

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 2011 through 2012 (March 1 2011 – February 28, 2013)

EA-10-72



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.

Contents

Section 1 Purpose and Need for Action	1
1.1 Background	1
1.2 Purpose and Need	1
1.3 Scope	1
1.4 Resources Potentially Affected	2
1.5 Reclamation’s Legal and Statutory Authorities and Jurisdiction Relevant to the Proposed Federal Action	2
Section 2 Alternatives Including Proposed Action	7
2.1 No Action	7
2.2 Proposed Action	7
Section 3 Affected Environment & Environmental Consequences	13
3.1 Water Resources	13
3.2 Geological Resources	25
3.3 Land Use	26
3.4 Biological Resources	27
3.5 Cultural Resources	33
3.6 Indian Trust Assets	34
3.7 Socioeconomic Resources	34
3.8 Environmental Justice	35
3.9 Air Quality	35
3.10 Global Climate Change	38
3.11 Cumulative Impacts	39
Section 4 Consultation and Coordination	41
4.1 Fish and Wildlife Coordination Act (16 USC § 661 et seq.)	41
4.2 Endangered Species Act (16 USC §1531 et seq.)	41
4.3 National Historic Preservation Act (16 USC § 470 et seq.)	41
4.4 Migratory Bird Treaty Act (16 USC § 703 et seq.)	41
4.5 Executive Order 11988 – Floodplain Management and Executive Order 11990 - Protection of Wetlands	42
4.6 Clean Water Act (16 USC § 703 et seq.)	42
4.7 Clean Air Act (42 USC § 7506 (C))	42
Section 5 List of Preparers and Reviewers	45
Section 6 References	47

Appendices

Appendix A Cultural Resources Determination	49
Appendix B Indian Trust Assets Determination	51
Appendix C Mitigation and Minimization Measures	53
Appendix D Delta-Mendota Canal 2011 Water Quality Monitoring Program	55

List of Figures and Tables

Figure 1-1 General Location Map.....5

Figure 2-1 Management Areas 2 and 3.....11

Figure 3-1 Federal Water District and Water Conveyance Facilities near the Mendota Pool.....17

Figure 3-2 Mendota Pool19

Table 2-1 Warren Act Contract/Exchange Agreement Quantities for Pumping into DMC 7

Table 2-2 Groundwater Pumping Requiring Exchange with Reclamation from the SLC 8

Table 2-3 List of Turnout locations nearest to Approved Wells that Could Pump into the DMC .. 8

Table 2-4 Potential Delivery Locations for Delivery of Non-Project Water..... 8

Table 3-1 5-Year CVP Allocation Percentages..... 13

Table 3-2 Baseline Supply 13

Table 3-3 Overall Groundwater Balance in the Exchange Contractors Service Area 1993-2002. 21

Table 3-4 San Joaquin Groundwater Basins, Ordinances and Districts..... 22

Table 3-5 Past Groundwater Pumping Under the Groundwater Pump-in Program 23

Table 3-6 Threatened and Endangered Species List..... 29

Table 3-7 District Pumps 36

Table 3-8 San Joaquin Valley General Conformity de minimis Thresholds 37

Table 3-9 Proposed Action Calculated Emissions..... 37

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 Purpose and Need for Action

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, 2011 through February 28, 2013, (Contract Years 2011-2012). The 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. 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 Central Valley Project (CVP) and Non-Project Water for domestic, municipal, industrial, fish and wildlife, and any other beneficial purpose. The Proposed Action area includes water districts in the Delta Division and San Luis Unit of the CVP in central California.

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 had above normal rainfall, these CVP contractors received only 45 percent of their full CVP contract supply. The hydrologic conditions for 2011 are not yet known. Operations of the Federal Jones Pumping Plant will continue to be limited due to the various constraints on Delta operations, which will reduce available CVP contract supplies. SOD CVP contractors thus need to identify additional supplies to avoid shortages for their customers.

1.3 Scope

This environmental assessment (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)

1.4 Resources Potentially Affected

The resources potentially affected by the Proposed Action and therefore analyzed within this EA include:

- Water Resources
- Land Use
- Biological Resources
- Cultural Resources
- Indian Trusts Assets
- Socioeconomic Resources
- Environmental Justice
- Air Quality
- Global Climate Change
- Cumulative Impacts

1.5 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 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 monitoring requirements are established by Reclamation to protect water quality in the DMC by ensuring that imported Non-

Project Water does not impair existing uses or negatively impact existing water quality conditions. These standards are updated periodically. The annual review for the approval of Warren Act Contracts would be subject to the then-existing water quality standards. The water quality standards are the maximum concentration of certain contaminants that may occur in each source of Non-Project Water.

- 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.
- 2011 letter from the San Joaquin River Exchange Contractors Authority.

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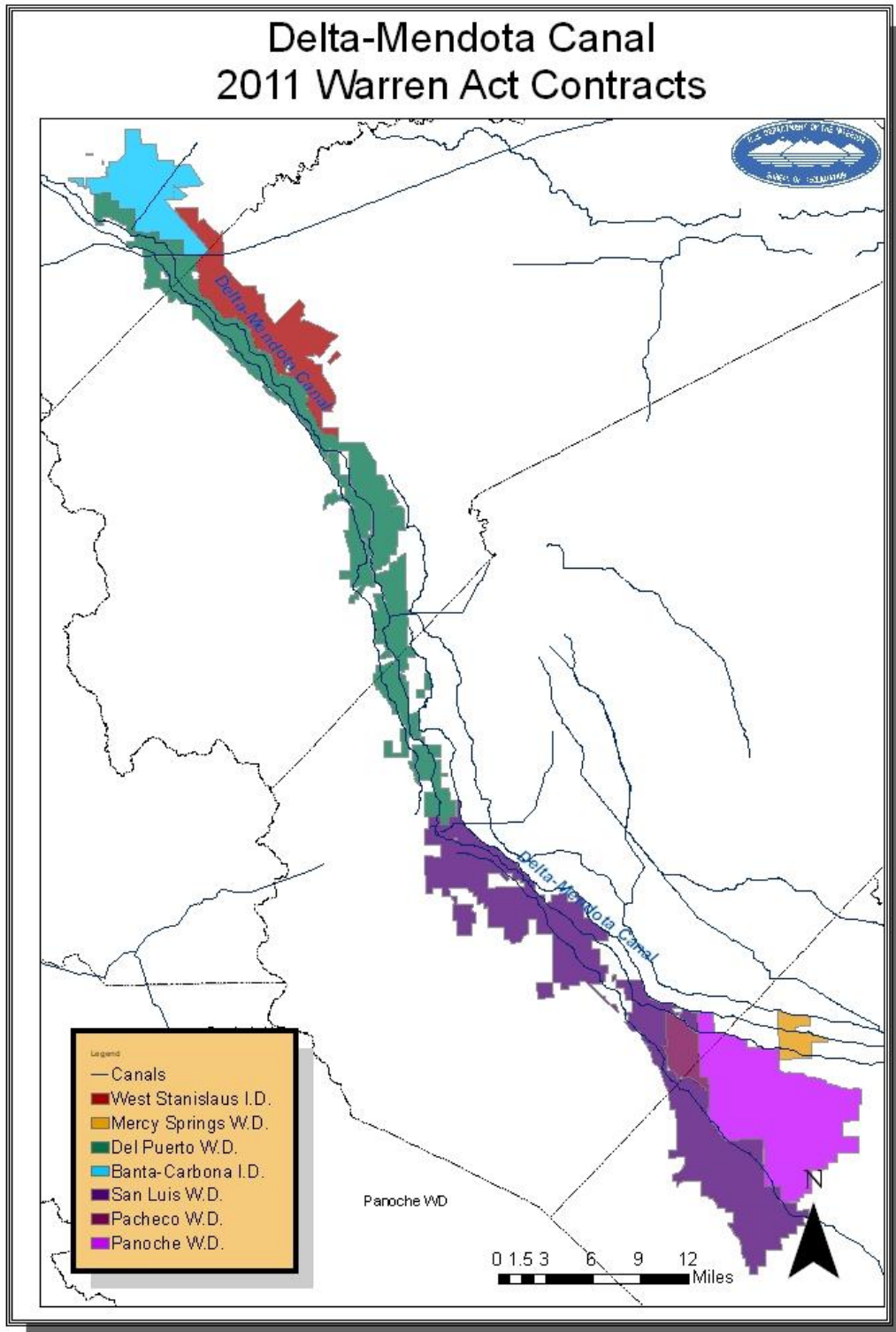


