

# RECLAMATION

*Managing Water in the West*

## FINDING OF NO SIGNIFICANT IMPACT

### San Luis Drainage Feature Reevaluation Demonstration Treatment Facility at Panoche Drainage District

FONSI-10-030

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# 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 the construction of a Demonstration Treatment Facility (Facility) near Firebaugh, California within Panoche Drainage District's San Joaquin River Water Quality Implementation Program (SJ RIP) reuse area is not a major federal action that will significantly affect the quality of the human environment and an environmental impact statement is not required. This Finding of No Significant Impact (FONSI) is supported by Reclamation's Environmental Assessment (EA)-10-030, *San Luis Drainage Feature Reevaluation Demonstration Treatment Facility at Panoche Drainage District*, and is hereby incorporated by reference.

Reclamation provided the public with an opportunity to comment on the draft FONSI and draft EA between September 16, 2011 and October 14, 2011. Reclamation received four comment letters: two comment letters from Western Area Power Administration, one comment letter from an eight-member coalition, and one comment letter from Joe McGahan a representative of Panoche Drainage District. Comment letters and Reclamation's response to comments are included in Appendix J of EA-10-030.

## Background

In 1960, Public Law No. 88-488 authorized the construction, operation, and maintenance of the San Luis Unit of the Central Valley Project, including the construction of San Luis Dam, San Luis Canal, Coalinga Canal, San Luis Drain, distribution systems, drains, pumping facilities, and other related works. The San Luis Unit serves 700,000 acres of irrigated agriculture and includes the Westlands, Broadview, Pacheco, and Panoche Water Districts and the southern portion of the San Luis Water District.

Since the closure of the Kesterson Reservoir in the mid-1980s, adequate drainage service has not been available for irrigation waters from agricultural lands served by the San Luis Unit. By court order (*Sumner Peck Ranch v. Reclamation*) Reclamation is re-evaluating options for providing agricultural drainage service to achieve long-term, sustainable salt and water balance in the root zone of irrigated lands in the San Luis Unit.

Reclamation released a Final Environmental Impact Statement (FEIS) for the *San Luis Drainage Feature Re-evaluation* to the public on June 8, 2006. The FEIS evaluated seven action alternatives in addition to the no action alternative for implementing drainage service within the San Luis Unit. The Record of Decision (ROD) for the FEIS was signed March 9, 2007. Subsequently, Reclamation prepared the *San Luis Drainage Feature Re-Evaluation Feasibility Report* (Feasibility Report) to evaluate the feasibility of implementing the preferred alternative. The FEIS, ROD, and Feasibility Report are hereby incorporated by reference.

Drainage service is needed to achieve a long-term, sustainable salt and water balance in the root zone of irrigated lands in the San Luis Unit and adjacent areas. The Federal action to supply

drainage services is required by Public Law 86-488 and the *Sumner Peck Ranch v. Reclamation* Court Order.

The primary purpose of the Facility is to demonstrate and operate the reverse osmosis (RO) and selenium biotreatment technologies described in the Feasibility Report in order to collect cost and performance data required for final design of the corresponding full-scale drainage service treatment components to be constructed in Westlands Water District.

In accordance with the 2007 ROD for the FEIS, and contingent upon available funding, a secondary purpose of the Facility is to evaluate other innovative technologies, which may reduce the cost and environmental impacts as compared to the technologies evaluated in the Feasibility Report, while meeting the requirements for drainage service.

## **Proposed Action**

Reclamation will construct, operate, and maintain for 18 months a Facility for drainage treatment within the geographical boundaries of the existing SJRIP reuse area after receiving easement(s) from Panoche Drainage District. The Facility will occupy a rectangular area approximately four acres in size, adjacent to and immediately north and east of Panoche Drainage District's existing perpendicular drainage distribution canals. Pipelines will be constructed to convey drainage water from the seven existing reuse sumps to the Facility. Drainage water treatments will include RO, microfiltration or ultrafiltration, a proprietary biological treatments system for selenium removal, and potentially up to two innovative technologies. At this point it is uncertain which innovative technologies will be installed; however, the Facility footprint includes adequate land area to incorporate these additional systems if and when they are built. Subsequent environmental analysis may be required for the addition of these technologies depending upon the type of treatment systems or equipment to be installed.

Project-Use Power will be used to treat drainage water from the SJRIP. Transportation of drainage water to and from treatment will not use Project-Use Power.

The treatment demonstration systems may be operated by, but not limited to, Reclamation staff, contractors, and for 18 months to collect data for final designs. Subsequently, Reclamation may elect to continue operating the Facility indefinitely or delegate it to their designated operating partner for treating reuse drainage. Disposition of the facility after the Proposed Action time period is unknown at this time and may require additional environmental analysis.

The SJRIP currently operates under Waste Discharge Requirements (Order Number 5-01-234) from the Regional Water Quality Control Board, Central Valley Region. Reclamation will acquire all appropriate permits for construction and operation of the Facility. Reclamation will not operate the Facility until all permits have been received.

## **Environmental Commitments**

Reclamation shall implement the following environmental protection measures to reduce environmental consequences associated with the Proposed Action (Table 1). Environmental consequences for resource areas assume the measures specified will be fully implemented.

**Table 1 Environmental Protection Measures and Commitments**

<b>Resource</b>	<b>Protection Measure</b>
Biological Resources	Preconstruction surveys and implementation of avoidance and minimization measures for San Joaquin kit fox (SJKF, USFWS 2011; see Appendix C).
Biological Resources	Preconstruction surveys and implementation of avoidance and minimization measures for Giant garter snake (GGS, see Appendix C)
Biological Resources	Preconstruction surveys and implementation of avoidance and minimization measures for burrowing owl (CDFG 1995; see Appendix D).
Biological Resources	Surveys (USFWS 2000; see Appendix E) will be conducted for nesting migratory birds on land that will be disturbed for construction. One eucalyptus trees ( <i>Eucalyptus</i> sp.) located at the Facility construction/staging site will likely be removed for construction. This tree will be removed either before nesting season commences, or if removal must occur during the bird breeding season, only after it is has been surveyed by a biologist and found not to support nesting birds.
Biological Resources	A biologist will be present at the inception of the construction and other times as required to insure that measures for avoidance of effects to species are implemented. Additionally, if a listed species is observed, work at the site will immediately stop and Reclamation biologists shall be notified. No work will continue without additional approval from Reclamation environmental staff, following further consultation with wildlife agencies, as appropriate.

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 factors:

## Findings

### Water Resources

Water to be treated by the Facility will be removed from existing drainage water collected for use in the SJRIP. No additional drainage water will be created for the Proposed Action. As described in Section 2.2.3 of the EA, approximately 50 percent of drainage water brought into the Facility will be concentrated into a waste stream that will be fed into the selenium biotreatment system for up to 99 percent selenium removal (selenium concentrations are estimated to be 2.5 µg/L after biotreatment). The remaining 50 percent will be recovered as low salinity product water (TDS estimated to be 340 mg/L after RO treatment). However, only selenium will be removed from the concentrated waste stream during biotreatment. Consequently, salt concentrations in the treated water discharged back into the SJRIP will be similar to that of the pre-treated drainage water sent into the Facility as the low-salinity RO water and the biotreated water will be discharged over rip rap within the existing irrigation ditch adjacent to the western edge of the Facility footprint, where it will be blended with other drainage waters and re-used by the SJRIP for irrigation in the reuse areas. As described in Section 2.2.3, Reclamation will acquire all appropriate permits for construction and operation of the Facility and will not operate the Facility until discharge permits are in place.

### Land Use

The Proposed Action will include construction of a Facility for treating drainage water to remove selenium. The Facility will not change land use designations nor will it impede existing uses. A small portion of an existing field will be removed for temporary staging during construction of the Facility; however, once construction is complete the field will be returned to its current use. Drainage water treated in the Facility will be returned to the SJRIP drainage system for continued use; however, this water will have improved water quality as selenium will be reduced

prior to its return. Consequently, there will be no impacts to land use as a result of the Proposed Action.

### **Biological Resources**

Effects to biological resources from the Proposed Action could occur from construction of the Facility, pipelines and appurtenances, or from operation or maintenance of the facilities during the Proposed Action. However, because the SJRIP reuse area is heavily affected by intense agriculture activity, and weed and pest species are controlled or eliminated, the habitat available is little used by wildlife and fish species. The reduced value of habitat may also relate to the relatively high concentrations of selenium in water applied to the landscape and the salt tolerant vegetation, which can be exploited by a relatively small suite of species. With implementation of avoidance measures as described in Section 2.2 and Appendices C through E of EA-10-030, the Proposed Action is not expected to adversely affect federally-listed and other protected species.

Construction activities will occur over approximately 14 months. The largest area of temporary disturbance (approximately 20 acres in roadways) will result from excavation and laying of pipelines to carry water from existing sumps, which collect in-ground water, to the Facility. The roadways that will be disturbed are heavily traveled by agricultural workers and are of limited use to wildlife.

Approximately 650 feet of 48-inch diameter reinforced concrete pipe placed underground will replace 650 feet of existing open irrigation ditch from RP-1 pump station to the southeast corner of the Facility. The portion of the pipe within the existing irrigation ditch will be covered with native soil from excavated material from the site construction, removing this habitat and also source of exposure of animals, to SJRIP irrigation water.

Operations occurring within the compound housing the Facility are not anticipated to measurably affect biological resources. The primary effect of Facility operation will be production of treated water which will be released to an irrigation ditch. The treated water will be a minor fraction of the SJRIP reuse water pool carried in the irrigation ditch, and it will minimally affect the SJRIP reuse water. The treated water will remain at the SJRIP and will not alter water quality elsewhere; the quality of water at the SJRIP will minimally be affected by the Facility and concentrations of salts and elements other than selenium in SJRIP reuse water will remain similar, if not slightly lower than current concentrations (see Table 2-1 in EA-10-030). Although the concentration of selenium in post treatment SJRIP reuse water will be reduced, including for bioactive forms, the overall improvement to water at the SJRIP will likely be minor because relatively “poorer quality” water will continue to be diverted to the SJRIP pool of water used for irrigation.

The facility will be operated year-round and will be lighted for safety and security. The effects to wildlife resources from this light source are expected to be negligible because of the existing low value of the area to wildlife.

Hazardous material (e.g. concentrated selenium) generated from the experimental treatment will be stored on site, within the secured, fenced, lighted compound as described previously. The

material stored will be “solids” and will have little opportunity to spread outside the secured area. Purposeful transport will occur to a waste disposal site approximately quarterly, where any effects of disposal will already be addressed.

Transport vehicles traveling on county roads, state highways, and federal highways (e.g. Interstates) will not be expected to affect biological resources. Similarly, staff traveling to and from the site for work on existing roads will not be expected to affect biological resources.

Besides effects from facilities construction and operation, some, minimal maintenance is anticipated over the period of operation of the Facility. Maintenance required for the Facility will be expected to be conducted within fenced compound surrounding the Facility and the perimeter fencing. Maintenance within the compound should have no effect to biological resources.

If necessary, “exclusion devices” such as netting or physical barriers will be installed to prevent access by breeding birds that could disrupt operation of the Facility. The Facility will be retrofitted during the bird non-breeding to exclude migratory birds.

Vermin, pests posing a human health hazard, or pests otherwise affecting the effective operation of the Facility inside the perimeter fencing will be controlled employing integrated pest management techniques. The potential for harm to listed species will be minimized when practicing control. Pesticides approved for use in California, as determined by the California Department of Pesticide Regulations will be utilized. Application of pesticides will follow recommendations of a Licensed Pest Control Operator and be applied by a Licensed Pest Control Applicator. Approval will be required from Reclamation prior to use.

***Effects to listed wildlife species and designated critical habitat***

The potential for habitat, specific to listed species to be affected by the Proposed Action was discussed with biologists from the Service and private industry. Two federally listed species considered possible candidates to occur in the area and which may be affected by the Proposed Action are SJKF and GGS. Potential effects to these species could result from construction activities in the Proposed Action footprint or from operation or maintenance of the Facility. Reclamation has completed consultation with the Service under Section 7 of the ESA for these species and on June 4<sup>th</sup>, 2012 a letter of concurrence was provided by the Service (Appendix K).

**Effects to Giant Garter Snake** GGS inhabits agricultural wetlands and other waterways such as irrigation and drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands in the Central Valley (USFWS 1999). Habitat requirements for GGS consist of (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter (USFWS 2009).

Potential habitat in the Proposed Action footprint includes irrigation ditches and adjacent uplands in the SJRIP reuse area, as well as the Outside Canal located adjacent to the area. The suitability of the aquatic habitat adjacent to construction areas is poor. The irrigation ditches adjacent to the

roadways where trenching will occur have steep-sided banks and are virtually devoid of vegetation, including emergent vegetation. There is limited algal growth and submersed aquatic vegetation in some portions of ditches, and prey such as bullfrogs (*Rana catesbeiana*) and minnows (Cyprinidae) occur there. Although prey are present, they are not abundant and there is considerable risk to GGS from predators. Herons and egrets forage along the ditches and easily could prey on GGS in the ditches because no escape cover is present for the snakes. Additionally, bullfrogs could prey on young GGS. Bullfrogs have reduced the suitability of nearly all permanent and semi-permanent waters in the Central Valley for GGS (USFWS 1993).

The habitat for GGS adjacent to the Proposed Action footprint is also poor, and dispersal to the SJRIP reuse area will not be favored. There are only a few records for GGS within about 5 miles of the Proposed Action footprint and these are over 30 years old (CNDDDB 2011). Valley garter snakes (*T. sirtalis*) have been found on areas surveyed north of the Outside Canal and west of Russell Avenue, but no GGS were recorded in the surveys of this area (Harvey and Associates 2008). Although Valley garter snakes were recorded from that area, this species is a broad ranging generalist, capable of utilizing terrestrial habitats to a far greater extent than GGS, which is essentially an aquatic obligate dependent exclusively on aquatic prey (Harvey & Associates 2008). In over 5 years of biological monitoring at the SJRIP reuse area, no GGS have been observed (J. Seay, pers. comm.).

The Outside Canal borders the northern edge of the Proposed Action footprint adjacent to Sump #1 and #7. Levees of the Outside Canal are earthen and the internal prism of the western (southern) levee is sparsely covered with a thin layer of crushed concrete (approximately 1 inch up to 6-inches in depth). Vegetation on this internal prism and also along the earthen service roads is controlled and largely lacking. Emergent vegetation in the Outside Canal also is virtually non-existent in the section bordering the Proposed Action footprint. Because of these conditions and the likely presence of predatory fish in the Outside Canal, this waterway will be considered relatively poor habitat. It will be unlikely to facilitate dispersal of GGS to the SJRIP reuse area.

The DMC is approximately 1,000 feet south of construction areas on the SJRIP reuse area at its closest. The DMC provides permanent water, which is needed by GGS. However, the portion of the DMC closest to the Proposed Action footprint is concrete lined and is poorly suited for GGS. Access to construction areas on the SJRIP reuse area by GGS via the DMC, will require overland movement, and this will be unlikely to occur.

Because there are no records from the area, quality of habitat is poor both on the SJRIP reuse area and in the nearby landscape, dispersal into the Proposed Action footprint is unlikely and the probability of occurrence for GGS is low.

The trenching from sumps and laying of associated pipeline will occur in compacted earthen and gravel roadways. Because this work will avoid aquatic areas, and because the roadways do not provide refugia suitable for GGS, GGS will not be harmed by this activity. Additionally, the construction area will be surveyed for GGS before construction and work will not occur without further consultation with Service if GGS was observed.



A limited amount of construction will occur in irrigation ditches which could have the potential to affect GGS. Approximately 650 feet of open irrigation ditch running from the existing RP-1 pump station along the graveled access road immediately south of the site for the proposed facility will be replaced with covered 48-inch concrete pipe. Additional temporary activity will occur where another pipeline segment from the Facility will be connected to a ditch west of the Facility. Together, however, this work is not likely to adversely affect GGS. The area is not likely to be inhabited by GGS and avoidance measures will be implemented (Appendix C); construction areas will be surveyed for GGS before work could begin and a biological monitor will be present when construction activities occur in suitable aquatic habitat. If a GGS was observed, work will not occur without further consultation with the Service. Replacing the open irrigation ditch will remove a small area of potential barren ditch habitat, but it also will remove a potential area for GGS exposure to adverse elements. Nevertheless, because GGS are not likely to be present in the area and there will be removal of a minimal amount of poor quality habitat, the effects to GGS from this portion of the Proposed Action are discountable and insignificant and therefore not likely to adversely affect GGS.

Effects to GGS in uplands will be unlikely because few burrows or other potential overwintering sites are present in the Proposed Action footprint and so GGS are not likely to be present on the affected area. Most of the construction work conducted during the GGS inactive period will occur at the Facility site. This site is a relatively small in area with limited adjacency to ditches. Once initial earth work is completed at the Facility, work will be focused inside an approximate four acre compound and it is unlikely to be used by GGS.

The operation of the Facility could slightly improve water quality on the SJRIP reuse area through reduced selenium concentrations in post treatment water discharged back into the SJRIP reuse area water pool. This could potentially benefit GGS; however, because the change to water quality will decline with dilution from pooling with other SJRIP reuse water, any benefit will likely be limited to areas close to the discharge site. The significance of any benefit to GGS will be minimal, especially since GGS will not likely be present in the area during the experimental period owing to its rarity in the area. Consequently, with implementation of the avoidance measures listed in Table 2-1 and included in the Reclamation's request for concurrence, effects from the Proposed Action to GGS are unlikely.

**Effects to San Joaquin kit fox** The Proposed Action could potentially affect SJKF during construction and maintenance activities; however, treatment of SJRIP reuse area water will not affect this species. Terrestrial habitat in the SJRIP reuse area is intensively managed for agriculture and the landscape is highly disturbed (e.g. through land preparation, planting, irrigation and harvesting). Workers utilize the numerous earthen roads running throughout the SJRIP reuse area and this is a considerable disturbance factor. Areas that are not cropped are kept barren and free of weeds, limiting areas for potential prey species. Those fields not in production are finely disked and lack vegetation. Together, these conditions, along with the limited diversity of vegetation and high selenium concentrations may limit invertebrate prey, which seemed to be relatively scarce in crop fields. There are few opportunities for rodents to burrow in fields and for burrows to persist because of frequent haying and flood irrigation. Pests such as California ground squirrel (*Spermophilus beecheyi*) are controlled and little evidence of burrowing activity by other rodents (possibly *Thomomys* sp.) occurs in the Proposed Action

footprint. Because few burrowing mammals are likely present, and there are few existing burrows for SJKF to exploit for shelter, the attractiveness of the site is limited.

The high intensity agriculture practices also likely limits the suitability of the site for prey for SJKF, such as for kangaroo rats (*Dipodomys* spp.) or invertebrates. During site visits, little evidence of potential prey was observed in the Proposed Action footprint.

The nearest records for SJKF are about 5 or more miles away and these are relatively old (CNDDDB 2011); they include records mostly from 1920. More recent records from the 1990's are located mostly east of the San Joaquin River, and separated from the Proposed Action footprint by the San Joaquin River and/or major canals. Other records are found west of the Proposed Action footprint, in the foothills of the Coast Range. During considerable field work on site from April to June, from 2003 through 2010, no SJKF or their sign or other evidence of SJKF has been observed on the SJRIP reuse area (J. Seay, pers. comm). SJKF might move through the site, but for lack of burrows and prey they will not be expected to reside or remain at the site. The paucity of observations in the open landscape over many years supports the suggestion that SJKF is not resident at the site. However, given records within 10 miles, and dispersal capabilities of the species, SJKF could move through the area. Incorporation of preconstruction surveys and avoidance measures, coupled with the relatively short-term required to construct the Facility and the relatively small Facility footprint, the construction for the Proposed Action will not likely affect SJKF. Additionally, the enclosure of a short section of open irrigation ditch in concrete pipe (to be covered under fill) at the SJRIP, will not affect SJKF.

Maintenance activities practiced at the Facility will occur over a relatively short time period and will be restricted primarily within a fenced compound. Maintenance activities at the Facility that could affect SJKF, such as control of vermin, will be done to minimize risk to SJKF. The fencing will be expected to effectively preclude access to the area where maintenance occurs, and therefore maintenance will not likely affect SJKF. Maintenance of the perimeter fencing that involve ground disturbance will require avoidance measures applied to ground disturbance for construction, such as standardized avoidance measures for SJKF (USFWS 2011a), or as appropriate for other listed species or migratory birds. If a listed species is detected, further consultation with Service will be conducted, as appropriate. There is little chance lighting will affect listed species such as SJKF, because of the low likelihood for this species to be present at the site or nearby and any temporary exposure to an animal passing through the area will be minimal.

#### ***Effects to listed fish species and designated critical habitat***

The Proposed Action will not affect listed fish species or their habitat because neither listed species or their habitat are present in the Action Area.

#### ***Effects to other fish species and their habitat***

The Magnuson-Stevens Fishery Conservation and Management Act (MFA) as amended (16 U.S.C. 1801 et seq.) requires evaluation of the Proposed Action on Essential Fish habitat. No species of fish or habitat that is regulated under MFA will be affected.

***Effects to Designated Critical Habitat***

No designated critical habitat exists in the Action Area. Therefore, there will be no effect to designated critical habitat.

**Cultural Resources**

Reclamation has determined that the Proposed Action will not significantly affect qualities that will make the Outside Canal eligible for listing on the National Register of Historic Places as there will be no modifications to the canal itself or change in its functions and any visual effects due to the installation of an underground pipeline will be temporary. On August 16, 2010, SHPO concurred with Reclamation's determination that there will be no significant impact to cultural resources as a result of the Proposed Action.

**Indian Sacred Sites**

At this time, no Indian sacred sites have been identified. In addition, the Proposed Action will not impede access to or ceremonial use of Indian sacred sites. If sites are identified in the future, Reclamation will comply with Executive Order 13007.

**Indian Trust Assets**

There will be no impact to Indian Trust Assets as there are none within the Proposed Action area.

**Hazardous Waste**

No additional hazardous waste will be generated from the construction of the Facility. However, selenium already present within the existing drainage water will be concentrated into solid waste after treatment. As the concentration of selenium present in the solid waste will be considered hazardous waste, Reclamation will comply with Resource Conservation and Recovery Act (RCRA) including temporary storage and containment requirements. This waste will be disposed of on a quarterly basis within a Class 1 Hazardous Waste Landfill. Therefore, the Proposed Action will not have significant impacts resulting from hazardous waste.

**Environmental Justice**

The Proposed Action is a pilot program to test mechanisms to remove selenium from drainage water in Panoche Drainage District. Staff to operate the Facility will come from existing employees within the district and Reclamation. Consequently, the Proposed Action will not cause dislocation, changes in employment, or increase flood, drought, or disease nor will it disproportionately impact economically disadvantaged or minority populations.

**Socioeconomic Resources**

The Facility will not increase or decrease socioeconomic opportunities with the SJRIP. No changes in use of the SJRIP are needed for construction or operation of the Facility. A small portion of an adjacent field will be removed during construction of the Facility for staging. However, after construction the field will be replanted. Consequently, there will be no impacts to socioeconomic resources as a result of the Proposed Action.

**Air Quality**

Operation of the Facility will not contribute to criteria pollutant emissions, as power for operation and movement of water will be electrical. The air quality emissions from electrical power have been considered in environmental documentation for the generating power plant

which found that there are no emissions from electrical engines. However, emissions will be associated with construction activities. Construction is expected to take approximately one year to complete. Construction equipment will include: grader, excavator, dozer, front end loader, roller, flatbed truck, crane, and compactor. Estimated construction emissions are well below the *de minimis* thresholds established by the San Joaquin Valley Air Pollution Control District. In addition, Reclamation will employ best management practices to reduce fugitive dust emissions during ground disturbance. Consequently, the Proposed Action will not result in a significant impact upon air quality.

### **Global Climate**

Estimated annual emissions of carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) from construction of the Facility are 151.31 and 0.01 tons (137.3 and 0.009 metric tons), respectively. The Facility will operate 24 hours a day for 1.5 years requiring the use of electricity for power. In addition, the 17 pumps used for moving water to the Facility will require the use of power as they cycle on and off to pump water. This will result in approximately 53.5 metric tons of CO<sub>2</sub>. Calculated CO<sub>2</sub> and CH<sub>4</sub> emissions for the construction and operation of the Proposed Action alternatives are estimated to be well below the Environmental Protection Agency's 25,000 metric tons per year threshold for annually reporting greenhouse gas (GHG) emissions. Accordingly, the Proposed Action will result in below *de minimis* impacts to global climate change.

### **Cumulative Impacts**

Facility treatment of drainage water will have a cumulatively beneficial impact on drainage water used within the SJRIP as selenium concentrations within treated drainage water will be substantially reduced.

No state or local actions in the area of the Proposed Action are currently known which could affect listed species or their critical habitat. Agriculture, as currently practiced, is assumed to continue in the area under both alternatives and these activities limit the availability of habitat suitable for listed species. Agricultural land is generally in-hospitable for most listed species, especially for most crops and practices applied in the vicinity of the SJRIP reuse area. Recently, there has been a trend toward converting lower value row crops to higher value perennial and nut crops. In general, this change is occurring on the west side of the valley where water supplies are sufficient to ensure requirements of perennial crops can be met.

The impact of the conversion is probably minimal for most species, although the SJKF could benefit slightly from this change, as more ground level "open" habitat is created, compared with denser row crops such as cotton and tomatoes. Greater visibility may minimize predation on SJKF by coyotes (*Canis latrans*). Additionally, almond and pistachio orchards generally have an open understory that may harbor ground squirrels which may be used as prey by SJKF. However, the overall benefit to SJKF from the changes occurring are expected to be minimal.

The minimal change to water quality in the SJRIP reuse area as a result of the Proposed Action will not influence water quality outside the SJRIP reuse area. As drainage water in SJRIP remains within SJRIP, neither alternative will affect biological resources "downstream" of the SJRIP project.

As the Proposed Action will not result in any direct or indirect impacts on land use, cultural resources, Indian Sacred Sites, Indian Trust Assets, economically disadvantage or minority populations, it will not contribute cumulatively to impacts on these resources.

As Reclamation will comply with all RCRA requirements for the storage, containment, and disposal of hazardous waste, it is not anticipated that the Proposed Action will have cumulative impacts resulting from hazardous waste.

Reclamation or its designated operating partner could elect, subject to any additional required environmental review, to continue operating the Facility for treatment of drainage water. Over the long term, treated drainage water will reduce the amount of selenium present within the SJRIP. As the treated drainage water originates from the Grassland Drainage Area and is removed before discharge to the Grassland Bypass Project for treatment this could save Panoche Drainage District some of the cost for discharge pursuant to their discharge permit and agreements for the Grassland Bypass Project.

The Proposed Action, when added to other existing and proposed actions, will not contribute to cumulative impacts to air quality since construction activities are short-term and operations will not result in air quality impacts. GHG emissions are considered cumulatively significant; however, the estimated annual CO<sub>2</sub> and CH<sub>4</sub> emissions required to construct and operate the Facility for the Proposed Action is 210.31 and 0.01 tons (190.8 and 0.009 metric tons) per year, respectively, which is well below the 25,000 metric tons per year threshold for reporting GHG emissions. As a result, the Proposed Action is not expected to contribute to cumulative impacts to global climate change.

# RECLAMATION

*Managing Water in the West*

**Final Environmental Assessment**

## **San Luis Drainage Feature Reevaluation Demonstration Treatment Facility at Panoche Drainage District**

**EA-10-030**



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

**June 2012**

## **Mission Statements**

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

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

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# List of Acronyms and Abbreviations

AF	Acre-feet
APE	Area of Potential Effect
Authority	San Luis Delta-Mendota Water Authority
CAA	Clean Air Act
CARB	California Air Resources Board
CEC	Categorical Exclusion Checklist
CFR	Code of Federal Regulations
CH <sub>4</sub>	Methane
CO	Carbon monoxide
CO <sub>2</sub>	Carbon dioxide
CVP	Central Valley Project
CWA	Clean Water Act
Delta	Sacramento-San Joaquin Delta
DMC	Delta-Mendota Canal
EA	Environmental Assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
Facility	Demonstration Treatment Facility
Feasibility Report	<i>San Luis Drainage Feature Re-Evaluation Feasibility Report</i>
FEIS	Final Environmental Impact Statement
FWCA	Fish and Wildlife Coordination Act
GGG	Giant garter snake
GHG	greenhouse gases
GPM	Gallons per minute
HDPE	High density polyethylene
kV	Kilovolt
ITA	Indian Trust Asset
MBTA	Migratory Bird Treaty Act
mg/L	Milligram per liter
mg/m <sup>3</sup>	Milligram per cubic meter
National Register	National Register of Historic Places
NHPA	National Historic Preservation Act
NO <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	Nitrogen oxides
O <sub>3</sub>	Ozone
PM <sub>2.5</sub>	Particulate matter less than 2.5 microns in diameter
PM <sub>10</sub>	Particulate matter between 2.5 and 10 microns in diameter
ppm	Parts per million
PWD	Panoche Water District
RCRA	Resource Conservation and Recovery Act
Reclamation	Bureau of Reclamation
RO	Reverse Osmosis
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board

SCADA	Supervisory Control and Data Acquisition
Service	U.S. Fish and Wildlife Service
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SJKF	San Joaquin kit fox
SJRIP	San Joaquin River Improvement Project
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO <sub>2</sub>	Sulfur dioxide
SO <sub>x</sub>	Sulfur oxides
TDS	Total Dissolved Solids
UF	Ultrafiltration
µg/L	Microgram per liter
µg/m <sup>3</sup>	Microgram per cubic meter
VOC	Volatile organic compounds
1995 Use Agreement	<i>Agreement for Use of the San Luis Drain</i> (Agreement No. 6-07-20-w1319) between Reclamation and the Authority

# Introduction

Revisions resulting from issues identified during the public review period and based on additional design analysis have been incorporated into the final Environmental Assessment (EA). Changes to the draft EA that are not minor editorial revisions are indicated by vertical lines on the left side of document. Project designs and flow schematics within Appendix A and Appendix B have been updated to include current data since release of the draft EA.

## Section 1 Purpose and Need for Action

### 1.1 Background

In 1960, Public Law No. 88-488 authorized the construction, operation, and maintenance of the San Luis Unit of the Central Valley Project (CVP), including the construction of San Luis Dam, San Luis Canal, Coalinga Canal, San Luis Drain, distribution systems, drains, pumping facilities, and other related works. The San Luis Unit serves 700,000 acres of irrigated agriculture and includes the Westlands Water District, Broadview Water District, Pacheco Water District, and Panoche Water District (PWD) and the southern portion of the San Luis Water District.

Since the closure of the Kesterson Reservoir in the mid-1980s, adequate drainage service has not been available for irrigation waters from agricultural lands served by the San Luis Unit. By court order (*Sumner Peck Ranch v. Reclamation*) the Bureau of Reclamation (Reclamation) is re-evaluating options for providing agricultural drainage service to achieve long-term, sustainable salt and water balance in the root zone of irrigated lands in the San Luis Unit.

Reclamation released a Final Environmental Impact Statement (FEIS) for the *San Luis Drainage Feature Re-evaluation* to the public on June 8, 2006. The FEIS evaluated seven action alternatives in addition to the no action alternative for implementing drainage service within the San Luis Unit. The Record of Decision (ROD) for the FEIS was signed March 9, 2007. Subsequently, Reclamation prepared the *San Luis Drainage Feature Re-Evaluation Feasibility Report* (Feasibility Report) to evaluate the feasibility of implementing the preferred alternative. The FEIS, ROD, and Feasibility Report are hereby incorporated by reference.

As part of the Feasibility Report, Reclamation is preparing to construct a Demonstration Treatment Facility (Facility) near Firebaugh, California within Panoche Drainage District's San Joaquin River Improvement Project (SJRIIP) reuse area a component of the Grasslands Drainage Area (Figure 1-1).

### 1.2 Purpose and Need

Drainage service is needed to achieve a long-term, sustainable salt and water balance in the root zone of irrigated lands in the San Luis Unit and adjacent areas. The Federal action to supply

drainage services is required by Public Law 86-488 and the *Sumner Peck Ranch v. Reclamation* Court Order.

The primary purpose of the Facility is to demonstrate and operate the reverse osmosis (RO) and selenium biotreatment technologies described in the Feasibility Report in order to collect cost and performance data required for final design of the corresponding full-scale drainage service treatment components to be constructed in Westlands Water District (Reclamation 2008).

In accordance with the 2007 ROD for the FEIS (Reclamation 2007), and contingent upon available funding, a secondary purpose of the Facility is to evaluate other innovative technologies, which may reduce the cost and environmental impacts as compared to the technologies evaluated in the Feasibility Report, while meeting the requirements for drainage service. At this point it is uncertain which innovative technologies would be installed and evaluated; however, the Facility footprint includes adequate land area to incorporate these additional systems if and when they are built.

### 1.3 Scope

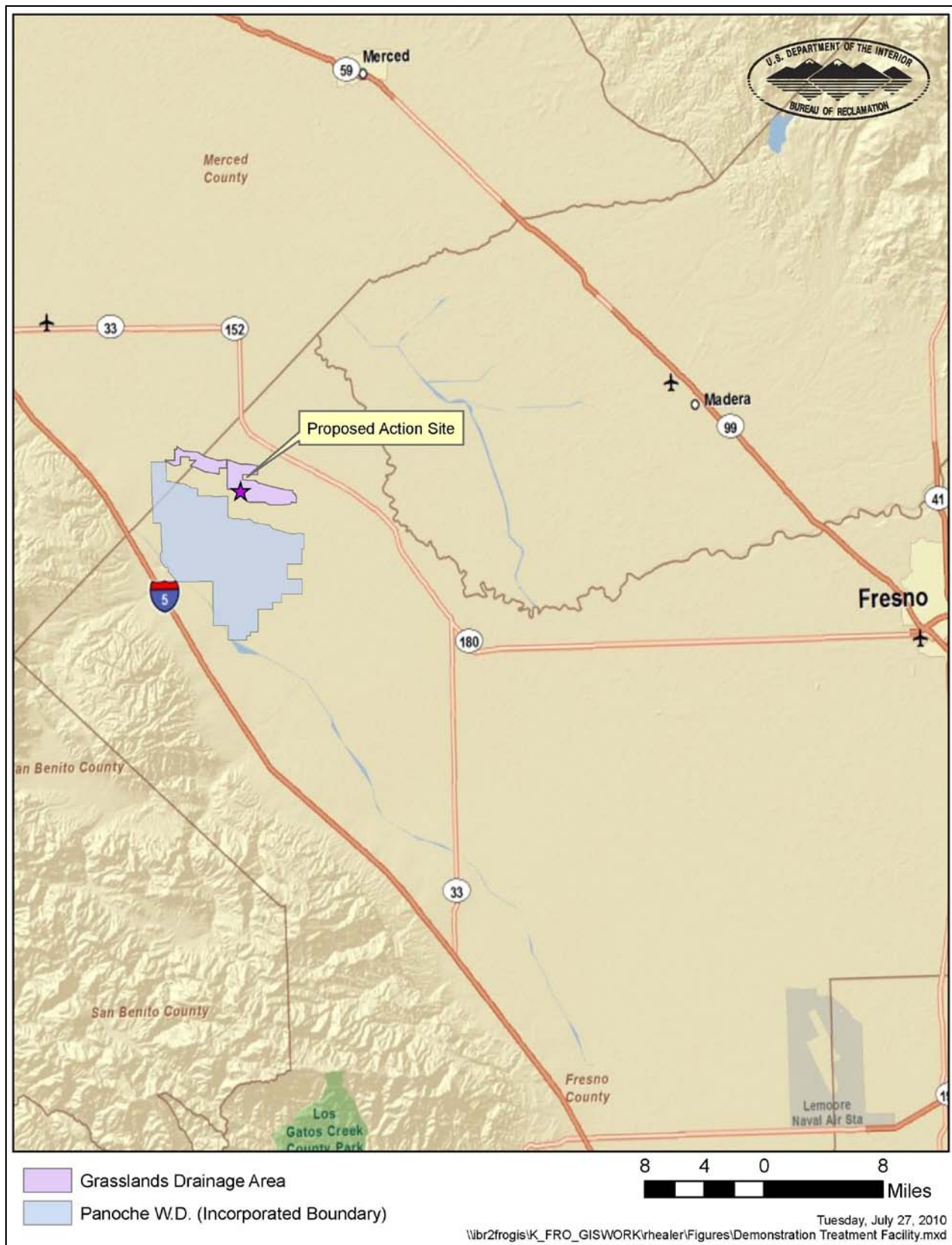
This EA has been prepared to examine the potential impacts on environmental resources as a result of construction and operation of the Facility. It has also been prepared to examine the impacts of the No Action Alternative.

In order to determine the geological feasibility of the Proposed Action site and to gather information for Proposed Action design, Reclamation conducted geotechnical explorations at the Proposed Action site. Due to timing concerns, Reclamation prepared a separate environmental analysis under a Categorical Exclusion Checklist (CEC) entitled *San Luis Drainage Feature Reevaluation Implementation Demonstration Treatment Facility Geotechnical Surveys* (CEC-10-037) which is hereby incorporated by reference. CEC-10-037 was approved on September 2, 2010 with work to begin on September 15, 2010.

The Proposed Action site is located in Fresno County within Sections 10, 11, 12, 13, and 14 of Township 12 South, Range 12 East and Sections 7 and 18 of Township 12 South, Range 13 East, MDB&M (Figures 1 and 2 in Appendix A).

### 1.4 Potential Issues

This EA will analyze the affected environment of the Proposed Action and No Action Alternative in order to determine the potential impacts and cumulative effects to the following resources: Water Resources, Land Use, Biological Resources, Cultural Resources, Indian Sacred Sites, Indian Trusts Assets (ITA), Hazardous Material, Environmental Justice, Socioeconomic Resources, Air Quality, and Global Climate.

**Figure 1-1 Proposed Action Location**

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## Section 2 **Alternatives Including the Proposed Action**

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

### 2.1 **No Action Alternative**

Reclamation would not construct a Facility for drainage treatment within the SJRIP. Selenium concentrations within the drainage water used in the SJRIP would remain the same and would continue to be reused in the SJRIP and ultimately discharged to the Grassland Bypass Project (GBP) consistent with current practices and permits. Reclamation would continue pursuing options for providing drainage service to the San Luis Unit.

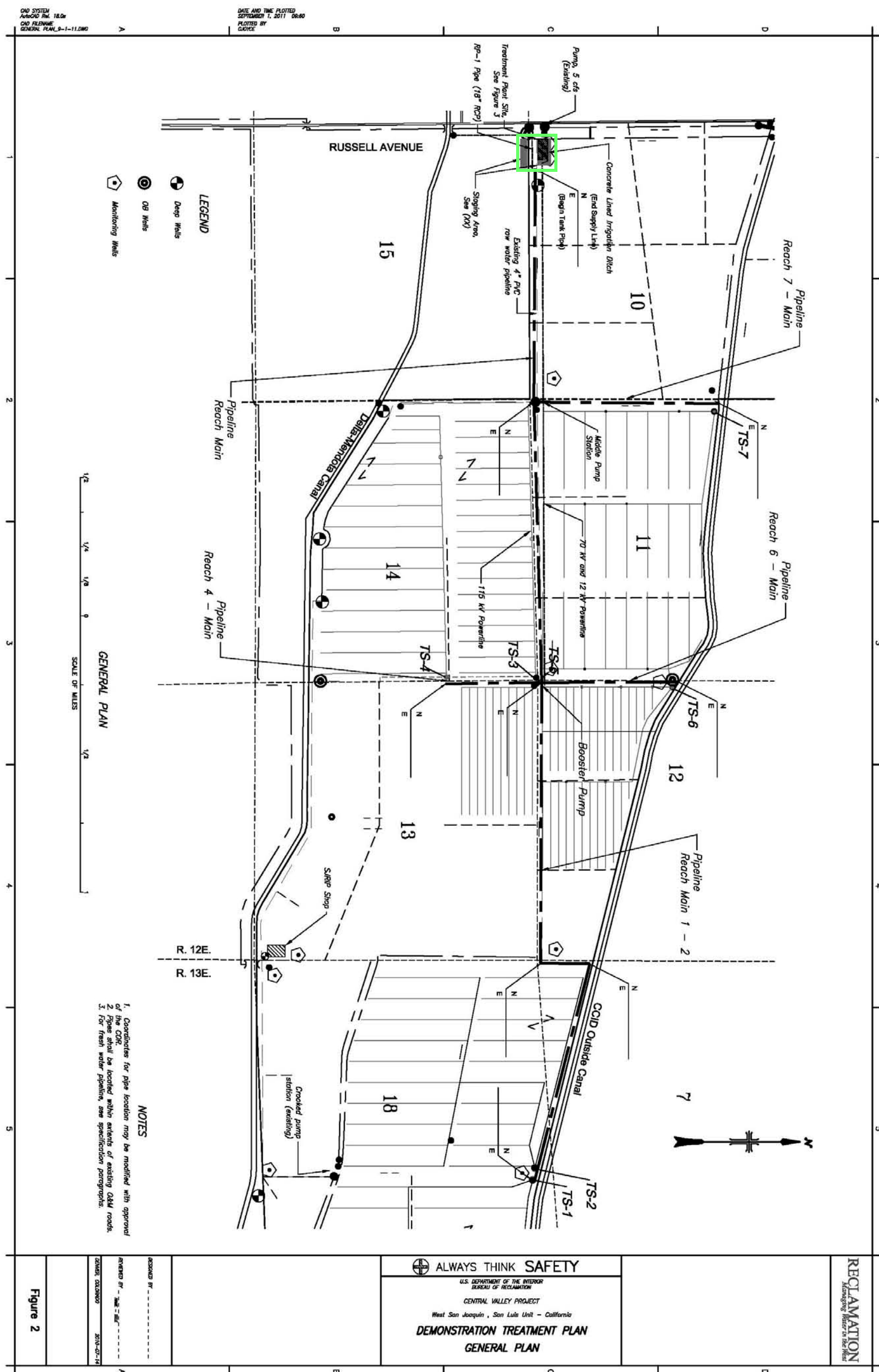
### 2.2 **Proposed Action**

Reclamation proposes to construct, operate, and maintain for 18 months a Facility for drainage treatment within the geographical boundaries of the existing SJRIP reuse area after receiving easement(s) from Panoche Drainage District. The Facility would occupy a rectangular area approximately four acres in size, adjacent to and immediately north and east of Panoche Drainage District's existing perpendicular drainage distribution canals (Figure 2-1). Pipelines would be constructed to convey drainage water from the seven existing reuse sumps to the Facility. See Appendix A for preliminary project designs. Proposed drainage water treatments would include RO, microfiltration (MF) or ultrafiltration (UF), a proprietary biological treatments system for selenium removal, and potentially up to two innovative technologies. At this point it is uncertain which innovative technologies would be installed; however, the Facility footprint includes adequate land area to incorporate these additional systems if and when they are built. Subsequent environmental analysis may be required for the addition of these technologies depending upon the type of treatment systems or equipment to be installed.

#### 2.2.1 **Treatment Facility**

An 10,200 square-foot pre-engineered metal building would be constructed on a three-foot thick concrete slab to house water treatment and associated mechanical and electrical equipment (Appendix A). Building equipment and facilities would include: domestic water and sanitary waste systems, compressor equipment, wet pipe fire suppression system, 5-ton moveable gantry crane, split system heat pump, chemical storage alarm system, laboratory bench and exhaust hood, lavatory, emergency eye wash and shower system, and electrical control panel with Supervisory Control and Data Acquisition (SCADA) system. A 21-foot by 71-foot covered multi-purpose concrete slab would be constructed along the east side of the building. A concrete parking area and walkway would be constructed along the south side of the building.





**Figure 2-1 Proposed Action area (approximate 4-acre Facility footprint and 8-acre temporary staging area outlined in green)**

Twenty steel and plastic tanks ranging from 8 to 78 feet in diameter and 6 to 26 feet in height would be constructed adjacent to the building (Appendix A). The tanks would be supported by aggregate pier foundations approximately 40 feet deep.

Six inches of gravel would be placed across the Facility yard and for the existing access road between Russell Avenue and the southeast corner of the Facility footprint. The yard would be sloped and graded to carry precipitation runoff to the adjacent irrigation ditches.

Two areas within the Facility yard would be reserved for alternative treatment equipment: (1) floor space within the southwest corner of the treatment building, and (2) trailer or skid mounted innovative technology equipment that would be located west of the building (Appendix A).

### ***Site Security***

An eight-foot high, approximately 1,500 feet long, chain-link, barbed-wire fence would be constructed around the site perimeter (Appendix A). Posts for the chain-link fence would be spaced 10 feet apart and embedded in nine-inch diameter concrete footings to a depth of 36 inches. Exterior lighting, video surveillance, door and gate sensors, and an intrusion alert notification system would also be installed for additional site security and would be operated 24 hours per day during the 18-month pilot project.

### ***Pipelines***

Between six- and eight-inch diameter high density polyethylene (HDPE) pipelines would be installed underground to convey drainage water from the seven existing SJRIP reuse sumps to the Facility (Appendix A). Pipelines would be placed within existing access roads owned by Panoche Drainage District. Installation would require trenching two feet wide by three feet deep for approximately 5.4 miles. The trench would be over-excavated to 0.5 foot below the pipe using a Ditch Witch trencher or similar equipment. The pipe would be embedded in pea gravel and the trench would be backfilled with compacted native material. Pipeline construction activity would require up to a 30-foot-wide temporary construction easement along the length of the alignment. A maximum total temporarily affected pipeline construction area would be about 20 acres. The pipelines would discharge drainage water into the above-ground, 78-foot diameter, steel regulating tank located within the treatment plant area. This tank would serve as the untreated drainage water (feed) supply to the Facility (Appendix A).

A separate 500-foot-long, eight-inch-diameter, HDPE pipeline would be constructed to convey surface drainage water from the ditch along Russell Avenue, north of the Access Road, at the DP-1 location to the 26-foot diameter steel regulating tank in the treatment plant area (Appendix A). This surface drainage would be a supplemental source of water for treatment operations, if needed, during seasonal low-flow periods from the drainage sumps.

### ***Drainage Sumps***

There are seven existing sumps in the SJRIP reuse area (TS-1 thru TS-7) which would provide drainage flows to the Facility treatment plant (Appendix A). Each sump collects drainage flow from tile drains in adjacent reuse farm lands within the SJRIP. Each sump contains a float-actuated pump, which discharges the drainage into existing adjacent open irrigation ditches. One vertical turbine pump and motor drive would be added to each of the seven existing pumps in

order to meet pumping needs for conveyance of drainage water to the Facility. The existing sump pumps would remain in place in order to maintain the capability for discharge of excess drainage flows into the adjacent irrigation ditches when flows exceed the Facility demands or during temporary plant shutdowns.

Two parallel 200 gallon per minute (GPM) booster pumps with motors would also be installed at a booster station along the Main Reach (Appendix A). The booster station includes the two pad-mounted pumps and motors and a nine-foot diameter by 14-foot high steel regulating tank. The Facility SCADA system would control the tile sump and booster pumps using remote telemetry stations.

### ***Irrigation Ditches***

An existing 1,000 foot long concrete-lined irrigation ditch that currently bisects the Facility footprint would be removed from the site. Panoche Drainage District may construct a new ditch around the perimeter of the Facility to replace this ditch once construction of the Facility is complete.

The existing irrigation ditch that runs along the southern edge of the Facility footprint would be replaced by approximately 650 feet of 48-inch diameter reinforced concrete pipe. The pipe would run underground from the existing RP-1 pump station into the existing ditch and to the southeast corner of the Facility. The portion of the pipe within the existing ditch would be covered with native soil from excavated material from the site construction.

A 500 GPM vertical turbine pump would be installed in the Russell Avenue irrigation ditch, adjacent to the site access road, to convey untreated drainage water to the Facility feed tank. Pump installation would require the construction of a concrete pump vault with trash rack approximately four-foot wide by six-foot long by six-foot deep within the existing Russell Avenue ditch.

### ***Facility Infrastructure***

**Water Supply** An existing 2-inch diameter pipeline carries non-potable water from the Delta-Mendota Canal (DMC) Turnout 97.7A, continues north along the east side of Russell Avenue, and ends at the southwest corner of the Facility footprint. A packaged water filtration and disinfection system 6 feet by 10 feet would be installed within the treatment building at the Facility to provide potable water for plant operators working at the site.

**Sanitary System** A conventional septic system (septic tank and leach field) would be installed within the southeast corner of the Facility footprint area (Appendix A). The septic tank capacity would be up to 1,000 gallons and the size of the leach field would be approximately 20 feet wide by 40 feet long and 30 inches deep. Local regulations require a five-foot vertical separation between the bottom of the leach field and the water table. Therefore, it is assumed that the leach field would be constructed about two feet below existing grade and imported fill would be used to provide a mounded cover and cap.

