

RECLAMATION

Managing Water in the West

Environmental Assessment

Refuge Level 2 Water Exchange between the United States and San Luis and Del Puerto Water Districts Resulting in Additional Incremental Level 4 Refuge Water

EA Number 14-29-MP



**U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Regional Office
Sacramento, CA**

October 2014

Mission Statements

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

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

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List of Acronyms and Abbreviations

AF	Acre-feet
B	Boron
CEQ	Council on Environmental Quality
CVP	Central Valley Project
DOI	Department of the Interior
CVPIA	Central Valley Project Improvement Act
Delta	Sacramento-San Joaquin Delta
Districts	San Luis and Del Puerto Water Districts
DWR	Department of Water Resources
EA	Environmental Assessment
FONSI	Finding of No Significant Impact
GEA	Grassland Ecological Area
GGS	Giant garter snake
GWD	Grassland Water District
GRCD	Grassland Resource Conservation District
IL4	Incremental Level 4
ITA	Indian Trust Assets
L2	Level 2 water supply
L4	Level 4 water supply
mg/L	Milligrams per Liter
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NWR	National Wildlife Refuges
PEIS	Programmatic Environmental Impact Statement
Reclamation	Bureau of Reclamation
Se	Selenium
SHPO	State Historic Preservation Officer
TDS	Total Dissolved Solids
ug/L	Micrograms per liter
USFWS	U.S. Fish and Wildlife Service

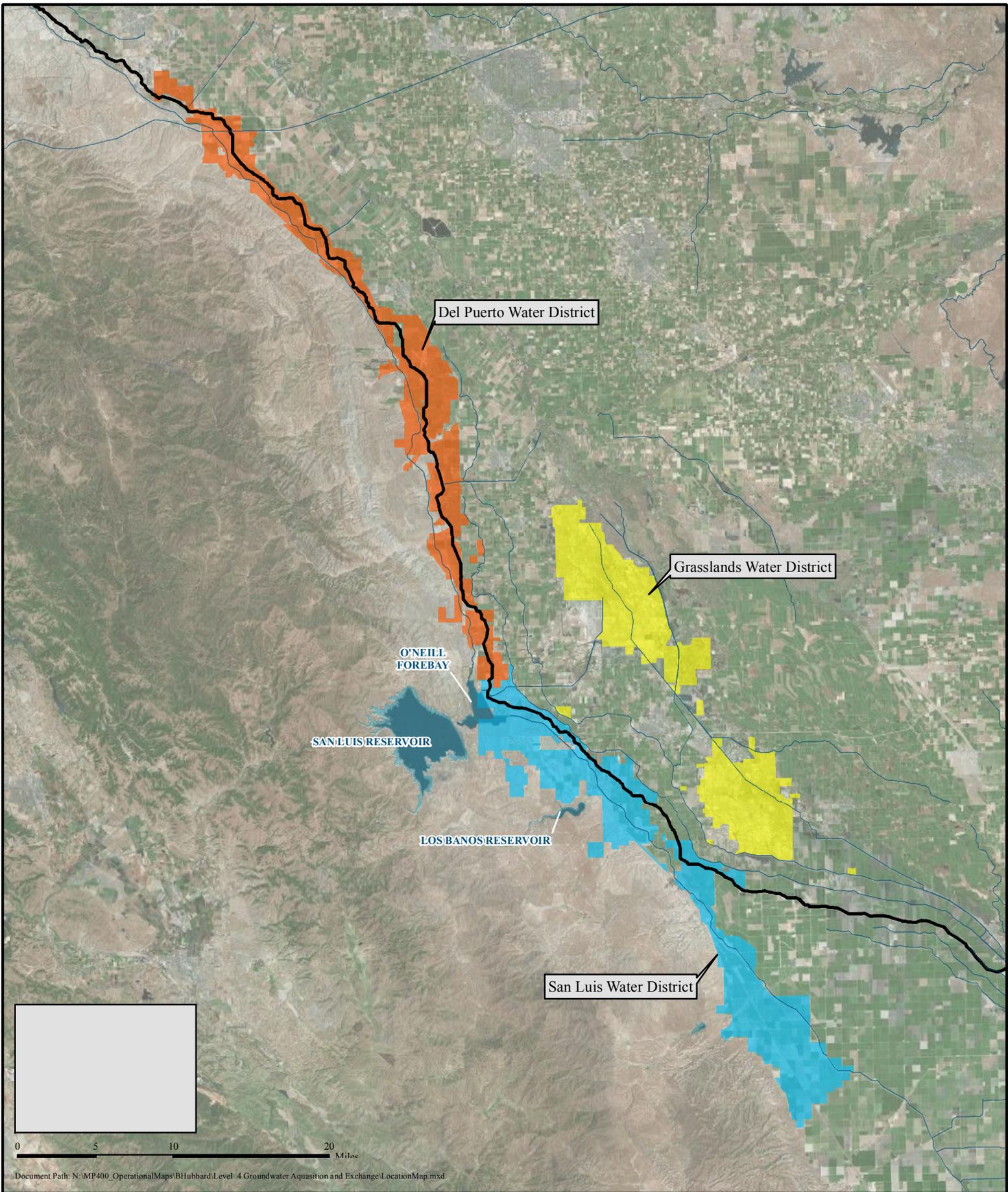
Section 1 Introduction

This Environmental Assessment (EA) has been prepared by the Bureau of Reclamation to evaluate and disclose any potential environmental impacts associated with Reclamation's exchange of up to 2,000 acre-feet (AF) of groundwater for up to 1,000 AF of Level (L) 2 water with the San Luis and Del Puerto Water Districts (Districts). This water exchange is authorized under Section 3406(d)(2) and 3406(b)(3) of the Central Valley Project Improvement Act (CVPIA).

A Report on Refuge Water Supply Investigations (Reclamation 1989) describes water needs and delivery requirements for National Wildlife Refuges (NWR), State Wildlife Management Areas, and the Grassland Resource Conservation District (GRCD) in the Central Valley of California. In this report, the average annual historical water supplies were termed "Level 2" (L2), and the supplies needed for optimum habitat management were termed "Level 4" (L4). Section 3406(d)(1) of the CVPIA requires the Secretary of the Interior to provide firm delivery of L2 water supplies to certain wildlife refuges in the Central Valley of California. Section 3406(d)(2) of the CVPIA further directs the Secretary to provide additional water supplies to meet Incremental L4 (IL4) needs through the acquisition of water from willing providers. This EA focuses on the potential impacts of exchanging up to 2,000 AF of groundwater developed by the Districts and delivered to Grassland Water District (GWD) for up to 1,000 AF of L2 water for the Districts between October 2014 and February 28, 2015 to meet L2 and IL4 refuge water needs.