Figure 1-1 General Location Map

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Section 2 Alternatives Including Proposed Action

2.1 No Action

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, but would not be authorized to pump the groundwater into the DMC.

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, 2011 through February 28, 2012 for pumping and conveyance, and March 1, 2011 through February 29, 2013 for storage in San Luis Reservoir (SLR) and conveyance from the SLR.

Each participating contractor would be allowed to pump up to 10,000 acre feet (AF) of Non-Project Water into the DMC. Reclamation has capped the Proposed Action at 50,000 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 displays a list of the water districts that could potentially participate in this Proposed Action and the estimated pumping quantities. Table 2-2 displays 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 2-1 Warren Act Contract/Exchange Agreement Quantities for Pumping into DMC

District	Quantity for 2011 (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 Groundwater Pumping Requiring Exchange with Reclamation from the SLC

District	Quantity for 2011 (AF)
San Luis Water District	10,000
Panoche Water District	10,000
Pacheco Water District	6,000

Source of Non-Project Water

The source of the Non-Project Water would be district groundwater pumping which would be pumped directly into the DMC (Table 2-3). The water pumped into the DMC would be measured by SLDMWA field staff. The district would then take out a like amount from turnouts (Table 2-4) on either the DMC or the SLC to be conveyed through their distribution systems for agricultural use to water users within the district.

Table 2-3 List of Turnout locations nearest to Approved Wells that Could Pump into the DMC

District	Turnout Milepost
Banta Carbona Irrigation District	12.75-R, 15.11-R
Del Puerto Water District	21.25-L, 21.86L, 22.77-R, 30.43-R, 30.43-L, 31.60-L, 32.36-L, 35.71L,-R, 35.73R, 36.01-L, 36.45-R, 36.68L, 36.80-L, 37.10-L, 37.32-L, 42.50R, 45.78-R, 48.97L, 48.97L, 49.54-R, 49.56R, 51.66-L, 57.73R, 57.93-L, 58.73R, 58.90L*, 64.32-L, 66.68-L, 66.71-L
Mercy Springs Water District	98.74L , 99.24L
Panoche Water District	80.03-L, 80.03-R, 98.74L , 99.24L
Pacheco Water District	98.74L , 99.24L
San Luis Water District	20.42-L, 48.97-L, 58.28-L, 58.73R, 79.13-L, 79.13R, , 79.60-L,
West Stanislaus Irrigation District	31.31L1, 31.31 L2

Wells also identified by Latitude/Longitude

58.90L* This well has not been constructed but is included here because it will be constructed during the period covered under this EA. The water quality analysis indicates this well meets current standards and may be used for DMC pump in as long as the combined quantity does not exceed the 10.000 af/y limit per district. The new well will require separate environmental approval prior to construction. While the well is located at Milepost 58.90, the discharge into the canal will be 0.3 mile away at 58.60L.

Table 2-4 Potential Delivery Locations for Delivery of Non-Project Water

District	Delivery Locations on the Delta-Mendota Canal	Delivery Locations on the San Luis Canal
Banta Carbona Irrigation District	12.75-R, 15.11-R	
Del Puerto Water District	20.37R, 21.25-L, 21.86L, 22.77-R, 23.41-L, 30.43-R, 30.43-L, 31.60-L, 32.36-L, 32.62 R, 35.71L,-R, 35.04 R, 34.04L, 35.63R, 35.73R, 36.01-L, 36.45-R, 36.68L, 36.80-L, 37.10-L, 37.32-L, 37.58L, 40.39R, 42.50R, 43.24L, 45.78-R, 48.97L, 48.97L, 48.38L, 49.54-R, 49.56R, 51.66-L, 57.73R, 57.93-L, 58.60L, 58.73R, 60.06R, 60.54R, 64.32-L, 66.68-L, 66.71-L	
West Stanislaus Irrigation District	31.31-L1, 31.31-L2	
Mercy Springs Water District	98.74L , 99.24L	
Panoche Water District	80.03-L, 80.03-R, 98.74L , 99.24L	96.15, 96.85, 100.48, 102.64
Pacheco Water District	98.74L , 99.24L	89366, 89.67
San Luis Water District	20.42-L, 48.97-L, 58.28-L, 58.73-R, 79.13-L, 79.13-R, 79.60-L, 81.08-R	75.49, 77.11, 79.39, 82.10, 82.26, 83.25, 87.78, 89369, 92.16, 92.73, 94.06, 98.15, 99.61, 102.20, 103.40, 104.20

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 Delta-Mendota Canal 2011 Water Quality Monitoring Program – Groundwater (Appendix E) would be adhered to. The 2011 Monitoring Program describes the plan for measuring the changes in the quality of water caused by the conveyance of groundwater during 2011. 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. Several sampling techniques would be used to collect samples of water, including real-time, grab, and composite.

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.

No native or untilled land (fallow for three years or more) may be cultivated with the water involved with these actions.

In addition to Reclamation’s groundwater monitoring program requirements, conditions specified in the Mitigation and Monitoring Table (Appendix D) and San Joaquin River Exchange Contractors’ Water Authority letter would be complied with. As of this writing, the Water Authority letter is being drafted and will be included in the Final EA. The Water Authority letter may result in removal of certain wells if there is a potential of inelastic subsidence.

