RECLAMATION
*Managing Water in the West*

**Draft FINDING OF NO SIGNIFICANT IMPACT**

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

## FONSI-14-031

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**U.S. Department of the Interior**
**Bureau of Reclamation**
**South-Central California Area Office**

**July 2014**

# Introduction

In accordance with section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969, as amended, the South-Central California Area Office of the Bureau of Reclamation (Reclamation), has determined that an environmental impact statement (EIS) 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, 2014. This Finding of No Significant Impact (FONSI) is supported by Reclamation's Environmental Assessment (EA)-14-031, *Temporary Change in Water Quality Requirements for Groundwater Introduced into the Upper Portion of the Delta-Mendota Canal*, and is hereby incorporated by reference.

The State of California is currently experiencing unprecedented water management challenges due to three consecutive years of drought. Both the State and Federal water projects are forecasting very low storage conditions in all major reservoirs. In addition, South-of-Delta Central Valley Project (CVP) contractors experienced reduced water supply allocations from 2007 to 2013 due to hydrologic conditions and regulatory requirements. Based on hydrologic conditions, Reclamation declared an allocation of 0 percent for South-of-Delta CVP agricultural contractors for the 2014 Contract Year. As a result, CVP contractors have a need to find alternative sources of water to fulfill demands.

## Background

In 2012, the San Luis & Delta-Mendota Water Authority (SLDMWA), on behalf of eight of its member agencies, requested approval from Reclamation to pump groundwater into the DMC for storage and conveyance to South-of-Delta CVP contractors over a 10-year period (referred to as the DMC Groundwater Pump-in Program). Reclamation analyzed the 10-year 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 acre-feet (AF) per year of groundwater would not significantly affect the quality of the human environment and a FONSI was executed on January 10, 2013.

All wells that participate in the DMC Groundwater Pump-in Program are required to meet the Reclamation's water quality requirements specifically described in Reclamation's *Delta-Mendota Canal Pump-in Program Water Quality Monitoring Plan* (see Appendix A in EA-14-031). As described in this plan, all wells are required to be tested and meet water quality requirements prior to introduction to the DMC. The current 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).

Reclamation measures selenium in the DMC at the headworks, Check 13 (Santa Nella) and Check 21 (terminus at Mendota Pool) using autosamplers to get daily composite samples. Real-time measurements of salinity are also made with sondes at these locations. Reclamation has received analytical results for 66 wells located along the upper portion of the DMC (between milepost [MP] 3.50 and MP 68.03) that want to participate in the DMC Groundwater Pump-in Program in 2014. Of these, 32 meet the current criteria (less than 2 ppb selenium) and 14 have between 2 and 5 ppb selenium concentrations. In order to provide additional water in the DMC during this critically dry year, SLDMWA has requested a temporary change in the criteria for selenium to allow these 14 wells to pump into the upper portion of the DMC.

## Proposed Action

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, 2014. The selenium maximum concentration for wells in the lower portion of the DMC is unchanged.

The temporary change would allow an additional 14 wells (see Table 2-1 in EA-14-031) to cumulatively pump up to 33 cubic feet per second (cfs) of groundwater into the upper portion of the DMC (see Figure 2-1 in EA-14-031) under the previously approved DMC Groundwater Pump-in Program. This would provide approximately 65.34 AF per day (33 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. Introductions would only occur prior to the fall delivery season for refuges as agreed to by the California Department of Fish and Wildlife (CDFW) and Grasslands Water District.

### 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 SLDMWA to shut off the most saline wells if those wells are causing the salinity of water in the DMC to increase above 2,200 $\mu$S/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 SLDMWA 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-14-031, the SLDMWA participating member agencies shall continue to implement the environmental commitments included in Table 2-1 of EA-14-031as required for the DMC Groundwater Pump-in Program.

[1] Equivalent to 1,500 mg/L total dissolved solids

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:

## Findings

### Water Resources

Under the Proposed Action, Reclamation would temporarily change the maximum acceptable concentration of selenium for the 14 wells listed in Table 2-1 of EA-14-031 from 2 ppb to 5 ppb. All 14 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, 2014, would allow up to 2,026 AF/month (65.34 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 D of EA-14-031, daily average selenium concentrations at the DMC headworks ranged from 0.4 ppb to 1.0 ppb (only in January) with the majority ranging from 0.4 to 0.6 ppb between January and July of 2014. For the same time period, daily average selenium concentrations at Check 13 ranged from 0.4 to 0.5 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 14 wells on the baseline concentration of selenium in the DMC (see Table 3-3 in EA-14-031). In addition, Reclamation reviewed recent lab analyses of the 14 wells. The range of selenium is between 2.3 and 4.6 ppb, with a flow-weighted average of 3.5 ppb (see Table 2-1 of EA-14-031). Full mixing of the groundwater from the 14 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 0.29 ppb with the addition of water from the 14 wells (see Table 3-3 of EA-14-031). The effect of the groundwater pump-ins would, therefore, result in water in the DMC remaining well below the 2 ppb selenium concentration requirement.

### Land Use

The addition of up to 65.34 AF per day through August 30, 2014 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.

### Geological Resources

All 14 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.

### Biological Resources

Under the Proposed Action, Reclamation would temporarily approve a change in the maximum acceptable concentration of selenium from 2 ppb to 5 ppb at the well head for the 14 wells listed

in Table 2-1 of EA-14-031. The temporary change, which would only be in effect through August 30, 2014, would allow up to 2,026 AF/month 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. No ground disturbance would occur and there would be no conversion of lands fallowed and untilled for three or more years.

State Wildlife Areas (e.g. refuges) receive water from the DMC via Mendota Pool or the Volta Wasteway; however, the proposed introductions would only occur prior to the fall delivery season for refuges as agreed to by the CDFW and Grasslands Water District (Personal communications from Bill Cook and Andy Gordus to Reclamation).

Because selenium is a bio-accumulative pollutant that is toxic to wildlife, there is potential concern that the temporary change in selenium concentrations could sufficiently elevate the concentration of selenium in the DMC so that wildlife, including listed species (in this case, aquatic/aquatic associated listed animal species and their aquatic prey such as the giant garter snake) could be adversely affected. Dietary uptake is the principal route of toxic exposure to selenium in wildlife, rather than from direct exposure to selenium in the water. However, as described in Section 3.1.2 of EA-14-031, baseline selenium concentrations are expected to increase to 0.29 ppb (see Table 3-3 in EA-14-031) and would, therefore, be well below the 2 ppb selenium criteria set for the DMC.

Potential effects to giant garter snakes would be expected only if the water quality parameters exceed concentrations or levels identified as toxic or of concern. As described in Section 2.2 of EA-14-031, daily water quality monitoring would be conducted by Reclamation. The requirement that pumping cease if water quality objectives are exceeded would avoid adverse effects to species. A brief "lag time" between detection of the exceedance (and the resultant shutting down of pumps) and the subsequent reduction in selenium concentrations would be no more than a day or two and would not cause any measurable effect because of the extremely short duration before the water quality standards are returned to background levels.

Based on the discussion above, 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.). Therefore, no consultation with the U.S. Fish and Wildlife Service or National Marine Fisheries Service is necessary. Reclamation has also determined that the Proposed Action would have no take of birds protected by the Migratory Bird Treaty Act, based on the lack of construction and the implementation of stringent water quality standards.

## 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 of EA-14-031 for Reclamation's determination.

### Indian Sacred Sites
The Proposed Action will 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. See Appendix C of EA-14-031 for Reclamation's determination.

### Socioeconomic Resources
The Proposed Action would have beneficial impacts on socioeconomic resources for Delta Division contractors as the additional groundwater would be used to help sustain existing crops and maintain farming within the districts.

### 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.

### Air Quality
The pumping of wells for the DMC Groundwater Pump-in Program was previously analyzed in DMC Groundwater Pump-in EA (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 *de minimis* 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.

### Global Climate and Energy Use
The pumping of wells for the DMC Groundwater Pump-in Program was previously analyzed in the DMC Groundwater Pump-in EA (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 *de minimis* thresholds for the Environmental Protection Agency. As such, there would be no additional impacts beyond those previously covered. Global climate change is expected to have some effect on the snow pack of the Sierra Nevada and the runoff regime. Current data are not yet clear on the hydrologic changes and how they will affect the San Joaquin Valley. CVP water allocations are made dependent on hydrologic conditions and environmental requirements. Since Reclamation operations and allocations are flexible, any changes in hydrologic conditions due to global climate change would be addressed within Reclamation's operation flexibility.

### Cumulative Impacts
As the Proposed Action is not expected to result in any additional direct or indirect adverse impacts to land use, geological resources, biological resources, cultural resources, Indian Sacred Sites, Indian Trust Assets, socioeconomics, minority or disadvantaged populations, air quality or global climate and energy use beyond those previously considered for the DMC Groundwater Pump-in Program, there would be no cumulative adverse impacts to these resources.

As shown in Table 3-3 in EA-14-031, selenium concentrations in the DMC would increase slightly due to groundwater pump-ins from the 14 wells. However, as selenium concentrations would remain well below the set water quality standard of 2 ppb, no cumulatively adverse water quality impacts would occur.

RECLAMATION

*Managing Water in the West*

**Draft Environmental Assessment**

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

**EA-14-031**

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

**July 2014**

# Mission Statements

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

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

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# Appendices

# Section 1 Introduction

## 1.1 Background

In 2012, the San Luis & Delta-Mendota Water Authority (SLDMWA), on behalf of eight of its member agencies, requested approval from the Bureau of Reclamation (Reclamation) to pump groundwater into the Delta-Mendota Canal (DMC) for storage and conveyance to South-of-Delta Central Valley Project (CVP) contractors over a 10-year period (referred to as the DMC Groundwater Pump-in Program). Reclamation analyzed the 10-year Groundwater Pump-in Program in Environmental Assessment (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 acre-feet (AF) per year of groundwater would not significantly affect the quality of the human environment and a Finding of No Significant Impact (FONSI) was executed on January 10, 2013.

All wells that participate in the DMC Groundwater Pump-in Program are required to meet the Reclamation's water quality requirements specifically described in Reclamation's *Delta-Mendota Canal Pump-in Program Water Quality Monitoring Plan* (Appendix A). As described in this plan, all wells are required to be tested and meet water quality requirements prior to introduction to the DMC. The current 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).

