

FINAL ENVIRONMENTAL ASSESSMENT (12-061)

**2013 Delta-Mendota Canal Groundwater Pump-in Program Water Quality  
Monitoring Plan**

**Appendix A**

January 2013

# RECLAMATION

*Managing Water in the West*

## **2013 Delta-Mendota Canal Groundwater Pump-in Program Water Quality Monitoring Plan**



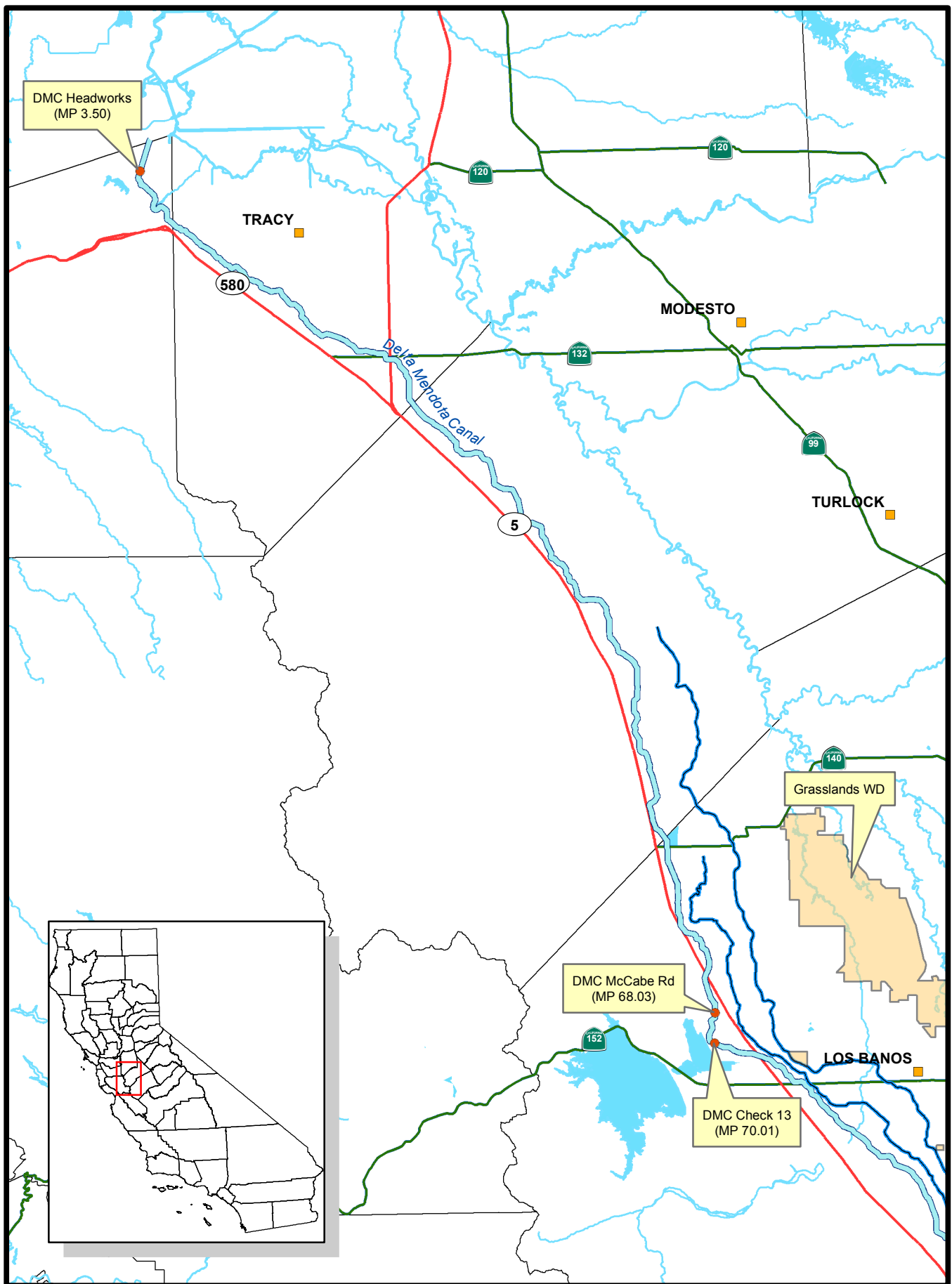
U.S. Department of the Interior  
Bureau of Reclamation  
Mid-Pacific Region  
South-Central California Area Office