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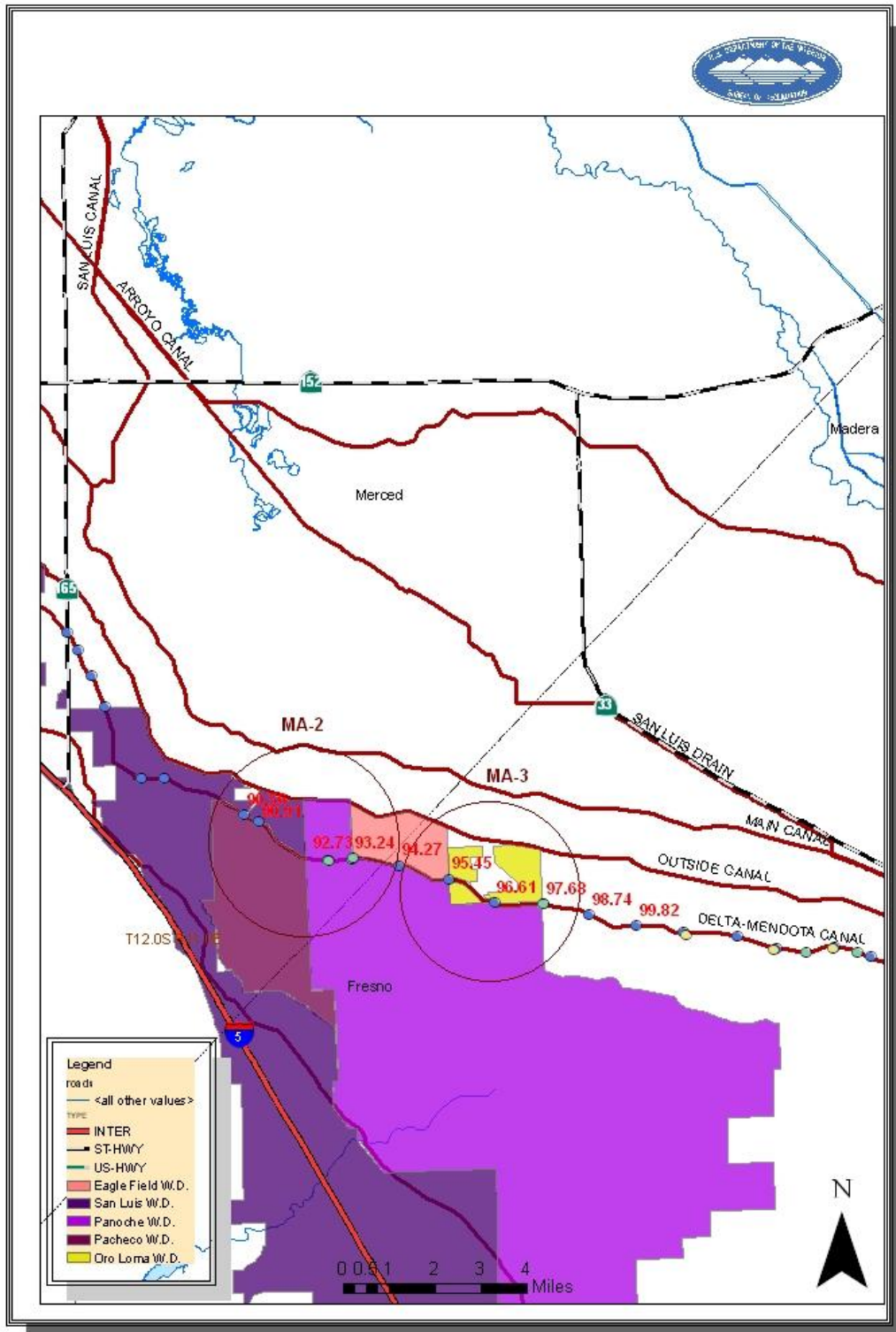


Figure 2-1 Management Areas 2 and 3

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Section 3 Affected Environment & Environmental Consequences

3.1 Water Resources

3.1.1 Affected Environment

Surface Water

For the purposes of the effect analysis, baseline conditions are described as the existing environment, and the existing environment is defined as the conditions during the past five years. The five-year average allocation of CVP water supplies delivered to the water contractors is described in Table 3-1. It lists deliveries of CVP water on a yearly basis for agriculture purposes from 2006 to 2010. The five-year average is 49 percent of contract amounts for agriculture.

Table 3-1 5-Year CVP Allocation Percentages

Year	Allocation Percentage
2006	100
2007	50
2008	40
2009	10
2010	45
5-year Average	49

The annual contract amounts for the districts is 442,212 AF, thus the baseline supply is 216,684 AF (Table 3-2).

Table 3-2 Baseline Supply

Water District	Maximum Contract Amount	49 Percent of Contract Amount
Banta-Carbona Irrigation District	20,000	9,800
Del Puerto Water District	140,210	68,703
Mercy Springs Water District	2,842	1,393
West Stanislaus Irrigation District	50,000	24,500
Pacheco Water District	10,080	4,939
Panoche Water District	94,000	46,060
San Luis Water District	125,080	61,289
TOTAL	442,212	216,684

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 131,000 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 13,300 AF. Of this amount, 10,458 AF has been partially assigned to Westlands Water District leaving 2,842 AF in-district. 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. 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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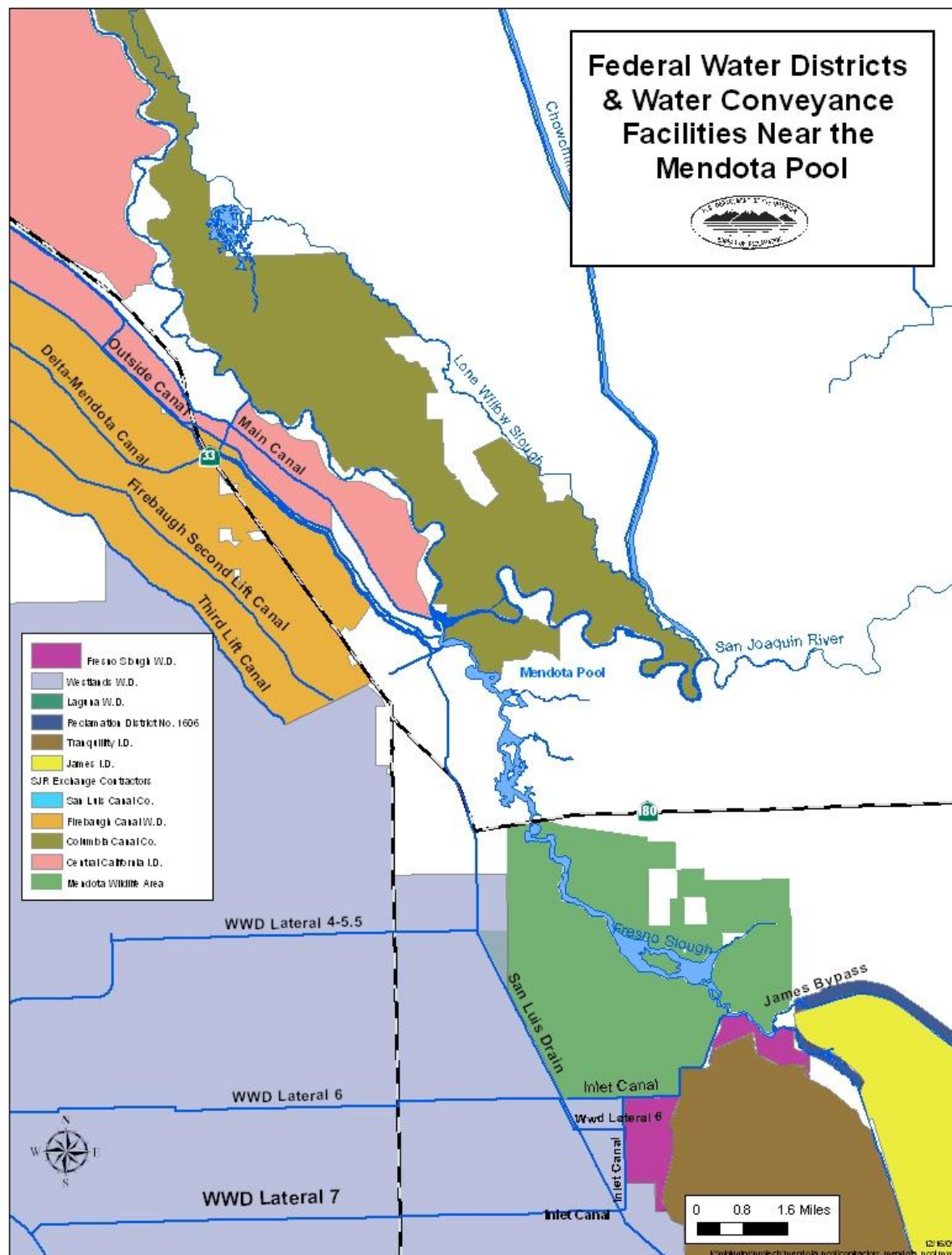


Figure 3-1 Federal Water District and Water Conveyance Facilities near the Mendota Pool

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.

