.2	n/a	60
91.80L	195.2	93.1	133.8	126.5	130.0	60
92.00R	172.6	109.0	137.7	131.2	n/a	60
92.14L	215.1	98.8	143.5	138.7	140.8	60
92.20R	220.0	95.8	141.0	139.1	132.0	60
92.72L	218.3	100.2	146.2	134.5	133.4	60
93.20L	296.1	102.2	138.1	131.0	134.9	60
93.27R	228.4	115.0	157.7	150.5	158.0	59
93.27L	218.9	100.8	144.7	140.1	141.7	60
94.26L	228.1	99.7	142.4	133.2	168.9	60
95.62L	213.4	99.6	143.0	129.9	167.9	60
97.28L	138.8	34.0	67.8	52.6	128.3	60
98.74L	114.2	39.2	53.8	45.8	56.9	60
99.24L	158.3	31.5	60.7	51.5	93.6	60
99.82L	181.8	19.5	64.4	54.7	75.0	60
100.24L	136.6	28.1	58.1	49.8	66.2	60
100.65L	131.2	36.5	64.7	58.2	98.8	60
100.85L	98.3	39.0	57.2	55.0	67.6	59
101.27L	131.4	37.4	63.4	50.5	74.4	59
102.04R	130.0	38.0	62.1	51.5	61.5	59
106.20R	138.3	60.7	90.4	83.2	126.0	59
113.72L	29.2	13.2	21.6	21.6	n/a	59
115.32R	82.9	18.5	30.6	31.6	19.8	59
115.62L	42.0	12.2	25.6	24.4	17.6	58
115.84R	39.2	14.9	24.8	23.0	19.3	59
116.40L1	77.0	14.2	29.8	27.8	17.2	59
116.40L2	74.0	11.3	29.8	23.7	29.1	55

Source: San Luis & Delta-Mendota Water Authority

Appendix 1. 2012 Letter from Exchange Contractors



Consisting of 240,000 acres on the Westside of the San Joaquin Valley

February 3, 2012

JAMES E. O'BANION
Chairman

ROY CATANIA
Vice Chairman

STEVE CHEDESTER
Executive Director

LARRY FREEMAN
Water Resources Specialist

JOANN WHITE
Administrative Assistant

**MINASIAN, SPRUANCE,
MEITH, SOARES &
SEXTON LLP**
Legal Counsel

VIA EMAIL & U.S. MAIL

Mr. Michael Jackson
U.S. Bureau of Reclamation
1243 N Street
Fresno, CA 93721-1813

Ms. Frances Mizuno
San Luis & Delta-Mendota Water Authority
Post Office Box 2157
Los Banos, CA 93635

**CENTRAL CALIFORNIA
IRRIGATION DISTRICT**

James E. O'Banion
President

Christopher White
General Manager

**SAN LUIS CANAL
COMPANY**

James L. Nickel
President

Chase Hurley
General Manager

**FIREBAUGH CANAL
WATER DISTRICT**

Mike Stearns
President

Jeff Bryant
General Manager

**COLUMBIA CANAL
COMPANY**

Roy Catania
President

Randy Houk
General Manager

RE: **2012 DMC Pumping**

Dear Michael and Frances:

This letter is to confirm the San Joaquin River Exchange Contractors Water Authority's (Exchange Contractors) approval of your request to continue the DMC pumping program in 2012. As a result of subsidence effects being determined in 2008, this year's program must continue to include that no pumping will be allowed in Management Areas 2 and 3.

Additionally, the joint groundwater study between the Central California Irrigation District, the City of Los Banos and the United States Bureau of Reclamation was completed in the Los Banos aquifer subarea due to significant groundwater concerns in April 2010. The study and its recommendations are to be incorporated into the 2012 DMC pumping program.

The Exchange Contractors' Board approval for this pumping program is based upon the conditions set forth below:

1. Any well that is proposed to pump into the lower DMC must obtain a current water quality analysis. The analysis shall consist of Ag Suitability and selenium, plus any other constituents the U.S. Bureau of Reclamation (USBR) may require. (Wells may be pumped for 24

P.O. Box 2115
541 H Street
Los Banos, CA 93635
(209) 827-8616
Fax (209) 827-9703
e-mail: jtoscana@sjrecwa.net
Website: www.sjrecwa.net

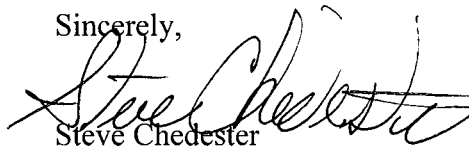
Mr. Michael Jackson
Ms. Frances Mizuno
RE: **2012 DMC Pumping**
February 3, 2012
Page 2

hours in order to get the initial sample for water quality testing.) These tests will be conducted on a monthly basis for the duration of the pumping period. From our perspective, pumping may begin once we have received copies of current lab test results for salinity and selenium, recognizing the other constituents may take longer to obtain the lab results.

2. Only wells that test at 1,500 ppm TDS or less at the well head will be allowed.
3. Only wells that test at 2 ppb selenium or less at the well head will be allowed.
4. The calculated degradation caused by the lower DMC wells shall not exceed 30 ppm. (The model developed by USBR during the 2008 and 2009 pumping program shall be used and USBR shall provide at least weekly updates of the reports to the Exchange Contractors.)
5. At any time, the wells in the lower DMC will be shut off if the measured water quality at Check 20 on the DMC exceeds 450 ppm TDS in a single day. The wells may resume pumping after the average water exceedence no longer exists for 3 days. Wells with water quality at the well head of 450 TDS or less would be allowed to continue to pump and would not be subject to this restriction.
6. Pumping in the Los Banos aquifer subarea shall only be credited for use in that local subarea (San Luis Water District) and is subject to the monitoring triggers established in the April 2010 joint report between the Central California Irrigation District, the City of Los Banos and the United States Bureau of Reclamation.
7. The water would be credited to the receiving district as a whole, not for specific growers.
8. The wells will only run through February 28, 2013.

If you agree with the program as outlined, and before any additional lower DMC pumping commences, we request that each of your agencies confirm in writing to the program described above. Please contact us if you have any questions regarding this matter.

Sincerely,



Steve Chedester

cc: San Joaquin River Exchange Contractors Board Members
Paul Minasian, Esq.