Revised: 07 Jan 2013

### **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.

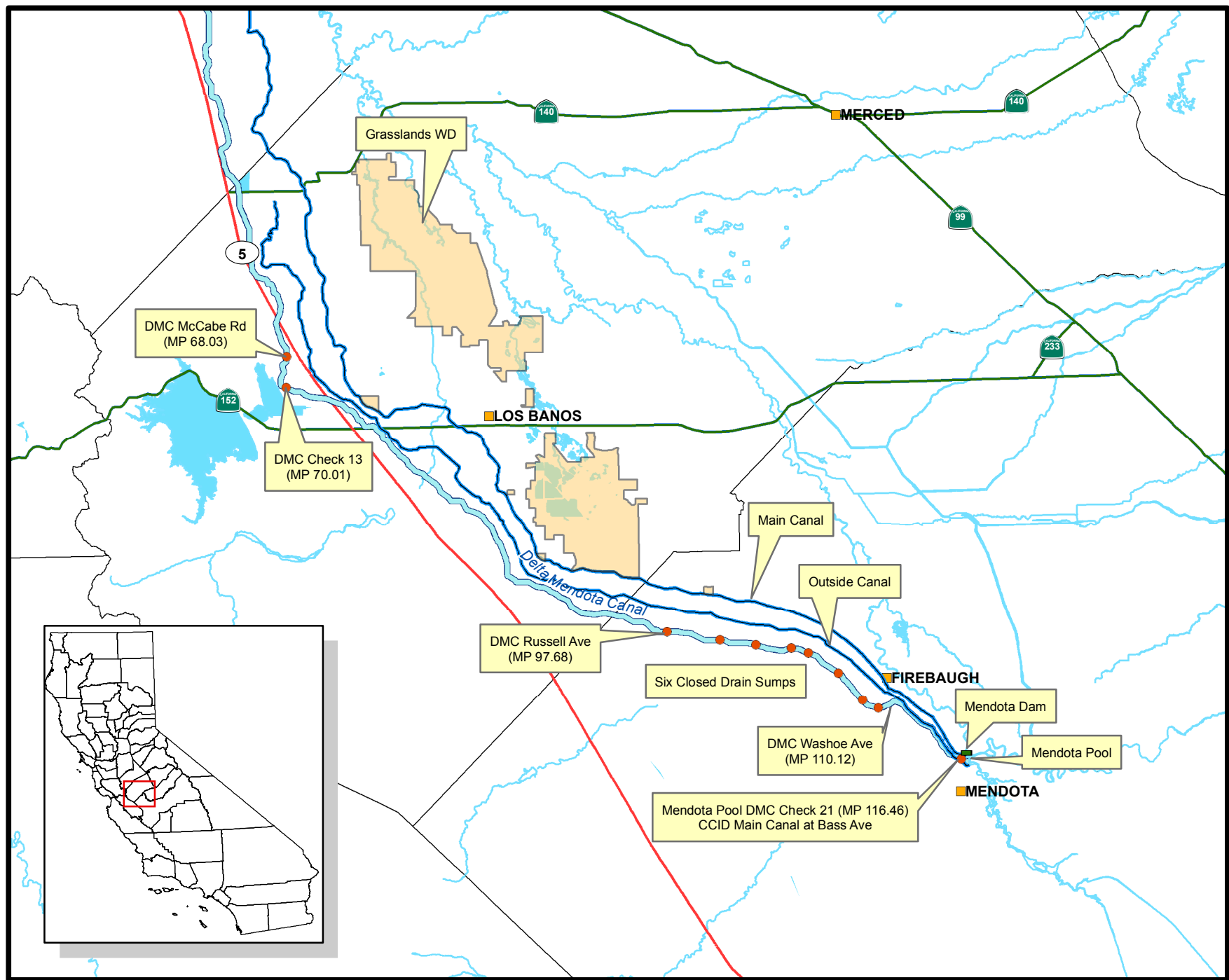


# DMC Water Quality Monitoring

0 2.5 5 10 15 20 Miles



ArcGIS 9.2  
Projection: WGS NAD 1984  
DMC Water Quality Monitoring  
U.S. Bureau of Reclamation



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0 2.5 5 10 15 20 Miles



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## 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



# **2013 Delta-Mendota Canal Groundwater 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 2013, 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.