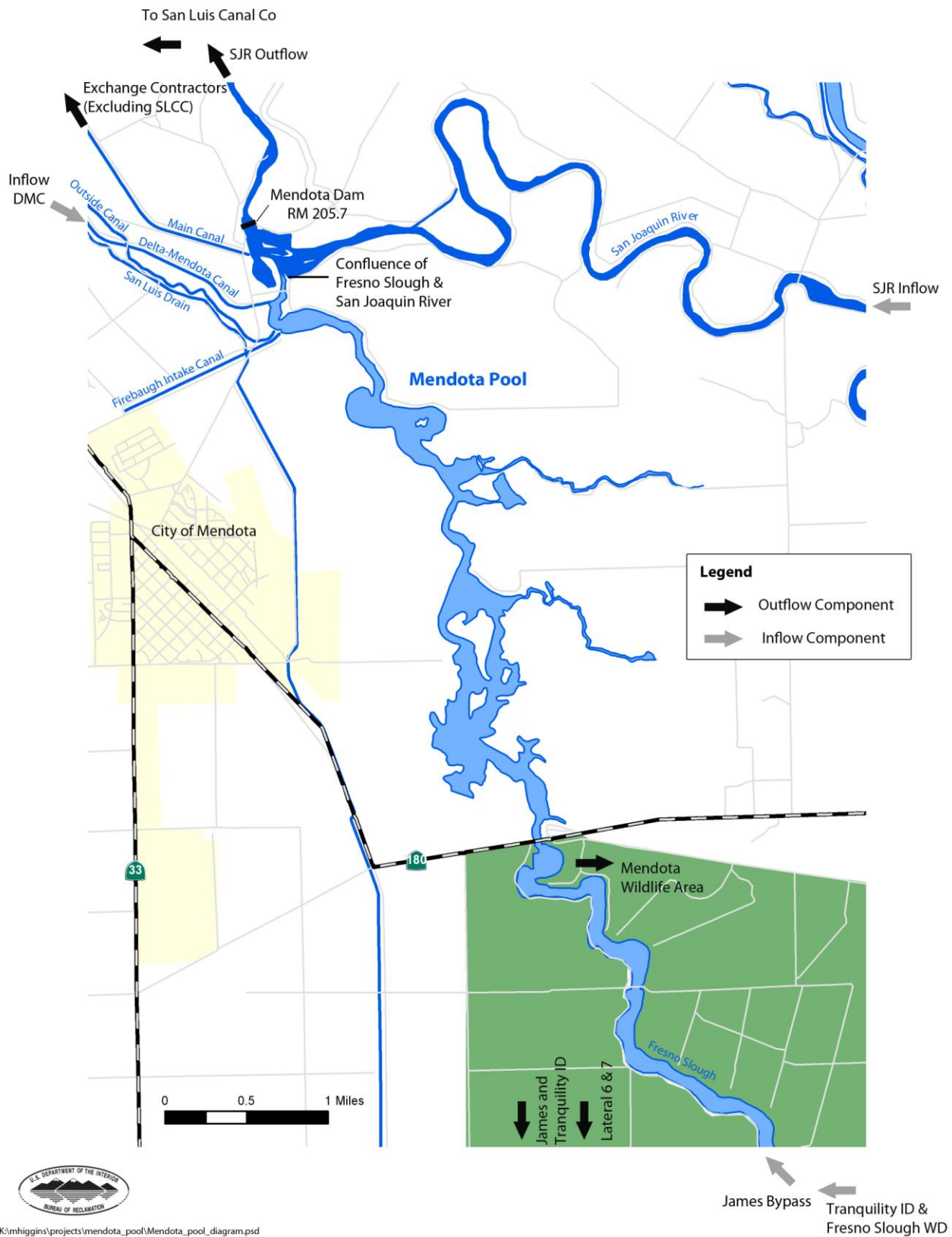


Figure 3-2 Mendota Pool

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 Overall 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 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 San Joaquin Valley Groundwater Basins (DWR 2003), Ordinances, and Districts

County	Subbasin Name	Ordinance	Districts overlying County & Subbasin
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

County	Subbasin	Ordinance	Districts overlying County & Subbasin
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

County	Subbasin	Ordinance	Districts overlying County & Subbasin
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.

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	2010*	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
BCID	9,977	9,451	8,425								
BBID	3,091	2,539									
DPWD	8,055	7,061	2,029				431	235	980	2,682	1,724
MSWD	0	6,584									
Pacheco	0	4,370									
Panoche	5,756	5,663	7,184				233	265	370	1,214	1,243
SLWD	1,500	5,040	2,909				1,097	1,401	4,176	4,650	5,485
WSID	1,495	4,370									
TOTAL	23,065	45,078	20,547				1,761	1,901	5,526	8,546	8,452
10-YR TOTAL	113,136										

Data based on contract year (March through February) deliveries

Non-CVP pumped quantities are in AF

*2010 data retrieved through September 2010

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 evaluating other methods for disposing of this sump water. Reclamation is in negotiations with Panoche Drainage District to treat and dispose of the sump water.

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

Selenium Monitoring A selenium monitoring program was initiated in July 2002. Daily composite samples for selenium and TDS are collected using 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. This program collects monthly samples from the DMC at McCabe Road near Check 13. The samples are analyzed for many constituents including alkalinity, total organic carbon, and coliforms.

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 2011 and 2012. 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 that the Exchange Contractors divert water from, 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. 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 under the Warren Act contract. The Warren Act contract provides for routine testing of each well by Reclamation and SLDMWA to confirm that the groundwater still meets standards. The contract also allows the Contracting Officer to stop a well that fails to meet standards. Reclamation and SLDMWA staff would monitor salinity and selenium 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.

3.2 Geological 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. and 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 2011 Delta-Mendota Canal Pump-in Program Water Quality Monitoring Plan (Appendix E) includes measures to ensure that overdraft and resulting subsidence does not occur from the Proposed Action. Measures include:

- All districts participating in the 2011 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 will be entered into worksheets and presented each week to Reclamation via e-mail. Reclamation will 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 will be compared to the measured depths. If the current depth exceeds the maximum measured depth, Reclamation will 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 will ensure that overdraft and resulting subsidence does not occur from the Proposed Action.

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.

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 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 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 fresh emergent wetlands.

The following list (Table 3-6) was obtained on October 19, 2010, by accessing the USFWS Database (Document Number 101019032320). 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 seasonally astatic grassland 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 mature elderberry shrubs of California's Central Valley and Sierra Foothills.	Present. The host plant for this species is common throughout the region. CNDDDB records indicate that this species is presumed extant.