GRCD is one of the wetland areas in the San Joaquin Valley that is an authorized recipient of CVPIA refuge water supplies. GWD manages and delivers water to landowners within the GRCD. The combined area of the GWD and GRCD contains approximately 60,000 acres of privately owned wetlands located north, east and south of the City of Los Banos in Merced County, California (Figure 1).

This exchange would benefit Refuge water supplies within GCRD and agriculture supplies within the Districts.



Document Path: N:\MP400_Operational\Maps\BHubbard\Level 4 Groundwater Aquasition and Exchange\LocationMap.mxd

Refuge Level 2 Exchange with San Luis and Del Puerto Water Districts Water District Boundaries

FIGURE 1

1.1 Need for the Proposal

Reclamation is responsible for providing L2 water to 19 designated federal, state, and privately owned/managed wetlands and wildlife areas (refuges), including the GRCD. L2 water supplies are primarily provided from Central Valley Project (CVP) supplies. The Proposed Action is needed to provide additional IL4 water supplies to GRCD lands to provide habitat for migratory waterfowl..

1.2 Resources Analyzed in Detail

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 environmental resources:

- Surface Water Resources
- Groundwater Resources
- Water Quality
- Biological Resources

Impacts to the following resources were considered and found to be minor or absent. Brief explanations for their elimination from further considerations are provided below:

- Indian Sacred Sites: The Proposed Action is not on federal lands, and will neither affect nor prohibit access to and ceremonial use of Indian sacred sites.
- Indian Trust Assets: There are no Indian reservations, rancherias, or allotments in the Proposed Action area. The Proposed Action does not have the potential to affect Indian Trust Assets.
- Environmental Justice: No significant changes in agricultural communities or practices would result from the Proposed Action, other than potential changes to individual irrigation structures. These changes are not likely to have affects to any individuals or populations within the action area. Accordingly, the Proposed Action would not have disproportionately negative impacts on low-income or minority individuals or populations.
- Cultural Resources: The Proposed Action involves the acquisition of water from existing facilities with no new ground disturbance, modifications to facilities, or other potential impacts to cultural resources. Pursuant to the regulations at 36 CFR Part 800.3(a)(1), the Proposed Action has no potential to cause effects on historic properties and will result in no impacts to cultural resources. As such, Reclamation has no further obligations under Section 106 of the National Historic Preservation Act (NHPA).

Section 2 Proposed Action & Alternatives

2.1 No Action Alternative

The No Action Alternative would consist of Reclamation not approving the exchange of L2 water supplies from GWD to the Districts. The proposed 2,000 AF of groundwater to be developed as part of this Proposed Action would not be delivered to GRCD this year. The Districts would not receive L2 water supplies (equivalent to 50% of the 2,000 AF delivered to GRCD) delivered by Reclamation to help meet agricultural water needs.

2.2 Proposed Action

The Districts propose to fund the costs associated with the delivery of groundwater supplies from three private wells located in GWD (up to 2,000 AF) in exchange for refuge L2 water supply (up to 1,000 AF). The developed groundwater would discharge directly into the GWD conveyance system (Santa Fe Canal and Standard Ditch/San Luis Canal) and be delivered to the private lands of the GRCD to meet a component of its L2 and IL4 water supply demands. GWD will provide all the oversight and coordination for delivery of the groundwater.

2.2.1 Well Locations

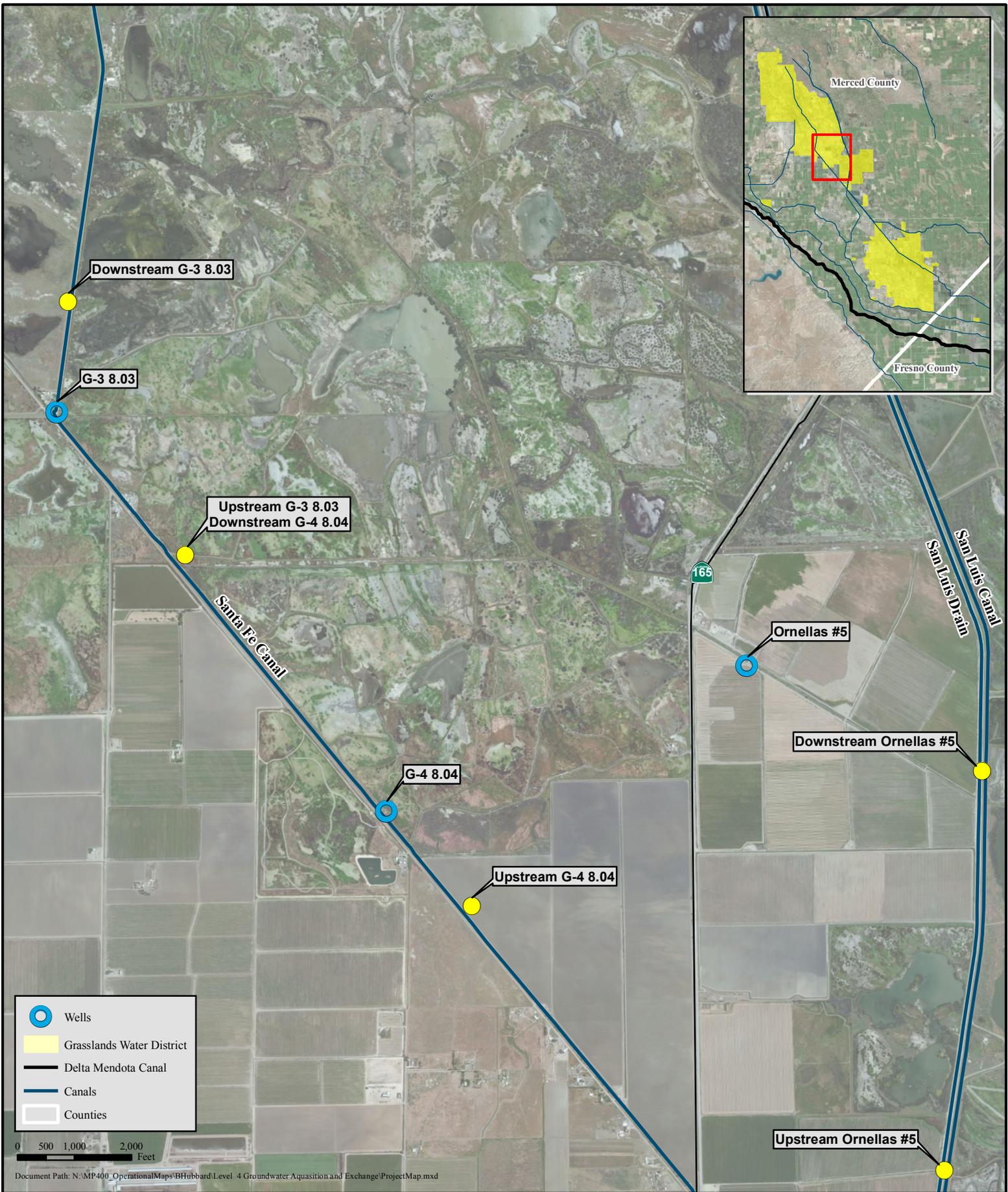
The location of the wells and the land within GWD that will receive the groundwater are shown in Figure 2. The approximate GPS coordinates for the three wells are:

Well 8.03 (G-3) = Latitude: 37.1435; Longitude: 120.8723.

