

# RECLAMATION

*Managing Water in the West*

FINDING OF NO SIGNIFICANT IMPACT

## **2015 Temporary Change in Water Quality Requirements for Groundwater Introduced into the Upper Portion of the Delta- Mendota Canal**

FONSI-15-040



U.S. Department of the Interior  
Bureau of Reclamation

July 2015

## **Mission Statements**

The mission of the Department of the Interior is to protect and manage the Nation's natural resources and cultural heritage; provide scientific and other information about those resources; and honor its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated 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.

**BUREAU OF RECLAMATION**  
**South-Central California Area Office, Fresno, California**

**FONSI-15-040**

**2015 Temporary Change in Water Quality  
Requirements for Groundwater  
Introduced into the Upper Portion of the  
Delta-Mendota Canal**

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# Introduction

In accordance with section 102(2)(c) of the National Environmental Policy Act of 1969, as amended, the South-Central California Area Office of the Bureau of Reclamation (Reclamation), has determined that an environmental impact statement is not required for the approval of a temporary change in the maximum acceptable concentration of selenium for groundwater introduced into the upper portion of the Delta-Mendota Canal (DMC) through August 30, 2015. This Finding of No Significant Impact (FONSI) is supported by Reclamation's Environmental Assessment (EA)-15-040, *2015 Temporary Change in Water Quality Requirements for Groundwater Introduced into the Upper Portion of the Delta-Mendota Canal*, and is hereby incorporated by reference.

Reclamation provided the public with an opportunity to comment on the Draft FONSI and Draft EA between July 15, 2015 and July 24, 2015. No comments were received.

## Background

The State of California has been and continues to experience unprecedented water management challenges due to severe drought in recent years. On January 17, 2014, the Governor proclaimed a Drought State of Emergency (State of California 2014). On December 22, 2014, provisions within this proclamation were extended until May 31, 2016. On April 1, 2015, following the lowest snowpack ever recorded in California and the ongoing drought, the Governor proclaimed a second Drought State of Emergency and directed the State Water Resources Control Board to implement mandatory water reductions in cities and towns across California to reduce water usage by 25 percent (State of California 2015a). On April 23, 2015 and May 1, 2015 the State Water Resources Control Board issued curtailment notices to junior water rights holders in the San Joaquin River watershed and the Delta, respectively. The curtailment notices require junior water rights holders to stop diverting water from the watershed in order to allow it to flow to more senior water-right holders, as required by state law (State of California 2015a). On June 12, 2015, the State Water Resources Control Board issued curtailment notices to senior water rights holders with a priority date of 1903 or later in the San Joaquin and Sacramento watersheds and the Delta (2015b).

In 2014, due to ongoing drought and regulatory requirements that limited available Central Valley Project (CVP) water supplies, the San Luis & Delta-Mendota Water Authority (Authority) requested approval from Reclamation to temporarily change water quality requirements for introduction of groundwater into the DMC under the DMC Groundwater Pump-in Program. The DMC Groundwater Pump-in Program allows CVP Contractors located north of O'Neill Forebay to cumulatively pump up to 50,000 acre-feet (AF) of groundwater into the DMC for storage and conveyance. Reclamation analyzed the DMC Groundwater Pump-in Program in EA-12-061 (Reclamation 2013). Based on specific environmental commitments required for the DMC Groundwater Pump-in Program, including water quality requirements,

Reclamation determined that the cumulative introduction, storage, and conveyance of up to 50,000 AF per year of groundwater would not significantly affect the quality of the human environment and a FONSI was signed on January 10, 2013.

All wells that participate in the DMC Groundwater Pump-in Program are required to meet Reclamation's then-current water quality requirements (see Appendix A in EA-15-040 for Reclamation's current water quality requirements and monitoring plan). Under Reclamation's current requirements, the maximum acceptable concentration for selenium in the DMC is 2 parts per billion (ppb), based on the monthly average limit specified in the Water Quality Plan for the Sacramento River and San Joaquin River for Grasslands wetlands water supply channels (Central Valley Regional Water Quality Control Board 2011). The current limit for selenium in the lower San Joaquin River downstream of the Merced River is 5 ppb (four-day average).

In 2014, Reclamation approved the temporary change in its water quality requirements to allow 14 wells to pump groundwater into the upper portion of the DMC that had between 2 and 5 ppb of selenium through August 30, 2014. Reclamation analyzed the proposal in EA-14-031 (Reclamation 2014) and predicted that the action would not significantly affect the quality of the human environment and a FONSI was signed on August 4, 2014. The conclusion was supported by analysis of daily composite measurements of selenium in the canal before, during, and after the action occurred. The addition of water from the 14 wells in 2014 did not cause a measurable increase in selenium in the canal as shown in Figure 1 of EA-15-040. In addition, during this period the concentration of selenium at Check 13 (O'Neill Forebay) did not exceed 0.4 ppb (see Figure 2). The results of all samples collected during the 2014 action were well below the water quality standard of 2 ppb.

In 2015, due to ongoing drought and regulatory requirements that limited available CVP water supplies, the Authority again requested a temporary change in water quality requirements for introduction of groundwater into the DMC.

## **Proposed Action**

For groundwater introduced into the upper portion of the DMC, Reclamation proposes to temporarily change the maximum acceptable concentration of selenium measured at the well head from 2 ppb to 5 ppb. The change would only be in effect through August 30, 2015. The maximum allowable selenium concentration for wells in the lower portion of the DMC would be unchanged.

The temporary change would allow an additional 13 wells (see Table 1 in EA-15-040) to cumulatively pump up to 30 cubic feet per second (cfs) of groundwater into the upper portion of the DMC (Figure 3 in EA-15-040) under the previously approved DMC Groundwater Pump-in Program. This would provide approximately 59.4 AF per day (30 cfs x 1.98 AF conversion factor). This water is included in the cumulative total (50,000 AF per year) allowed under the DMC Groundwater Pump-in Program.

## **Environmental Commitments**

The Proposed Action is subject to the following conditions:

- Selenium concentrations in the DMC measured at Check 13 may not exceed 2 ppb.
- Reclamation will monitor salinity in the canal using the real-time data to identify daily changes caused by the conveyance of groundwater. While there is no direct correlation between salinity and selenium concentration, Reclamation will direct the Authority to shut off the most saline wells if those wells are causing the salinity of water in the DMC to increase above 2,200  $\mu\text{S}/\text{cm}^1$ .
- Reclamation will continue to measure selenium in the canal. If the addition of groundwater to the canal causes selenium concentrations in the DMC to exceed 2 ppb, Reclamation will direct the Authority to immediately shut off wells with the highest concentrations of selenium until water the proposed criteria are met.

In addition to the conditions described above and the criteria included in Appendix A of EA-15-040, the Authority and participating member agencies shall continue to implement the environmental commitments included in Table 2 of EA-15-040 as required for the DMC Groundwater Pump-in Program.

## Findings

Reclamation's finding that implementation of the Proposed Action will result in no significant impact to the quality of the human environment is supported by the following findings:

### Resources Eliminated from Detailed Analysis

As described in Table 3 of EA-15-040, Reclamation analyzed the affected environment and determined that the Proposed Action does not have the potential to cause direct, indirect, or cumulative adverse effects to the following resources: air quality, cultural resources, environmental justice, geology, global climate change and energy use, Indian Sacred Sites, Indian Trust Assets, land use, or socioeconomic resources.

### Water Resources

Under the Proposed Action, Reclamation would temporarily change the maximum acceptable concentration of selenium for the 13 wells listed in Table 1 from 2 ppb to 5 ppb. All 13 of these wells are located between MP 12.69 and MP 59.50 within the upper portion of the DMC and all have selenium concentrations below 5 ppb. The temporary change, which would only be in effect through August 30, 2015, would allow up to 1,841 AF per month (59.4 AF/day x 31 days) to be introduced under the previously approved DMC Groundwater Pump-in Program. This water would be used to sustain existing permanent crops during this period of severe drought.

As shown in Appendix C, daily average selenium concentrations measured at the DMC headworks ranged from 0.4 ppb to 1.0 ppb (the 1.0 ppb only occurred in January 2014) with the majority of the results ranging from 0.4 to 0.6 ppb between January 2014 and May 2015. For the same time period, daily average selenium concentrations at Check 13 ranged from 0.4 to less than 0.7 ppb. At both locations monthly average selenium concentrations were 0.4 ppb.

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<sup>1</sup> Equivalent to 1,500 mg/L total dissolved solids

Based on the background selenium concentration and base flows in the DMC, Reclamation has calculated the effect of adding the groundwater pump-ins from these 13 wells on the baseline concentration of selenium in the DMC (see Table 5). In addition, Reclamation reviewed recent lab analyses results of the 13 wells. The range of selenium measured is between 2.5 and 4.6 ppb, with a flow-weighted average of 3.4 ppb (see Table 1 and Table 5 in EA-15-040). Full mixing of the groundwater from the 13 wells is expected to occur as the groundwater pump-ins are spread over approximately 45 miles of the DMC. Reclamation predicts that the concentration of selenium in the DMC is expected to increase to 0.5 ppb with the addition of water from the 13 wells (see Table 5 in EA-15-040). The effect of the groundwater pump-ins would, therefore, result in water in the DMC remaining well below the 2 ppb selenium concentration requirement as occurred last year with 14 wells that had selenium concentrations that ranged between 2.3 and 4.6 ppb, with a flow-weighted average of 3.5 ppb.

### **Biological Resources**

The water associated with the Proposed Action would be used to sustain existing permanent crops during the current severe drought, and would not be used to convert natural lands, or lands which have been fallowed or untilled for three or more years. The infrastructure required to carry out the Proposed Action is already in place and no ground disturbance, modification of facilities, or construction would occur as a result of the Proposed Action.

Selenium is an essential micronutrient that occurs naturally, but is also a bio-accumulative pollutant which can be toxic at elevated concentrations (EPA 2015a). A substantial increase in selenium concentrations within the DMC could negatively affect wildlife species that are associated with aquatic habitats, including certain federally listed species like the giant garter snake. Toxic exposure to selenium occurs primarily through the consumption of selenium-contaminated prey, rather than direct exposure to selenium in the water (EPA 2015a). Currently, the Environmental Protection Agency's (EPA) water quality criteria recommend a maximum selenium concentration of 5 ppb for the protection of freshwater aquatic life (EPA 2015b); however, the EPA is currently in the process of updating their criteria to reflect more recent scientific knowledge and, pending external peer review and approval, the EPA is suggesting a new maximum selenium concentration of 4.8 ppb (EPA 2015a; EPA 2015b). As discussed in Section 3.2.2, baseline selenium concentrations in the DMC (0.4 ppb on average) are expected to increase by about 0.05 ppb as a result of the Proposed Action, and would, therefore, remain well below the EPA's current and proposed selenium criteria for the protection of aquatic wildlife, and below the 2 ppb selenium criteria set for the DMC.

On August 4, 2014, Reclamation approved a similar action which allowed 14 wells, with selenium concentrations between 2 ppb and 5 ppb, to pump groundwater into the upper portion of the DMC through August 30, 2014. Before approval of the 2014 action, it was estimated that selenium concentrations in the DMC would increase by 0.5 ppb (Reclamation 2014). However, daily composite measurements of selenium in the DMC taken before, during, and after the 2014 action occurred showed that the addition of water from the 14 wells caused no measurable increase in selenium concentrations within the canal. Furthermore, selenium concentrations at Check 13 (O'Neill Forebay) did not exceed 0.4 ppb, and remained well below the water quality standard of 2 ppb during that time.



Potential effects to giant garter snakes, or aquatic birds, would only be expected to occur if selenium concentrations in the DMC exceed water quality criteria sufficiently long enough to affect prey or federally protected species. Reclamation will continue real-time monitoring of water quality in the DMC and if the addition of groundwater under the Proposed Action causes selenium concentrations to exceed 2 ppb, Reclamation will order wells with the highest selenium concentrations to be shut off immediately. The brief delay between the detection of exceeded water quality standards, the subsequent shut down of the pumps, and the resulting reduction in selenium concentrations would take no more than a day or two. This process would further avoid any adverse effects to wildlife because water quality standards would quickly return to baseline conditions and would remain well below the EPA's recommended 5 ppb criteria for the protection of aquatic wildlife.

State Wildlife Areas (e.g. refuges) generally receive their water from the DMC via Mendota Pool or the Volta Wasteway. Although water from the Proposed Action may reach these areas it would have no effect on wildlife because selenium concentrations were previously shown to stay well below 2 ppb and would be closely monitored to ensure that they would remain below the 2 ppb criteria for the DMC.