Table 3-6 Threatened and Endangered Species List (Continued)

Species	Status	Habitat	*Occurrence in the Study Area
FISH			
Southern Distinct Population of North American green sturgeon (<i>Acipenser medirostris</i>)	FT	Anadromous and highly marine-oriented; spawns mainly in Sacramento River. No evidence of occurrence in San Joaquin River system. Juveniles salvaged in South Delta pumping plants in summer.	Absent. No natural waterways within the species' range would 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 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 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 in cold waters.	Absent. No natural waterways within the species' range would be affected by the proposed action.
AMPHIBIANS & REPTILES			
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 stockponds occur in the region. Rodent burrows are common along the fringes of agricultural areas.
California red-legged frog (<i>Rana aurora draytonii</i>) Critical habitat	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.
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.

Table 3-6 Threatened and Endangered Species List (Continued)

Species	Status	Habitat	*Occurrence in the Study Area
Riparian brush rabbit (<i>Sylvilagus bachmani riparius</i>)	FE, CE	Habitat for the riparian brush rabbit consists of riparian communities dominated by willow thickets (<i>Salix spp.</i>), 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.	Possible. Only occurs in Stanislaus and San Joaquin 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 10°, 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. CNDDDB 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 absence of detections since 1992 in spite of intense survey efforts suggests that it may now be extinct.

*Adapted from CNDDDB, 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

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.

Proposed Action

There would be no impacts to biological resources. 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 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.

3.5 Cultural Resources

”Cultural resources” is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. The National Historic Preservation Act (NHPA) of 1966 is the primary Federal legislation that outlines the Federal Government’s responsibility to cultural resources. Section 106 of the NHPA requires the Federal Government to take into consideration the effects of an undertaking on cultural resources listed in or eligible for inclusion in the National Register of Historic Places (NRHP). Those resources that are in or eligible for inclusion in the NRHP are referred to as historic properties.

The Section 106 process is outlined in the Federal regulations at 36 CFR Part 800. These regulations describe the process that a Federal agency (Reclamation) follows to identify cultural resources and the level of effect that a proposed undertaking will have on historic properties. In summary, Reclamation must first determine if the Proposed Action is the type of action that has the potential to affect historic properties. If the action is the type of action with the potential to affect historic properties, Reclamation must identify the area of potential effects (APE), determine if historic properties are present within that APE, determine the effect that the undertaking will have on historic properties, and consult with the State Historic Preservation Officer, to seek concurrence on Reclamation’s findings. In addition, Reclamation is required through the Section 106 process to consult with Indian tribes concerning the identification of sites of religious or cultural significance, and to consult with individuals or groups who are entitled to be consulting parties or have requested to be consulting parties.

3.5.1 Affected Environment

The San Joaquin Valley is rich in historical and prehistoric cultural resources. Prehistoric cultural resources in this area include remnants of indigenous human populations that existed long before European settlement of the West. Prior to the 18th Century, many Native American groups inhabited the Central Valley. The San Joaquin Valley supported extensive populations of Native Americans, principally the ethnographically-known Northern Valley Yokuts. The conversion of land and intensive farming practices over the last century may have destroyed many Native American cultural sites; however, it is possible that additional cultural resources lie undiscovered across the valley.

The DMC is a component of the CVP, which is currently being evaluated for inclusion in the National Registry of Historic Properties (NRHP) as a multiple property listing. The DMC, completed in 1951, carries water southeasterly from the Tracy Pumping Plant along the west side of the San Joaquin Valley for irrigation supply, for use in the San Luis Unit and Delta Division, and to replace San Joaquin River water stored at Friant Dam and used in the Friant-Kern and Madera canal systems. The DMC is about 117 miles long and terminates at the Mendota Pool, about 30 miles west of Fresno. The initial diversion capacity is 4,600 cfs, which is gradually decreased to 3,211 cfs at the terminus (Reclamation 2007).

3.5.2 Environmental Consequences

No Action

The No Action Alternative would neither change nor modify the DMC or other CVP facilities and has no potential to affect historic properties pursuant to 36 CFR Part 800.3(a)(1).

Proposed Action

There would be no impacts to cultural resources as a result of implementing the Proposed Action. 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).

3.6 Indian Trust Assets

3.6.1 Affected Environment

Indian Trust Assets (ITA) are legal interests in property held in trust by the U.S. for federally-recognized Indian tribes or individual Indians. An Indian trust has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset. ITA can include land, minerals, federally-reserved hunting and fishing rights, federally-reserved water rights, and in-stream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally-recognized Indian tribes with trust land; the U.S. is the trustee. By definition, ITA cannot be sold, leased, or otherwise encumbered without approval of the U.S. The characterization and application of the U.S. trust relationship have been defined by case law that interprets Congressional acts, executive orders, and historic treaty provisions.

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

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. This action would have no adverse effect on ITA.

3.7 Socioeconomic Resources

3.7.1 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.

3.7.2 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 2011 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.

3.8 Environmental Justice

3.8.1 Affected Environment

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

3.8.2 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 would help maintain agricultural production and farm worker employment if 2011 is a dry year. Therefore implementing the Proposed Action would not cause any harm to minority or disadvantaged populations within the Proposed Action area.

3.9 Air Quality

3.9.1 Affected Environment

The Proposed Action lies within the San Joaquin Valley Air Basin (SJVAB), the second largest air basin in California. Air basins share a common “air shed,” the boundaries of which are defined by surrounding topography. Although mixing between adjacent air basins inevitably occurs, air quality conditions are relatively uniform within a given air basin. The San Joaquin Valley experiences episodes of poor atmospheric mixing caused by inversion layers formed when temperature increases with elevation above ground, or when a mass of warm, dry air settles over a mass of cooler air near the ground. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) have been established for the following criteria pollutants: carbon monoxide (CO), ozone (O₃), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), inhalable particulate matter (PM₁₀ and PM_{2.5}), and lead (Pb). The CAAQS also set standards for sulfates, hydrogen sulfide, and visibility.

Despite years of improvements, the SJVAB does not meet state and federal health-based air quality standards. The San Joaquin Valley is designated as a State and Federal non-attainment area for O₃, and PM_{2.5}, and a State and Federal attainment area for CO, SO₂, NO₂, and Pb. The San Joaquin Valley is designated a Non-attainment area by State standards and an Attainment area by Federal standards for PM₁₀. To protect health, the San Joaquin Valley Air Pollution Control District (SJVAPCD) is required by federal law to adopt stringent control measures to reduce emissions (SJVAPCD 2010).

Section 176 (C) of the Clean Air Act [CAA] (42 USC 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 USC 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 NAAQS 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 will, in fact conform to the applicable SIP before the action is taken.

On November 30, 1993, the Environmental Protection Agency (EPA) promulgated final general conformity regulations at 40 Code of Federal Regulations (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.

Table 3-7 lists the kinds of pumps that could be used under the Pump-in Program for the participating districts.

Table 3-7 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 3-8 lists the de minimis thresholds for the San Joaquin Valley Air Basin.

Table 3-8 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 2010a; 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 2011 contract year ending February 28, 2012. 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 2011. No new facilities would be needed as a result of the Proposed Action.

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 minimus thresholds for the SJVAPCD (Table 3-9); therefore, there would be no air quality impacts associated with this Proposed Action.

Table 3-9 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 2010b; 40 CFR 93.153

3.10 Global Climate Change

3.10.1 Affected Environment

Climate change refers to significant change in measures of climate (e.g., temperature, precipitation, or wind) lasting for decades or longer. Many environmental changes can contribute to climate change (changes in sun's intensity, changes in ocean circulation, deforestation, urbanization, burning fossil fuels, etc.) (EPA 2008a).