Reclamation has limited the total amount of groundwater to be conveyed in 2013 to 50,000 acre-feet. This amount would be allocated to the districts based on need. The following districts could potentially participate in this program:

- Banta-Carbona Irrigation District
- Byron Bethany Irrigation District
- Del Puerto Water District
- Mercy Springs Water District
- Pacheco Water District
- Panoche Water District
- San Luis Water District
- West Stanislaus Irrigation District

This document describes the plan for measuring the changes in the quality of water in the DMC caused by the conveyance of groundwater during 2013, plus changes in groundwater elevation to estimate subsidence. Various agencies will use these data to assess water quality 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 2013 Groundwater Pump-in Program, and will implement the terms and conditions of the 2013 Warren Act Contracts, exchange agreements, and the 04 January 2013 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<sup>(1)</sup> authorizes Reclamation to execute temporary contracts to impound, store, and carry water in federal irrigation canals when excess capacity is available. Such contracts will be negotiated by Reclamation with Delta Division water districts to allow the introduction of non-project water into the DMC to supplement the supply of CVP water to help farmers deliver enough water to irrigate and sustain valuable permanent crops like grapes, citrus, and deciduous fruit, and to sustain the local multi-billion dollar farming economy.

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

In 2013<sup>2</sup>, environmental regulations and climate change may continue to reduce the supply of surface water for the Central Valley Project. Water managers now must depend on groundwater to supplement a diminished supply of 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 plan 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 2013. The data will be used to implement the terms of the 2013

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<sup>1</sup> Act of February 21, 1911, ch. 141, 36 Stat. 925

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 2013 DMC Groundwater 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**

The quality of water in each source of groundwater 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.<sup>2</sup> The salinity of each source of pump-in water shall not exceed 1500 mg/L TDS. The other constituents are mainly agricultural chemicals listed in the California Drinking Water Standards (Title 22)<sup>3</sup>.

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<sup>2</sup> 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](http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr.pdf)

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

## Water Quality Monitoring Plan

### In-stream Monitoring

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

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

Table 3 is a list of places along the canal near groups 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 each group of wells. Furthermore, if flow of CVP water in the canal is limited, Reclamation will require detailed monitoring to identify the individual and cumulative changes in water quality caused by the addition of groundwater.

**Table 1. Real-Time Monitoring Stations**

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

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

**Table 2. Water Quality Monitoring Stations**

Location	Operating Agency	Parameters	Frequency	Remarks
DMC Headworks Milepost 3.5	Reclamation	EC, selenium	Daily composite	Autosampler
DMC at McCabe Rd Milepost 68	Reclamation	Various	Monthly	Grab sample
DMC Check 13 Milepost 70	Reclamation	EC, selenium	Daily composite	Autosampler
DMC at Russell Ave Milepost 97.7	Reclamation	EC, selenium, boron, mercury	Monthly	Grab sample
DMC at Telles Farm Bridge Milepost 100	Reclamation	EC, selenium	Monthly	Grabs sampler
DMC at Washoe Ave Milepost 110.1	Reclamation	EC, selenium, boron, mercury	Monthly	Grab sample
DMC Check 21 Milepost 116.5	Reclamation	EC, selenium	Daily composite	Autosampler
CCID Main Canal at Bass Ave	Reclamation	EC, selenium	Daily composite	Autosampler

**Table 3. In-Stream Monitoring Stations (Optional)**

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

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

## Wellhead Monitoring

### Initial Analysis

All districts participating in the 2013 DMC Groundwater Pump-in Program must provide the following information about each well to Reclamation prior to pumping groundwater into the DMC:

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

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

All water samples must be sampled and preserved according to established protocols in correct containers. Analyses should be conducted by laboratories that have been approved by Reclamation, listed in Table 7. Each sample of well water must be sampled and analyzed at the expense of the well owner. Reclamation staff will review the analytical results and notify the District which wells may pump into the DMC in 2013.