Well 8.04 (G-4) = Latitude: 37.1238; Longitude: 120.8533

Well Ornellas (OR)-5 = Latitude: 37.1306; Longitude: 120.8314

Once GWD begins receiving scheduled deliveries of its L2 water supply in the fall 2014, it is proposed that the Districts fund the cost to develop and deliver up to 2,000 AF of groundwater in exchange for up to 1,000 AF of L2 water during the GRCD L2 delivery period this water year (2014/15). For every 2 AF of groundwater delivered to GWD the Districts will receive 1 AF of Refuge L2 water. The L2 exchange water will be made available to the Districts in the O'Neill Forebay of the CVP facilities each month following the delivery of groundwater to GWD. This 2:1 exchange will result in a net increase of up to 1,000 AF of IL4 refuge water at no cost to Reclamation and up to 1,000 AF of new water supply for the Districts.



Refuge Level 2 Exchange with San Luis and Del Puerto Water Districts
 Well Sites Utilized in Grassland Water District

FIGURE 2



The Districts will enter into an agreement with Reclamation for the exchange of water. The Districts, in cooperation with GWD, will be responsible for all water quality monitoring associated with the development of these groundwater supplies and insure that all water quality monitoring criteria and standards identified in the Monitoring Plan (Appendix A) are met. GWD will provide monthly volumetric totals to the Districts and Reclamation.

GWD started taking delivery of its L2 water in the latter part of September 2014 and plans to receive L2 water deliveries through the end of the water year (February 28, 2015). When the exchange agreement with Reclamation is executed and GWD starts taking delivery of its scheduled L2 water the exchange can be initiated. It is anticipated the wells will be operated for exchange purposes through the end of February 2015.

2.2.2 Groundwater Pumping

The well owner would be responsible for all well maintenance and for pumping groundwater into GWD’s facilities at times when GWD requests such water. GWD would have access to the wells in order to test water quality and monitor flow. If water quality parameters do not meet those set forth in the monitoring plan or are unacceptable to GWD, GWD would notify Reclamation and the exchange would cease until water quality improved.

Table 1: Well Information

Well	Well Depth (feet)	Output (cu.-ft./sec)	TDS (mg/L)	Boron (mg/L)	Selenium (ug/L)
G-3 8.03	300	3.4	1,050	1.1	ND
G-4 8.04	310	3.6	341	0.66	ND
OR-5	450	4.5	1,680	3.3	ND

2.2.3 Monitoring

Project monitoring would include metering of the flows received from each groundwater well. Flows would be metered at each wellhead and at the well discharge pipes into the GWD conveyance canals.

To minimize any potential for surface water quality degradation associated with the utilization of groundwater in the GRCD to supplement IL4 water supply, water quality monitoring would consist of both surface and groundwater quality monitoring. Surface water quality monitoring would consist of both continuous and instantaneous sampling. Monitoring will include sampling from upstream locations to determine the base flow constituent concentrations, a downstream location, and at each wellhead. If threshold surface water quality objectives are exceeded at any time, corrective actions would be

implemented within 24 hours, including blending groundwater with surface water supplies and reducing or ceasing well pumping operations until water quality objectives can be met.

In an effort to minimize any potential significant impact on groundwater aquifers associated with the development of groundwater as part of this Proposed Action, groundwater levels will be measured prior to beginning pumping operations for the Proposed Action using an electronic water level meter referenced to a GPS coordinate and elevation at each wellhead. Subsequently, well drawdown related to the operation of each well will be measured in the middle of the proposed pumping period, and at the end of the pumping period prior to well shutdown. Groundwater recovery will be measured approximately 24 hours after pump shutoff. Groundwater level data will be recorded and included in GWD's annual reports to Reclamation for review. If the mid-pumping period groundwater level data indicates a significant decline in groundwater levels in the vicinity of the proposed wells, different from the levels of decline typically seen during operation of GWD's Incremental Level 4 Pilot Project wells, and if any such decline is not directly attributable to a cause other than the operation of the proposed wells during the Proposed Action pumping period, GWD will modify or terminate pumping to avoid any significant adverse groundwater impacts. GWD will immediately respond to any complaints received from third parties, and will take all measures necessary to avoid third party well impacts.

To minimize any potential impacts on land subsidence associated with cumulative groundwater pumping in the Delta-Mendota groundwater sub-basin, the GWD and GRCD will collaborate with and participate in the established land subsidence monitoring programs of the San Luis and Delta Mendota Water Authority and Central California Irrigation District. The Proposed Action wells are 300 to 450 feet deep and pump groundwater from above the Corcoran Clay, which has not been associated with land subsidence. Significant land subsidence has not been documented within the GRCD.

More detailed monitoring information is located in the Project Monitoring Plan (Appendix A).

Section 3 Affected Environment and Environmental Consequences

The Districts are located on the west side of San Joaquin, Stanislaus, Merced and Fresno counties and GWD and GRCD are located in Merced County (Figure 1). The counties are bounded by the Sierra Nevada Mountains to the east and the Pacific coastal range to the west. The project region is characterized by flat valley lowland wetlands and agricultural lands, with a climate that is cool and moist in the winter and hot and dry in the summer.

The 58,000 acre GRCD is located in western Merced County. The northern division of the GRCD consists of approximately 38,000 acres and is located approximately 2.5 miles east of the town of Gustine and approximately 2.5 miles north of the City of Los Banos. The northern portion of the GWD is encompassed by the GRCD.

The GRCD has primarily been managed as a seasonally flooded wetland to provide for the habitat needs of migratory waterfowl and associated species. The GRCD provides habitat for a variety of bird species, including ducks, geese, shorebirds, coots, and wading birds. Black-necked stilts, sandpipers, dunlins, and dowitchers are the dominant shorebird species.