Gases that trap heat in the atmosphere are often called greenhouse gases (GHG). Some GHG such as carbon dioxide (CO₂) occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHG (e.g., fluorinated gases) are created and emitted solely through human activities. The principal GHG that enter the atmosphere because of human activities are: CO₂, methane (CH₄), nitrous oxide, and fluorinated gasses (EPA 2008a).

During the past century humans have substantially added to the amount of GHG in the atmosphere by burning fossil fuels such as coal, natural gas, oil and gasoline to power our cars, factories, utilities and appliances. The added gases, primarily CO₂ and CH₄, are enhancing the natural greenhouse effect, and likely contributing to an increase in global average temperature and related climate changes. There are uncertainties associated with the science of climate change (EPA 2008b).

More than 20 million Californians rely on the SWP and CVP. Increases in air temperature may lead to changes in precipitation patterns, runoff timing and volume, sea level rise, and changes in the amount of irrigation water needed due to modified evapotranspiration rates. These changes may lead to impacts to California's water resources and project operations.

While there is general consensus in their trend, the magnitudes and onset-timing of impacts are uncertain and are scenario-dependent (Anderson et al. 2008).

3.10.2 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 not be distributed to other areas to supplement the diminished CVP water supply.

Implementation of the No Action Alternative would have no change on the composition of the atmosphere and therefore would have no direct or indirect effects to climate.

Proposed Action

The Proposed Action would involve no physical changes to the environment, no 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. Current data are not yet clear on the hydrologic changes and how they will affect the San Joaquin Valley. Water allocations are made dependent on hydrologic conditions and environmental requirements. Since Reclamation operations and allocations are flexible, any changes in hydrologic conditions due to global climate change would be addressed within Reclamation's operation flexibility and therefore surface water resource changes due to climate change would be the same with or without the Proposed Action.

3.11 Cumulative Impacts

Cumulative impacts result from incremental impacts of a Proposed Action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

To determine whether cumulatively significant impacts are anticipated from the Proposed Action, the incremental effects of the Proposed Action were examined together with impacts from past, present, and reasonably foreseeable future actions in the same geographic area.

Reclamation's action would be the approval of Exchange Agreements and/or Warren Act contracts for conveyance and storage of Non-Project Water. Subsequent actions are beyond Reclamation's approval and authority. Reclamation has made Exchange Agreements and/or Warren Act contracts available in previous years when excess capacity was available. Most likely in 2011, more districts will request Warren Act contracts since it could be a dry year and groundwater is needed to supplement the reduced CVP supply. This is a two-year action, and the cumulative amount the districts are limited to, under this Proposed Action, is 50,000 AF. However, districts can request a Warren Act contract separate from this Proposed Action to convey Non-Project Water from surface water sources but these actions would be analyzed in separate environmental documents. Additionally, in accordance with the Warren Act contract, Reclamation would continue to make these contracts available to requesting districts in future years, given that each district meets present and future requirements for Warren Act contracts.

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

Two types of requests for use of the DMC include:

- A 40-year long-term Exchange Agreement for conveyance of 4,500 AF/y of Byron Bethany Irrigation District's non-CVP Delta water through the DMC to the City of Tracy's Water Treatment Plant. This proposed action includes an easement for placement of a new discharge pipeline at the headwall of the DMC.
- A transfer of up to 20,500 AF of Central California Irrigation District's (CCID) Exchange Contract CVP supplies to Westlands Water District, San Luis Water District, Panoche Water District, and Del Puerto Water District for the period April through December 2010 and April through December 2011. Certain landowners within CCID would pump up to 75 cfs of groundwater to meet in-district demands in lieu of CCID taking surface water deliveries. The groundwater would be discharged into CCID's conveyance system freeing up its CVP water under the San Joaquin Exchange Contractor's Contract to be delivered to the districts via the DMC and/or the San Luis Canal.

Other potential projects in the area:

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

In California, authority for managing different aspects of groundwater and surface water resources is separated among federal, Tribal, state, and local agencies. For example, State Water Resources Control Board regulates surface water rights dating from 1914, but not rights prior to 1914; *Regional Water Quality Control* Board regulates groundwater quality, but not the rights to use groundwater; County groundwater ordinances and local agency groundwater management plans often only apply to a portion of the groundwater basin, and counties or local agencies with overlapping boundaries of responsibility within the same groundwater basin do not necessarily have consistent management objectives in their groundwater ordinances or management plans; and, except in adjudicated basins and areas with adopted groundwater management plans, individuals have few restrictions on how much groundwater they can use, provided the water is put to beneficial use. Because of the connection between surface water and groundwater, the unmanaged groundwater use will eventually affect other water users and may have significant impacts on the environment and economy (DWR 2009).

Under Reclamation's monitoring program, data would be collected to fill gaps in information related to subsidence and groundwater quality, and changes made in order to safely maintain water quality and water levels above subsidence thresholds.

Section 4 Consultation and Coordination

Reclamation is posting the draft EA/FONSI for public review and comment on Reclamation's website between February 7, 2002 and February 21, 2011.

4.1 Fish and Wildlife Coordination Act (16 USC § 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 resource development projects that could affect biological 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.

4.2 Endangered Species Act (16 USC §1531 et seq.)

Section 7 of this Act requires Federal agencies to ensure that all federally associated activities within the U.S. do not jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of the critical habitat of these species. Action agencies must consult with the USFWS, which maintains current lists of species that have been designated as threatened or endangered, to determine the potential impacts a project may have on protected 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.

4.3 National Historic Preservation Act (16 USC § 470 et seq.)

The Section 106 process is outlined in the Federal regulations at 36 CFR Part 800. These regulations describe the process that the Federal agency (Reclamation) takes to identify cultural resources and the level of effect that the proposed undertaking will have on historic properties. In summary, Reclamation must first determine if the action is the type of action that has the potential to affect historic properties. If the action is the type of action that has the potential to affect historic properties, Reclamation must identify the APE, determine if historic properties are present within that APE, determine the effect that the undertaking would have on historic properties, and consult with the State Historic Preservation Office, to seek concurrence on Reclamation's findings. In addition, Reclamation is required through the Section 106 process to consult with Indian Tribes concerning the identification of sites of religious or cultural significance, and consult with individuals or groups who are entitled to be consulting parties or have requested to be consulting parties. 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)).

4.4 Migratory Bird Treaty Act (16 USC § 703 et seq.)

The MBTA implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the MBTA 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 MBTA, the Secretary of the Interior (Secretary) 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 will 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.

4.5 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.

4.6 Clean Water Act (16 USC § 703 et seq.)

Section 401

Section 401 of the Clean Water Act [CWA] (33 USC § 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 USC § 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 United States Army Corps of Engineers dredge and fill discharge permit to first obtain certification from the state that the activity associated with dredging or filling will 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.

Section 404

Section 404 of the CWA authorizes the United States Army Corps of Engineers to issue permits to regulate the discharge of “dredged or fill materials into waters of the United States” (33 USC § 1344).

The Proposed Action does not involve discharge into waters of the United States or wetlands; hence, no permit would be required.

4.7 Clean Air Act (42 USC § 7506 (C))

Section 176 of the CAA requires that any entity of the Federal government that engages in, supports, or in any way provided financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable SIP required under Section 110 (a) of the CAA (42 USC 7401 (a)) before the action is otherwise approved. In this context, conformity means that such federal actions must be consistent with a SIP’s purpose of eliminating or reducing the severity and number of violations of the NAAQS 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 will, in fact conform to the applicable SIP before the action is taken. There would be no impacts to air quality; therefore, a conformity analysis is not required.