Reclamation measures selenium in the DMC at the headworks, Check 13 (Santa Nella) and Check 21 (terminus at Mendota Pool) using autosamplers to get daily composite samples. Real-time measurements of salinity are also made with sondes at these locations. Reclamation has received analytical results for 66 wells located along the upper portion of the DMC (between milepost [MP] 3.50 and MP 68.03) that want to participate in the DMC Groundwater Pump-in Program in 2014. Of these, 32 meet the current criteria (less than 2 ppb selenium) and 14 have between 2 and 5 ppb selenium concentrations. In order to provide additional water in the DMC during this critically dry year, SLDMWA has requested a temporary change in the criteria for selenium to allow these 14 wells to pump into the upper portion of the DMC.

## 1.2 Need for the Proposed Action

The State of California is currently experiencing unprecedented water management challenges due to three consecutive years of drought. Both the State and Federal water projects are forecasting very low storage conditions in all major reservoirs. In addition, South-of-Delta CVP contractors experienced reduced water supply allocations from 2007 to 2013 due to hydrologic conditions and regulatory requirements. Based on hydrologic conditions, Reclamation declared

an allocation of 0 percent for South-of-Delta CVP agricultural contractors for the 2014 Contract Year. As a result, CVP contractors have a need to find alternative sources of water to fulfill demands.

# 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, 2014. 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 DMC Groundwater Pump-in Program.

## 2.2 Proposed Action

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, 2014. The selenium maximum concentration for wells in the lower portion of the DMC is unchanged.

The temporary change would allow an additional 14 wells (see Table 2-1) to cumulatively pump up to 33 cubic feet per second (cfs) of groundwater into the upper portion of the DMC (Figure 2-1) under the previously approved DMC Groundwater Pump-in Program. This would provide approximately 65.34 AF per day (33 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. Introductions would only occur prior to the fall delivery season for refuges as agreed to by the California Department of Fish and Wildlife (CDFW) and Grasslands Water District.

**Table 2-1 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 | MP 12.69L | 2.5 | 4.0 | 2/21/2014 |
| Del Puerto WD | ARRA 102 | MP 21.25L | 2.0 | 2.8 | 4/2/2014 |
| Del Puerto WD | Brown | MP 21.25L | 2.0 | 3.9 | 4/2/2014 |
| Del Puerto WD | ETS | MP 23.41L | 3.7 | 2.5 | 1/30/2014 |
| Del Puerto WD | Athwal | MP 29.95L | 2.0 | 3.4 | 2/17/2014 |
| Del Puerto WD | Arambal | MP 33.71L | 2.3 | 2.7 | 4/3/2013 |
| Del Puerto WD | RC Capital | MP 35.73L | 2.7 | 2.8 | 1/29/2014 |
| Del Puerto WD | Lara | MP 36.01L | 3.5 | 2.4 | 3/5/2013 |

| District | Well ID | Discharge Point at the DMC | Flow (cfs) | Selenium (ppb) | Recent Water Quality Test |
|---|---|---|---|---|---|
| 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 |
| 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 SLDMWA to shut off the most saline wells if those wells are causing the salinity of water in the DMC to increase above 2,200 $\mu$S/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 SLDMWA 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 SLDMWA participating member agencies shall continue to implement the following environmental commitments as required for the DMC Groundwater Pump-in Program (Table 2-2).

**Table 2-2 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 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 SLDMWA staff |
| | All compliance monitoring data collected by the SLDMWA 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 SLDMWA 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 |

[1] Equivalent to 1,500 mg/L total dissolved solids

| Resource | Protection Measure |
|---|---|
| | 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. |
| 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 permanent crops (orchards, vineyards). |

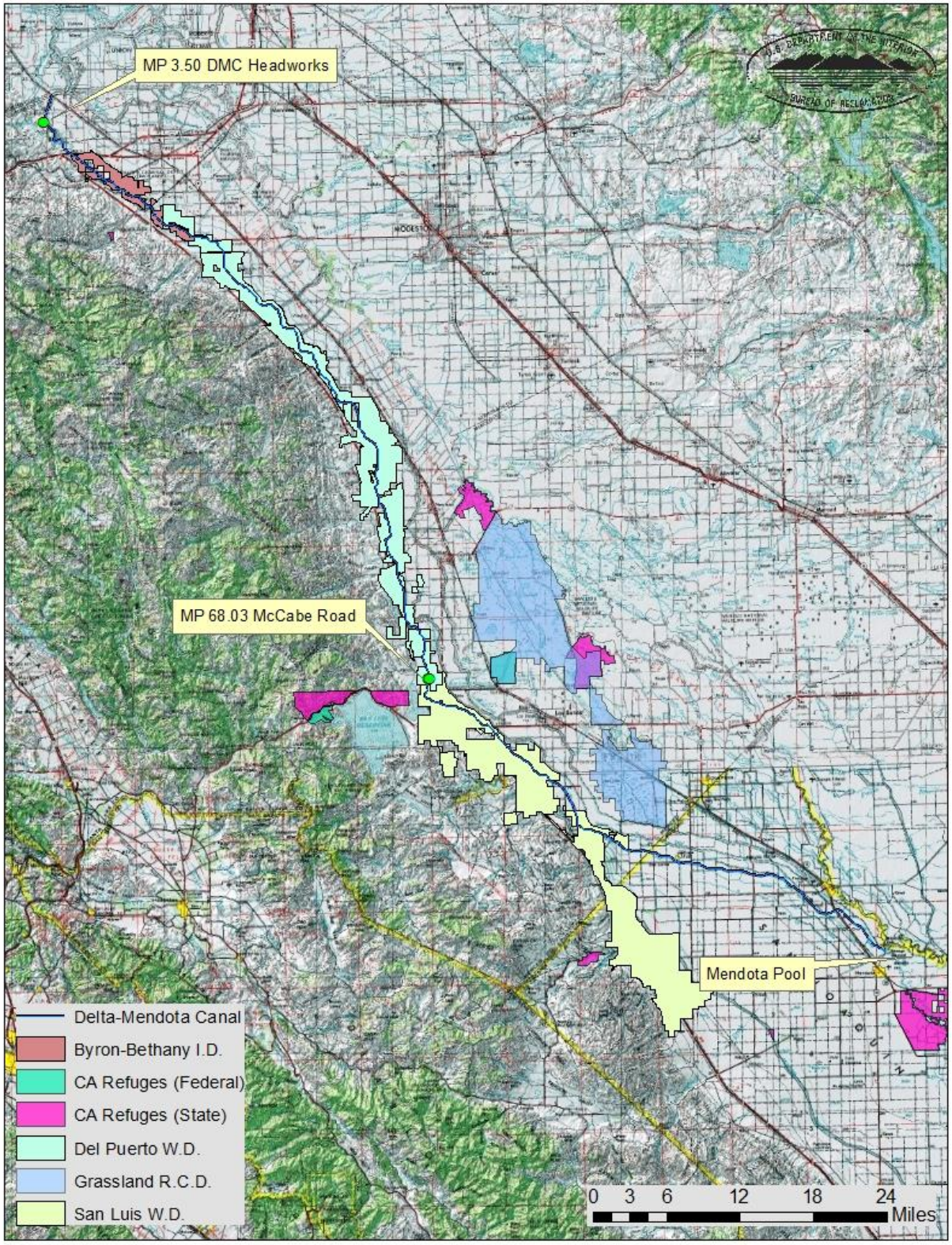


**Figure 2-1 Proposed Action Area**

# Section 3 Affected Environment and Environmental Consequences

The areas in which impacts may occur are shown in Figure 2-1 which are the same as those analyzed in the DMC Groundwater Pump-In Program EA (EA-12-061). The environmental impacts analyzed within Section 3 of EA-12-061 are still valid and adequately assesses the environmental effects from this Proposed Action, which is hereby incorporated by reference. Potential impacts to the following resources were re-considered as a result of this proposal and were still found to be minor. Brief explanations of impacts are provided in Table 3-1.

**Table 3-1 Resources Eliminated from Further Analysis**

| Resource | Reason Eliminated |
|---|---|
| Land Use | The addition of up to 65.34 AF per day through August 30, 2014 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. |
| Geology | All 14 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. |
| 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. |
| 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. See Appendix C for Reclamation's determination. |
| Socioeconomics | The Proposed Action would have beneficial impacts on socioeconomic resources for Delta Division contractors as the additional groundwater would be used to help sustain existing crops and maintain farming within the districts. |
| 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. |
| 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 *de minimis* 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. |
| 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 *de minimis* thresholds for the Environmental Protection Agency. As such, there would be no additional impacts beyond those previously covered. Global climate change is expected to have some effect on the snow pack of the Sierra Nevada and the runoff regime. Current data are not yet clear on the hydrologic changes and how they will affect the San Joaquin Valley. CVP water allocations are made dependent on hydrologic conditions and environmental requirements. Since Reclamation operations and allocations are flexible, any changes in hydrologic conditions due to global climate change would be addressed within Reclamation's operation flexibility. |

# 3.1 Water Resources

## 3.1.1 Affected Environment

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

### *Central Valley Project*

CVP water is used for the irrigation of agricultural areas, for municipal and industrial uses, for the restoration of fisheries and aquatic habitat in the waterways that have been affected by water development, for wildlife refuges, and for other purposes. The largest use of CVP water is for agricultural irrigation. The greatest demand for irrigation water occurs in mid to late summer, as crops mature and crop water use increases. During the winter, farmers in the CVP also use water for frost control, pre-irrigation of fields to saturate the upper soil, and for irrigation when precipitation is insufficient.

The amount of CVP water available each year for contractors is based, among other considerations, on the storage of winter precipitation and the control of spring runoff in the Sacramento and San Joaquin River basins. Reclamation's delivery of CVP water diverted from these rivers is determined by State water right permits, judicial decisions, and State and Federal obligations to prior rights holders, to maintain water quality, to enhance environmental conditions, and to prevent flooding.

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 3-2.