3.1 Surface Water Resources

3.1.1 Affected Environment

CVPIA L2 and IL4 water is provided by Reclamation contract 01-WC-20-1756 signed January 19, 2001, to provide firm water supplies to refuge lands south of the Delta. The total amount of CVPIA Level 4 water allocated to GWD for delivery to the GRCD is 180,000 acre-feet per year (125,000 L2 and 55,000 IL 4). CVP water is delivered to the GRCD and other south-of-Delta refuges from water pumped from the Delta by the Jones Pumping Plant and conveyed via the Delta Mendota Canal to the Mendota Pool in the San Joaquin River. A series of canals and ditches convey CVP water through the GRCD.

GWD also delivers IL4 water supplies to the GRCD from a variety of sources. Historically, Reclamation has made annual purchases of up to 49,000 AF of IL4 water from the San Joaquin River Exchange Contractors (SJREC). Reclamation also acquires up to 10,000 AF of groundwater from wells that are within or in close proximity to the GRCD as part of an ongoing pilot project.

Within GWD and GCRD, a large network of surface water conveyance facilities exists to provide water to private and public lands. The Santa Fe Canal would be utilized as the conveyance facility to deliver groundwater from two wells (G-3 8.03 and G-4 8.04) and Well G-5 8.05 will discharge into the Standard Ditch and the groundwater will be delivered to meet demands off the Standard Ditch and San Luis Canal. Total flow in the Santa Fe Canal will range from approximately 40 cubic-feet per second (cfs) to 450 cfs during the Proposed Action. Total flow in the San Luis Canal will range from approximately 40 cubic-feet per second (cfs) to 100 cfs during the Proposed Action.

3.1.2 Environmental Consequences

No Action

Under the no action alternative, Reclamation would not approve the exchange of surface water for groundwater from the three privately owned wells within the GRCD. Groundwater would not be delivered via the Santa Fe Canal and San Luis Canal to

GRCD to help meet Incremental Level 4 refuge water needs. The total available water supply for the GRCD refuge this year would remain below Level 4 water needs, and the risk of avian disease outbreaks would remain extremely high.

Proposed Action

The Proposed Action would result in no substantial change or impact to CVP operations, or to Delta pumping by the CVP. The acquired water would be delivered to GWD using existing conveyance facilities, namely Santa Fe and San Luis Canals. Implementation of the monitoring program (Appendix A) would ensure that conveyance of water under this Proposed Action would not adversely impact existing water supplies or water quality. The Proposed Action would not adversely impact water conveyance facilities or activities within GWD.

Cumulative Impacts

No adverse impacts to surface water resources would result from implementation of the Proposed Action, therefore, the Proposed Action would not contribute to cumulative impacts to the resource.

3.2 Groundwater Resources, Geologic Resources, and Water Quality

3.2.1 Affected Environment

The groundwater wells are located in the Delta-Mendota subbasin of the San Joaquin Groundwater Basin. Groundwater in the Delta-Mendota subbasin typically occurs in three water-bearing zones. These include the lower zone, which contains confined fresh water in the lower section of the Tulare Formation, an upper zone which contains confined, semi-confined, and unconfined water in the upper section of the Tulare Formation and younger deposits, and a shallow zone which contains unconfined water within about 25 feet of the land surface (Davis 1959). The estimated specific yield of this subbasin is 11.8 percent (based on DWR San Joaquin District internal data and Davis 1959). (DWR Bulletin 118)

Groundwater flow was historically northwestward parallel to the San Joaquin River (Hotchkiss 1971). Recent data (DWR 2000) show flow to the north and eastward, toward the San Joaquin River. Based on current and historical groundwater elevation maps, groundwater barriers do not appear to exist in the subbasin. (DWR Bulletin 118)

Changes in groundwater levels are based on annual water level measurements by DWR and cooperators. Water level changes were evaluated by Quarter Township and computed through a custom DWR computer program using geostatistics (kriging). On average, the subbasin water level has increased by 2.2 feet from 1970 through 2000. The period from 1970 through 1985 showed a general increase, topping out in 1985 at 7.5 feet above the 1970 water level. The nine-year period from 1985 to 1994 saw general declines in groundwater levels, reaching back down to the 1970 groundwater level in

1994. Groundwater levels rose in 1995 to about 2.2 feet above the 1970 groundwater level. Water levels fluctuated around this value until 2000. (DWR Bulletin 118)

The groundwater in this subbasin is characterized by mixed sulfate to bicarbonate types in the northern and central portion with areas of sodium chloride and sodium sulfate waters in the central and southern portion. Total Dissolved Solids (TDS) values range from 400 to 1,600 mg/L in the northern portion of the subbasin and from 730 to 6,000 mg/L in the southern portion of the subbasin (Hotchkiss 1971). The Department of Health Services (DHS), which monitors Title 22 water quality standards, reports TDS values in 44 public supply wells to range from 210 to 1,750 mg/L, with an average value of 770 mg/L. A typical range of water quality in wells is 700-1,000 mg/L. (DWR Bulletin 118)

Groundwater supplies in the region are declining due to a long-term overdraft condition caused by over-pumping. However, due to reliable surface water deliveries to the refuges in the area and the neighboring SJREC, the groundwater level in the vicinity of the proposed wells remains stable and the temporary pumping of the wells for refuge water purposes is not expected to impact local groundwater resources (GWD 2011).

Land subsidence due to groundwater withdrawal is triggered by decreases in pore pressure in a confined aquifer system containing clay layers (typically montmorillonite or kaolinite clay). The decrease in pore pressure increases the effective stress on the aquifer skeleton. If this effective stress exceeds the maximum stress to which the aquifer skeleton has been subjected in the past, the clay layers can undergo permanent compaction (USGS 2009).

Elastic subsidence occurs in response to seasonal changes in pore pressure within the aquifer system. Elastic subsidence is a characteristic of any confined aquifer system and does not result in permanent compaction (USGS 2009).

The groundwater quality within the Delta-Mendota sub-basin varies with location and depth both within the upper aquifer above the Corcoran Clay and in the lower aquifer beneath the Corcoran Clay. Groundwater quality in the GRCD is typically characterized by total dissolved solids (TDS), selenium (Se), and boron. Based on several years of data under the existing IL4 Pilot Program, the primary constituents of concern for refuge water supplies are TDS and selenium.

The water quality of the receiving waterway is also a relevant factor. Under the proposed action Monitoring and Mitigation Plan (Appendix A), groundwater entering GWD's conveyance system may require dilution or mixing with surface water to ensure that concentrations of TDS do not increase by more than 200 milligrams per Liter (mg/L) downstream of the groundwater discharge, and selenium concentrations do not exceed 0.0020 mg/L in the conveyance facility. Blending with better quality water supply ensures compliance with Total Maximum Daily Load regulations and refuge water quality requirements. Concentrations of all constituents are also monitored at each wellhead. Groundwater that exceeds 0.0050 mg/L of selenium at the

wellhead will not be utilized, regardless of the resulting blended concentration in GWD's conveyance system.