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

## **Compliance Monitoring**

### **Daily Salinity**

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

### **Weekly Monitoring**

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

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

### **Selenium Monitoring**

Based on available funds, 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 Parameters**

The Central Valley Operations Office (CVO) operates four 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.

CVO uses this conversion factor for estimating Total Dissolved Solids (TDS) from

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

### **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 2013. Parameters include selenium, mercury, boron, nutrients, and other compounds that cannot be measured with field sensors. Table 7 is a list of laboratories whose sampling and analytical practices have been approved by Reclamation.

#### **Sampling methods**

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

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

#### **Chain of Custody documentation**

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

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

#### **Chain of Custody documentation**

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

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

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

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

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



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

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

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

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

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

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

#### **Chain of Custody documentation**

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

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

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

#### **Chain of Custody documentation**

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

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

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

#### **Chain of Custody documentation**

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

#### **Water Quality Requirements**

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

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

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

<b>Constituent</b>	<b>Monitoring Location</b>	<b>Maximum concentration in the DMC</b>
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: TDS (mg/L) = EC (µS/cm) x 0.618 + 16

Reclamation will direct the Authority contact 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 per day
Total Dissolved Solids*	Check 20	450 mg/L

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

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

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

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

							Recommended
Constituent	Units	Maximum Contaminant Level		Detection Limit for Reporting		CAS Registry Number	Analytical Method
Primary							
Aluminum	mg/L	1	(1)	0.05	(2)	7429-90-5	EPA 200.7
Antimony	mg/L	0.006	(1)	0.006	(2)	7440-36-0	EPA 200.8
Arsenic	mg/L	0.01	(1)	0.002	(2)	7440-38-2	EPA 200.8
Barium	mg/L	1	(1)	0.1	(2)	7440-39-3	EPA 200.7
Beryllium	mg/L	0.004	(1)	0.001	(2)	7440-41-7	EPA 200.7
Boron	mg/L	0.7	(13)			7440-42-8	EPA 200.7
Cadmium	mg/L	0.005	(1)	0.001	(2)	7440-43-9	EPA 200.7
Chromium, total	mg/L	0.05	(1)	0.01	(2)	7440-47-3	EPA 200.7