**Power Supply** An existing 300 kilovolt ampere (kV) electrical pad-mounted transformer located at the southwest corner of the Facility would be replaced with a 750 kV secondary substation transformer and 600-ampere switchgear at a power pole drop to be installed about 350

feet east of the existing transformer. Approximately 3,000 linear feet of electrical conduit would be installed at a depth of 30 inches to carry electrical power from the transformer to the Facility service switchgear, the biotreatment equipment building, and appurtenant electrical equipment. The Facility service switchgear would include a 480-volt, 60-hertz, 3-phase, 600-ampere distribution panel board. A 600 kilowatt, 480-volt, three-phase backup engine generator would also be installed near the transformer along with a 500 gallon fuel tank. The tank would be installed within a lined containment area to contain potential fuel spills.

Transformer upgrades for drainage sumps are required at two locations: TS-1/TS-2 and TS3/TS-5. A three-phase, 45-kV, 12-kV triplex pole-type transformer would be installed at each location. Approximately 600 linear feet of 600-volt, No. 2 American Wire Gage conductor wire would be dropped from the existing power lines to the transformer at each location.

### 2.2.2 Construction Details

Access to the Facility construction site would be provided by Russell Avenue. Access for constructing drainage pipelines would be provided via existing earthen or gravel roads. No new roads would be needed for access to the site.

A temporary eight acre staging area would be placed to the north, east, and south of the Facility (Figure 2-1). The staging area would provide temporary office space, parking area, equipment and material storage, and stockpiling of excavated materials. The temporary staging area would be restored to its existing condition when the Facility construction is complete.

During construction, it is anticipated that 10 to 45 people would travel to and from the site on any given day. Construction equipment would include: grader, excavator, dozer, front end loader, roller, flatbed truck, crane, trencher and compactor. Pile driving equipment would be used if geotechnical investigations determine that pile support foundations are required for Facility tanks. Construction is expected to take approximately 14 months to complete and would likely begin Fall 2012.

### 2.2.3 Facility Operation

Drainage pipelines would provide up to 400 GPM of flow from the tile drain sumps (TS-1 to TS-7) to the 78-foot diameter regulating feed/equalizing tank for Facility treatment operations. From the feed tank, drainage flows would be pretreated to remove suspended particles that could clog or foul RO membranes. The Facility would evaluate two options for removal of suspended solids: (1) conventional pretreatment (i.e., flocculation, sedimentation, and sand/anthracite media filtration) and (2) membrane pretreatment (MF or UF). After pretreatment, approximately 200 GPM of drainage flows would be fed into the RO treatment system. Once through the RO treatment system, approximately 50 percent of the feed water (about 100 GPM) would be recovered as low salinity product water. The remaining 50 percent of the feed water (about 100 GPM) would exit the RO treatment system as a concentrated waste stream and be fed into the selenium biotreatment system. The concentrated waste stream produced after RO treatment would contain all the salts and selenium from the drainage feed water; therefore, salt and selenium concentrations would be approximately double that of the feed flow (Table 2-1). The RO concentrated waste stream would then be treated in bioreactor tanks to remove about 99 percent of the selenium. In general, only selenium would be removed from the RO concentrated waste stream (Table 2-1) during biotreatment. The residual selenium in the treated water would

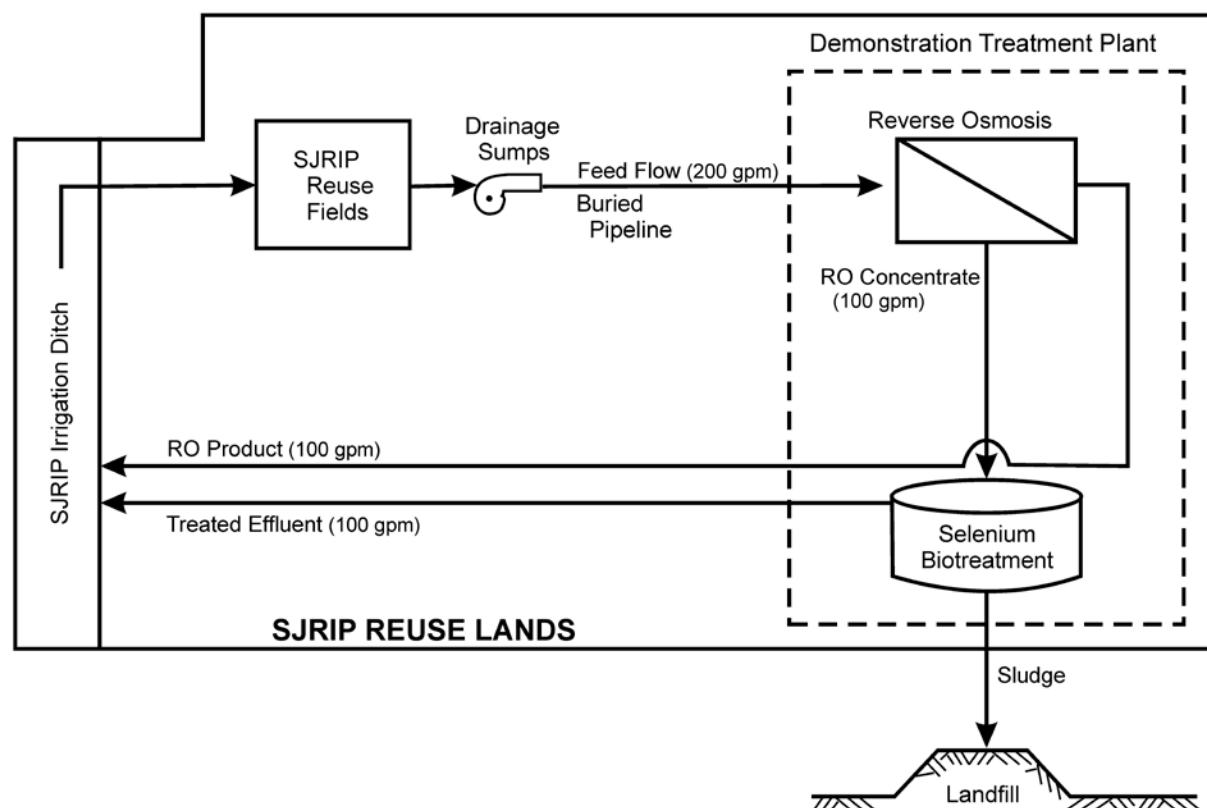
be oxidized to ensure that it is converted to inorganic selenate and/or selenite ions prior to discharge. The water quality of the biotreatment discharge water would be approximately the same as the water quality of the RO concentrate stream (Table 2-1), except that the selenium concentration would not exceed 10 micrograms per liter (µg/L) in the biotreatment effluent. A flow schematic for treatment operations are provided in Appendix B.

**Table 2-1 Water Quality Projections for RO Treatment**

Analyte	Units	Feed Concentration <sup>1</sup> (200 GPM)	Percent of Analyte Rejection	Reject Concentration <sup>2</sup> (100 GPM)	Product Concentration <sup>3</sup> (100 GPM)
Total Dissolved Solids	mg/L	14,828		29,318	340
Conductance	µS/cm	17,908		32,468	
pH		7.4		7.55	7.3
<b>MAJOR COMPONENTS</b>					
Bicarbonate	mg/L	161	96.70%	314.16	7.8
Bromide	mg/L	4	98.00%	7.88	0.12
Calcium	mg/L	113	99.00%	224.31	1.69
Carbonate	mg/L	0	98.00%	0	0
Chloride	mg/L	3,386	98.00%	6,671.43	100.00
Magnesium	mg/L	309	99.50%	615.69	2.3
Nitrate as N	mg/L	179	88.50%	328.8	29
Potassium	mg/L	23.7	98.20%	46.77	0.63
Silica	mg/L	6.7	97.00%	13.1	0.3
Sodium	mg/L	5,750	98.20%	11,346.13	150.00
Sulfate	mg/L	4,853	99.50%	9,669.69	36.00
<b>MINOR COMPONENTS</b>					
Ammonia	µg/L	3,400	95.00%	6,551.22	250.00
Aluminum	µg/L	0	95.00%	0	0
Arsenic	µg/L	8	98.00%	15.76	0.24
Boron	µg/L	33,000	90.00%	61,285.71	4,700.00
Cadmium	µg/L	3	99.50%	5.98	0.02
Chromium	µg/L	84	98.00%	165.5	2.5
Copper	µg/L	26	98.00%	51.23	0.77
Fluoride	µg/L	900	98.00%	1,773.27	26.00
Iron	µg/L	391	99.00%	776.16	5.8
Lead	µg/L	3	99.00%	5.96	0.04
Manganese	µg/L	26	99.00%	51.61	0.39
Mercury	µg/L	0.3	98.00%	0.59	0.01
Molybdenum	µg/L	150	98.00%	295.54	4.5
Nickel	µg/L	52	99.00%	103.22	0.78
Selenium	µg/L	330	99.50%	657.53	2.5
Silver	µg/L	3	98.00%	5.91	0.09
Strontium	µg/L	4,300	98.00%	8,472.28	130.00
Zinc	µg/L	26	98.00%	51.23	0.77
<sup>1</sup> Pre-treatment drainage water analyte concentrations. Data for these concentrations are from a March 2010 flow-weighted blend (average) of all 7 sumps within the SJRIP. <sup>2</sup> RO Concentrated waste stream to be sent for biotreatment. <sup>3</sup> Low-salinity RO treated water.  Note: Data for this table has been updated since release of the draft EA to include more recent sampling data. Values for the Reject and Product concentrations are based on software that analyzes RO output. Actual values are likely to vary.					

Both post-biotreatment water and low-salinity RO treated water (product stream) would be discharged onto rip rap in the existing irrigation ditch adjacent to the southeast corner of the Facility footprint, where it would be blended with other drainage waters and re-used by the SJRIP for irrigation in the reuse areas (Figure 2-2). At the start of the Project there would be an

approximate 12 hour lag time between the discharge of the RO treated water (product stream) and the discharge of the concentrated stream due to the 12-hour residence time within the bioreactor tanks. This means that “clean” water would be discharged into the irrigation ditch for 12 hours before discharge of concentrated water. After this initial 12 hour period, discharge of both streams would be simultaneous. In general, the water quality of the post-treated discharge waters from the Facility would be substantially the same as the current untreated drainage discharge water, except that 99 percent of the selenium would have been removed from the treated discharge water.



**Figure 2-2 Generalized Overview of Facility Operation**

The bioreactor tanks would be periodically backwashed to remove accumulated solids and selenium. The backwash water would be sent to a clarifier tank to provide gravity separation of the water and solids. The clarified water would be returned to the pretreatment operations at the head of the plant for re-processing. Prior to transport by truck to an off-site waste disposal facility the separated solids would be combined with solids from pretreatment backwashing and de-watered using a belt press. Up to 55,000 pounds of waste solids would be generated per year (approximately 4,500 pounds per month which would contain about 36 pounds of selenium), which would be stored on site in closed steel “roll-off” containers until transported to a disposal facility on a quarterly basis (Figure 2-2). Title 22 of the California Code of Regulations (§66261.24) defines acceptable quantities of selenium associated with solids as less than 100 parts per million (ppm). Since selenium concentrations in the waste solids are assumed to have over 2,000 ppm, the waste solids are defined as hazardous and as such, must be disposed of at a

Class 1 Hazardous Waste Landfill. The closest Class 1 landfill is the Kettleman Hills Landfill in Kings County.

### ***Treatment Chemicals***

The RO, pretreatment, and biotreatment processes are expected to add the following chemical treatments to the drainage water during treatment operations:

- **Coagulants:** One or more of the following chemicals would be added to coagulate suspended solids in the raw drainage to form larger floc particles that can be removed through gravity settling or filtration: ferric chloride, Alum (aluminum sulfate), and/or polyaluminum chloride. All of these coagulants are currently used in municipal water treatment plants.
- **Acids:** Potential acids used during treatment include hydrochloric acid, sulphuric acid, and/or citric acid. Acids may be used during treatment to lower the pH of drainage water to reduce scaling (salt deposition) or to clean scale from membrane and equipment surfaces.
- **Bases:** Sodium hydroxide may be added to the drainage water to raise the pH to increase rejection of boron by the RO membranes, or to adjust/neutralize the pH of treatment discharge streams.
- **Disinfectants:** Sodium hypochlorite (as found in common bleach) may be used as a disinfectant as part of pretreatment operations to reduce the potential for biological fouling of membranes.
- **Dechlorination:** Sodium bisulfate may be used to dechlorinate the drainage after pretreatment disinfection and prior to RO treatment.

### ***Project Power***

Central Valley Project-Use Power would be used to treat drainage water from the SJRIP. Transportation of drainage water to and from treatment would not use Central Valley Project-Use Power.

### ***Innovative Technologies***

Up to 200 GPM of raw drainage water would be available to evaluate alternative treatment technologies within the treatment plant footprint and would utilize the same treatment plant infrastructure (i.e., pipelines, sumps, storage tanks) as the RO/MF/UF systems.

### ***Facility Staffing***

Up to three full-time treatment operators would be required to operate and maintain the Facility treatment systems: one full-time treatment plant operator would be required to operate the combined pretreatment, RO, and biotreatment systems; and one treatment plant operator would be required for each of two potential innovative treatment technology systems. The drainage sumps and conveyance pipelines located outside the Facility would be operated and maintained by Panoche Drainage District staff.

### ***Facility Disposition***

The treatment demonstration systems may be operated by, but not limited to, Reclamation staff, contractors, and for 18 months to collect data for final designs. Subsequently, Reclamation may elect to continue operating the Facility indefinitely or delegate it to their designated operating

partner for treating reuse drainage. Disposition of the facility after the Proposed Action time period is unknown at this time and may require additional environmental analysis.

### **Permitting**

The SJRIP currently operates under Waste Discharge Requirements (Order Number 5-01-234) from the Regional Water Quality Control Board (RWQCB), Central Valley Region.

Reclamation would acquire all appropriate permits for construction and operation of the Facility. Reclamation would not operate the Facility until all permits have been received.

### **2.2.4 Environmental Commitments**

Reclamation shall implement the following environmental protection measures to reduce environmental consequences associated with the Proposed Action (Table 2-2). Environmental consequences for resource areas assume the measures specified would be fully implemented.

**Table 2-2 Environmental Protection Measures and Commitments**

<b>Resource</b>	<b>Protection Measure</b>
Biological Resources	Preconstruction surveys and implementation of avoidance and minimization measures for San Joaquin kit fox (SJKF, USFWS 2011a; see Appendix C).
Biological Resources	Preconstruction surveys and implementation of avoidance and minimization measures for Giant garter snake (GGS, see Appendix C)
Biological Resources	Preconstruction surveys and implementation of avoidance and minimization measures for burrowing owl (CDFG 1995; see Appendix D).
Biological Resources	Surveys (USFWS 2000; see Appendix E) will be conducted for nesting migratory birds on land that would be disturbed for construction. One eucalyptus trees ( <i>Eucalyptus</i> sp.) located at the Facility construction/staging site would likely be removed for construction. This tree would be removed either before nesting season commences, or if removal must occur during the bird breeding season, only after it is has been surveyed by a biologist and found not to support nesting birds.
Biological Resources	A biologist will be present at the inception of the construction and other times as required to insure that measures for avoidance of effects to species are implemented. Additionally, if a listed species is observed, work at the site would immediately stop and Reclamation biologists shall be notified. No work would continue without additional approval from Reclamation environmental staff, following further consultation with wildlife agencies, as appropriate.



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## Section 3 Affected Environment and Environmental Consequences

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

### 3.1 Water Resources

#### 3.1.1 Affected Environment

In March 1996, the Grassland Area Farmers formed a regional drainage entity under the umbrella of the San Luis and Delta-Mendota Water Authority (Authority) to implement the GBP and manage subsurface drainage within the Grassland Drainage Area. Participants included the Broadview Water District, Charleston Drainage District, Firebaugh Canal Water District, Pacheco Water District, Panoche Drainage District, Widren Water District, and the Camp 13 Drainers (an association of landowners located in the Central California Irrigation District). The Grassland Area Farmers' drainage area consists of approximately 97,400 gross acres of irrigated farmland on the west side of San Joaquin Valley and is known as the Grassland Drainage Area. Discharges of subsurface drainage from this area contain elevated levels of salt, selenium, and boron (Reclamation 2009a).

The original GBP was implemented in November 1995 through an *Agreement for Use of the San Luis Drain* (Agreement No. 6-07-20-w1319) between Reclamation and the Authority (1995 Use Agreement). The 1995 Use Agreement allowed the Authority to use a portion of the San Luis Drain to convey agricultural drainage water through adjacent wildlife management areas to Mud Slough, a tributary to the San Joaquin River. The 1995 Use Agreement allowed for use of the San Luis Drain through September 30, 2001. This agreement was extended through December 31, 2009 through a second Use Agreement. On December 21, 2009, Reclamation signed a ROD to extend the Use Agreement to December 31, 2019 (Reclamation 2009a).

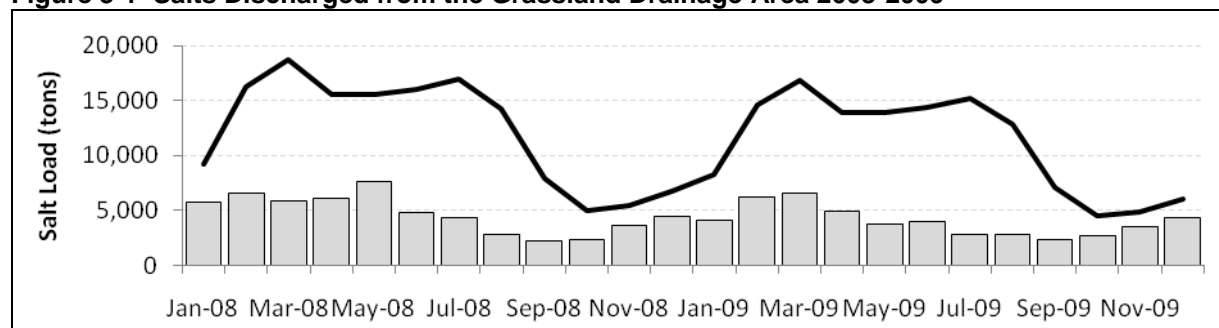
#### ***San Joaquin River Improvement Project***

In December of 2000, Panoche Drainage District began implementation of the SJRIP as a tool to help manage subsurface drainage water generated throughout the Grassland Drainage Area. Drainage flows collected from the Grassland Drainage Area are removed from the Grassland Bypass Project and used to irrigate salt tolerant crops within the approximately 6,000 acre SJRIP which has reduced the volume of agricultural subsurface drain water discharged to the San Joaquin River. Water that is brought in from the Grassland Drainage Area to SJRIP remains within SJRIP (see Figure 2-2).

**Drainage Water Quality** Between 1986 and 1996 (pre-SJRIP), average annual flow discharged for the Grassland Drainage Area was 49,760 acre-feet (AF). Selenium concentrations averaged 67.4 µg/L with a range between 52.3 µg/L and 80.5 µg/L. TDS averaged 2,910 mg/L with a range of 2,351 mg/L and 3,307 mg/L. Boron concentrations averaged 5.5 mg/L with a range of 4.3 mg/L to 6.8 mg/L. Between 1997 and 2008 (post implementation of the SJRIP), the

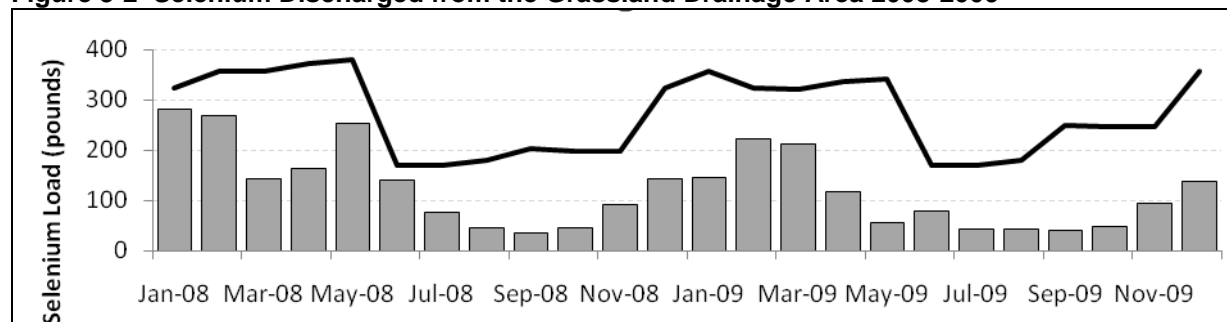
average annual flow discharged to the Grassland Drainage Area was reduced to 27,080 AF. Average selenium concentrations averaged 59.9 µg/L with a range between 46.6 µg/L and 70.6 µg/L. TDS annual averages increased to 3,387 mg/L with a range of 3,072 mg/L and 3,580 mg/L. Boron concentrations also increased to 7.6 mg/L with a range of 7.0 mg/L and 8.1 mg/L (see Appendix F for a summary table of these annual flows). Figures 3-1 and 3-2 below show variation in salt and selenium loads discharged from the Grassland Drainage Area from January 2008 to November 2009.

**Figure 3-1 Salts Discharged from the Grassland Drainage Area 2008-2009**



Source: Reclamation 2009b

**Figure 3-2 Selenium Discharged from the Grassland Drainage Area 2008-2009**



Source: Reclamation 2009b

### 3.1.2 Environmental Consequences

#### **No Action**

Water quality within the SJRIP would remain the same as existing conditions. Drainage flows from the Grassland Drainage Area would continue to be removed from the Grassland Bypass Project and used to irrigate salt tolerant crops within the approximately 6,000 acre SJRIP. Reduction in the volume of agricultural subsurface drain water discharged to the San Joaquin River would continue. Reclamation would continue pursuing options for providing drainage service to the San Luis Unit.

#### **Proposed Action**

Water to be treated by the Facility would be removed from existing drainage water collected for use in the SJRIP. No additional drainage water would be created for the Proposed Action. As described in Section 2.2.3, approximately 50 percent of drainage water brought into the Facility would be concentrated into a waste stream that would be fed into the selenium biotreatment system for up to 99 percent selenium removal (selenium concentrations are estimated to be 2.5

µg/L after biotreatment). The remaining 50 percent would be recovered as low salinity product water (TDS estimated to be 340 mg/L after RO treatment). However, only selenium would be removed from the concentrated waste stream during biotreatment. Consequently, salt concentrations in the treated water discharged back into the SJRIP would be similar to that of the pre-treated drainage water sent into the Facility as the low-salinity RO water and the biotreated water would be discharged over rip rap within the existing irrigation ditch adjacent to the western edge of the Facility footprint, where it would be blended with other drainage waters and re-used by the SJRIP for irrigation in the reuse areas. As described in Section 2.2.3, Reclamation would acquire all appropriate permits for construction and operation of the Facility and would not operate the Facility until discharge permits are in place.

### ***Cumulative Impacts***

Facility treatment of drainage water would have a cumulatively beneficial impact on drainage water used within the SJRIP as selenium concentrations within treated drainage water would be substantially reduced. Selenium concentrations under the No Action Alternative would continue to cumulatively build up as drainage water would not be treated and would remain within the SJRIP.

## **3.2 Land Use**

### **3.2.1 Affected Environment**

Agriculture is the primary land use within the SJRIP. Crops that are generally grown in the SJRIP by the Panoche Drainage District include salt tolerant crops such as Jose tall wheatgrass, alfalfa, and pistachios.

### **3.2.2 Environmental Consequences**

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

There would be no change in land use as conditions would remain the same as existing conditions.

#### ***Proposed Action***

The Proposed Action would include construction of a Facility for treating drainage water to remove selenium. The Facility would not change land use designations nor would it impede existing uses. A small portion of an existing field would be removed for temporary staging during construction of the Facility; however, once construction is complete the field would be returned to its current use. Drainage water treated in the Facility would be returned to the SJRIP drainage system for continued use; however, this water would have improved water quality as selenium would be reduced prior to its return. Consequently, there would be no adverse impacts to land use as a result of the Proposed Action.

### ***Cumulative Impacts***

There would be no change in land use or land use designations as a result of the Proposed Action or the No Action alternative. Consequently, there would be no cumulative change in land use.

### 3.3 Biological Resources

#### 3.3.1 Affected Environment

Historically, lands on the valley floor in the vicinity of the SJRIP reuse area likely included prairie grassland, along with alkali sink and saltbush scrub habitat. Some low lying areas may have included wetlands or vernal pools, and areas along the San Joaquin River, east of the SJRIP reuse area, provided riparian habitat. West of the SJRIP reuse area, the Panoche Hills and the base of the Coast Range rise from the edge of the valley floor. The foothills provided open grasslands and shrub lands. The foothill areas remain predominantly undeveloped and support introduced annual grasslands and native shrub lands. Higher elevation and wetter sites in the Coast Range support shrubs and trees.

The SJRIP reuse area covers approximately 6,000 acres of Panoche Drainage District. It utilizes subsurface drainage water as an irrigation source for salt tolerant crops to reduce the volume of drainage that must be discharged into the San Joaquin River (LAFCO 2011). Salt laden SJRIP reuse water is commonly applied to fields of Jose tall wheatgrass (*Agropyron elgongatum*), bermudagrass (*Cynodon dactylon*) and seashore paspalum (*Paspalum vaginatum*). Fields in the SJRIP reuse area are bordered by open ditches that supply irrigation water. The terrain is flat and the agriculture practiced there is intensive. Fields are plowed, disked and prepared for planting. The current landscape is highly utilized for agricultural purposes. Lands not used for agricultural infrastructure are used to produce crops. Irrigation, maintenance and harvesting frequently occur throughout the area.

The footprint for the Proposed Action is within that portion of the SJRIP reuse area south of the Outside Canal, north of the DMC, and immediately east of Russell Avenue, extending to Sump TS1. The Proposed Action footprint covers approximately 5 acres of cropland adjacent to Russell Avenue, approximately 3 acres of compacted, bare earthen staging area and roadway used for drying hay prior to shipment, and about 20 acres of compacted, bladed, roadway through the SJRIP reuse area leading to sumps TS1 through TS7. Crops grown in the areas that would be disturbed include Jose tall wheatgrass and alfalfa. Construction of pipelines from the seven existing sumps (TS1-TS7) to the Facility would affect compacted, bladed, earthen roadway. Plantings along these roadways commonly include bermudagrass, seashore paspalum, alfalfa, or fallowed land. The fallowed lands are frequently finely disced and lack vegetative cover.

The crop fields within the Proposed Action footprint are subdivided by earthen roads and open field irrigation ditches which may contain water, depending on current water reuse management and delivery of water for irrigated crops. Typically small (approximately one to three feet across) earthen (or in one case a concrete lined section) field ditches, devoid of vegetation, exist immediately adjacent to crop fields. The ditches are used to supply irrigation water directly to croplands. Slightly larger (approximately 4 to 10 foot wide and sometimes quite deep (approximately 4 to 8 feet from bottom to crest) ditches run parallel to, and between adjacent earthen roadways. The larger ditches also lack terrestrial vegetation on their steep sided banks. In contrast to the small field ditches, some of the larger ditches hold water for periods long enough to support growth of filamentous green algae, and in some places, submerged aquatic plants (e.g. pondweed [*Potamogeton* sp.]). Emergent vegetation is essentially lacking from all

waterways. Only one small clump of cattail (*Typha* sp.) and one small clump of bulrush (*Scirpus* sp.) were observed in waterways during an August 2010 site survey that traversed approximately 5 miles of roadway where pipe would be placed. The waterways are periodically dried depending on the need to move water around the SJRIP reuse area, and conditions are not favorable for establishment of emergent vegetation in them.

As a consequence of human activities over the last century, the grasslands and shrub habitat, along with other San Joaquin Valley habitats, have largely been converted to other uses such as agriculture, housing, commerce, transportation, water projects, and utility services. Today the SJRIP reuse area lands and surrounding lands in Panoche Drainage District are devoted primarily to agriculture. Typical crops grown in Panoche Drainage District include almonds, tomatoes, cotton, wheat, asparagus, pistachios and alfalfa (PWD 2011).

In addition to croplands, small acreages are devoted to farm support facilities, processing centers, and a limited number of rural residences. Recently, there has been interest in developing lands on the west side of the San Joaquin Valley for energy production, especially solar power.

Several thousand acres of agricultural lands in the vicinity of the SJRIP reuse area have been idled from irrigated agricultural use. A total of 37,106 acres of irrigated lands in nearby Westlands Water District were set aside by means of “non-irrigation” covenants that prevent any future irrigation with CVP water (USFWS 2006). Additionally, assignments of water contracts have contributed to fallowing of lands that were formerly irrigated for agricultural production in Centinella Water District (Reclamation 2004), Widren (Reclamation 2005) and other water districts. These idled lands may be grazed, utilized for dry-land farming, or fallowed. Fallowed lands are sometimes plowed or disked to reduce weed establishment, but seasonally can be colonized by weedy annual vegetation. Additionally, limited remnant alkali/saltbush scrub habitat may remain within Panoche Drainage District.

Because the Proposed Action would temporarily remove a fraction of SJRIP reuse area water (i.e. from the sumps), treat it experimentally, and then return it to the larger pool of SJRIP reuse water, lands that receive the water and the areas the water flows through, are included in the Action Area covered under Reclamation’s Endangered Species Act (ESA) Section 7 consultation with the U.S. Fish and Wildlife Service (Service). The treated water would be discharged to an existing open irrigation ditch that runs east-west, and lies at the southern edge of the proposed Facility. This east-west ditch receives water from an open north-south running ditch that runs along the east side of Russell Avenue. The east-west running ditch supplies water to the SJRIP reuse area lands. Water treated in the Facility would discharge to this east-west running ditch. Consequently, treated water from the facility would return to the pool of irrigation water for the SJRIP, where it would remain. It should be noted, however, that as part of the Proposed Action, approximately 650 feet of the east-west running ditch would be enclosed in pipe.

The Proposed Action would produce waste solids that require disposal as described in Section 2.2, consequently, roadways and lands used to transport and dispose of this material are also included as part of the Action Area. The disposal site for waste from the Facility has not yet been determined, but a facility, near Buttonwillow, California, has been identified as a possible disposal site. Access to this or other disposal sites would be via paved roads leading from the

Facility. If disposal were to occur near Buttonwillow, waste solids would likely be transported via Russell Avenue, U.S. Interstate 5, Buttonwillow Drive, State Highway 58, and Lokern Road, west of Buttonwillow. If another site is used, existing Interstate Highway, State Highways, and County Roads would be used. It is possible that transport near the terminus of the disposal site would occur over a short distance of unpaved roadway, though presumably the roadway would customarily host vehicles delivering waste products.

### **Special-Status Species**

On August 15, 2011 a list of species and designated critical habitat protected under the ESA (16 U.S.C. §1531 et. seq.) was obtained (document #110815104800) for the Proposed Action from the Service (USFWS 2011b). The list covers the SJRIP reuse and surrounding areas, including the following USGS 7.5 minute Quads: Bliss Ranch (401C), Broadview Farms (382D), Delta Ranch (402C), Dos Palos (382B), Firebaugh (381C), Hammonds Ranch (382C), Oxalis (382A), Poso Farm (381B) and Santa Rita Bridge (402D). The status and determination of effects from the Proposed Action on federally listed species and their critical habitats, and a summary of the rationale supporting the determination are provided in Table 3-1.

**Table 3-1 Federally-listed species and designated critical habitat**

Species	Status <sup>1</sup>	Effects <sup>2</sup>	Summary basis for ESA determination <sup>3</sup>
<b>AMPHIBIANS</b>			
California red-legged frog ( <i>Rana aurora draytonii</i> )	T	NE	<b>Absent.</b> Species absent from San Joaquin Valley floor and from vicinity of the project. No suitable habitat in Project footprint <sup>4</sup> . No change to wetland or riparian habitat.
California tiger salamander, central population ( <i>Ambystoma californiense</i> )	T	NE	<b>Absent.</b> No vernal pool habitat or other suitable wetland habitat in the Facility footprint. No species records within 15 miles. No disturbance to wetland habitat or change to water quality of their habitat.
<b>FISH</b>			
Central Valley steelhead ( <i>Oncorhynchus mykiss</i> )	T, X (NMFS)	NE	<b>Absent.</b> No stream habitat present in Project footprint or Action Area. No disturbance to waters inhabited by this species.
Delta smelt ( <i>Hypomesus transpacificus</i> )	T, X	NE	<b>Absent.</b> No suitable habitat in Project footprint or Action Area. No disturbance of aquatic habitat for this species.
<b>INVERTEBRATES</b>			
Longhorn fairy shrimp ( <i>Branchinecta longiantenna</i> )	E	NE	<b>Absent.</b> No vernal pool habitat in Project footprint. No vernal pool habitat would be disturbed. Water quality of vernal pools would not be affected.
valley elderberry longhorn beetle ( <i>Desmocerus californicus dimorphus</i> )	T	NE	<b>Absent.</b> No suitable habitat in the Project footprint. No elderberry shrubs would be disturbed.
vernal pool fairy shrimp ( <i>Branchinecta lynchi</i> )	T	NE	<b>Absent.</b> No vernal pool habitat in Project footprint. No vernal pool habitat would be disturbed. Water quality of vernal pools would not be affected.
vernal pool tadpole shrimp ( <i>Lepidurus packardii</i> )	E	NE	<b>Absent.</b> No vernal pool habitat in Project footprint. No vernal pool habitat would be disturbed. Water quality of vernal pools would not be affected.
<b>MAMMALS</b>			
Fresno kangaroo rat ( <i>Dipodomys nitratoides exilis</i> )	E	NE	<b>Absent.</b> Possibly extirpated; no records for this subspecies recorded since 1992. No suitable habitat in Project footprint. No disturbance of suitable habitat.

Species	Status <sup>1</sup>	Effects <sup>2</sup>	Summary basis for ESA determination <sup>3</sup>
Giant kangaroo rat ( <i>Dipodomys ingens</i> )	E	NE	<b>Absent.</b> No records from the Project footprint. No suitable habitat in Project footprint. No disturbance of suitable habitat.
San Joaquin kit fox ( <i>Vulpes macrotis mutica</i> )	E	NLAA	<b>Possible.</b> No records exist in the Project footprint. Closest records on the valley floor are mostly old (ca. 1920). Those further from the Project footprint date to the 1990's, although only one record from within 10 miles is from west of the San Joaquin River. Newer records are more located in the hills mostly west of Interstate 5. No SJKF recorded in recent surveys of SJRIP reuse lands. However, there would be temporary disturbance to bladed, compacted earthen roadway and agricultural land for staging and construction and about 4 acres of agricultural lands and roadway would be used for treatment Facilities for the duration of the pilot project. In addition, infrequent transport of solid waste material would occur within the San Joaquin Valley. Unlikely presence on roads traveled by staff. Standard avoidance measures would be implemented and fencing would be placed around the Facility during construction (Appendix C). Additionally, permanent chain link fence would surround the facility.
PLANTS			
Palmate-bracted bird's beak ( <i>Cordylanthus palmatus</i> )	E	NE	<b>Absent.</b> No suitable habitat in Project footprint. No suitable habitat affected.
REPTILES			
Blunt-nosed leopard lizard ( <i>Gambelia</i> (= <i>Crotaphytus</i> ) <i>silae</i> )	E	NE	<b>Absent.</b> No suitable habitat in Project footprint. No suitable habitat would be disturbed.
Giant garter snake ( <i>Thamnophis gigas</i> )	T	NLAA	<b>Possible.</b> Minimal disturbance to aquatic habitat would occur. Records for GGS within 5 miles of the Project footprint are more than 30 years old. There are no records of GGS from surveys or monitoring in the SJRIP reuse area. Quality of SJRIP reuse water would improve minimally from a reduction in the concentration of selenium, including bioactive forms. This improvement would be small and likely of minimal benefit. Avoidance measures would be applied during construction (Appendix C). Temporary disturbance to bladed, compacted earthen roadway and agricultural land for staging and construction would occur. About 4 acres of agricultural and roadway would be used for treatment facilities for the duration of the pilot project.
<sup>1</sup> Status= Status of federally protected species protected under federal ESA. E: Listed as Endangered under the federal ESA. T: Listed as Threatened under the federal ESA. X: Critical habitat designated under the federal ESA. NMFS: Species under the Jurisdiction of the National Marine Fisheries Service. <sup>2</sup> Effects = ESA determination NE: No Effect anticipated from the Proposed Action to federally listed species. NLAA: May affect, but not likely to adversely affect federally listed species. <sup>3</sup> Definition Of Occurrence Indicators Present: Species known to occur within the Action Area. Possible: Species recorded in area but habitat of actively cultivated lands of poor quality Absent: Species not recorded in study area and/or habitat requirements not met <sup>4</sup> Project footprint is a term used to describe the action area under ESA consultation and is larger than the Facility footprint described under the Proposed Action as defined in Section 3.3.			



In addition to federally listed species and designated critical habitat from the SJRIP reuse area, state listed and other species of interest from the broader Action Area were considered (Table 3-2).

**Table 3-2 State-listed and other Species of Special Concern**

Common Name	Listing <sup>1</sup>	Determination of Effects from the Proposed Action
<b>AMPHIBIANS</b>		
California tiger salamander, central population ( <i>Ambystoma californiense</i> )	ST	See Table 3-1
<b>BIRDS</b>		
Burrowing owl ( <i>Athene cunicularia</i> )	MBTA	MBTA avoidance measures will be applied during construction (Appendix D and E). Temporary disturbance to bladed, compacted earthen roadway and agricultural land for staging and construction would occur. About 4 acres of agricultural and roadway would be used for treatment Facility for the duration of the pilot project.
California least tern ( <i>Sternula antillarum browni</i> )	SE	No records were found for this species within the Facility footprint and occurrence of this species is improbable. MBTA avoidance measures will be implemented to reduce potential impacts (Appendix E). There would be no disturbance of aquatic habitat under the Proposed Action and no change in water quality in the Delta.
Mountain plover ( <i>Charadrius montanus</i> )	MBTA	There are recorded occurrences of this species on SJRIP reuse area lands. There would be no disturbance to wetlands under the Proposed Action. There would be temporary disturbance to bladed, compacted earthen roadway and agricultural land. About 4 acres of agriculture and roadway to be used for treatment Facility for the duration of the pilot project. MBTA avoidance measures will be implemented to reduce potential impacts from these activities (Appendix E).
<b>FISH</b>		
Delta smelt ( <i>Hypomesus transpacificus</i> )	SE	See Table 3-1
Longfin smelt ( <i>Spirinchus thalesichthys</i> )	SE	No effects are expected as there is no suitable habitat within the Facility footprint or Action area.
<b>PLANTS</b>		
Palmate-bracted bird's-beak ( <i>Cordylanthus palmatus</i> )	SE	See Table 3-1
<b>REPTILES</b>		
Blunt-nosed leopard lizard ( <i>Gambelia [=Crotaphytus] sila</i> )	SE	No effects are expected as there is no suitable habitat within the Facility footprint and no suitable habitat would be affected by the Proposed Action.
Giant garter snake ( <i>Thamnophis gigas</i> )	ST	See Table 3-1
Fresno kangaroo rat ( <i>Dipodomys nitratoide exilis</i> )	SE	See Table 3-1
Giant kangaroo rat ( <i>Dipodomys ingens</i> )	SE	See Table 3-1
San Joaquin antelope squirrel ( <i>Ammospermophilus nelson</i> )	ST	No effects are expected as are no records of this species within the Facility footprint. There are only two known records within the vicinity of the Proposed action area that are about 100 years old.
San Joaquin kit fox ( <i>Vulpes macrotis mutica</i> )	ST	See Table 3-1
<sup>1</sup> Status= Status of protected species SE: Listed as Endangered under the California ESA. ST: Listed as Threatened under the California ESA. MBTA: Protected under the Migratory Birds Treaty Act.		

### 3.3.2 Environmental Consequences

#### **No Action**

The No Action Alternative would not result in construction and no water from the SJRIP reuse area would be treated. Current activities would continue as is and no new affects to biological resources would occur.

#### **Proposed Action**

Effects to biological resources from the Proposed Action could occur from construction of the Facility, pipelines and appurtenances, or from operation or maintenance of the facilities during the Proposed Action. However, because the SJRIP reuse area is heavily affected by intense agriculture activity, and weed and pest species are controlled or eliminated, the habitat available is little used by wildlife and fish species. The reduced value of habitat may also relate to the relatively high concentrations of selenium in water applied to the landscape and the salt tolerant vegetation, which can be exploited by a relatively small suite of species. With implementation of avoidance measures as described in Section 2.2 and Appendices C through E, the Proposed Action is not expected to adversely affect federally-listed and other protected species.

Construction activities would occur over approximately 14 months. The largest area of temporary disturbance (approximately 20 acres in roadways) would result from excavation and laying of pipelines to carry water from existing sumps, which collect in-ground water, to the Facility. The roadways that would be disturbed are heavily traveled by agricultural workers and are of limited use to wildlife.

Approximately 650 feet of 48-inch diameter reinforced concrete pipe placed underground would replace 650 feet of existing open irrigation ditch from RP-1 pump station to the southeast corner of the Facility. The portion of the pipe within the existing irrigation ditch would be covered with native soil from excavated material from the site construction, removing this habitat and also source of exposure of animals, to SJRIP irrigation water.

Operations occurring within the compound housing the Facility are not anticipated to measurably affect biological resources. The primary effect of Facility operation would be production of treated water which would be released to an irrigation ditch. The treated water would be a minor fraction of the SJRIP reuse water pool carried in the irrigation ditch, and it would minimally affect the SJRIP reuse water. The treated water would remain at the SJRIP and would not alter water quality elsewhere; the quality of water at the SJRIP would minimally be affected by the Facility and concentrations of salts and elements other than selenium in SJRIP reuse water would remain similar, if not slightly lower than current concentrations (see Table 2-1). Although the concentration of selenium in post treatment SJRIP reuse water would be reduced, including for bioactive forms, the overall improvement to water at the SJRIP would likely be minor because relatively “poorer quality” water would continue to be diverted to the SJRIP pool of water used for irrigation.

The facility would be operated year-round and would be lighted for safety and security. The effects to wildlife resources from this light source are expected to be negligible because of the existing low value of the area to wildlife.

Hazardous material (e.g. concentrated selenium) generated from the experimental treatment would be stored on site, within the secured, fenced, lighted compound as described previously. The material stored would be “solids” and would have little opportunity to spread outside the secured area. Purposeful transport would occur to a waste disposal site approximately quarterly, where any effects of disposal would already be addressed.

Transport vehicles traveling on county roads, state highways, and federal highways (e.g. Interstates) would not be expected to affect biological resources. Similarly, staff traveling to and from the site for work on existing roads would not be expected to affect biological resources.

Besides effects from facilities construction and operation, some, minimal maintenance is anticipated over the period of operation of the Facility. Maintenance required for the Facility would be expected to be conducted within fenced compound surrounding the Facility and the perimeter fencing. Maintenance within the compound should have no effect to biological resources.

If necessary, “exclusion devices” such as netting or physical barriers would be installed to prevent access by breeding birds that could disrupt operation of the Facility. The Facility would be retrofitted during the bird non-breeding to exclude migratory birds.

Vermin, pests posing a human health hazard, or pests otherwise affecting the effective operation of the Facility inside the perimeter fencing would be controlled employing integrated pest management techniques. The potential for harm to listed species would be minimized when practicing control. Pesticides approved for use in California, as determined by the California Department of Pesticide Regulations would be utilized. Application of pesticides would follow recommendations of a Licensed Pest Control Operator and be applied by a Licensed Pest Control Applicator. Approval would be required from Reclamation prior to use.

**Effects to listed wildlife species and designated critical habitat** The potential for habitat, specific to listed species to be affected by the Proposed Action was discussed with biologists from the Service and private industry. Two federally listed species considered possible candidates to occur in the area and which may be affected by the Proposed Action are SJKF and GGS. Potential effects to these species could result from construction activities in the Proposed Action footprint or from operation or maintenance of the Facility. Reclamation has completed consultation with the Service under Section 7 of the ESA for these species and on June 4<sup>th</sup>, 2012 a letter of concurrence was provided by the Service (Appendix K).

*Effects to Giant Garter Snake* GGS inhabits agricultural wetlands and other waterways such as irrigation and drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands in the Central Valley (USFWS 1999). Habitat requirements for GGS consist of (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter (USFWS 2009).

Potential habitat in the Proposed Action footprint includes irrigation ditches and adjacent uplands in the SJRIP reuse area, as well as the Outside Canal located adjacent to the area. The suitability of the aquatic habitat adjacent to construction areas is poor. The irrigation ditches adjacent to the roadways where trenching would occur have steep-sided banks and are virtually devoid of vegetation, including emergent vegetation. There is limited algal growth and submersed aquatic vegetation in some portions of ditches, and prey such as bullfrogs (*Rana catesbeiana*) and minnows (Cyprinidae) occur there. Although prey are present, they are not abundant and there is considerable risk to GGS from predators. Herons and egrets forage along the ditches and easily could prey on GGS in the ditches because no escape cover is present for the snakes. Additionally, bullfrogs could prey on young GGS. Bullfrogs have reduced the suitability of nearly all permanent and semi-permanent waters in the Central Valley for GGS (USFWS 1993).

The habitat for GGS adjacent to the Proposed Action footprint is also poor, and dispersal to the SJRIP reuse area would not be favored. There are only a few records for GGS within about 5 miles of the Proposed Action footprint and these are over 30 years old (CNDDDB 2011). Valley garter snakes (*T. sirtalis*) have been found on areas surveyed north of the Outside Canal and west of Russell Avenue, but no GGS were recorded in the surveys of this area (Harvey and Associates 2008). Although Valley garter snakes were recorded from that area, this species is a broad ranging generalist, capable of utilizing terrestrial habitats to a far greater extent than GGS, which is essentially an aquatic obligate dependent exclusively on aquatic prey (Harvey & Associates 2008). In over 5 years of biological monitoring at the SJRIP reuse area, no GGS have been observed (J. Seay, pers. comm.).

The Outside Canal borders the northern edge of the Proposed Action footprint adjacent to Sump #1 and #7. Levees of the Outside Canal are earthen and the internal prism of the western (southern) levee is sparsely covered with a thin layer of crushed concrete (approximately 1 inch up to 6-inches in depth). Vegetation on this internal prism and also along the earthen service roads is controlled and largely lacking. Emergent vegetation in the Outside Canal also is virtually non-existent in the section bordering the Proposed Action footprint. Because of these conditions and the likely presence of predatory fish in the Outside Canal, this waterway would be considered relatively poor habitat. It would be unlikely to facilitate dispersal of GGS to the SJRIP reuse area.

The DMC is approximately 1,000 feet south of construction areas on the SJRIP reuse area at its closest. The DMC provides permanent water, which is needed by GGS. However, the portion of the DMC closest to the Proposed Action footprint is concrete lined and is poorly suited for GGS. Access to construction areas on the SJRIP reuse area by GGS via the DMC, would require overland movement, and this would be unlikely to occur.

Because there are no records from the area, quality of habitat is poor both on the SJRIP reuse area and in the nearby landscape, dispersal into the Proposed Action footprint is unlikely and the probability of occurrence for GGS is low.

The trenching from sumps and laying of associated pipeline would occur in compacted earthen and gravel roadways. Because this work would avoid aquatic areas, and because the roadways do not provide refugia suitable for GGS, GGS would not be harmed by this activity.

Additionally, the construction area would be surveyed for GGS before construction and work would not occur without further consultation with Service if GGS was observed.

A limited amount of construction would occur in irrigation ditches which could have the potential to affect GGS. Approximately 650 feet of open irrigation ditch running from the existing RP-1 pump station along the graveled access road immediately south of the site for the proposed facility would be replaced with covered 48-inch concrete pipe. Additional temporary activity would occur where another pipeline segment from the Facility would be connected to a ditch west of the Facility. Together, however, this work is not likely to adversely affect GGS. The area is not likely to be inhabited by GGS and avoidance measures would be implemented (Appendix C); construction areas would be surveyed for GGS before work could begin and a biological monitor would be present when construction activities occur in suitable aquatic habitat. If a GGS was observed, work would not occur without further consultation with the Service. Replacing the open irrigation ditch would remove a small area of potential barren ditch habitat, but it also would remove a potential area for GGS exposure to adverse elements. Nevertheless, because GGS are not likely to be present in the area and there would be removal of a minimal amount of poor quality habitat, the effects to GGS from this portion of the Proposed Action are discountable and insignificant and therefore not likely to adversely affect GGS.

Effects to GGS in uplands would be unlikely because few burrows or other potential overwintering sites are present in the Proposed Action footprint and so GGS are not likely to be present on the affected area. Most of the construction work conducted during the GGS inactive period would occur at the Facility site. This site is a relatively small in area with limited adjacency to ditches. Once initial earth work is completed at the Facility, work would be focused inside an approximate four acre compound and it is unlikely to be used by GGS.

The operation of the Facility could slightly improve water quality on the SJRIP reuse area through reduced selenium concentrations in post treatment water discharged back into the SJRIP reuse area water pool. This could potentially benefit GGS; however, because the change to water quality would decline with dilution from pooling with other SJRIP reuse water, any benefit would likely be limited to areas close to the discharge site. The significance of any benefit to GGS would be minimal, especially since GGS would not likely be present in the area during the experimental period owing to its rarity in the area. Consequently, with implementation of the avoidance measures listed in Table 2-1 and included in the Reclamation's request for concurrence, effects from the Proposed Action to GGS are unlikely.