3.2.2 Environmental Consequences

No Action

GWD would not deliver groundwater via the Santa Fe Canal and Standard Ditch/San Luis Canal to GRCD to help meet Incremental Level 4 refuge water needs. The volume of groundwater pumping within the GRCD would remain unchanged.

Proposed Action

Groundwater would be produced from the three electrically powered privately owned wells within the GRCD for use within GRCD. Groundwater would be pumped in an amount up to 2,000 AF between late October 2014 and the end of February 2015 (four months). This four-month period coincides with the highest demand period for refuge water supply and would ensure that blending with surface water would be maximized. The actual amount of groundwater produced would be dependent on the productivity of the wells and other factors, such as water quality and groundwater drawdown. All groundwater produced by the production wells would be discharged into the Santa Fe Canal and the San Luis Canal (via the Standard Ditch) and mixed with surface water for dilution (if necessary). All groundwater produced during the project would be used for refuge management purposes at GRCD. Pumping would only occur if monitoring data indicates water quality and water levels are suitable for refuge use.

GWD will monitor groundwater depths at the three wells. GWD will measure groundwater depths 24 hours prior to pumping, and then measure again at the end of the pumping period. GWD will then take another measure of groundwater depth 24 hours after the pumping period ends to evaluate the recovery time of the groundwater. GWD staff will conduct the tests.

The three major constituents of concern are salinity (measured in TDS), boron and selenium. GWD will closely monitor water quality at the three wells during the Proposed Action. If the water quality data indicates that the use of a well(s) may adversely impact water quality, the mitigation measures described below (and incorporated into the Proposed Action) will be implemented. If groundwater is found to contain constituent concentrations above the Central Valley Regional Water Quality Control Board's (CVRWQCB) surface water thresholds, groundwater will be blended with higher quality surface water upon discharge into flowing conveyance channels, effectively reducing concentrations below the thresholds outlined below, or the well production rate will be reduced or curtailed for purposes of the Proposed Action until flow conditions improve and water quality objectives can be achieved. The mitigation measures below will ensure that the groundwater supply developed during this Proposed Action will not adversely impact surface water quality. If the monitoring indicates that threshold values are exceeded, mitigation measures will be implemented within 24 hours of identifying an exceedance.

Water Quality Mitigation Measures

GWD will not accept water from any of the subject wells if any of the wells exceed the following values:

- Maximum of 5.0 µg/L for selenium

GWD will modify or cease wellhead operation until flow conditions improve if any of the following downstream water quality thresholds are exceeded:

- Maximum increase of 200 mg/L TDS upstream to downstream per well
- Maximum of 2.0 µg/L for selenium

In the event that the water from any of the wells increase TDS levels in GWD's conveyance downstream from a wellhead by more than 200 mg/L, the well production rate will be reduced or operation curtailed for Proposed Action purposes until flow conditions improve and downstream water quality objectives can be achieved.

Monitoring of downstream locations will determine the combined flow and chemistry of the blended water. The sites shall be adequate distance from the well discharges to assure proper blending for grab sample collection. All water quality data will be kept at GWD's office. As soon as practical (generally within 7 days of GWD's receipt of information from the water quality testing laboratory), GWD will ensure that Reclamation receives electronic copies of the complete data reports submitted by the laboratory. GWD will also provide a monthly water quality summary report, including volumetric data on wellhead production, within 60 days of sample collection. All data will also be recorded and included in GWD's annual reports to Reclamation for review. Water quality data and reports will also be provided to the CVRWQCB at least once per year. GWD will provide Reclamation with a monitoring report at the end of the Proposed Action. The report will describe, among other things, the results of GWD's monitoring efforts (See Appendix A, Monitoring Program).

Cumulative Effects

When added to past, present, and future foreseeable action, the proposed action would contribute a minor increase in groundwater production in the general vicinity for four months. Private wells in and near the project area would continue to utilize groundwater during the proposed action, however, local groundwater use would be low since the period of the proposed action is during the non-irrigation season. Pumping would not affect the lower aquifer system below the Corcoran Clay, and it is not anticipated that pumping during the Proposed Action would substantially impact the upper aquifer system.

The incremental impact of pumping up to 2,000 acre-feet under the Proposed Action when added to the pumping that occurs at the 2014 IL4 Groundwater Acquisition Project wells and the GWD IL4 Pilot Project wells would contribute a minimal increase to groundwater pumping from above the Corcoran Clay during the four month proposed action. This cumulative impact would not be substantial because groundwater levels would be monitored for drawdown to avoid adverse impacts.

Monitoring has indicated pumping of up to 10,000 acre-feet from the Pilot Project wells since 2008 has not had a negative impact on groundwater elevations (GWD 2011; GWD 2012; Reclamation 2014).

The refuge groundwater production period would not occur during the irrigation season and would be unlikely to occur simultaneous with significant pumping of any local agricultural wells. The project wells would only contribute up to approximately 17 acre-feet/day maximum for the four month period. This additional amount of pumping would not substantially impact groundwater resources.

Water quality analyses were conducted on samples taken from the three project wells. A summary of the analysis reports is shown in Table 1. Selenium was not detectable in all of the wells. Water quality monitoring and mitigation measures associated with this project, the IL4 Pilot Project, and the 2014 GWD Level 4 Groundwater Acquisition Project will ensure that cumulative impacts to water quality within the GRCD are less than significant. Under the Proposed Action, impacts to water quality would be insignificant and continual monitoring would occur along with any follow-on actions under the Project Monitoring Plan. Therefore, the Proposed Action would not contribute to cumulative impacts to water quality.

3.3 Biological Resources

3.3.1 Affected Environment

Wetlands

The wetlands of GRCD are maintained primarily by surface water and water conveyance infrastructure is in place to service each of the numerous ponds or cells. Low lift pumps are located along GWD's conveyance canals to facilitate water conveyance to the higher elevations of the GRCD. In GRCD, wetland habitats consist of seasonally flooded marshes, including moist soil impoundments, and permanent ponds and summer water. Vernal pools or seasonal wetlands occur within the GRCD.

Seasonally flooded marsh is by far the most numerous and diverse of the wetland habitat types on the state and federal refuges and private wetland areas of the San Joaquin River Basin. Seasonal wetlands are inundated fields or ponds that are managed primarily to grow seed and to produce invertebrates for migratory waterfowl, shorebirds and other wetland-dependent wildlife. These wetlands are usually flooded from October through March, and are dry for the rest of the year except for summer irrigation.