Lead	mg/L	0.015	(9)	0.005	(8)	7439-92-1	EPA 200.8
Mercury	mg/L	0.002	(1)	0.001	(2)	7439-97-6	EPA 245.1
Nickel	mg/L	0.1	(1)	0.01	(2)	7440-02-0	EPA 200.7
Nitrate (as NO3)	mg/L	45	(1)	2	(2)	7727-37-9	EPA 300.1
Nitrate + Nitrite (sum as nitrogen)	mg/L	10	(1)				EPA 353.2
Nitrite (as nitrogen)	mg/L	1	(1)	0.4	(2)	14797-65-0	EPA 300.1
Selenium	mg/L	0.002	(10)	0.0004		7782-49-2	EPA 200.8
Thallium	mg/L	0.002	(1)	0.001	(2)	7440-28-0	EPA 200.8
Secondary							
Chloride	mg/L	250	(7)			16887-00-6	EPA 300.1
Copper	mg/L	1	(10)	0.05	(8)	7440-50-8	EPA 200.7
Iron	mg/L	0.3	(6)			7439-89-6	EPA 200.7
Manganese	mg/L	0.05	(6)			7439-96-5	EPA 200.7
Molybdenum	mg/L	0.01	(11)			7439-98-7	EPA 200.7
Silver	mg/L	0.1	(6)			7440-22-4	EPA 200.7
Sodium	mg/L	69	(12)			7440-23-5	EPA 200.7
Specific Conductance	µS/cm	2,200	(7)				SM 2510 B
Sulfate	mg/L	250	(7)			14808-79-8	EPA 300.1
Total Dissolved Solids	mg/L	1,500	(7)				SM 2540 C
Zinc	mg/L	5	(6)			7440-66-6	EPA 200.7
Radioactivity							
Gross Alpha	pCi/L	15	(3)	3	(3)		SM 7110C
Organic Chemicals							
Dibromochloropane (DBCP)	µg/L	1	(4)	0.5	(5)	96-12-8	EPA 504.1
Ethylene Dibromide (EDB)	µg/L	18	(4)	2	(5)	206-93-4	EPA 504.1
Chlordane	µg/L	18	(4)	5	(5)	57-74-9	EPA 505
Endrin	µg/L	0.1	(4)	0.1	(5)	72-20-8	EPA 505
Heptachlor	µg/L	25	(4)	0	(5)	76-44-8	EPA 505
Heptachlor Epoxide	µg/L	70	(4)	10	(5)	1024-57-3	EPA 505
Lindane	µg/L	160	(4)	0	(5)	58-89-9	EPA 505
Methoxychlor	µg/L	0.2	(4)	0.01	(5)	72-43-5	EPA 505
Toxaphene	µg/L	2	(4)	0.1	(5)	8001-35-2	EPA 505
Diazinon	µg/L	0.16	(11)			333-41-5	EPA 507
Atrazine	µg/L	700	(4)	25	(5)	1912-24-9	EPA 508.1
Simazine	µg/L	0.01	(4)	0.01	(5)	122-34-9	EPA 508.1
Bentazon	µg/L	0.01	(4)	0.01	(5)	25057-89-0	EPA 515.1-4
2, 4, 5-TP (Silvex)	µg/L	30	(4)	10	(5)	93-72-1	EPA 515.1-4
2,4-D	µg/L	0.2	(4)	0.2	(5)	94-75-7	EPA 515.1-4
Molinate	µg/L	20	(4)	2	(5)	2212-67-1	EPA 525.2
Thiobencarb	µg/L	50	(4)	1	(5)	28249-77-6	EPA 525.2
Carbofuran	µg/L	4	(4)	1	(5)	1563-66-2	EPA 531.1-2
Glyphosate	µg/L	70	(4)	1	(5)	1071-83-6	EPA 547
Chlorpyrifos	µg/L	0.025	(11)			2921-88-2	EPA 8141

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

Sources:

Sources:

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

(1) Title 22, Table 64431-A Maximum Contaminant Levels, Inorganic Chemicals

(2) Title 22, Table 64432-A Detection Limits for Reporting (DLRs) for Regulated Inorganic Chemicals

(3) Title 22, Table 64442 Radionuclide Maximum Contaminant Levels (MCLs) and Detection Levels for Purposes of Reporting

(4) Title 22, Table 64444-A Maximum Contaminant Levels, Organic Chemicals

(5) Title 22, Table 64445.1-A Detection Limits for Purposes of reporting (DLRs) for Regulated Organic Chemicals

(6) Title 22, Table 64449-A Secondary Maximum Contaminant Levels "Consumer Acceptance Contaminant Levels"

(7) Title 22, Table 64449-B Secondary Maximum Contaminant Levels "Consumer Acceptance Contaminant Level Ranges"

(8) Title 22, Table 64678-A DLRs for Lead and Copper

(9) Title 22, Section 64678 (d) Lead Action level

[California Drinking Water Regulations Sep 2011](#)

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

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

(10) Basin Plan, Table III-1 (ug/L) (selenium in Grasslands water supply channels)

(11) Basin Plan, Table III-2A (ug/L) (chlorpyrifos & diazinon in San Joaquin River from Mendota to Vernalis)

[Sacramento & San Joaquin River Basin Plan 2009](#)

[http://www.waterboards.ca.gov/centralvalley/water\\_issues/basin\\_plans/sacsjr.pdf](http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr.pdf)

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

(12) Ayers, Table 1 (mg/L) (sodium)

(13) Ayers, Table 21 (mg/L) (boron)