Although certain federally listed species are expected to occur in areas of suitable habitat within the Proposed Action area (see Table 6), the Proposed Action would not involve any construction, ground disturbance, or changes in land use; so areas of suitable habitat, and the species that depend on them, would not be affected. Selenium concentrations are not predicted to increase more than 0.5 ppb during the Proposed Action, well below the 2 ppb criteria for the DMC. In addition, when the same action was carried out last year (with one additional well) selenium concentrations in the canal did not measurably change as shown in Figures 1 and 2 of EA-15-040.

Based upon the discussion above, and with the implementation of avoidance measures listed in Table 2, Reclamation has determined there would be No Effect to proposed or listed species or critical habitat under the Endangered Species Act of 1973, as amended (16 U.S.C. §1531 et seq.) and No Take of birds protected under the Migratory Bird Treaty Act (16 U.S.C. §703 et seq.).

### **Cumulative Impacts**

Cumulative impacts result from incremental impacts of the 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. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment.

### **Water Resources**

As shown in Table 5 in EA-15-040, selenium concentrations in the DMC would temporarily increase slightly due to groundwater pump-ins from the 13 wells. However, as selenium concentrations would remain well below the set water quality criteria of 2 ppb, no cumulatively adverse water quality impacts would occur.

***Biological Resources***

As the Proposed Action would not result in any direct or indirect impacts to federally listed, proposed, or candidate species, or critical habitat, it would not contribute cumulatively to any impacts to these resources.

# RECLAMATION

*Managing Water in the West*

Final Environmental Assessment

## **2015 Temporary Change in Water Quality Requirements for Groundwater Introduced into the Upper Portion of the Delta-Mendota Canal**

EA-15-040



U.S. Department of the Interior  
Bureau of Reclamation

July 2015

## **Mission Statements**

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# Section 1 Introduction

The Bureau of Reclamation (Reclamation) provided the public with an opportunity to comment on the Draft Finding of No Significant Impact (FONSI) and Draft Environmental Assessment (EA) between July 15, 2015 and July 24, 2015. No comments were received. Changes between this Final EA and the Draft EA, which are not minor editorial changes, are indicated by vertical lines in the left margin of this document.

## 1.1 Background

The State of California has been and continues to experience unprecedented water management challenges due to severe drought in recent years. On January 17, 2014, the Governor proclaimed a Drought State of Emergency (State of California 2014). On December 22, 2014, provisions within this proclamation were extended until May 31, 2016. On April 1, 2015, following the lowest snowpack ever recorded in California and the ongoing drought, the Governor proclaimed a second Drought State of Emergency and directed the State Water Resources Control Board to implement mandatory water reductions in cities and towns across California to reduce water usage by 25 percent (State of California 2015a). On April 23, 2015 and May 1, 2015 the State Water Resources Control Board issued curtailment notices to junior water rights holders in the San Joaquin River watershed and the Delta, respectively. The curtailment notices require junior water rights holders to stop diverting water from the watershed in order to allow it to flow to more senior water-right holders, as required by state law (State of California 2015a). On June 12, 2015, the State Water Resources Control Board issued curtailment notices to senior water rights holders with a priority date of 1903 or later in the San Joaquin and Sacramento watersheds and the Delta (2015b).

In 2014, due to ongoing drought and regulatory requirements that limited available Central Valley Project (CVP) water supplies, the San Luis & Delta-Mendota Water Authority (Authority) requested approval from Reclamation to temporarily change water quality requirements for introduction of groundwater into the Delta-Mendota Canal (DMC) under the DMC Groundwater Pump-in Program. The DMC Groundwater Pump-in Program allows CVP Contractors located north of O'Neill Forebay to cumulatively pump up to 50,000 acre-feet (AF) of groundwater into the DMC for storage and conveyance. Reclamation analyzed the DMC Groundwater Pump-in Program in EA-12-061 (Reclamation 2013). Based on specific environmental commitments required for the DMC Groundwater Pump-in Program, including water quality requirements, Reclamation determined that the cumulative introduction, storage, and conveyance of up to 50,000 AF per year of groundwater would not significantly affect the quality of the human environment and a FONSI was signed on January 10, 2013.

All wells that participate in the DMC Groundwater Pump-in Program are required to meet Reclamation's then-current water quality requirements (see Appendix A for Reclamation's current water quality requirements and monitoring plan). Under Reclamation's current

requirements, the maximum acceptable concentration for selenium in the DMC is 2 parts per billion (ppb), based on the monthly average limit specified in the Water Quality Plan for the Sacramento River and San Joaquin River for Grasslands wetlands water supply channels (Central Valley Regional Water Quality Control Board 2011). The current limit for selenium in the lower San Joaquin River downstream of the Merced River is 5 ppb (four-day average).

In 2014, Reclamation approved the temporary change in its water quality requirements to allow 14 wells to pump groundwater into the upper portion of the DMC that had between 2 and 5 ppb of selenium through August 30, 2014. Reclamation analyzed the proposal in EA-14-031 (Reclamation 2014) and predicted that the action would not significantly affect the quality of the human environment and a FONSI was signed on August 4, 2014. The conclusion was supported by analysis of daily composite measurements of selenium in the canal before, during, and after the action occurred. The addition of water from the 14 wells in 2014 did not cause a measurable increase in selenium in the canal as shown in Figure 1.

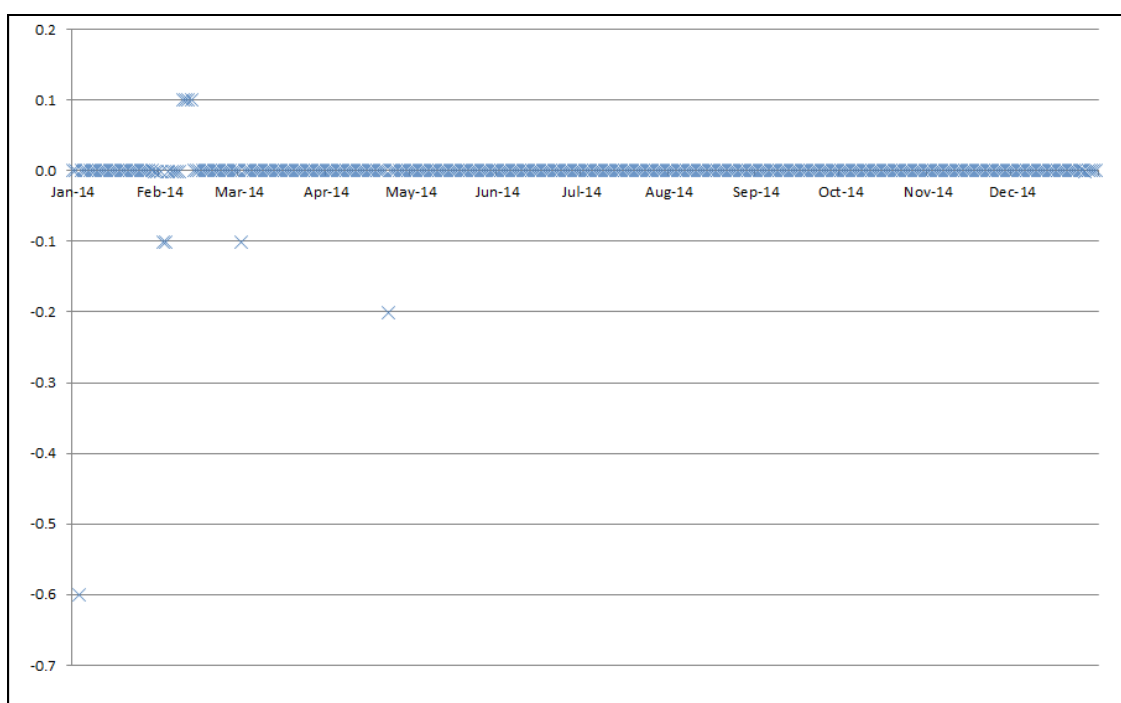


Figure 1 Change in Selenium Concentration between the Headworks and Check 13 of the DMC

In addition, during this period the concentration of selenium at Check 13 (O'Neill Forebay) did not exceed 0.4 ppb (see Figure 2). The results of all samples collected during the 2014 action were well below the water quality standard of 2 ppb.



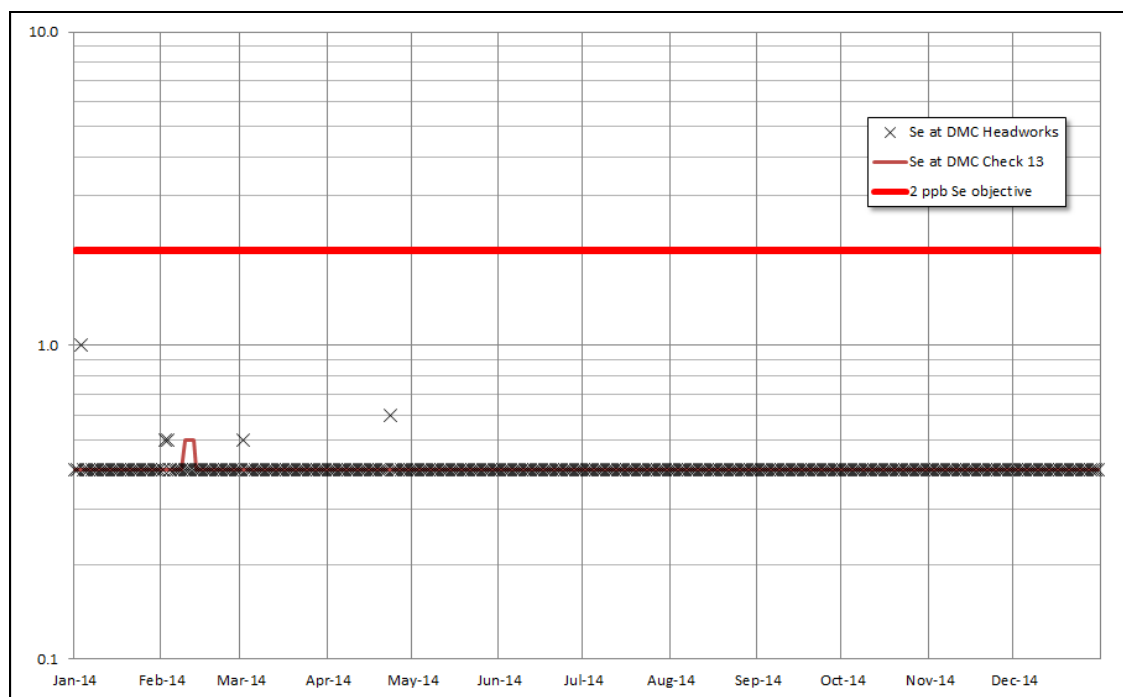


Figure 2 Concentration of Selenium (Se) at the Headworks and Check 13 of the DMC (in ppb)

In 2015, due to ongoing drought and regulatory requirements that limited available CVP water supplies, the Authority again requested a temporary change in water quality requirements for introduction of groundwater into the DMC.

## 1.2 Need for the Proposed Action

Based on hydrologic conditions described above, Reclamation declared a 0 percent allocation for south of Delta CVP agricultural contractors for the 2014 and 2015 Contract Year. As a result, CVP contractors have a need to find alternative sources of water to fulfill demands.

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## Section 2 Alternatives Including the Proposed Action

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

### 2.1 No Action Alternative

Under the No Action Alternative, Reclamation would not temporarily change the maximum acceptable concentration of selenium measured at the well head from 2 ppb to 5 ppb through August 30, 2015. Only wells that meet the water quality requirements specifically described in Reclamation's water quality monitoring plan (Appendix A) would be allowed to pump groundwater into the DMC as previously approved under the existing DMC Groundwater Pump-in Program.

### 2.2 Proposed Action

For groundwater introduced into the upper portion of the DMC, Reclamation proposes to temporarily change the maximum acceptable concentration of selenium measured at the well head from 2 ppb to 5 ppb. The change would only be in effect through August 30, 2015. The maximum allowable selenium concentration for wells in the lower portion of the DMC would be unchanged.

The temporary change would allow an additional 13 wells (see Table 1) to cumulatively pump up to 30 cubic feet per second (cfs) of groundwater into the upper portion of the DMC (Figure 3) under the existing DMC Groundwater Pump-in Program. This would provide approximately 59.4 AF per day (30 cfs x 1.98 AF conversion factor). This water would be included in the cumulative total (50,000 AF per year) allowed under the DMC Groundwater Pump-in Program.