The diversity of seasonal wetlands is the product of a variety of water depths that result in an array of vegetative species that, in combination, provide habitat for the greatest number of wildlife species throughout the course of a year. Through the fall and winter, seasonally flooded marshes are used by large concentrations of

waterfowl and smaller numbers of egrets, herons, ibis, and grebes, to name a few. In addition, a full complement of raptors takes advantage of the water bird prey base. Water is removed in the spring, so large concentrations of shorebirds use the shallow depth and exposed mudflats on their northern migration. Seed-producing plants germinate and grow to maturity on the moist pond bottoms during the springs and early summer. Wetland flooding in the fall makes this food available to early migrant waterfowl and other waterfowl.

Moist soil impoundments are similar to seasonally flooded marshes, except that they are irrigated in the summer to improve production of water grass, sprangletop, and swamp timothy, the primary food species for waterfowl. Moist soil impoundments are typically irrigated during the summer to bolster plant growth and to enhance seed production. During irrigation periods, these units are often used by locally nesting colonial water birds (egrets, herons). Once flooded, these units provide an abundant food source for waterfowl. In addition, a number of wading bird species frequent them throughout the year.

Semi-permanent and permanent wetlands provide wetland habitat for year-round and summer resident species. Semi-permanent wetlands are flooded for 8 or months of the year, while permanent wetlands remain flooded throughout the year. Characterized by both emergent and submergent aquatic plants, semi-permanent and permanent wetlands provide brood and molting areas for waterfowl, secure roosting and nesting sites for wading birds and other over-water nesters, and provide feeding areas for species like cormorants and pelicans.

Riparian

There are no riparian habitats that occur in the Proposed Action area or near the water delivery areas.

Developed/Disturbed

Developed and disturbed areas include major roads, highways, and buildings and structures within more urban areas, but also facilities and access roads which are located throughout the GRCD near each well location.

Wildlife

The following list of federally listed, proposed and candidate species potentially occurring in GWD was obtained on September 9, 2014 by accessing the USFWS Database. The list also includes State listed, proposed and candidate species potentially occurring in GWD area obtained by accessing the California Department of Fish and Game California Natural Diversity Database/Rarefind (CNDDB/Rarefind) on September 9, 2014.

The following list is for the San Luis Ranch and Los Banos 7 ½ minute U.S. Geological Survey quadrangles:

Invertebrates

Branchinecta conservatio

Conservancy fairy shrimp (FE)

Critical habitat, Conservancy fairy shrimp (X)

Branchinecta longiantenna

Critical habitat, longhorn fairy shrimp (X)

Longhorn fairy shrimp (FE)

Branchinecta lynchi

Critical habitat, vernal pool fairy shrimp (X)

Vernal pool fairy shrimp (FT)

Desmocerus californicus dimorphus

Valley elderberry longhorn beetle (FT)

Lepidurus packardi

Critical Habitat, vernal pool tadpole shrimp (X)

Vernal pool tadpole shrimp (FE)

Fish

Hypomesus transpacificus

Delta smelt (FT) (ST)

Oncorhynchus mykiss

Central Valley steelhead (FT) (NMFS)

Amphibians

Ambystoma californiense

California tiger salamander, central population (FT)

Rana aurora draytonii

California red-legged frog (FT)

Reptiles

Gambelia (=Crotaphytus) *silae*

Blunt-nosed leopard lizard (FE) (SE)

Thamnophis gigas

Giant garter snake (FT) (ST)

Mammals

Dipodomys nitratooides exillis
Fresno kangaroo rat (FE)

Vulpes macrotis mutica
San Joaquin kit fox (FE) (ST)

Plants

Chamaesyce hooveri
Critical habitat, Hoover's spurge (X)
Hoover's spurge (FT)

FE: Listed as Endangered under the ESA.
FT: Listed as Threatened under the ESA.
X: Critical Habitat designated for this species
SE: Listed as Endangered under the CESA
ST: Listed as Threatened under the CESA

Giant Garter Snake

The giant garter snake (GGS) inhabits wetland habitats and vegetated permanent water channels in scattered subpopulations in the Central Valley from Butte County in the north to Fresno County in the south. It is believed extirpated from the vicinity of Buena Vista and Tulare Lakes south of Fresno County. Giant garter snakes are present within the GRCD, primarily within the Volta Wildlife Area.

Giant garter snakes are always found in close proximity to permanent or semi-permanent water with vegetated perimeters. The GGS is an aquatic feeder specializing in capturing small fish and frogs in or under water. The giant garter snake spends the winter in upland retreats above the high water level. As discussed further below, the proposed action is not expected to impact this species and its habitat.

Aleutian Canada Goose, Bald Eagle, Peregrine Falcon, and Yellow-Billed Cuckoo

The Aleutian Canada goose, Bald Eagle, Peregrine Falcon, and Yellow-Billed Cuckoo are occasional visitors to the project area. The project would provide additional loafing, foraging, and roosting sites within the GRCD for Aleutian Canada Geese, Bald Eagles, and Peregrine Falcons. There is no suitable riparian habitat within GRCD for the Yellow-billed Cuckoo.

Swainson's Hawk

This species is the most migratory of all North American buteos. It breeds and summers in the arid and semiarid regions of western North America and winters on the pampas of Argentina. The breeding population in California has declined by an estimated 90 percent. In 1979, the breeding population in California was estimated at 375 pairs. This species arrives in the vicinity of the North Grasslands Wildlife Area and Los Banos Wildlife Area in late February to early March each year, and nests within an intermix of trees. Trees commonly used for nesting in this area are cottonwoods, willows, and valley oaks. The principal foods in the Central Valley are meadow mice and small birds.

Use of the area by Swainson's hawk coincides with the time of year when most of the seasonal wetlands have been allowed to dry for their annual growing season. Likewise, this species migrates south prior to the seasonal wetlands being flooded for wintering wildlife populations arriving in the fall.

Based upon The California Natural Diversity Database records and observations by CDFW staff, no known Swainson's hawk nest sites occur within the GRCD Comprehensive Management Plan project area. Nest sites do occur along the San Joaquin River, which is not located in the Proposed Action area. Swainson's hawks are featured species in the GRCD management plan and would benefit from the proposed action. Grassland foraging areas and potential nest trees would not be disturbed.