[Water Quality Standards for Agriculture 1985](#)

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

revised: 10 Jan 2012 SCC-107

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

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

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

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

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

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

(5) Spectrum Analytic, Inc. Guide to Interpreting Irrigation Water Analysis. Washington C.H., Ohio

[http://www.spectrumanalytic.com/support/library/rf/A\\_Guide\\_to\\_Interpreting\\_Irrigation\\_Water\\_Analysis.htm](http://www.spectrumanalytic.com/support/library/rf/A_Guide_to_Interpreting_Irrigation_Water_Analysis.htm)

revised 11/23/2009 SCC-107

# RECLAMATION

## *Managing Water in the West*

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

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

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

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

revised: 2/14/2011



Table 8. Summary of Depth to Groundwater in Wells Beside the Delta-Mendota Canal (feet)  
May 1995 - Dec 2012

DMC Milepost	Max	Min	Average	Median	Recent	Count
12.37L	327.8	164.2	227.8	222.0	210.7	67
12.69L	244.8	201.4	219.8	218.5	209.0	67
12.75R	295.0	212.0	248.0	249.0	239.7	66
13.31L	275.8	201.4	224.3	221.0	209.9	66
14.26R	268.5	218.4	236.4	232.9	227.2	66
15.11R	264.0	200.0	241.4	241.5	233.5	67
21.25L	169.5	106.0	127.9	126.0	142.3	65
21.86L	130.0	89.6	109.2	109.0	114.0	67
22.77R	170.0	39.2	135.0	135.1	137.6	67
23.41L	254.0	141.0	188.2	184.6	168.1	67
30.43R	169.8	121.8	146.1	147.2	149.8	67
30.43L	191.0	102.0	127.7	124.7	191.0	67
31.60L	277.0	110.1	197.0	229.0	135.6	67
33.71L	198.6	130.9	159.7	157.0	139.2	67
35.73R	287.0	146.8	167.0	168.9	174.5	67
36.01L	290.0	137.2	202.2	181.2	181.2	65
36.80L	204.0	111.0	155.2	154.4	154.3	66
37.10L	277.0	158.0	190.4	189.5	173.7	66
37.32L	200.0	150.8	165.3	162.0	164.0	66
37.58L	170.0	127.8	145.9	144.2	146.0	66
45.78R	127.2	83.0	102.4	100.8	107.8	66
48.97L	130.0	71.0	96.1	94.0	71.0	49
48.96LNEW	96.0	88.0	93.3	96.0	96.0	6
48.97L	101.0	101.0	101.0	101.0	101.0	18
51.66L	150.4	86.4	110.8	109.0	110.8	66
58.28L	69.0	27.0	46.2	47.0	59.9	65
60.06R	95.0	37.6	69.5	73.0	78.2	65
66.71L	54.0	19.8	37.9	39.4	43.5	65
78.31L	49.3	21.9	29.9	28.0	38.8	74
79.13R	111.8	57.8	81.0	83.0	81.7	74
79.13L	132.1	63.3	93.3	93.7	132.1	22
79.60L	83.2	52.9	64.9	62.2	59.6	74
80.03L	80.0	16.0	36.5	36.2	44.5	74
80.03R	143.5	73.0	99.4	94.9	94.9	23
80.62R	100.2	47.8	63.1	61.2	80.0	74
80.62L	69.0	19.4	44.2	44.0	51.1	74
81.08-R	72.5	55.1	60.2	58.7	58.7	22
83.08-R	64.9	37.6	47.1	45.6	46.5	49
83.67-L	71.6	12.0	25.6	24.5	25.6	49
90.18R	201.3	103.9	142.5	136.2	178.4	74
90.19L1	218.5	98.9	146.6	138.3	138.3	74
90.19L2	190.0	72.0	132.3	126.3	144.3	74
90.39R	212.0	105.0	140.3	136.5	145.0	74
90.60L	192.0	28.7	141.2	138.1	167.8	74
90.61R	198.0	104.0	138.9	135.8	142.4	74
90.91L	285.9	93.2	144.2	137.6	137.8	74
91.15L	287.7	97.4	140.6	134.5	140.6	74
91.36L	217.0	10.3	86.9	114.0	13.3	74
91.57R	222.2	91.8	136.4	131.2	143.0	74