Table 1 Wells with Selenium Concentrations between 2 ppb and 5 ppb

District	Well ID	Discharge Point at the DMC	Flow (cfs)	Selenium (ppb)	Recent Water Quality Test
Byron-Bethany ID	Tuso Figli Family LP	MP 12.69L	4.9	4.0	2/21/2014
Del Puerto WD	ARRA 102	MP 21.25L	2.2	2.8	4/2/2014
Del Puerto WD	Brown	MP 21.25L	0.9	3.9	4/2/2014
Del Puerto WD	ETS	MP 23.41L	3.4	2.5	1/30/2014
Del Puerto WD	Bays	MP 30.43L	2.7	3.7	1/28/2014
Del Puerto WD	Athwal	MP 31.60R	0.9	4.5	2/12/2014
Del Puerto WD	RC Capital	MP 35.73R	2.8	2.8	1/29/2014
Del Puerto WD	Pacific Earth	MP 43.22L	2.2	2.5	3/18/2014
San Luis WD	Craven #3	MP 48.97L	2.0	3.6	2/23/2008

District	Well ID	Discharge Point at the DMC	Flow (cfs)	Selenium (ppb)	Recent Water Quality Test
San Luis WD	Craven #6	MP 48.97L	2.0	3.1	2/22/2012
Del Puerto WD	Borges	MP 59.50R	2.0	2.8	7/10/2013
Del Puerto WD	Borges #1N Taglio	MP 59.50R	2.0	4.6	4/16/2013
Del Puerto WD	Borges #3 Taglio 70	MP 59.50R	2.0	4.0	4/16/2013

The Proposed Action is subject to the following conditions:

- Selenium concentrations in the DMC measured at Check 13 may not exceed 2 ppb.
- Reclamation will monitor salinity in the canal using the real-time data to identify daily changes caused by the conveyance of groundwater. While there is no direct correlation between salinity and selenium concentration, Reclamation will direct the Authority to shut off the most saline wells if those wells are causing the salinity of water in the DMC to increase above 2,200  $\mu\text{S}/\text{cm}^1$ .
- Reclamation will continue to measure selenium in the canal. If the addition of groundwater to the canal causes selenium concentrations in the DMC to exceed 2 ppb, Reclamation will direct the Authority to immediately shut off wells with the highest concentrations of selenium until water the proposed criteria are met.

In addition to the conditions described above and the criteria included in Appendix A, the Authority and participating member agencies shall continue to implement the following environmental commitments as required for the DMC Groundwater Pump-in Program (Table 2).

Table 2 Environmental Commitments Required for the DMC Groundwater Pump-in Program

Resource	Protection Measure
Water Resources	Each district would be required to confirm that the proposed pumping of groundwater would be compatible with local ordinances. Each district would be limited to pumping a quantity below the "safe yield" as established in applicable ordinances or their groundwater management plan, in order to prevent groundwater overdraft and avoid adverse impacts.
	No groundwater pumping would occur in Management Areas 2 and 3 since these areas are subject to inelastic subsidence.
	All districts participating in the DMC Groundwater Pump-in Program must annually provide the depth to groundwater in every well prior to start of pumping.
	Though most of the wells are privately owned, the Districts must provide access to each well for Reclamation and Authority staff.
	All compliance monitoring data collected by the Authority would be entered into worksheets and presented each week to Reclamation via e-mail. Reclamation would review the data to identify potential changes in the local aquifer that could lead to overdraft or subsidence.
	Groundwater measurements have been collected by the Authority since May 1995. Annually, the current depth to groundwater in each well would be compared to the measured depths. If the current depth exceeds the maximum measured depth, Reclamation would recommend that the District stop pumping from that well until the depth of water recovers to an agreed depth, such as the median observed depth.
Various Resources	The water shall be used for beneficial purposes and in accordance with Federal Reclamation law and guidelines, as applicable.
	Use of the water shall comply with all federal, state, local, and tribal law, and requirements imposed for protection of the environment and Indian Trust Assets.
	The water shall be used within the permitted place of use.
	No land conversions may occur and no construction or other ground disturbing activity may occur as part of the Proposed Action.

<sup>1</sup> Equivalent to 1,500 mg/L total dissolved solids



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

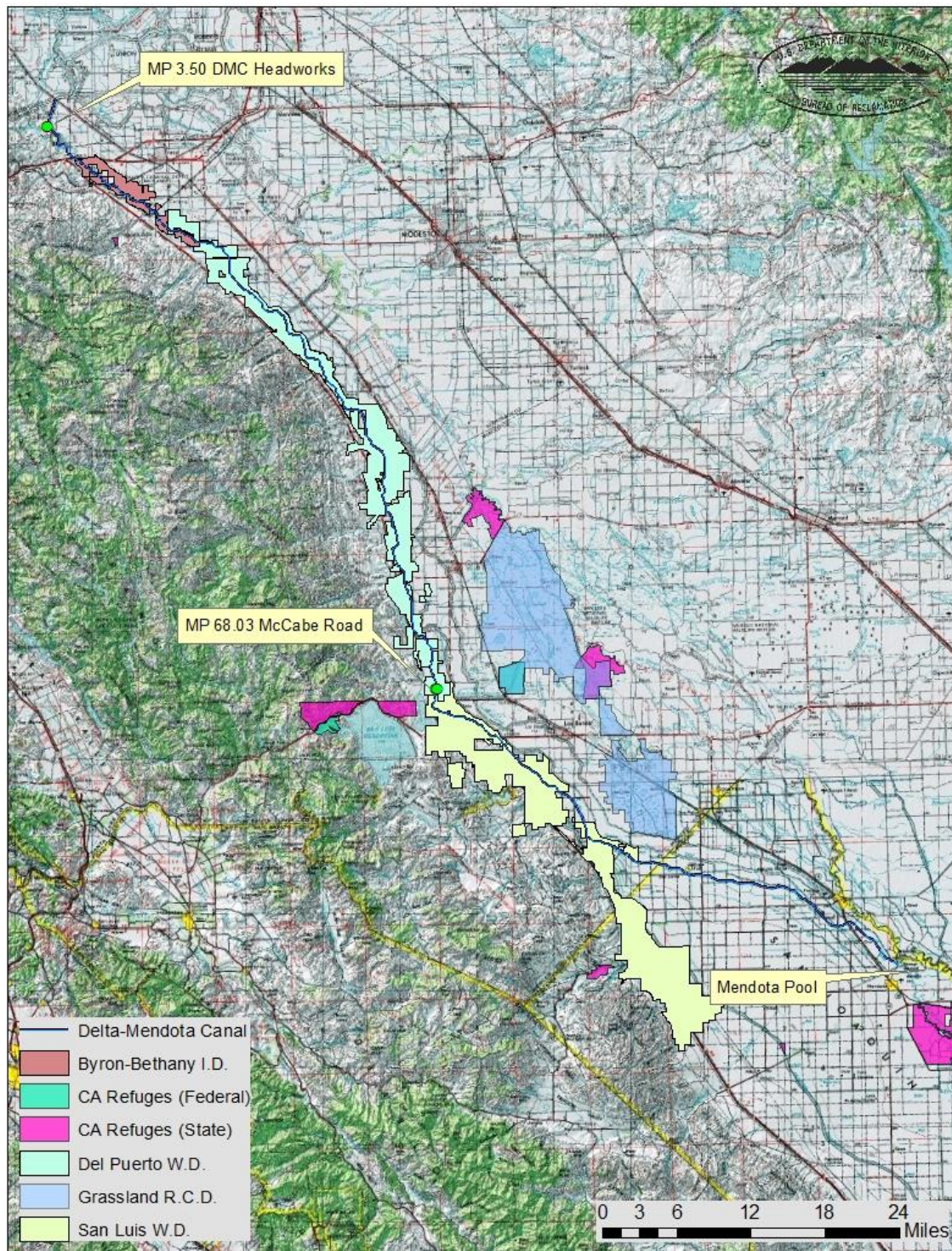


Figure 3 Proposed Action area

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## Section 3 Affected Environment and Environmental Consequences

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

### 3.1 Resources Eliminated from Further Analysis

Reclamation analyzed the affected environment and determined that the Proposed Action did not have the potential to cause direct, indirect, or cumulative adverse effects to the resources listed in Table 3.

Table 3 Resources Eliminated from Further Analysis

Resource	Reason Eliminated
Air Quality	The pumping of wells for the DMC Groundwater Pump-in Program was previously analyzed in EA-12-061 which found emissions of all of the proposed pumps, including those under the Proposed Action considered here, to be well below the <i>de minimis</i> thresholds for the San Joaquin Valley Air Pollution Control District. As such, there would be no additional impacts beyond those previously covered and a conformity analysis pursuant to the Clean Air Act is not required.
Cultural Resources	The Proposed Action would facilitate the flow of water through existing facilities to existing users. As no construction or modification of facilities would be needed in order to complete the Proposed Action, Reclamation has determined that these activities have no potential to cause effects to historic properties pursuant to 36 CFR Part 800.3(a)(1). See Appendix B for Reclamation's determination.
Environmental Justice	The Proposed Action would not cause dislocation, changes in employment, or increase flood, drought, or disease nor would it disproportionately impact economically disadvantaged or minority populations.
Geology	All 13 wells are included in the subsidence monitoring program required for the DMC Groundwater Pump-in Program. As these have previously been covered, no additional effects would occur as a result of the Proposed Action.
Global Climate and Energy Use	The pumping of wells for the DMC Groundwater Pump-in Program was previously analyzed in EA-12-061 which found emissions of all of the proposed pumps, including those under the Proposed Action considered here, to be well below the <i>de minimis</i> thresholds for the Environmental Protection Agency. As such, there would be no additional impacts beyond those previously covered.
Indian Sacred Sites	The Proposed Action would not limit access to or ceremonial use of Indian sacred sites on Federal lands by Indian religious practitioners or significantly adversely affect the physical integrity of such sacred sites.
Indian Trust Assets	The Proposed Action would not impact Indian Trust Assets as there are none in the Proposed Action area. The nearest Indian Trust Asset is approximately 35 miles from the Proposed Action area.
Land Use	The addition of up to 59.4 AF per day through August 30, 2015 would be used to irrigate existing permanent crops. The water would not be used to place untilled or new lands into production, or to convert undeveloped land to other uses.
Socioeconomics	The Proposed Action would have beneficial impacts on socioeconomic resources for south of Delta CVP contractors as the additional groundwater would be used to help sustain existing crops and maintain farming within the districts.



## 3.2 Water Resources

### 3.2.1 Affected Environment

The affected environment is the same as described in Section 3.1 of EA-12-061 (Reclamation 2013) and Section 3.2 in EA-14-031 which is incorporated by reference into this EA. Rather than repeating the same information, the affected environment and environmental consequences section in this EA will focus on updates or changes.

#### ***South of Delta CVP Allocations***

South-of-Delta CVP agricultural allocations averaged 47 percent from 2005 to 2014 (Table 3-2). Over the last five years the average allocation was 37 percent with a range of 0 to 80 percent. A 100 percent allocation was only received once in the last 10 years (2006). Due to operational constraints and fluctuating hydrologic conditions, water allocations in the future are likely to be similar to those shown in Table 4.

Table 4 Ten Year Average South-of-Delta Agricultural Allocation

Contract Year	Agricultural Allocations (%) <sup>1</sup>
2014 <sup>2</sup>	0
2013	20
2012	40
2011	80
2010	45
2009	10
2008	40
2007	50
2006	100
2005	85
<b>Average</b>	<b>47</b>

<sup>1</sup>As percentage of Water Service Contract total  
<sup>2</sup>Initial 2014 allocation.  
Source: [http://www.usbr.gov/mp/cvo/vungvari/water\\_allocations\\_historical.pdf](http://www.usbr.gov/mp/cvo/vungvari/water_allocations_historical.pdf)

### **Water Quality Results for the DMC in 2014**

As described in Section 1.1, Reclamation previously approved a temporary change in its water quality requirements through August 30, 2014 for 14 wells that had concentrations of selenium between 2 and 5 ppb. As shown in Figures 1 and 2, the selenium concentrations during the previous action analyzed in EA-12-061 did not change the concentration of selenium in the DMC and the selenium concentrations at Check 13 (near O'Neill Forebay as shown in Figure 3) remained well below the 2 ppb requirement.

Reclamation and the Authority continuously monitor water quality within the DMC. A summary of water quality test results for the headworks of the DMC and Check 13 over the last year are included in Appendix C.

### 3.2.2 Environmental Consequences

#### ***No Action***

Under the No Action Alternative, Reclamation would not temporarily change the maximum acceptable concentration of selenium at the well head for the 13 wells included in Table 1 from 2 ppb to 5 ppb through August 30, 2015. Only wells that meet the current water quality



requirements specifically described in Reclamation's water quality monitoring plan (Appendix A) would be allowed to pump groundwater into the DMC under the previously approved DMC Groundwater Pump-in Program. South of Delta CVP contractors would not have an additional supply, up to 59.4 AF per day, available for use on existing crops.