San Joaquin Kit Fox

The San Joaquin kit fox, a State-listed threatened and Federally-listed endangered species, is a small nocturnal canid which now occurs in scattered populations from Contra Costa County south to Kern County. Historically, this species occupied extensive areas of semiarid lands in the San Joaquin Valley. Flat topography in valley bottoms with valley sink scrub, valley saltbush scrub, interior coast range saltbush scrub, nonnative grassland and alkali playa plain communities (described in Holland, 1986) are the typical habitat, but substantial populations have always inhabited the surrounding low foothills where slopes do not exceed 40 degrees (O'farrell 1983). Agricultural, industrial, and urban developments have caused rapidly increasing rates of habitat loss.

The San Joaquin kit fox is an obligate year-round burrow dweller which feeds largely upon lagomorphs and kangaroo rats (but would utilize whatever prey is locally abundant). Numerous dens are excavated and inhabited in the course of a year and individuals may cover great distances while foraging and/or dispersing.

The San Joaquin kit fox is considered here because of the potential foraging habitat (irrigated pasture and seasonally flooded grassland and alkali sink scrub). No known active or potential kit fox dens have been observed within the project area.

3.3.2 Environmental Consequences

No Action

Conditions would remain the same as existing conditions if no action were taken. There would be no new impacts to wildlife, including threatened and endangered species, their critical habitat, or general habitat types.

Proposed Action

The pumping and conveyance of groundwater within GRCD would not affect aquatic species or their habitat. Habitat for Delta smelt, Chinook salmon (spring and winter run), central valley steelhead, or green sturgeon would not be affected because no construction or flow modifications are proposed on natural waterways. There would be no effect to federally listed fish species mentioned above and there would be no modification of critical habitat for the species as a result of the Proposed Action.

The addition of up to 2,000 acre-feet of groundwater supplies to GWD's conveyance system during the proposed period of operation will not adversely affect the species since overall water deliveries during this period will be less than normal.

Indirect impacts are not expected to occur from water quality affecting the prey base of the GGS. Groundwater from existing production wells would be pumped into the Santa Fe Canal and San Luis Canal and delivered downstream throughout the GRCD. This would occur during a period when the GGS is not active, and no effects to GGS are anticipated.

Water is expected to be of suitable quality for other aquatic species that use wetland areas within the GRCD. Water quality would be continually tested during the five-month project at the outflow of the production wells and immediately upstream and downstream of the proposed well locations. If water quality is determined to be of unsuitable quality, pumping into the GWD conveyance system would be modified or curtailed.

Overall, the Proposed Action would provide a benefit to waterfowl, shorebirds, and raptors, as the water would be used for refuge management to sustain wetland habitats. The Proposed Action may benefit GGS in that it would provide additional habitat to offset extremely dry conditions.

The Proposed Action will have no effect on any special status species. The Proposed Action would not change how water is managed. Also, with implementation of the Proposed Action, CVP operations would be consistent with existing operating and conveyance agreements. The Proposed Action is consistent with the actions covered by previous analyses and would not result in any changes from existing operations or conditions.

Cumulative Impacts

Implementation of the Proposed Action would not result in effects to biological resources, and therefore could not contribute to cumulative impacts.

Section 4 Consultation and Coordination

4.1 Public Review

Reclamation intends to sign a Finding of No Significant Impact for this Project, and will make the EA available for a one week period beginning October 20, 2014. All comments will be addressed in the FONSI. Additional analysis will be prepared if substantive comments identify impacts that were not previously analyzed or considered.

4.2 Agencies Consulted

Reclamation coordinated with the following agencies during preparation of this EA.

- San Luis Water District
- Del Puerto Water District
- Grassland Resource Conservation District
- Grassland Water District
- U.S. Fish and Wildlife Service

Section 5 References

California Department of Fish and Game, California Natural Diversity Database/Rarefind. Accessed September 2014.

California Department of Water Resources. 2003. California's Groundwater Bulletin 118 Update 2003.

California Department of Water Resources. 2006. *California's Groundwater Bulletin 118 Update 2006, San Joaquin Valley Groundwater Basin Delta-Mendota Subbasin*

Grassland Water District. 2011. *Grassland Water District Groundwater Management Plan.*

Grassland Water District. 2012. Incremental Level 4 Groundwater Acquisition Pilot Project 2012 Water Quality Monitoring Report.

United States Bureau of Reclamation, 1989. *Report on Refuge Water Supply Investigations. Central Valley Hydrological Basin, California.*

United States Bureau of Reclamation, 1997. *Finding of No Significant Impact and Final Environmental Assessment for San Joaquin Basin Action Plan and North Grasslands Area.*

United States Bureau of Reclamation, 2001. *Finding of No Significant Impact and Final Environmental Assessment for Refuge Water Supply – Long-Term Agreements San Joaquin River Basin.*

United States Bureau of Reclamation, 2001. *Record of Decision Central Valley Project Improvement Act Final Programmatic Environmental Impact Statement.*

United States Bureau of Reclamation and the California Department of Fish and Game, 2003. *Conveyance of Refuge Water Supply Environmental Assessment and Initial Study--South San Joaquin Valley Study Area.*

United States Department of the Interior, Bureau of Reclamation, U.S. Fish and Wildlife Service, 1999. *Central Valley Improvement Act, Final Programmatic Environmental Impact Statement.*

U.S. Fish & Wildlife Service. September 8, 2014. Species List Generator, San Luis Ranch and Ignomar Quad Maps (Quads 403A and 403B).
(http://www.fws.gov/sacramento/es_species/Lists/es_species_lists-overview.htm)

U.S. Geological Survey. 2009. Groundwater Resources Program. Professional paper 1766. *Groundwater Availability of the Central Valley Aquifer, California.*

U.S. Geological Survey. 2013. *Land Subsidence along the Delta-Mendota Canal in the Northern Part of the San Joaquin Valley, California, 2003–10.*
(<http://pubs.usgs.gov/sir/2013/5142/pdf/sir2013-5142.pdf>)

Appendix A

Appendix A
Monitoring and Mitigation Plan
For
San Luis & Del Puerto Water Districts' Exchange
Of Grassland Resource Conservation District's
Groundwater for Refuge Level 2 Water

WATER QUALITY MONITORING

In an effort to minimize ambient surface water quality degradation associated with the San Luis and Del Puerto Water Districts' (Districts) development and exchange of Grassland Resource Conservation District's groundwater for refuge Level 2 water supplies, water quality monitoring will consist of both surface and groundwater quality monitoring. Additionally, this groundwater exchange will provide refuge Incremental Level 4 water supplies. The Districts, in collaboration with the Grassland Water District (GWD), will be responsible for implementing this Monitoring and Mitigation Plan (Plan).