*Effects to San Joaquin kit fox* The Proposed Action could potentially affect SJKF during construction and maintenance activities; however, treatment of SJRIP reuse area water would not affect this species. Terrestrial habitat in the SJRIP reuse area is intensively managed for agriculture and the landscape is highly disturbed (e.g. through land preparation, planting, irrigation and harvesting). Workers utilize the numerous earthen roads running throughout the SJRIP reuse area and this is a considerable disturbance factor. Areas that are not cropped are kept barren and free of weeds, limiting areas for potential prey species. Those fields not in production are finely disked and lack vegetation. Together, these conditions, along with the limited diversity of vegetation and high selenium concentrations may limit invertebrate prey, which seemed to be relatively scarce in crop fields. There are few opportunities for rodents to

burrow in fields and for burrows to persist because of frequent haying and flood irrigation. Pests such as California ground squirrel (*Spermophilus beecheyi*) are controlled and little evidence of burrowing activity by other rodents (possibly *Thomomys* sp.) occurs in the Proposed Action footprint. Because few burrowing mammals are likely present, and there are few existing burrows for SJKF to exploit for shelter, the attractiveness of the site is limited.

The high intensity agriculture practices also likely limits the suitability of the site for prey for SJKF, such as for kangaroo rats (*Dipodomys* spp.) or invertebrates. During site visits, little evidence of potential prey was observed in the Proposed Action footprint.

The nearest records for SJKF are about 5 or more miles away and these are relatively old (CNDDDB 2011); they include records mostly from 1920. More recent records from the 1990's are located mostly east of the San Joaquin River, and separated from the Proposed Action footprint by the San Joaquin River and/or major canals. Other records are found west of the Proposed Action footprint, in the foothills of the Coast Range. During considerable field work on site from April to June, from 2003 through 2010, no SJKF or their sign or other evidence of SJKF has been observed on the SJRIP reuse area (J. Seay, pers. comm). SJKF might move through the site, but for lack of burrows and prey they would not be expected to reside or remain at the site. The paucity of observations in the open landscape over many years supports the suggestion that SJKF is not resident at the site. However, given records within 10 miles, and dispersal capabilities of the species, SJKF could move through the area. Incorporation of preconstruction surveys and avoidance measures, coupled with the relatively short-term required to construct the Facility and the relatively small Facility footprint, the construction for the Proposed Action would not likely affect SJKF. Additionally, the enclosure of a short section of open irrigation ditch in concrete pipe (to be covered under fill) at the SJRIP, would not affect SJKF.

Maintenance activities practiced at the Facility would occur over a relatively short time period and would be restricted primarily within a fenced compound. Maintenance activities at the Facility that could affect SJKF, such as control of vermin, would be done to minimize risk to SJKF. The fencing would be expected to effectively preclude access to the area where maintenance occurs, and therefore maintenance would not likely affect SJKF. Maintenance of the perimeter fencing that involve ground disturbance would require avoidance measures applied to ground disturbance for construction, such as standardized avoidance measures for SJKF (USFWS 2011a), or as appropriate for other listed species or migratory birds. If a listed species is detected, further consultation with Service would be conducted, as appropriate. There is little chance lighting would affect listed species such as SJKF, because of the low likelihood for this species to be present at the site or nearby and any temporary exposure to an animal passing through the area would be minimal.

**Effects to listed fish species and designated critical habitat** The Proposed Action would not affect listed fish species or their habitat because neither listed species or their habitat are present in the Action Area.

**Effects to other fish species and their habitat** The Magnuson-Stevens Fishery Conservation and Management Act (MFA) as amended (16 U.S.C. 1801 et seq.) requires evaluation of the

Proposed Action on Essential Fish habitat. No species of fish or habitat that is regulated under MFA would be affected.

**Effects to Designated Critical Habitat** No designated critical habitat exists in the Action Area. Therefore, there would be no effect to designated critical habitat.

### ***Cumulative Impacts***

No state or local actions in the area of the Proposed Action are currently known which could affect listed species or their critical habitat. Agriculture, as currently practiced, is assumed to continue in the area under either alternative and these activities limit the availability of habitat suitable for listed species. Agricultural land is generally inhospitable for most listed species, especially for most crops and practices applied in the vicinity of the SJRIP reuse area. Recently, there has been a trend toward converting lower value row crops to higher value perennial and nut crops. In general, this change is occurring on the west side of the valley where water supplies are sufficient to ensure requirements of perennial crops can be met.

The impact of the conversion is probably minimal for most species, although the SJKF could benefit slightly from this change, as more ground level “open” habitat is created, compared with denser row crops such as cotton and tomatoes. Greater visibility may minimize predation on SJKF by coyotes (*Canis latrans*). Additionally, almond and pistachio orchards generally have an open understory that may harbor ground squirrels which may be used as prey by SJKF. However, the overall benefit to SJKF from the changes occurring are expected to be minimal.

The minimal change to water quality in the SJRIP reuse area as a result of the Proposed Action would not influence water quality outside the SJRIP reuse area. As drainage water in SJRIP remains within SJRIP, neither alternative would affect biological resources “downstream” of the SJRIP project.

## **3.4 Cultural Resources**

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

The Section 106 process is outlined in the Federal regulations at 36 Code of Federal Regulations (CFR) Part 800. These regulations describe the process that the Federal agency (Reclamation) takes to identify cultural resources and the level of effect that the proposed undertaking will have on historic properties. In summary, Reclamation must first determine if the action is the type of action that has the potential to affect historic properties. If the action is the type of action to affect historic properties, Reclamation must identify the area of potential effects (APE), determine if historic properties are present within that APE, determine the effect that the undertaking will have on historic properties, and consult with the State Historic Preservation

Office (SHPO), to seek concurrence on Reclamation's findings. In addition, Reclamation is required through the Section 106 process to consult with Indian Tribes concerning the identification of sites of religious or cultural significance, and consult with individuals or groups who are entitled to be consulting parties or have requested to be consulting parties.

#### **3.4.1 Affected Environment**

In 1992, a cultural resources survey was conducted within and adjacent to the Proposed Action area which found no cultural resources (Bissonnette 1992). On June 24, 2010, Reclamation archaeologists conducted a pedestrian archaeological survey of the entire APE for the Proposed Action. No cultural resources were found during the survey. However, the Central California Irrigation District's Outside Canal is located on the northern boundary of the Proposed Action's APE. The Outside Canal was originally constructed in 1890 by the San Joaquin and Kings River Canal Company for Miller and Lux, Incorporated for irrigation purposes. The canal is still in use delivering irrigation and municipal and industrial water supplies. To date, the Outside Canal has not been evaluated for listing on the National Register. Since evaluating the Outside Canal in its entirety is outside the scope of the Proposed Action, Reclamation assumes, for the purposes of this undertaking, that the Outside Canal is eligible for inclusion on the National Register under Criterion A because of its contribution to broad patterns of history, specifically its association and contribution in water development and agricultural development of California's Central Valley.

#### **3.4.2 Environmental Consequences**

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

There would be no impact to cultural resources as there would be no ground disturbing or construction activities.

##### ***Proposed Action***

Reclamation has determined that the Proposed Action would not adversely affect qualities that would make the Outside Canal eligible for listing on the National Register as there would be no modifications to the canal itself or change in its functions and any visual effects due to the installation of an underground pipeline would be temporary. On August 16, 2010, SHPO concurred with Reclamation's determination (Appendix G) that there would be no adverse impact to cultural resources as a result of the Proposed Action.

##### ***Cumulative Impacts***

There would be no cumulative impact to cultural resources as there would be no direct or indirect impacts associated with either alternative.

### **3.5 Indian Sacred Sites**

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



sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion.

### 3.5.1 **Affected Environment**

On July 14, 2010, Reclamation sent Proposed Action notification letters and requests for consultation to Big Sandy Rancheria, Cold Springs Rancheria of Mono Indians, Santa Rosa Rancheria, and Table Mountain Rancheria. To date, no responses have been received regarding the Proposed Action.

### 3.5.2 **Environmental Consequences**

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

There would be no impacts to sacred sites as conditions would remain the same as existing conditions.

#### ***Proposed Action***

At this time, no Indian sacred sites have been identified. In addition, the Proposed Action would not impede access to or ceremonial use of Indian sacred sites. If sites are identified in the future, Reclamation would comply with Executive Order 13007.

#### ***Cumulative Impacts***

There would be no cumulative impact to sacred sites as there would be no direct or indirect impacts associated with either alternative. Should any sacred sites be identified in the future, Reclamation would comply with Executive Order 13007. This would ensure that no cumulative impacts would occur that could impede access to or ceremonial use of Indian sacred sites due to the Proposed Action.

## 3.6 **Indian Trust Assets**

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

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

### 3.6.1 Affected Environment

The nearest ITA is the Table Mountain Rancheria located approximately 52 miles east-northeast of the Proposed Action location.

### 3.6.2 Environmental Consequences

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

Without construction activities there would be no potential to impact ITA.

#### ***Proposed Action***

There would be no impact to ITA as there are none within the Proposed Action area. See Appendix H for Reclamation's determination.

#### ***Cumulative Impacts***

There would be no cumulative impacts to ITA as there are none in the Proposed Action area that could be impacted.

## 3.7 Hazardous Material

Hazardous waste is waste that is dangerous or potentially harmful to human health or the environment and can be liquids, solids, gases, or sludges (EPA 2010a). As defined by 40 CFR 260.10, a hazardous waste generator is any person or site that produces or generates hazardous waste. Hazardous waste generators are divided into three categories based on production of waste: large (more than 2,205 pounds [lbs] per month), small (more than 220 lbs per month but less than 2,205 lbs per month), and conditionally exempt small [220 lbs per month or less] (EPA 2010b).

The Resource Conservation and Recovery Act (RCRA) Subtitle C establishes a federal program to manage hazardous wastes for its entire existence in order to protect human health and the environment (EPA 2010c). Section 3010 of Subtitle C of RCRA requires any person who generates, transports, or recycles regulated wastes or who owns or operates a facility for the treatment, storage, or disposal of regulated wastes to notify the Environmental Protection Agency (EPA) of their activities, including the location and general description of the activities and the regulated wastes handled. RCRA only addresses active or future facilities not abandoned or historical sites. EPA has established regulations and procedures for the generation, transportation, storage and disposal of hazardous waste handlers. EPA also has established technical standards for the design and safe operation of treatment, storage and disposal facilities to minimize the release of hazardous waste into the environment. These standards serve as the basis for developing and issuing permits. The EPA has delegated authority and responsibility for enforcement of RCRA to the State of California's Department of Toxic Substance Control.

Hazardous waste is commonly stored prior to treatment or disposal, and must be stored in containers, tanks, containment buildings, drip pads, waste piles, or surface impoundments that comply with the RCRA regulations (EPA 2010c).

### 3.7.1 Affected Environment

Up to 55,000 pounds of waste solids containing selenium would be generated per year at the Facility. Treated solids would be stored on site in closed steel roll-off containers until transported to a qualified disposal facility on a quarterly basis. Title 22 of the California Code of Regulations (§66261.24) defines acceptable quantities of selenium associated with solids as less than 100 ppm. Since selenium concentrations in the wasted solids would have over 2,000 ppm, the wasted solids are defined as hazardous and as such, must be disposed at a Class 1 Hazardous Waste Landfill. The closest Class 1 landfill is the Kettleman Hills Landfill in Kings County.

### 3.7.2 Environmental Consequences

#### **No Action**

There would be no changes to existing conditions under the No Action Alternative. Selenium would continue to be present within drainage water used within the SJRIP and discharged under the GBP.

#### **Proposed Action**

No additional hazardous waste would be generated from the construction of the Facility. However, selenium already present within the existing drainage water would be concentrated into solid waste after treatment (see Section 2.2.3). As the concentration of selenium present in the solid waste would be considered hazardous waste, Reclamation would comply with RCRA including temporary storage and containment requirements. This waste would be disposed of on a quarterly basis within a Class 1 Hazardous Waste Landfill. Therefore, it is not anticipated that the Proposed Action would have adverse impacts resulting from hazardous waste.

#### **Cumulative Impacts**

As Reclamation would comply with all RCRA requirements for the storage, containment, and disposal of hazardous waste, it is not anticipated that the Proposed Action would have cumulative adverse impacts resulting from hazardous waste. There would be no cumulative impacts associated with the No Action alternative as conditions would not change and hazardous waste would not be generated.

## 3.8 Environmental Justice

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

### 3.8.1 Affected Environment

Panoche Drainage District provides drainage service for agricultural areas located in its boundaries within Merced and Fresno Counties. The Hispanic community within Fresno and Merced County is 13 to 17 percent greater than the State average (Table 3-3). The market for seasonal workers on local farms draws thousands of migrant workers, commonly of Hispanic origin from Mexico and Central America. The population of some small communities typically increases during late summer harvest.

**Table 3-3 2010 County Demographics**

	<b>Fresno County</b>		<b>Merced County</b>		<b>California</b>	
<b>Demographics</b>	<b>Estimate</b>	<b>%</b>	<b>Estimate</b>	<b>%</b>	<b>Estimate</b>	<b>%</b>
Total Population	930,450	--	255,793	--	37,253,956	--
White, non-Hispanic	--	55.4	--	58.0	--	57.6
Black or African American	--	5.3	--	3.9	--	6.2
American Indian	--	1.7	--	1.4	--	1.0
Asian	--	9.6	--	7.4	--	13.0
Native Hawaiian/Pacific Islander	--	0.2	--	0.2	--	0.4
Hispanic	--	50.3	--	54.9	--	37.6
Source: U.S. Census Bureau 2011						

### 3.8.2 Environmental Consequences

#### **No Action**

There would be no impacts to minority or disadvantaged populations as conditions would remain the same as existing conditions.

#### **Proposed Action**

The Proposed Action is a pilot program to test mechanisms to remove selenium from drainage water in Panoche Drainage District. Staff to operate the Facility would come from existing employees within the district and Reclamation. Consequently, 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.

#### **Cumulative Impacts**

There would be no cumulative impacts to economically disadvantaged or minority populations as the Facility would be temporary and would not remove or create new employment opportunities. As there are no impacts to minority or disadvantaged populations under the No Action alternative, there would be no cumulative impacts.

## 3.9 Socioeconomic Resources

### 3.9.1 Affected Environment

Panoche Drainage District operates the SJRIP in order to reduce the amount of discharge released from the Grassland Drainage Area. Crops grown within the SJRIP include salt tolerant crops described under Section 3.2.

### 3.9.2 Environmental Consequences

#### **No Action**

There would be no impact to socioeconomics as conditions would remain the same as existing conditions.

#### **Proposed Action**

The Facility would not increase or decrease socioeconomic opportunities with the SJRIP. No changes in use of the SJRIP are needed for construction or operation of the Facility. A small portion of an adjacent field would be removed during construction of the Facility for staging.

However, after construction the field would be replanted. Consequently, there would be no adverse impacts to socioeconomic resources as a result of the Proposed Action.

### **Cumulative Impacts**

As described in Section 2.2.3, Reclamation or its designated operating partner could elect, subject to any additional required environmental review, to continue operating the Facility for treatment of drainage water. Over the long term, treated drainage water would reduce the amount of selenium present within the SJRIP. As the treated drainage water originates from the Grassland Drainage Area and is removed before discharge to the Grassland Bypass Project for treatment this could save Panoche Drainage District some of the cost for discharge pursuant to their discharge permit and agreements for the Grassland Bypass Project.

As there are no impacts to socioeconomic resources under the No Action alternative, there would be no cumulative impacts.

## **3.10 Air Quality**

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

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

### **3.10.1 Affected Environment**

The Proposed Action area lies within the San Joaquin Valley Air Basin (SJVAB) under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). The pollutants of greatest concern in the San Joaquin Valley are carbon monoxide (CO), ozone (O<sub>3</sub>), O<sub>3</sub> precursors such as volatile organic compounds (VOC), inhalable particulate matter between 2.5 and 10 microns in diameter (PM<sub>10</sub>) and particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>). The SJVAB has reached Federal and State attainment status for CO, nitrogen dioxide (NO<sub>2</sub>), and sulfur dioxide (SO<sub>2</sub>). Federal attainment status has been reached for PM<sub>10</sub> but is in non-attainment for O<sub>3</sub>, PM<sub>2.5</sub>, and VOC (Table 3-4). There are no established standards for nitrogen oxides (NO<sub>x</sub>); however, NO<sub>x</sub> does contribute to NO<sub>2</sub> standards (SJVAPCD 2010).

**Table 3-4 San Joaquin Valley Attainment Status**

Pollutant	Averaging Time	California Standards		National Standards	
		Concentration	Attainment Status	Concentration	Attainment Status
O <sub>3</sub>	8 Hour	0.070 ppm (137 µg/m <sup>3</sup> )	Nonattainment	0.075 ppm	Nonattainment
	1 Hour	0.09 ppm (180 µg/m <sup>3</sup> )	Nonattainment	--	--
CO	8 Hour	9.0 ppm (10 mg/m <sup>3</sup> )	Attainment	9.0 ppm (10 mg/m <sup>3</sup> )	Attainment
	1 Hour	20.0 ppm (23 mg/m <sup>3</sup> )	Unclassified	35.0 ppm (40 mg/m <sup>3</sup> )	Unclassified
NO <sub>2</sub>	Annual arithmetic mean	0.030 ppm (56 µg/m <sup>3</sup> )	Attainment	0.053 ppm (100 µg/m <sup>3</sup> )	Attainment
	1 Hour	0.18 ppm (338 µg/m <sup>3</sup> )	Attainment	--	--
SO <sub>2</sub>	Annual average	--	--	0.03 ppm (80 µg/m <sup>3</sup> )	Attainment
	24 Hour	0.04 ppm (105 µg/m <sup>3</sup> )	Attainment	0.14 ppm (365 µg/m <sup>3</sup> )	Attainment
	1 Hour	0.25 ppm (655 µg/m <sup>3</sup> )	Attainment	--	--
PM <sub>10</sub>	Annual arithmetic mean	20 µg/m <sup>3</sup>	Nonattainment	--	--
	24 Hour	50 µg/m <sup>3</sup>	Nonattainment	150 µg/m <sup>3</sup>	Attainment
PM <sub>2.5</sub>	Annual Arithmetic mean	12 µg/m <sup>3</sup>	Nonattainment	15 µg/m <sup>3</sup>	Nonattainment
	24 Hour	--	--	35 µg/m <sup>3</sup>	Attainment
Lead	30 day average	1.5 µg/m <sup>3</sup>	Attainment	--	--
	Rolling-3 month average	--	--	0.15 µg/m <sup>3</sup>	Unclassified
Source: CARB 2010; SJVAPCD 2010; 40 CFR 93.153 mg/m <sup>3</sup> = milligram per cubic meter µg/m <sup>3</sup> = microgram per cubic meter -- = No standard established					

### 3.10.2 Environmental Consequences

#### **No Action**

There would be no change in air quality impacts as conditions would remain the same as existing conditions.

#### **Proposed Action**

Operation of the Facility would not contribute to criteria pollutant emissions, as power for operation and movement of water would be electrical. The air quality emissions from electrical power have been considered in environmental documentation for the generating power plant which found that there are no emissions from electrical engines. However, emissions would be associated with construction activities. As described previously, construction is expected to take approximately one year to complete. Construction equipment would include: grader, excavator, dozer, front end loader, roller, flatbed truck, crane, and compactor. Estimated air quality emissions for construction activities associated with the Proposed Action were calculated utilizing the South Coast Air Quality Management District's *EMFAC2007 Version 2.3* emission factors (Appendix I). Annual estimated emissions can be found in Table 3-5 below.

**Table 3-5 Estimated Emissions due to Construction of the Proposed Action**

Source	Total Emission (Tons per Year)							
	CO	VOC	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>	CH <sub>4</sub>
Site Preparation/Ground Disturbance	0.02	0.01	0.07	0.01	11.60	2.41	7.19	0.00
Building Construction	0.78	0.15	1.90	0.21	0.12	0.03	122.00	0.01
Concrete Paving Operations	0.18	0.03	0.42	0.05	0.03	0.03	22.12	0.00
<b>Total Emissions</b>	<b>0.98</b>	<b>0.19</b>	<b>2.39</b>	<b>0.27</b>	<b>11.75</b>	<b>2.47</b>	<b>151.31</b>	<b>0.01</b>
<b>Conformity Thresholds (SJVAPCD)</b>	<b>100</b>	<b>NA</b>	<b>100</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

NA = not applicable. SO<sub>x</sub> = sulfur oxides. CO<sub>2</sub> = carbon dioxide. CH<sub>4</sub> = methane.

Estimated emissions for construction and operation of the Facility are well below the *de minimis* thresholds established by the SJVAPCD; therefore, a conformity analysis is not required.

In addition, Reclamation would employ best management practices to reduce fugitive dust emissions during ground disturbance. Consequently, the Proposed Action would not result in an adverse impact upon air quality.

### **Cumulative Impacts**

Construction, operation and maintenance emissions for the Proposed Action are well below the *de minimis* thresholds established by the SJVAPCD and are expected to be temporary in duration. As a result, the Proposed Action is not expected to contribute to cumulative adverse impacts to air quality.

As there are no impacts to air quality under the No Action alternative, there would be no cumulative impacts.

## **3.11 Global Climate**

Climate change refers to significant change in measures of climate (e.g., temperature, precipitation, or wind) lasting for decades or longer and is considered a cumulative impact. Many environmental changes can contribute to climate change [changes in sun's intensity, changes in ocean circulation, deforestation, urbanization, burning fossil fuels, etc.] (EPA 2010c)

Gases that trap heat in the atmosphere are often called greenhouse gases (GHG). Some GHG, such as CO<sub>2</sub>, occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHG (e.g., fluorinated gases) are created and emitted solely through human activities. The principal GHG that enter the atmosphere because of human activities are: CO<sub>2</sub>, CH<sub>4</sub>, nitrous oxide, and fluorinated gasses (EPA 2010c). Between 1990 and 2009, CO<sub>2</sub> was the primary GHG (approximately 85 percent) produced in the U.S. due to the combustion of fossil fuels. Methane steadily declined within the same time period (EPA 2010d).

During the past century humans have substantially added to the amount of GHG in the atmosphere by burning fossil fuels such as coal, natural gas, oil and gasoline to power our cars, factories, utilities and appliances. The added gases, primarily CO<sub>2</sub> and CH<sub>4</sub>, are enhancing the natural greenhouse effect, and likely contributing to an increase in global average temperature and related climate changes (EPA 2010e). While there is general consensus in their trend, the magnitudes and onset-timing of impacts are uncertain and are scenario-dependent (Anderson et al. 2008).

Climate change has only recently been widely recognized as an imminent threat to the global climate, economy, and population. As a result, the national, state, and local climate change regulatory setting is complex and evolving.

In 2006, the State of California issued the California Global Warming Solutions Act of 2006, widely known as Assembly Bill 32, which requires the California Air Resources Board (CARB) to develop and enforce regulations for the reporting and verification of statewide GHG emissions. CARB is further directed to set a GHG emission limit, based on 1990 levels, to be achieved by 2020.

In addition, the EPA has issued regulatory actions under the CAA as well as other statutory authorities to address climate change issues (EPA 2010f). In 2009, the EPA issued a rule (40 CFR Part 98) for mandatory reporting of GHG by large source emitters and suppliers that emit 25,000 metric tons or more of GHG per year (EPA 2009). The rule is intended to collect accurate and timely emissions data to guide future policy decisions on climate change and has undergone and is still undergoing revisions (EPA 2010f).

### 3.11.1 Affected Environment

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

### 3.11.2 Environmental Consequences

#### **No Action**

There would be no impacts to global climate change from this alternative as conditions would remain the same as existing conditions.

#### **Proposed Action**

Estimated annual emissions of CO<sub>2</sub> and CH<sub>4</sub> from construction of the Facility are 151.31 and 0.01 tons (137.3 and 0.009 metric tons), respectively (see Table 3-5 above). The Facility would operate 24 hours a day for 1.5 years requiring the use of electricity for power. In addition, the 17 pumps used for moving water to the Facility would require the use of power as they cycle on and off to pump water. Estimated annual CO<sub>2</sub> emissions for the operation of the Facility and pumps can be found in Table 3-6.

**Table 3-6 Calculated Annual CO<sub>2</sub> Emissions**

Emission Source	Annual hours of operation	Annual CO <sub>2</sub> Emissions (tons)	Annual CO <sub>2</sub> Emissions (metric tons)
Facility operation	8,760	6.3	5.7
Pump operation (17 pumps)	4,380	52.7	47.8
<b>Total</b>	<b>13,140</b>	<b>59</b>	<b>53.5</b>

Note: CO<sub>2</sub> was calculated using the EPA's GHG Equivalencies Calculator (EPA 2010g) which can estimate CO<sub>2</sub> emissions based on number of kilowatt hours of electricity used. This is an estimate of emissions and is not meant to determine actual emissions. Although estimated emissions are based on the pumps being run continuously, they are likely to only run half the time.



Calculated CO<sub>2</sub> and CH<sub>4</sub> emissions for the construction and operation of the Proposed Action alternatives are estimated to be well below the EPA's 25,000 metric tons per year threshold for annually reporting GHG emissions (EPA 2009). Accordingly, the Proposed Action would result in below *de minimis* impacts to global climate change.

***Cumulative Impacts***

GHG emissions are considered cumulatively significant; however, the estimated annual CO<sub>2</sub> and CH<sub>4</sub> emissions required to construct and operate the Facility for the Proposed Action is 210.31 and 0.01 tons (190.8 and 0.009 metric tons) per year, respectively, which is well below the 25,000 metric tons per year threshold for reporting GHG emissions. As a result, the Proposed Action is not expected to contribute to cumulative adverse impacts to global climate change.

As there are no GHG produced under the No Action alternative, there would be no cumulative impacts to global climate change associated with this alternative.

## Section 4 Consultation and Coordination

### 4.1 Public Review Period

Reclamation provided the public with an opportunity to comment on the draft Finding of No Significant Impact and draft EA between September 16, 2011 and October 14, 2011.

Reclamation received four comment letters: two comment letters from Western Area Power Administration, one comment letter from an eight-member coalition, and one comment letter from Joe McGahan a representative of Panoche Drainage District. Comment letters and Reclamation's response to comments can be found in Appendix J.

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

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

The Proposed Action does not involve any new impoundment, channel deepening, or other control or modification of a stream or body of water as described in the statute. Water would be piped from sumps to an experimental Facility where attempts to reduce the concentration of selenium in total and its various forms would be tested. The movement of SJRIP reuse water taken from sumps through pipes to the proposed Facility is not a water development project. Therefore, Reclamation has determined that FWCA does not apply to the Proposed Action. Additionally, Reclamation has been in consultation with Service through Section 7 of the ESA and has incorporated measures to reduce potential impacts to wildlife resources.

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

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

Reclamation has completed consultation with Service on effects from the Proposed Action to terrestrial species and on June 04, 2012 received a letter of concurrence. The letter of concurrence is included in Appendix K.

For anadromous fish and their designated critical habitat, Reclamation has determined that the Proposed Action would not affect species or critical habitat under jurisdiction of the National Marine Fisheries Service.

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

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

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

Reclamation has determined that the Proposed Action would not adversely affect qualities that would make the Outside Canal eligible for listing on the National Register as there would be no modifications to the canal itself or change in its functions and any visual effects due to the installation of an underground pipeline would be temporary. On August 16, 2010, SHPO concurred with Reclamation's determination (Appendix G).

During consultation with SHPO, the Proposed Action was originally identified as approximately seven acres of temporary disturbance for staging, permanent disturbance of four acres for the basin project footprint and 5.5 miles of pipeline with a 30-foot easement. The entire APE included approximately 31 acres (Appendix G). Since completion of consultation, Reclamation has increased the temporary staging area to eight acres and decreased permanent disturbance to four within the same APE analyzed during consultation. The total area of disturbance is the same that SHPO concurred with on August 16, 2010.

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

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

Avoidance measures would be implemented for protection of migratory birds and no take is expected to occur from Proposed Action activities.

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

Executive Order 11988 requires Federal agencies to prepare floodplain assessments for actions located within or affecting flood plains, and similarly, Executive Order 11990 places similar requirements for actions in wetlands. The Proposed Action would not affect either concern as there are no floodplains or wetlands within the action area.

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

Section 401 of the Clean Water Act [CWA] (33 U.S.C. § 1311) prohibits the discharge of any pollutants into navigable waters, except as allowed by permit issued under sections 402 and 404 of the CWA (33 U.S.C. § 1342 and 1344). If new structures (e.g., treatment plants) are proposed, that would discharge effluent into navigable waters, relevant permits under the CWA would be required for the project applicant(s). Section 401 requires any applicant for an individual U. S. Army Corps of Engineers dredge and fill discharge permit (Section 404) to first obtain certification from the state that the activity associated with dredging or filling will comply with applicable state effluent and water quality standards. This certification must be approved or waived prior to the issuance of a permit for dredging and filling. No activities such as dredging or filling of wetlands or surface waters would be required for implementation of the Proposed Action, therefore permits obtained in compliance with CWA section 404 and 401 are not required.

#### **4.8 California Water Code Section 13260**

The RWQCB regulates point source discharge of wastewater to land and surface waters of the State of California so that the highest quality and beneficial uses of these waters are protected and enhanced. Regulation is by issuance of either National Pollutant Discharge Elimination System (NPDES) permits which are updated every five years, or Waste Discharge Requirements. Activities that result in discharges to California's surface waters require NPDES permits. For discharges to land, Waste Discharge Requirements are issued by the RWQCB. Both NPDES permits and Waste Discharge Requirements contain effluent limitations which ensure the protection of the quality of the receiving waters.

Reclamation will obtain and comply with all requirements from the RWQCB prior to operation of the Facility.

## Section 5 List of Preparers and Reviewers

Rain Healer, Natural Resources Specialist, SCCAO  
Ned Gruenhagen, PhD., Wildlife Biologist, SCCAO  
Dawn Ramsey, Archaeologist, MP-153  
Patricia Rivera, ITA, MP-400  
Scott Irvine, Environmental Engineer, Reclamation Technical Services Center – reviewer  
Sheryl Carter, Supervisory Land Management Specialist, SCCAO – reviewer  
Chuck Siek, Supervisory Natural Resources Specialist, SCCAO – reviewer

## Section 6 References

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FINAL ENVIRONMENTAL ASSESSMENT (10-030)

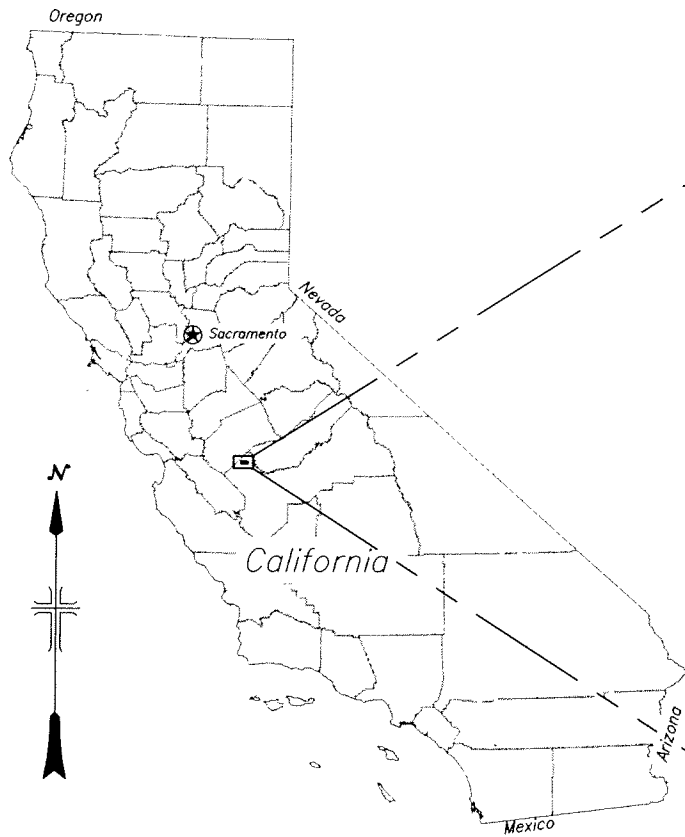
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FACILITY AT PANOCHÉ DRAINAGE DISTRICT*

**Appendix A**  
**Project Designs**

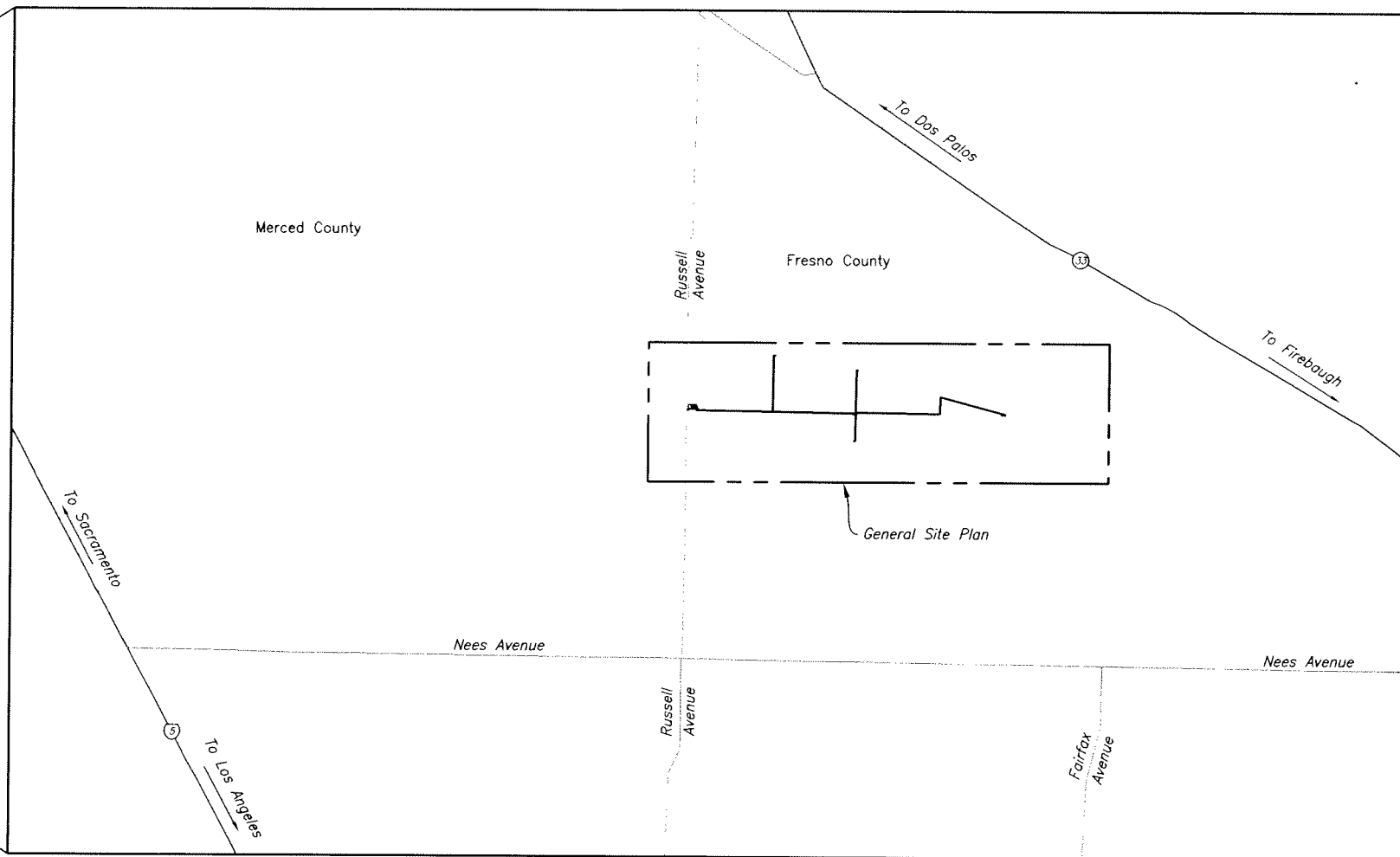
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June 2012

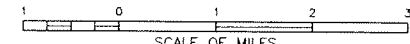




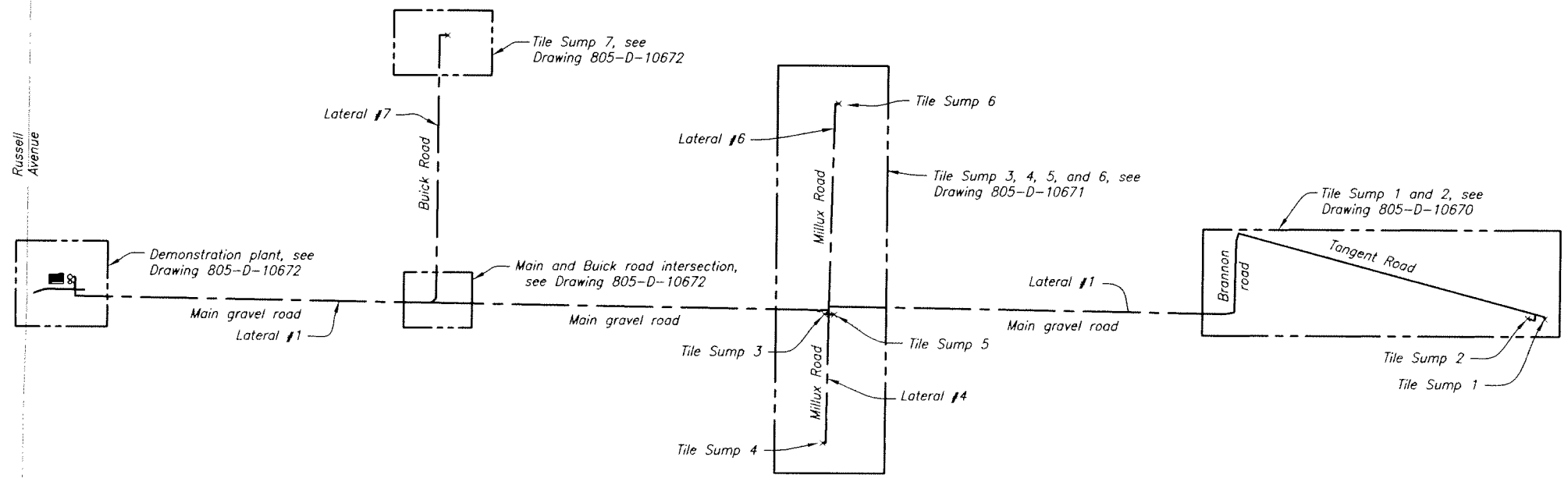
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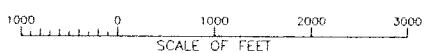
VICINITY MAP



NOTES



GENERAL SITE PLAN



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BUREAU OF RECLAMATION

CENTRAL VALLEY PROJECT - CALIFORNIA  
WEST SAN JOAQUIN DIVISION - SAN LUIS UNIT

SAN LUIS DRAIN

NORTHERLY AREA TREATMENT PLANT  
DEMONSTRATION TREATMENT PLANT

GENERAL SITE PLAN

DESIGNED - CHRIS DUKE

DRAWN

CHECKED

TECH. APPR.

APPROVED

DAVID A. EDWARDS, MANAGER, WATER CONVEYANCE GROUP

DENVER, COLORADO

2011-5-5

805-D-10669

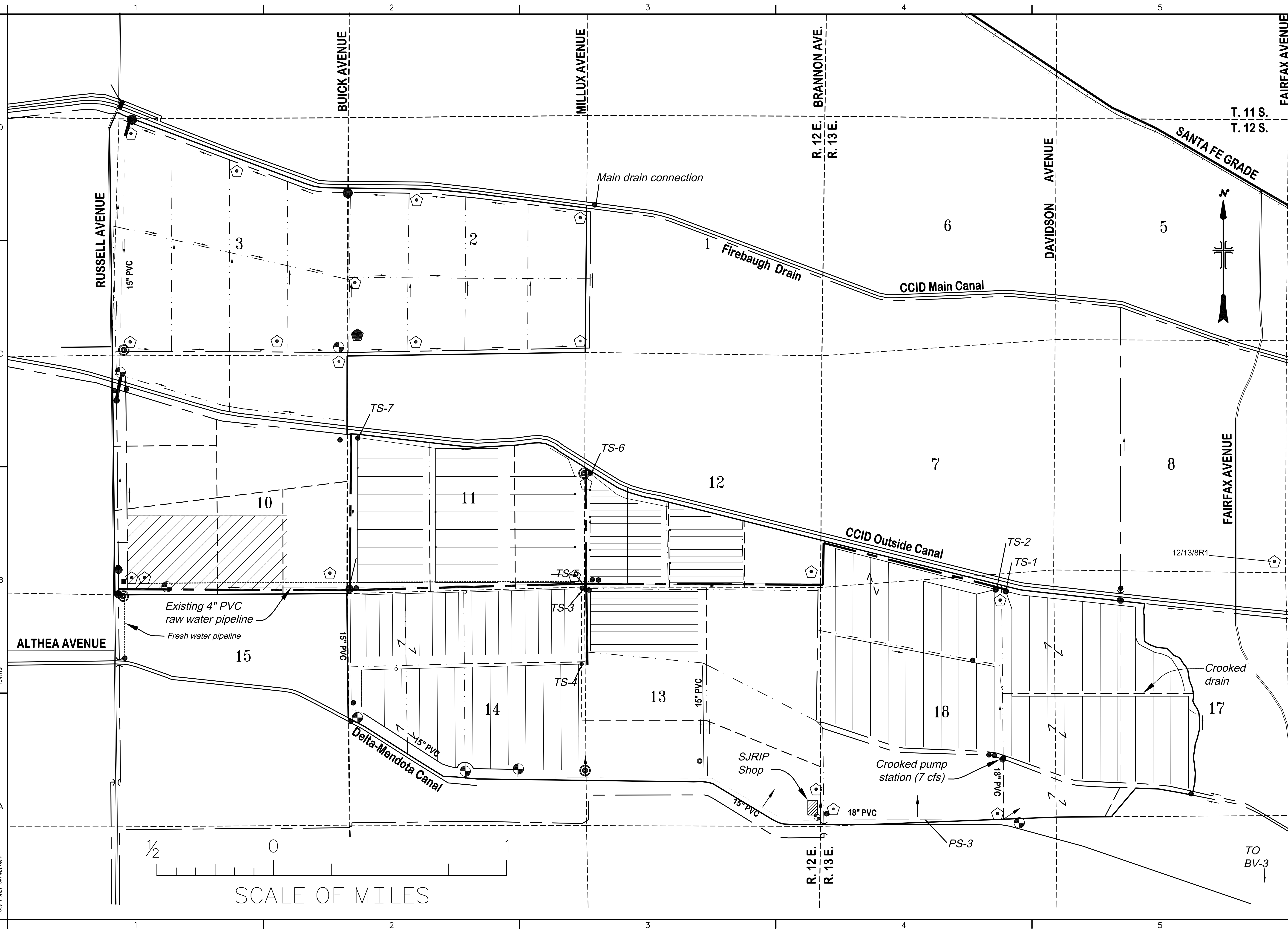
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PLOTTER BY  
CJOICE

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BUREAU OF RECLAMATION  
SAN LUIS PROJECT - CALIFORNIA  
GENERAL PLAN

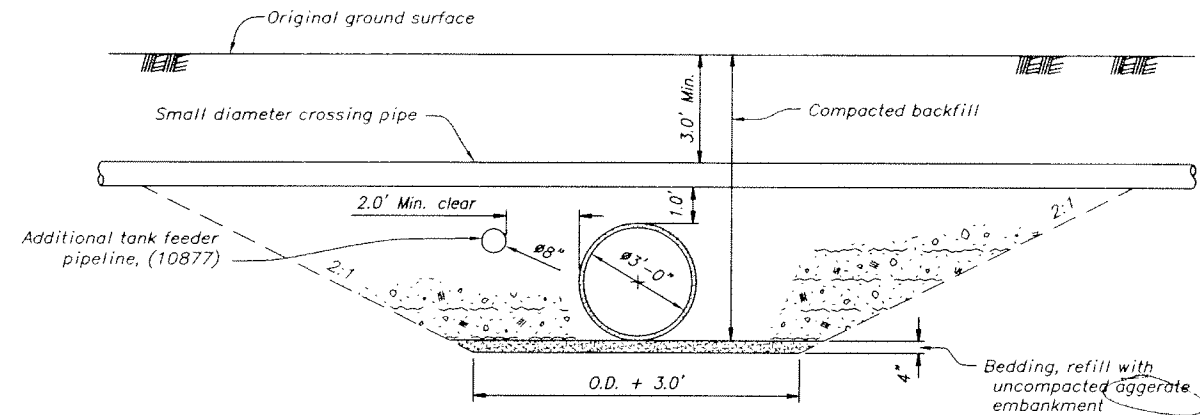
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CHECKED  
TECH. APPR. - NAME - TITLE  
APPROVED  
PEER REVIEWER - NAME - TITLE  
DENVER, COLORADO 7-7-2010

809-D-  
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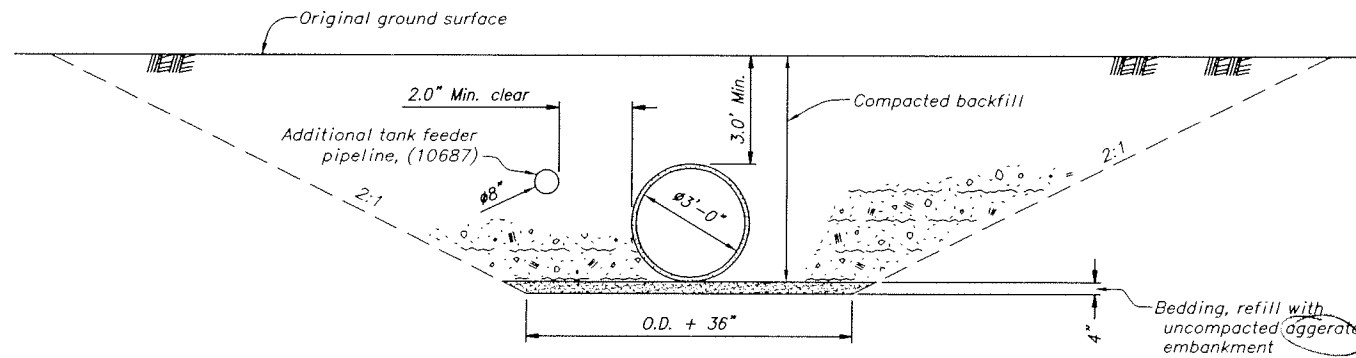


1. Yard elevations are to top of gravel surfacing.
2. Slope yard uniformly between elevations given.
3.  Indicates contour lines of existing topography and finished grade.
4.  Indicates contour lines of existing topography altered by construction.

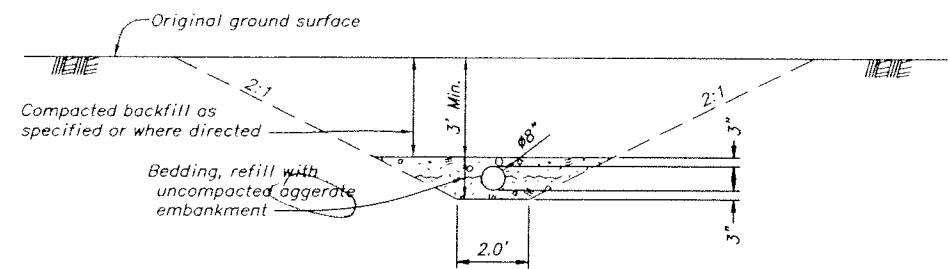
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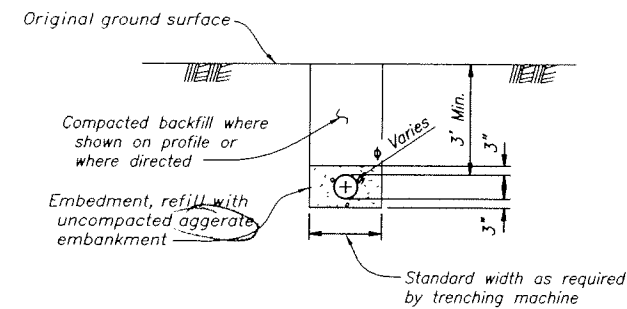
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DETAIL  
(Concrete and HDPE Parallel)



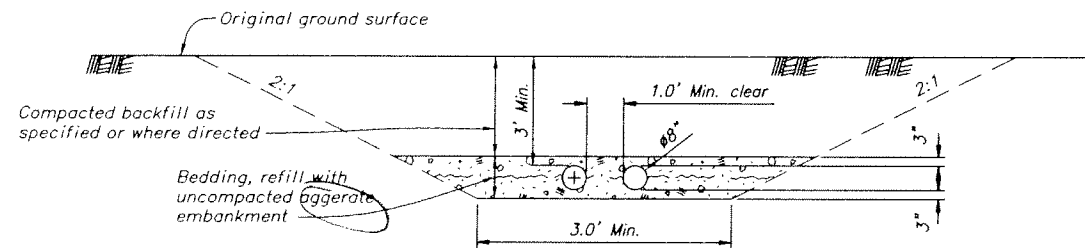
TYPICAL TRENCH SECTION  
(Concrete and HDPE Parallel)



TYPICAL TRENCH SECTION  
(HDPE)



TYPICAL VERTICAL TRENCH SECTION  
(HDPE)



TYPICAL TRENCH SECTION  
(HDPE Parallel)

- NOTES
1. Support and protect crossing utility pipes until backfill is completed.