### ***Proposed Action***

Under the Proposed Action, Reclamation would temporarily change the maximum acceptable concentration of selenium for the 13 wells listed in Table 1 from 2 ppb to 5 ppb. All 13 of these wells are located between MP 12.69 and MP 59.50 within the upper portion of the DMC and all have selenium concentrations below 5 ppb. The temporary change, which would only be in effect through August 30, 2015, would allow up to 1,841 AF per month (59.4 AF/day x 31 days) to be introduced under the previously approved DMC Groundwater Pump-in Program. This water would be used to sustain existing permanent crops during this period of severe drought.

As shown in Appendix C, daily average selenium concentrations measured at the DMC headworks ranged from 0.4 ppb to 1.0 ppb (the 1.0 ppb only occurred in January 2014) with the majority of the results ranging from 0.4 to 0.6 ppb between January 2014 and May 2015. For the same time period, daily average selenium concentrations at Check 13 ranged from 0.4 to less than 0.7 ppb. At both locations monthly average selenium concentrations were 0.4 ppb.

Based on the background selenium concentration and base flows in the DMC, Reclamation has calculated the effect of adding the groundwater pump-ins from these 13 wells on the baseline concentration of selenium in the DMC (see Table 5). In addition, Reclamation reviewed recent lab analyses results of the 13 wells. The range of selenium measured is between 2.5 and 4.6 ppb, with a flow-weighted average of 3.4 ppb (see Table 1 and Table 5). Full mixing of the groundwater from the 13 wells is expected to occur as the groundwater pump-ins are spread over approximately 45 miles of the DMC. Reclamation predicts that the concentration of selenium in the DMC is expected to increase to 0.5 ppb with the addition of water from the 13 wells (see Table 5). The effect of the groundwater pump-ins would, therefore, result in water in the DMC remaining well below the 2 ppb selenium concentration requirement as occurred last year with 14 wells that had selenium concentrations that ranged between 2.3 and 4.6 ppb, with a flow-weighted average of 3.5 ppb.

**Table 5 Projected Monthly Contribution of Pump-ins to DMC Selenium Concentrations in 2015**

	Number of wells	Flow (cfs)	Selenium concentration** (ppb)	Total Dissolved Solids* (mg/L)
Baseline (DMC headworks)		304	<0.4	510
Approved wells (less than 2 ppb selenium)	37	61	1.9	704
Proposed wells (2 – 5 ppb selenium)	13	37	3.4	675
Blend of all wells and canal	50	402	0.9	556
Predicted change in the canal			0.5	46

Notes: DMC baseline data for 21 July 2014; \*flow weighted concentrations, 1 ppb is equivalent to 1 µg/L.

### ***Cumulative Impacts***

As shown in Table 5, selenium concentrations in the DMC is predicted to temporarily increase slightly due to groundwater pump-ins from the 13 wells. However, as selenium concentrations would remain well below the set water quality criteria of 2 ppb, no cumulatively adverse water quality impacts would occur.

### 3.3 Biological Resources

#### 3.3.1 Affected Environment

The Proposed Action area includes the upper portion of the DMC, the San Luis Reservoir, the Byron-Bethany Irrigation District, the Del Puerto Water District, and the San Luis Water District. The Proposed Action area consists primarily of agricultural lands, including pasture, row crops, vineyards, and orchards; some limited urban development and remnant patches of natural habitat are also present.

Reclamation requested an official species list, for the Proposed Action area, from the U.S. Fish and Wildlife Service (Service) via the Service's website, <http://ecos.fws.gov/ipac/>, on June 25, 2015 (Consultation Code: 08ESMF00-2015-SLI-0766). The California Department of Fish and Wildlife's California Natural Diversity Database (CNDDDB) was also queried for records of protected species near the Proposed Action area (CNDDDB 2015). The information collected above, in addition to information within Reclamation's files, was combined to determine the likelihood of protected species occurrence within the Proposed Action area.

Table 6 Threatened and Endangered Species and Critical Habitat that may occur within the Proposed Action area

Listed Species	Status <sup>1</sup>	ESA Effects <sup>2</sup>	Basis for Effects Determination
<b>AMPHIBIANS</b>			
California red-legged frog ( <i>Rana draytonii</i> )	T, X	NE	There are CNDDDB records of this species in western portions of the Byron-Bethany Irrigation District (CNDDDB 2015). The Proposed Action would not result in any land use changes or conversion of habitat which may be suitable for this species.
Critical Habitat California red-legged frog ( <i>Rana draytonii</i> )	X	NE	Critical Habitat for this species is present in a portion of the Byron-Bethany Irrigation District. The Proposed Action would not result in any construction, land use changes, or conversion of habitat which may be suitable for this species.
California tiger salamander, central population ( <i>Ambystoma californiense</i> )	T, X	NE	There are CNDDDB records of this species occurring within the Byron Bethany Irrigation District (CNDDDB 2015). The Proposed Action would not involve any construction, land use changes, or conversion of habitat which may be suitable for this species.
<b>BIRDS</b>			
California condor ( <i>Gymnogyps californianus</i> )	E, X	NE	There are no records of this species occurring in or near the Proposed Action area, and this species has likely been extirpated from areas to the north of the San Luis Reservoir. The Proposed Action would not result in any land use changes or conversion of habitat which may be suitable for this species.

Listed Species	Status <sup>1</sup>	ESA Effects <sup>2</sup>	Basis for Effects Determination
Least Bell's vireo ( <i>Vireo bellii pusillus</i> )	E, X	NE	There are no records of this species within the Proposed Action area and suitable riparian habitat for this species appears to be lacking from the Proposed Action area. The Proposed Action would not result in any land use changes or conversion of habitat which may be suitable for this species.
Yellow-billed cuckoo ( <i>Coccyzus americanus occidentalis</i> )	T, PX	NE	There are no records of this species within the Proposed Action area, and suitable woodland habitat for this species appears to be lacking from the Proposed Action area. The Proposed Action would not result in any land use changes or conversion of habitat which may be suitable for this species.
<b>CRUSTACEANS</b>			
Conservancy fairy shrimp ( <i>Branchinecta conservation</i> )	E, X	NE	There are no records of this species occurring within the Proposed Action area, but this species may be present if suitable vernal pool habitat exists within the Action Area. The Proposed Action would not involve any ground disturbing activities, changes in land use, or conversion of suitable vernal pool habitat.
Vernal pool fairy shrimp ( <i>Branchinecta lynchi</i> )	T, X	NE	There are records of this species occurring in the Byron Bethany Irrigation District (CNDDDB 2015). The Proposed Action would not involve any ground disturbing activities, changes in land use, or conversion of suitable vernal pool habitat.
Critical Habitat Vernal pool fairy shrimp ( <i>Branchinecta lynchi</i> )	X	NE	Critical habitat for this species is present within the Byron-Bethany Irrigation District. The Proposed Action would not involve any ground disturbing activities, changes in land use, or conversion of suitable vernal pool habitat.
Vernal Pool tadpole shrimp ( <i>Lepidurus packardii</i> )	T, X	NE	There are no records of this species occurring within the Proposed Action area (CNDDDB 2015), but this species may be present if suitable vernal pool habitat exists within the Action Area. The Proposed Action would not involve any ground disturbing activities, changes in land use, or conversion of suitable vernal pool habitat.
<b>FISH</b>			
Delta smelt ( <i>Hypomesus transpacificus</i> )	T, X	NE	This species occupies brackish waters in the Delta, and does not occur within the DMC. The Proposed Action would have No Effect on waterways within this species' range.
Critical Habitat Delta smelt ( <i>Hypomesus transpacificus</i> )	X	NE	Designated Critical Habitat for this species is present within the Byron-Bethany Irrigation District; however, no waterways that support delta smelt would be affected by the Proposed Action.
Steelhead, Northern California DPS ( <i>Oncorhynchus mykiss</i> )	T, NMFS, X	NE	This species does not occur within the DMC and the Proposed Action would have No Effect on waterways that are inhabited by this species.

Listed Species	Status <sup>1</sup>	ESA Effects <sup>2</sup>	Basis for Effects Determination
<b>FLOWERING PLANTS</b>			
Antioch Dunes evening-primrose <i>Oenothera deltoids</i> ssp. <i>Howellii</i>	E,X	NE	This species does not occur within the Proposed Action area.
Contra Costa goldfields <i>Lasthenia conjugens</i>	E,X	NE	There are no CNDDDB records of this species within the Proposed Action area (CNDDDB 2015); however, suitable vernal pool habitat for this species may be present within the Byron-Bethany Irrigation District. The Proposed Action would not involve any ground disturbing activities, changes in land use, or conversion of suitable vernal pool habitat.
Critical Habitat Contra Costa goldfields <i>Lasthenia conjugens</i>	X	NE	Critical habitat for this species is present within the Byron-Bethany Irrigation District. The Proposed Action would not involve any ground disturbing activities, changes in land use, or conversion of suitable vernal pool habitat.
Large-Flowered fiddleneck <i>Amsinckia grandiflora</i>	E,X	NE	This species does not occur within the Proposed Action area.
San Joaquin woolly-threads <i>Monolopia congdonii</i>	E	NE	This species does not occur within the Proposed Action area.
San Mateo thornmint <i>Acanthomintha obovata</i> ssp. <i>duttonii</i>	E	NE	This species does not occur within the Proposed Action area.
<b>INSECTS</b>			
San Bruno Elfin butterfly <i>Callophrys mossii bayensis</i>	E	NE	There are no records of this species in or near the Proposed Action area and suitable coastal scrub and cliff habitat for this species is not present.
Valley Elderberry Longhorn beetle <i>Desmocerus californicus dimorphus</i>	T,X	NE	There are no records of this species within the Proposed Action area (CNDDDB 2015); however, this species may occur if its host plant, the elderberry bush, is present. The Proposed Action would not involve any construction, changes in land use, or conversion of habitat which may be suitable for this species.
<b>MAMMALS</b>			
Fresno kangaroo rat <i>Dipodomys nitratoide exilis</i>	E, X	NE	There are no records of this species occurring within the Proposed Action area (CNDDDB 2015), and a majority of the Proposed Action area is outside of the known range of this species. The Proposed Action would not involve any construction, changes in land use, or conversion of habitat which may be suitable for this species
Giant kangaroo rat <i>Dipodomys ingens</i>	E	NE	There is one record of this species within the San Luis Water District (CNDDDB 2015). The Proposed Action would not involve any construction, changes in land use, or conversion of habitat which may be suitable for this species.

Listed Species	Status <sup>1</sup>	ESA Effects <sup>2</sup>	Basis for Effects Determination
Riparian brush rabbit ( <i>Sylvilagus bachmani riparius</i> )	E	NE	This species does not occur within the Proposed Action area.
Riparian woodrat ( <i>Neotoma fuscipes riparia</i> )	E	NE	This species does not occur within the Proposed Action area.
San Joaquin kit fox ( <i>Vulpes macrotis mutica</i> )	E	NE	There are multiple records of this species within the Proposed Action area (CNDDDB 2015). The Proposed Action would not involve any ground disturbance, changes in land use, or conversion of habitat which may be suitable for this species
<b>REPTILES</b>			
Alameda whipsnake ( <i>Masticophis lateralis euryxanthus</i> )	T, X	NE	There are no records of this species within the Proposed Action area (CNDDDB 2015); however, a portion of the Byron-Bethany Irrigation District is located within this species' range. The Proposed Action would not involve any construction, changes in land use, or conversion of habitat which may be suitable for this species.
Blunt-nosed leopard lizard ( <i>Gambelia sila</i> )	E	NE	There are records of this species within the San Luis Water District (CNDDDB 2015). The Proposed Action would not involve any construction, changes in land use, or cultivation of native or untilled lands which may provide habitat for this species.
Giant garter snake ( <i>Thamnophis gigas</i> )	T	NE	There are records of this species near the Proposed Action area (CNDDDB, 2015), and this species may occupy portions of the DMC, or nearby irrigation ditches. The Proposed Action would not involve any ground disturbance, land conversion or construction, and all water introduced into the canal would comply with water quality requirements in order to avoid potential effects to the species.
<p>1 Status= Federally protected species under the Endangered Species Act, unless otherwise specified.  E: Listed as Endangered.  NMFS: Species under the jurisdiction of the National Marine Fisheries Service.  T: Listed as Threatened.  P: Proposed for federal listing.  PX: Proposed Critical Habitat – critical habitat proposed for a species already listed.  X: Critical Habitat designated for this species.</p> <p>2 ESA Effects = Effect determination for Endangered Species Act Analysis  NE: No Effect from the Proposed Action to federally listed species</p>			

### 3.3.2 Environmental Consequences

#### **No Action**

Under the No Action Alternative, Reclamation would not allow groundwater with selenium concentrations from 2 to 5 ppb to be temporarily pumped into the DMC under the existing DMC Groundwater Pump-in Program. Because conditions would remain the same as existing conditions, there would be no impact to biological resources.