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Section 5 List of Preparers and Reviewers

Patti Clinton, Natural Resource Specialist, SCCAO

Chris Eacock, Natural Resources Specialist, SCCAO

Shauna McDonald, Wildlife Biologist, SCCAO

Chuck Siek, Supervisory Natural Resources Specialist, SCCAO

Joanne Goodsell, Archaeologist, MP

Patricia Rivera, Native American Affairs, MP

Valerie Curley, Supervisory Repayment Specialist, SCCAO

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Section 6 References

- Anderson, J, F Chung, M Anderson, L Brekke, D Easton, M Ejetal, R Peterson, and R Snyder. 2008. *Progress on Incorporating Climate Change into Management of California's Water Resources*. Climatic Change (2008) 87 (Suppl 1):S91–S108 DOI 10.1007/s10584-007-9353-1.
- Bertoldi, G.L., R.M.H. Johnson, and K.D. Evenson. 1991. Ground Water in the Central Valley, California - A Summary Report. U.S. Geological Survey Professional Paper 1401-A.
- Boyle Engineering Corporation. 2007. *Groundwater Management Plan for the Northern Agencies in the Delta-Mendota Canal Service Area and a Portion of San Joaquin County*. Groundwater Management Plan/SLDMWA-Northern. 49.
- Bureau of Reclamation. 2004. EIS/EIR Water Transfer Program for the San Joaquin River Exchange Contractors Water Authority 2005-2014, December 2004.
- Bureau of Reclamation. 2004b. Environmental Impact Statement – Mendota Pool 10-Year Exchange Agreements.
- Bureau of Reclamation. 2005. *Environmental Assessment, Long-Term Contract Renewal, Delta Mendota Canal Unit, Central Valley Project, Sacramento, CA*. February 2005.
- Bureau of Reclamation. 2005b. *Delta-Mendota Canal Unit Environmental Assessment for Long Term Contract Renewal*, dated February 2005.
- Bureau of Reclamation. 2007. *EA-07-59 San Luis Unit Water Service Interim Renewal Contracts 2008-2011*, dated December 2007.
- California Labor & Workforce Development Agency. 2009. *San Joaquin Valley Region 2009 Economic Profile*. Website:
http://www.labor.ca.gov/panel/pdf/2009_San_Joaquin_Valley_Region_Economic_Profile.pdf
- CCID. 1997. Central California Irrigation District. Groundwater Conditions in and Near the Central California Irrigation District. Kenneth D. Schmidt and Associates, Los Banos, CA.
- Central Valley Regional Water Quality Control Board. 1998. Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins.
- Central Valley Regional Water Quality Control Board. 2009. Website - *Irrigated Lands - Development of the Long-term*. Long-Term Irrigated Lands Regulatory Program Alternatives, 2nd Draft Proposal.
http://www.waterboards.ca.gov/rwqcb5/water_issues/irrigated_land/long_term_program_development/exist_cond_rpt/ch04_pt3.pdf
- CVRWQCB. 1998. The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region, Fourth Edition: The Sacramento River Basin and the San Joaquin River Basin. California Regional Water Quality Control Board, Central Valley Region. Sacramento, CA.
- DWR. 1975. California Department of Water Resources. California's Ground Water Bulletin 118. State of California. Sacramento, CA.
- DWR. 2003. California's Ground Water, Bulletin 118-update 2003.
- DWR. 2009. Website – *California Water Plan Update 2009 Pre-final Draft*, Ch 8 Conjunctive Management, Volume 2, Resource Management Strategies and Groundwater.
http://www.waterplan.water.ca.gov/docs/cwpu2009/1009prf/v2ch08-conj_mgt_pf_09.pdf
- EPA. 2008: Website – Climate Change, Basic Information.
<http://www.epa.gov/climatechange/basicinfo.html>
- EPA. 2008b: Website – Climate Change, Science.

- Exchange Contractors. 1997. Exchange Contractors. 1997b. AB 3030-Groundwater Management Plan. Los Banos, CA.
- Fitch, H. S. 1940. *A biogeographical study of the ordinoides Artenkreis of garter snakes (genus Thamnophis)*. *University of California Publications in Zoology* 44:1-150.
- Fox, W. (1948). *The relationships of the garter snakes of the garter snake Thamnophis ordinoides*. *Copeia* 1948:113-120.
- Fresno County and Exchange Contractors. 2001. Fresno County and Exchange Contractors. Memorandum of Understanding Providing Local Water District Exemption from Regulation of Groundwater Resources within Fresno County Referencing Fresno County Ordinance Code Title 14, Chapter 3, Section 14.03.05E.
- Hansen, G.E. and J.M. Brode. 1980. *Status of the giant garter snake, Thamnophis couchi gigas* (Fitch). California Department of Fish and Game, Inland Fisheries Endangered Species Program Special Publication Report. 80-5:1-14.
- Madera County. 2009. Website - http://www.madera-county.com/countycode/_DATA/TITLE13/Chapter_13_100_RULES_AND_REGU.html#5
- Mizuno, Frances. 2009. Personal communication with Frances Mizuno of SLDMWA.
- Rossman, D.A. and G.R. Stewart. 1987. *Taxonomic reevaluation of Thamnophis couchii (Serpentes: Colubridae)*. *Occasional Papers of the Museum of Zoology, Louisiana State University* 63:1-25.
- San Joaquin Valley Drainage Program. 1990. *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley. Final Report of the San Joaquin Valley Drainage Program*. U.S. Department of the Interior and California Resources Agency
- San Joaquin River Dissolved Oxygen Technical Working Group. 2002. San Joaquin River Dissolved Oxygen Total Maximum Daily Load Technical Working Group website: http://www.sjrtmdl.org/technical/2001_studies/reports/final/qt_final_apdx_i.pdf
- SJVAPCD. 2010a. Ambient Air Quality Standards and Valley Attainment Status. Website: <http://www.valleyair.org/aqinfo/attainment.htm>. Accessed: February 19, 2010.
- SJVAPCD. 2010b. Requirements for Agricultural Operations: Do I need a permit project calculator. Website: http://www.valleyair.org/General_Info/AGLoader.htm.
- Stanislaus. 2009. Stanislaus Local Agency Formation Commission. Executive Officer's Agenda Report. July 22, 2009. Website: <http://www.stanislauslafco.org/info/PDF/Staff%20Rpts/MSR.SOI.6WDsIDs.pdf>
- USFWS. 1991. *Endangered and threatened wildlife and plants; proposed endangered status for the giant garter snake, proposed rule*. *Federal Register* 56:67046-67053.
- USFWS. 1993. *Endangered and threatened wildlife and plants; determination of threatened status for the giant garter snake*. *Federal Register* 58:54053-54066.
- USFWS. 1999. *Draft recovery plan for the giant garter snake*
- USFWS. 2008. Potential effects of selenium contamination on federally-listed species resulting from delivery of federal water to the San Luis Unit. USFWS, Sacramento Fish & Wildlife Office, Environmental Contaminants Division. March 2008.
- USFWS & NMFS. 2000. Joint Biological Opinion on the Environmental Protection Agency's (EPA) "Final Rule for the Promulgation of Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California".
- White, C. 2004. Central California Irrigation District, Personal Communication with Susan Hootkins and Jim Durkin, URS, March 2, 2004.