**Table 8. Summary of Depth to Groundwater in Wells Beside the Delta-Mendota Canal (feet)  
May 1995 - Dec 2012**

DMC Milepost	Max	Min	Average	Median	Recent	Count
91.68R	219.6	99.2	149.6	141.2	168.9	74
91.77R	172.2	96.0	127.1	124.2	n/a	74
91.80L	195.2	93.1	137.9	134.9	141.7	74
92.00R	172.6	109.0	137.7	131.2	n/a	74
92.14L	215.1	98.8	144.7	140.9	145.0	74
92.20R	220.0	95.8	142.6	142.6	142.0	74
92.72L	218.3	100.2	149.4	143.6	146.6	74
93.20L	296.1	102.2	143.2	134.1	173.2	74
93.27R	228.4	115.0	161.4	158.0	179.6	73
93.27L	218.9	100.8	146.8	142.2	165.6	74
94.26L	228.1	99.7	148.2	141.1	177.2	74
95.62L	213.4	99.6	147.8	141.3	172.1	74
97.28L	159.9	34.0	76.5	60.7	91.1	74
98.74L	114.2	39.2	54.0	46.9	56.9	74
99.24L	158.3	31.5	67.3	62.2	136.7	74
99.82L	190.3	19.5	75.0	57.8	88.1	74
100.24L	144.1	28.1	65.3	53.0	71.1	74
100.65L	137.6	36.5	70.1	66.5	94.4	74
100.85L	133.6	39.0	63.1	59.9	73.7	73
101.27L	131.4	37.4	69.2	60.5	72.1	73
102.04R	130.0	38.0	65.3	60.0	62.8	73
106.20R	138.3	60.7	94.4	88.6	97.1	73
113.72L	29.2	13.2	21.6	21.6	n/a	73
115.32R	82.9	18.5	29.1	28.9	24.6	73
115.62L	42.0	12.2	25.5	24.0	18.2	72
115.84R	39.2	14.9	24.5	22.6	22.6	73
116.40L1	77.0	14.2	28.9	27.5	20.6	73
116.40L2	74.0	11.3	31.2	27.6	31.2	73

Subsidence Wells near Russell Ave

97.69LH-2	23.1	23.0	23.0	23.0		11
97.69LH-3	17.3	17.3	17.3	17.3		24
97.69LH-4	no data					
97.69LH-5	139.5	131.5	137.1	137.7		24
97.69LH-6	209.9	64.3	134.4	134.3		24

Source: San Luis & Delta-Mendota Water Authority

## Appendix 1. 2013 Letter from Exchange Contractors



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

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January 4, 2013

**JAMES E. O'BANION**  
Chairman

**ROY CATANIA**  
Vice Chairman

**STEVE CHEDESTER**  
Executive Director

**LARRY FREEMAN**  
Water Resources Specialist

**JOANN WHITE**  
Administrative Assistant

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

**VIA E-MAIL & U.S. MAIL**

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

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

**CENTRAL CALIFORNIA  
IRRIGATION DISTRICT**

**James E. O'Banion**  
President

**Christopher White**  
General Manager

**SAN LUIS CANAL  
COMPANY**

**James L. Nickel**  
President

**Chase Hurley**  
General Manager

**FIREBAUGH CANAL  
WATER DISTRICT**

**Mike Stearns**  
President

**Jeff Bryant**  
General Manager

**COLUMBIA CANAL  
COMPANY**

**Roy Catania**  
President

**Randy Houk**  
General Manager

RE: ***Long-Term DMC Pumping***

Dear Michael and Frances:

This letter is to confirm that the San Joaquin River Exchange Contractors Water Authority (Exchange Contractors) is in receipt of the San Luis & Delta-Mendota Water Authority's (Authority) request to conduct a comprehensive long-term environmental review for a DMC pumping program. We also understand the large commitments of time and resource requirements to annually conduct the necessary environmental review and Warren Act contracts. Therefore, we believe that the EA- FONSI entitled, "Ten-Year Exchange Agreements and/or Warren Act Contracts for Conveyance of Groundwater in the Delta-Mendota Canal – Contract Years 2013 through 2023 (March 1, 2013 – February 29, 2024)" has established a ten year authorization subject to certain terms and conditions for groundwater pumping.