### ***Proposed Action***

The water associated with the Proposed Action would be used to sustain existing permanent crops during the current severe drought, and would not be used to convert natural lands, or lands which have been fallowed or untilled for three or more years. The infrastructure required to carry out the Proposed Action is already in place and no ground disturbance, modification of facilities, or construction would occur as a result of the Proposed Action.

Selenium is an essential micronutrient that occurs naturally, but is also a bio-accumulative pollutant which can be toxic at elevated concentrations (EPA 2015a). A substantial increase in selenium concentrations within the DMC could negatively affect wildlife species that are associated with aquatic habitats, including certain federally listed species like the giant garter snake. Toxic exposure to selenium occurs primarily through the consumption of selenium-contaminated prey, rather than direct exposure to selenium in the water (EPA 2015a). Currently, the Environmental Protection Agency's (EPA) water quality criteria recommend a maximum selenium concentration of 5 ppb for the protection of freshwater aquatic life (EPA 2015b); however, the EPA is currently in the process of updating their criteria to reflect more recent scientific knowledge and, pending external peer review and approval, the EPA is suggesting a new maximum selenium concentration of 4.8 ppb (EPA 2015a; EPA 2015b). As discussed in Section 3.2.2, baseline selenium concentrations in the DMC (0.4 ppb on average) are expected to increase by about 0.05 ppb as a result of the Proposed Action, and would, therefore, remain well below the EPA's current and proposed selenium criteria for the protection of aquatic wildlife, and below the 2 ppb selenium criteria set for the DMC.

On August 4, 2014, Reclamation approved a similar action which allowed 14 wells, with selenium concentrations between 2 ppb and 5 ppb, to pump groundwater into the upper portion of the DMC through August 30, 2014. Before approval of the 2014 action, it was estimated that selenium concentrations in the DMC would increase by 0.5 ppb (Reclamation 2014). However, daily composite measurements of selenium in the DMC taken before, during, and after the 2014 action occurred showed that the addition of water from the 14 wells caused no measurable increase in selenium concentrations within the canal. Furthermore, selenium concentrations at Check 13 (O'Neill Forebay) did not exceed 0.4 ppb, and remained well below the water quality standard of 2 ppb during that time.

Potential effects to giant garter snakes, or aquatic birds, would only be expected to occur if selenium concentrations in the DMC exceed water quality criteria sufficiently long enough to affect prey or federally protected species. Reclamation will continue real-time monitoring of water quality in the DMC and if the addition of groundwater under the Proposed Action causes selenium concentrations to exceed 2 ppb, Reclamation will order wells with the highest selenium concentrations to be shut off immediately. The brief delay between the detection of exceeded water quality standards, the subsequent shut down of the pumps, and the resulting reduction in selenium concentrations would take no more than a day or two. This process would further avoid any adverse effects to wildlife because water quality standards would quickly return to baseline conditions and would remain well below the EPA's recommended 5 ppb criteria for the protection of aquatic wildlife.

State Wildlife Areas (e.g. refuges) generally receive their water from the DMC via Mendota Pool or the Volta Wasteway. Although water from the Proposed Action may reach these areas it would have no effect on wildlife because selenium concentrations were previously shown to stay well below 2 ppb and would be closely monitored to ensure that they would remain below the 2 ppb criteria for the DMC.

Although certain federally listed species are expected to occur in areas of suitable habitat within the Proposed Action area (see Table 6), the Proposed Action would not involve any construction, ground disturbance, or changes in land use; so areas of suitable habitat, and the species that depend on them, would not be affected. Selenium concentrations are not predicted to increase more than 0.5 ppb during the Proposed Action, well below the 2 ppb criteria for the DMC. In addition, when the same action was carried out last year (with one additional well) selenium concentrations in the canal did not measurably change as shown in Figures 1 and 2.

Based upon the discussion above, and with the implementation of avoidance measures listed in Table 2, Reclamation has determined there would be No Effect to proposed or listed species or critical habitat under the Endangered Species Act of 1973, as amended (16 U.S.C. §1531 et seq.) and No Take of birds protected under the Migratory Bird Treaty Act (16 U.S.C. §703 et seq.).

***Cumulative Impacts***

As the Proposed Action would not result in any direct or indirect impacts to federally listed, proposed, or candidate species, or critical habitat, it would not contribute cumulatively to any impacts to these resources.

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## **Section 4 Consultation and Coordination**

### **4.1 Public Review Period**

Reclamation provided the public with an opportunity to comment on the Draft FONSI and Draft EA between July 15, 2015 and July 24, 2015. No comments were received.

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## **Appendix A**

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### **Reclamation's Water Quality Standards for the Delta-Mendota Canal**

# RECLAMATION

*Managing Water in the West*

## **Delta-Mendota Canal Non-Project Surface Water Pump-in Program**

### **2015 Water Quality Monitoring Plan**





### **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.

**Delta-Mendota Canal  
Non-Project Surface Water Pump-in Program  
2015 Water Quality Monitoring Plan**

United States Department of the Interior  
Bureau of Reclamation  
Mid-Pacific Region  
South-Central California Area Office

Cover Photograph: Patterson ID facility at Delta-Mendota Canal Milepost 42.53L (MCS Eacock, 2013)

# 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
CDEC	California Data Exchange Center
COC	Chain of Custody
CVP	Central Valley Project
DFG	California Department of Fish and Game
DWR	California Department of Water Resources
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
MP-157	Environmental Monitoring Branch, Reclamation
QA	Quality Assurance
QC	Quality Control
QCO	Quality Control Officer
Reclamation	U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region
Regional Board	California EPA, Central Valley Regional Water Quality Board
SCCAO	South-Central California Area Office, Reclamation
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

# 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 Contract Water Year 2015<sup>1</sup>, Reclamation proposes to execute temporary contracts with water districts to convey non-project surface water in the Delta-Mendota Canal (DMC) subject to the monitoring and reporting requirements outlined in this document. The following districts could participate in this program:

**Table 1. Non-Project Surface Water Pump-in Locations**

<b>DMC Milepost</b>	<b>District</b>	<b>Flow Rate (cfs)</b>
3.32R	Byron-Bethany ID	40
20.42L	Banta-Carbona ID	60
31.31L	West Stanislaus ID	25
42.54L	Patterson ID <sup>2</sup>	40
79.64R	Central California ID <sup>3</sup>	250

This document describes the plan for measuring the changes in the quality of water in the DMC resulting from the conveyance of non-project surface water. Various agencies will use these data to assess any impacts on the quality of water delivered to farms, wetlands, and the State Water Project through the O'Neill Forebay.

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). This monitoring plan will be conducted by staff of Reclamation and the Authority, and the data will complement independent monitoring by other Federal, State, and private agencies.

This monitoring program will consist of initial analysis of each source of non-project water, comparison with water quality standards, and routine in-stream analysis. Daily flow and salinity will be monitored in a mass balance to assess any degradation caused by the conveyance of this water.

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 later in this plan.

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<sup>1</sup> Contract Water Year = 01 March 2015 – 29 February 2016

<sup>2</sup> May include more water from the proposed North Valley Regional Recycling Program

<sup>3</sup> Proposed floodwater from Los Banos Creek

Continuous measurement of specific conductance (SC) will be recorded at three stations in the canal and four sites in the San Joaquin River 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 online 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 Authority will record the rate of flow from each source of non-project surface water and will report monthly totals to Reclamation. The Authority will also provide mean daily flow in the canal at the headworks and passing Checks 13 and 21.

Reclamation will use these data to assess changes in water quality caused by the conveyance of non-project surface water and groundwater in Contract Water Year 2015. The real-time data will be collected by Reclamation and used in a mass balance to predict water quality conditions along the DMC, and attribute changes caused by each source of non-project water. The calculated results will be reported to the Authority and other interested agencies.

## **Background**

The Delta Division of the federal CVP delivers water to a million acres of farmland and wetlands in the San Joaquin Valley, California. This is the sole source of clean water for the Cities of Tracy and Dos Palos, and 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 the Sierra Nevada in northern California, passing through the delta of the Sacramento and San Joaquin Rivers. This water is typically suitable in quality for irrigation and wetlands. California 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 DMC carries CVP water to farms, communities, and wetlands between Tracy and Mendota. The 116 mile canal is operated and maintained by the Authority under contract with Reclamation. Inflows of tailwater and subsurface water add contaminants to the canal. The DMC is connected to the State Water Project at the O'Neill Forebay.

The districts and refuges in the Delta Division use non-project water to supplement their contractual supply from the CVP. The term "Non-Project Water" applies to supplies of water that have not been appropriated by the United States for the purposes of the CVP.

The Warren Act of 1911<sup>4</sup> authorizes Reclamation to execute temporary contracts to impound, store, and carry non-project water in federal irrigation canals when excess capacity is available. These contracts are negotiated by Reclamation with Delta Division water districts to allow the introduction of non-project water into the Delta-Mendota Canal 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 two sources of non-project water are 1) wells located beside the canal, and 2) through pipelines from the San Joaquin River and Los Banos Creek. The quality of non-project water must be measured to confirm that there will be no harm to downstream water users when this water is pumped into the canal. Reclamation has developed a set of standards for the acceptance of non-project water in the canal based on the requirements of downstream water users.

In Contract Water Year 2015, environmental regulations and climate change may continue to reduce the supply of CVP water for the Delta Division. Water managers now must depend on non-project water to supplement a diminished supply of CVP water.

This monitoring plan will measure any changes in the quality of CVP water in the Delta-Mendota Canal caused by the introduction of non-project surface water. The data will be used by the Authority and Reclamation to regulate the 2015 pump-in program and evaluate future programs.

## **Monitoring Mission and Goals**

The mission of this monitoring plan is to provide reliable data for managers to implement the terms of the 2015 Warren Act Contracts and exchange agreements, and to ensure that the quality of CVP water is suitable for all downstream water users.

## **Program Goals**

The general goals of monitoring are:

- Evaluate the quality of each source of non-project surface water,
- Compare this water with established water quality standards (Table 5), and
- Confirm that the blend of CVP water and non-project surface water will be suitable for domestic, agricultural, and wetlands uses.

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<sup>4</sup> Act of February 21, 1911, ch. 141, 36 Stat. 925

## Study Area

The Study Area for this program encompasses 1) the Delta-Mendota Canal from Tracy to Mendota, 2) the O'Neill Forebay and the connection to the State Water Project, and 2) the San Joaquin River between Patterson and Mossdale. There is a proposed connection to Los Banos Creek to convey floodwater, but this construction may not occur in 2015. The five surface water pump-in sites are listed in **Table 1**.

## Water Quality Standards

Each source of non-project surface water will be tested for the constituents listed in **Table 4**. The results will be compared with standards developed by Reclamation based on the requirements of downstream water users. For example, 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>5</sup>. The other constituents are mainly agricultural chemicals listed in the California Drinking Water Standards (Title 22)<sup>6</sup>.

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<sup>5</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>6</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.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/Lawbook.shtml](http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Lawbook.shtml)

# Water Quality Monitoring Plan

## Initial Analysis

All districts participating in the 2015 DMC Surface Water Pump-in Program must provide the following information about each source of non-project surface water to Reclamation prior to pumping that water into the DMC:

- the current license to erect and maintain the pump-in structure within the DMC right-of-way
- the current Warren Act Contract that allows the non-project water to be conveyed in the DMC
- the schedule and pump-in rate of each source;
- and complete report of water quality analysis (**Table 4**).

The Districts must provide access to each pump-in facility for Reclamation and Authority staff. Each pump-in facility must have an easily accessible device that lists flow (cubic-feet per second) and cumulative acre-feet, a spigot for collecting a water sample, and a corporation stop to calibrate the flow meter.

All water samples must be collected and preserved according to established protocols in correct containers. Reclamation will assist with the collection of these samples.

Analyses should be conducted by laboratories that have been approved by Reclamation, listed in **Table 5a** and **Table 5b**. Each sample of non-project surface water must be sampled and analyzed at the expense of the Warren Act Contract district.

## In-stream Monitoring

The quality of water in the DMC will be measured at the locations listed in **Table 2** and **Table 3**.

Reclamation will compile electrical conductivity data from the real-time stations listed in **Table 2**. 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 where water quality will be measured within the DMC under this program. If the real-time monitoring is not sufficient to identify in-stream changes in quality caused by the addition of the non-project surface water, Reclamation may require weekly measurements at the checks listed in **Table 3** to determine local effects from pump-in site.