**Table 3-2 Ten Year Average South-of-Delta Agricultural Allocation**

| Contract Year | Agricultural Allocations (%)[1] |
|---|---|
| 2014[2] | 0 |
| 2013 | 20 |
| 2012 | 40 |
| 2011 | 80 |
| 2010 | 45 |
| 2009 | 10 |
| 2008 | 40 |
| 2007 | 50 |
| 2006 | 100 |
| 2005 | 85 |
| **Average** | **47** |

[1]As percentage of Water Service Contract total
[2]Initial 2014 allocation.
Source: http://www.usbr.gov/mp/cvo/vungvari/water_allocations_historical.pdf

**Delta-Mendota Canal** The DMC, the second largest of the CVP waterways, was completed in 1951. It includes a combination of both concrete-lined and earth-lined sections and is about 117 miles in length. The canal transports water from the Jones Pumping Plant to the Mendota Pool,

which is controlled by a concrete storage dam that was constructed in 1917. The Mendota Pool is the terminus for the DMC and is located at the confluence of the San Joaquin River and the North Fork of the Kings River, approximately 30 miles west of the city of Fresno. The DMC is divided into the upper and lower portions. The dividing point is Check 13 near Santa Nella, California. Check 13 is the intake to the O'Neill Forebay and San Luis Reservoir. Capacity in the DMC is restricted by the physical limitations of the canal and the pumping limits of the Jones Pumping Plant.

*Recent Water Quality Results for the DMC* As mentioned previously, Reclamation and SLDMWA continuously monitor water quality within the DMC. Recent water quality results near the headworks of the DMC and Check 13 are included in Appendix D.

### 3.1.2 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 14 wells included in Table 2-1 from 2 ppb to 5 ppb through August 30, 2014. 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 DMC Groundwater Pump-in Program. South-of-Delta CVP contractors would not have an additional supply, up to 65.34 AF/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 14 wells listed in Table 2-1 from 2 ppb to 5 ppb. All 14 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, 2014, would allow up to 2,026 AF/month (65.34 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 D, daily average selenium concentrations at the DMC headworks ranged from 0.4 ppb to 1.0 ppb (only in January) with the majority ranging from 0.4 to 0.6 ppb between January and July of 2014. For the same time period, daily average selenium concentrations at Check 13 ranged from 0.4 to 0.5 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 14 wells on the baseline concentration of selenium in the DMC (see Table 3-3). In addition, Reclamation reviewed recent lab analyses of the 14 wells. The range of selenium is between 2.3 and 4.6 ppb, with a flow-weighted average of 3.5 ppb (see Table 2-1). Full mixing of the groundwater from the 14 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 0.29 ppb with the addition of water from the 14 wells (see Table 3-3). The effect of

the groundwater pump-ins would, therefore, result in water in the DMC remaining well below the 2 ppb selenium concentration requirement.

**Table 3-3 Projected Monthly Contribution of Pump-ins to DMC Selenium Concentrations**

| | Number of wells | Flow (cfs) | Selenium concentration** (ppb) | Total Dissolved Solids ** (mg/L) |
|---|---|---|---|---|
| Baseline (DMC headworks)* | | 572 | <0.4 | 415 |
| Approved wells (less than 2 ppb selenium) | 29 | 59 | 2.1 | 722 |
| Proposed wells (2 – 5 ppb selenium) | 14 | 35 | 3.2 | 830 |
| Blend of all wells and canal | | 667 | 0.69 | 464 |
| Predicted change in the canal | | | 0.29 | 49 |
| 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 3-3, selenium concentrations in the DMC would temporarily increase slightly due to groundwater pump-ins from the 14 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.

## 3.2 Biological Resources

### 3.2.1 Affected Environment

Reclamation requested a list of endangered, threatened, and sensitive species from the U.S. Fish and Wildlife Service (USFWS) on May 9, 2014 via the Sacramento Field Office's website: http://www.fws.gov/sacramento/ES_Species/Lists/es_species_lists-form.cfm (Document Number: 140509093905). The list is for the following U.S. Geological Survey 7½-minute topographic quadrangles which are overlapped by the districts (see Table 2-1) that would pump the 14 wells under the Proposed Action: Broadview Farms, Charleston School, Chounet Ranch, Crows Landing, Dos Palos, Hammonds Ranch, Howard Ranch, Laguna Seca Ranch, Los Banos, Los Banos Valley, Newman, Orestimba Peak, Ortigalita Peak NW, Oxalis, Patterson, San Luis Dam, Solyo, Tracy, Vernalis, Volta, and Westley. Reclamation also queried the California Natural Diversity Database (CNDDB), and combined the USFWS and CNDDB information with information in Reclamation's files to create Table 3-4.

**Table 3-4 Threatened and Endangered Species and Critical Habitat that may occur within the Proposed Action Area**

| Species | Status[1] | Habitat | Effects[2] | Occurrence in the Study Area[3] |
|---|---|---|---|---|
| **AMPHIBIANS** | | | | |
| California red-legged frog (*Rana draytonii*) | E, X | Red-legged frogs require aquatic habitat for breeding but also use a variety of other habitat types including riparian and upland areas. Adults often utilize dense, shrubby or emergent vegetation closely associated with deep-water pools with fringes of cattails and dense stands of overhanging vegetation such as willows. | NE | **Present.** Documented as extant within western border of Byron-Bethany ID and Critical Habitat on the Bethany Reservoir State Recreation Area. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |

| Species | Status[1] | Habitat | Effects[2] | Occurrence in the Study Area[3] |
|---|---|---|---|---|
| California tiger salamander, central population (*Ambystoma californiense*) | T | Found primarily in annual grasslands; requires vernal pools for breeding and rodent burrows for refuge. | NE | **Possible.** Suitable breeding habitats in the form of vernal pools and stock ponds occur in the region. Rodent burrows can be common along the fringes of agricultural areas. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| **BIRDS** | | | | |
| Least Bell's vireo (*Vireo bellii pusillus*) | E | Neotropical migrant that nests in parts of California; uses riparian areas with a dense understory and will forage up to 300 feet away in upland areas | NE | **Unlikely.** Has been detected in recent years on the San Joaquin River National Wildlife Refuge west of Modesto. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| **FISH** | | | | |
| Central Valley steelhead (*Oncorhynchus mykiss*) | T | Anadromous species; spawns in cold waters. | NE | **Absent.** No natural waterways within the species' range would be affected by the Proposed Action. |
| Chinook salmon - Central Valley spring-run (*Oncorhynchus tshawytscha*) | T | Anadromous species; spawns in cold waters. | NE | **Absent.** No natural waterways within the species' range would be affected by the Proposed Action. |
| Chinook salmon - Sacramento River winter-run (*Oncorhynchus tshawytscha*) | E | Anadromous species; spawns in cold waters. | NE | **Absent.** No natural waterways within the species' range would be affected by the Proposed Action. |
| Delta smelt (*Hypomesus transpacificus*) | T | Endemic to the Delta. Found in San Joaquin River up to Mossdale in some years and in Sacramento River up to Rio Vista where salinity is 2-7 parts per thousand. | NE | **Absent.** No natural waterways within the species' range would be affected by the Proposed Action. |
| Southern Distinct Population of North American green sturgeon (*Acipenser medirostris*) | T | Anadromous and highly marine-oriented; spawns mainly in Sacramento River. No evidence of occurrence in San Joaquin River system. Juveniles salvaged in South Delta pumping plants in summer. | NE | **Absent.** No natural waterways within the species' range would be affected by the Proposed Action. |
| **INVERTEBRATES** | | | | |

| Species | Status[1] | Habitat | Effects[2] | Occurrence in the Study Area[3] |
|---|---|---|---|---|
| Conservancy fairy shrimp (*Branchinecta conservatio*) | E | Vernal pool habitats. The species is currently known from several disjunct populations: (1) the Vina Plains in Tehama County, south of Chico in Butte County, (2) the Jepson Prairie Preserve and surrounding area in Solano County, (3) Sacramento National Wildlife Refuge in Glenn County, (4) Mapes Ranch west of Modesto, (5) San Luis National Wildlife Refuge, (6) the Haystack Mountain/Yosemite Lake area in Merced County, and (7) two locations on the Los Padres National Forest in Ventura County. | NE | **Possible**. Vernal pool habitats within the study area may support populations of this species. CNDDB records indicate that this species is presumed extant. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| Longhorn fairy shrimp (*Branchinecta longiantenna*) | E, X | Endemic to the eastern margin of the central coast mountains in vernal pools. | NE | **Possible**. Vernal pool habitats within the study area may support populations of this species. CNDDB records indicate that this species is presumed extant. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) | T | Lives in elderberry shrubs of California's Central Valley and Sierra Foothills with stems one inch or greater in diameter at ground level. | NE | **Present**. The host plant for this species is common throughout the region. CNDDB records indicate that this species is presumed extant. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| Vernal pool fairy shrimp (*Branchinecta lynchi*) | T, X | Primarily found in vernal pools, may use other seasonal wetlands. | NE | **Present**. CNDDB records indicate that this species is presumed extant in Stanislaus, Contra Costa, and San Joaquin Counties. A small section of critical habitat occurs in Byron-Bethany ID near the Byron Airport. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| Vernal pool tadpole shrimp (*Lepidurus packardi*) | E | The vernal pool tadpole shrimp is currently distributed across the Central Valley of California and in the San Francisco Bay area. Inhabits highly turbid vernal pools. | NE | **Possible**. Vernal pool habitats within the study area may support populations of this species. CNDDB records indicate that this species is presumed extant. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| **MAMMALS** | | | | |

| Species | Status[1] | Habitat | Effects[2] | Occurrence in the Study Area[3] |
|---|---|---|---|---|
| Fresno kangaroo rat (*Dipodomys nitratoides exilis*) | E | Prefers arid, alkaline plains with sparse vegetation. There are no known populations within the circumscribed historical geographic range in Merced, Madera, and Fresno Counties. | NE | **Absent.** No individuals or habitat in area of impact. |
| Giant kangaroo rat (*Dipodomys ingens*) | E | San Joaquin River Annual grassland on gentle slopes of generally less than $10^{o}$, with friable, sandy-loam soils. However, most remaining populations are on poorer, marginal habitats which include shrub communities on a variety of soil types and on slopes up to about 22°. | NE | **Unlikely.** Some suitable habitats may be present in the southern portion of the study area. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| Riparian brush rabbit (*Sylvilagus bachmani riparius*) | E | Habitat for the riparian brush rabbit consists of riparian communities dominated by willow thickets (*Salix* spp.), California wild rose (*Rosa californica*), Pacific blackberry (*Rubus vitifolius*), wild grape (*Vitis californica*), Douglas' coyote bush (*Baccharis douglasii*) and various grasses. A captive breeding program is in place in certain locations along the San Joaquin River. | NE | **Absent.** Only occurs in Stanislaus and San Joaquin Counties along the Stanislaus and San Joaquin Rivers. |
| Riparian woodrat (*Neotoma fuscipes riparia*) | E | Well-developed riparian habitats along the San Joaquin and Stanislaus Rivers. | NE | **Absent.** Only occurs in Stanislaus and San Joaquin Counties along the Stanislaus and San Joaquin Rivers. |
| San Joaquin kit fox (*Vulpes macrotis mutica*) | E | Annual grasslands or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing, and suitable prey base. | NE | **Present.** CNDDB records indicate that this species is presumed extant in Fresno, Merced, Stanislaus and San Joaquin Counties. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| **PLANTS** | | | | |
| Contra Costa goldfields (*Lasthenia conjugens*) | E, X | Valley and foothill grassland, vernal pools, cismontane woodland. Extirpated from most of its range | NE | **Possible.** Extirpated from area but designated critical habitat located in the northeastern Livermore Valley, and in the vicinity of the Byron airport. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| Large-flowered fiddleneck (*Amsinckia grandiflora*) | E | Cismontane woodland, valley and foothill grassland in various soils. | NE | **Possible**. In undisturbed areas of San Joaquin County. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |

| Species | Status[1] | Habitat | Effects[2] | Occurrence in the Study Area[3] |
|---|---|---|---|---|
| San Joaquin woolly-threads (*Monolopia congdonii*) | E | Chenopod scrub, valley and foothill grasslands. This species is found only in the southern San Joaquin Valley and surrounding hills. It grows on neutral to subalkaline soils. On the San Joaquin Valley floor, it typically is found on sandy or sandy loam soils. | NE | **Possible**. CNDDB records indicate extant populations occur within western foothills of Fresno County. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| **REPTILES** | | | | |
| Alameda whipsnake (*Masticophis lateralis euryxanthus*) | T | Typically found in chaparral and scrub habitats interspersed with other native vegetation types and rock lands. This species is mostly found on south-facing slopes and ravines, with rock outcrops, deep crevices or abundant rodent burrows. | NE | **Possible.** In undisturbed areas of Alameda, Contra Costa, and San Joaquin Counties. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| Blunt-nosed leopard lizard (*Gambelia sila*) | E | Resident of sparsely vegetated alkali and desert scrub habitats in areas of low topographic relief. They seek cover in mammal burrows, under shrubs or structures such as fence posts; they do not excavate their own burrow. | NE | **Present.** Documented as extant within Fresno and Merced County. No construction of new facilities in potential habitat and no conversion of lands from existing uses. |
| Giant garter snake (*Thamnophis gigas*) | T | Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. | NE | **Possible.** Documented as extant within Fresno, Merced and San Joaquin Counties. No construction of new facilities in potential habitat and no conversion of lands from existing uses. All pumped water would comply with water quality requirements, preventing potential impacts to this species. |

1 Status= Listing of Federally special status species, unless otherwise indicated.
E: Listed as Endangered.
T: Listed as Threatened.
X: Critical Habitat
2 Effects =
NE = No Effect determination.
3 Definition Of Occurrence Indicators in Proposed Action Area.
Present: Species observed and suitable habitat present.
Possible: Species reported in area but suitable habitat suboptimal or entirely lacking.
Unlikely: Species recorded in vicinity over 10-years ago but habitat suboptimal or entirely lacking.
Absent: No species records and habitat requirements not met.

### *Special-Status Species and Critical Habitat*

Many of the natural habitats in the Central Valley have been largely replaced by agricultural habitats. The habitats associated with the Proposed Action area are predominately agriculture including pasture, orchard, vineyard, and row crops. The intensive management of agricultural lands, including disking, grazing, crop rotation, and the use of chemicals, has extensively reduced the value of these habitats for wildlife (Reclamation 2013). Other habitats in the Proposed Action area include non-native grassland, valley foothill riparian, alkali desert scrub, ruderal, freshwater emergent wetlands, and water delivery canals. As described in Table 3-4 the following species may occur within the Proposed Action area: giant garter snake, vernal pool

tadpole shrimp, vernal pool fairy shrimp, longhorn fairy shrimp, conservancy fairy shrimp, Valley elderberry longhorn beetle, California tiger salamander, California red-legged frog, Alameda whipsnake, blunt-nosed leopard lizard, riparian woodrat, riparian brush rabbit, giant kangaroo rat, and San Joaquin kit fox.

### 3.2.2 Environmental Consequences

#### *No Action*

Under the No Action Alternative, Reclamation would not allow well water having a selenium concentration from 2 to 5 ppb to be temporarily pumped into the DMC under the existing DMC Groundwater Pump-in Program and there would be no impacts to biological resources since conditions would remain the same as existing conditions.

#### *Proposed Action*

Under the Proposed Action, Reclamation would temporarily approve a change in the maximum acceptable concentration of selenium from 2 ppb to 5 ppb at the well head for the 14 wells listed in Table 2-1. The temporary change, which would only be in effect through August 30, 2014, would allow up to 2,026 AF/month 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. No ground disturbance would occur and there would be no conversion of lands fallowed and untilled for three or more years.

State Wildlife Areas (e.g. refuges) receive water from the DMC via Mendota Pool or the Volta Wasteway; however, the proposed introductions would only occur prior to the fall delivery season for refuges as agreed to by the CDFW and Grasslands Water District (Personal communications from Bill Cook and Andy Gordus to Reclamation).

Because selenium is a bio-accumulative pollutant that is toxic to wildlife (Environmental Protection Agency 2014), there is potential concern that the temporary change in selenium concentrations could sufficiently elevate the concentration of selenium in the DMC so that wildlife, including listed species (in this case, aquatic/aquatic associated listed animal species and their aquatic prey such as the giant garter snake) could be adversely affected. Dietary uptake is the principal route of toxic exposure to selenium in wildlife, rather than from direct exposure to selenium in the water (Beckon et. al. 2003; Environmental Protection Agency 2014). However, as described in Section 3.1.2, baseline selenium concentrations are expected to increase to 0.29 ppb (see Table 3-3) and would, therefore, be well below the 2 ppb selenium criteria set for the DMC.

Potential effects to giant garter snakes would be expected only if the water quality parameters exceed concentrations or levels identified as toxic or of concern (e.g., Central Valley Regional Water Quality Control Board 1998; Reclamation 2005; USFWS and National Marine Fisheries Service 2000; USFWS 2008). As described in Section 2.2, daily water quality monitoring would be conducted by Reclamation. The requirement that pumping cease if water quality objectives are exceeded would avoid adverse effects to species. A brief "lag time" between detection of the exceedance (and the resultant shutting down of pumps) and the subsequent reduction in selenium concentrations would be no more than a day or two and would not cause any measurable effect

because of the extremely short duration before the water quality standards are returned to background levels.

Based on the discussion above, 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.). Therefore, no consultation with the USFWS or National Marine Fisheries Service is necessary. Reclamation has also determined that the Proposed Action would have no take of birds protected by the Migratory Bird Treaty Act, based on the lack of construction and the implementation of stringent water quality standards.

### *Cumulative Impacts*

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

# Section 4 Consultation and Coordination

## 4.1 Public Review Period

Reclamation intends to provide the public with an opportunity to comment on the Draft FONSI and Draft EA during a 10-day public review period.

# Section 5 Preparers and Reviewers

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# Appendix A

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

RECLAMATION

*Managing Water in the West*

# 2014 Delta-Mendota Canal Groundwater Pump-in Program Water Quality Monitoring Plan

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

Revised: 06 Jan 2014

**Mission Statements**

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

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

**List of Abbreviations and Acronyms**

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

# 2014 Delta-Mendota Canal Groundwater Pump-in Program Water Quality Monitoring Plan

## Introduction

The overall supply of Central Valley Project (CVP) water has been reduced by drought and restrictions on pumping from the Sacramento-San Joaquin Delta. Under the Warren Act of 1911, Reclamation may execute temporary contracts to convey non-project water in excess capacity in federal irrigation canals. In 2014, Reclamation proposes to execute temporary contracts with water districts to convey up to 50,000 acre-feet of groundwater in the Delta-Mendota Canal (DMC) subject to the monitoring and reporting requirements outlined in this document. The following districts could potentially participate in this program:

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

This document describes the plan for measuring the changes in the quality of water in the DMC caused by the conveyance of groundwater during 2014, plus changes in groundwater elevation to estimate subsidence. Various agencies will use these data to assess water quality in the DMC, Mendota Pool, and wetlands water supply channels, and physical condition of local groundwater resources.

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

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

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

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

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

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

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

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

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

Reclamation will use these data to assess changes in water quality and groundwater conditions caused by the 2014 Groundwater Pump-in Program, and will implement the terms and conditions of the 2014 Warren Act Contracts, exchange agreements, and the current Letter from the Exchange Contractors to Reclamation (Appendix 1).

**Background**

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

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

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

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

The districts and refuges in the Delta Division use groundwater to supplement their contractual supply from the CVP. These supplies of groundwater are called "Non-Project Water" because they have not been appropriated by the United States for the purposes of the CVP.

The Warren Act of 1911([1]) authorizes Reclamation to execute temporary contracts to impound, store, and carry non-project water in federal irrigation canals when excess capacity is available. Such contracts will be negotiated by Reclamation with Delta Division water districts to allow the introduction of non-project water into the 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 quality of local groundwater is variable and must be measured to confirm that there will be no harm to downstream water users when the non-project water is pumped into the 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 2014, environmental regulations and climate change continue to reduce the supply of surface water for the Central Valley Project. Water managers now must depend on groundwater to supplement a diminished supply of surface water for irrigation. However, continuous pumping of groundwater can quickly reduce local aquifers and can cause irreversible damage to facilities through subsidence.

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

This monitoring plan will ensure that monitoring data will measure any changes in the quality of CVP water in the Delta-Mendota Canal and Mendota Pool, and assess impacts on local aquifers.

**Monitoring Mission and Goals**

The mission of this monitoring plan is to produce physical measurements that will determine the changes in the quality of the water in canal caused by the conveyance of groundwater during 2014. The data will be used to implement the terms of the 2013 Warren Act Contracts and exchange agreements, and to ensure that the quality of CVP water is commensurate with the needs and expectations of water users.