1 0 1 2 3 4 5  
SCALE OF FEET

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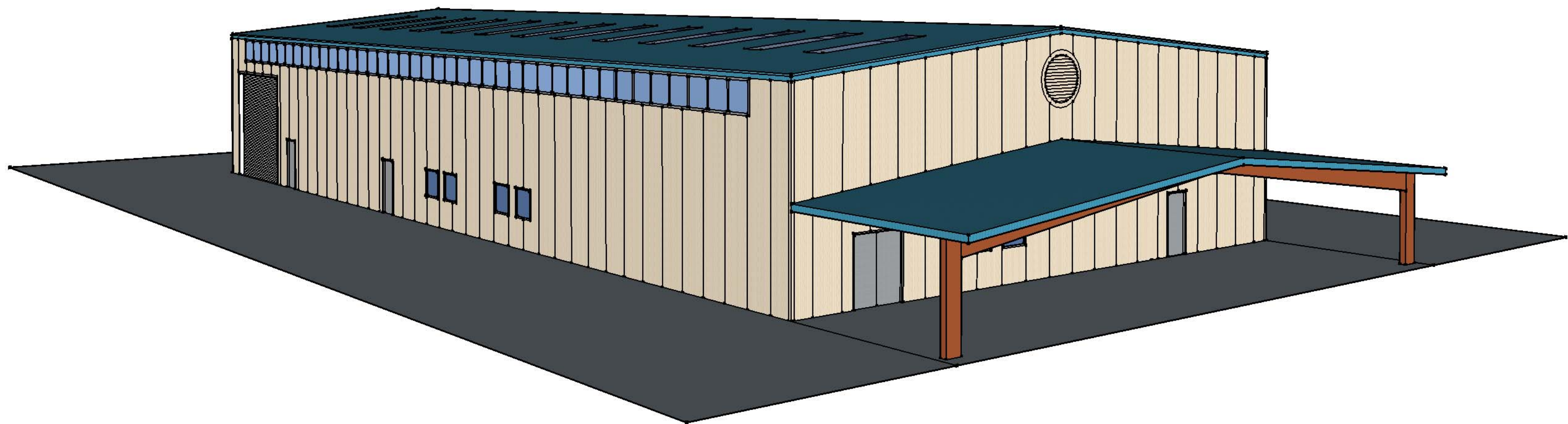
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BUREAU OF RECLAMATION  
CENTRAL VALLEY PROJECT  
WEST SAN JOAQUIN DIVISION - SAN LUIS UNIT - CALIFORNIA  
SAN LUIS DRAINAGE IMPLEMENTATION  
DEMONSTRATION TREATMENT PLANT  
TYPICAL PIPE TRENCH SECTIONS

DESIGNED \_\_\_\_\_  
DRAWN \_\_\_\_\_  
CHECKED \_\_\_\_\_  
TECH. APPR. \_\_\_\_\_  
APPROVED \_\_\_\_\_  
DAVID R. LEONARDO, MANAGER, WATER COMPLIANCE GROUP  
DENVER, COLORADO DATE \_\_\_\_\_

805-D-10686

SHEET 1 OF 1





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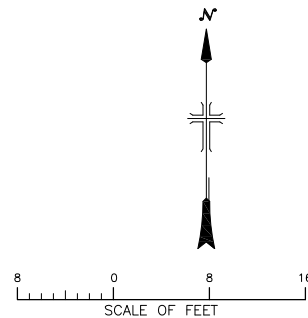
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|-------|---|
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| 1 & a | BUILDING LINE SYMBOLS   |
|       | ELEVATION SYMBOL  |
|       | COVERED TRENCH GRATE  |
|       | METAL INSULATED STUD WALLS                                    |
|       | STEEL BUILDING GIRTS WITH PRE-INSULATED METAL PANELS ATTACHED |
|       | STEEL FRAME COLUMN  |
|       | CIRCULATION AREAS TO REMAIN CLEAR OF EQUIPMENT                |

## PROPOSED EQUIPMENT LAYOUT PLAN

EL. 158.00  
(10843)

### GENERAL NOTES

1. CONFERENCE ROOM AND BREAK ROOM TABLES NOT IN THIS CONTRACT.
2. FOR EXTENDED TRENCHES OUTSIDE OF BUILDING SEE DRAWINGS 805-D-10828, 29, 30, AND 31.
3. FOR EYEWASH/SHOWERS SEE DRAWING 805-D-10862.
4. FOR CONTROL ROOM EQUIPMENT SEE DRAWING 805-D-10876.
5. FOR WATER TREATMENT ROOM EQUIPMENT SEE DRAWING 805-D-10862.
6. DO NOT USE THE EXTERIOR METAL WALL PANELS AS SUPPORTS FOR CONDUIT, DUCTWORK AND PIPING PENETRATIONS. ALL WALL PENETRATIONS MUST BE INDEPENDENTLY SUPPORTED BY OTHER MEANS IN ORDER TO PREVENT DAMAGE TO THE PANEL. FIELD CUTTING PENETRATIONS THROUGH THE PRE-INSULATED METAL PANELS MUST BE PERFORMED AS RECOMMENDED BY THE PANEL MANUFACTURER. ALL PENETRATIONS MUST BE PROPERLY WEATHER SEALED TO INSURE PROTECTION FROM THE ELEMENTS.



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**SAN LUIS UNIT DRAINAGE  
DEMONSTRATION TREATMENT PLANT**  
ARCHITECTURAL  
TREATMENT BUILDING  
PROPOSED EQUIPMENT LAYOUT PLAN

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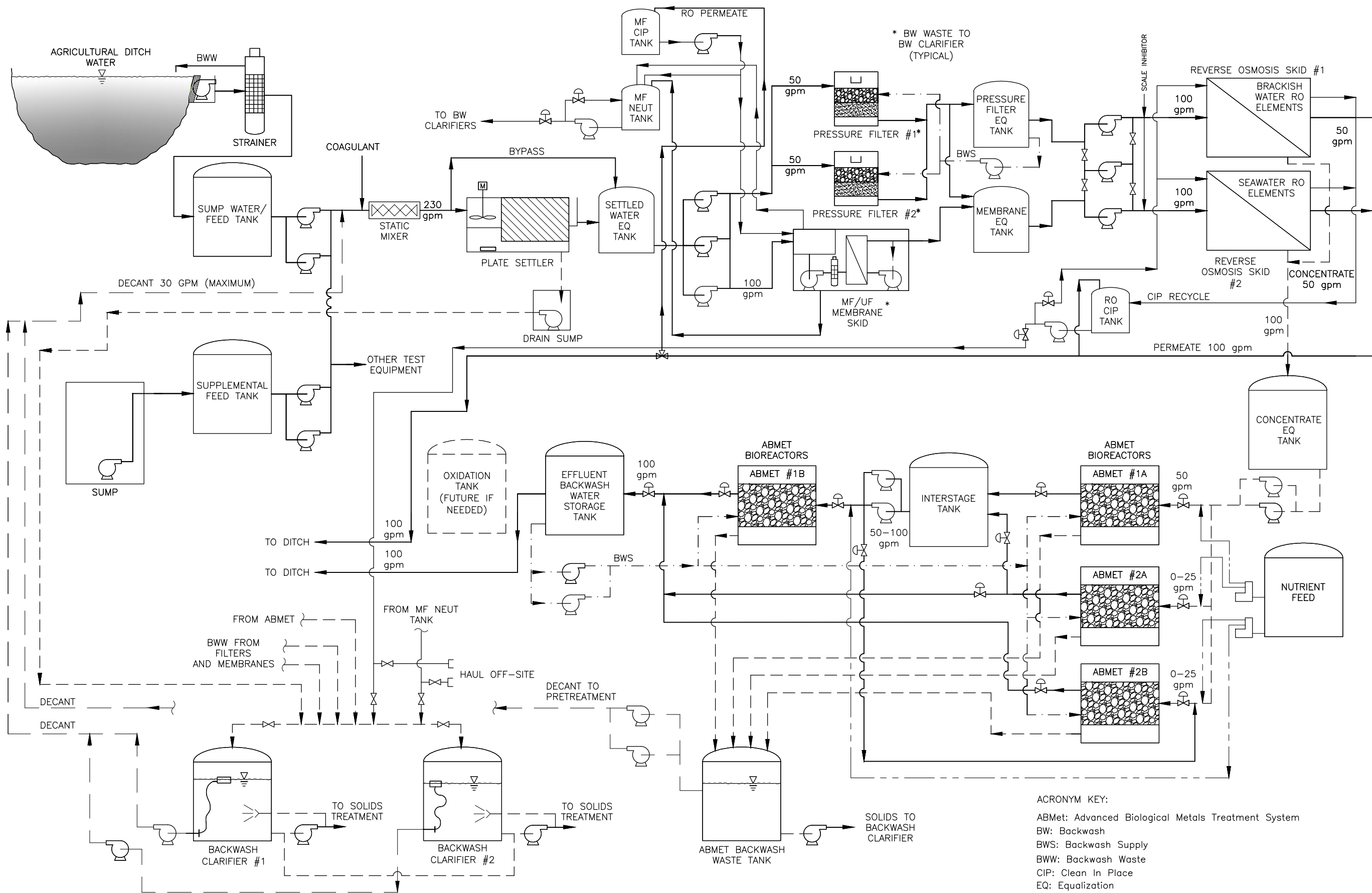
FINAL ENVIRONMENTAL ASSESSMENT (10-030)

*SAN LUIS DRAINAGE FEATURE REEVALUATION DEMONSTRATION TREATMENT  
FACILITY AT PANOCHÉ DRAINAGE DISTRICT*

**Appendix B**  
**Biotreatment Flow Diagram**

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June 2012





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FINAL ENVIRONMENTAL ASSESSMENT (10-030)

*SAN LUIS DRAINAGE FEATURE REEVALUATION DEMONSTRATION TREATMENT  
FACILITY AT PANOCHÉ DRAINAGE DISTRICT*

**Appendix C**

**San Joaquin kit fox and Giant garter snake avoidance measures**

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June 2012

## Measures to Be Implemented for Avoidance of Listed Species for the Project: San Luis Drainage Implementation Proposed Demonstration Treatment Facility at Panoche Drainage District (SLDFR Pilot Project)

Prior to ground disturbance an environmental awareness training session shall be provided to construction workers by a Reclamation or other designated biologist. The training shall address listed species from the vicinity and cover recognition of listed species, their habitat requirements, natural history and ecology, protections afforded species by the ESA (16 U.S.C. Sect 1531 et seq.), and penalties for take (as defined below). Information shall be presented for species including, at a minimum, the San Joaquin kit fox (SJKF; *Vulpes macrotis mutica*) and giant garter snake (GGS; *Thamnophis gigas*). For personnel working on construction of the project unable to attend the training session, written material shall be provided for self study. Prior to conducting field work at the site all construction personnel shall either attend a training session in person, or review written material independently, and sign a participation form stating they have either attended the training session or have read and understand the written material presented.

A laminated sheet displaying image(s) of SJKF and GGS and presenting information on their identification, habitat requirements, behavior, and protection status shall be provided to the person in charge of construction at the site. The sheets shall also be made available at the construction site and shall remain on site during construction and operation of the facilities.

The person in charge of activities at the construction site (e.g. construction foreman) shall be identified before construction begins, and shall be designated as the point of contact (POC) and as a liaison between construction personnel and Reclamation and Fish and Wildlife Service (Service) biologists for issues related to fish and wildlife species at the site. Contact information, including the name and mobile telephone number for the POC shall be identified and provided to Reclamation and Service biologists before construction begins. The POC shall maintain the availability of the fact sheets at the construction site during the period of construction.

Should a listed species be encountered during construction, the POC shall be responsible for communicating this information to Reclamation and Service biologists. Communication regarding the presence of a listed species shall be reported immediately to Reclamation and Service. Further construction work may not proceed if take would occur. Take is defined as:

**Take** ... The term “take” means to **harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.**[Section 3 of the ESA -16 USC 1532(3)(19)]

**Harass** – in the definition of “take” in the Act means an intentional or negligent **act or omission** which **creates the likelihood of injury** to wildlife by **annoying it** to such an extent as to **significantly disrupt normal** behavioral patterns which include, but are **not limited to**, breeding, feeding, or sheltering(50 CFR 17.3).

**Harm** – in the definition of “take” in the Act means an act which **actually kills or injures** wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by **significantly impairing essential** behavior patterns, including breeding, feeding or sheltering(50 CFR 17.3).

The Following specific avoidance measures for SJKF and GGS, as identified below, shall be implemented for the project.

***San Joaquin kit fox***

A survey of the area affected and buffer zone shall be conducted by a biologist, following the recommendations of the Service (2011). The preconstruction/preactivity surveys shall be conducted no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities or any project activity likely to impact the SJKF.

Written results of preconstruction/preactivity surveys must be received by Reclamation and the Service within five days after survey completion and prior to the start of ground disturbance and/or construction activities. If evidence of the presence of SJKF is obtained, findings will be discussed with Service and further consultation and avoidance measures may be required.

During construction a welded wire fence shall be erected around the perimeter of the area where the Pilot Project water treatment facility will be constructed. The bottom edge of the fencing shall be buried from 3 to 6 inches (deeper depth preferred) below the surface of the ground and the top of the fence shall not be less than 4 feet above the ground (therefore fencing must be at least 4.5 feet tall prior to installation).

At locations of ingress and egress, where gates in the fencing are required, a metal or other substantive curtain shall be installed so that SJKF access to the compound underneath gate(s) is precluded.

Measures identified in *U.S. Fish and Wildlife Service Standardized Recommendations For Protection Of The Endangered San Joaquin Kit Fox Prior To Or During Ground Disturbance* (Service 2011) for “Construction and On-Going Operational Requirements”, shall be implemented during project construction. Habitat subject to permanent and temporary construction disturbances and other types of ongoing project-related disturbance activities should be minimized by adhering to the following activities.

Project designs should limit or cluster permanent project features to the smallest area possible while still permitting achievement of project goals.

To minimize temporary disturbances, all project-related vehicle traffic should be restricted to established roads, construction areas, and other designated areas. These areas should also be included in preconstruction surveys and, to the extent possible, should be established in locations disturbed by previous activities to prevent further impacts.

Additionally, the following measures, as described in Service (2011) shall be implemented:

1. Project-related vehicles should observe a daytime speed limit of 20-mph throughout the site in all project areas, except on county roads and State and Federal highways; this is particularly important at night when SJKF are most active. Night-time construction should be minimized to the extent possible. However if it does occur, then the speed limit should be reduced to 10-mph. Off-road traffic outside of designated project areas should be prohibited.

2. To prevent inadvertent entrapment of SJKF or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2-feet deep should be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen-fill or wooden planks shall be installed. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the Service and the California Department of Fish and Game (CDFG) shall be contacted as noted under measure 13 referenced below.

3. SJKF are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for SJKF before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved and should be left alone until the Service has been consulted; no further action may be taken until Reclamation biologists have been notified and guidance has been provided by Service.

4. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in securely closed containers and removed at least once a week from the construction or project site.

5. No firearms shall be allowed on the project site.

6. No pets, such as dogs or cats, should be permitted on the project site to prevent harassment, mortality of SJKF, or destruction of dens.

7. Use of rodenticides and herbicides in project areas should be restricted. This is necessary to prevent primary or secondary poisoning of SJKF and the depletion of prey populations on which they depend. All uses of such compounds should observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other State and Federal legislation, as well as additional project-related restrictions deemed necessary by the Service. If rodent control must be conducted, zinc phosphide should be used because of a proven lower risk to kit fox.

8. A representative shall be appointed by the project proponent (see POC description above) who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped kit fox. The POC will be identified during the employee education program and their name and telephone number shall be provided to Reclamation and the Service.

9. An employee education program should be conducted for any project that has anticipated impacts to kit fox or other endangered species. The program should consist of a brief presentation by persons knowledgeable in kit fox biology and legislative protection to explain endangered species concerns to contractors, their employees, and military and/or agency personnel involved in the project. The program should include the following: A

description of the San Joaquin kit fox and its habitat needs; a report of the occurrence of kit fox in the project area; an explanation of the status of the species and its protection under the Endangered Species Act; and a list of measures being taken to reduce impacts to the species during project construction and implementation. A fact sheet conveying this information should be prepared for distribution to the previously referenced people and anyone else who may enter the project site.

10. Upon completion of the project, all areas subject to temporary ground disturbances, including storage and staging areas, temporary roads, pipeline corridors, etc. should be re-contoured if necessary, and revegetated to promote restoration of the area to preproject conditions. An area subject to "temporary" disturbance means any area that is disturbed during the project, but after project completion will not be subject to further disturbance and has the potential to be revegetated. Appropriate methods and plant species used to revegetate such areas should be determined on a site-specific basis in consultation with the Service, CDFG, and revegetation experts.

11. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or if a protected species is involved Reclamation and the Service should be contacted for guidance.

12. Any contractor, employee, or military or agency personnel who are responsible for inadvertently killing or injuring a San Joaquin kit fox shall immediately report the incident to their POC. This representative shall contact Reclamation and the CDFG immediately in the case of a dead, injured or entrapped kit fox. The CDFG contact for immediate assistance is State Dispatch at (916) 445-0045. They will contact the local warden or Mr. Paul Hoffman, the wildlife biologist, at (530) 934-9309. The Service should be contacted as well..

13. The Sacramento Fish and Wildlife Office and CDFG shall be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The Service contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers below. The CDFG contact is Mr. Paul Hoffman at 1701 Nimbus Road, Suite A, Rancho Cordova, California 95670, (530) 934-9309.

14. New sightings of kit fox shall be reported to the California Natural Diversity Database (CNDDDB). A copy of the reporting form and a topographic map clearly marked with the location of where the kit fox was observed should also be provided to the Service at the address below.

### ***Giant Garter Snake***

The following measures shall be implemented for avoidance of effects to GGS from the project:

1. Movement of heavy equipment shall be confined to existing roadways to the extent possible.

2. To the extent possible, construction activity adjacent to canals or ditches should be conducted between May 1 and October 1. This is the active period for giant garter snakes.
3. Confine clearing to the minimal area necessary to facilitate construction activities.
4. If construction activities would occur between May 1 and October 1 and the canal is wetted or has not been dry for 15 consecutive days a biologist shall survey (24-hours prior to initiating construction activities) construction areas adjacent to open ditches/or canals for GGS. Survey of the project area should be repeated if a lapse in construction activity of two weeks or greater has occurred. If a GGS is encountered during construction, activities shall cease until appropriate corrective measures have been completed, the POC has communicated this information to the Reclamation and Service biologists and it has been determined that the snake will not be harmed.
5. A biological monitor shall be present at construction site(s) when construction activities are occurring in aquatic habitat during the GGS active period.

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FINAL ENVIRONMENTAL ASSESSMENT (10-030)

*SAN LUIS DRAINAGE FEATURE REEVALUATION DEMONSTRATION TREATMENT  
FACILITY AT PANOCHÉ DRAINAGE DISTRICT*

**Appendix D**  
**Burrowing Owl avoidance measures**

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June 2012

## M e m o r a n d u m

: "Div. Chiefs - IFD, BDD, NED, & WMD  
Reg. Mgrs. - Regions 1, 2, 3, 4, & 5

Date : October 17, 1995

From : Department of Fish and Game

Subject :  
Staff Report on Burrowing Owl Mitigation

I am hereby transmitting the Staff Report on Burrowing Owl Mitigation for your use in reviewing projects (California Environmental Quality Act [CEQA] and others) which may affect burrowing owl habitat. The Staff Report has been developed during the last several months by the Environmental Services Division (ESD) in cooperation with the Wildlife Management Division (WMD) and regions 1, 2, and 4. It has been sent out for public review and redrafted as appropriate.

Either the mitigation measures in the staff report may be used or project specific measures may be developed. Alternative project specific measures proposed by the Department divisions/regions or by project sponsors will also be considered. However, such mitigation measures must be submitted to ESD for review. The review process will focus on the consistency of the proposed measure with Department, Fish and Game Commission, and legislative policy and with laws regarding raptor species. ESD will coordinate project specific mitigation measure review with WMD.

If you have any questions regarding the report, please contact Mr. Ron Rempel, Supervising Biologist, Environmental Services Division, telephone (916) 654-9980.

**COPY** Original signed by  
C.F. Raysbrook

C. F. Raysbrook  
Interim Director

Attachment

cc: Mr. Ron Rempel  
Department of Fish and Game  
Sacramento



# STAFF REPORT ON BURROWING OWL MITIGATION

## Introduction

The Legislature and the Fish and Game Commission have developed the policies, standards and regulatory mandates to protect native species of fish and wildlife. In order to determine how the Department of Fish and Game (Department) could judge the adequacy of mitigation measures designed to offset impacts to burrowing owls (*Speotyto cunicularia*; A.O.U. 1991) staff (WMD, ESD, and Regions) has prepared this report. To ensure compliance with legislative and commission policy, mitigation requirements which are consistent with this report should be incorporated into: (1) Department comments to Lead Agencies and project sponsors pursuant to the California Environmental Quality Act (CEQA); and (2) other authorizations the Department gives to project proponents for projects impacting burrowing owls.

This report is designed to provide the Department (including regional offices and divisions), CEQA Lead Agencies and project proponents the context in which the Environmental Services Division (ESD) will review proposed project specific mitigation measures. This report also includes preapproved mitigation measures which have been judged to be consistent with policies, standards and legal mandates of the Legislature, the Fish and Game Commission and the Department's public trust responsibilities. Implementation of mitigation measures consistent with this report are intended to help achieve the conservation of burrowing owls and should compliment multi-species habitat conservation planning efforts currently underway. The *Burrowing Owl Survey Protocol and Mitigation Guidelines* developed by The California Burrowing Owl Consortium (CBOC 1993) were taken into consideration in the preparation of this staff report as were comments from other interested parties.

A range-wide conservation strategy for this species is needed. Any range-wide conservation strategy should establish criteria for avoiding the need to list the species pursuant to either the California or federal Endangered Species Acts through preservation of existing habitat, population expansion into former habitat, recruitment of young into the population, and other specific efforts.

California's burrowing owl population is clearly declining and, if declines continue, the species may qualify for listing. Because of the intense pressure for urban development within suitable burrowing owl nesting and foraging habitat (open, flat and gently rolling grasslands and grass/shrub lands) in California, conflicts between owls and development projects often occur. Owl survival can be adversely affected by disturbance and foraging habitat loss even when impacts to individual birds and nests/burrows are avoided. Adequate information about the presence of owls is often unavailable prior to project approval. Following project approval there is no legal mechanism through which to seek mitigation other than avoidance of occupied burrows or nests. The absence of standardized survey methods often impedes consistent impact assessment.

## **Burrowing Owl Habitat Description**

Burrowing owl habitat can be found in annual and perennial grasslands, deserts, and arid scrublands characterized by low-growing vegetation (Zarn 1974). Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface. Burrows are the essential component of burrowing owl habitat. Both natural and artificial burrows provide protection, shelter, and nests for burrowing owls (Henny and Blus 1981). Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement.

## **Occupied Burrowing Owl Habitat**

Burrowing owls may use a site for breeding, wintering, foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can be verified at a site by detecting a burrowing owl, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance. Burrowing owls exhibit high site fidelity, reusing burrows year after year (Rich 1984, Feeney 1992). A site should be assumed occupied if at least one burrowing owl has been observed occupying a burrow there within the last three years (Rich 1984).

## **CEQA Project Review**

The measures included in this report are intended to provide a decision-making process that should be implemented whenever there is potential for an action or project to adversely affect burrowing owls. For projects subject to the California Environmental Quality Act (CEQA), the process begins by conducting surveys to determine if burrowing owls are foraging or nesting on or adjacent to the project site. If surveys confirm that the site is occupied habitat, mitigation measures to minimize impacts to burrowing owls, their burrows and foraging habitat should be incorporated into the CEQA document as enforceable conditions. The measures in this document are intended to conserve the species by protecting and maintaining viable populations of the species throughout their range in California. This may often result in protecting and managing habitat for the species at sites away from rapidly urbanizing/developing areas. Projects and situations vary and mitigation measures should be adapted to fit specific circumstances.

Projects not subject to CEQA review may have to be handled separately since the legal authority the Department has with respect to burrowing owls in this type of situation is often limited. The burrowing owl is protected from "take" (Section 3503.5 of the Fish and Game Code) but unoccupied habitat is likely to be lost for activities not subject to CEQA.

## **Legal Status**

The burrowing owl is a migratory species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). Sections 3505, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs. To avoid violation of the take provisions of these laws generally requires that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle (February 1 to August 31). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) may be considered “take” and is potentially punishable by fines and/or imprisonment.

The burrowing owl is a Species of Special Concern to California because of declines of suitable habitat and both localized and statewide population declines. Guidelines for the Implementation of the California Environmental Quality Act (CEQA) provide that a species be considered as endangered or “rare” regardless of appearance on a formal list for the purposes of the CEQA (Guidelines, Section 15380, subsections b and d). The CEQA requires a mandatory findings of significance if impacts to threatened or endangered species are likely to occur (Sections 21001 (c), 2103; Guidelines 15380, 15064, 15065). To be legally adequate, mitigation measures must be capable of “avoiding the impact altogether by not taking a certain action or parts of an action”; “minimizing impacts by limiting the degree or magnitude of the action and its implementation”; “rectifying the impact by repairing, rehabilitating or restoring the impacted environment”; “or reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action” (Guidelines, Section 15370). Avoidance or mitigation to reduce impacts to less than significant levels must be included in a project or the CEQA lead agency must make and justify findings of overriding considerations.

## **Impact Assessment**

### **Habitat Assessment**

The project site and a 150 meter (approximately 500 ft.) buffer (where possible and appropriate based on habitat) should be surveyed to assess the presence of burrowing owls and their habitat (Thomsen 1971, Martin 1973). If occupied habitat is detected on or adjacent to the site, measures to avoid, minimize, or mitigate the project’s impacts to the species should be incorporated into the project, including burrow preconstruction surveys to ensure avoidance of direct take. It is also recommended that preconstruction surveys be conducted if the species was not detected but is likely to occur on the project site.

## **Burrowing Owl and Burrow Surveys**

Burrowing owl and burrow surveys should be conducted during both the wintering and nesting seasons, unless the species is detected on the first survey. If possible, the winter survey should be conducted between December 1 and January 31 (when wintering owls are most likely to be present) and the nesting season survey should be conducted between April 15 and July 15 (the peak of the breeding season). Surveys conducted from two hours before sunset to one hour after, or from one hour before to two hours after sunrise, are also preferable.

Surveys should be conducted by walking suitable habitat on the entire project site and (where possible) in areas within 150 meters (approx. 500 ft.) of the project impact zone. The 150-meter buffer zone is surveyed to identify burrows and owls outside of the project area which may be impacted by factors -such as noise and vibration (heavy equipment, etc.) during project construction. Pedestrian survey transects should be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters (approx. 100 ft.) and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To effectively survey large projects (100 acres or larger), two or more surveyors should be used to walk adjacent transects. To avoid impacts to owls from surveyors, owls and/or occupied burrows should be avoided by a minimum of 50 meters (approx. 160 ft.) wherever practical. Disturbance to occupied burrows should be avoided during all seasons.

## **Definition of Impacts**

The following should be considered impacts to the species:

- Disturbance within 50 meters (approx. 160 ft.) Which may result in harassment of owls at occupied burrows;
- Destruction of natural and artificial burrows (culverts, concrete slabs and debris piles that provide shelter to burrowing owls); and
- Destruction and/or degradation of foraging habitat adjacent (within 100 m) of an occupied burrow(s).

## **Written Report**

A report for the project should be prepared for the Department and copies should be submitted to the Regional contact and to the Wildlife Management Division Bird and Mammal Conservation Program. The report should include the following information:

- Date and time of visit(s) including name of the qualified biologist conducting surveys, weather and visibility conditions, and survey methodology;
- Description of the site including location, size, topography, vegetation communities, and animals observed during visit(s);
- Assessment of habitat suitability for burrowing owls;
- Map and photographs of the site;
- Results of transect surveys including a map showing the location of all burrow(s) (natural or artificial) and owl(s), including the numbers at each burrow if present and tracks, feathers, pellets, or other items (prey remains, animal scat);
- Behavior of owls during the surveys;
- Summary of both winter and nesting season surveys including any productivity information and a map showing territorial boundaries and home ranges; and
- Any historical information (Natural Diversity Database, Department regional files? Breeding Bird Survey data, American Birds records, Audubon Society, local bird club, other biologists, etc.) regarding the presence of burrowing owls on the site.

## **Mitigation**

The objective of these measures is to avoid and minimize impacts to burrowing owls at a project site and preserve habitat that will support viable owls populations. If burrowing owls are detected using the project area, mitigation measures to minimize and offset the potential impacts should be included as enforceable measures during the CEQA process.

Mitigation actions should be carried out from September 1 to January 31 which is prior to the nesting season (Thomsen 1971, Zam 1974). Since the timing of nesting activity may vary with latitude and climatic conditions, this time frame should be adjusted accordingly. Preconstruction surveys of suitable habitat at the project site(s) and buffer zone(s) should be conducted within the 30 days prior to construction to ensure no additional, burrowing owls have established territories since the initial surveys. If ground disturbing activities are delayed or suspended for more than 30 days after the preconstruction survey, the site should be resurveyed.

Although the mitigation measures may be included as enforceable project conditions in the CEQA process, it may also be desirable to formalize them in a Memorandum of Understanding (MOU) between the Department and the project sponsor. An MOU is needed when lands (fee title or conservation easement) are being transferred to the Department.

## Specific Mitigation Measures

1. Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by the Department verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.
2. To offset the loss of foraging and burrow habitat on the project site, a minimum of 6.5 acres of foraging habitat (calculated on a 100 m {approx. 300 ft.} foraging radius around the burrow) per pair or unpaired resident bird, should be acquired and permanently protected. The protected lands should be adjacent to occupied burrowing owl habitat and at a location acceptable to the Department. *Protection of additional habitat acreage per pair or unpaired resident bird may be applicable in some instances.* The CBOC has also developed mitigation guidelines (CBOC 1993) that can be incorporated by CEQA lead agencies and which are consistent with this staff report.
3. When destruction of occupied burrows is unavoidable, existing unsuitable burrows should be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 on the protected lands site. One example of an artificial burrow design is provided in Attachment A.
4. If owls must be moved away from the disturbance area, passive relocation techniques (as described below) should be used rather than trapping. At least one or more weeks will be necessary to accomplish this and allow the owls to acclimate to alternate burrows.
5. The project sponsor should provide funding for long-term management and monitoring of the protected lands. The monitoring plan should include success criteria, remedial measures, and an annual report to the Department.

## Impact Avoidance

If avoidance is the preferred method of dealing with potential project impacts, then no disturbance should occur within 50 meters (approx. 160 ft.) of occupied burrows during the nonbreeding season of September 1 through January 31 or within 75 meters (approx. 250 ft.) during the breeding season of February 1 through August 31. Avoidance also requires that a minimum of 6.5 acres of foraging habitat be *permanently* preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird. The configuration of the protected habitat should be approved by the Department.

### **Passive Relocation - With One-Way Doors**

Owls should be excluded from burrows in the immediate impact zone and within a 50 meter (approx. 160 ft.) buffer zone by installing one-way doors in burrow entrances. One-way doors (e.g., modified dryer vents) should be left in place 48 hours to insure owls have left the burrow before excavation. Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily for one* week to confirm owl use of burrows before excavating burrows in the immediate impact zone. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into the tunnels during excavation to maintain an escape route for any animals inside the burrow.

### **Passive Relocation - Without One-Way Doors**

Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily until the owls have relocated to the new burrows*. The formerly occupied burrows may then be excavated. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into burrows during excavation to maintain an escape route for any animals inside the burrow.

## **Projects Not Subject to CEQA**

The Department is often contacted regarding the presence of burrowing owls on construction sites, parking lots and other areas for which there is no CEQA action or for which the CEQA process has been completed. In these situations, the Department should seek to reach agreement with the project sponsor to implement the specific mitigation measures described above. If they are unwilling to do so, passive relocation without the aid of one-way doors is their only option based upon Fish and Game Code 3503.5.

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# Reproductive Success of Burrowing Owls Using Artificial Nest Burrows in Southeastern Idaho

by Bruce Olenick

Artificial nest burrows were implanted in southeastern Idaho for burrowing owls in the spring of 1986. These artificial burrows consisted of a 12" x 12" x 8" wood nesting chamber with removable top and a 6 foot corrugated and perforated plastic drainage pipe 6 inches in diameter (Fig. 1). Earlier investigators claimed that artificial burrows must provide a natural dirt floor to allow burrowing owls to modify the nesting tunnel and chamber. Contrary to this, the artificial burrow introduced here does not allow owls to modify the entrance or tunnel. The inability to change the physical dimensions of the burrow tunnel does not seem to reflect the owls' breeding success or deter them from using this burrow design.

In 1936, 22 artificial burrows were inhabited. Thirteen nesting attempts yielded an average clutch size of 8.3 eggs per breeding pair. Eight nests successfully hatched at least 1 nestling. In these nests, 67 of 75 eggs hatched (59.3%) and an estimated 61 nestlings (91.0%) fledged. An analysis of the egg laying and incubation periods showed that incubation commenced well after egg lay-

ing began. Average clutch size at the start of incubation was 5.6 eggs. Most eggs tended to hatch synchronously in all successful nests.

Although the initial cost of constructing this burrow design may be slightly higher than a burrow consisting entirely of wood, the plastic pipe burrow offers the following advantages: (1) it lasts several field seasons without rotting or collapsing; (2) it may prevent or retard predation; (3) construction time is min-

imal; (4) it is easy to transport, especially over long distances; and (5) the flexible tunnel simplifies installation. The use of this artificial nest burrow design was highly successful and may prove to be a great resource technique for future management of this species.

*For additional information on constructing this artificial nest burrow, contact Bruce Olenick, Department of Biology, Idaho State University, Pocatello, ID 83209.*

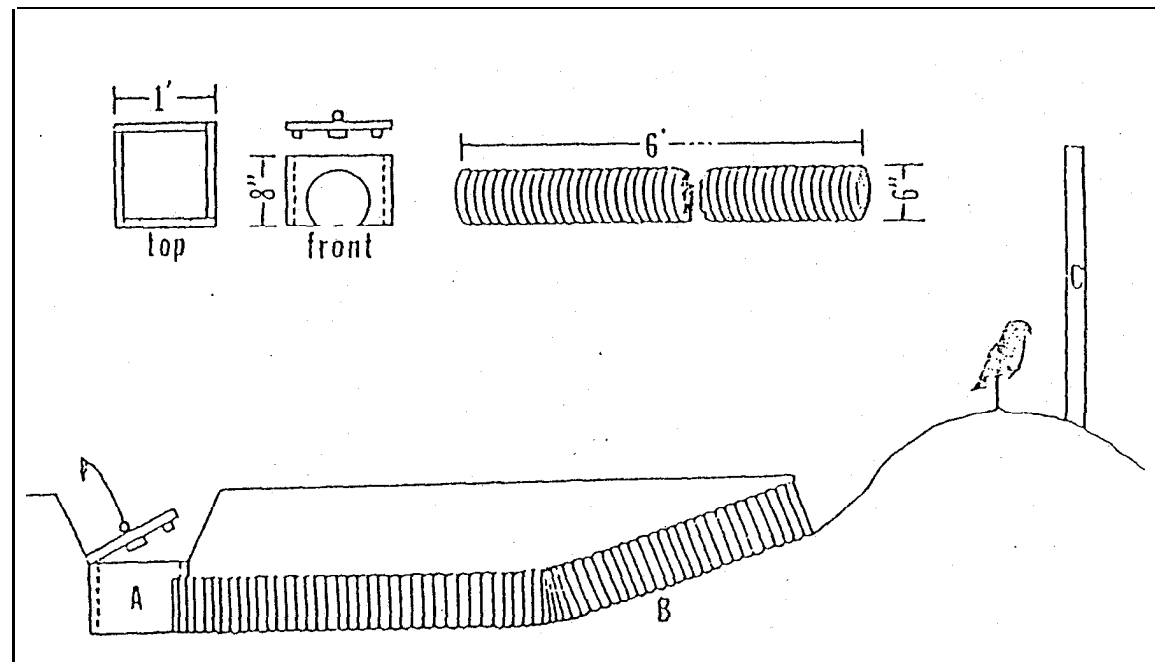


fig. 1 Artificial nest burrow design for burrowing owls. Entire unit (including nest chamber) is buried 12" -- 18" below ground for maintaining thermal stability of the nest chamber. A = nest chamber, B = plastic pipe. C = perch.

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FINAL ENVIRONMENTAL ASSESSMENT (10-030)

*SAN LUIS DRAINAGE FEATURE REEVALUATION DEMONSTRATION TREATMENT  
FACILITY AT PANOCHÉ DRAINAGE DISTRICT*

**Appendix E**

**Nesting Migratory Bird avoidance measures**

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June 2012

## **Interim Empty Nest Policy of the U. S. Fish and Wildlife Service, Region 2**

Effective May 2000. Revised November 15, 2000

The following is the Interim policy of the Region 2 Migratory Bird Office regarding the need for permits to remove/destroy nuisance empty bird nests. Under this interpretation, empty nests are those nests that contain no live eggs or nestlings. Empty nests include nests under construction by adult birds. This interim policy is in effect pending review by the D.O.I. Solicitors Office of the scope of applicability of the Migratory Bird Treaty Act (MBTA) to empty nests. Possession of nests in the absence of a valid permit continues to fall under the prohibitions of the MBTA.

1. **Solitary-Nesting Birds** (species that do not cluster nests in colonies - all species except the groups listed under Colonial-Nesting Birds below).

A permit is not needed for any individual to remove or destroy nuisance empty nests of non-colonial species of birds. If live eggs or nestlings are present in the nest, or if recently fledged birds are returning to roost in the nest at night until they achieve complete independence from the adult birds, then those nests may not be destroyed.

2. **Colonial-Nesting Birds** (species placing nests in dense multiple nest colonies - eared, western, and Clark's grebes; pelicans; cormorants; herons; egrets; ibis; spoonbills; storks; gulls; terns; skimmers; swifts; cave, cliff, and bank swallows).

- A.) **Inactive or Abandoned Colonies**. In cases where a colony is no longer active (*i.e.* no evidence of the colonial species using the colony site for nesting purposes in the current year), then those old nests may be destroyed at any time without the need for a permit.

In cases where a colony that was active during the current year abandons the site for some reason (*e.g.* weather; harassment), the colony should be considered ACTIVE; those nests may not be removed without permit until after the nesting season would normally be over (*i.e.* October through February). Reasons: (a) Birds may resume nesting after responsible weather factor abates; (b) in cases where abandonment is due to deliberate harassment to reduce depredation damages, the colony is often only partially abandoned and is therefore still (partially) active. Take of nests in partially or fully active colonies must be done by trained Wildlife Services personnel (see below). If all birds abandon the colony (which may be difficult to determine), the depredation problem is resolved and there should be no need to rush to remove the nests. Removal can commence after nesting would normally be over for the year.

- B.) **Active or Partially Active Colonies**. Empty nests may be destroyed without permit at the beginning of the nesting season, up until such time as the first egg is laid by any bird in that colony. Once egg laying has commenced by any of those birds, all nest destruction must cease. Destruction of empty nests in an active or partially active colony will likely threaten surrounding nests that contain eggs or

nestlings; therefore it will not be allowed except on a case-by-case basis as determined by the Migratory Bird Permits Office. Nest destruction may resume at the end of the nesting season without a permit only after all nesting activities by all birds in the colony have ceased, which should be by October 1 (*i.e.* after all nestlings have fledged and left the site and no eggs are being incubated by late nesters). At such time nests containing infertile/abandoned/dead eggs or long-dead nestlings may also be destroyed without permit.

### **Permitting and Related Nest Issues.**

Permits will not be issued for activities constituting unintentional (incidental) take (*i.e.* when take of the nest contents is not the ultimate purpose of the activity, but is an incidental result of an otherwise legal activity, such as construction of buildings or roads). Unintentional take of nests with live eggs or nestlings remains a violation of the MBTA.

Permits to take active nests (containing eggs or nestlings) of colonial species for Depredation Control purposes will not be issued by the Migratory Bird Permits Office. Destruction of such active nests must be done by trained personnel of the U.S.D.A. - Wildlife Services.

Please direct questions to the Region 2 Migratory Bird Permits Office (505-248-7882).

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FINAL ENVIRONMENTAL ASSESSMENT (10-030)

*SAN LUIS DRAINAGE FEATURE REEVALUATION DEMONSTRATION TREATMENT  
FACILITY AT PANOCHÉ DRAINAGE DISTRICT*

**Appendix F**  
**Grassland Drainage Area Summary Table 1986-2009**

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June 2012

Grassland Drainage Area - Water Years 1986 - 2008

Water Year (1)	Flow acre-feet	Flow Weighted Loads			Flow Weighted Concentration			TDS mg/L	Reference
		Selenium pounds	Boron 1000 pounds	TDS tons	Selenium µg/L	Boron mg/L	EC µS/cm		
WY 1986	67,006	9,524	787	214,250	52.3	4.3		2,351	(2)
WY 1987	74,902	10,959	889	241,526	53.8	4.4		2,371	(2)
WY 1988	65,327	10,097	821	236,301	56.8	4.6		2,660	(2)
WY 1989	54,186	8,718	743	202,420	59.2	5.0		2,747	(2)
WY 1990	41,662	7,393	672	171,265	65.2	5.9		3,023	(2)
WY 1991	29,290	5,858	544	129,899	73.5	6.8		3,261	(2)
WY 1992	24,533	5,083	435	110,327	76.2	6.5		3,307	(2)
WY 1993	41,197	8,856	730	183,021	79.0	6.5		3,267	(2)
WY 1994	38,670	8,468	645	171,495	80.5	6.1		3,261	(2)
WY 1995	57,574	11,875	868	237,530	75.8	5.6		3,034	(2)
WY 1996	52,978	10,034	723	197,526	69.6	5.0		2,742	(3)
<b>Pre-Project Averages</b>	<b>49,760</b>	<b>8,806</b>	<b>714</b>	<b>190,510</b>	<b>67.4</b>	<b>5.5</b>		<b>2,910</b>	
WY 1997	37,800	7,418	772	176,750	67.5	7.3	4,480	3,315	(4)
WY 1998	43,574	8,436	868	211,340	70.6	7.7	4,838	3,580	(4)
WY 1999	30,510	5,178	620	143,910	65.3	7.7	4,820	3,567	(4)
WY 2000	29,330	4,685	583	135,250	61.3	7.4	4,614	3,414	(4)
WY 2001	27,050	4,509	538	125,080	62.8	7.4	4,605	3,408	(4)
WY 2002	25,816	3,815	509	111,220	58.3	7.4	4,397	3,254	(4)
WY 2003	25,246	3,865	543	113,600	61.6	8.1	4,552	3,368	(4)
WY 2004	25,372	3,813	513	110,700	60.9	7.6	4,445	3,290	(4)
WY 2005	27,540	3,701	613	126,990	49.0	8.2	4,584	3,392	(4)
WY 2006	23,080	3,612	508	111,070	58.2	8.1	4,782	3,538	(4)
WY 2007	16,480	2,581	309	77,140	57.3	7.0	4,660	3,449	(4)
WY 2008	13,210	1,740	281	55,280	46.6	7.7	4,152	3,072	(4)
<b>Project Averages</b>	<b>27,080</b>	<b>4,446</b>	<b>555</b>	<b>124,860</b>	<b>59.9</b>	<b>7.6</b>	<b>4,577</b>	<b>3,387</b>	

References:

(1) Water Year: October - September

(2) CVRWQCB, February 1998. Loads of Salt, Boron, and Selenium in the Grassland Watershed and Lower San Joaquin River, October 1985 to September 1995; Volume I: Load Calculations. Table 16.

(3) CVRWQCB, December 1998. Agricultural Drainage Contribution to Water Quality in the Grassland Watershed of Western Merced County, California: October 1995 - September 1997 (Water Years 1996 and 1997). Table 20

(4) Concentrations and loads calculated from data for GBP Site A

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FINAL ENVIRONMENTAL ASSESSMENT (10-030)

*SAN LUIS DRAINAGE FEATURE REEVALUATION DEMONSTRATION TREATMENT  
FACILITY AT PANOCHÉ DRAINAGE DISTRICT*

**Appendix G**

**State Historic Preservation Officer Concurrence Memo**

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June 2012

**OFFICE OF HISTORIC PRESERVATION  
DEPARTMENT OF PARKS AND RECREATION**

1725 23<sup>rd</sup> Street, Suite 100  
SACRAMENTO, CA 95816-7100  
(916) 445-7000 Fax: (916) 445-7053  
calshpo@parks.ca.gov  
www.ohp.parks.ca.gov



August 16, 2010

In Reply Refer To: BUR100804D

Michael A. Chotkowski  
Regional Environmental Officer  
United States Department of the Interior  
Bureau of Reclamation  
Mid-Pacific Regional Office  
2800 Cottage Way  
Sacramento, CA 95825-1898

BUREAU OF RECLAMATION OFFICIAL FILE COPY		
AUG 19 2010		
CODE	ACTION	TURNNAME & DATE
150	✓	
150		Aug 8/19/2010

Re: San Luis Drainage Demonstration Facility Project, Fresno County, California  
(Project No. 03-SCAO-240.1).

Dear Mr. Chotkowski:

Thank you for consulting with me regarding the above noted undertaking. Pursuant to 36 CFR Part 800 (as amended 8-05-04) regulations implementing Section 106 of the National Historic Preservation Act (NHPA), the Bureau of Reclamation (BUR) is the lead Federal agency for this undertaking and is seeking my comments on the effects that the proposed project will have on historic properties. The undertaking, the San Luis Drainage Demonstration Facility Project consists of the demonstration and operation of test treatment technologies (e.g. reverse osmosis and selenium bio-treatment) designed to collect data required for the development of full-scale treatment facilities. The locations of these test facilities will include a basic project footprint of 4 acres, approximately 7 acres for temporary construction staging, and a 5.5-mile pipeline route with a 30-foot wide right-of-way. The BUR has determined that the area of potential effects (APE) consists of the entirety of these project locations, totaling approximately 31 acres.

Historic property identification efforts by the BUR, which included a records search, Native American consultation, and an archaeological field survey, conclude that there is one historic property in the APE, the Central California Irrigation District's (CCID) Outside Canal. Originally built in 1890, the Outside Canal was constructed for private irrigation uses, becoming a public facility when the CCID purchased it with bond funds in 1953. The Outside Canal has not been evaluated under National Register of Historic Places (NRHP) criteria, and the BUR cannot fully evaluate it under the constraints of this undertaking. However, the BUR is proposing to treat it as eligible for the NRHP under criterion A, for the purposes of this undertaking only, due to its importance in the development of cattle ranching and irrigated agriculture in this portion of the San Joaquin Valley. Under this strategy, the BUR has determined that the proposed undertaking will have only a temporary visual impact to the Outside Canal during

Classification	ENV 3.00
Project	214
Control No.	10062537
Folder I.D.	1114652
Date Input & Initials	8-18-10 B



pipeline installation and that it will retain its same appearance and function post-project. The BUR has consequently determined that this undertaking can be constructed with a finding of No Adverse Effect pursuant to 36 CFR Part 800.5(b).

After having reviewed your letter of August 4, 2010, and supporting documentation, I have no objection to your finding of No Adverse Effect. Be advised that under certain circumstances, such as unanticipated discovery or a change in project description, the BUR may have additional future responsibilities for this undertaking under 36 CFR Part 800. Thank you for seeking my comments and for considering historic properties in planning your project. If you require further information, please contact William Soule, Associate State Archeologist, at phone 916-445-7022 or email [wsoule@parks.ca.gov](mailto:wsoule@parks.ca.gov).

Sincerely,

A handwritten signature in cursive script, reading "Susan H. Stratton for".