During the past several years, the Exchange Contractors have agreed to the annual program subject to certain terms and conditions as specified below. We anticipate we will annually approve the program so long as there are no unmitigated impacts to our water supply or operations. Exchange Contractors agree that a comprehensive long-term environmental review for a DMC pumping program is warranted. If there are unanticipated conditions, we understand the U.S. Bureau of Reclamation (Reclamation) and Authority would not proceed in later years with the program until the conditions are studied and mitigated. We have included condition 8 for that purpose.

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

Mr. Michael Jackson  
Ms. Frances Mizuno  
RE: ***DMC Pumping Program***  
January 4, 2013  
Page 2

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Our understanding is that the Authority's request is to continue the annual DMC pumping program from Water Year 2013-2023, but each year determine if there are new or different conditions which require reconsideration.

As a result of subsidence effects determined in 2008, wells in Management Areas 2 and 3 must continue to be excluded from pumping in this program. If subsidence is detected in other areas along the DMC, one of the mitigation conditions of the program should be reduction of pumping in those areas; and, in following years, no pumping in those areas would occur until a mitigation plan is developed and implemented.

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

1. Annually, any well that is proposed to pump into the lower DMC must obtain a current water quality analysis. The analysis shall consist of Ag Suitability and selenium, plus any other constituents the 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 our perspective, pumping may begin once we have received copies of current lab test results for salinity and selenium, recognizing the other constituents may take longer to obtain the lab results.
2. Only wells that test at 1,500 ppm TDS or less at the well head will be allowed.
3. Only wells that test at 2 ppb selenium or less at the well head will be allowed.
4. The calculated degradation caused by the lower DMC wells shall not exceed 30 ppm (the model developed by Reclamation during the 2008 and 2009 pumping program shall be used to determine this calculation and Reclamation shall provide at least weekly updates of the reports to the Exchange Contractors).
5. At any time, the wells in the lower DMC will be shut off if the measured water quality at Check 20 on the DMC exceeds 450 ppm TDS in a single day. The wells may resume pumping after the average water exceedence no longer exists for three (3) days. Wells with water quality at the well head of 450 TDS or less would be allowed to continue to pump and would not be subject to this restriction.
6. A joint groundwater study between the Central California Irrigation District (CCID), the City of Los Banos and Reclamation was completed in the Los Banos aquifer subarea due to significant groundwater concerns in April 2010. This study is updated

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each year. The annual study and its recommendations for triggers for any pumping adjustments must be incorporated into the annual DMC pumping program.

- a. Pumping in the Los Banos aquifer subarea shall be in accordance with the recommendation contained within the annual updates.
7. The water would be credited to the receiving district as a whole, not for specific growers.
8. It is our understanding that the above described mitigation conditions would be utilized on an ongoing basis to avoid significant impacts upon the environment. If there were detected significant impacts from the program after commencement of pumping in the spring of the year or summer periods which are in addition to or different than the above-described conditions and mitigation measures designed to reduce those impacts below significance, we would understand that efforts would be made to reduce pumping that may be causing or contributing to those unexpected new conditions, but because of irrigation commitments, it may not be possible for Reclamation and the Authority to completely terminate in that water year the pumping that may be causing the impacts that were not anticipated. A review of those conditions would occur following the irrigation season. No pumping would be permitted in those areas suspected to be subject to these new and unexpected environmental conditions not addressed by the above described mitigation conditions in the following years until supplemental examination of the environmental conditions and effects had occurred. In this way, the costs of repeatedly processing environmental documents on an annual basis by the Authority and Reclamation can be avoided unless there are new and unexpected conditions which have not been contemplated and addressed.

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

Sincerely,



Steve Chedester

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