Furthermore, if flow of CVP water in the canal is less than 500 cfs, Reclamation may require detailed instream monitoring to identify the individual and cumulative changes in water quality caused by the addition of non-project water. The need for these optional samples will be determined by Reclamation.

## **Compliance Monitoring**

The salinity of water in the San Joaquin River and DMC will be measured with sensors that report real-time data to CDEC, listed in **Table 2**. Reclamation will monitor daily changes in salinity in the DMC while the non-project surface water is being pumped into the canal. The daily flow data will be collected by Reclamation and used in a mass balance to monitor water quality conditions along the DMC, and attribute changes caused by each source of non-project water. The calculated results will be reported to the Authority and other interested agencies.

## **Weekly Monitoring (Optional)**

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 upstream and downstream from each pump-in site.

The monthly volume of water pumped into the DMC from each pump-in structure will be measured by the Authority and reported to Reclamation at the beginning of each month.

## **Selenium Monitoring**

Based on available funds, Reclamation will continue to measure selenium in the canal with autosamplers at the DMC headworks, Check 13, and Check 21. Reclamation may collect random samples of water from the active pump-ins and at other places in the DMC; the cost of these selenium tests will be borne by Reclamation.

## **Data Compilation and Review**

All monitoring data collected by the Authority (i.e., volume of water pumped into the DMC, optional grab samples) will be presented each week to Reclamation via e-mail. Reclamation will use a mass-balance to assess the effects of the pump-ins on salinity in the DMC.

# Water Quality Monitoring Parameters

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. The Department of Water Resources operates similar sensors along the San Joaquin River and California Aqueduct. Preliminary data from these sensors are reported by the California Data Exchange Center. Reclamation will compile these data for the salinity mass balance.

### 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.

## 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 4** lists constituents to be measured at each well that will pump into the DMC. Parameters include selenium, mercury, boron, nutrients, and other compounds that cannot be measured with field sensors. **Table 5a** 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.

## **Data Management**

### **Chain of Custody Documentation**

Chain of custody (COC) forms will be used to document custody of the samples. 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.

### **Field Logbooks**

At the time of sample collection, field logbook entries are made. The field logbook documents: site name, date of sample collection, start and end time of sample collection, QA samples collected, sample identification (ID), method of sampling, parameters and matrices collected, and any unusual conditions that might affect the samples. After entering the required information, the field sampler must sign the field logbook entry. The field logbook is bound with numbered pages.

### **Instrument Calibration Sheet**

The instrument calibration sheet documents the information from an initial calibration, performed prior to instrument use, and information from a verification check, performed after all sampling for that day is completed. Information documented on the instrument calibration sheet should include project name, date, time(s), field sampler's name, instrument number, standard value, initial value, adjusted value and post calibration value.

## Quality Assurance and Quality Control

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 criteria will be documented in the program Quality Assurance Project Plan (QAPP) and 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.

External QA samples will be incorporated at the rate specified in the QAPP; external QA samples can include duplicates, spikes, reference materials or blanks. The precision, accuracy, and contamination criteria will be used by the Quality Control Officer (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.

The sensitivities of the analytical methods selected should ideally provide reporting limits (RL) at levels of at least three times below the parameter's lowest water quality threshold. However, the technology may not always be in place to achieve the needed level of sensitivity and even if present, may not be fiscally possible. Note that due to sample matrix effects and other analytical issues, the RL values actually obtained may be higher than the anticipated RLs.

Hand held instruments (meters) will be used to measure water characteristics (i.e., EC). The detection limits (or sensitivity) for field instruments will conform to the specifications of the manufacturer.

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.

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.

## **Data Management**

**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.

# Water Quality Requirements

Each week, Reclamation staff will use the real-time salinity measurements (**Table 2**) and optional weekly in-stream measurements (**Table 3**) to monitor and determine the changes in salinity in the DMC, and determine if the pump-ins have caused these changes.

Reclamation staff will compile other water quality data collected for this program and by others to evaluate changes in the canal.

Reclamation and the Authority will allow non-project surface water and 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 **Table 6**.

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

Revised: 30 December 2014

Table 1. Non-Project Surface Water Pump-in Locations

Table 2. Real-time Water Quality Monitoring Stations

Table 3. Water Quality Monitoring Stations

Table 4. Water Quality Standards

Table 5a. Approved Laboratory List for the Mid-Pacific Region Quality Assurance and Data Management Branch and Environmental Monitoring and Hazardous Materials Branch

Table 5b. Approved Laboratory Matrix for the Mid-Pacific Region Quality Assurance and Data Management Branch and Environmental Monitoring and Hazardous Materials Branch

Table 6. Parameters for Accepting Non-Project Surface Water in the Upper DMC

Delta-Mendota Canal  
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Table 1. Non-Project Surface Water Pump-in Locations

DMC Milepost	District	Flow Rate (cfs)	Notes
3.32R	Byron-Bethany ID	40	three pipes
20.42L	Banta-Carbona ID	60	
31.31L	West Stanislaus ID	25	three pipes
42.54L	Patterson ID	40	
79.64R	Central California ID	up to 250 cfs	flood water from Los Banos Creek



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**Table 2. Real-time Water Quality Monitoring Stations**

<b>DMC Milepost</b>	<b>River Mile</b>	<b>Location</b>	<b>Operating Agency</b>	<b>Parameters</b>	<b>CDEC</b>
3.31L		Connection to State Water Project	DWR	EC	HRD
2.53		Jones Pumping Plant	CVO	EC	DMC
20.42L	56.1	San Joaquin River at Mossdale	DWR	EC	MSD
31.31L	77.3	San Joaquin River, Maze Road Bridge	DWR	EC	MRB
42.54L	98.5	San Joaquin River at Patterson	DWR	EC	SJP
70.01		DMC Check 13	CVO	EC	ONI
111.26		DMC Check 20	CVO	EC	DM2
116.48	204.2	DMC Check 21	CVO	EC	DM3

Key:

CDEC: California Data Exchange Center

CVO: Central Valley Operations Office

DWR: California Department of Water Resources

EC: Electrical conductivity

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**Table 3. Water Quality Monitoring Stations**

DMC Milepost	River Mile	Location	Operating Agency	Parameters	Frequency/ method	CDEC
2.53		Jones Pumping Plant	CVO	EC	Real-time	DMC
3.30L		Pump-in from State Water Project	Byron-Bethany ID	EC	Real-time	HRD
4.58		Farm bridge	SLDMWA	EC	TBD/grab*	
19.17		Farm bridge	SLDMWA	EC	TBD/grab*	
20.42L	56.1	Pump-in from San Joaquin River near Mossdale	Banta-Carbona ID	Table 5	Annual	MSD
20.96		Farm bridge	SLDMWA	EC	Real-time	
31.12		Farm bridge	SLDMWA	EC	TBD/grab*	
31.31L	77.3	Pump-in from San Joaquin River near Maze Road	West Stanislaus ID	Table 5	Annual	MRB
31.59		Farm bridge	SLDMWA	EC	Real-time	
41.49		Farm bridge	SLDMWA	EC	TBD/grab*	
42.54L	98.5	Pump-in from San Joaquin River near Patterson	Patterson ID	Table 5	Annual	SJP
43.24		Marshall Road bridge	SLDMWA	EC	Real-time	
70.01		DMC Check 13 O'Neill Forebay	SLDMWA	EC	TBD/grab*	
79.12		Canyon Road bridge	CVO	EC	Real-time	ONI
79.86R		Pump-in from Los Banos Creek	SLDMWA	EC, turbidity	Daily grab**	
80.34		Creek Road bridge	CCID	EC, turbidity	Daily grab**	
			SLDMWA	EC, turbidity	Daily grab**	
111.26		DMC Check 20 (Exchange Contract)	SLDMWA	EC	Daily grab**	
116.48	204.2	DMC Check 21 (terminus at Mendota Pool)	CVO	EC	Real-time	DM2
			CVO	EC	Real-time	DM3

Key:

CCID: Central California Irrigation District

CDEC: California Data Exchange Center

CVO: Central Valley Operations Office

EC: Electrical conductivity

Real-time: Daily averages calculated from in-situ sondes

SLDMWA: San Luis and Delta-Mendota Water Authority

TBD: Frequency to be determined

\* Optional instream sampling as needed

\*\* While floodwater is being pumped into the DMC

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Table 4. Water Quality Standards

Constituent	Units	Maximum Contaminant Level		Detection Limit for Reporting		CAS Registry Number	Recommended Analytical Method
<b>Primary</b>							
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	(12)			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
Cyanide	mg/L	0.15	(1)	0.1	(2)	74-90-8	EPA 335.2-4
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 NO <sub>3</sub> )	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
<b>Secondary</b>							
Chloride	mg/L	250 - 600	(7)			16887-00-6	EPA 300.1
Copper	mg/L	1.0	(6)	0.05	(8)	7440-50-8	EPA 200.7
Iron	mg/L	0.3	(6)			7439-89-6	EPA 200.7
Lead	mg/L	0.015	(9)	0.005	(8)	7439-92-1	EPA 200.8
Manganese	mg/L	0.05	(6)			7439-96-5	EPA 200.7
Molybdenum	mg/L	0.050	(10)			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	900 - 2,200	(7)				SM 2510 B
Sulfate	mg/L	250 - 600	(7)			14808-79-8	EPA 300.1
Total Dissolved Solids	mg/L	500 - 1,500	(7)				SM 2540 C
Zinc	mg/L	5	(6)			7440-66-6	EPA 200.7
<b>Radioactivity</b>							
Gross Alpha	pCi/L	15	(3)	3	(3)		SM 7110C
<b>Organic Chemicals</b>							
2, 4, 5-TP (Silvex)	mg/L	0.05	(4)	0.001	(5)	93-72-1	EPA 515.1-4
2,4-D	mg/L	0.07	(4)	0.01	(5)	94-75-7	EPA 515.1-4
Atrazine	mg/L	0.001	(4)	0.0005	(5)	1912-24-9	EPA 508.1
Bentazon	mg/L	0.018	(4)	0.002	(5)	25057-89-0	EPA 515.1-4
Carbofuran	mg/L	0.018	(4)	0.005	(5)	1563-66-2	EPA 531.1-2
Chlordane	mg/L	0.0001	(4)	0.0001	(5)	57-74-9	EPA 505
Chlorpyrifos	µg/L	0.025	(11)			2921-88-2	EPA 8141
Diazinon	µg/L	0.16	(11)			333-41-5	EPA 507
Dibromochloropropane (DBCP)	mg/L	0.0002	(4)	0.00001	(5)	96-12-8	EPA 504.1
Dinoseb	mg/L	0.007	(4)	0.002	(5)	88-85-7	EPA 515.1-4
Diquat	mg/L	0.02	(4)	0.04	(5)	85-00-7	EPA 549.1-2
Endothall	mg/L	0.1	(4)	0.045	(5)	145-73-3	EPA 548.1
Endrin	mg/L	0.002	(4)	0.0001	(5)	72-20-8	EPA 505
Ethylene Dibromide (EDB)	mg/L	0.00005	(4)	0.00002	(5)	206-93-4	EPA 504.1
Glyphosate	mg/L	0.7	(4)	0.025	(5)	1071-83-6	EPA 547
Heptachlor	mg/L	0.00001	(4)	0.00001	(5)	76-44-8	EPA 505

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**Table 4. Water Quality Standards**

						Recommended
Constituent	Units	Maximum Contaminant Level		Detection Limit for Reporting	CAS Registry Number	Analytical Method
Heptachlor Epoxide	mg/L	0.00001	(4)	0.00001	(5) 1024-57-3	EPA 505
Lindane	mg/L	0.0002	(4)	0.002	(5) 58-89-9	EPA 505
Methoxychlor	mg/L	0.03	(4)	0.01	(5) 72-43-5	EPA 505
Molinate	mg/L	0.02	(4)	0.002	(5) 2212-67-1	EPA 525.2
Oxamyl	mg/L	0.05	(4)	0.02	(5) 23135-22-0	EPA 531.1-2
Pentachlorophenol	mg/L	0.001	(4)	0.0002	(5) 87-86-5	EPA 4010A
Picloram	mg/L	0.5	(4)	0.001	(5) 1918-02-1	EPA 515.1-4
Simazine	mg/L	0.004	(4)	0.001	(5) 122-34-9	EPA 508.1
Thiobencarb	mg/L	0.07	(4)	0.001	(5) 28249-77-6	EPA 525.2
Toxaphene	mg/L	0.003	(4)	0.001	(5) 8001-35-2	EPA 505

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.

[http://www.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/Lawbook.shtml](http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Lawbook.shtml)

- (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 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)

- (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)

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).