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

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

**Program Goals**

The general goals of monitoring are:

- Evaluate the quality of water in each well, and

- Confirm that the blend of CVP water and groundwater is suitable for domestic, agricultural, and wetlands uses.

- Provide reliable data for regulation of the 2014 DMC Groundwater Pump-in Program to prevent contamination problems

- Provide measurements of groundwater dynamics (depth, recharge) to identify overdraft and subsidence

**Study Area**

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

**Water Quality Standards**

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

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

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

## Water Quality Monitoring Plan

### In-stream Monitoring

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

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

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

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

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

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

**Table 2. Water Quality Monitoring Stations**

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

Key: Reclamation: MP-157 Environmental Monitoring Branch

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

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

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

## Wellhead Monitoring

### Initial Analysis

All districts participating in the 2014 DMC Groundwater Pump-in Program must provide the following information about each well to Reclamation prior to pumping groundwater into the DMC:

- the location of each well, pumping rate, and point of discharge into the DMC;

- complete water quality analyses (Table 5 or 6)[4]

- the depth to groundwater in every well before pumping into the DMC commences.

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

All water samples must be sampled and preserved according to established protocols in correct containers. Analyses should be conducted by laboratories that have been approved by Reclamation, listed in Table 7. Each sample of well water must be sampled and analyzed at the expense of the well owner. Reclamation staff will review the analytical results and notify the District which wells may pump into the DMC in 2014.

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

## Compliance Monitoring

### Daily Salinity

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

### Weekly Monitoring

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

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

### Selenium Monitoring

Based on available funds, Reclamation will continue to measure selenium in the canal and Mendota Pool with autosamplers listed in Table 2. Reclamation may collect random samples of water from various active wells; the cost of these selenium tests will be borne by Reclamation. Based on available funds, Reclamation may also measure boron in the canal and wells.

### Depth to Groundwater

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

### Data Compilation and Review

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

## Water Quality Monitoring Parameters and Data Management

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

## Real-Time Water Quality Monitoring Parameters

The Central Valley Operations Office (CVO) operates four sensors along the DMC that measure salinity and temperature of water. These continuous measurements are posted on the Internet in real-time.

### Salinity

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

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

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

## Sampling For Laboratory Analyses of Water Quality

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

### Constituents

Table 5 and 6 are lists of constituents to be measured at in each well that will pump into the DMC during 2014. Parameters include selenium, mercury, boron, nutrients, and other compounds that cannot be measured with field sensors. Table 7 is a list of laboratories whose sampling and analytical practices have been approved by Reclamation.

### Sampling methods

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

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

**Chain of Custody documentation**

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

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

**Quality Control/ Quality Assurance**

Quality control (QC) is the overall system of technical activities that measure the attributes and performance of a process, item, or service against defined standards to verify that stated requirements are met.

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

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

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

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

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

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

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

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

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

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

**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

In-stream data will be collected by Reclamation. Routine measurements of flow, EC, and depth of groundwater in each well will be collected by the Authority and sent to Reclamation each week.

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

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

**Water Quality Requirements**

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

Reclamation and the Authority will allow groundwater to be pumped into the DMC if such water does not cause the concentration of selenium or salinity in the canal to exceed certain thresholds listed in Tables 4a and 4b.

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

| Constituent | Monitoring Location | Maximum concentration in the DMC |
|---|---|---|
| Selenium | Check 13 | 1 µg/L |
| Specific conductance | Check 13 | 800 µS/cm |
| Increase in Conductance | Between Jones PP and Check 13 | Less than 50 µS/cm |

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

**Table 4b. Maximum Allowable Concentration of Three Constituents in the Lower DMC[5]**

| Constituent | Monitoring Location | Maximum concentration in the DMC |
|---|---|---|
| Selenium | Check 21 | 2 µg/L |
| Specific Conductance | Check 21 | 800 µS/cm |
| Increase in Conductance | Checks 13 – 20 | Not to exceed 50 µS/cm per day for seven consecutive days[6] |
| Minimum flow | Check 21 | 300 cfs |

Reclamation will direct the Authority to contact the Districts to stop pumping groundwater into the lower DMC if any of the parameters listed in Table 4b are exceeded, or if flow is insufficient for dilution.

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

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

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[5] The 2014 Exchange Contractors letter will have further conditions for the lower portion of the canal.
[6] Equivalent to 30 mg/L Total Dissolved Solids

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

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

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

Sources:

Sources:

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

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

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

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

(4) Title 22. Table 64444-A Maximum Contaminate 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

2013 California Drinking Water Regulations: http://www.cdph.ca.gov/certlic/drinkingwater/Pages/Lawbook.aspx

http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Lawbook/dwregulations-2013-07-01.pdf

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

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

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

Sacramento & San Joaquin River Basin Plan 2009

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

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

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

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

Water Quality Standards for Agriculture 1985

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

revised: 06 Jan 2014

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

| Constituent | Units | Maximum Contaminant Level | | CAS Registry Number | Recommended Analytical Method |
|---|---|---|---|---|---|
| Bicarbonate | mg/L | 61 | (5) | 71-52-3 | SM 2320 A |
| Boron | mg/L | 0.7 | (3) | 7440-42-8 | EPA 200.7 |
| Calcium | mg/L | 80 | (5) | 7440-70-2 | EPA 200.5 |
| Chloride | mg/L | 40 | (5) | 189689-94-9 | EPA 300.1 |
| Chlorpyrifos | µg/L | 0.025 | (2) | 2921-88-2 | EPA 8141 |
| Chromium, total | µg/L | 50 | (1) | 7440-47-3 | EPA 200.7 |
| Diazinon | µg/L | 0.16 | (2) | 333-41-5 | EPA 507 |
| Hardness | mg/L | | | | calculated |
| Magnesium | mg/L | 16 | (5) | 7439-95-4 | EPA 200.5 |
| Mercury | µg/L | 2 | (1) | 7439-97-6 | EPA 245.1 |
| Molybdenum | µg/L | 10 | (3) | 7439-98-7 | EPA 200.7 |
| Nickel | µg/L | 100 | (1) | 7440-02-0 | EPA 200.7 |
| Nitrate (as NO3) | mg/L | 45 | (1) | 7727-37-9 | EPA 300.1 |
| Nitrite (as nitrogen) | mg/L | 1 | (1) | 14797-65-0 | EPA 300.1 |
| pH | units | 5.0 - 7.0 | (5) | | EPA 150.1 |
| Potassium | mg/L | 4.5 | (5) | 7440-09-7 | EPA 200.5 |
| SAR | | <2 | (5) | | calculated |
| Selenium | µg/L | 2 | (2) | 7782-49-2 | EPA 200.8 |
| Sodium | mg/L | 69 | (3) | 7440-23-5 | EPA 200.7 |
| Specific Conductance | µS/cm | 1,230 | (4) | | SM 2510 B |
| Sulfate | mg/L | 250 | (1) | 14808-79-8 | EPA 300.1 |
| Total Dissolved Solids | mg/L | 800 | (4) | | SM 2540 C |

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

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

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

(4) Second Amended Contract for Exchange of Waters, No I1r-1144, Article 9. Quality of Substitute Water.

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

revised 06 Jan 2014

RECLAMATION
*Managing Water in the West*

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

| | | |
|---|---|---|
| **APPL Laboratory** | **Address** | 908 North Temperance Avenue, Clovis, CA 93611 |
| | **Contact** | Renee' Patterson, Project Manager |
| | **P/F** | (559) 275-2175 / (559) 275-4422 |
| | **Email** | rpatterson@applinc.com; danderson@applinc.com; |
| | **Methods** | *Approved for inorganic and organic parameters in water and soil* |
| **Basic Laboratory** | **Address** | 2218 Railroad Avenue Redding, CA 96001 USA |
| | **Contact** | Josh Kirkpatrick, Nathan Hawley, Melissa Hawley |
| | **P/F** | (530) 243-7234 / (530) 243-7494 |
| | **Email** | jkirkpatrick@basiclab.com (QAO and PM); nhawley@basiclab.com, mhawley@basiclab.com (invoices); poilar@basiclab.com (sample custody), khawley@basiclab.com (sample custody) |
| | **Methods** | *Approved for inorganic/organic parameters* |
| **California Laboratory Services** | **Address** | 3249 Fitzgerald Road Rancho Cordova, CA 95742 |
| | **Contact** | Scott Furnas |
| | **P/F** | (916) 638-7301 / (916) 638-4510 |
| | **Email** | janetm@californialab.com (QA); scottf@californialab.com (PM) |
| | **Methods** | *Approved for inorganic, organic, and microbiological parameters* |
| **Calscience Environmental Laboratories** | **Address** | 7440 Lincoln Way; Garden Grove, CA 92841 |
| | **Contact** | Don Burley |
| | **P/F** | 714-895-5494 (ext. 203)/714-894-7501 |
| | **Email** | DBurley@calscience.com |
| | **Methods** | *Approved for inorganic and organic parameters in water, sediment, and soil.* |
| **Caltest Analytical Laboratory** | **Address** | 1885 N. Kelly Rd. Napa, CA 94558 |
| | **Contact** | Mike Hamilton, Patrick Ingram (Lab Director) |
| | **P/F** | (707) 258-4000/(707) 226-1001 |
| | **Email** | Mike_Hamilton@caltestlabs.com; Patrick_Ingram@caltestlabs.com info@caltestlabs.com |
| | **Methods** | *Approved for inorganic and microbiological parameters* |
| **Dept. of Fish & Game - WPCL** | **Address** | 2005 Nimbus Road Rancho Cordova, CA 95670 USA |
| | **Contact** | David B. Crane - Laboratory Director, Patty Bucknell - Inorganic Chemist (916) 358-4398<br>Gail Chow - QA Manager + re-analysis requests (916) 358-2840 |
| | **P/F** | (916) 358-2858 / (916) 985-4301, Sample Receiving: (916) 358-0319 Scott or Mary |
| | **Email** | dcrane@ospr.dfg.ca.gov; pbucknell@ospr.dfg.ca.gov; gcho@ospr.dfg.ca.gov |
| | **Methods** | *Approved only for metals analysis in tissue, organics pending* |