Appendix A Cultural Resource Determination

From: Goodsell, Joanne E

Sent: Tuesday, October 12, 2010 12:12 PM

To: Clinton, Patricia L

Cc: Perry, Laureen (Laurie) M; Nickels, Adam M; Bruce, Brandee E; Barnes, Amy J; Overly, Stephen A; Ramsey, Dawn; Leigh, Anastasia T

Subject: EA-10-72 / 11-SCAO-005

Project No. 11-SCAO-005 / EA-10-72

I have reviewed Draft EA-10-72, which outlines Reclamation's Proposed Action 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 for Contract Years 2011 through 2013. These agreements and/or contracts would allow for the pumping, conveyance, and storage of non-CVP water in the Delta-Mendota Canal and Central Valley Project facilities. Both the No Action and Proposed Action alternatives covered in the EA have no potential to cause effects on historic properties pursuant to 36 CFR Part 800.3(a)(1). As the Proposed Action has no potential to affect historic properties, no additional consideration under Section 106 of the National Historic Preservation Act is required. This email serves to conclude the Section 106 process. Please include a copy of it with the EA file.

Additionally, I have made a few edits to the cultural resources sections of the EA. These are reflected in the attached document, Track Changes on. If you have any questions about the suggested changes, please let me know.

Sincerely,

Joanne Goodsell

Archeologist, Bureau of Reclamation
Mid-Pacific Regional Office
2800 Cottage Way, MP-153
Sacramento, CA 95825
(916) 978-5499 jgoodsell@usbr.gov

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Appendix B Indian Trust Determination

From: Rivera, Patricia L
Sent: Tuesday, February 01, 2011 3:24 PM
To: Siek, Charles R
Cc: Robbins, Eleanor J (Ellie)
Subject: RE: DMC pump-ins---ADMIN ACTION

Chuck,

I reviewed the proposed action 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 for the 2011 Contract Year and ending 2013. The term would be March 1, 2011 through February 28, 2012 for pumping and conveyance, and March 1, 2011 through February 29, 2013 for storage in San Luis Reservoir (SLR) and conveyance from the SLR.

Each participating contractor would be allowed to pump up to 10,000 acre-feet (AF) of non-CVP water into the DMC. Reclamation has capped the Proposed Action at 50,000 AF combined for all districts participating in the DMC Pump-in Program. The total amount of groundwater pumped into the DMC would not exceed that 50,000 AF. Conveyance and storage of non-CVP 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, and Table 2-2 are those districts that would require an exchange with Reclamation from the San Luis Canal (SLC).

Warren Act Contract/Exchange Agreement Quantities for Groundwater Pumping into DMC

District	Quantity for 2011 (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

The proposed action does not have a potential to affect Indian Trust Assets.

Patricia

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Appendix C Mitigation and Minimization Measures

Resource	Measures
Water Quality	<ul style="list-style-type: none"> • 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. • No pumping will be allowed in Management Areas 2 and 3 (Figure 2-1) • 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 Reclamation may require (wells may be pumped for 24 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 the Exchange Contractors’ perspective, pumping may be begin once they have received copies of current lab test results for salinity and selenium, recognizing the other constituents may take longer to obtain the lab results. • Only wells that test at 1,500 ppm total dissolved solids (TDS) or less at the well head will be allowed. • Only wells that test at 2 ppb selenium or less at the well head will be allowed. • The calculated degradation caused by the lower DMC wells shall not exceed 30 ppm. (The model developed by Reclamation during the 2008 and 2009 pumping program shall be used and Reclamation shall provide at least weekly updates of the reports to the Exchange Contractors.) • 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 three days. Wells with water quality at the well head of 450 TDS or less would be allowed to continue to pump and would be subject to this restriction. • The water would be credited to the receiving district as a whole, not for specific growers. • The wells will only run through February 28, 2012. • Reclamation would use real-time salinity data in the DMC to confirm that the groundwater is not increasing the salinity of water in the canal by more than 30 mg/L or above 450 TDS. A mass balance worksheet would be used by Reclamation and the SLDMWA to predict the changes in salinity in the canal caused by the addition of groundwater under this program.
Geological Resources/Aquifer	<ul style="list-style-type: none"> • All districts participating in the 2011 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 will be entered into worksheets and presented each week to Reclamation via e-mail. Reclamation will review the data to identify potential changes in the local aquifer that could lead to overdraft or subsidence; • If the current depth exceeds the maximum depth, Reclamation will recommend that the District stop pumping from that well until the depth of water in the well recovers to an agreed depth, such as the median observed depth.

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**Appendix D Delta-Mendota Canal 2011 Water Quality
Monitoring Program – Groundwater**

RECLAMATION

Managing Water in the West

2011 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 Jan 2011

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

2011 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 2011, 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 2011 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 2011, 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 2011 DMC Pump-in Program, and will implement the terms and conditions of the 2011 Warren Act Contracts, exchange agreements, and the 2011 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

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

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 2011, 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 2011. The data will be used to implement the terms of the 2011 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.

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 2011 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 agricultural chemicals listed in the California Drinking Water Standards (Title 22)³.

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 Milepost 70 (Check 13)	CVO	EC	Real-time	CDEC site : ONI
DMC Milepost 111 (Check 20)	CVO	EC	Real-time	CDEC site : DM2
DMC Milepost 116.5 (Check 21)	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

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>

DMC Milepost 68 (McCabe Road)	Reclamation	Various	Monthly	Grab sample
DMC Milepost 70 (Check 13)	Reclamation	EC, selenium	Daily composite	Autosampler
DMC Milepost 97.7 (Russell Ave)	Reclamation	EC, selenium, boron, mercury	Monthly	Grab sample
DMC Milepost 110.1 (Washoe Ave)	Reclamation	EC, selenium, boron, mercury	Monthly	Grab sample
DMC Milepost 116.5 (Check 21)	Reclamation	EC, selenium	Daily composite	Autosampler
Mendota Pool (CCID Main Canal at Bass Ave)	Reclamation	EC, selenium	Daily composite	Autosampler

Key: Reclamation: MP-157 Environmental Monitoring Branch

Table 3. In-Stream Monitoring Stations (Optional)

Location	Responsible Agency	Parameters	Frequency	Remarks
DMC Milepost 16.2 (Check 2)	SLDMWA	EC	Weekly	Field measurement
DMC Milepost 20.6 (Check 3)	SLDMWA	EC	Weekly	Field measurement
DMC Milepost 34.4 (Check 6)	SLDMWA	EC	Weekly	Field measurement
DMC Milepost 38.7 (Check 7)	SLDMWA	EC	Weekly	Field measurement
DMC Milepost 48.6 (Check 9)	SLDMWA	EC	Weekly	Field measurement
DMC Milepost 64.0 (Check 12)	SLDMWA	EC	Weekly	Field measurement

DMC Milepost 85.1 (Check 16)	SLDMWA	EC	Weekly	Field measurement
DMC Milepost 100.9 (Telles Bridge)	SLDMWA	EC	Weekly	Field measurement

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

Wellhead Monitoring

Initial Analysis

All districts participating in the 2011 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 in to 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.

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

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 2011.

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. Such data will be downloaded by Reclamation and the Authority to monitor changes 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 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 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 2011. 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, In accordance with the 2011 Exchange Contractor letter (Appendix 1), the addition of groundwater cannot cause an increase in salinity of more than 30 mg/L in the lower DMC, nor cause the in-stream salinity to exceed 450 mg/L.

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 water quality caused by the conveyance of groundwater in the DMC.

Table 4a. Maximum Allowable Concentration of 7 Constituents in the Upper DMC

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 these parameters 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.
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