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

- (12) Ayers, Table 1 (mg/L) (sodium and boron)
- (13) Ayers, Table 16 (mg/L) (boron tolerance in sensitive crops)

revised: 30 Dec 2014

# RECLAMATION

*Managing Water in the West*

**Table 5a. Approved Laboratory List for the Mid-Pacific Region**  
**Quality Assurance and Data Management Branch (MP-156)**  
**Environmental Monitoring and Hazardous Materials Branch (MP-157)**

<b>APPL Laboratory</b>	<b><u>Address</u></b>	908 North Temperance Avenue, Clovis, CA 93611
	<b><u>Contact</u></b>	Renee' Patterson, Project Manager
	<b><u>P/F</u></b>	(559) 275-2175 / (559) 275-4422
	<b><u>Email</u></b>	rpatterson@applinc.com; danderson@applinc.com;
	<b><u>Methods</u></b>	Approved for inorganic and organic parameters in water and soil
<b>Applied Speciation and Consulting</b>	<b><u>Address</u></b>	18804 North Creek Parkway Bothell, WA 98011
	<b><u>Contact</u></b>	Russell Gerads
	<b><u>P/F</u></b>	(425) 483-3300
	<b><u>Email</u></b>	russ@appliedspeciation.com
	<b><u>Methods</u></b>	Approved for selenium speciation and mercury speciation in water, solids, and tissue
<b>Basic Laboratory</b>	<b><u>Address</u></b>	2218 Railroad Avenue Redding, CA 96001
	<b><u>Contact</u></b>	Josh Kirkpatrick, Nathan Hawley, Melissa Hawley
	<b><u>P/F</u></b>	(530) 243-7234 / (530) 243-7494
	<b><u>Email</u></b>	jkirkpatrick@basiclab.com (QAO and PM); nhawley@basiclab.com, mhawley@basiclab.com (invoices); poilar@basiclab.com (sample custody), khawley@basiclab.com (sample custody)
	<b><u>Methods</u></b>	Approved for inorganic/organic parameters
<b>California Laboratory Services</b>	<b><u>Address</u></b>	3249 Fitzgerald Road Rancho Cordova, CA 95742
	<b><u>Contact</u></b>	Scott Furnas
	<b><u>P/F</u></b>	(916) 638-7301 / (916) 638-4510
	<b><u>Email</u></b>	janetm@californialab.com (QA); scottf@californialab.com (PM)
	<b><u>Methods</u></b>	Approved for inorganic, organic, and microbiological parameters in water
<b>Calscience Environmental Laboratories</b>	<b><u>Address</u></b>	7440 Lincoln Way; Garden Grove, CA 92841
	<b><u>Contact</u></b>	Don Burley
	<b><u>P/F</u></b>	714-895-5494 (ext. 203)/714-894-7501
	<b><u>Email</u></b>	DBurley@calscience.com
	<b><u>Methods</u></b>	Approved for inorganic and organic parameters in water, sediment, and soil.
<b>Caltest Analytical Laboratory</b>	<b><u>Address</u></b>	1885 N. Kelly Rd. Napa, CA 94558
	<b><u>Contact</u></b>	Eli Greenwald, Patrick Ingram (Lab Director)
	<b><u>P/F</u></b>	(707) 258-4000/(707) 226-1001
	<b><u>Email</u></b>	eli_greenwald@caltestlabs.com; Patrick_Ingram@caltestlabs.com info@caltestlabs.com
	<b><u>Methods</u></b>	Approved for inorganic and microbiological parameters
<b>Eurofins Eaton Analytical, Inc. (formerly MWH Laboratories)</b>	<b><u>Address</u></b>	750 Royal Oaks Drive Ste. 100 Monrovia, CA 91016 USA
	<b><u>Contact</u></b>	Joline Neal
	<b><u>P/F</u></b>	(626) 386-1100, Linda - (626) 386-1163, Rick - (626) 386-1157
	<b><u>Email</u></b>	JolineNeal@eurofinsus.com
	<b><u>Methods</u></b>	Approved for all inorganic, organic, and radiochemistry parameters in water
<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

**Table 5a. Approved Laboratory List for the Mid-Pacific Region**  
**Quality Assurance and Data Management Branch (MP-156)**  
**Environmental Monitoring and Hazardous Materials Branch (MP-157)**

	<b><u>Methods</u></b>	<i>Approved for general physical analysis in soils and most inorganic and organic parameters in water and soil; not approved for mercury in water or silver in soil.</i>
<b>Moore Twining Associates, Inc.</b>	<b><u>Address</u></b>	2527 Fresno St., Fresno, CA 93721 USA
	<b><u>Contact</u></b>	Juli Adams (Lab Director), Maria Manuel (QA Manager)
	<b><u>P/F</u></b>	(559) 268-7021
	<b><u>Email</u></b>	julia@mooretwinning.com, mariam@mooretwinning.com
	<b><u>Methods</u></b>	<i>Approved for BOD analysis.</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 Karen Lantz (Program Manager)
	<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 (except low level TKN), microbiological parameters, acute and chronic toxicity.</i>
<b>South Dakota Agricultural Laboratories</b>	<b><u>Address</u></b>	Brookings Biospace, 1006 32nd Avenue, Suites 103,105, Brookings, SD 57006-4728
	<b><u>Contact</u></b>	Regina Wixon, Jessie Davis, Steven Hauger (sample custodian)
	<b><u>P/F</u></b>	(605) 692-7325/(605) 692-7326
	<b><u>Email</u></b>	regina.wixon@sdaglabs.com, annie.mouw@sdaglabs.com, emily.weissenfluh@sdaglabs.com, darin.wixon@sdaglabs.com
	<b><u>Methods</u></b>	<i>Approved for selenium analysis</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>	Kurt Clarkson/Logan Greenwood (Client Services), Andy Smith (Lab Director)
	<b><u>P/F</u></b>	(775) 355-0202 / (775) 355-0817
	<b><u>Email</u></b>	kurtc@wetlaboratory.com, logang@wetlaboratory.com, andy@wetlaboratory.com
	<b><u>Methods</u></b>	<i>Approved for inorganic parameters (metals, general chemistry) and coliforms.</i>

Revised: 04 Nov 2014

**Table 5b. Approved Laboratory Matrix for the Mid-Pacific Region**  
**Quality Assurance and Data Management Branch (MP-156)**  
**Environmental Monitoring and Hazardous Materials Branch (MP-157)**

Laboratory	Water					Sediment/Soil				Tissue/Vegetation	
	Inorganic	Organic	Micro-biological	Radio-chemistry	Toxicity	Inorganic	Organic	General physical	Toxicity	Inorganics	Organics
APPL Laboratory	X	X				X	X				
Applied Speciation and Consulting	X*	X*				X*	X*			X*	X*
Basic Laboratory	X	X				X	X				
California Laboratory Services	X	X	X								
Calscience Environmental Laboratories	X	X				X	X				
Caltest Analytical Laboratory	X		X								
Eurofins Eaton Analytical, Inc. (formerly MWH Laboratories)	X	X		X							
Fruit Growers Laboratory	X (not for mercury)	X				X (not for silver)	X	X			
Moore Twining Associates	BOD										
Sierra Foothill Laboratory, Inc.	X (not for TKN)		X		X				X		
South Dakota Agricultural Laboratories	selenium					selenium				selenium	
TestAmerica	X	X				X	X				
Western Environmental Testing Laboratories	X		X								

**Delta-Mendota Canal  
Non-Project Surface Water Pump-in Program  
2015 Water Quality Monitoring Plan**

**Table 6. Parameters for Accepting Non-Project Surface Water in the DMC**

Parameter	Values in the DMC
<b>Upper DMC between Jones PP and Check 13</b>	
Minimum dilution flow from Jones PP	More than 500 cfs
Specific conductance (EC)* at Check 13	Not to exceed 1,000 µS/cm
Increase in Conductance*	Less than 50 µS/cm
<b>Lower DMC between Check 13 and Check 20</b>	
Minimum dilution flow passing Check 13	More than 500 cfs
Specific conductance (EC)* at Check 20	Not to exceed 1,200 µS/cm
Increase in Conductance*	Less than 50 µS/cm

\* Duration of five consecutive days or more



## **Appendix B**

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### Reclamation's Cultural Resources Determination

**CULTURAL RESOURCES COMPLIANCE**  
**Division of Environmental Affairs**  
**Cultural Resources Branch (MP-153)**

**MP-153 Tracking Number:** 15-SCAO-190

**Project Name:** 2015 Temporary Change in Water Quality Requirements for Groundwater Introduced into the Upper Portion of the Delta-Mendota Canal (DMC)

**NEPA Document:** EA-15-040

**NEPA Contact:** Rain Emerson, Natural Resource Specialist

**MP 153 Cultural Resources Reviewer:** Scott Williams, Archaeologist 

**Date:** July 1, 2015

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Reclamation proposes to temporarily change the maximum acceptable concentration of selenium for groundwater introduced into the upper portion of the DMC. This is the type of undertaking that does not have the potential to cause effects to historic properties, should such properties be present, pursuant to the NHPA Section 106 regulations codified at 36 CFR § 800.3(a)(1). Reclamation has no further obligations under NHPA Section 106, pursuant to 36 CFR § 800.3(a)(1).

Reclamation proposes to temporarily change the maximum acceptable concentration of selenium measured at the well head from 2 ppb to 5 ppb for groundwater introduced into the upper portion of the DMC. The change is only in effect through August 30, 2015. The selenium maximum concentration for wells in the lower portion of the DMC is unchanged. No land conversions may occur and no construction or other ground disturbing activity may occur as part of the Proposed Action. After reviewing documentation provided within EA-15-040, Reclamation has concluded this action would not have significant impacts on properties listed, or eligible for listing, on the National Register of Historic Places. This document serves as notification that Section 106 compliance has been completed for this undertaking. Please note that if project activities subsequently change, additional NHPA Section 106 review, including further consultation with the SHPO, may be required.

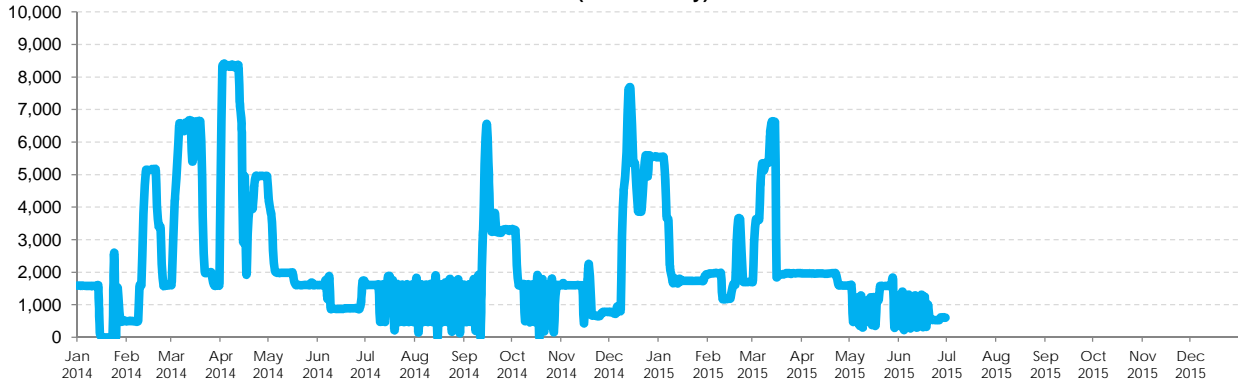
This document is intended to convey the completion of the NHPA Section 106 process for this undertaking. Please retain a copy in the administrative record for this action. Should changes be made to this project, additional NHPA Section 106 review, possibly including consultation with the State Historic Preservation Officer, may be necessary. Thank you for providing the opportunity to comment.