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

| | | |
|---|---|---|
| **Eurofins Eaton Analytical, Inc. (formerly MWH Laboratories)** | **Address** | 750 Royal Oaks Drive Ste. 100 Monrovia, CA 91016 USA |
| | **Contact** | Linda Geddes (Project Manager), Rick Zimmer (quotes) |
| | **P/F** | (626) 386-1100, Linda - (626) 386-1163, Rick - (626) 386-1157 |
| | **Email** | lindageddes@eurofinsus.com |
| | **Methods** | *Approved for all inorganic, organic, and radiochemistry parameters in water* |
| **Fruit Growers Laboratory** | **Address** | 853 Corporation Street Santa Paula, CA 93060 USA |
| | **Contact** | David Terz, QA Director |
| | **P/F** | (805) 392-2024 / (805) 525-4172 |
| | **Email** | davidt@fglinc.com |
| | **Methods** | *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.* |
| **Sierra Foothill Laboratory, Inc.** | **Address** | 255 Scottsville Blvd, Jackson, CA 95642 |
| | **Contact** | Sandy Nurse (Owner) or Karen Lantz (Program Manager) |
| | **P/F** | (209) 223-2800 / (209) 223-2747 |
| | **Email** | sandy@sierrafoothilllab.com, CC: dale@sierrafoothilllab.com |
| | **Methods** | *Approved for all inorganic parameters (except low level TKN), microbiological parameters, acute and chronic toxicity.* |
| **South Dakota Agricultural Laboratories** | **Address** | Brookings Biospace, 1006 32nd Avenue, Suites 103,105, Brookings, SD 57006-4728 |
| | **Contact** | Regina Wixon, Jessie Davis, Steven Hauger (sample custodian) |
| | **P/F** | (605) 692-7325/(605) 692-7326 |
| | **Email** | regina.wixon@sdaglabs.com, annie.mouw@sdaglabs.com, emily.weissenfluh@sdaglabs.com, darin.wixon@sdaglabs.com |
| | **Methods** | *Approved for selenium analysis* |
| **TestAmerica** | **Address** | 880 Riverside Parkway West Sacramento, CA 95605 USA |
| | **Contact** | Linda Laver |
| | **P/F** | (916) 374-4362 / (916) 372-1059 fax |
| | **Email** | Linda.Laver@TestAmericaInc.com |
| | **Methods** | *Approved for all inorganic parameters and hazardous waste organics. Ag analysis in sediment, when known quantity is present, request 6010B* |
| **Western Environmental Testing Laboratories** | **Address** | 475 East Greg Street # 119 Sparks, NV 89431 USA |
| | **Contact** | Kurt Clarkson/Logan Greenwood (Client Services), Andy Smith (Lab Drctr) |
| | **P/F** | (775) 355-0202 / (775) 355-0817 |
| | **Email** | kurtc@wetlaboratory.com, logang@wetlaboratory.com, andy@wetlaboratory.com |
| | **Methods** | *Approved for inorganic parameters (metals, general chemistry) and coliforms.* |

Revised: 09 Dec 2013

**Table 7b. Approved Laboratory Matrix for the Mid-Pacific Region Environmental Monitoring 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 | | | | |
| Basic Laboratory | X | X | | | | X | X | | | | |
| California Laboratory Services | X | X | X | | | X | X | | | | |
| Calscience Environmental Laboratories | X | X | | | | X | X | | | | |
| Caltest Analytical Laboratory | X | | X | | | | | | | | |
| Dept. of Fish & Game - WPCL | | pending | | | | X | pending | | | X | pending |
| Eurofins Eaton Analytical, Inc. (formerly MWH Laboratories) | X | X | | X | | | | | | | |
| Fruit Growers Laboratory | X (not for mercury) | X | | | | X (not for silver) | X | X | | | |
| 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 | | | | | | | | |

revised: 11 Dec 2013

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

| DMC Milepost | Max | Min | Average | Median | Recent | Last measure | Count |
|---|---|---|---|---|---|---|---|
| 12.37L | 327.8 | 164.2 | 228.7 | 223.0 | 210.7 | Dec-12 | 59 |
| 12.69L | 244.8 | 201.4 | 221.9 | 219.7 | 209.0 | Dec-12 | 59 |
| 12.75R | 295.0 | 212.0 | 248.7 | 252.0 | 239.7 | Dec-12 | 58 |
| 13.31L | 275.8 | 201.4 | 226.1 | 222.0 | 209.9 | Dec-12 | 58 |
| 14.26R | 268.5 | 218.4 | 237.9 | 237.0 | 227.2 | Dec-12 | 58 |
| 15.11R | 264.0 | 200.0 | 240.7 | 241.5 | 233.5 | Dec-12 | 59 |
| 21.25L | 169.5 | 106.0 | 125.4 | 117.5 | 142.3 | Dec-12 | 57 |
| 21.86L | 130.0 | 89.6 | 108.9 | 109.0 | 114.0 | Dec-12 | 59 |
| 22.77R | 170.0 | 39.2 | 135.0 | 135.1 | 137.6 | Dec-12 | 59 |
| 23.41L | 254.0 | 141.0 | 189.7 | 185.0 | 168.1 | Dec-12 | 59 |
| 30.43R | 169.8 | 121.8 | 145.7 | 147.2 | 149.8 | Dec-12 | 59 |
| 30.43L | 191.0 | 102.0 | 127.7 | 124.7 | 191.0 | Jun-12 | 59 |
| 31.60L | 277.0 | 110.1 | 203.9 | 231.0 | 135.6 | Dec-12 | 59 |
| 33.71L | 198.6 | 130.9 | 162.3 | 165.2 | 139.2 | Dec-12 | 59 |
| 35.73R | 287.0 | 146.8 | 165.8 | 164.0 | 174.5 | Dec-12 | 59 |
| 36.01L | 290.0 | 137.2 | 201.3 | 181.2 | 181.2 | Dec-12 | 57 |
| 36.80L | 204.0 | 111.0 | 154.8 | 154.3 | 154.3 | Dec-12 | 58 |
| 37.10L | 277.0 | 158.0 | 191.3 | 189.5 | 173.7 | Dec-12 | 58 |
| 37.32L | 200.0 | 150.8 | 165.3 | 162.0 | 164.0 | Mar-10 | 58 |
| 37.58L | 170.0 | 127.8 | 145.9 | 142.7 | 146.0 | Sep-11 | 58 |
| 45.78R | 127.2 | 83.0 | 101.1 | 97.5 | 107.8 | Dec-12 | 58 |
| 48.97L | 130.0 | 71.0 | 96.1 | 94.0 | 71.0 | Mar-10 | 49 |
| 48.96LNEW | 96.0 | 88.0 | 93.3 | 96.0 | 96.0 | Jun-10 | 6 |
| 48.97L | 101.0 | 101.0 | 101.0 | 101.0 | 101.0 | Mar-11 | 10 |
| 51.66L | 150.4 | 86.4 | 109.8 | 108.5 | 110.8 | Dec-12 | 58 |
| 58.28L | 69.0 | 27.0 | 45.3 | 43.3 | 59.9 | Mar-12 | 57 |
| 60.06R | 95.0 | 37.6 | 68.3 | 69.0 | 78.2 | Dec-12 | 57 |
| 66.71L | 54.0 | 19.8 | 37.1 | 38.0 | 43.5 | Dec-12 | 57 |
| 78.31L | 49.3 | 21.9 | 29.7 | 28.0 | 38.8 | Dec-12 | 66 |
| 79.13R | 111.8 | 57.8 | 82.4 | 86.2 | 81.7 | Dec-12 | 66 |
| 79.13L | 132.1 | 63.3 | 92.6 | 90.7 | 132.1 | Dec-12 | 14 |
| 79.60L | 83.2 | 52.9 | 65.2 | 62.3 | 59.6 | Mar-11 | 66 |
| 80.03L | 80.0 | 16.0 | 36.2 | 35.8 | 44.5 | Dec-12 | 66 |
| 80.03R | 143.5 | 73.0 | 105.7 | 107.0 | 94.9 | Dec-12 | 15 |
| 80.62R | 100.2 | 47.8 | 62.7 | 61.0 | 80.0 | Dec-12 | 66 |
| 80.62L | 69.0 | 19.4 | 44.0 | 43.6 | 51.1 | Dec-12 | 66 |
| 81.08-R | 72.5 | 55.1 | 60.8 | 58.7 | 58.7 | Dec-12 | 14 |
| 83.08-R | 64.9 | 37.6 | 46.8 | 44.1 | 46.5 | Dec-12 | 41 |
| 83.67-L | 71.6 | 12.0 | 25.3 | 24.1 | 25.6 | Dec-12 | 41 |
| 90.18R | 201.3 | 103.9 | 140.9 | 134.6 | 178.4 | Dec-12 | 66 |
| 90.19L1 | 218.5 | 98.9 | 145.6 | 138.0 | 138.3 | Dec-12 | 66 |
| 90.19L2 | 190.0 | 72.0 | 132.5 | 126.3 | 144.3 | Dec-12 | 66 |
| 90.39R | 212.0 | 105.0 | 139.7 | 134.1 | 145.0 | Dec-12 | 66 |
| 90.60L | 192.0 | 28.7 | 139.2 | 134.2 | 167.8 | Dec-12 | 66 |
| 90.61R | 198.0 | 104.0 | 138.2 | 135.0 | 142.4 | Dec-12 | 66 |
| 90.91L | 285.9 | 93.2 | 143.9 | 136.5 | 137.8 | Dec-12 | 66 |
| 91.15L | 287.7 | 97.4 | 139.2 | 134.0 | 140.6 | Dec-12 | 66 |