Milford Wayne Donaldson, FAIA  
State Historic Preservation Officer

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FINAL ENVIRONMENTAL ASSESSMENT (10-030)

*SAN LUIS DRAINAGE FEATURE REEVALUATION DEMONSTRATION TREATMENT  
FACILITY AT PANOCHÉ DRAINAGE DISTRICT*

**Appendix H**  
**Reclamation's Environmental Determinations**  
**(Cultural Resources and ITA)**

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June 2012

## Healer, Rain L

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**From:** Ramsey, Dawn  
**Sent:** Friday, August 20, 2010 10:24 AM  
**To:** Irvine, Scott R  
**Cc:** Mongano, Gregory S; Healer, Rain L; McDonald, Shauna A; Barnes, Amy J; Bruce, Brandee E; Fogerty, John A; Goodsell, Joanne E; Leigh, Anastasia T; Nickels, Adam M; Overly, Stephen A; Perry, Laureen (Laurie) M  
**Subject:** San Luis Drainage Demonstration Facility Section 106 Complete (03-SCAO-240.1)  
**Attachments:** 03-SCAO-240.1\_SHPOConcur.pdf

Tracking No. 03-SCAO-240.1

Project: San Luis Drainage Demonstration Facility Project, Fresno County, California

Scott:

The proposed project to construct the San Luis Drainage demonstration treatment facility has the potential to affect historic properties. Based on information from efforts to identify historic properties, Reclamation entered into consultation with the California State Historic Preservation Officer (SHPO) on a finding of no adverse effect to historic properties as outlined in the 36 CFR Part 800 regulations describing the Section 106 process.

The consultation package was sent to the SHPO on August 8, 2010. On August 16, 2010, SHPO concurred with Reclamation's findings. Reclamation received the SHPO consensus letter on June 19, 2010. Please find a copy of the letter attached for your convenience.

After receiving SHPO concurrence, the Section 106 process has been completed. Please retain a copy of this e-mail and the SHPO letter for your files. Please note that if project plans or actions change, these revisions may require additional Section 106 consideration including consultation with the SHPO.

Sincerely,  
Dawn

Dawn Ramsey Ford  
Archaeologist  
U.S. Bureau of Reclamation  
Mid-Pacific Region  
2800 Cottage Way, MP-153  
Sacramento, CA 95825  
916-978-5042  
[dramsey@usbr.gov](mailto:dramsey@usbr.gov)

## Healer, Rain L

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**From:** Rivera, Patricia L  
**Sent:** Wednesday, September 15, 2010 1:08 PM  
**To:** Healer, Rain L  
**Subject:** RE: EA-10-30 SLDFR Demonstration Treatment Facility

Rain,

I reviewed the proposed action to construct a Demonstration Treatment Facility (Facility) for drainage treatment within the geographical boundaries of the existing San Joaquin River Implementation Program reuse area. The Facility would occupy a rectangular area approximately four acres in size, adjacent to and immediately north and east of Panoche Drainage District's existing perpendicular drainage distribution canals. Additional pipelines would be constructed to convey drainage water from the seven existing reuse sumps to the Facility.

The proposed action does not have a potential to affect Indian Trust Assets. The nearest ITA is Table Mountain Rancheria, which is approximately .52 miles ENE of the project location.

Patricia

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FINAL ENVIRONMENTAL ASSESSMENT (10-030)

*SAN LUIS DRAINAGE FEATURE REEVALUATION DEMONSTRATION TREATMENT  
FACILITY AT PANOCHÉ DRAINAGE DISTRICT*

**Appendix I**  
**Air Quality Emission Factors**

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June 2012

## SCAB Fleet Average Emission Factors (Diesel)

2012

Air Basin	SC
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Equipment	MaxHP	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4
Aerial Lifts	15	0.0102	0.0528	0.0642	0.0001	0.0030	8.7	0.0009
	25	0.0175	0.0517	0.0957	0.0001	0.0055	11.0	0.0016
	50	0.0650	0.1822	0.1916	0.0003	0.0169	19.6	0.0059
	120	0.0607	0.2451	0.4012	0.0004	0.0324	38.1	0.0055
	500	0.1276	0.4941	1.6553	0.0021	0.0491	213	0.0115
	750	0.2379	0.8930	3.0795	0.0039	0.0903	385	0.0215
Aerial Lifts Composite		0.0576	0.1976	0.3249	0.0004	0.0219	34.7	0.0052
Air Compressors	15	0.0129	0.0494	0.0768	0.0001	0.0052	7.2	0.0012
	25	0.0286	0.0779	0.1337	0.0002	0.0087	14.4	0.0026
	50	0.1010	0.2646	0.2310	0.0003	0.0239	22.3	0.0091
	120	0.0891	0.3287	0.5333	0.0006	0.0492	47.0	0.0080
	175	0.1135	0.5074	0.8954	0.0010	0.0512	88.5	0.0102
	250	0.1066	0.3052	1.2194	0.0015	0.0379	131	0.0096
	500	0.1709	0.5726	1.9077	0.0023	0.0623	232	0.0154
	750	0.2681	0.8849	3.0371	0.0036	0.0980	358	0.0242
	1000	0.4533	1.5617	5.4098	0.0049	0.1589	486	0.0409
Air Compressors Composite		0.0984	0.3445	0.6494	0.0007	0.0469	63.6	0.0089
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0194	0.0658	0.1233	0.0002	0.0054	16.0	0.0017
	50	0.0351	0.2335	0.2768	0.0004	0.0149	31.0	0.0032
	120	0.0514	0.4724	0.5026	0.0009	0.0328	77.1	0.0046
	175	0.0750	0.7538	0.7479	0.0016	0.0366	141	0.0068
	250	0.0838	0.3435	0.8722	0.0021	0.0268	188	0.0076
	500	0.1354	0.5526	1.3152	0.0031	0.0437	311	0.0122
	750	0.2685	1.0916	2.6320	0.0062	0.0865	615	0.0242
	1000	0.4491	1.6773	6.6123	0.0093	0.1699	928	0.0405
Bore/Drill Rigs Composite		0.0854	0.5068	0.9013	0.0017	0.0367	165	0.0077
Cement and Mortar Mixers	15	0.0075	0.0386	0.0475	0.0001	0.0023	6.3	0.0007
	25	0.0293	0.0852	0.1548	0.0002	0.0091	17.6	0.0026
Cement and Mortar Mixers Composite		0.0093	0.0425	0.0564	0.0001	0.0029	7.2	0.0008
Concrete/Industrial Saws	25	0.0199	0.0678	0.1261	0.0002	0.0050	16.5	0.0018
	50	0.1047	0.3015	0.2972	0.0004	0.0268	30.2	0.0094
	120	0.1155	0.4880	0.7625	0.0009	0.0639	74.1	0.0104
	175	0.1685	0.8723	1.4507	0.0018	0.0767	160	0.0152
Concrete/Industrial Saws Composite		0.1090	0.4148	0.5910	0.0007	0.0491	58.5	0.0098
Cranes	50	0.1101	0.2979	0.2478	0.0003	0.0258	23.2	0.0099
	120	0.0982	0.3650	0.5844	0.0006	0.0533	50.1	0.0089
	175	0.1089	0.4838	0.8259	0.0009	0.0479	80.3	0.0098
	250	0.1103	0.3103	1.0712	0.0013	0.0388	112	0.0100
	500	0.1635	0.5691	1.5327	0.0018	0.0571	180	0.0148
	750	0.2767	0.9554	2.6486	0.0030	0.0974	303	0.0250
	9999	0.9905	3.5715	10.9484	0.0098	0.3384	971	0.0894
Cranes Composite		0.1425	0.4946	1.2753	0.0014	0.0553	129	0.0129
Crawler Tractors	50	0.1262	0.3333	0.2713	0.0003	0.0289	24.9	0.0114
	120	0.1374	0.4906	0.8120	0.0008	0.0729	65.8	0.0124
	175	0.1758	0.7491	1.3245	0.0014	0.0765	121	0.0159
	250	0.1854	0.5225	1.7044	0.0019	0.0667	166	0.0167
	500	0.2659	1.0217	2.3914	0.0025	0.0942	259	0.0240
	750	0.4784	1.8248	4.3817	0.0047	0.1705	465	0.0432
	1000	0.7229	2.8959	7.7626	0.0066	0.2503	658	0.0652

Crawler Tractors Composite		0.1671	0.6051	1.2309	0.0013	0.0752	114	0.0151
Crushing/Proc. Equip	50	0.1927	0.5215	0.4545	0.0006	0.0462	44.0	0.0174
	120	0.1525	0.5829	0.9172	0.0010	0.0851	83.1	0.0138
	175	0.2088	0.9654	1.6343	0.0019	0.0946	167	0.0188
	250	0.1953	0.5592	2.1896	0.0028	0.0682	245	0.0176
	500	0.2733	0.8961	2.9457	0.0037	0.0972	374	0.0247
	750	0.4361	1.3892	4.8387	0.0059	0.1560	589	0.0394
9999		1.2112	4.0327	14.2648	0.0131	0.4203	1,308	0.1093
Crushing/Proc. Equipment Comp		0.1872	0.6911	1.2633	0.0015	0.0819	132	0.0169
Dumpers/Tenders	25	0.0100	0.0324	0.0614	0.0001	0.0031	7.6	0.0009
Dumpers/Tenders Composite		0.0100	0.0324	0.0614	0.0001	0.0031	7.6	0.0009
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0048	16.4	0.0018
	50	0.0912	0.2933	0.2568	0.0003	0.0237	25.0	0.0082
	120	0.1183	0.5220	0.7300	0.0009	0.0657	73.6	0.0107
	175	0.1288	0.6678	0.9613	0.0013	0.0569	112	0.0116
	250	0.1301	0.3630	1.2438	0.0018	0.0415	159	0.0117
	500	0.1805	0.5493	1.6112	0.0023	0.0574	234	0.0163
750		0.3013	0.9096	2.7605	0.0039	0.0969	387	0.0272
Excavators Composite		0.1300	0.5401	0.9817	0.0013	0.0536	120	0.0117
Forklifts	50	0.0514	0.1682	0.1488	0.0002	0.0136	14.7	0.0046
	120	0.0489	0.2195	0.3017	0.0004	0.0277	31.2	0.0044
	175	0.0624	0.3304	0.4664	0.0006	0.0278	56.1	0.0056
	250	0.0595	0.1638	0.5872	0.0009	0.0187	77.1	0.0054
	500	0.0806	0.2241	0.7257	0.0011	0.0252	111	0.0073
Forklifts Composite		0.0585	0.2257	0.4330	0.0006	0.0231	54.4	0.0053
Generator Sets	15	0.0157	0.0698	0.1063	0.0002	0.0061	10.2	0.0014
	25	0.0276	0.0951	0.1632	0.0002	0.0096	17.6	0.0025
	50	0.0959	0.2734	0.2966	0.0004	0.0255	30.6	0.0087
	120	0.1206	0.4956	0.8099	0.0009	0.0640	77.9	0.0109
	175	0.1460	0.7413	1.3131	0.0016	0.0644	142	0.0132
	250	0.1372	0.4502	1.8047	0.0024	0.0508	213	0.0124
	500	0.1952	0.7617	2.5896	0.0033	0.0756	337	0.0176
	750	0.3257	1.2296	4.3019	0.0055	0.1241	544	0.0294
9999		0.8673	3.0642	10.8871	0.0105	0.3104	1,049	0.0783
Generator Sets Composite		0.0832	0.3121	0.5779	0.0007	0.0351	61.0	0.0075
Graders	50	0.1182	0.3365	0.2882	0.0004	0.0286	27.5	0.0107
	120	0.1348	0.5355	0.8223	0.0009	0.0740	75.0	0.0122
	175	0.1554	0.7363	1.1931	0.0014	0.0688	124	0.0140
	250	0.1575	0.4508	1.5344	0.0019	0.0547	172	0.0142
	500	0.1947	0.6639	1.8193	0.0023	0.0671	229	0.0176
	750	0.4147	1.4022	3.9602	0.0049	0.1439	486	0.0374
Graders Composite		0.1533	0.6129	1.2503	0.0015	0.0649	133	0.0138
Off-Highway Tractor	120	0.2224	0.7269	1.2964	0.0011	0.1143	93.7	0.0201
	175	0.2135	0.8404	1.6085	0.0015	0.0923	130	0.0193
	250	0.1718	0.4896	1.5282	0.0015	0.0644	130	0.0155
	750	0.6814	3.0883	6.1417	0.0057	0.2515	568	0.0615
	1000	1.0246	4.8137	10.5080	0.0082	0.3620	814	0.0924
Off-Highway Tractors Composite		0.2170	0.7878	1.7969	0.0017	0.0871	151	0.0196
Off-Highway Trucks	175	0.1533	0.7593	1.1072	0.0014	0.0666	125	0.0138
	250	0.1469	0.3944	1.3513	0.0019	0.0461	167	0.0133
	500	0.2263	0.6661	1.9463	0.0027	0.0705	272	0.0204
	750	0.3695	1.0792	3.2612	0.0044	0.1164	442	0.0333
	1000	0.5790	1.7854	6.4025	0.0063	0.1933	625	0.0522
Off-Highway Trucks Composite		0.2241	0.6635	2.0158	0.0027	0.0715	260	0.0202
Other Construction	15	0.0118	0.0617	0.0737	0.0002	0.0028	10.1	0.0011
	25	0.0160	0.0544	0.1019	0.0002	0.0044	13.2	0.0014
	50	0.0842	0.2740	0.2707	0.0004	0.0228	28.0	0.0076
	120	0.1104	0.5320	0.7540	0.0009	0.0633	80.9	0.0100
	175	0.1008	0.5880	0.8599	0.0012	0.0467	107	0.0091

	500	0.1517	0.5426	1.6573	0.0025	0.0545	254	0.0137
Other Construction Equipment Composite		0.0925	0.3847	0.8599	0.0013	0.0366	123	0.0083
Other General Industrial Equipment	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0045	15.3	0.0017
	50	0.1085	0.2856	0.2332	0.0003	0.0253	21.7	0.0098
	120	0.1274	0.4542	0.7277	0.0007	0.0703	62.0	0.0115
	175	0.1349	0.5757	1.0001	0.0011	0.0599	95.9	0.0122
	250	0.1235	0.3281	1.2983	0.0015	0.0417	136	0.0111
	500	0.2232	0.6772	2.2367	0.0026	0.0758	265	0.0201
	750	0.3707	1.1162	3.8016	0.0044	0.1273	437	0.0334
	1000	0.5621	1.8453	6.4018	0.0056	0.1947	560	0.0507
Other General Industrial Equipment Composite		0.1635	0.5362	1.4520	0.0016	0.0632	152	0.0148
Other Material Handling Equipment	50	0.1506	0.3950	0.3243	0.0004	0.0352	30.3	0.0136
	120	0.1239	0.4423	0.7103	0.0007	0.0684	60.7	0.0112
	175	0.1703	0.7292	1.2706	0.0014	0.0759	122	0.0154
	250	0.1305	0.3496	1.3863	0.0016	0.0443	145	0.0118
	500	0.1590	0.4876	1.6124	0.0019	0.0545	192	0.0143
	9999	0.7467	2.4395	8.4619	0.0073	0.2565	741	0.0674
Other Material Handling Equipment Composite		0.1566	0.5108	1.4125	0.0015	0.0613	141	0.0141
Pavers	25	0.0255	0.0811	0.1531	0.0002	0.0080	18.7	0.0023
	50	0.1451	0.3680	0.3038	0.0004	0.0327	28.0	0.0131
	120	0.1467	0.5107	0.8788	0.0008	0.0776	69.2	0.0132
	175	0.1864	0.7833	1.4495	0.0014	0.0819	128	0.0168
	250	0.2182	0.6365	2.0698	0.0022	0.0818	194	0.0197
	500	0.2383	0.9957	2.2418	0.0023	0.0883	233	0.0215
Pavers Composite		0.1596	0.5445	0.8980	0.0009	0.0642	77.9	0.0144
Paving Equipment	25	0.0153	0.0520	0.0974	0.0002	0.0042	12.6	0.0014
	50	0.1239	0.3124	0.2591	0.0003	0.0279	23.9	0.0112
	120	0.1150	0.3997	0.6897	0.0006	0.0610	54.5	0.0104
	175	0.1455	0.6114	1.1384	0.0011	0.0640	101	0.0131
	250	0.1349	0.3946	1.2976	0.0014	0.0507	122	0.0122
Paving Equipment Composite		0.1204	0.4365	0.8114	0.0008	0.0570	68.9	0.0109
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0013	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0013	4.3	0.0005
Pressure Washers	15	0.0075	0.0334	0.0509	0.0001	0.0029	4.9	0.0007
	25	0.0112	0.0385	0.0662	0.0001	0.0039	7.1	0.0010
	50	0.0349	0.1074	0.1339	0.0002	0.0102	14.3	0.0032
	120	0.0332	0.1458	0.2385	0.0003	0.0172	24.1	0.0030
Pressure Washers Composite		0.0173	0.0635	0.0921	0.0001	0.0063	9.4	0.0016
Pumps	15	0.0133	0.0508	0.0790	0.0001	0.0054	7.4	0.0012
	25	0.0386	0.1051	0.1803	0.0002	0.0117	19.5	0.0035
	50	0.1155	0.3229	0.3362	0.0004	0.0299	34.3	0.0104
	120	0.1250	0.5036	0.8226	0.0009	0.0669	77.9	0.0113
	175	0.1498	0.7431	1.3164	0.0016	0.0664	140	0.0135
	250	0.1357	0.4345	1.7375	0.0023	0.0501	201	0.0122
	500	0.2089	0.8032	2.6861	0.0034	0.0803	345	0.0188
	750	0.3557	1.3279	4.5700	0.0057	0.1350	571	0.0321
	9999	1.1456	4.0641	14.2305	0.0136	0.4081	1,355	0.1034
Pumps Composite		0.0813	0.2983	0.4999	0.0006	0.0351	49.6	0.0073
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0162	0.0549	0.1029	0.0002	0.0045	13.3	0.0015
	50	0.1105	0.2994	0.2677	0.0003	0.0263	26.0	0.0100
	120	0.1054	0.4098	0.6619	0.0007	0.0574	59.0	0.0095
	175	0.1320	0.6220	1.0725	0.0012	0.0591	108	0.0119
	250	0.1347	0.4083	1.4103	0.0017	0.0498	153	0.0122
	500	0.1755	0.6752	1.8093	0.0022	0.0652	219	0.0158
Rollers Composite		0.1038	0.4107	0.6936	0.0008	0.0488	67.1	0.0094
Rough Terrain Forklifts	50	0.1315	0.3910	0.3455	0.0004	0.0330	33.9	0.0119
	120	0.1038	0.4364	0.6425	0.0007	0.0585	62.4	0.0094



	175	0.1444	0.7268	1.1204	0.0014	0.0652	125	0.0130
	250	0.1353	0.3896	1.4082	0.0019	0.0458	171	0.0122
	500	0.1894	0.5985	1.8577	0.0025	0.0642	257	0.0171
Rough Terrain Forklifts Composite		0.1093	0.4680	0.6995	0.0008	0.0587	70.3	0.0099
Rubber Tired Doze	175	0.2209	0.8528	1.6304	0.0015	0.0945	129	0.0199
	250	0.2545	0.7124	2.1985	0.0021	0.0942	183	0.0230
	500	0.3345	1.5220	2.8822	0.0026	0.1210	265	0.0302
	750	0.5042	2.2809	4.4100	0.0040	0.1832	399	0.0455
	1000	0.7807	3.6654	7.7816	0.0060	0.2729	592	0.0704
Rubber Tired Dozers Composite		0.3114	1.2491	2.6866	0.0025	0.1137	239	0.0281
Rubber Tired Load	25	0.0205	0.0697	0.1295	0.0002	0.0052	16.9	0.0018
	50	0.1315	0.3756	0.3242	0.0004	0.0319	31.1	0.0119
	120	0.1045	0.4187	0.6404	0.0007	0.0576	58.9	0.0094
	175	0.1312	0.6288	1.0135	0.0012	0.0583	106	0.0118
	250	0.1330	0.3838	1.3129	0.0017	0.0462	149	0.0120
	500	0.1961	0.6755	1.8555	0.0023	0.0677	237	0.0177
	750	0.4044	1.3812	3.9115	0.0049	0.1408	486	0.0365
	1000	0.5480	1.9543	6.3337	0.0060	0.1909	594	0.0494
Rubber Tired Loaders Composite		0.1272	0.4855	1.0034	0.0012	0.0558	109	0.0115
Scrapers	120	0.1990	0.7011	1.1749	0.0011	0.1054	93.9	0.0180
	175	0.2172	0.9158	1.6429	0.0017	0.0945	148	0.0196
	250	0.2367	0.6699	2.1849	0.0024	0.0859	209	0.0214
	500	0.3333	1.3000	3.0162	0.0032	0.1190	321	0.0301
	750	0.5779	2.2380	5.3231	0.0056	0.2075	555	0.0521
Scrapers Composite		0.2916	1.0984	2.5680	0.0027	0.1087	262	0.0263
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0017	6.2	0.0006
	50	0.1270	0.3587	0.3564	0.0005	0.0324	36.2	0.0115
	120	0.1284	0.5269	0.8360	0.0009	0.0703	80.2	0.0116
	175	0.1661	0.8370	1.4268	0.0017	0.0750	155	0.0150
	250	0.1746	0.5516	2.1599	0.0029	0.0639	255	0.0158
Signal Boards Composite		0.0203	0.0940	0.1470	0.0002	0.0083	16.7	0.0018
Skid Steer Loaders	25	0.0211	0.0635	0.1189	0.0002	0.0067	13.8	0.0019
	50	0.0596	0.2332	0.2402	0.0003	0.0180	25.5	0.0054
	120	0.0482	0.2769	0.3536	0.0005	0.0286	42.8	0.0043
Skid Steer Loaders Composite		0.0534	0.2360	0.2686	0.0004	0.0207	30.3	0.0048
Surfacing Equipme	50	0.0513	0.1441	0.1411	0.0002	0.0128	14.1	0.0046
	120	0.1040	0.4251	0.6895	0.0007	0.0557	63.8	0.0094
	175	0.0950	0.4745	0.8195	0.0010	0.0422	85.8	0.0086
	250	0.1095	0.3526	1.1993	0.0015	0.0413	135	0.0099
	500	0.1631	0.6813	1.7819	0.0022	0.0622	221	0.0147
	750	0.2601	1.0660	2.8642	0.0035	0.0986	347	0.0235
Surfacing Equipment Composite		0.1362	0.5467	1.3678	0.0017	0.0512	166	0.0123
Sweepers/Scrubbe	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1501	0.0002	0.0060	19.6	0.0021
	50	0.1195	0.3565	0.3179	0.0004	0.0302	31.6	0.0108
	120	0.1233	0.5204	0.7534	0.0009	0.0706	75.0	0.0111
	175	0.1575	0.8008	1.2212	0.0016	0.0717	139	0.0142
	250	0.1205	0.3447	1.3019	0.0018	0.0402	162	0.0109
Sweepers/Scrubbers Composite		0.1278	0.5215	0.7403	0.0009	0.0576	78.5	0.0115
Tractors/Loaders/B	25	0.0199	0.0662	0.1250	0.0002	0.0061	15.9	0.0018
	50	0.1006	0.3305	0.3030	0.0004	0.0267	30.3	0.0091
	120	0.0760	0.3557	0.4910	0.0006	0.0432	51.7	0.0069
	175	0.1058	0.5866	0.8294	0.0011	0.0478	101	0.0095
	250	0.1264	0.3755	1.2813	0.0019	0.0415	172	0.0114
	500	0.2386	0.7714	2.2621	0.0039	0.0784	345	0.0215
	750	0.3611	1.1563	3.5105	0.0058	0.1199	517	0.0326
Tractors/Loaders/Backhoes Com		0.0862	0.3824	0.5816	0.0008	0.0435	66.8	0.0078
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0398	0.1355	0.2519	0.0004	0.0101	32.9	0.0036

	50	0.1656	0.4176	0.3536	0.0004	0.0374	32.9	0.0149
	120	0.1354	0.4732	0.8257	0.0008	0.0709	64.9	0.0122
	175	0.2050	0.8694	1.6306	0.0016	0.0901	144	0.0185
	250	0.2483	0.7418	2.3854	0.0025	0.0951	223	0.0224
	500	0.3135	1.4011	3.0220	0.0031	0.1190	311	0.0283
	750	0.5949	2.6307	5.8034	0.0059	0.2259	587	0.0537
Trenchers Composite		0.1507	0.4749	0.6995	0.0007	0.0582	58.7	0.0136
Welders	15	0.0111	0.0425	0.0660	0.0001	0.0045	6.2	0.0010
	25	0.0224	0.0609	0.1044	0.0001	0.0068	11.3	0.0020
	50	0.1071	0.2854	0.2637	0.0003	0.0260	26.0	0.0097
	120	0.0708	0.2687	0.4376	0.0005	0.0387	39.5	0.0064
	175	0.1183	0.5475	0.9688	0.0011	0.0531	98.2	0.0107
	250	0.0909	0.2704	1.0791	0.0013	0.0329	119	0.0082
	500	0.1154	0.4072	1.3538	0.0016	0.0431	168	0.0104
Welders Composite		0.0703	0.2150	0.2702	0.0003	0.0243	25.6	0.0063



## Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Passenger Vehicles & Delivery Trucks

Projects in the SCAQMD (Scenario Years 2007 - 2026)  
Derived from Peak Emissions Inventory (**Winter**, **Annual**, **Summer**)

### Vehicle Class:

### Passenger Vehicles (<8500 pounds) & Delivery Trucks (>8500 pounds)

The following emission factors were compiled by running the California Air Resources Board's EMFAC2007 (version 2.3) Burden Model, taking the weighted average of vehicle types and simplifying into two categories:

#### Passenger Vehicles & Delivery Trucks.

These emission factors can be used to calculate on-road mobile source emissions for the vehicle categories listed in the tables below, by use of the following equation:

$$\text{Emissions (pounds per day)} = N \times TL \times EF$$

where N = number of trips, TL = trip length (miles/day), and EF = emission factor (pounds per mile)

This methodology replaces the old EMFAC emission factors in Tables A-9-5-J-1 through A-9-5-L in Appendix A9 of the current SCAQMD CEQA Handbook. All the emission factors account for the emissions from start, running and idling exhaust. In addition, the ROG emission factors include diurnal, hot soak, running and resting emissions, and the PM10 & PM2.5 emission factors include tire and brake wear.

#### Scenario Year: 2007

All model years in the range 1965 to 2007

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.01155158	CO	0.02407553
NOx	0.00121328	NOx	0.02508445
ROG	0.00118234	ROG	0.00323145
SOx	0.00001078	SOx	0.00002626
PM10	0.00008447	PM10	0.00091020
PM2.5	0.00005243	PM2.5	0.00078884
CO2	1.10672236	CO2	2.72245619
CH4	0.00010306	CH4	0.00016030

#### Scenario Year: 2008

All model years in the range 1965 to 2008

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.01054844	CO	0.02194915
NOx	0.00110288	NOx	0.02371258
ROG	0.00107919	ROG	0.00299270
SOx	0.00001075	SOx	0.00002565
PM10	0.00008505	PM10	0.00085607
PM2.5	0.00005293	PM2.5	0.00073933
CO2	1.09953226	CO2	2.71943400
CH4	0.00009465	CH4	0.00014769

#### Scenario Year: 2009

All model years in the range 1965 to 2009

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00968562	CO	0.02016075
NOx	0.00100518	NOx	0.02236636
ROG	0.00099245	ROG	0.00278899
SOx	0.00001066	SOx	0.00002679
PM10	0.00008601	PM10	0.00080550
PM2.5	0.00005384	PM2.5	0.00069228
CO2	1.09755398	CO2	2.72330496
CH4	0.00008767	CH4	0.00013655

#### Scenario Year: 2010

All model years in the range 1966 to 2010

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00826276	CO	0.01843765
NOx	0.00091814	NOx	0.02062460
ROG	0.00091399	ROG	0.00258958
SOx	0.00001077	SOx	0.00002701
PM10	0.00008698	PM10	0.00075121
PM2.5	0.00005478	PM2.5	0.00064233
CO2	1.09568235	CO2	2.73222199
CH4	0.00008146	CH4	0.00012576



## Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Passenger Vehicles & Delivery Trucks

Projects in the SCAQMD (Scenario Years 2007 - 2026)  
Derived from Peak Emissions Inventory (**Winter**, **Annual**, **Summer**)

### Vehicle Class:

### Passenger Vehicles (<8500 pounds) & Delivery Trucks (>8500 pounds)

Scenario Year: **2011**

All model years in the range 1967 to 2011

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00826276	CO	0.01693242
NOx	0.00084460	NOx	0.01893366
ROG	0.00085233	ROG	0.00241868
SOx	0.00001077	SOx	0.00002728
PM10	0.00008879	PM10	0.00070097
PM2.5	0.00005653	PM2.5	0.00059682
CO2	1.10235154	CO2	2.75180822
CH4	0.00007678	CH4	0.00011655

Scenario Year: **2012**

All model years in the range 1968 to 2012

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00765475	CO	0.01545741
NOx	0.00077583	NOx	0.01732423
ROG	0.00079628	ROG	0.00223776
SOx	0.00001073	SOx	0.00002667
PM10	0.00008979	PM10	0.00064975
PM2.5	0.00005750	PM2.5	0.00054954
CO2	1.10152540	CO2	2.76628414
CH4	0.00007169	CH4	0.00010668

Scenario Year: **2013**

All model years in the range 1969 to 2013

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00709228	CO	0.01407778
NOx	0.00071158	NOx	0.01577311
ROG	0.00074567	ROG	0.00206295
SOx	0.00001072	SOx	0.00002682
PM10	0.00009067	PM10	0.00059956
PM2.5	0.00005834	PM2.5	0.00050174
CO2	1.10087435	CO2	2.78163459
CH4	0.00006707	CH4	0.00009703

Scenario Year: **2014**

All model years in the range 1970 to 2014

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00660353	CO	0.01284321
NOx	0.00065484	NOx	0.01425162
ROG	0.00070227	ROG	0.00189649
SOx	0.00001069	SOx	0.00002754
PM10	0.00009185	PM10	0.00054929
PM2.5	0.00005939	PM2.5	0.00045519
CO2	1.10257205	CO2	2.79845465
CH4	0.00006312	CH4	0.00008798

Scenario Year: **2015**

All model years in the range 1971 to 2015

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00614108	CO	0.01169445
NOx	0.00060188	NOx	0.01285026
ROG	0.00066355	ROG	0.00173890
SOx	0.00001070	SOx	0.00002741
PM10	0.00009259	PM10	0.00050307
PM2.5	0.00006015	PM2.5	0.00041268
CO2	1.10192837	CO2	2.81247685
CH4	0.00005923	CH4	0.00008076

Scenario Year: **2016**

All model years in the range 1972 to 2016

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00575800	CO	0.01080542
NOx	0.00055658	NOx	0.01172881
ROG	0.00063254	ROG	0.00161521
SOx	0.00001071	SOx	0.00002767
PM10	0.00009392	PM10	0.00046606
PM2.5	0.00006131	PM2.5	0.00037868
CO2	1.10677664	CO2	2.83134285
CH4	0.00005623	CH4	0.00007355



## Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Passenger Vehicles & Delivery Trucks

Projects in the SCAQMD (Scenario Years 2007 - 2026)  
Derived from Peak Emissions Inventory (**Winter**, **Annual**, **Summer**)

### Vehicle Class:

### Passenger Vehicles (<8500 pounds) & Delivery Trucks (>8500 pounds)

Scenario Year: **2017**

All model years in the range 1973 to 2017

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00537891	CO	0.00998101
NOx	0.00051297	NOx	0.01070034
ROG	0.00060109	ROG	0.00150242
SOx	0.00001079	SOx	0.00002723
PM10	0.00009446	PM10	0.00043131
PM2.5	0.00006192	PM2.5	0.00034605
CO2	1.10627489	CO2	2.84005015
CH4	0.00005300	CH4	0.00006663

Scenario Year: **2018**

All model years in the range 1974 to 2018

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00502881	CO	0.00923234
NOx	0.00047300	NOx	0.00979416
ROG	0.00057178	ROG	0.00139856
SOx	0.00001071	SOx	0.00002749
PM10	0.00009494	PM10	0.00040110
PM2.5	0.00006234	PM2.5	0.00031792
CO2	1.10562643	CO2	2.84646835
CH4	0.00005003	CH4	0.00006203

Scenario Year: **2019**

All model years in the range 1975 to 2019

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00471820	CO	0.00857192
NOx	0.00043716	NOx	0.00900205
ROG	0.00054654	ROG	0.00130563
SOx	0.00001072	SOx	0.00002706
PM10	0.00009523	PM10	0.00037393
PM2.5	0.00006259	PM2.5	0.00029276
CO2	1.10496100	CO2	2.85060182
CH4	0.00004743	CH4	0.00005619

Scenario Year: **2020**

All model years in the range 1976 to 2020

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00444247	CO	0.00799617
NOx	0.00040506	NOx	0.00831802
ROG	0.00052463	ROG	0.00122382
SOx	0.00001073	SOx	0.00002733
PM10	0.00009550	PM10	0.00035054
PM2.5	0.00006279	PM2.5	0.00027128
CO2	1.10456157	CO2	2.85148109
CH4	0.00004495	CH4	0.00005330

Scenario Year: **2021**

All model years in the range 1977 to 2021

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00421218	CO	0.00748303
NOx	0.00037757	NOx	0.00773500
ROG	0.00050573	ROG	0.00115568
SOx	0.00001073	SOx	0.00002755
PM10	0.00009640	PM10	0.00033125
PM2.5	0.00006364	PM2.5	0.00025331
CO2	1.11009559	CO2	2.86434187
CH4	0.00004322	CH4	0.00004905

Scenario Year: **2022**

All model years in the range 1978 to 2022

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00397866	CO	0.00699290
NOx	0.00035150	NOx	0.00722470
ROG	0.00048658	ROG	0.00108569
SOx	0.00001072	SOx	0.00002774
PM10	0.00009661	PM10	0.00031501
PM2.5	0.00006389	PM2.5	0.00023906
CO2	1.11019931	CO2	2.87006769
CH4	0.00004121	CH4	0.00004557



## Highest (Most Conservative) EMFAC2007 (version 2.3) Emission Factors for On-Road Passenger Vehicles & Delivery Trucks

Projects in the SCAQMD (Scenario Years 2007 - 2026)  
Derived from Peak Emissions Inventory (**Winter**, **Annual**, **Summer**)

### Vehicle Class:

### Passenger Vehicles (<8500 pounds) & Delivery Trucks (>8500 pounds)

Scenario Year: **2023**

All model years in the range 1979 to 2023

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00377527	CO	0.00658123
NOx	0.00032851	NOx	0.00679147
ROG	0.00046900	ROG	0.00102852
SOx	0.00001070	SOx	0.00002790
PM10	0.00009676	PM10	0.00030109
PM2.5	0.00006405	PM2.5	0.00022582
CO2	1.11023373	CO2	2.87466338
CH4	0.00003951	CH4	0.00004218

Scenario Year: **2024**

All model years in the range 1980 to 2024

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00358611	CO	0.00625076
NOx	0.00030721	NOx	0.00647083
ROG	0.00045136	ROG	0.00096578
SOx	0.00001080	SOx	0.00002807
PM10	0.00009676	PM10	0.00029407
PM2.5	0.00006410	PM2.5	0.00021880
CO2	1.11061572	CO2	2.88010717
CH4	0.00003781	CH4	0.00004019

Scenario Year: **2025**

All model years in the range 1981 to 2025

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00342738	CO	0.00595363
NOx	0.00028846	NOx	0.00615945
ROG	0.00043545	ROG	0.00092178
SOx	0.00001070	SOx	0.00002761
PM10	0.00009679	PM10	0.00028425
PM2.5	0.00006418	PM2.5	0.00020958
CO2	1.11078571	CO2	2.88143570
CH4	0.00003641	CH4	0.00003765

Scenario Year: **2026**

All model years in the range 1982 to 2026

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.00328779	CO	0.00569435
NOx	0.00027141	NOx	0.00589869
ROG	0.00042052	ROG	0.00088403
SOx	0.00001076	SOx	0.00002716
PM10	0.00009687	PM10	0.00027657
PM2.5	0.00006415	PM2.5	0.00020187
CO2	1.11105829	CO2	2.88298299
CH4	0.00003518	CH4	0.00003581

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FINAL ENVIRONMENTAL ASSESSMENT (10-030)

*SAN LUIS DRAINAGE FEATURE REEVALUATION DEMONSTRATION TREATMENT  
FACILITY AT PANOCHÉ DRAINAGE DISTRICT*

**Appendix J**  
**Comment Letters and Response to Comments**

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June 2012

## Healer, Rain L

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**From:** Joe McGahan [jmcgahan@summerseng.com]  
**Sent:** Thursday, October 06, 2011 9:17 AM  
**To:** Healer, Rain L; Marcos Hedrick  
**Cc:** Carter, Sheryl R; Irvine, Scott R; Gruenhagen, Ned M; Hyatt, David E; Siek, Charles R; Diane Rathmann  
**Subject:** RE: MP-11-131 San Luis Drainage Feature Reevaluation Demonstration Treatment Facility  
**Attachments:** Pilot Treatment Facility ROWD 06-22-11.pdf  
  
**Follow Up Flag:** Follow up  
**Flag Status:** Completed

There is an incorrect statement in the Draft FONSI. The last paragraph under Proposed Action on page 2 states "Operation of the Facility will require a new National Pollution Discharge Elimination System (NPDES) permit issued by the RWQCB." The Regional Board notified me on June 15, 2011 that an NPDES permit is not required for the project and they are processing Waste Discharge Requirements. Attached is the Report of Waste Discharge. Note the box checked under II.A. is waste discharge to land. The discharge from the plant is going to be discharged back onto the reuse area and not to surface waters. The sentence should state: "Operation of the Facility will require Waste Discharge Requirements issued by the RWQCB." If you have any questions please call.

Joseph C. McGahan  
Summers Engineering  
P. O. Box 1122  
887 N. Irwin St.  
Hanford, CA 93232  
559-582-9237 Phone  
559-582-7632 Fax  
559-696-0989 Cell

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**From:** Healer, Rain L [<mailto:rhealer@usbr.gov>]  
**Sent:** Monday, September 19, 2011 12:21 PM  
**To:** Joe McGahan; Marcos Hedrick  
**Cc:** Carter, Sheryl R; Irvine, Scott R; Gruenhagen, Ned M; Hyatt, David E; Siek, Charles R  
**Subject:** FW: MP-11-131 San Luis Drainage Feature Reevaluation Demonstration Treatment Facility

Joe,

Here is the press release.

Rain

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**From:** Glover, Ellen  
**Sent:** Monday, September 19, 2011 12:16 PM  
**To:** BOR MP All Mid-Pacific Employees; Arroyave, Pablo R; Brewer, Jeri Domingo; DuBray, Daniel J; Glaser, Donald R; Gore, David W; Griffin, Effie; Harris-Brace, Gertel; Hunt, Shane D; Lucero, Pedro A (Pete); Maucieri, Mathew; Thompson, Dionne E; Thompson, Katherine A; Weinstock, Regina D (Gina); White, F Clifton (Kip); Wirth, Lynnette J  
**Subject:** MP-11-131 San Luis Drainage Feature Reevaluation Demonstration Treatment Facility

The attached press release from Reclamation's MP Region, "Reclamation Releases Environmental Documents for the San Luis Drainage Feature Reevaluation Demonstration Treatment Facility" was released today, Monday, Sept. 19. Thank you. Ellen



Mid-Pacific Region  
Sacramento, CA

MP-11-131

Media Contact: Pete Lucero, 916-978-5100, [plucero@usbr.gov](mailto:plucero@usbr.gov)

For Release On: Sept. 16, 2011

## **Reclamation Releases Environmental Documents for the San Luis Drainage Feature Reevaluation Demonstration Treatment Facility**

The Bureau of Reclamation today released for public review environmental documents on the proposed construction of a treatment facility to demonstrate and operate reverse osmosis and selenium biotreatment technologies. The project will be used to collect cost and performance data needed for final design of the corresponding full-scale drainage service treatment components. The project site is about 45 miles west of Fresno, Calif.

The Draft Environmental Assessment and Finding of No Significant Impact (Draft EA/FONSI) were prepared in accordance with the National Environmental Policy Act and are available online at [http://www.usbr.gov/mp/nepa/nepa\\_projdetails.cfm?Project\\_ID=8295](http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=8295). If you encounter problems accessing the website, please call 916-978-5100 or e-mail [mppublicaffairs@usbr.gov](mailto:mppublicaffairs@usbr.gov).

Please send written comments to Rain Healer, Bureau of Reclamation, 1243 N Street, Fresno, CA 93721, by Friday, Oct. 14, 2011. Comments may also be faxed to Ms. Healer at 559-487-5397, or e-mailed to [rhealer@usbr.gov](mailto:rhealer@usbr.gov). For additional information or to request a copy of the Draft EA/FONSI, please contact Ms. Healer at 559-487-5196. Copies of the draft documents may also be viewed at Reclamation's Fresno office at the above address.

# # #

Reclamation is the largest wholesale water supplier and the second largest producer of hydroelectric power in the United States, with operations and facilities in the 17 Western States. Its facilities also provide substantial flood control, recreation, and fish and wildlife benefits. Visit our website at <http://www.usbr.gov>.

If you would rather not receive future communications from Bureau of Reclamation, let us know by clicking [here](#).  
Bureau of Reclamation, Denver Federal Center, Alameda & Kipling Street PO Box 25007, Denver, CO 80225 United States



# **PANOCHÉ DRAINAGE DISTRICT**

52027 WEST ALTHEA, FIREBAUGH, CA 93622 • TELEPHONE (209) 364-6136 • FAX (209) 364-6122

June 24, 2011

Pamela Creedon, Executive Officer  
Central Valley Regional Water Quality Control Board  
3443 Routier Road, Suite A  
Sacramento, Ca 95827-3098

SUBJECT: Report of Waste Discharge; Demonstration Treatment Facility

Dear Pamela:

The Panoche Drainage District and the U.S Bureau of Reclamation are cooperating on the construction of a pilot treatment plant to demonstrate the treatment of agricultural drainage water. Attached is a completed Report of Waste Discharge Form 200 for this facility.

The back-up information for the characterization of the discharge is contained in the attached Preliminary Project Description Revised February 10, 2011, April 7, 2011 30% Design Technical Memorandum and an 11 drawing set of preliminary design drawing. A proposed time schedule is included in the drawing set.

We look forward to working with you and if you should have any questions, please give me a call.

Very truly yours,

Dennis Falaschi  
General Manager

Enclosure

Cc via email:

Michael Jackson, USBR, Fresno  
Scott Irvine USBR, Denver, Colorado  
Rudy Schnagl, CVRWQCB, Rancho Cordova



# APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT



## I. FACILITY INFORMATION

## A. Facility:

Name:			
Address:			
City:	County:	State:	Zip Code:
Contact Person:		Telephone Number:	

## B. Facility Owner:

Name:		Owner Type (Check One)	
Address:		1. <input type="checkbox"/> Individual      2. <input type="checkbox"/> Corporation	
City:	State:	Zip Code:	3. <input type="checkbox"/> Governmental Agency      4. <input type="checkbox"/> Partnership
Contact Person:		Telephone Number:	Federal Tax ID:

## C. Facility Operator (The agency or business, not the person):

Name:		Operator Type (Check One)	
Address:		1. <input type="checkbox"/> Individual      2. <input type="checkbox"/> Corporation	
City:	State:	Zip Code:	3. <input type="checkbox"/> Governmental Agency      4. <input type="checkbox"/> Partnership
Contact Person:		Telephone Number:	5. <input type="checkbox"/> Other: _____

## D. Owner of the Land:

Name:		Owner Type (Check One)	
Address:		1. <input type="checkbox"/> Individual      2. <input type="checkbox"/> Corporation	
City:	State:	Zip Code:	3. <input type="checkbox"/> Governmental Agency      4. <input type="checkbox"/> Partnership
Contact Person:		Telephone Number:	5. <input type="checkbox"/> Other: _____

## E. Address Where Legal Notice May Be Served:

Address:		
City:	State:	Zip Code:
Contact Person:	Telephone Number:	

## F. Billing Address:

Address:		
City:	State:	Zip Code:
Contact Person:	Telephone Number:	



# **APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT**



## II. TYPE OF DISCHARGE

Check Type of Discharge(s) Described in this Application (A or B):

☐ **A. WASTE DISCHARGE TO LAND**

☐ **B. WASTE DISCHARGE TO SURFACE WATER**

**Check all that apply:**

☐ Domestic/Municipal Wastewater  
Treatment and Disposal

☐ Cooling Water

☐ Mining

☐ Waste Pile

☐ Wastewater Reclamation

☐ Other, please describe: \_\_\_\_\_

☐ Animal Waste Solids

☐ Land Treatment Unit

☐ Dredge Material Disposal

☐ Surface Impoundment

☐ Industrial Process Wastewater

☐ Animal or Aquacultural Wastewater

☐ Biosolids/Residual

☐ Hazardous Waste (see instructions)

☐ Landfill (see instructions)

☐ Storm Water

## III. LOCATION OF THE FACILITY

Describe the physical location of the facility.

**1. Assessor's Parcel Number(s)**

**Facility:**

**Discharge Point:**

**2. Latitude**

**Facility:**

**Discharge Point:**

**3. Longitude**

**Facility:**

**Discharge Point:**

## IV. REASON FOR FILING

☐ New Discharge or Facility

☐ Changes in Ownership/Operator (see instructions)

☐ Change in Design or Operation

☐ Waste Discharge Requirements Update or NPDES Permit Reissuance

☐ Change in Quantity/Type of Discharge

☐ Other: \_\_\_\_\_

## V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Name of Lead Agency: \_\_\_\_\_

Has a public agency determined that the proposed project is exempt from CEQA?

☐ Yes

☐ No

If Yes, state the basis for the exemption and the name of the agency supplying the exemption on the line below.

Basis for Exemption/Agency: \_\_\_\_\_

Has a "Notice of Determination" been filed under CEQA?

☐ Yes

☐ No

If Yes, enclose a copy of the CEQA document, Environmental Impact Report, or Negative Declaration. If no, identify the expected type of CEQA document and expected date of completion.

Expected CEQA Documents:

☐ EIR

☐ Negative Declaration

Expected CEQA Completion Date: \_\_\_\_\_



# APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT



## VI. OTHER REQUIRED INFORMATION

Please provide a COMPLETE characterization of your discharge. A complete characterization includes, but is not limited to, design and actual flows, a list of constituents and the discharge concentration of each constituent, a list of other appropriate waste discharge characteristics, a description and schematic drawing of all treatment processes, a description of any Best Management Practices (BMPs) used, and a description of disposal methods.

Also include a site map showing the location of the facility and, if you are submitting this application for an NPDES permit, identify the surface water to which you propose to discharge. Please try to limit your maps to a scale of 1:24,000 (7.5' USGS Quadrangle) or a street map, if more appropriate.

## VII. OTHER

Attach additional sheets to explain any responses which need clarification. List attachments with titles and dates below:

See attached "Preliminary Project Description" Rev. February 10, 2011

You will be notified by a representative of the RWQCB within 30 days of receipt of your application. The notice will state if your application is complete or if there is additional information you must submit to complete your Application/Report of Waste Discharge, pursuant to Division 7, Section 13260 of the California Water Code.

## VIII. CERTIFICATION

"I certify under penalty of law that this document, including all attachments and supplemental information, were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Print Name: \_\_\_\_\_

Title: General Manager

Signature: \_\_\_\_\_

Date: 6/24/11

Note: The facility will be constructed by the U.S. Bureau of Reclamation. Operation will be jointly by the USBR and Panoche Drainage District

### FOR OFFICE USE ONLY

Date Form 200 Received:	Letter to Discharger:	Fee Amount Received:	Check #:
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**Response to J. McGahan Comment Letter, October 6, 2011**

McGahan-1     The Environmental Assessment has been updated to reflect this information.

## Healer, Rain L

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**From:** Howard Hirahara [HIRAHARA@wapa.gov]  
**Sent:** Friday, October 14, 2011 10:20 AM  
**To:** Healer, Rain L  
**Cc:** gov@bmortimeyer.usbr; Arroyave, Pablo R; Carter, Sheryl R; Tom Patton; Sonja Anderson  
**Subject:** Comments on San Luis Drainage Feature Reevaluation Demonstration Treatment Facility

Ms. Healer:

Western Area Power Administration (Western) has reviewed the draft environmental assessment relating to the planned construction of a treatment facility to demonstrate and operate reverse osmosis and selenium bio-treatment technologies in connection with the proposed San Luis Drainage Project and is providing the following set of comments.

Western understands Reclamation's responsibility for determining the circumstances and conditions associated with the designation of certain project additions as being eligible for an allocation of project use energy. Western understands that Reclamation has already determined that the proposed demonstration project is eligible to receive project use energy. As the sister Federal agency charged with the statutory responsibility for procuring and delivering energy to meet project use pumping loads, Western would like to work closely with Reclamation as this demonstration project moves forward so that we will be able to understand and be able to better plan to meet the ultimate project use power requirements associated with the developmental potential of the ultimate set of facilities, should a decision be made that it is feasible to scale up the demonstration project.