## **Appendix C**

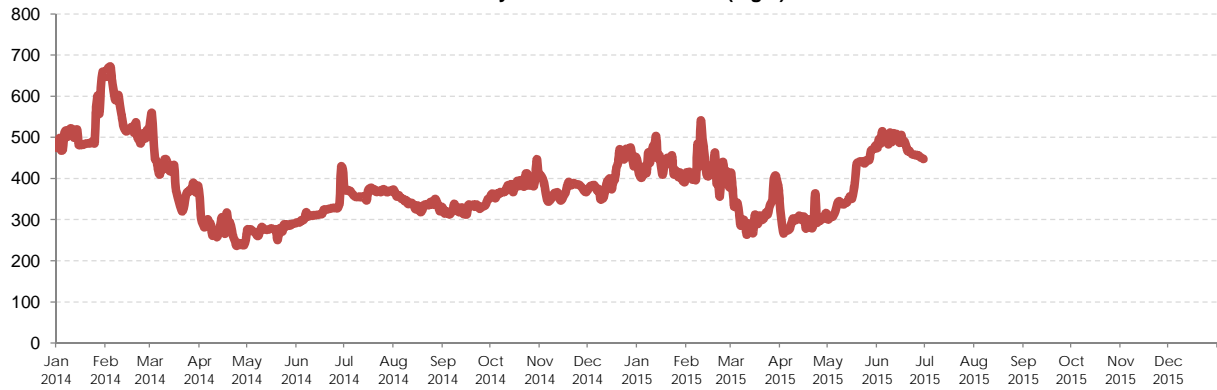
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### **2014-2015 Water Quality Results for the Delta-Mendota Canal (Headworks and Check 13)**

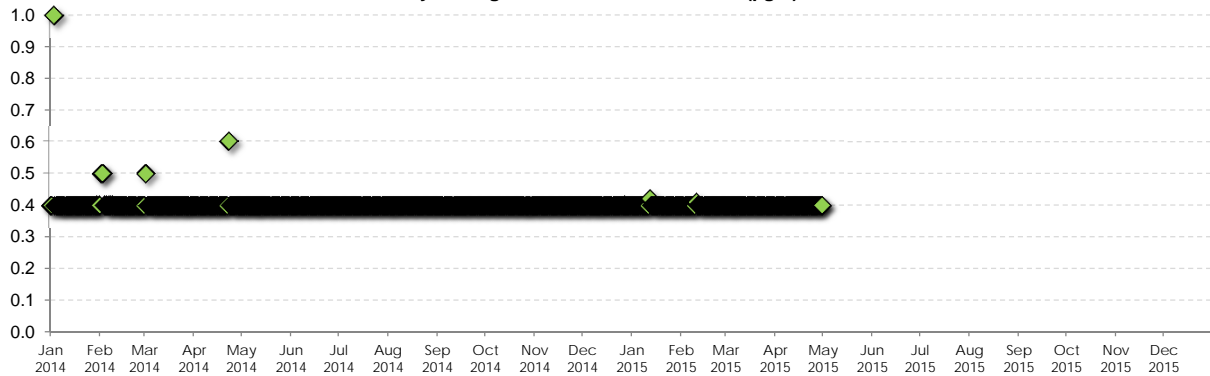
**Figure 1a. DMC Headworks  
Flow (acre-feet/day)**



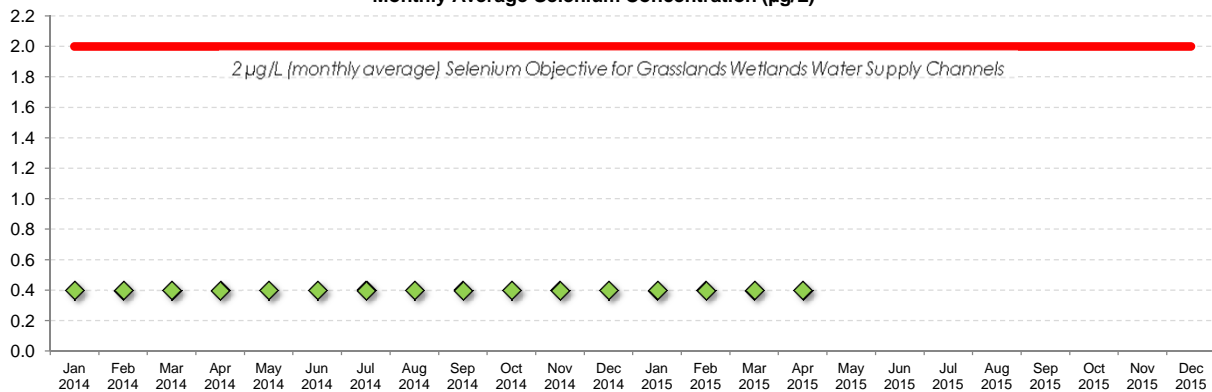
**Figure 1b. DMC Headworks  
Mean Daily Total Dissolved Solids (mg/L)**



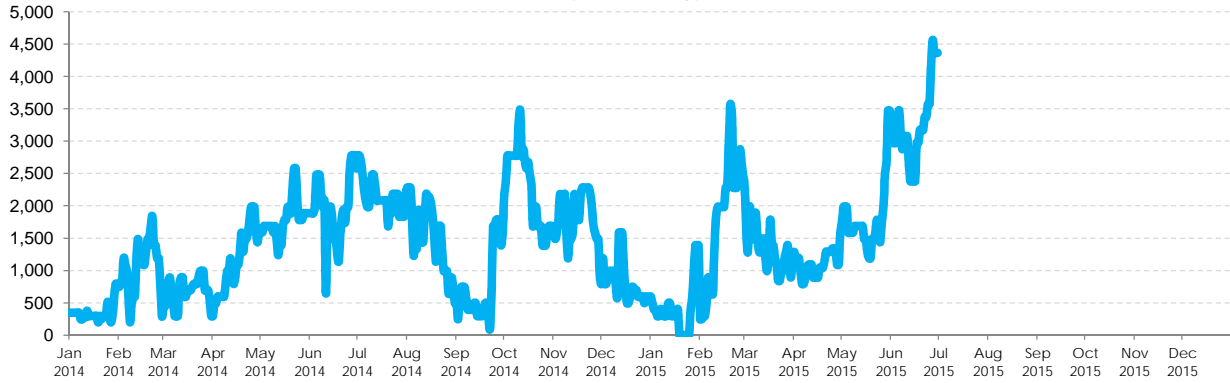
**Figure 1c. DMC Headworks  
Daily Average Selenium Concentration (µg/L)**



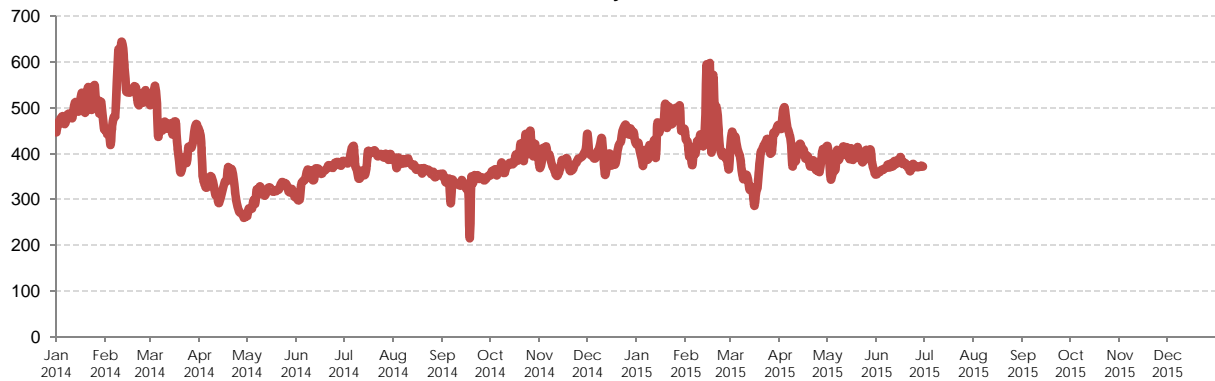
**Figure 1d. DMC Headworks  
Monthly Average Selenium Concentration (µg/L)**



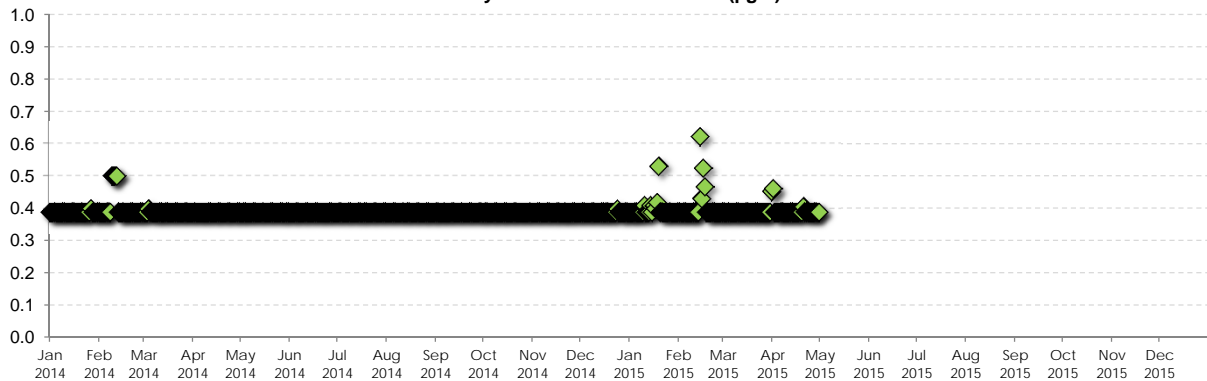
**Figure 2a. DMC Check 13  
Flow (acre-feet/day)**



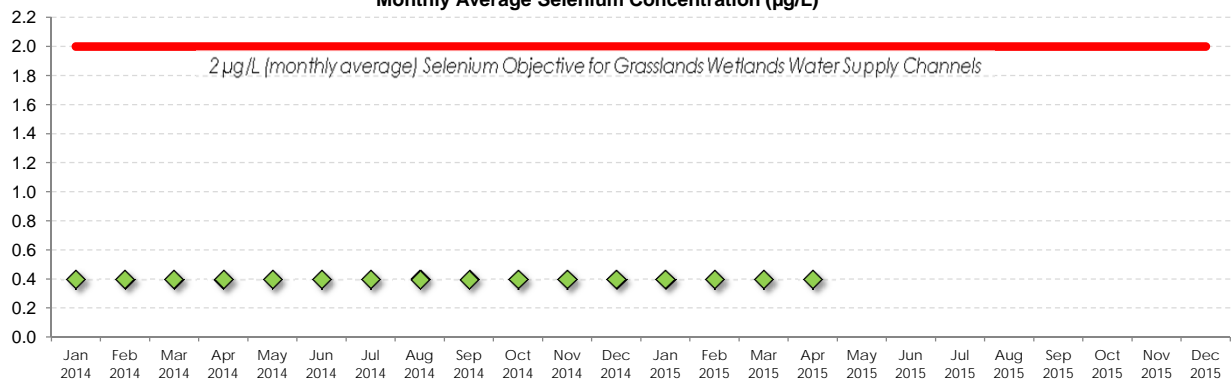
**Figure 2b. DMC Check 13  
Mean Daily TDS**



**Figure 2c. DMC Check 13  
Mean Daily Selenium Concentration (µg/L)**



**Figure 2d. DMC Check 13  
Monthly Average Selenium Concentration (µg/L)**



# Delta-Mendota Canal Water Quality Monitoring Program

April - June 2015

**Table 7a. Summary of the monthly average selenium concentrations (flow-weighted)**

Sample Site:	DMC Near Headworks	DMC Check 13	Firebaugh Sumps	DMC Bass Ave	CCID Main Canal
DMC Milepost:	MP-3.50	MP-70.01	MP 100.86 - 109.50	MP-116.48	Bass Ave
Units:	µg/L	µg/L	µg/L	µg/L	µg/L
January 2014	<0.4	<0.4	180	1.9	<0.4
February 2014	<0.4	<0.4	185	1.0	0.8
March 2014	<0.4	<0.4	194	1.3	1.2
April 2014	<0.4	<0.4	210	0.8	0.8
May 2014	<0.4	<0.4	178	0.5	0.4
June 2014	<0.4	<0.4	185	0.5	<0.4
July 2014	<0.4	<0.4	157	0.4	<0.4
August 2014	<0.4	<0.4	182	0.5	<0.4
September 2014	<0.4	<0.4	178	0.8	<0.4
October 2014	<0.4	<0.4	111	<0.4	<0.4
November 2014	<0.4	<0.4	88	<0.4	<0.4
December 2014	<0.4	<0.4	105	<0.4	<0.4
January 2015	<0.4	<0.4	113	0.6	0.7
February 2015	<0.4	<0.4	111	<0.4	0.4
March 2015	<0.4	<0.4	104	0.5	0.5
April 2015	<0.4	<0.4	102	0.4	0.5
May 2015			77		
June 2015					
July 2015					
August 2015					
September 2015					
October 2015					
November 2015					
December 2015					

Data Source: US Bureau of Reclamation, MP-157, Sacramento, California

Summary of USBR data: July 2002 to present

Sample Site:	DMC Near Headworks	DMC Check 13	Firebaugh Sumps	DMC Bass Ave	CCID Main Canal
DMC Milepost:	MP-3.50	MP-70.01	MP 100.86 - 109.50	MP-116.48	Bass Ave
Units:	µg/L	µg/L	µg/L	µg/L	µg/L
Maximum	1.0	1.0	314	8.4	2.7
Minimum	<0.4	<0.4	77	<0.4	<0.4
Median	<0.4	<0.4	183	0.7	0.4
Average	<0.4	<0.4	189	1.1	0.6
Number of samples	153	153	156	151	149