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

| DMC Milepost | Max | Min | Average | Median | Recent | Last measure | Count |
|---|---|---|---|---|---|---|---|
| 91.36L | 217.0 | 10.3 | 96.1 | 116.9 | 13.3 | Dec-12 | 66 |
| 91.57R | 222.2 | 91.8 | 135.5 | 128.5 | 143.0 | Dec-12 | 66 |
| 91.68R | 219.6 | 99.2 | 145.5 | 140.0 | 168.9 | Dec-12 | 66 |
| 91.77R | 172.2 | 96.0 | 127.1 | 124.2 | out | Sep-03 | 66 |
| 91.80L | 195.2 | 93.1 | 135.7 | 132.6 | 141.7 | Dec-12 | 66 |
| 92.00R | 172.6 | 109.0 | 137.7 | 131.2 | out | Sep-03 | 66 |
| 92.14L | 215.1 | 98.8 | 144.0 | 139.8 | 145.0 | Dec-12 | 66 |
| 92.20R | 220.0 | 95.8 | 141.6 | 142.0 | 142.0 | Dec-12 | 66 |
| 92.72L | 218.3 | 100.2 | 147.0 | 135.8 | 146.6 | Dec-12 | 66 |
| 93.20L | 296.1 | 102.2 | 140.9 | 131.8 | 173.2 | Dec-12 | 66 |
| 93.27R | 228.4 | 115.0 | 159.4 | 154.0 | 179.6 | Dec-12 | 65 |
| 93.27L | 218.9 | 100.8 | 146.1 | 141.9 | 165.6 | Dec-12 | 66 |
| 94.26L | 228.1 | 99.7 | 144.8 | 135.2 | 177.2 | Dec-12 | 66 |
| 95.62L | 213.4 | 99.6 | 145.2 | 132.0 | 172.1 | Dec-12 | 66 |
| 97.28L | 159.9 | 34.0 | 71.8 | 58.6 | 91.1 | Dec-12 | 66 |
| 98.74L | 114.2 | 39.2 | 53.9 | 46.0 | 56.9 | Mar-11 | 66 |
| 99.24L | 158.3 | 31.5 | 63.7 | 53.1 | 136.7 | Dec-12 | 66 |
| 99.82L | 190.3 | 19.5 | 69.8 | 56.0 | 88.1 | Dec-12 | 66 |
| 100.24L | 144.1 | 28.1 | 61.8 | 52.0 | 71.1 | Dec-12 | 66 |
| 100.65L | 137.6 | 36.5 | 67.0 | 64.5 | 94.4 | Dec-12 | 66 |
| 100.85L | 133.6 | 39.0 | 60.6 | 58.3 | 73.7 | Dec-12 | 65 |
| 101.27L | 131.4 | 37.4 | 66.3 | 57.0 | 72.1 | Dec-12 | 65 |
| 102.04R | 130.0 | 38.0 | 63.8 | 54.0 | 62.8 | Dec-12 | 65 |
| 106.20R | 138.3 | 60.7 | 91.6 | 85.0 | 97.1 | Dec-12 | 65 |
| 113.72L | 29.2 | 13.2 | 21.6 | 21.6 | n/a | Mar-05 | 65 |
| 115.32R | 82.9 | 18.5 | 30.0 | 31.0 | 24.6 | Dec-12 | 65 |
| 115.62L | 42.0 | 12.2 | 25.6 | 24.3 | 18.2 | Dec-12 | 64 |
| 115.84R | 39.2 | 14.9 | 24.7 | 23.0 | 22.6 | Dec-12 | 65 |
| 116.40L1 | 77.0 | 14.2 | 29.5 | 27.7 | 20.6 | Dec-12 | 65 |
| 116.40L2 | 74.0 | 11.3 | 30.6 | 24.1 | 31.2 | Dec-12 | 65 |
| Subsidence Wells near Russell Ave | | | | | | | |
| 97.69LH-2 | 23.1 | 23.0 | 23.0 | 23.0 | | | 11 |
| 97.69LH-3 | 17.3 | 17.3 | 17.3 | 17.3 | | | 16 |
| 97.69LH-4 | no data | | | | | | |
| 97.69LH-5 | 139.5 | 131.5 | 137.1 | 137.7 | | | 16 |
| 97.69LH-6 | 209.9 | 64.3 | 134.4 | 134.3 | | | 16 |

Source: San Luis & Delta-Mendota Water Authority

Appendix 1.  2014 Letter from Exchange Contractors

# Appendix B

## Reclamation's Cultural Resources Determination

# CULTURAL RESOURCE COMPLIANCE
# Reclamation Division of Environmental Affairs
# MP-153

**MP-153 Tracking Number:** 14-SCAO-187

**Project Name:** Temporary Change in the Selenium Maximum Contaminate Level from 2 Parts Per Billion (ppb) to up to 5 ppb for Groundwater Introduced into the Upper Portion of the Delta-Mendota Canal (DMC)

**NEPA Document:** SCCAO-EA-14-031

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

**MP 153 Cultural Resources Reviewer:** William Soule, Archaeologist

**Date:** 05/08/2014

---

Reclamation proposes to approve a temporary change in the maximum selenium contaminate levels in the upper portion of the DMC from 2 ppb to 5 ppb for the DMC Groundwater Pump-in Program. This is the type of undertaking that does not have the potential to cause effects to historic properties, should such historic properties be present, pursuant to the National Historic Preservation Act (NHPA) Section 106 regulations codified at 36 CFR Part 800.3(a)(1).

Only wells in the upper portion of the DMC, between the Tracy headworks and McCabe Road (DMC milepost 68), with selenium concentrations of less than 5 ppb tested at the well head would be allowed to pump-in under the DMC Groundwater Pump-in Program between May 1, 2014 and August 30, 2014. The selenium MCL for wells in the lower portion of the DMC would be unchanged.

After reviewing the materials submitted by SCAO, I concur with a determination in SCCAO-EA-14-31 which states that neither the proposed action nor the no action alternative have the potential to cause effects to historic properties pursuant to the NHPA Section 106 regulations codified at 36 CFR Part 800.3(a)(1). With this determination, Reclamation has no further NHPA Section 106 obligations. This memorandum 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.

CC: Cultural Resources Branch (MP-153), Anastasia Leigh – Regional Environmental Officer (MP-150)

# Appendix C

## Reclamation's Indian Trust Assets Determination

Emerson, Rain <remerson@usbr.gov>

# Re: Project Description for Review (EA-14-031)

**RIVERA, PATRICIA** <privera@usbr.gov> Wed, May 7, 2014 at 1:10 PM
To: "Emerson, Rain" <remerson@usbr.gov>
Cc: Kristi Seabrook <kseabrook@usbr.gov>, "Williams, Mary D (Diane)" <marywilliams@usbr.gov>

Rain,

I reviewed the propposec action to temporarily change the selenium maximum contaminate level (MCL) in the upper portion of the Delta-Mendota Canal (DMC) from 2 parts per billion (ppb) to 5 ppb for the DMC Groundwater Pump-in Program. The change is only in effect between May 1, 2014 and August 30, 2014. The selenium MCL for wells in the lower portion of the DMC is unchanged.

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

Patricia Rivera
Native American Affairs Program Manager
US Bureau of Reclamation
Mid-Pacific Region
2800 Sacramento, California 95825
(916) 978-5194