WAPA-1 | In general, Western has two potential concerns. First, to the extent that significant amounts of project use energy may be ultimately required, (if the proposed approach is found feasible), implementation of the scaled up version of the proposed projection given our limited understanding of the relatively high energy consumption requirements associated with reverse osmosis process, could result in a significant reduction of the net amount of hydropower generation from Central Valley Project reservoirs, and thus potentially affect the price competitiveness of the Federal hydropower product. This in turn could potentially make the resource less attractive, and hence viewed as being less desirable, and thus more difficult to market, potentially impacting the ability of the Central Valley Project to realize revenues from the preference power customers to meet not only the assigned costs to the commercial power function for repayment, but any shortfalls associated with the irrigation function's inability to repay any of its allocated share of the capital costs. Under existing Reclamation law, those shortfalls are currently met through supplemental surcharges on the preference power customers.

WAPA-2 | Second, given the fact that an existing transmission contract (Contract No. 14-06-200-2207A) with the Pacific Gas and Electric Company to wheel power to the San Luis Unit is set to expire in 2016 and incapable of being succeeded by successor transmission arrangements by Western under the same favorable economic and financial terms and conditions as the existing legacy contract, may have a significant financial impact on the proposed project's economic and financial elements. Given our non-participation in Reclamation's efforts thus far, Western is unsure whether the expected cost increases associated with the successor arrangements after 2016 could have a direct impact on the approach, as well as the ultimate size and scope of the proposed scaled up project, should the demonstration project succeed in this initial "proof-of-concept" stage. The successor contract would be within the purview of the California Independent System Operator and project use loads in the San Luis Unit would be expected to bear the full weight of the appropriate set of uplift, wheeling, access, and administrative costs, all of which would be expected to be higher than what project use loads are paying today.

WAPA-3 | As part of getting ready for this post 2016 environment, Western would desire to be more actively engaged and to work collaboratively with Reclamation on the front of this proposed new project initiative so that the appropriate planning activities can be initiated to factor in, anticipate, and potentially mitigate the cost impacts associated with the post-2207A operating environment. Western's desire is that as the demonstration project goes forward and as additional planning for the ultimate set of facilities are undertaken, that information and data can be shared and incorporated into any decision making process to enable prudent and informed decision-making. Ms. Sonja Anderson, Western's Power Marketing Manager has the functional responsibility for meeting Reclamation project use energy requirements. We would be pleased when Reclamation takes the next set of steps related to the implementation of this project, if the appropriate member of your staff(s) would contact Ms. Anderson at (916) 353-4421 at their earliest convenience so that Western may be of assistance to Reclamation in their efforts to move forward on this proposed new project activity.

Howard Hirahara  
Western Area Power Administration

## **Response to Western Area Power Administration Comment Letter, October 14, 2011**

- WAPA-1      Reclamation views its obligation related to treating Central Valley Project drainage water as a project purpose. Accordingly, Reclamation has determined that the Demonstration Treatment Facility, which would be owned by Reclamation and would treat project water, qualifies for project energy.
- WAPA-2      See Response to WAPA-1
- WAPA-3      It is understood that 2207A expires in 2016 and costs of service after that time could significantly increase. At this time, the disposition of the Demonstration Treatment Facility after the 18 month pilot project is unknown. Cost of service will be included in environmental analysis for disposition of the facility and Western's involvement is appreciated.





NORTH

COAST

RIVERS

ALLIANCE



October 17, 2011

Rain Healer  
South Central California Area Office  
U.S. Bureau of Reclamation  
1243 N St  
Fresno, CA 93721

**Subject: Comments on Draft EA/FONSI (DEA) for the San Luis Drainage Feature Reevaluation Demonstration Treatment Facility at Panoche Drainage District's San Joaquin River Improvement Project (SJRIIP) FONSI-10-030**

Dear Ms. Healer:

We appreciate the opportunity to comment on the proposed demonstration project that will that will transport „in ground“ Panoche Water District polluted sump water directly to where it will be „treated“ by a yet to be disclosed treatment process. The treatment process will produce selenium hazardous waste residues, which will be trucked to a disposal site, as well as contaminated wastewater that will be then discharged in an irrigation ditch under a NPDES permit back into the SJRIIP, Mud Slough, the San Joaquin River and the Delta. The Project may last 18 months or

Coalition-1

operate indefinitely with an unknown operating time period that *may* need additional analysis.”<sup>1</sup>

We applaud the Bureau’s recognition that these west side water pollution discharges need to comply with the Clean Water Act and require a National Pollutant Discharge Elimination System [NPDES] permit.<sup>2</sup> The project proposes the discharge of concentrations of selenium above Clean Water Act standards even after treatment along with other contaminants such as salt, boron, mercury.<sup>3</sup> We find there is insufficient data presented to make an informed decision regarding the impacts from the project. The full range of alternatives is not examined and without sufficient data regarding costs, treatment methods, and the levels of contaminants in the source water to be treated, one cannot meet the National Environmental Policy Act (NEPA) requirements to determine economic and technical feasibility. Absent is any consideration of the only proven effective method of solving this water pollution—stopping the import of water and application to these poisonous soils--and without cost figures, the public cannot make an informed decision regarding the environmental impacts, costs and trade-offs. It appears the DEA attempts to meet these requirements by citing other drainage documents<sup>4</sup> and yet, this new project is a significant departure from the treatment proposals contained in those documents. For example, the proposed treatment does not propose to remove salt, boron, or mercury and will continue to discharge lethal levels of selenium.

It is discouraging that despite the work of the last twenty plus years, Reclamation is presenting another project with a yet to be identified treatment process to remove selenium alone, without any cost analysis or analysis of the feasibility or consideration of a full range of alternatives, including the reduction of imported water to irrigate these poisonous lands—as has been recommended by numerous federal and state agencies as the most cost effective control solution that protects downstream users. This latest project is just another delay and distraction in meeting Clean Water Act water quality standards and will likely waste scarce taxpayer dollars.

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<sup>1</sup> [http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc\\_ID=8298](http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=8298)

<sup>2</sup> <http://water.epa.gov/lawsregs/guidance/wetlands/section402.cfm>

<sup>3</sup> <http://www.usbr.gov/mp/sccao/sld/docs/index.html> No information could be found on mercury treatment removal levels in the NEPA documents or previous 2004 or 2005 pilot testing. The conclusion mercury levels are projected to be low, is not supported by data.

<sup>4</sup> <http://www.usbr.gov/mp/sccao/sld/docs/index.html>

Coalition-2 This demonstration project would spend millions of dollars on yet to be identified treatment and then discharging the remaining pollutants into the SJRIP and natural water ways, claiming that these discharges will not harm the environment. The documents do not provide sufficient data to support this claim. As shown in Figure 4, after some 15 years of operation, the existing discharge concentrations are still lethal to fish and wildlife as the polluted water flows through national and state wildlife refuges before reaching the San Joaquin River, where significant salmon mortality is predicted.

Coalition-3 The DEA fails to consider new information in the just released United States Geological Survey (USGS) study (See Figure 2).<sup>5</sup> Further the project appears to be segmented into various projects elements and pieces, which is in violation of NEPA. In April 2011, Reclamation, without NEPA review, agreed to grant Panoche Drainage District \$4.24 M to construct pipelines and pump station at the same location and replace the Grassland Bypass Channel Inlet with a concrete structure.<sup>6</sup> Started under a 1995 FONSI and EA, this “temporary” pollution discharge project has been continued now for a quarter of a century. The full costs of this project along with all the pieces are not disclosed.

Coalition-4 As you can see from Figure 2, if the existing load limits contained in the 2001 Waste Discharge Requirements for the Grassland Bypass Project had been enforced, the toxic discharges exceeded the selenium load target in every year until Broadview Water District lands are retired.<sup>7</sup> The project still misses the pollution control targets for 2 of 6 years after that land retirement. [The red bars show the years when they fail to meet the WDR targets and the green bars show when the dischargers meet the targets.] Clearly, the most effective treatment is land retirement.

Coalition-5 The more water imported, the more the project pollutes downstream users and harms beneficial uses. Putting water on these toxic soils creates polluted ground and surface water. The rhetoric used by Reclamation to tout the benefits and success of the San Luis Drainage Grassland Bypass Project misleads the public. Often success is presented in percentages that compare a single year load value with either 1995 or 1996, both 100% supply allocation years, with, for example 2009, when water supply allocation was 10% nor 2008 when it was 40%. The benefits are not from the GBP project necessarily, but from the reduction in imported water supplies that create the pollution.

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<sup>5</sup> <http://www.epa.gov/region9/water/ctr/>

<sup>6</sup> <http://apply07.grants.gov/apply/opportunities/instructions/oppR11AS20026-cfda15.507-instructions.pdf>

<sup>7</sup> [http://www.swrcb.ca.gov/rwqcb5/board\\_decisions/adopted\\_orders/fresno/5-01-234.pdf](http://www.swrcb.ca.gov/rwqcb5/board_decisions/adopted_orders/fresno/5-01-234.pdf)

Coalition-6

There is insufficient information to make a finding of no significant impact. The FONSI and DEA do not meet the legal requirements of the National Environmental Policy Act [NEPA]. A full EIS is needed to prevent further waste of taxpayer dollars and to assure an alternative that will prevent the continued pollution of the water ways with selenium, salt and contaminants is adopted.

Respectfully submitted,



Jim Metropulos  
Senior Advocate  
Sierra Club California



Carolee Krieger  
Executive Director  
California Water Impact Network



Zeke Grader  
Executive Director  
Pacific Coast Federation of Fisherman's  
Alliance  
Federation Association Inc.



Bill Jennings  
Executive Director  
California Sportfishing Protection



Barbara Vlamis  
Executive Director  
AquAlliance



Jonas Minton  
Senior Water Policy Advisor  
Planning and Conservation League



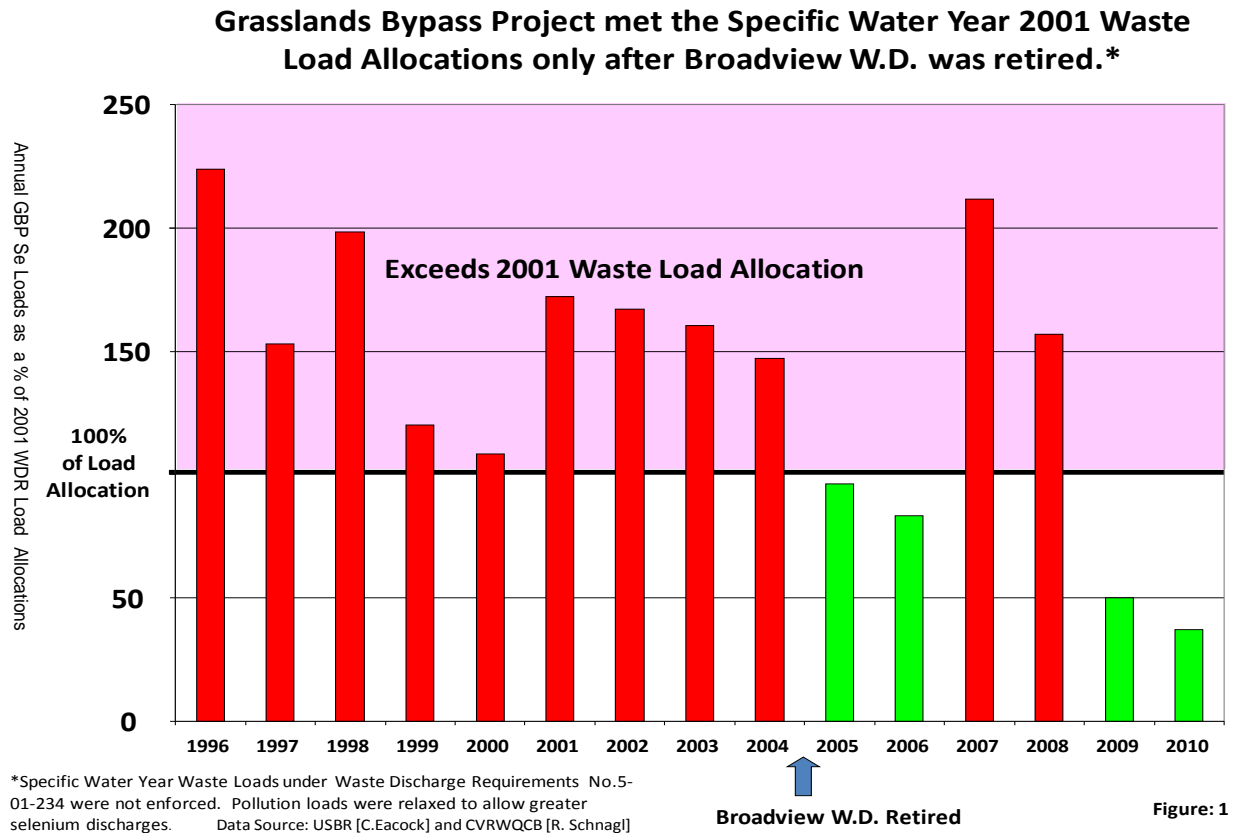
Conner Everts  
Executive Director  
Southern California Watershed Alliance

Frank Egger, President  
North Coast Rivers Alliance

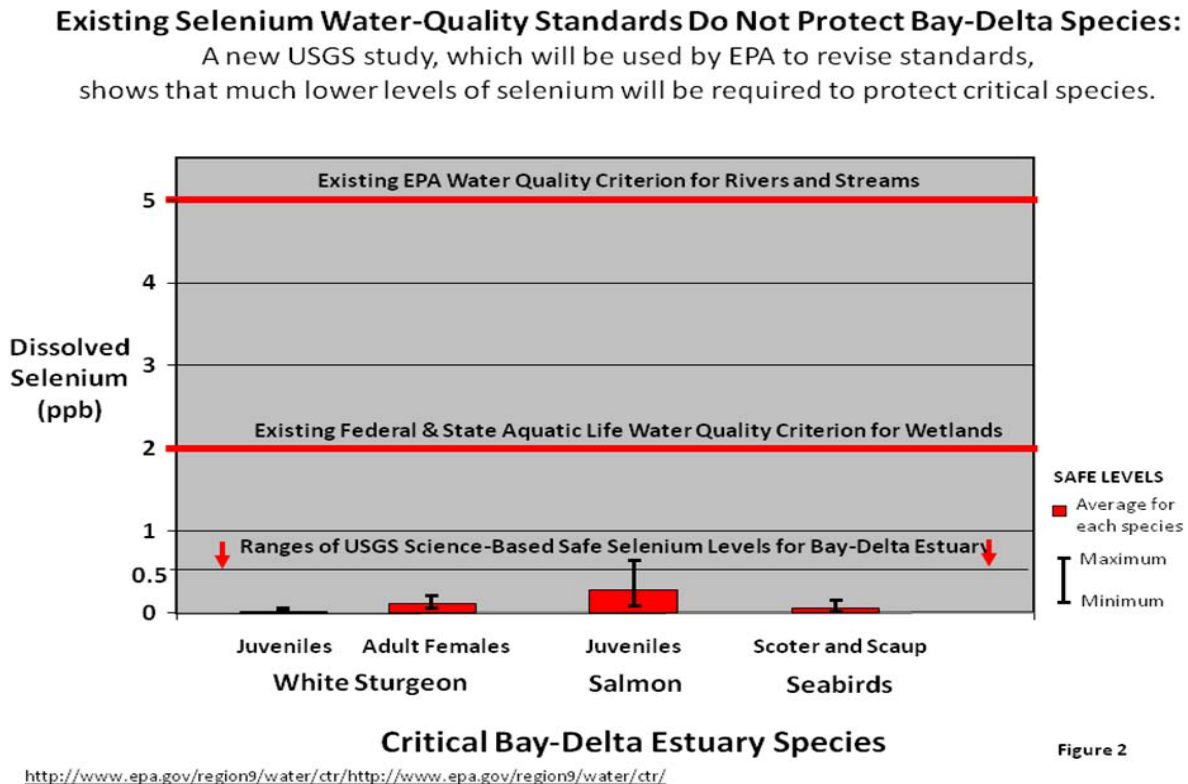
**Attachment: Figures 1-6 & Detailed comments**

cc: Nancy Sutley, Chair, Council Environmental Quality  
Ken Salazar Interior Secretary  
David Hayes, Deputy Interior Secretary  
Don Glaser, Regional Director BOR  
Alexis Strauss, USEPA  
John Laird, Resources Secretary  
Phil Isenberg, Delta Stewardship Council  
Charles Hoppin, Chairman SWRCB  
Kate Hart, Chair CVRWQCB  
Rod McGinnis, NMFS  
Ren Lohofener, USFWS  
Charlton "Chuck" Bonham, Department of Fish and Game  
Gerry Meral, Department of Water Resources  
Mark Madison, City of Stockton  
Tom Howard, SWRCB  
Rudy Schnagl, CVRWQCB  
Interested parties

Coalition-7



Coalition-8



### Lethal Concentrations of Selenium in Irrigation Drainage Discharged from the San Luis Drain (Site B)

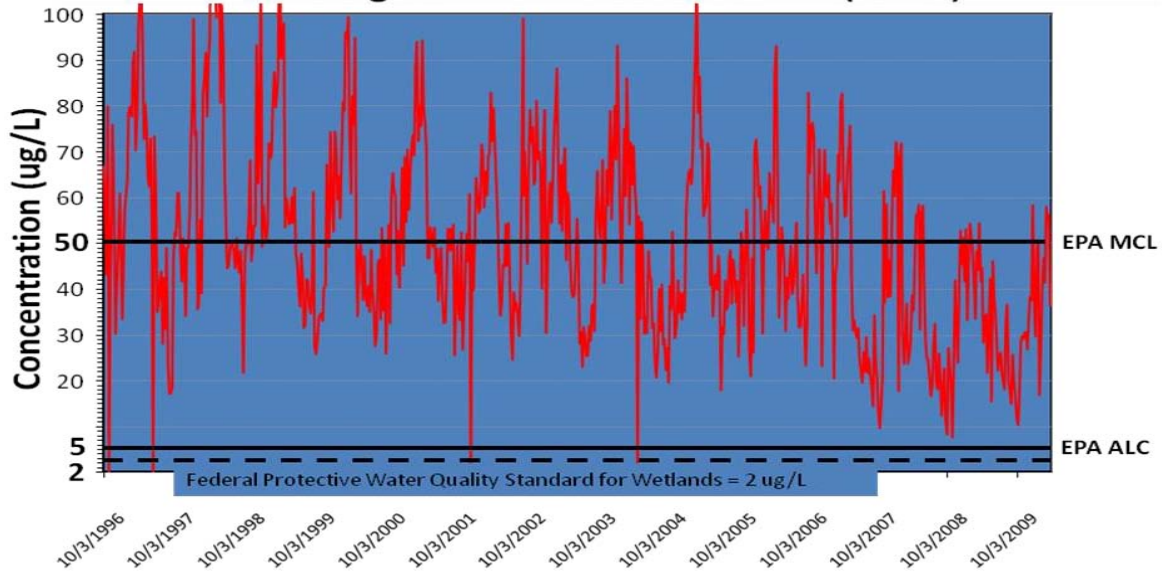


Figure 3

Data from USBR MCL=Maximum Contaminant Level for Drinking Water ALC=Aquatic Life Criterion

### Lethal Concentrations of Selenium in Mud Slough (Site D) Passing Through State and National Wildlife Refuges

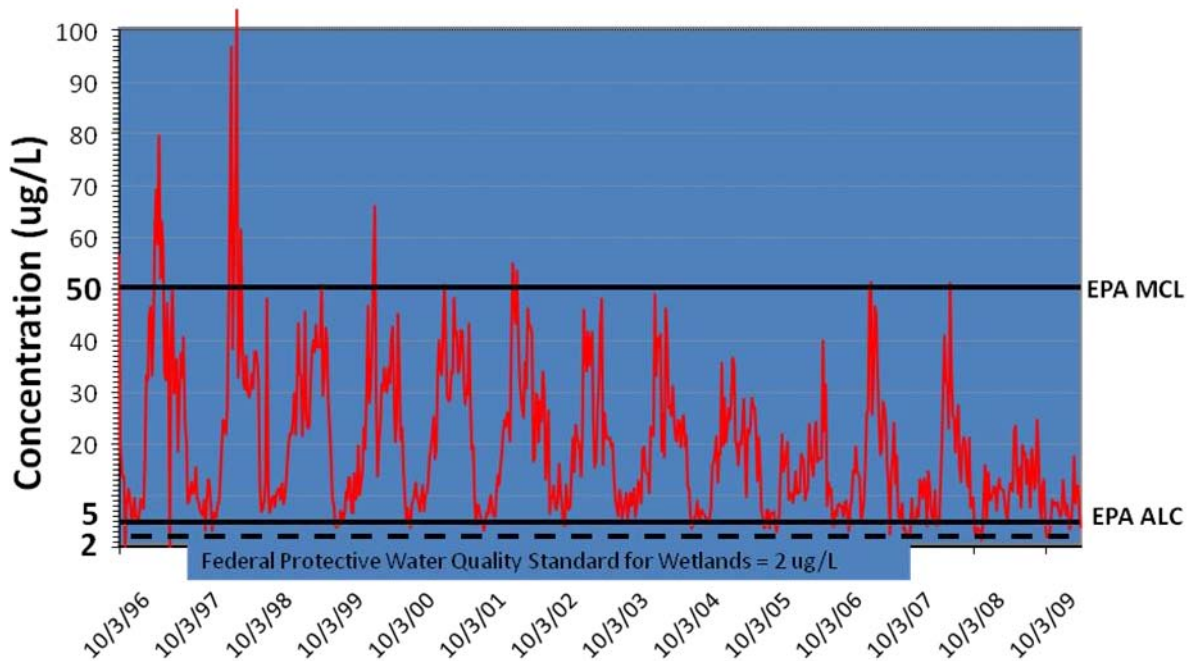
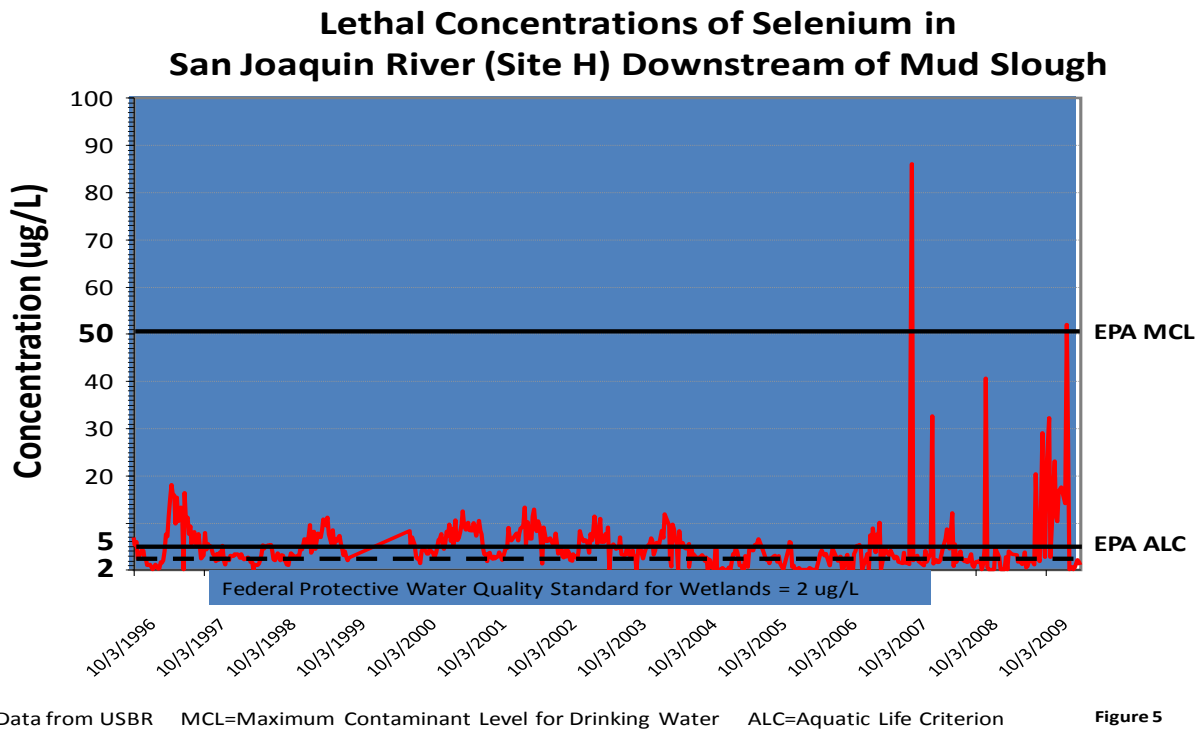


Figure 4

Data from USBR MCL=Maximum Contaminant Level for Drinking Water ALC=Aquatic Life Criterion

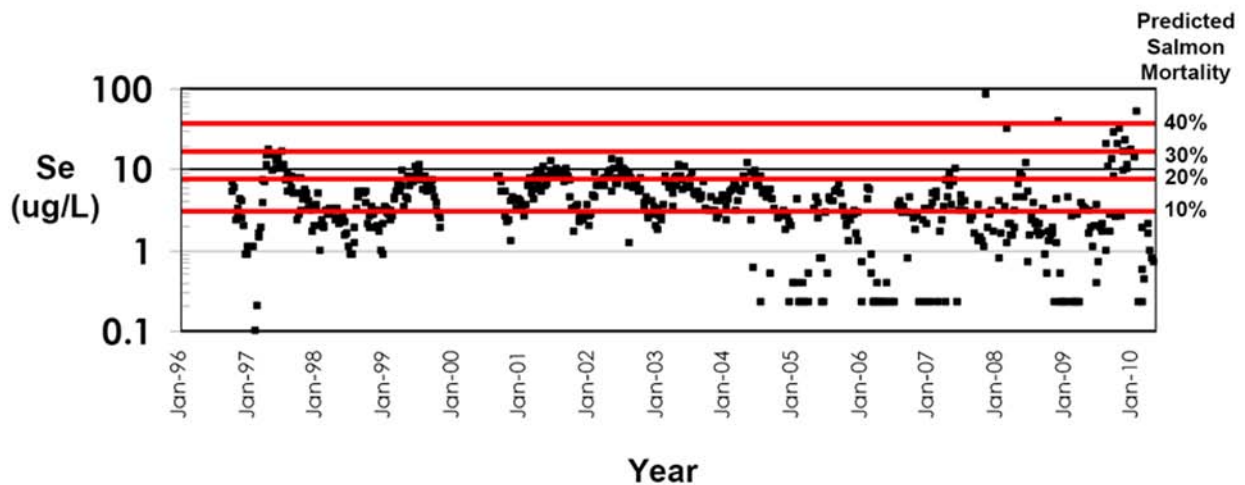


Coalition-10



## GBP Selenium Discharged to the San Joaquin River Causes Levels that are Dangerous for Salmon

Coalition-11



Selenium concentrations measured in the San Joaquin River at Hills Ferry (data from the U.S. Bureau of Reclamation)

Figure 6



**Specific Comments on Draft EA/FONSI for San Luis Drainage Feature  
Reevaluation Demonstration Treatment Facility  
At Panoche Drainage District**

**The Project Does Not Meet Drainage Needs or Existing Waste Discharge Requirements—This Project Is Yet Another Delay in Meeting Clean Water Act Requirements.**

The proposed project does not meet the primary need “*to achieve a long-term, sustainable salt and water balance in the root zone of irrigated lands in the San Luis Unit and adjacent areas*” because the proposed demonstration plant will not remove salt from drainage water, nor will it reduce water table elevations. Removal of selenium but not salt from high groundwater does not meet the project need.

The Draft EA/FONSI fails to provide even rudimentary documentation on project costs in order to meet the proposed project purpose to “*demonstrate and operate the reverse osmosis (RO) and selenium biotreatment technologies described in the Feasibility Report in order to collect cost and performance data required for final design of the corresponding full-scale drainage service treatment components to be constructed in Westlands Water District (Reclamation 2008).*” The Draft EA/FONSI excludes the findings of the Feasibility Report that RO treatment is not cost effective compared to the value of crops grown and that substantial increases in subsidies to San Luis Unit contractors would be necessary in order to implement full-scale drainage service.<sup>8</sup>

As stated, the rhetoric used by Reclamation to tout the benefits and success of the San Luis Drainage Grassland Bypass Project is misleading and exaggerates the benefits. Often success is presented in percentages that compare a single year load value with either 1995 or 1996, both 100% supply allocation years, with, for example 2009, when water supply allocation was 10% nor 2008 when it was 40%. Failing to account for water delivery volume differences imported to irrigate these toxic soils

<sup>8</sup> [http://www.usbr.gov/mp/sccaosld/docs/sldfr\\_report/slfr\\_3-08\\_v02.pdf](http://www.usbr.gov/mp/sccaosld/docs/sldfr_report/slfr_3-08_v02.pdf) pg 99

misleads decision makers when analyzing the environmental impacts of the project. Appendix F is not up to date and perpetuates the misrepresentation. Not adjusting the averages for „pre-project“ and post project to account for water volume imports distorts the benefits. Simply put, the more water that is imported the more pollution created. As one can see from Figures 3 & 4 the consolidation of this drainage for discharge to Mud Slough and the San Joaquin River has consistently put lethal levels of selenium through National and State Wildlife areas and the San Joaquin River until it is diluted some fifty miles downstream from the point of discharge.

This project is inconsistent with Reclamations“ current project Waste Discharge Requirements<sup>9</sup> permitting use of the San Luis Drain to discharge polluted water from the project to Mud Slough and the San Joaquin River: Item 29(i):

*“An In-Valley Treatment/Drainage Reuse element of the Project will be implemented on up to 6,200 acre of land within the Grassland Drainage Area. This element of the Project is composed of three phases involving water reuse, removal of salt, selenium and boron, and the disposal of the removed salts to prevent them from discharging into the San Joaquin River. Approximately 17,000 acre-feet, or half of the total drain water produced in the Grassland Drainage Area will be handled by this element of the Project. Phase I involves the purchase of land and planting to salt-tolerant crops by 2003, Phase II involves the installation of subsurface drainage and collection systems and an initial treatment system, and Phase III involves the completion of construction of treatment removal and salt disposal systems by 2009.”*

The proposed project treats just 200 gallons a minute, equivalent to about 40 garden hoses and only a small fraction of total drainage flow and contaminated groundwater,<sup>10</sup> and does not remove salts. Thus, the proposed project misses the mark in meeting Reclamation“s permit conditions required to meet water quality protections.

The proposed project also does not meet the secondary project purpose “to

<sup>9</sup> [http://www.swrcb.ca.gov/rwqcb5/board\\_decisions/adopted\\_orders/fresno/5-01-234.pdf](http://www.swrcb.ca.gov/rwqcb5/board_decisions/adopted_orders/fresno/5-01-234.pdf)

<sup>10</sup> [http://www.usbr.gov/mp/ptms/docs/08-07-07\\_proj\\_update\\_west\\_side\\_reg\\_drainage.pdf](http://www.usbr.gov/mp/ptms/docs/08-07-07_proj_update_west_side_reg_drainage.pdf)

↑ evaluate other innovative technologies, which may reduce the cost and environmental impacts as compared to the technologies evaluated in the Feasibility Report, while meeting the requirements for drainage service” because the document fails to identify those “innovative technologies.” Because these technologies are not described at all, the reader can only assume that those technologies do not exist.

## **Failure to Consider a Full Range of Treatment and Pollution Control Alternatives**

The Proposed Action does not meet the project need *to achieve a long-term, sustainable salt and water balance in the root zone of irrigated lands in the San Luis Unit and adjacent areas* because it does not remove salt from drainage water nor does it reduce high groundwater levels.

As stated by USGS Director Mark Myers in a letter to Senator Feinstein, May 2008, *“Perhaps the greatest uncertainties in the proposed plans are the technical feasibility of biotreatment of selenium at the scale and salinities to be encountered. (The feasibility report for treatment has still not been released and could not be reviewed for this letter.) Land retirement was the only alternative presented as an option to drainage treatment within the Reclamation EIS. Substitution of deep ground-water pumping that offsets a fraction of the surface water delivery is another alternative that has merit.”*<sup>11 12</sup> No feasibility report for treatment was provided in this DEA or a full range of treatment options. Further, without knowledge of the water chemistry to be treated the public and decision makers cannot make an informed decision regarding the feasibility of removing

<sup>11</sup> [http://www.rcamnl.wr.usgs.gov/Selenium/Library\\_articles/feinsteinltr0001-from-Director.pdf](http://www.rcamnl.wr.usgs.gov/Selenium/Library_articles/feinsteinltr0001-from-Director.pdf)

<sup>12</sup> [http://www.usbr.gov/mp/sccao/sld/docs/sldfr\\_report/slfr\\_3-08\\_v02.pdf](http://www.usbr.gov/mp/sccao/sld/docs/sldfr_report/slfr_3-08_v02.pdf) pg viii

The San Luis Unit was authorized with two appropriation ceilings. The construction of project works, except for distribution systems and drains, are covered by an indexable ceiling. The ceiling for the distribution systems and drains is not subject to indexing. The combined remaining construction cost ceiling for the San Luis Unit is \$428,674,777. The total estimated cost to implement the In-Valley/Drainage-Impaired Land Retirement Alternative is \$2.24 billion. The total estimated cost to implement the In-Valley/Water Needs Land Retirement Alternative is \$2.69 billion. Thus, implementation of either of these action alternatives would exceed the combined remaining construction cost ceilings for the San Luis Unit.

Coalition-17 continued ↑ selenium in water containing salts, mercury, boron, trace elements, nitrate and other contaminants. Many of these trace elements and contaminants can render the treatment ineffective.

Coalition-18 | A summary of the existing credible scientific evidence relevant to selenium removal at this scale and volumes along with the potential chemical interference from other contaminants was not provided. Instead the document relies on 1980 ground water quality data from Westlands Water District in the SLDFRE EIS.

Coalition-19 | No information is provided on either additional treatment alternatives or pollution control strategies such as curbing the importation of water to these contaminated soils and thus, the resulting polluted water being collected and discharged to the San Joaquin River and Delta Estuary. Without cost figures and detailed information regarding contaminants in this polluted groundwater caused by importing water, the public cannot make an informed decision regarding the environmental impacts, costs and trade-offs. Groundwater levels, groundwater quality and costs could be compared to the estimated costs based on reverse osmosis and undisclosed “innovative technologies.” The averted costs of water, crop and power subsidies previously going to retired lands could be compared to the value of crops that would have otherwise been grown on the retired lands to determine improvements in salt and water balance in the root zone of remaining irrigated lands in the San Luis Unit and adjacent areas. Evaluation of such an alternative would help determine whether retirement of lands within the San Luis Unit would improve saline groundwater conditions.

Coalition-20 | Insufficient maps and information is provided to determine if the project is in the San Luis Unit of the Central Valley Project, and thus potentially authorized under Public Law No 88-488. At first glance the project appears to be outside of the service area. Thus, what authority and funding the proposed project is under is not clear. Further it appears there is no identified funding, and yet Reclamation is moving ahead with a controversial undefined project that might obligate Congress to expenditures not authorized.

Coalition-21 ↓ The Proposed Action differs significantly from the Preferred Alternative in the San Luis Drainage Feature Reevaluation Record of Decision (SLDFRE ROD) in that it

↑ proposes to directly treat sump water, rather than concentrated sump water that has gone through reuse and concentration at the San Joaquin River Improvement Project. This is a significant change. The decision to treat these polluted flows was based on a reduced volume to reduce the costs. Even that approach was not cost effective. The Proposed Action would result in even greater costs because of the larger volume of drainage to be treated.

The Proposed Action description fails to provide any cost estimates for plant construction, operation, energy needs, energy sources, or disposal of hazardous wastes. A cost-benefit analysis is relevant to the selection of not only the treatment options but weighing these against other alternatives. No cost benefit analysis is provided. Compliance with section 102(2) (B) of NEPA is not adequate given these deficiencies.

### **Section 3.1 Water Resources—Failure to Provide Meaningful Analysis of the Impacts From the Treatment Approaches.**

The Draft EA claims that the project will cumulatively improve water quality and amounts of selenium discharged into Mud Slough would be “much less” but no specific quantities of selenium are provided. Without information or data, the project plan simply states that operating this treatment plant in perpetuity will not have an impact. Quantities of selenium and other contaminants discharged should be provided. Also the water quality parameters of the water to be treated are not provided. The chemistry affects the treatment efficacy. Trace elements, nitrate and other contaminants are known to render biological treatment ineffective in removing selenium. Large quantities of salts and other contaminants impact the effectiveness of reverse osmosis. No details are provided regarding the treatment methods so it is impossible to know what are the potential water pollution impacts and compliance with Clean Water Act standards. The proposal to discharge selenium at 10 µ/L would violate CWA standards.

Additionally, the project fails to identify mercury as a constituent of concern for this project. Additional monitoring of mercury should be performed to determine if it is of concern.<sup>13</sup>

<sup>13</sup> [http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc\\_ID=4826](http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=4826) pgs 94-96 USFWS 2009 BO

### Section 3.3 Biological Baseline Data Insufficient to Determine Impacts

Coalition-25 The approach presented in this document is different from the schematic presented in the SLDFRE document referenced in the DEA. The poor maps, details and absence of a schematic for the project make assessment of the project impacts difficult. From the document it appears that “in-ground water” will be pumped directly to the proposed facility in pipes, enter the facility and then the discharge is to an existing irrigation drainage ditch. Without a better explanation or flow diagram the process at the facility and how the yet to be named alternative technology will enter into the project remain unknown. Without this information it is difficult to determine the impacts on biological resources.

Coalition-26 The H.T. Harvey and Associates Panoche Drainage District, Giant Garter Snake Survey Report of July 8, 2008, admittedly was not conducted according to protocol timing of April 15 to June 1 and for a different project, but the map at page 8 where the two valley snakes were trapped could be useful in assessing the impacts of this project if the collection and distribution of the polluted flows were clearly defined and shown on the map. Also a Craig Swick survey of San Joaquin Kit Fox Range in 1973, found the range to include Delta Mendota Canal, which is not surveyed for this project, but is adjacent to the southern boundary. The USFWS Protocols Kit Fox cited in the Categorical Exemption used for the test borings are June 1999, which are out of date.

Coalition-27 The sloppy information in this document is evident in the following incorrect statement on page 17: “*Under the GBP Biological Opinion (USFWS 2010), several thousand acres of agricultural lands in the vicinity of the SJRIP reuse area have been idled from irrigated agricultural use.*” The reality is that the U.S. Fish and Wildlife Service’s (USFWS) Grasslands Bypass Project Biological Opinion did not result in the retirement of any agricultural lands. The purchase/assignments of Broadview, Centinella, Widren and Mercy Springs water districts, as well as the Britz and Sumner Peck settlements where saline groundwater limits crop production were responsible for

[http://wwwrcamnl.wr.usgs.gov/Selenium/Library\\_articles/san\\_luis\\_articles/USFWS\\_CEQA\\_Scoping\\_Comments\\_C\\_VRWQCB\\_GBP\\_Extension\\_3-19-09.pdf](http://wwwrcamnl.wr.usgs.gov/Selenium/Library_articles/san_luis_articles/USFWS_CEQA_Scoping_Comments_C_VRWQCB_GBP_Extension_3-19-09.pdf) Pgs 15-17

↑ the land retirement.

Coalition-27 continued

However, it is true that in the Final Fish and Wildlife Coordination Act Report for SLDFRE, the USFWS recommended retirement of all San Luis Unit lands within the Grasslands area.<sup>14</sup> The Fish and Wildlife Coordination Act requires coordination with Fish and Wildlife Service when a permit or license will impact natural water ways or wetlands.....*otherwise controlled or modified for any purpose whatever, including navigation and **drainage**, by any department or agency of the United States.* (Emphasis added). Reclamation brushes this requirement aside without a valid justification. Further Reclamation also disregards the recommendation from the USFWS to retire of the 80,000 acres of San Luis Unit lands within the Grasslands Watershed area.<sup>15</sup> A new EIS should be prepared which considers retirement of all San Luis Unit lands within the Grasslands Drainage Area, as recommended previously by the U.S. Fish and Wildlife Service in their Coordination Act Report for SLDFRE.

Coalition-28 ↓

At page 4, no data is provided to support the opinion, “The facility will be

<sup>14</sup> USFWS, 2006, Coordination Act Report on San Luis Drainage Feature Re-evaluation. Available at: [http://www.usbr.gov/mp/mp150/envdocs/MP700\\_San%20Luis%20Drain\\_FinalEIS\\_App%20M%20\(Part%201%20of%204\).pdf](http://www.usbr.gov/mp/mp150/envdocs/MP700_San%20Luis%20Drain_FinalEIS_App%20M%20(Part%201%20of%204).pdf).

<sup>15</sup> [http://www.usbr.gov/mp/mp150/envdocs/MP700\\_San%20Luis%20Drain\\_FinalEIS\\_App%20M%20\(Part%201%20of%204\).pdf](http://www.usbr.gov/mp/mp150/envdocs/MP700_San%20Luis%20Drain_FinalEIS_App%20M%20(Part%201%20of%204).pdf) pg 63:

*We believe the Service’s Preferred Land Retirement Alternative (full retirement) for the San Luis Drain Feature Re-Evaluation Project would release Reclamation from any future obligation to provide drainage service to the SLU while maximizing avoidance of adverse environmental effects. Our contention is that a full retirement alternative represents the most logical and least risky option to finally solve the drainage problem from the perspective of protecting and enhancing regional fish and wildlife resources. This land retirement alternative is compatible with CALFED and CVPIA goals and objectives by reducing project water demand, increasing available supplies, enhancing fish and wildlife habitat, and reducing contaminants reaching the Delta. It is an approach that appears most compatible with both the Service and Reclamation’s respective missions, since the goal is to find a drainage solution for the study area which includes measures to preserve, protect, restore, and enhance fish and wildlife resources affected by water deliveries to the SLU.*

*The Service strongly prefers to address SLU drainage issues with options that would eliminate the need for drainage service altogether. The Service believes the SLDFR should seek a more permanent and complete resolution of drainage issues in the San Joaquin Valley. Drain water management is expensive and risk-laden.*

↑ operated year-round and will be lighted for safety and security. The effects to wildlife resources from this light source are expected to be negligible because of existing low value of the area to wildlife.”

### 3.6 Indian Trust Asset Impacts Not Adequately Analyzed.

The Draft EA/FONSI fails to identify that the continued diversion of Trinity River water to the Grasslands area impacts the Indian Trust Assets of the Hoopa Valley and Yurok Tribes. The Bureau of Reclamation’s 1959 water permits for the Trinity River Division of the Central Valley Project (CVP) included a significant expansion of the CVP service area within the San Luis Unit.<sup>16</sup>

The Draft EA/FONSI is part of an attempt to justify continued irrigation of lands that are causing impairment of the beneficial uses of water contaminating groundwater and harm to other beneficial uses. Continued taxpayer subsidies cannot be economically justified. This project will continue the taxpayer’s downward economical spiral, throwing good money after bad money. Diverting water from the Trinity River will continue to adversely affect the salmon fishery that is the basis for the Hoopa Valley and Yurok Indian Trust Assets. The Draft EA/FONSI fails to disclose the negative economic and environmental impacts of continued irrigation of the San Luis Unit. Conversely, the document fails to identify the benefits of ceasing irrigation of toxic lands, including benefits to Tribal Trust and Public Trust assets.

#### 3.7.1 Hazardous Waste

↓ The DEA does not characterize 55,000 pounds of hazardous waste that is being created and stored at the facility before shipment to a hazardous waste facility. How much of it is selenium? What other constituents/pollutants are expected to be in it in what amounts? What is the cost of disposing of this amount of hazardous waste and cumulatively is it even feasible to consider disposal of a larger amount for the entire San Luis Unit? USGS raised questions regarding the feasibility—both technically and

<sup>16</sup> See <http://tcrd.net/exhibita.htm>



↑ economically—of treatment because of the sheer volumes to be treated if technically feasible. USGS estimates at 50 years, with 100,000 acres of land retirement and treatment for the rest of the drainage, there will be a requirement for salt storage of 20 million tons in evaporators or landfills. This salt will be contaminated with a variety of trace elements common in drainage waters including selenium, boron, molybdenum, chromium, and arsenic.<sup>17</sup>

Coalition-30  
continued

### 3.9.2 Socioeconomic Impacts

What is the expected cost savings to the Panoche Drainage District from the reduced selenium discharged into Mud Slough? How many pounds will it be and what is the rate of savings?

Coalition-31

### 3.10 Air Quality Impact and 3.11 Global Climate Impacts Not Fully Considered.

The Draft EA/FONSI is grossly inadequate in its evaluation of air quality and the impact on global climate change. The document fails to identify the source or amount of necessary electricity to run the demonstration plant. Will the project use CVP Project Power? If so, what will be the source of replacement power for CVP preference customers from increased demand for CVP Project Use Power? It is likely that replacement power would be generated from fossil fuels. Therefore, the air quality section completely fails to identify the air quality impacts of replacement fossil fuel energy. How much energy will it be and what kind of load will it create on the system? How much will the Western Area Power Administration's (WAPA) customer costs increase to purchase replacement power? How will it affect the power allocation and costs of the Hoopa Valley Tribe's WAPA contract? How will cost increases affect low income populations such as those within the Trinity Public Utilities District boundaries? If the plant is turned over to the contractors, who will pay for the energy for the plant? Is it a reimbursable CVP expense or non-reimbursable?

Coalition-32

Cumulatively, a revised document should identify the expected global warming and air quality impacts from the replacement energy demand from fossil fuels for a fully built-out drainage system for the San Luis Unit, as well as, cost impacts to CVP customers, including low income and tribal customers.

<sup>17</sup> <http://pubs.usgs.gov/of/2008/1210/> pg 2.

## Response to Coalition Comment Letter, October 17, 2011

**Coalition-1** As described in Section 1.1 of Environmental Assessment (EA)-10-030, Reclamation released a Final Environmental Impact Statement for the *San Luis Drainage Feature Re-evaluation* to the public on June 8, 2006 (SLDFR FEIS). The SLDFR FEIS evaluated seven action alternatives in addition to the no action alternative for implementing drainage service within the San Luis Unit. The Record of Decision (ROD) for the SLDFR FEIS was signed March 9, 2007. Subsequently, Reclamation prepared the *San Luis Drainage Feature Re-Evaluation Feasibility Report* (Feasibility Report) to evaluate the feasibility of implementing the preferred alternative. As described in Section 1.2 of EA-10-030, the primary purpose of the Proposed Action is to demonstrate and operate the reverse osmosis (RO) and selenium biotreatment technologies described in the Feasibility Report in order to collect cost and performance data required for the final design of full-scale drainage service treatment analyzed in the SLDFR FEIS. This action does not need to consider all possible drainage service components nor consider all potential alternatives for resolution of drainage issues as these have already been analyzed in the SLDFR EIS and are not part of the Proposed Action in EA-10-030. One point of the Proposed Action is in part to develop cost data, but the cost data Coalition refers to is a much broader scale policy issue that has been addressed in the SLDFR FEIS and Feasibility Report.

As described in Section 2.2 of EA-10-030, the Proposed Action is the construction, operation, and maintenance of an 18-month pilot project (Facility) within the San Joaquin River Improvement Project (SJRIP) reuse area. The Proposed Action is not the implementation of full-scale drainage treatment, the Grassland Bypass Project (GBP), or the SJRIP, all of which have undergone separate environmental review. The proposed project primarily would pick up subsurface drainage water generated within the SJRIP from irrigation of salt tolerant crops, not water entering the SJRIP from Panoche Water District. An alternate source of water from the Russell Avenue Drain just westerly of the site would be available to the pilot project to provide the flexibility to test different water qualities and to provide adequate water supply at the Facility. As described in Section 2.2.3, disposition of the Facility is currently unknown but Reclamation or its designated operating partner could elect, subject to any additional required environmental review, to continue operating the project for treatment of drainage water.

The SJRIP currently operates under Waste Discharge Requirements (Order Number 5-01-234) from the Regional Water Quality Control Board (RWQCB), Central Valley Region. Reclamation would acquire all appropriate permits for construction and operation of the Facility. Reclamation would not operate the Facility until all permits have been received. EA-10-030 has been updated to reflect this information.

Discharges from the pilot project do not alter the inherent quality of the drainage water coming into the plant for treatment and will be returned to the reuse area for use on salt tolerant crops. The Proposed Action would not affect the quality of drainage water that may be discharged from the GBP as none of this water would be discharged to the GBP.

The RO portion of the proposed treatment would remove salts as shown in Table 2-1 in EA-10-030; however, the Proposed Action is a pilot project as described above and in EA-10-030 and is not meant to test every component of a complete drainage treatment facility. Both post-biotreatment water and low-salinity RO treated water (product stream) would be discharged onto rip rap in the existing irrigation ditch adjacent to the southeast corner of the Facility footprint, where it would be blended with other drainage waters and re-used by the SJRIP for irrigation in the reuse areas. As described in Section 2.2.3, the Facility would remove approximately 99 percent of selenium contained within the sub-surface drainage water from the SJRIP.