# Appendix D

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

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

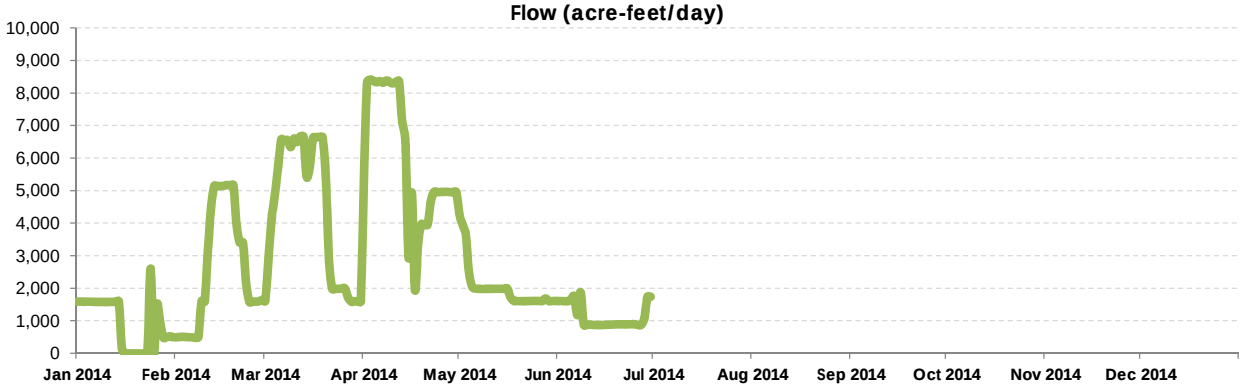


**Figure 1b. DMC Headworks**
**Mean Daily Total Dissolved Solids (mg/L)**

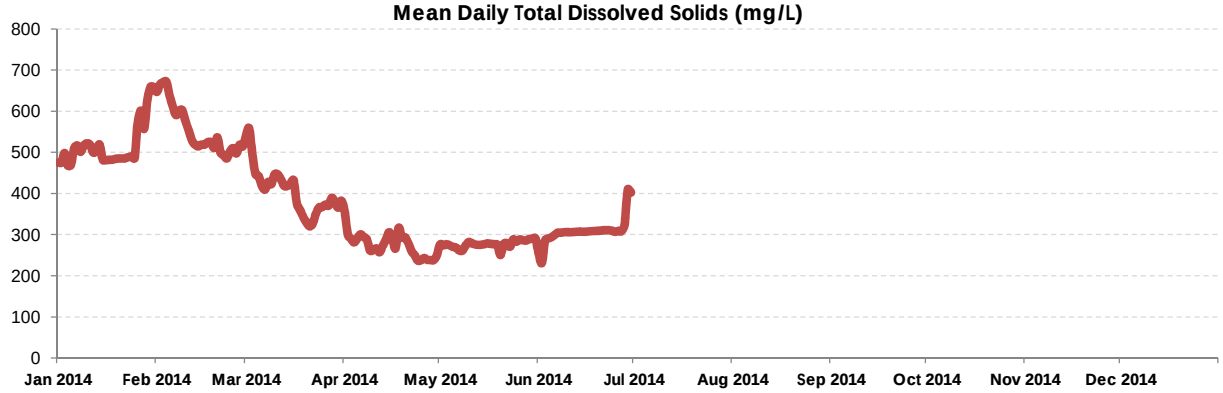


**Figure 1c. DMC Headworks**
**Daily Average Selenium Concentration (µg/L)**

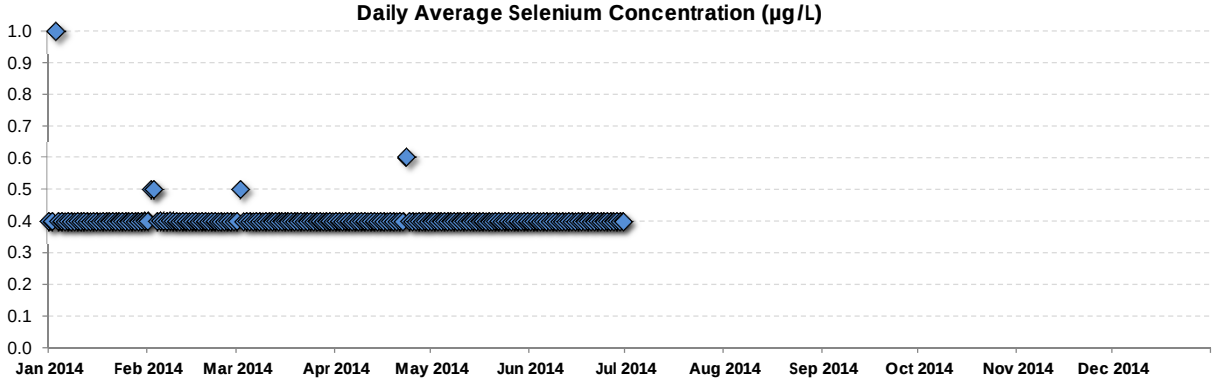


**Figure 1d. DMC Headworks**
**Monthly Average Selenium Concentration (µg/L)**

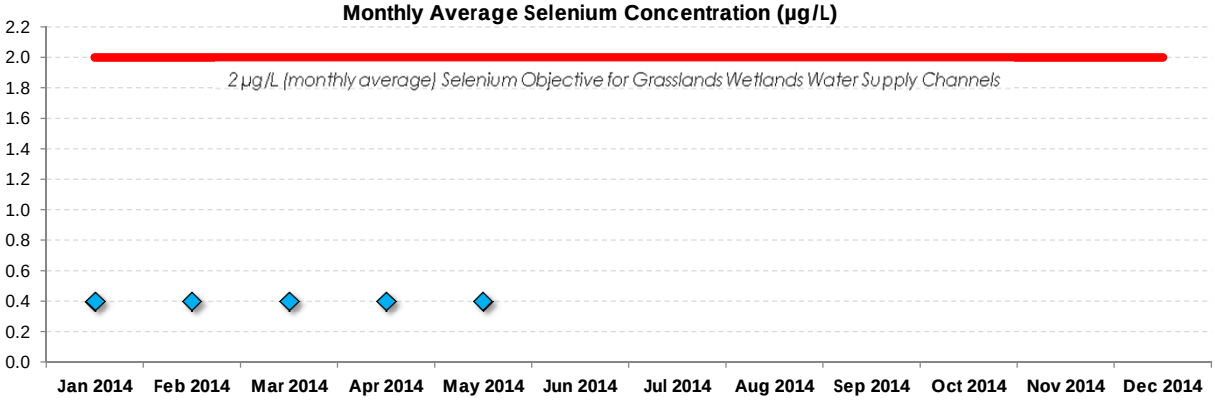

**Figure 2a. DMC Check 13**
**Flow (acre-feet/day)**

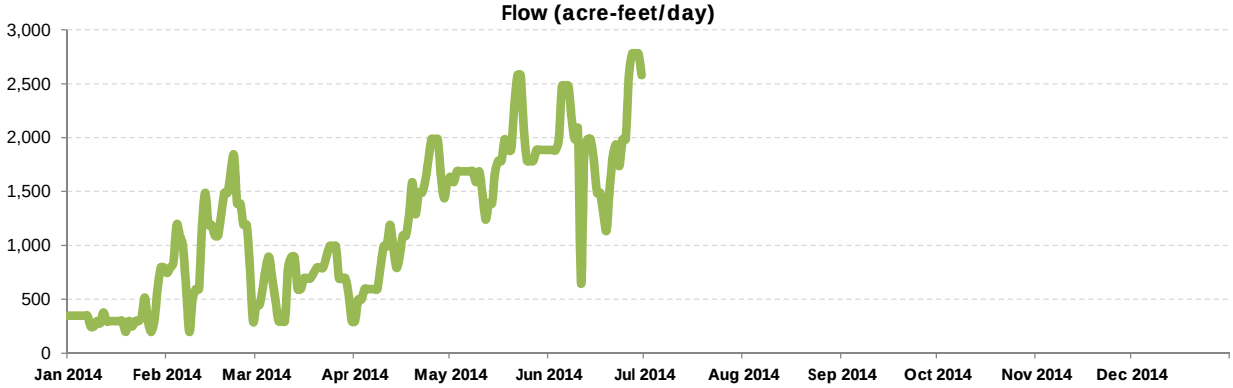


**Figure 2b. DMC Check 13**
**Mean Daily TDS**

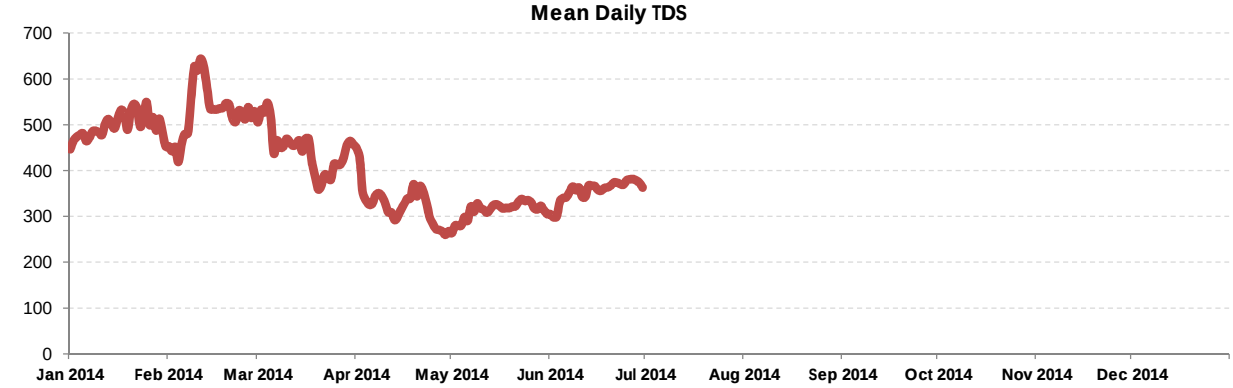


**Figure 2c. DMC Check 13**
**Mean Daily Selenium Concentration (µg/L)**

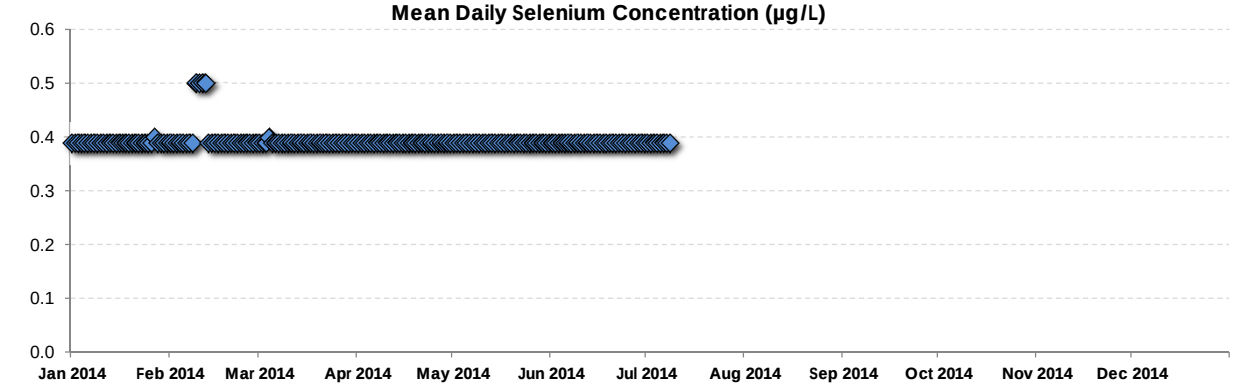


**Figure 2d. DMC Check 13**
**Monthly Average Selenium Concentration (µg/L)**

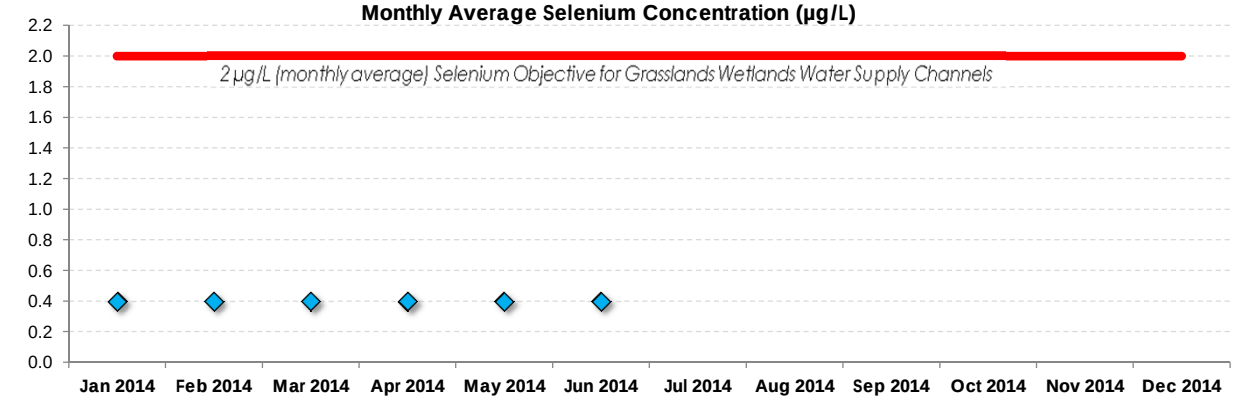

**Table 7a. Summary of the monthly average selenium concentrations (flow-weighted)**

| 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 | 175 | 1.9 | <0.4 |
| February 2014 | <0.4 | <0.4 | 191 | 1.0 | 0.8 |
| March 2014 | <0.4 | <0.4 | 194 | 1.3 | 1.2 |
| April 2014 | <0.4 | <0.4 | 205 | 0.8 | 0.8 |
| May 2014 | <0.4 | <0.4 | 174 | 0.5 | 0.4 |
| June 2014 | P | <0.4 | P | P | P |
| July 2014 | | | | | |
| August 2014 | | | | | |
| September 2014 | | | | | |
| October 2014 | | | | | |
| November 2014 | | | | | |
| December 2014 | | | | | |

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 | 104 | <0.4 | <0.4 |
| Median | <0.4 | <0.4 | 188 | 0.7 | 0.4 |
| Average | <0.4 | <0.4 | 194 | 1.1 | 0.6 |
| Number of samples | 143 | 143 | 145 | 141 | 139 |