**Coalition-2** The Proposed Action analyzed in EA-10-030 is for a 400 gallon per minute pilot project as described above. The Proposed Action is not the implementation of full-scale drainage treatment, the GBP, or the SJRIP, all of which have undergone separate environmental review. The data cited within the Coalition comment letter are based upon the ongoing GBP. The GBP is regulated through waste discharge requirements and is subject to Environmental Protection Agency (EPA), State Water Resources Control Board (SWRCB), and RWRCB water quality objectives as they are established and implemented. The GBP is obligated to reduce discharges over the course of the Project and also involves mitigation for the use of Mud Slough. This water is not used for state and federal refuges.

The comment on selenium and other pollutant discharges to the San Joaquin River does not take into account the success of actions taken to reduce these discharges through the GBP. The GBP is extensively monitored by various agencies to assess changes in water quality (RWQCB, U.S. Geological Survey, Reclamation), sediment (Reclamation), fish, invertebrates, and plants (U.S. Fish & Wildlife Service and California Department of Fish & Game), and toxicity (Block Environmental). Monitoring reports are published by the San Francisco Estuary Institute, an independent data management agency. RWQCB data confirm that the GBP has consistently achieved its goals specified in the 2001 Waste Discharge Requirements to reduce selenium levels in the San Joaquin River and adjacent wetlands (see Grassland Bypass Project monitoring reports at <http://www.sfei.org/gbp>). The 1995, 2001, and 2009 Use Agreements impose significant fees for exceedances of monthly and annual selenium load values. Exceedances of monthly load values have occurred in 19 of 183 months, usually following heavy rainstorms across the Grasslands Drainage Area. Incentive fees were paid for applicable exceedances in these months. There have been no exceedances of monthly load values since February 2006. There will be no increase in discharge as a result of the pilot treatment project as all of the treated

water would be returned to the SJRIP for reuse on salt tolerant crops and none would enter the GBP.

**Coalition-3** Results from a U.S. Geological Survey study have not yet been incorporated into water quality objectives by the RWQCB; however, the 2009 GBP Use Agreement obligates the GBP to comply with regulations implementing any new water quality objectives that are more stringent than existing ones. As described previously, the Proposed Action for EA-10-030 is an 18-month pilot project whose purpose is to test RO and selenium biotreatment technologies in order to collect cost and performance data required for the final design of full-scale drainage service treatment as described in the Feasibility Report and the SLDFR FEIS and ROD. The Proposed Action is not the implementation of full-scale drainage treatment, the GBP, or the SJRIP, all of which have undergone separate environmental review. EA-10-030 analyzes site specific impacts of the pilot project consistent with National Environmental Policy Act (NEPA) regulations and guidance from the Council on Environmental Quality (CEQ) and is not improperly segmented.

The awarding of a grant that funded installation of pipelines in the SJRIP did undergo NEPA review. The GBP EIS/ Environmental Impact Report provided review of SJRIP development, such as the installation of additional pipelines. See also Response to Coalition-2.

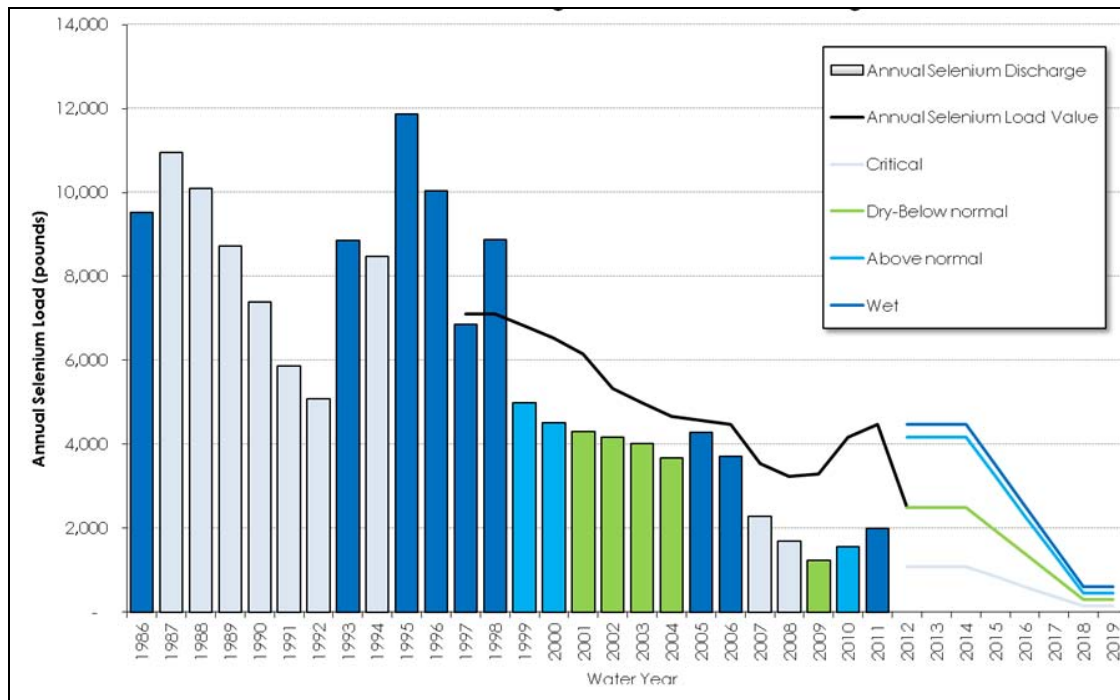
**Coalition-4** See Response to Coalition-2.

**Coalition-5** See Response to Coalition-2. The only exceedance of requirements has occurred during periods of heavy runoff, which occurred during winter months with high precipitation; even if those wet years led to higher water supplies during the same year, the targets were met during the irrigation season.

**Coalition-6** In accordance with NEPA an EA is initially prepared to determine if there are significant impacts from carrying out the Proposed Action. As described previously, the Proposed Action for EA-10-030 is an 18-month pilot project whose purpose is to test RO and selenium biotreatment technologies in order to collect cost and performance data required for the final design of full-scale drainage service treatment as described in the Feasibility Report and the SLDFR FEIS and ROD. The Proposed Action is not the implementation of full-scale drainage treatment which was analyzed in the SLDFR FEIS. Reclamation has followed applicable procedures in the preparation of EA-10-030 which includes the required components of an EA as described in the CEQ's NEPA regulations: discussion of the need, alternatives as required, Environmental Impacts, and Listing of Agencies Consulted.

**Coalition-7** Figure 1 in the Coalition comment letter compares discharged loads from the GBP in 1996 through 2010 to load allocations under full implementation of the selenium total maximum daily load (TMDL), without regard to interim load

targets during a compliance period. The GBP has met all the applicable load values for all years since 1999 and in 164 of 183 months (see Grassland Bypass monitoring reports at <http://www.sfei.org/gbp>). Incentive fees were paid for applicable exceedances in these months. There have been no exceedances of load values since February 2006 (see Figure 1 below).



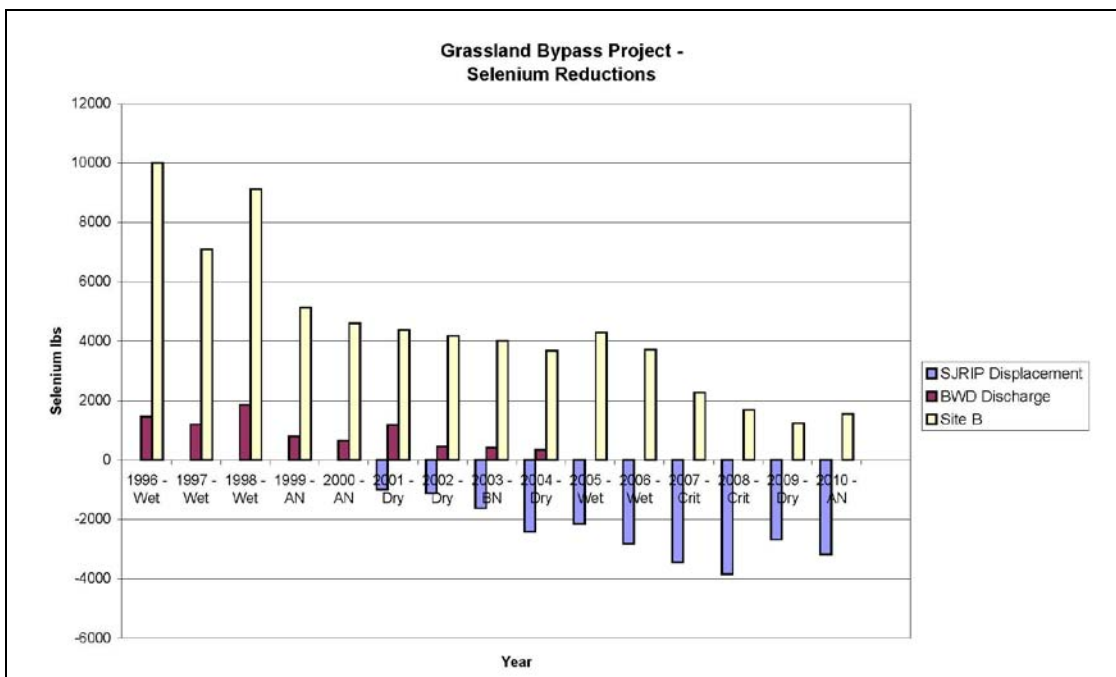
**Figure 1. Grassland Bypass Project Annual Loads of Selenium Discharged from the Grassland Drainage Areas**

Reductions of loads subsequent to 2004 were accomplished through implementation of conservation projects within the Grassland Drainage Area including the SJRIP reuse area. Table 1 lists the volume of drain water that has been displaced through the SJRIP, i.e., used to irrigate salt tolerant plants rather than be discharged to the San Joaquin River or surrounding wetlands water supply channels.

**Table 1 San Joaquin River Improvement Project Displaced Drain water**

Water Year	Reused Drain Water (acre-feet)	Displaced Selenium (pounds)	Displaced Boron (pounds)	Displaced Salt (tons)
2001	2,850	1,025	61,847	14,491
2002	3,711	1,119	77,134	17,715
2003	5,376	1,626	141,299	27,728
2004	7,890	2,417	193,956	41,444
2005	8,143	2,150	210,627	40,492
2006	9,139	2,825	184,289	51,882
2007	11,233	3,441	210,582	61,412
2008	14,955	3,844	238,435	80,900
2009	11,595	2,807	198,362	60,502
2010	13,119	3,298	370,752	75,362
2011	23,169	4,619	483,135	108,289
<b>Total</b>	<b>111,220</b>	<b>29,180</b>	<b>2,371,000</b>	<b>580,430</b>

Table 1 also lists the loads of selenium, salts, and boron that have been removed from the river and wetlands. Selenium is a naturally occurring metal that is highly toxic to wildlife. The SJRIP has removed over 29,180 pounds of the element that would otherwise have been discharged from the San Luis Drain to Mud Slough and the San Joaquin River. In addition, Figure 2 shows Broadview Water District's share of the total discharges prior to fallowing of those lands. After 2001, the quantity of Broadview Water District discharge can be compared with the reduction caused by displacement in the SJRIP. The reductions in loads subsequent to 2004 are clearly due to the SJRIP reuse project. There will be no increase in discharge as a result of the 18-month pilot project as all discharge water would be returned to the reuse area for continued use on salt tolerant crops and none would enter the GBP.



**Figure 2 Selenium reductions before and after fallowing in Broadview Water District**

**Coalition-8** Figure 2 in the Coalition comment letter applies “safe levels” of selenium taken from a U.S. Geological Survey study that has been delivered to EPA for consideration as part of EPA’s ongoing work on an alternative, tissue-based approach for establishing selenium water quality objectives. EPA has not made public its reaction to the study and has not promulgated new selenium objectives. EPA’s response to the study analysis is not yet known. The GBP has met applicable water quality objectives in the San Joaquin River downstream of the Merced River and in fact this reach and downstream reaches have been removed from the 303(d) list of impaired water bodies by SWRCB for selenium TMDLs. The 2009 Use Agreement obligates the GBP to comply with regulations implementing any new water quality objectives that are more stringent than existing ones. The 18-month pilot project would not negatively affect the water

quality at the discharge point at Site B or downstream as treated water would be re-used within the SJRIP reuse area and would not be discharged to the GBP.

- Coalition-9** Figures 3 and 4 in the Coalition comment letter show water quality results at two monitoring sites for the GBP that are governed by Waste Discharge Requirements issued by the California RWQCB. Site B is within the San Luis Drain and is used to measure selenium load discharge. There are no water quality objectives applicable at Site B. Site D is in Mud Slough downstream of the San Luis Drain discharge and is on a timetable to meet water quality objectives which is included in the existing Basin Plan Amendment. In the interim, mitigation measures are implemented in accordance with the GBP Use Agreement by providing freshwater to flood summer habitat on both U.S. Fish and Wildlife Service and California Department of Fish & Game properties. The 18-month pilot project would not negatively affect the water quality at this site as treated water would be re-used within the SJRIP reuse area and would not be discharged to the GBP.
- Coalition-10** The Grassland Basin Drainers prepared a report on the anomalies at Site H. Subsequent monitoring has not shown these anomalies to continue (see monthly Grassland Bypass monitoring reports found at <http://www.sfei.org/gbp>). The 18-month pilot project would not negatively affect the water quality at this site as treated water would be re-used within the SJRIP reuse area and would not be discharged to the GBP.
- Coalition-11** Figure 6 reports data at the same site as Figure 5 and compares that data to predicted mortality from a U.S. Fish and Wildlife Service March 2008 report. Monitoring is being undertaken to determine if there could be impacts to migrating salmon from food sources at this location. The 18-month pilot project would not negatively affect the water quality at this site as treated water would be re-used within the SJRIP reuse area and would not be discharged to the GBP.
- Coalition-12** See Response to Coalition-2 and Coalition-5
- Coalition-13** See Response to Coalition-1.
- Coalition-14** See Response to Coalition-1. EA-10-030 incorporates the Feasibility Report by reference.
- Coalition-15** See Responses to Coalition-2, Coalition-3, and Coalition-5.
- Coalition-16** This pilot project does not change the quality of water discharged through the GBP. The technology does remove salts, although the design of the small, pilot project returns them for irrigation of salt-tolerant crops. The current waste discharge requirements and compliance schedule are pending updating by the RWQCB, now that a Basin Plan Amendment accommodating the continuing SJRIP project has been approved by the California State Office of Administrative Law.

- Coalition-17** See Responses to Coalition-1, Coalition-2, and Coalition-3. The purpose of the pilot project is to evaluate the effectiveness and costs, at a pilot project level, of a particular treatment technology as well as potentially other innovative technologies on subsurface drainage developed after irrigation of salt tolerant crops and is not full-scale drainage treatment.
- Coalition-18** See Responses to Coalition-1, Coalition-2, and Coalition-3.
- Coalition-19** The United States is obligated to provide drainage service to the San Luis Unit, and the SLDFR FEIS and ROD determined the preferred alternative after extensive analysis, including economic analysis. Also see Responses to Coalition-1 and Coalition-12.
- Coalition-20** As described in Section 2.2 of EA-10-030, the project picks up subsurface drainage collected in SJRIP sumps following application to salt tolerant crops and therefore is not a change from the Preferred Alternative in the SLDFR ROD. The pilot project is located on an existing reuse facility that serves a portion of the San Luis Unit (Pacheco Water District, Panoche Water District and a portion of San Luis Water District) as part of developing drainage service for that Unit. The statute does not require that the test facility be located in the San Luis Unit. In addition, Public Law 86-488, Section 5 states "...the Secretary is authorized to enter into agreements and participate in construction and operation of drainage facilities designed to serve the general area of which the lands to be served by the San Luis unit are a part..." Funding for the demonstration treatment facility is provided for under annual appropriations.
- Coalition-21** Water for treatment is concentrated sump water that has gone through reuse in the SJRIP. See also response to Coalition-8
- Coalition-22** See Responses to Coalition-1, Coalition-12, and Coalition-15.
- Coalition-23** See Responses to Coalition-1, Coalition-6, and Coalition-11. As shown in Table 2-1 in EA-10-030, selenium concentrations after biotreatment would be approximately 2.5 micrograms per liter (µg/L). Water from RO and biotreatment would be recombined and used for irrigation of salt tolerant crops within the SJRIP. As described in Section 2.2.3 of EA-10-030, selenium and any solids remaining after the biotreatment would be hauled to a hazardous waste site. In addition, Reclamation would acquire all appropriate permits for construction and operation of the Facility, including those from the RWQCB. Reclamation would not operate the Facility until all permits have been received.
- Coalition-24** See Response to Coalition-1. The current project tests a process for selenium removal and does not specifically address every constituent of concern.



**Coalition-25** The diagrams included in EA-10-030 generally demonstrate the flow process for the pilot project. Alternative technologies have not yet been identified and therefore cannot be evaluated in this document. A schematic of the project has been added to Section 2.2 in EA-10-030 to assist the reader in understanding the project. The Proposed Action is a pilot project to investigate the suitability and performance of different treatments for reducing selenium concentration in reuse water, and does not enact the SLDFR project. The Coalition correctly grasped the essentials of the project. Subsurface drainage collected at sumps would be pumped directly in pipes to the proposed facilities, where it would undergo treatment. With treatment, some selenium would be extracted from the water and transported to a waste facility. The water, with residual solutes, would exit the facility and enter an SJRIP irrigation ditch for reuse within the SJRIP reuse area. The schematic added to EA-10-030 depicts this process. As the Coalition recognized, water would be subjected to RO and biological treatments and potentially alternate treatment process(es) in the future. Any such alternate treatment process would require additional environmental review prior to implementation. The effects of the RO and biotreatment processes, described in the Proposed Action of the EA, have been analyzed for effects to biological and other resources.

**Coalition-26** Quantitative water quality data were not collected at the sites where snakes were trapped in the H. T. Harvey study, so there are no data available for comparison or upon which inference could be made with regard to potential project effects. The sample of two snakes would make meaningful evaluations difficult. As noted, the Proposed Action would not affect the quality of water entering the GBP as treated drainage water would be reused within the SJRIP and would not enter the GBP.

Reclamation has previously acknowledged that the SJRIP is within the range of kit fox. Swick (1973) surveyed kit fox in Contra Costa, Alameda, San Joaquin and Tulare Counties and delineated range maps through sightings, road kills and active dens indicated. The range of kit fox was reported to be bounded along the northeast by the Delta Mendota Canal (DMC) in San Joaquin County near interstate Highway 580 (Swick 1973). However, Swick (1973) did not report on kit fox records from along the DMC in Fresno County, near the Proposed Action area. The Proposed Action area does not include San Joaquin County.

The Categorical Exclusion processed for geotechnical work in 2010 applied U.S. Fish and Wildlife Service kit fox measures that were available at the time (USFWS 1999). These measures were updated in January 2011 (USFWS 2011), after geotechnical work was completed.

#### **References:**

Swick, C. D. 1973. Determination of San Joaquin kit fox range in Contra Costa, Alameda, San Joaquin and Tulare Counties, 1973. Federal Aid in Wildlife Restoration, Project W-54-R-4, "Special Wildlife investigations". California Department of Fish and Game. 17pp.

U.S. Fish and Wildlife Service (USFWS). 1999. U. S. Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance. Sacramento Fish and Wildlife Office. June 1999. 8 pp.

U.S. Fish and Wildlife Service (USFWS). 2011. Standard Recommendations. U. S. Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance. Sacramento Fish and Wildlife Office. January 2011.

**Coalition-27** This error has been corrected in the EA (see Section 3.4 page 19 of the final EA). The Proposed Action involves irrigation ditches and agricultural land on the SJRIP, not natural waterways or wetlands. The Proposed Action does not involve any new impoundment, channel deepening, or other control or modification of a stream or body of water as described in the statute. Water would be piped from sumps to an experimental Facility where attempts to reduce the concentration of selenium in total and its various forms would be tested. In addition, the movement of SJRIP reuse water taken from sumps through pipes to the proposed Facility is not a water development project. The Proposed Action does not provide drainage. Coordination with the U.S. Fish and Wildlife Service was conducted through the Fish and Wildlife Coordination Act (FWCA) for the SJRIP. Subsequent coordination for FWCA is not required.

As described in Section 1.2 of EA-10-030, the primary purpose of the Proposed Action is to demonstrate and operate the RO and selenium biotreatment technologies described in the Feasibility Report in order to collect cost and performance data required for the final design of full-scale drainage service treatment analyzed in the SLDFR FEIS. A preferred alternative and ROD have been completed for the SLDFR FEIS. This action does not need to consider all possible drainage service components nor consider all potential alternatives for resolution of drainage issues as these have already been analyzed in the SLDFR FEIS and are not part of the Proposed Action in EA-10-030. As described in Section 3.3.2 and Section 4.2 and 4.3, Reclamation is coordinating with the U.S. Fish and Wildlife Service and acknowledges the U.S. Fish and Wildlife Service's previously stated position regarding drainage and full land retirement.

**Coalition-28** Lighting and secure fencing are integral to the Proposed Action to provide safety and security and have been included since design planning began for the Facility. Section 2.2.1 in EA-10-030 has been updated to include this information.

The Facility would be constructed within the SJRIP reuse area adjacent to Russell Avenue, a well traveled road that connects South Dos Palos with Interstate 5. The towns of Dos Palos and South Dos Palos both are within six miles of the proposed Facility and Firebaugh is less than 12 miles distant. Light pollution from these communities would be visible from the Facility during nighttime, as potentially would light pollution from dwellings on Russell Avenue and from farm related

operations on Nees Avenue (e.g. R&N Packing, Co., and Peri and Sons, Turlock Fruit Co, and Legend Produce). Ambient nighttime light pollution from many other sources exists in the valley and contributes to a highly modified nighttime lightscape. Light from the Facility would increase the existing ambient light at night, but the strongest effect would be localized at the Facility. However, because the Facility is poorly suited for wildlife, it is reasonable to expect that the effect on wildlife at the approximate four acre Facility would be minimal.

Furthermore, the land surrounding the Facility is highly disturbed agricultural land, dominated by crop field monocultures. These croplands are regularly harvested (hayed; e.g. Jose tall wheatgrass, seaside paspallum, bermudagrass, and alfalfa), removing wildlife cover and plant biomass, while disturbing organisms that could make use of this land. The land also is frequently flood irrigated, which disrupts burrowing rodents and other ground dwelling organisms. The borders to the crop fields and the adjacent irrigation ditches where the Facility would be located are kept virtually weed free and rodent pest control is practiced, further reducing their suitability to wildlife.

The highly disturbed crops in the SJRIP have low plant diversity and structural heterogeneity compared with native habitats. Compared with native lands, the extensive agricultural habitat covering much of the San Joaquin Valley is a challenging environment and is generally considered relatively poor habitat for several native wildlife species, including those that are federally listed as threatened or endangered (see discussion in USFWS 1998). Attwood et al. (2008) found greater arthropod abundance in native vegetation than agricultural land. Spiders (Araneae), beetles (Coleoptera), orthopterans (Grasshoppers and crickets), and lepidopterans (butterflies and moths), which are prey for larger organisms such as breeding birds, were found to be more abundant in native shortgrass prairie habitat than in Conservation Reserve Program habitat plantings, reflecting differences in vegetative diversity and structure (McIntyre and Thompson 2003). In structurally more complex agroforestry plots in the San Joaquin Valley, Chesemore et al. (1990) found that rodents had denser populations compared with agricultural types (i.e. alfalfa, sugar beet, tomato, cotton and fallow).

Although wildlife utilize SJRIP reuse lands and other croplands, compared with native habitats that are less disturbed (i.e., vegetatively more diverse and consequently structurally more complex environments with a greater number of niches), the highly disturbed SJRIP reuse lands reasonably can be considered to provide lower value habitat for wildlife and impacts at the approximate four acre Facility. The effects to wildlife from the Proposed Action would be minimal when examined in relation to the tremendous acreage of surrounding highly modified agricultural landscape.

**References:**

Attwood, S. J., M. Maron, A.P. N. House, and C. Zammit. 2008. Do arthropod assemblages display globally consistent responses to intensified agricultural land use and management? *Global Ecol. Biogeogr.* 17:585-599.

Bureau of Reclamation (Reclamation). 2004. CVP Water Supply Contract Assignment from Centinella Water District (Contract Number 7-07-20-W-0055) to Westlands Water District. Final Environmental Assessment and Initial Study; EA 03-116, and Finding of No Significant Impact (FONSI), Bureau of Reclamation, Fresno, CA. March 2004.

Bureau of Reclamation (Reclamation). 2005. CVP Water Supply Contract Assignment from Widren Water District (Contract Number 14-06-200-8018-1R7) to Westlands Water District. Final Environmental Assessment and Initial Study; EA 03-117, and Finding of No Significant Impact (FONSI), Bureau of Reclamation, Fresno, CA. January 2005.

Chesemore, D. L., T. D. Kelly, and A. R. Dyer. 1990. Wildlife Use of Agroforestry Plantations in the San Joaquin Valley of California 1987-1989. California Department of Food and Agriculture. Sacramento, CA. August 1990. 115 pp.

McIntyre, N.E. and T. R. Thompson. 2003. A comparison of Conservation Reserve Program habitat plantings with respect to arthropod prey for grassland birds. *Am. Midl. Nat.* 150: 291-301.

U.S. Fish and Wildlife Service (USFWS). 2006. Biological Opinion on the Proposed San Luis Drainage Feature Re-evaluation (SLDFR). Sacramento Fish and Wildlife Office. 1-1-06-F-0027. March 16, 2006. 142 pp.

**Coalition-29** General operations of the Central Valley Project, including delivery to water contractors in the San Luis Unit, are not a part of the Proposed Action analyzed in EA-10-030. See Response to Coalition-1. The Central Valley Project (CVP) Improvement Act, Public Law 102-575 (CVPIA) Programmatic EIS (PEIS) provided a programmatic evaluation of the impacts of implementing the CVPIA. Four alternatives, 17 supplemental analyses, the Preferred Alternative, and a No Action Alternative were evaluated in the PEIS. In addition, the PEIS analyzed the region-wide and cumulative impacts of the CVPIA including the renewal of CVP water service contracts. The diversion of water is an on-going action and the current conditions of that diversion are discussed in the PEIS. The impacts of continuing the diversions through the implementation of CVPIA, including impacts to Indian Trust Assets, have been discussed in the CVPIA PEIS. In addition, CVPIA, Section 3406(b)(23), and the December 2000 U.S. Department of the Interior's ROD entitled *Trinity River Mainstem Fishery Restoration*, with the Tribe's concurrence, determined the water necessary in the Trinity River to restore fishery resources in order to meet the federal trust responsibility. The

ROD adopts the analysis contained in the final EIS/EIR and selects the Preferred Alternative as the necessary and appropriate action which best meets the statutory and trust obligations of the Department to restore and maintain the Trinity River's anadromous fishery resources. The ROD provides annual instream flows ensuring the maximum benefit for fishery purposes and for the restoration of the river to support the fisheries; thereby, fulfilling the statutory and trust obligations on the Department regarding the restoration of the Trinity River's fishery.

**Coalition-30** As described in EA-10-030, the pilot project would produce up to 55,000 pounds of waste solids per year and is assumed to have concentrations of over 2,000 parts per million of selenium. These waste solids are defined as hazardous and would be disposed of at a Class 1 Landfill. The EA has been updated to clarify the amount of waste solids and selenium generated per month (approximately 4,500 pounds of waste solids containing about 8.8 pounds of selenium).

**Coalition-31** As described previously, the purpose of the pilot project is to test treatment on a pilot project scale and to develop better cost information about treatment. During the pilot project, it is not expected that the pilot project would remove sufficient selenium to provide a significant cost savings to Panoche Drainage District.

**Coalition-32** Reclamation views its obligation related to treating CVP drainage water as a Project purpose. Accordingly, Reclamation has determined that the Facility, which would be owned by Reclamation and would treat project water, qualifies for Project energy. Project-Use Power would be used to treat drainage water from the SJRIP. Transportation of drainage water to and from treatment would not use Project-Use Power.

As described in Section 1.2 of EA-10-030, the primary purpose of the Proposed Action is to demonstrate and operate the RO and selenium biotreatment technologies described in the Feasibility Report in order to collect cost and performance data required for the final design of full-scale drainage service treatment analyzed in the SLDFR FEIS. A preferred alternative and ROD have been completed for the SLDFR FEIS. This action does not need to consider all possible drainage service components and their impacts on air quality or global climate change nor consider all potential alternatives for resolution of drainage issues as these have already been analyzed in the SLDFR FEIS and are not part of the Proposed Action in EA-10-030. EA-10-030 analyzed emissions of greenhouse gases from construction and operation of the 18-month pilot project in order to determine the Proposed Action's impacts on global climate change as well as the impacts of global climate change on the project.

## Healer, Rain L

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**From:** Howard Hirahara [HIRAHARA@wapa.gov]  
**Sent:** Wednesday, October 19, 2011 9:18 AM  
**To:** Healer, Rain L  
**Cc:** Mortimeyer, Barry S; Tom Patton; Russell Knight; Sonja Anderson  
**Subject:** Supplemental Comments -- San Luis Drainage Feature Reevaluation Demonstration Treatment Facility

Ms. Healer:

Based on a recent conversation that you've had with Russell Knight of our Contracts Staff in relationship to securing a project use delivery point for the proposed project, Western Area Power Administration would like to submit the following additional comments.

WAPA-1 | First, given that drainage facilities do not normally differentiate between project and non-project water, what is the possibility that the demonstration project will treat and/or transport non-project water? In the event that non-project water is treated or delivered, what is Reclamation's position relative to that water being eligible for project use pumping energy? In the event that Reclamation determines that the possibility that non-project water could be either treated or transported, what steps does Reclamation plan to put into place to appropriately identify and separate the costs?

WAPA-2 | Second, in most conventional situations, drainage facilities ordinarily do not required energy to transport drain water away from a farmer's field. Given that project use energy would be required to treat and transport the drain water, would this be considered a precedent setting action?

As our previous e-mail, should you be interested in following up on these particular comments, Western's contact point is Ms. Sonja Anderson, our Power Marketing Manager. Ms Anderson can be reached at: (916) 353-4421.

Thanks,

Howard Hirahara  
Western Area Power Administration

**Response to Western Area Power Administration Supplemental Comment Letter, October 19, 2011**

- WAPA-1      Project-Use Power would be used to treat drainage water from the San Joaquin River Improvement Project (SJRIIP).
- WAPA-2      Project-Use Power would be used to treat drainage water from the SJRIIP. Transportation of drainage water to and from treatment would not use Project-Use Power.

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FINAL ENVIRONMENTAL ASSESSMENT (10-030)

*SAN LUIS DRAINAGE FEATURE REEVALUATION DEMONSTRATION TREATMENT  
FACILITY AT PANOCHÉ DRAINAGE DISTRICT*

**Appendix K**

**Concurrence Memo from the U.S. Fish and Wildlife Service**

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June 2012





# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Sacramento Fish and Wildlife Office  
2800 Cottage Way, Room W-2605  
Sacramento, California 95825-1846



In Reply Refer To:  
81420-2011-F-0855

JUN 04 2012

## Memorandum

To: Chief, Resource Management Division, U.S. Bureau of Reclamation, South Central California Area Office, Fresno, California

From: Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: San Luis Drainage Feature Reevaluation Demonstration Treatment Facility at Panoche Drainage District

This memorandum responds to your September 16, 2011 and March 13, 2012 memoranda (Memos) requesting initiation of consultation pursuant to section 7(a)(2) of the Endangered Species Act of 1973 (Act) (16 U.S.C. 1531 *et seq.*), for the San Luis Drainage Feature Re-evaluation (SLDFR) Demonstration Treatment Facility (Demo Facility) at Panoche Drainage District in Fresno County. The U.S. Bureau of Reclamation (Reclamation) has requested concurrence under the Act with their effects determinations that construction and operation of the SLDFR Demo Facility for 18 months is not likely to adversely affect (NLAA) the San Joaquin kit fox (*Vulpes macrotis mutica*) and the giant garter snake (*Thamnophis gigas*). This response is provided pursuant to section 7(a)(2) of the Act, and in accordance with the regulations governing interagency consultations (50 CFR §402). We received your Memos on September 19, 2011 and April 2, 2012, respectively. Your March 13, 2012 Memo provided additional avoidance measures to be incorporated into the Proposed Action, which are described in more detail below. A Draft Environmental Assessment (DEA) for the Proposed Action was made available for a 30-day public comment period on September 19, 2011.

We are also providing comments and recommendations under authority of, and in accordance with, provisions of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*) and the National Environmental Policy Act (NEPA) (40 CFR Part 1500), through our role as a Cooperating Agency under NEPA for the SLDFR Project, and within associated guidance from the President's Council on Environmental Quality. The FWCA requires Federal agencies proposing water resource development projects involved in issuance of related permits or licenses to consult with the Service and provide equal consideration to the conservation, rehabilitation, and enhancement of fish and wildlife resources with other project purposes. We believe the Service's role as Cooperating Agency is to assist Reclamation in its identification of issues that are germane to subsequent actions it would take on the SLDFR project, to identify significant issues early, and to provide for better decision-making. Our focus is to assist Reclamation in its efforts to "...make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment" (40 CFR Part 1500.1[c]).

This memorandum transmits our concurrence with your effects determinations that the construction and operation of the SLDFR Demo Facility for 18 months is NLAA the San Joaquin kit fox and the giant garter snake. However, as we will describe in detail below, the Service believes that new information, subsequent to the 2006 SLDFR biological opinion and FWCA Report has become available that should be considered for all future SLDFR-related actions. The Service recommends therefore that prior to full-scale implementation of the SLDFR project within any of the subareas considered in the SLDFR EIS, reinitiation of formal consultation under the Act and revision of the FWCA Report is warranted.

### **Consultation History**

*September 19, 2011:* The Service receives a memo from Reclamation requesting initiation of consultation for the SLDFR Demo Facility.

*October 13, 2011:* Reclamation clarifies via e-mail that the source of the drainwater for the Demo Facility will be sumps within the Grassland Bypass Project's drainage reuse area.

*October 19, 2011:* Reclamation clarifies via e-mail that the duration of the Project is 18 months.

*October 23, 2011:* The Service requests clarification on the predicted constituent concentrations in effluent and waste streams from the SLDFR Demo Facility and identifies several inconsistencies between the schematic of the Demo Facility provided on October 24, 2011, and Table 2-1 and text of the Draft EA for the project.

*November 1, 2011:* Reclamation transmits via e-mail a revised schematic for the SLDFR Demo Facility operations and confirmed that there would be monitoring to track the composition of drainage sump water and consequent waste-streams and sludge waste products and to quantify volumes, concentrations, and loads for disposal to assess the effectiveness and capacity of treatment technologies. Reclamation noted that they had not developed a testing and monitoring plan, however, this task is scheduled to be prepared during FY 2012.

*November 4, 2011:* The Service transmits a number of questions about the biotreatment process and expected water quality of the biotreatment effluent (for total dissolved solids [TDS] and other minor constituents), the mass balance of the schematic for selenium and TDS, the oxidation step on the biotreatment effluent, loss of selenium to volatilization, and connection of the San Joaquin River Improvement Project (SJRIP) to the Grasslands Bypass Project (GBP) and San Luis Drain (denoted by an arrow in the upper left corner of the schematic that Reclamation provided to the Service).

*November 10, 2011:* Reclamation and the Service participate in conference call to address questions submitted by the Service on November 4, 2011, including discussion of various materials provided by Reclamation since November 7, 2011.

*November 13, 2011:* The Service requests information on the final oxidation step after the biotreatment process used to convert organo-selenium into inorganic selenium and prior to disposal into evaporation ponds, including: 1) production and handling of waste products from the oxidation step; and 2) expected efficiency of the oxidation step.

*November 16, 2011:* The Service requests via e-mail data on TDS concentrations of SJRIP sump water that will be used in the SLDFR Demo Facility.

*November 17, 2011:* Reclamation transmits a revised construction schedule for the SLDFR Demo Facility.

*November 21, 2011:* Reclamation responds to questions from the Service about the ozonation treatment step after selenium biotreatment. Reclamation concluded that ozone is the most efficient oxidation process that can be used, and ozone transfer efficiency is projected to be 90 percent or greater.

*November 21, 2011:* Telephone call between Reclamation and the Service to discuss the status of the ESA consultation. The Service identified two key issues that needed to be addressed prior to concurrence: 1) fate of other constituents in the water as it moves through the system (e.g. mercury – does it become methylated, etc.); and, 2) post treatment water quality that would be released into the environment.

*December 5, 2011:* The Service transmits via e-mail a list of questions for the conference call with Reclamation and General Electric (GE) on the SLDFR Demo Facility scheduled for Wednesday December 7, 2011. The list of questions is attached to this Memo as Appendix A.

*December 7, 2011:* Representatives of the Service, Reclamation, U.S. Geological Survey and GE (the manufacturer of the treatment technology to be used at the Demo Facility) participate in a conference call to address questions raised by the Service in the December 5, 2011 e-mail to Reclamation.

*December 13, 2011:* The Service transmits two e-mails to Reclamation with information on selenium analytical techniques.

*December 21, 2011:* The Service transmits a list of suggested environmental commitments for construction and operation of the SLDFR Demo Facility. The list of suggested commitments is attached to this Memo as Appendix B.

*January 11-February 1, 2012:* Reclamation and the Service work on revisions to the December 21, 2011 list of suggested environmental commitments.

*February 17, 2012:* Reclamation notifies the Service via e-mail that Reclamation cannot commit to providing reports from GE establishing efficacy of the selenium biotreatment technology because those reports constitute proprietary information of the manufacturer.

*March 13, 2012:* Reclamation transmits a memorandum providing additional avoidance measures to be incorporated into the Proposed Action and requests concurrence with their effects determination that the construction and operation of the SLDFR Demo Facility is NLAA the San Joaquin kit fox or the giant garter snake. The list of commitments is similar in content to what was transmitted in the December 21, 2011 e-mail to Reclamation with the following exceptions: 1.) the commitment to conduct a bioassay study to establish environmental risk to food webs was removed; and 2.) the commitment to provide the Service reports on the efficacy of the selenium biotreatment technology was changed to sharing new information with the Service, as it becomes available, establishing

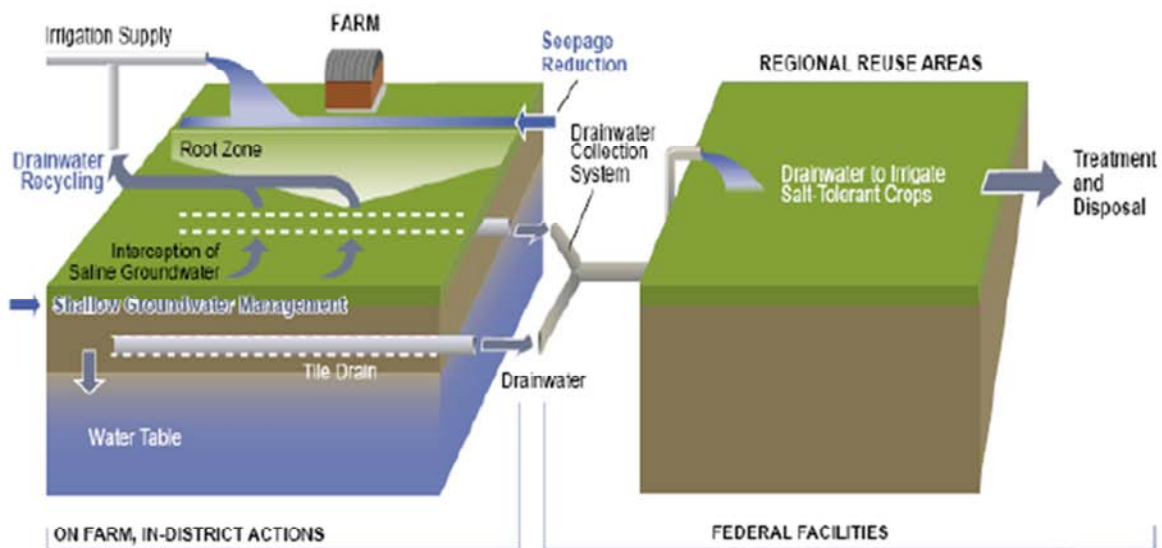
efficacy of the selenium biotreatment technology and efficacy of ozonation in reducing organoselenium to selenate.

*April 23, 2012:* Reclamation approves the Service's request via e-mail to change the word "would" to "will" in the list of environmental commitments transmitted in the March 13, 2012 Memo.

## Background

The San Luis Unit (SLU) has received Central Valley Project contract water for more than 40 years, with only partial drainage removal services. Drainage service is needed to achieve a long-term, sustainable salt and water balance in the root zone of irrigated lands in the SLU and adjacent areas. The San Luis Act of 1960 (Public Law 86-488) recognized the drainage management requirement, and several lawsuit decisions confirmed the Federal government's obligation to provide drainage service when irrigation water is applied to the SLU. Reclamation completed the SLDFR plan to supply drainage service for the SLU in a Final EIS (FEIS) in 2006. The FEIS evaluated seven action alternatives in addition to the no action alternative for implementing drainage service within the SLU. Common elements of the SLDFR FEIS action alternatives are depicted in Figure 1 below. The Record of Decision (ROD) for the FEIS was signed March 9, 2007. Subsequently, Reclamation prepared the *San Luis Drainage Feature Re-Evaluation Feasibility Report* (Feasibility Report), which reviewed the performance of the treatment technologies and evaluated the feasibility of implementing the preferred alternative (USBR 2008).

Figure 1. Common Elements of SLDFR In-Valley Disposal Alternatives



Source: SLDFR Feasibility Report page 23 (USBR 2008).

**Performance of Treatment Technologies during Previous SLDFR Pilot Studies**

The SLDFR Pilot Studies conducted from 2004 to 2006 were unable to successfully implement the drainage treatment schematic or consistently meet project specifications of 10 µg/L selenium, primarily to be composed of inorganic selenate and/or selenite ions prior to discharge into evaporation ponds. The SLDFR FEIS Appendix B (USBR 2006) and Feasibility Report Appendices D and E (USBR 2008) documented numerous operational problems associated with the SLDFR treatment pilot studies implemented in 2004 through 2006. These problems included the following:

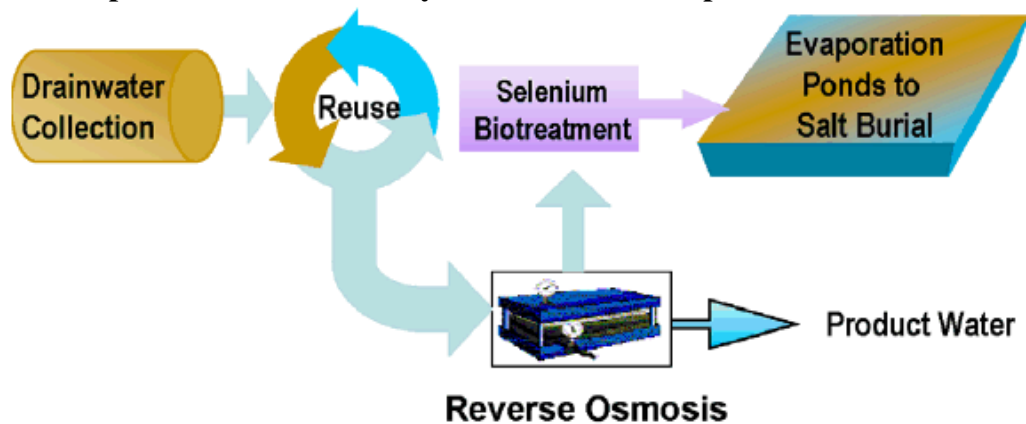
- Introduction of oxygen into the influent distribution line significantly diminishing the performance of the anaerobic bacteria in Reactor 1 to remove selenium and nitrate;
- Scaling problems on numerous occasions in the Reverse Osmosis (RO) and biotreatment systems which ultimately forced the shutdown of these systems (SLDFR Feasibility Report Appendix D page 20);
- Solidification of the granular activated carbon in the biotreatment system resulting in overflowing of bioreactor tanks on several occasions;
- Insufficient hydraulic head in the bioreactor tanks that could not produce sufficient pressure to move water through the fouled distribution headers and the carbon media. The bio-growth caused several shutdowns of the reactors;
- The biotreatment system at Red Rock Ranch experienced problems with its nutrient dosing system causing reduced efficiency of the biotreatment system;
- The granular activated carbon scaling at Panoche WD and the nutrient dosing problem at Red Rock Ranch caused performance problems which prevented the pilots from achieving the SLDFR performance criterion selenium level of 10 µg/L selenium (primarily in inorganic forms), prior to discharge into an evaporation pond. With the exception of the first month of the pilot, the biotreatment system at Red Rock Ranch was hindered by performance problems that resulted in effluent selenium concentrations higher than the target of 10 µg/L;
- A high proportion of organo-selenium in the biotreatment effluent resulted in twice the selenium bioconcentration in invertebrates in the evaporation pond than was predicted by the bioconcentration model presented in the SLDFR EIS (see pg 18, SLDFR FEIS Appendix B);
- During Phase III of the SLDFR Pilot studies, the bioreactors at Panoche WD operated without problems during the first three weeks of the pilot. During the week of June 27, 2006, nitrogen gas buildup in the bioreactors caused air binding (bubble accumulation) within the carbon media. The expanding carbon reached the top of the bioreactor and plugged the effluent port resulting in overflow from the bioreactors;
- The biotreatment systems in Panoche and Red Rock Ranch were only able to successfully meet the performance criterion of 10 µg/L Se in the biotreated effluent when treating raw drainwater (i.e., drainwater collected prior to being routed to a drainage reuse area; raw drainwater is significantly lower in total dissolved solids [TDS] and selenium). This differs substantially from the schematic in the SLDFR EIS which planned for RO treatment to occur on subsurface drainage collected from drainage reuse areas, and biotreatment to occur on effluent from the RO treatment process.



### SLDFR Demo Facility Project Description

The proposed action, the SLDFR Demo Facility, will test the efficacy and operation of RO treatment and selenium biotreatment technologies for agricultural drainage disposal. As noted above, these technologies had previously been tested in SLDFR Pilot Studies Phases I thru III but results did not achieve performance specifications identified in the SLDFR FEIS (see SLDFR Feasibility Reports Appendices D and E, USBR 2008). Advances in biotreatment technology have been made since the last SLDFR pilot studies were completed in 2006. Reclamation intends to collect cost and performance data to use for final design, construction and operation of a full-scale drainage service facility in one sub-area of Westlands Water District consistent with the schematic depicted in Figure 2. A secondary purpose of the SLDFR Demo Facility is to evaluate other innovative technologies, which may reduce the cost and environmental impacts as compared to the technologies evaluated in the SLDFR Feasibility Report, while meeting the requirements for drainage service (Draft SLDFR Demo Facility Finding of No Significant Impact pages 1-2). These other technologies have not yet been identified and will likely require subsequent environmental analysis and may require separate consultation under the Act.

**Figure 2. Components of the In-Valley Treatment and Disposal Alternatives in the SLDFR FEIS**



Source: SLDFR FEIS, page ES-11 (USBR 2006).

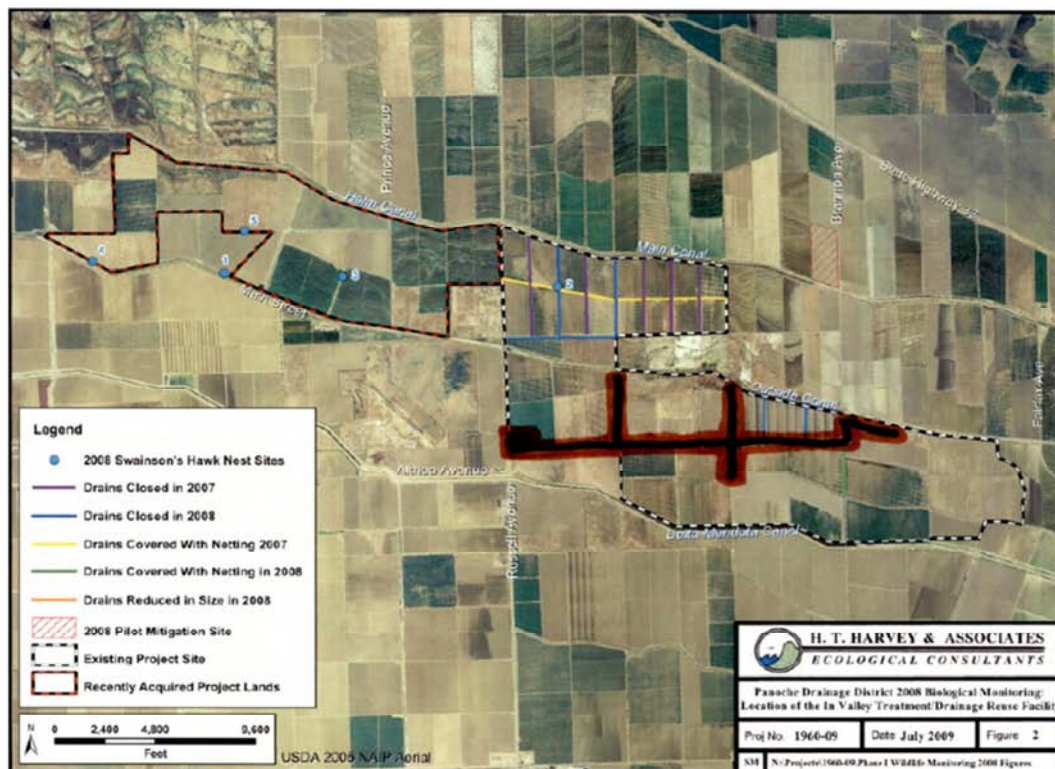
### Construction

Reclamation proposes to construct, operate, and maintain for 18 months the SLDFR Demo Facility for drainage treatment within the geographical boundaries of the existing Grassland Bypass Project's Drainage Reuse Area (part of the SJRIP). According to the Draft Environmental Assessment for this project (DEA), the SLDFR Demo Facility may be operated by Reclamation staff, and/or contractors for at least 18 months to collect data for final designs. Subsequently, Reclamation may elect to continue operating the Facility indefinitely or delegate it to their designated operating partner for treating reuse drainage. Disposition and operation of the facility after the 18-month time period is unknown at this time and is not considered in this consultation.

The SLDFR Demo Facility is expected to occupy a rectangular area, approximately four-acres in size, adjacent to and immediately north and east of Panoche Drainage District's existing distribution canals and within the Grassland Bypass Project's SJRIP drainage reuse area. Additional pipelines will be constructed to convey drainage water from the seven existing reuse sumps to the Demo Facility (as

depicted in Figure 3). Proposed drainage water treatments will include RO, ultrafiltration, and selenium biotreatment and ozonation prior to discharge to the SJRIP. The Demo Facility may also evaluate up to two other innovative technologies as yet to be determined and not included in this consultation. The SLDFR Demo Facility footprint includes adequate land area to incorporate these additional technologies if and when they are built. Subsequent environmental analysis may be required for these additional technologies depending upon the type of treatment systems or equipment to be installed. The SLDFR Demo Facility will include an 11,600 square-foot metal building, a 21-foot by 71-foot covered multi-purpose concrete slab along the east side of the building, a concrete parking area and walkway along the south side of the building, fourteen steel and plastic tanks ranging from 8 to 65 feet in height adjacent to the building, and six inches of gravel across the Facility yard for the existing access road between Russell Avenue and the southeast corner of the Facility footprint.

**Figure 3. SLDFR Demonstration Facility (depicted in red and black marker). Existing and Recently Acquired Project Lands are of the Grassland Bypass Project's San Joaquin River Improvement Project.**



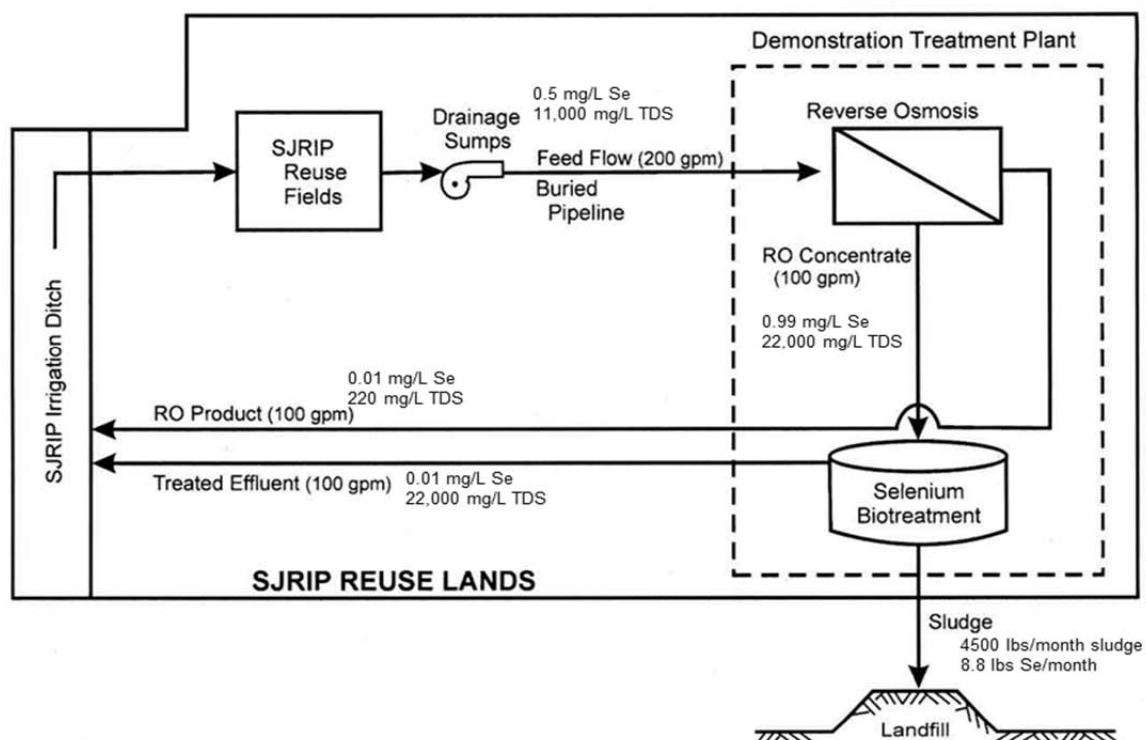
Sources: N. Gruenhagen *in litt.*, 9.26.2011; H.T. Harvey and Associates 2009.

### SLDFR Demo Facility Operation

The SLDFR Demo Facility will follow a modified schematic from what was considered in the SLDFR FEIS. The SLDFR biological opinion and FWCA Report analyzed the effects of the components of In-Valley Treatment and Disposal Alternatives for the SLDFR EIS as presented in the schematic in Figure 2. By comparison, the schematic of the expected SLDFR Demo Facility operations with predicted flow volumes and selenium and total dissolved solids concentrations, is depicted in Figure 4

below (N. Gruenhagen, *in litt.*, 10.24.2011 and D. Hyatt, *in litt.*, 4.23.2012). The key differences between the SLDFR EIS schematic and the SLDFR Demo Facility are summarized in Table 1 below:

**Figure 4. Schematic of SLDFR Demo Facility Operations**



Source: Adapted from N. Gruenhagen, *in litt.*, 10.24.2011 and D. Hyatt, *in litt.*, 4.23.2012

**Table 1. Differences between SLDFR FEIS and SLDFR Demo Facility DEA Schematics**

	SLDFR EIS	SLDFR Demo Facility
Drainage conveyed to reuse area in closed pipes	Yes	No
Treatment Effluents and backwash disposed into Evaporation Ponds	Yes	No
Treatment Effluents discharged into drainage reuse area	No	Yes
Disposition of RO Product Water	Anticipated use was Ag	Blended with treatment effluent to be disposed of in SJRIP drainage reuse area



Water for the SLDFR Demo Facility will be provided from existing drainage water collected for use in the SJRIP drainage reuse area. Drainage flow of up to 400 gallons per minute (GPM) from tile drain sumps in the SJRIP will be provided to a 65-foot diameter regulating tank for Facility treatment

operations. From the feed tank, drainage flows will be pretreated to remove suspended particles that could clog the RO membranes. The SLDFR Demo Facility will evaluate two options for removal of suspended solids: (1) conventional pretreatment (i.e., flocculation, sedimentation, and sand/anthracite media filtration) and (2) membrane pretreatment (microfiltration or ultrafiltration). After pretreatment, approximately 200 GPM of drainage flows will be fed into the RO treatment system. Once through the RO treatment system, approximately 50 percent of the feed water (about 100 GPM) will be recovered as low salinity product water. The remaining 50 percent of the feed water (about 100 GPM) will exit the RO treatment system as a concentrated waste stream and be fed into the selenium biotreatment system. The concentrated waste stream produced after RO treatment will contain all the salts and selenium from drainage feed water (Table 2); therefore, the concentration is expected to be roughly double that of the feed flow. The RO concentrated waste stream will then be treated in bioreactor tanks to remove about 99 percent of the selenium. The biotreatment system is designed to primarily remove selenium from this waste stream. The residual selenium in the treated water will then be oxidized to ensure that it is converted to primarily inorganic selenate and/or selenite ions prior to discharge. The water quality of the biotreatment discharge water will be approximately the same as the water quality of the RO concentrate stream except that the selenium concentration will not exceed 10 µg/L in the biotreatment effluent. Effluent streams from the RO system (product stream) and the biotreatment system (treated effluent) will be conveyed in separate pipes to the SJRIP ditch and then blended with drainwater in the ditch, and returned for irrigation use on SJRIP drainage reuse area lands.

Post-biotreatment water will then be blended with the low-salinity RO treated water (product stream) and discharged into the existing drainage ditch adjacent to the western edge of the SLDFR Demo Facility footprint where it will be blended with other drainage water and used by the SJRIP drainage reuse area for irrigation in their drainage reuse areas. Reclamation clarified in their March 13, 2012 Memo that effluent from the SLDFR Demo Facility will be discharged to an irrigation ditch in the SJRIP and remain as reuse water within the SJRIP and will not flow to the San Joaquin River (D. Hyatt *in litt.*, 3.13.2012).

The bioreactor tanks will be periodically backwashed to remove accumulated solids and selenium. The backwash water will be sent to a clarifier tank to provide gravity separation of water and solids. The clarified water will be returned to the bioreactor feed tank for reprocessing. Prior to transport by truck to an off-site waste disposal facility the separated solids will be combined with solids from pretreatment backwashing and de-watered using a belt press. Up to 55,000 pounds of waste solids could be generated per year, which will be stored on-site in closed steel “roll-off” containers until transported to a disposal facility on a quarterly basis. The material stored will be “solids” and will have little opportunity to spread outside the secured area. Title 22 of the California Code of Regulations (§66261.24) defines acceptable quantities of selenium associated with solids as less than 100 mg/L. As the concentration of selenium present in the solid waste will be considered hazardous waste, Reclamation will comply with Resource Conservation and Recovery Act including temporary storage and containment requirements. Since selenium concentrations in the waste solids will likely be over 2,000 mg/L, the waste solids are defined as hazardous and as such, must be disposed of at a Class 1 Hazardous Waste Landfill approximately quarterly. The closest Class 1 landfill

is the Kettleman Hills Landfill in Kings County. The DEA for the SLDFR Demo Facility did not anticipate any adverse environmental impacts resulting from hazardous waste storage or disposal.

**Table 2. Water Quality Projections for RO Treatment at SLDFR Demo Facility**

Analyte	Units	Feed Concentration <sup>1</sup> (200 GPM)	Percent of Analyte Rejection	Reject Concentration <sup>2</sup> (100 GPM)	Product Concentration <sup>3</sup> (100 GPM)
Total Dissolved Solids	mg/L	14,828		29,318	340
Conductance	µS/cm	17,908		32,468	
pH		7.4		7.55	7.3
<b>MAJOR COMPONENTS</b>					
Bicarbonate	mg/L	161	96.70%	314.16	7.8
Bromide	mg/L	4	98.00%	7.88	0.12
Calcium	mg/L	113	99.00%	224.31	1.69
Carbonate	mg/L	0	98.00%	0	0
Chloride	mg/L	3,386	98.00%	6,671.43	100.00
Magnesium	mg/L	309	99.50%	615.69	2.3
Nitrate as N	mg/L	179	88.50%	328.8	29
Potassium	mg/L	23.7	98.20%	46.77	0.63
Silica	mg/L	6.7	97.00%	13.1	0.3
Sodium	mg/L	5,750	98.20%	11,346.13	150.00
Sulfate	mg/L	4,853	99.50%	9,669.69	36.00
<b>MINOR COMPONENTS</b>					
Ammonia	µg/L	3,400	95.00%	6,551.22	250.00
Aluminum	µg/L	0	95.00%	0	0
Arsenic	µg/L	8	98.00%	15.76	0.24
Boron	µg/L	33,000	90.00%	61,285.71	4,700.00
Cadmium	µg/L	3	99.50%	5.98	0.02
Chromium	µg/L	84	98.00%	165.5	2.5
Copper	µg/L	26	98.00%	51.23	0.77
Fluoride	µg/L	900	98.00%	1,773.27	26.00
Iron	µg/L	391	99.00%	776.16	5.8
Lead	µg/L	3	99.00%	5.96	0.04
Manganese	µg/L	26	99.00%	51.61	0.39
Mercury	µg/L	0.3	98.00%	0.59	0.01
Molybdenum	µg/L	150	98.00%	295.54	4.5
Nickel	µg/L	52	99.00%	103.22	0.78
Selenium	µg/L	330	99.50%	657.53	2.5
Silver	µg/L	3	98.00%	5.91	0.09
Strontium	µg/L	4,300	98.00%	8,472.28	130.00
Zinc	µg/L	26	98.00%	51.23	0.77

<sup>1</sup>Pre-treatment drainage water analyte concentrations. Data for these concentrations are from a March 2010 flow-weighted blend (average) of all 7 sumps within the SJRIP.

<sup>2</sup>RO Concentrated waste stream to be sent for biotreatment.

<sup>3</sup>Low-salinity RO treated water.

Note: Data for this table has been updated since release of the draft EA to include more recent sampling data. Values for the Reject and Product concentrations are based on software that analyzes RO output. Actual values are likely to vary.

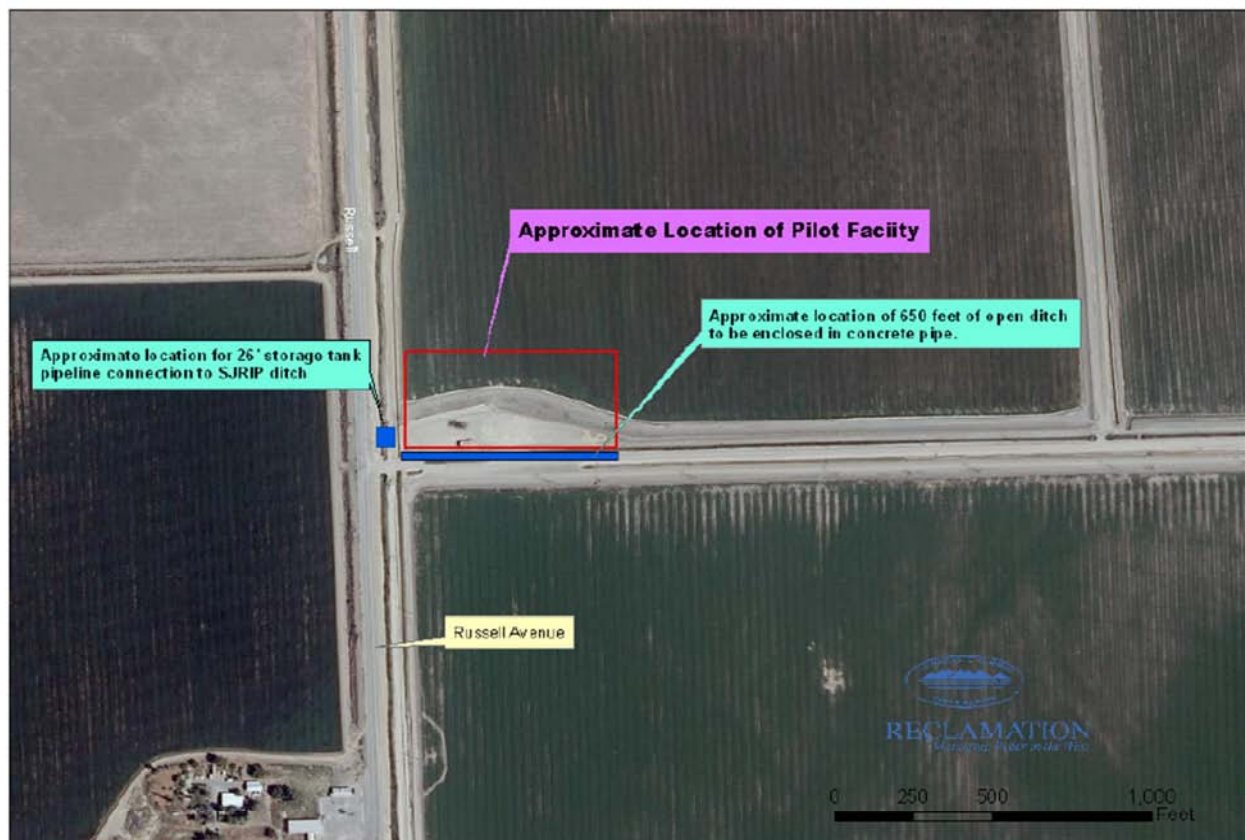
Source: R. Healer, *in litt.*, 11.7.2011.

## Effects

The primary effect to biological resources of the SLDFR Demo Facility operation will be from treated water that will be released into an irrigation ditch. The DEA for the SLDFR Demo Facility concluded that because the treated water will be a minor fraction of the drainage reuse water pool carried in the irrigation ditch, it is expected to have minimal effect on the drainwater quality used to irrigate the SJRIP's drainage reuse area.

In addition, a limited amount of construction would occur in irrigation ditches that could have the potential to affect giant garter snakes. Approximately 650 feet of open irrigation ditch running from the existing RP-1 pump station along the graveled access road immediately south of the site for the proposed facility would be replaced with covered 48-inch concrete pipe as shown in Figure 5. Additional temporary activity would occur where another pipeline segment from the Facility would be connected to the irrigation ditch west of the Facility. Reclamation determined that this work is not likely to adversely affect the giant garter snake because the area is unlikely to be inhabited by the snake and avoidance measures would be implemented (See Environmental Protection Measures below); construction areas would be surveyed for garter snakes before work could begin and a biological monitor would be present when construction activities occur in aquatic habitat. If giant garter snakes are observed, work will not occur without further consultation with the Service. Replacing the open irrigation ditch will remove a small area of potential barren ditch habitat, but it also would remove a potential area for garter snake exposure to adverse elements. Nevertheless, because giant garter snakes are unlikely to be present in the area and there would be removal of a minimal amount of poor quality habitat, the effects to giant garter snakes from this portion of the Proposed Action are discountable and insignificant and therefore are not likely to adversely affect the giant garter snake (N. Gruenhagen, *in litt.*, 11.9.2011).

**Figure 5. Approximate Location of Open Irrigation Ditch to be Enclosed in Concrete Pipe and Connection Point for Feed to SLDFR Demo Facility Storage Tank.**



### Environmental Protection Measures

Appendix C of the SLDFR Demo Facility DEA includes Environmental Protection Measures to reduce environmental consequences of the proposed action. These Environmental Protections Measures are summarized in Table 3 below.

**Table 3. Environmental Protection Measures and Commitments**

Resource	Protection Measure
Biological Resources	Preconstruction surveys and implementation of avoidance and minimization measures for San Joaquin kit fox (USFWS 2011; see Appendix C).
Biological Resources	Preconstruction surveys and implementation of avoidance and minimization measures for giant garter snake (see Appendix C).
Biological Resources	A biologist will be present at the inception of the construction and other times as required to insure that measures for avoidance of effects to species are implemented. Additionally, if a listed species is observed, work at the site will immediately stop and Reclamation biologists shall be notified. No work will continue without additional approval from Reclamation environmental staff, following further consultation with wildlife agencies, as appropriate.

In addition, Reclamation's March 13, 2012 memo committed to add avoidance measures into the Proposed Action, to ensure that the action would not be likely to adversely affect species and critical habitat protected under the Act. Those avoidance measures are listed below with minor wording changes approved by Reclamation (D. Hyatt, *in litt.*, 4.23.2012).

1. Reclamation will fund and implement a program to monitor the composition of drainage sump water and consequent waste-streams and sludge based, as applicable, to the "Conceptual Monitoring, Compliance, and Adaptive Management Plan for San Luis Drainage" prepared by the Service in December 2007. The proposed monitoring program would be developed with guidance from technical experts within Reclamation, the Service, and U.S. Geological Survey. The program would measure the changes in concentration and chemistry of selenium\* and mercury\* (\*organic and inorganic forms), as well as other constituents including arsenic, boron, cadmium, chromium, copper, manganese, molybdenum, nickel, nitrates, salts, and zinc. The program would include standard QA/QC protocols to provide accurate and verifiable results. The results will be compared to established thresholds of concern and toxicity. Reclamation will use the program results to guide operation of the Demonstration Facility.
2. Reclamation will provide the Service with monthly monitoring reports during the entire period of operation of the Demo Facility that will quantify daily volumes, summarize concentrations of the measured constituents, and calculate a mass balance to assess the effectiveness and capacity of the treatment facility.
3. If the monitoring program identifies contaminant concentrations in the biotreatment effluent greater than the established thresholds of concern, or if the tiered study identifies bioaccumulation risk with the potential to adversely affect species, Reclamation will fund and implement additional biological monitoring on the San Joaquin River Improvement Project's drainage reuse area. Reclamation will determine whether or not to reinitiate ESA consultation.

4. Reclamation will continue to share information with the Service as new information comes available establishing efficacy of the selenium biotreatment technology (e.g., from full scale biotreatment of high TDS waters) and efficacy of ozonation in reducing organoselenium to selenate.
5. Reclamation will commit to using contract laboratories that would provide accurate verifiable results based on QA/QC protocols for water and sludge.
6. Within 90 days of completion of the Service's ESA consultation, Reclamation will fund and implement a comparative study of selenium analysis of typical SJRIP sump water (high salinity, high sulfates) using hydride generation and ICP DRC MS technology to confirm accuracy of these methods.

#### **Further ESA and FWCA Analysis is Warranted for Full-Scale Implementation in any Subarea of SLDFR**

As defined in 50 CFR §402.16, reinitiation of formal consultation is required if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered. The Service believes that new information on the performance of the biotreatment system and evaporation ponds, and on mercury in drainwater, subsequent to the 2006 SLDFR biological opinion and FWCA Report has become available that should be considered for all future SLDFR-related actions. This new information is discussed in greater detail below. The Service recommends therefore that prior to full-scale implementation of the SLDFR project within any of the subareas considered in the SLDFR EIS, reinitiation of formal consultation under the Act and revision of the FWCA Report is warranted.

At the time the FWCA Report and biological opinion for SLDFR were completed, and coincident with the SLDFR Final EIS, Reclamation had not yet selected precise locations for specific project features, although a general mitigation proposal (with an initial estimate of acreage obligations) and broad planning level analysis had been completed. The Service was able to analyze the proposed action in a similarly broad perspective, and Reclamation agreed that the specific siting of facilities associated with SLDFR would be subject to future consultations with the Service under the Act. Additionally, the Service intended to continue participation with the SLDFR Mitigation Work Group during future phases of the planning process, including assistance with the feasibility analysis, facilities siting, and the preparation of the mitigation monitoring and adaptive management plans. However, the SLDFR Mitigation Work Group has not met since the FWCA report was completed in 2006. The Service recommends therefore, that when Reclamation proceeds with a full-scale facility in the SLDFR Westlands central subarea, Reclamation reinitiate consultation under the Act and FWCA to address among other things, siting of facilities, evaporation pond mitigation acreage, and mitigation monitoring and adaptive management plans.

#### **Bioaccumulation Potential in SLDFR Drainage Evaporation Ponds**

In an interagency meeting held December 6, 2005, Reclamation indicated that the SLDFR project would be predicated on the successful compliance with the 10 µg/L waterborne selenium concentration following pre-treatment. Further, it was agreed at this meeting that the effluent would be treated to oxidize the selenium to selenate (SeO<sub>4</sub>). These thresholds formed the basis for the underlying risk assessments in the SLDFR FWCA and biological opinion, and are therefore critical project elements. The Service's understanding of this agreement is that failure to meet these objectives would necessitate future FWCA, National Environmental Policy Act, and ESA consultation.

On March 31, 2006, the Service received the SLDFR Administrative Final EIS (AFEIS), along with a request for comments from Reclamation. The Service had already submitted the Final FWCA Report (USFWS, March 2006a) and biological opinion (USFWS, March 2006b) to Reclamation by this date, and, as a result, had not commented completely on the SLDFR as represented in the AFEIS. The Service reviewed the pertinent sections in the AFEIS and confirmed that new information had been presented for evaluation; specifically, the results from preliminary selenium treatment pilot studies (Appendix B in the AFEIS).

Appendix B of the SLDFR FEIS contains bioaccumulation data and water chemistry results from the field trial that ponded the selenium pretreatment effluent in evaporation pond mesocosms, information not available to the Service during the preparation of the Final SLDFR FWCA Report or biological opinion. In previous planning aid memoranda and the Draft FWCA Report, the Service repeatedly stressed the critical importance of treatment projection in relation to risk assessment (USFWS, Sep 2005; USFWS, Feb 2005; USFWS, Nov 2004; USFWS, Jul 2003). Given our review of the EIS and its associated level of commitment for selenium treatment, the Service believes it important to highlight the significance of this particular aspect of SLDFR within our FWCA mandate, and to reiterate risks associated with failure to meet this standard.

The SLDFR pilot evaporation pond data in the SLDFR FEIS demonstrated double the bioconcentration that was predicted by the bioconcentration model (see page 18, Appendix B). The highest reported invertebrate selenium concentration from the SLDFR pilot evaporation ponds was 225.7 µg/L dry weight from a sample of aquatic nektonic invertebrates (primarily water boatmen) collected from pond 1 (see Appendix B, Attachment B-2, Table 10, SLDFR FEIS). Most selenium concentrations for invertebrates from the SLDFR pilot evaporation ponds were well above concentrations associated with adverse biological effects to wildlife (i.e., >7 µg/L dry weight in invertebrates based on dietary effects on reproduction in chickens, quail and ducks, see Table 6-4, Recommended Ecological Risk Guidelines Based Upon Selenium Concentrations, on page 6-27 of the FEIS/R Grassland Bypass Project, 2010–2019, (USBR 2009)).

By comparison, concentrations of selenium in water boatman collected from Kesterson Reservoir in the mid-1980's were in the range of 5.9-130 µg/L (See Moore *et al.*, 1990 page 4-43). Beginning in the spring of 1983, the Service found abnormally high numbers of dead and deformed aquatic bird embryos, and dead adult birds at Kesterson Reservoir. Embryotoxicosis, nest abandonment, hatchling deformities, and reproductive failure were observed in numerous aquatic bird species from the 1983 through the 1986 breeding seasons (Ohlendorf *et al.*, 1986b; Ohlendorf *et al.*, 1989). The problems with avian reproduction and survival reported from 1983 to 1986 were primarily attributed to elevated concentrations of selenium in the waters and food-chain at the reservoir (Hoffman *et al.*, 1988; Ohlendorf 1989; Ohlendorf and Skorupa, 1989; Ohlendorf *et al.*, 1986a; Ohlendorf *et al.*, 1986b; Williams *et al.*, 1989; Williams 1986).

While the data in the SLDFR FEIS on selenium in invertebrates collected from the pilot evaporation ponds is too limited to draw definitive conclusions, it is safe to say from the waterborne selenium data and the existing monitoring indicated that treatment (RO and selenium biotreatment) had not been performing to performance objectives that the Service used for the basis of the FWCA Report and biological opinion (<10 µg/L selenium in treatment effluents, primarily as selenate). The critical issue with respect to environmental risk is associated with bioaccumulation potential of waterborne selenium through the food-web and into higher trophic level consumers. A two-fold increase in bioconcentration

factors may have a pronounced impact on realized risks to wildlife populations because toxicity is not a linear phenomenon (i.e., the dose-response curve is sigmoidal). In the case of selenium, a trace element with a very narrow safety margin (the range between nutritionally beneficial and toxic concentrations), the dose-response curve is quite steep (see, for example, SLDFR FEIS Appendix M, USFWS Adult Avian Mortality Protocol).

The SLDFR Demo Facility provides an opportunity to address the issue of bioaccumulative potential of the waste streams that will be disposed of in evaporation ponds in a full-scale facility as planned to be implemented in Westlands central subarea starting in 2014. The Service made such a recommendation to conduct a lab-scale bioassay of the drainage disposal effluents in a recommended list of environmental commitments for the SLDFR Demo Facility submitted to Reclamation on December 21, 2011. However, Reclamation's March 13, 2012 Memo did not include a commitment to conduct a bioassay study to assess the bioaccumulative potential of the drainage treatment waste-streams. Absent a bioassay study, the best available information for analysis of a full-scale facility would be the data presented in Appendix B of the SLDFR FEIS which documented double the bioconcentration assumed in the the SLDFR FEIS and FWCA and ESA consultations.

#### Mercury in Drainage Water not Considered in SLDFR FEIS

The Service believes that new information, subsequent to the SLDFR FEIS, biological opinion and FWCA Report has become available on mercury in drainwater that should be considered in all future SLDFR-related actions. Mercury was eliminated as a constituent of concern in the SLDFR FEIS and is not considered in the DEA for the SLDFR Demo Facility based on estimates of mercury in drainage water from limited data collected from the project area in the 1980's and 1990's. The water quality projections in Table 2-1 in the DEA for this project (Table 2 above) were derived from the SLDFR FEIS, Appendix C (USBR 2006). Estimates of drainwater quantity and quality from farmed lands and reuse areas were developed in the SLDFR FEIS to enable calculation of discharge water quality for each disposal alternative. Water quality data in the SLDFR FEIS for Westlands drainage were derived from data collected in the mid 1980's (Page C-39 SLDFR FEIS) (CH2MHill 1985). Westlands North, South, and Central water quality data were estimated by scaling geostatistical analysis by a ratio of extrapolated TDS concentrations to the measured concentrations of each constituent in each subarea. Drainage water quality in the Northerly Area was based on samples collected in the San Luis Drain in 1997 (USBR 2001). Water quality projections for mercury in drainwater from the SLDFR FEIS indicated total mercury concentrations at or near the detection limit (100 ng/L or 200 ng/L). These water quality estimations served as the basis to eliminate mercury as a constituent of concern for the SLDFR planning effort.

In 1987, mercury was identified as a potential substance of concern in agricultural drainage water from the west-side San Joaquin Valley and was assigned to the highest priority rank (Hansen and Morhardt, 1987). The San Joaquin Valley Drainage Program identified mercury as a substance of concern that warrants further attention (Moore *et al.*, 1990). Deverel *et al.* (1984) observed elevated concentrations of mercury in the shallow groundwater in the SLU at concentrations approaching or exceeding water-quality criteria for protection of freshwater aquatic life (the maximum concentration of total mercury observed in this study was 1,600 ng/L).

Recent water quality monitoring has indicated that, at least in some areas within the SLDFR project area, mercury has accumulated to elevated concentrations in subsurface agricultural drainage water. For example, water quality sampling conducted by Reclamation since 2002 of the Delta Mendota



Canal (DMC) sumps (located along the DMC in the Firebaugh Canal Water District and within the Grassland Bypass Project's Drainage Project Area, i.e., the agricultural lands that participate in the Grassland Bypass Project) has documented significantly elevated concentrations of total mercury in at least some of the DMC sump water currently being pumped into the DMC upstream of the Mendota Pool. Total mercury in water from the DMC sumps has ranged from 200 ng/L to 3,000 ng/L as presented in Table 4 below (USBR 2010). The water quality data for mercury from the DMC sumps is significantly higher than what was estimated and considered in the SLDFR FEIS or the SLDFR Demo Facility DEA.

**Table 4. Summary of total mercury in drainage water from the DMC sumps, 2002-2009**

DMC Sump Site DMC Milepost Units <sup>1</sup>	Sump A&B MP 100.86 ng/L	Sump C MP 102.86 ng/L	Sump D&E MP 104.19 ng/L	Sump F&G MP 105.6 ng/L	Sump H&J MP 107.24 ng/L	Sump K MP 109.50 ng/L
Maximum	2,000	430	580	1,300	1,200	3,000
Minimum	200	190	200	300	670	500
Median	450	300	300	930	940	1,200
Average	659	312	353	959	943	1,353
Number of samples	15	15	15	15	15	15

Data Source: USBR 2010

<sup>1</sup> Nanograms per liter of Total Mercury

In a separate study of avian eggs at an evaporation pond in Westlands Water District, mercury was found to be elevated above toxic levels in some of the eggs collected. In 2002 the Service's Sacramento Fish and Wildlife Office, Environmental Contaminants Division, randomly sampled nine black-necked stilt eggs at the Britz-Deavenport evaporation pond. The mercury concentrations in those eggs ranged from 0.74 to 3.1 µg/g (ppm) dry weight, with a median value of 1.2 µg/g (Skorupa pers comm.; Service unpublished data). Based on data for mallards reported in Heinz (1979), the putative toxic threshold for mercury in avian eggs is 3 µg/g dry weight. In 2002, two of the nine eggs (22 percent) sampled at Britz-Deavenport contained  $\geq 3$  µg/g dry weight mercury.

Preliminary methyl mercury water data collected from the vicinity of the San Luis Drain was provided to the Service in a letter from Dr. Chris Foe, staff scientist of the CVRWQCB in 2005 (Foe 2005). In that letter Dr. Foe noted, "*Regional Board staff has been monitoring methyl mercury concentrations in the San Joaquin watershed for the past two years to identify sources and to characterize concentrations and loads. The highest concentrations in the Basin occur in Mud Slough downstream of the inflow from the San Luis Drain (GBP monitoring site D). Methyl mercury loads in Mud Slough are sufficiently high that they may account for 40-60 percent of the Vernalis load during non-irrigation season. Similar calculations have not been made for the irrigation season as the amount of water removed and returned to the River by water agencies and others is not known. However, Mud Slough concentrations and loads remain high suggesting that the Slough is still a significant source of River methyl mercury. The non-irrigation season loads imply that Mud Slough is responsible for about half the methyl mercury accumulating in fish in the main stem San Joaquin River in winter. The source of the methyl mercury in Mud Slough is not known.*" Table 5 summarizes the preliminary methyl mercury concentrations for the San Joaquin River at Vernalis, and for Mud Slough at site D and the San Luis Drain.



**Table 5. Summary of unfiltered methyl mercury concentrations (ng/L) in the Grassland Bypass portion of the San Luis Drain, Mud Slough at Site D and San Joaquin River at Vernalis (from Foe 2005).**

Date	San Luis Drain at Site B	Mud Slough at Site D (downstream of GBP San Luis Drain outfall)	San Joaquin River at Vernalis
6/14/05	0.302	0.671	0.235
7/13/05	0.648	0.769	0.218
8/9/05	1.150	1.430	0.226
9/12/05	0.846	1.070	0.062

Dr. Foe concluded that, “*The results suggest that methyl mercury concentrations at all three sites are elevated and may constitute a health hazard to wildlife consuming local fish. Methyl mercury mass balance calculations have not yet been made for Mud Slough. Regional Board staff has commenced a mass balance study to better define the primary source(s) of methyl mercury in Mud Slough.*”

Eighteen miles of Panoche Creek (from Silver Creek to Belmont Avenue) and the San Joaquin River (from Bear Creek to the Delta Boundary) are listed on the 2006 Clean Water Act section 303(d) List of Water Quality Limited Segments for mercury impairment (SWRCB 2007). Mercury levels in fish from the lower San Joaquin River and Mud Slough have been found to be elevated (Davis *et al.* 2000; Slotton *et al.* 2000). The principal finding of a CalFed Mercury Study in the San Joaquin Basin is that Mud Slough contributes about 50 percent of the methylated mercury at Vernalis (legal boundary of the Delta) but only 10 percent of the water volume during the non-irrigation season (September to March) (Stephenson *et. al.*, 2005).

Mercury is a trace element with no known essential biological function. Mercury can exist in many forms including elemental form (HgO), dissolved and particulate ionic forms, and dissolved and particulate methylmercury (Gill and Bruland 1990; Vandal et al 1991; Mason and Fitzgerald 1993). Methylmercury may be formed either in the water column or in sediment. Methylmercury is the most toxic and the most bioaccumulated form of mercury. Intestinal absorption of inorganic mercury is limited to a few percent while absorption of methyl mercury is nearly complete (Scheuharnmer 1987). Inorganic mercury appears to have the greatest effect upon the kidneys, while methylmercury is a potent embryo and nervous system toxicant. Methylmercury readily penetrates the blood brain barrier, produces brain lesions, spinal cord degeneration, and central nervous system dysfunctions. The proportion of total mercury which is found as methylmercury in biota increases with trophic level approaching 100 percent at trophic levels 3 and 4. Methylmercury is biomagnified between trophic levels in aquatic systems and in proportion to its supply in water (Wattras and Bloom, 1992). It is appropriate therefore to focus attention on the toxicity of methylmercury, particularly in higher trophic level organisms (Nichols *et al.*, 1999).

Toxic constituents such as mercury have a variety of different modes of action. Combinations may work additively, synergistically, or antagonistically to cause toxic effects. Some chemicals are more likely to cause acute effects, while others are more likely to cause chronic problems through bioaccumulation and food-chain transfer. Examples of chronic effects include mutagenic, carcinogenic, or teratogenic effects, as well as changes in behavior and decreased reproduction (USBR 2006, Appendix G, page G-16). It has been shown that mercury added to a selenium-enriched test diet for mallards increased the amount of selenium stored in the mallards eggs (Heinz and Hoffman 1998). In

addition, the Heinz and Hoffman (1998) study indicated that methylmercury chloride and selenomethionine may have antagonistic effects on adult mallards and synergistic effects on ducklings.

The SLDFR FEIS notes the following with respect to salt disposal and management of evaporation basin salts (Appendix I, pages I-1 – I-2): *“Evaporative concentration of salts could also result in concentration of toxic elements. Water treatment plants are planned to reduce selenium and nitrate levels; however, high levels of elements such as such molybdenum, mercury [emphasis added], nickel, and boron could complicate salt disposal and management of evaporation basin salts. The chemical reduction and lowering of pH associated with selenium removal could also affect the toxicity of other elements in the evaporation basin waters, which in turn could complicate management procedures and increase costs.”* As a result, we recommend that evaporation pond mitigation in the SLDFR FEIS and SLDFR Record of Decision (ROD) be re-evaluated based on actual field measurements of mercury in drainwater from the SLDFR project area and from the treatment effluents of the SLDFR Demo Facility.

According to projections in Table 2, most of the mercury in the drainage effluent from the RO Treatment for the SLDFR Demo Facility will be removed. It is unclear what the projections of post-RO treatment concentrations for constituents (such as mercury) in Table 2 above (Table 2-1 in the SLDFR Demo Facility DEA) are based on, since no actual data on these constituents from the SLDFR pilot studies of treatment and disposal was presented in the SLDFR FEIS or in the Review of Biotreatment Technology completed for Reclamation on SLDFR (Trussell Technologies 2006).

The current extent of mercury contamination in drainage water in much of the SLDFR project area has not been revisited since surveys were done in the 1980's and 1990's. It therefore would be prudent to perform a reconnaissance level survey to determine the extent and severity of mercury contamination in drainage water of the SLDFR project area and revise all appropriate aspects of the SLDFR FEIS/ROD accordingly. The mitigation prescriptions in SLDFR FWCA Report were based solely on effects of selenium to breeding waterfowl and will have to be revisited to consider effects from mercury based on treatment technologies' performance.

## **Conclusion**

As a result of the Environmental Commitments incorporated into the Proposed Action, including those provided in the DEA and Draft FONSI, and in Reclamation's September 19, 2011 and March 13, 2012 Memos, and the short-term nature of the action, the Service concurs with Reclamation's effects determination that the Proposed Action may affect, but is not likely to adversely affect the San Joaquin kit fox and giant garter snake.

However, the Service recommends that Reclamation reinitiate consultation under the Act and FWCA to address among other things, siting of facilities, evaporation pond mitigation acreage, and mitigation monitoring and adaptive management plans during the planning process for a SLDFR full-scale facility in the Westlands central subarea as is anticipated to begin in 2014. Further, as discussed in this memo, the Service believes that new information on the performance of the biotreatment system and evaporation ponds, and on mercury in drainwater, subsequent to the 2006 SLDFR biological opinion and FWCA Report has become available that should be considered for all future SLDFR-related actions. The Service recommends therefore that prior to full-scale implementation of the SLDFR

project within any of the subareas considered in the SLDFR EIS, reinitiation of formal consultation under the Act and revision of the FWCA Report is warranted. The Service additionally encourages Reclamation to conduct a field or lab-scale bioassay study of the SLDFR disposal effluents from the SLDFR Demo Facility prior to full-scale implementation of the SLDFR project (as these waste streams will ultimately be disposed in evaporation basins). Absent a bioassay study, the best available information for analysis of a full-scale SLDFR facility would be the data presented in Appendix B of the SLDFR FEIS which documented twice the bioaccumulative potential that was assumed in the SLDFR FWCA Report and biological opinion. Such an increase in bioaccumulative potential could translate into significant increases in wetland mitigation acreage needed to compensate for increased avian mortality. This magnitude of difference in mitigation would clearly have a bearing on cost and feasibility of potential mitigation actions associated with the SLDFR project.

Our concurrence with the NLAA determination for the SLDFR Demo Facility concludes consultation for this action. If you have questions or concerns regarding this action, please contact Daniel Russell, Thomas Leeman, or Joy Winckel at the letterhead address or at (916) 414-6600.

cc:

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N. Gruenhagen. (2011). Electronic mail transmitting corrected information about the SLDFR Demo Facility and an Administrative Final EA for the project, 11.9.2011.

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D. Hyatt. (2012). Electronic mail transmitting transmits a memorandum providing additional avoidance measures to be incorporated into the Proposed Action and requesting concurrence with their effects determination that the construction and operation of the SLDFR Demo Facility is NLAA the San Joaquin kit fox or the giant garter snake. 4.23.2012.

### **Personal Communication**

Skorupa, J.P. November 13, 2008. Electronic mail summarizing Britz Evap Pond 2002 Stilt Egg Mercury Data. U.S. Fish and Wildlife Service, Division of Environmental Quality, Arlington, VA.

**Appendix A.** List of Questions provided to Reclamation and GE on December 5, 2011 regarding operations and performance of the SLDFR Demo Facility.

USFWS Questions about SLDFR Demo Facility for GE

1. What full-scale projects using ABMet are successfully operating with TDS concentrations in RO Concentrate in excess of 20,000 mg/L? How was "successfully operating" defined in those cases? What constituted success?
2. The water quality projections in Table 2-1 of the Admin Final EA for the SLDFR Demo Project for the RO Reject and Product water concentrations were based on software that analyzes RO output and includes the caveat: "Actual values are likely to vary." What is the anticipated efficiency of RO and ABMet processes at the high TDS concentrations expected with this project? What is the upper limit of TDS that the ABMet bacteria can effectively remove Se?
3. Are there peer-reviewed scientific papers or empirical data documenting the efficacy of the oxidation step using ozone to be employed to reduce organo-selenium in the treated water to ensure that it is converted to inorganic selenate and/or selenite ions prior to discharge? Are there other full-scale projects that have been implemented that have been able to meet the following performance standard for the SLDFR Demo Project?: *"The concentrations of organic selenium species in the treated effluent shall be less than the concentrations of organic selenium species in the influent untreated drainage."*
4. The bottomline performance measure for successful drainage treatment is that algae and invertebrates grown in the product water and biotreatment effluent won't bioaccumulate tissue Se concentrations that would be problematic from a risk assessment perspective for wildlife (and fish if the product water is going to be discharged into waters of the U.S.). How is this bottomline performance measure going to be evaluated in this project? Shouldn't the Pilot Treatment Facility evaluate matrices such as algae, invertebrates, etc. to provide a credible analysis of environmental risk and treatment performance before a full-scale facility with evaporation ponds is built in Westlands?
5. Is GE responsible for the performance of the RO treatment as well as the ABMet biotreatment systems?
6. What improvements in the technologies have emerged since the Phase III of SLDFR pilot studies and retrofit were completed in 2006?
7. What is the methodology that will be used to analyze for selenium in the water effluents and sludge? What lab(s) will be performing these analyses? What are the difficulties associated with the analysis of water and sludge with extremely high concentrations of Se and TDS? Will the Se analyses be conducted on filtered samples? What are the Se detection limits for both the ICP DRC MS and IC ICP MS methodologies? What is the justification for using ICP DRC MS technology instead of the standard hydride generation with atomic absorption that has been used successfully on high concentration Se samples? USGS has tried ICP DRC MS technology for both As and Se and obtained erroneous results. Consequently, for Se analysis, USGS continues to use hydride generation with atomic absorption technology.
8. What is the turnaround time for the Se analyses for the 30-day initial period, and for the 18-month duration of the project?
9. Will the temperature be constant enough to maintain bacterial growth in the winter months?
10. Is there empirical data supporting the prediction that the SLDFR Demo Facility can be running continuously, 24 hours a day, 365 days per year?



11. What is the supplementary Ditch Water RP-1 listed in Table 44 45 00A – *Anticipated Feedwater Quality to Demonstration Treatment Plan* - going to be used for?
12. What influent can be used to meet the ABMet system treatment process performance requirements? Would a test of the ABMet system solely on Supplementary Ditch Water that meets performance requirements be considered sufficient?
13. What happens if the system fails to perform for a 30-day continuous period?
14. Will gases from the biotreatment be monitored? Appendix E of the SLDFR Feasibility Report noted off-gas sampling and analysis is important because: *“1. Determining the content of any gases generated by the biological processes to determine if supplemental off-gas treatment equipment is required for the full scale system. 2. Knowledge of gases would allow Zenon to determine if any special safety precautions would be necessary for operations staff. 3. Knowledge of gases would assist in the selection/evaluation of appropriate materials of construction for the reactor vessel structures, reactor internals and any other equipment associated with the project.”*

**Appendix B.** List of Suggested Environmental Commitments for Construction and Operation of the SLDFR Demo Facility provided to Reclamation on December 21, 2011.

1. Reclamation will commit to track the composition of drainage sump water and consequent waste-streams and sludge waste products for disposal (for selenium, total dissolved solids and drainwater constituents of concern) and quantify daily volumes, concentrations, loads and mass balance to assess the effectiveness and capacity of treatment technologies (as was recommended by Presser and Schwarzbach, 2008, Technical Analysis of In-Valley Drainage Management Strategies for the Western San Joaquin Valley, California, USGS Open File Report 2008-1210). Consistent with the San Joaquin Valley Drainage Program's Final Report (A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley, 1990), drainwater constituents of concern to be tracked in this monitoring program should include selenium (dissolved and total, and speciation), boron, molybdenum, arsenic, total dissolved solids, cadmium, chromium (including the hexavalent form), copper, manganese, nickel, zinc, and nitrates. In addition, based on newer information identifying elevated mercury in some subsurface drainage water (sources: USBR, 2010, Delta-Mendota Canal Water Quality Monitoring Program for Selenium, Salinity and, and Boron; Foe, C., November 14, 2005, Methyl Mercury Concentration in Mud Slough, San Luis Drain, and Refuge Wetlands. Letter from Central Valley Regional Water Quality Control Board, Rancho Cordova, CA, to T. C. Maurer, U.S. Fish and Wildlife Service, Sacramento, CA. 2 pp), we recommend that mercury (including organic forms such as methyl mercury) be included as a constituent of concern and also be tracked in a comprehensive monitoring program for this project.
2. During the first 30 days of operation, Reclamation will provide the Service with monitoring reports from GE within 30 days of receipt. Reclamation will commit to providing the Service with monitoring reports from the SLDFR Demo Treatment Facility for the remaining 17 months on a periodic basis (bi-weekly or monthly).
3. Reclamation will fund and contract for a laboratory scale bioassay study with the biotreatment effluent to establish environmental risk to food webs (i.e., food web modeling) of selenium in treatment effluent (if any).
4. If the monitoring identifies contaminant concentrations in the biotreatment effluent of concern, or if the bioassay identifies bioaccumulation risk, then Reclamation will, in coordination with Panoche Drainage District, fund and implement additional biological monitoring on the San Joaquin River Improvement Project's drainage reuse area to determine whether or not to reinitiate ESA consultation.
5. Prior to the conclusion of the consultation, Reclamation will provide reports to the Service from GE establishing efficacy of the selenium biotreatment technology (e.g., from full scale biotreatment of high TDS waters at Belews and Hyco Lakes) and efficacy of ozonation in

removing selenium and reducing organoselenium to selenate. These reports are needed to fill the data gaps between the 1<sup>st</sup> generation ABMet system documented in the SLDFR Feasibility Report and 3<sup>rd</sup> generation ABMet systems currently in operation.

6. Reclamation will commit to using hydride generation to analyze for selenium since it has been shown to be the most consistent and effective method (Moellmer et al., ICP-MS Analysis of Trace Selenium in the Great Salt Lake, Spectroscopy, January 2007). If Reclamation opts to use ICP DRC MS technology, they should employ octopole reaction cell (ORC) ICP-MS and fund a comparison of this technology with hydride generation technology to confirm accuracy of the methods.
7. Reclamation will revise the project description for the SLDFR Demo Facility to state that all the product water from the SLDFR Demo Facility Treatment Plants would be piped to the San Joaquin River Improvement Project's paspalum grass area, and would not be discharged back into the adjacent drainage ditch linked to the Grassland Bypass Channel. This would facilitate ESA consultation by clearly defining/restricting the action area. This change is based on a November 18, 2011 e-mail from Chris Eacock to Joy Winckel and Ned Gruenhagen. This e-mail transmitted a verbal commitment from Dennis Falaschi of Panoche Drainage District that all the product water from the SLDFR Drainage Treatment Plants would be piped to the paspalum grass area, and would not be discharged back into the adjacent drainage ditch linked to the Grassland Bypass Channel.