Surface water quality monitoring will consist of both continuous and instantaneous sampling. Monitoring will include sampling from upstream locations to determine the base flow constituent concentrations, a downstream location, and at each wellhead. Continuous surface water quality monitoring will be accomplished in part through the GWD's Real-Time Water Quality Monitoring Network, characterizing electrical conductivity (EC), temperature, pH, and flow, which is subject to a rigorous quality assurance program plan to ensure that the data is accurate and representative of actual conditions. Additionally, flow meters at each of the wellheads will characterize individual wellhead production in cubic-feet per second and total flow in acre-feet. Data will be recorded and included in GWD's monthly reports to the Bureau of Reclamation (Reclamation) in conjunction with monthly meter readings. Instantaneous water quality monitoring will be accomplished through grab sample analysis of the ambient surface water quality upstream and downstream of the wellhead discharge as well as the groundwater quality at the wellhead. The upstream, downstream and wellhead water will be sampled and analyzed (EC, pH, and temperature) by the GWD on a weekly basis during the well operational period utilizing YSI 600XL multi-parametric SONDE water quality sensors, and recorded in a weekly log.

Grab samples will also be collected upstream of the wellhead discharge, downstream of the wellhead discharge, and at each wellhead on a monthly basis and analyzed for selenium, boron, and Total Dissolved Solids (TDS) concentrations by a Reclamation approved laboratory. The Reclamation-approved lab used to analyze selenium will provide a maximum reporting limit (RL) of 0.4 micrograms per liter ($\mu\text{g/L}$). Boron analysis requires a maximum RL of 100 $\mu\text{g/L}$ and TDS a maximum RL of 10 milligrams per liter (mg/L).

If the water quality data indicates that the use of a well(s) may adversely impact water quality, the mitigation measures described later in this Plan (and incorporated into the Proposed Action) will be implemented. If groundwater is found to contain constituent concentrations above the Central Valley Regional Water Quality Control Board's (CVRWQCB) surface water thresholds, groundwater will be blended with higher quality surface water upon discharge into flowing conveyance channels, effectively reducing concentrations below the thresholds outlined below, or the well production rate will be reduced or curtailed for purposes of the Proposed Action until flow conditions improve and water quality objectives can be achieved. The mitigation measures below will ensure that the groundwater supply developed during this Proposed Action will not adversely impact surface water quality. If the monitoring indicates that threshold values are exceeded, mitigation measures will be implemented within 24 hours of identifying an exceedance.

Water Quality Threshold and Reporting Limits – Laboratory Analysis

Analyte	Water Quality Goal	Maximum RL (µg/L)
Boron (µg/L)	Monitor	100
TDS (mg/L)	<200 increase over background	10,000 (10 mg/L)
Selenium (µg/L)	Not to exceed 2 µg/L in conveyance/not to exceed 5µg/L at the wellhead	0.4

Water Quality Monitoring and Sampling Schedule

Location	Sample Frequency				
	EC	FLOW	SELENIUM	BORON	TDS
Upstream	Weekly	continuous	monthly	monthly	monthly
Wellhead	Weekly	continuous	monthly	monthly	monthly
Downstream	Weekly	continuous	monthly	monthly	monthly
Conveyance	Continuous	continuous	monthly	monthly	monthly

Water Quality Mitigation Measures

GWD will not accept water from any of the subject wells if any of the wells exceed the following values:

- Maximum of 5.0 µg/L for selenium

GWD will modify or cease wellhead operation until flow conditions improve if any of the following downstream water quality thresholds are exceeded:

- Maximum increase of 200 mg/L TDS upstream to downstream per well

- Maximum of 2.0 µg/L for selenium

In the event that the water from any of the wells increase TDS levels in GWD's conveyance downstream from a wellhead by more than 200 mg/L, the well production rate will be reduced or operation curtailed for Proposed Action purposes until flow conditions improve and downstream water quality objectives can be achieved.

GWD has quantified flow conditions required to meet downstream water quality objectives for each of the wells based on individual wellhead water quality sampling data. Accordingly, GWD will immediately modify or cease pumping if inadequate flow conditions are observed prior to receiving laboratory confirmation of an exceedance.

Each well, as it is operated for Proposed Action purposes, will be monitored for selenium, boron, TDS, EC and flow at its discharge point (this point must represent wellhead water quality) into GWD's conveyance channels. Flow will be measured by a flow meter capable of recording instantaneous flow in cubic-feet per second and total flow in acre-feet.

Monitoring of downstream locations will determine the combined flow and chemistry of the blended water. The sites shall be adequate distance from the well discharges to assure proper blending for grab sample collection. All water quality data will be kept at GWD's office. As soon as practical (generally within 7 days of GWD's receipt of information from the water quality testing laboratory), GWD will ensure that Reclamation receives electronic copies of the complete data reports submitted by the laboratory. GWD will also provide a monthly water quality summary report, including volumetric data on wellhead production, within 60 days of sample collection. All data will also be recorded and included in GWD's annual reports to Reclamation for review. Water quality data and reports will also be provided to the CVRWQCB at least once per year.

GROUNDWATER LEVEL MONITORING

In an effort to minimize any potential significant impact on groundwater aquifers associated with the development of groundwater as part of this Proposed Action, groundwater levels will be measured prior to pump operation for the Proposed Action using an electronic water level meter referenced to a GPS coordinate and elevation at each wellhead. Subsequently, well drawdown related to the operation of each well will be measured in the middle of the proposed pumping period, and at the end of the pumping period prior to well shutdown. Groundwater recovery will be measured approximately 24 hours after pump shutoff. Groundwater level data will be recorded and included in GWD's annual reports to Reclamation for review. If the mid-pumping period groundwater level data indicates a significant decline in groundwater levels in the vicinity of the proposed wells, different from the levels of decline typically seen during operation of GWD's Incremental Level 4 Pilot Project wells, and if any such decline is not directly attributable to a cause other than the operation of the proposed wells during the Proposed Action pumping period, GWD will modify or terminate pumping to avoid any significant adverse groundwater impacts. GWD will immediately respond to any complaints

received from third parties, and will take all measures necessary to avoid third party well impacts.

LAND SUBSIDENCE MONITORING

The San Luis and Delta-Mendota Water Authority (Authority) is the monitoring agency for the Delta-Mendota subbasin. Currently, all wells operated by GWD pump from the intermediate zone, above the Corcoran Clay. Although significant land subsidence has been measured within the Delta-Mendota subbasin, most of it has occurred south of the GWD and has been associated with pumping from the lower zone, beneath the Corcoran Clay. Because of this, the GWD's groundwater pumping activities are not expected to contribute to potential land subsidence issues. The Authority and Central California Irrigation District maintain land subsidence monitoring programs. The Districts and GWD will review the results of those monitoring programs and collaborate with those agencies and to the extent practical mitigate problems associated with land subsidence attributable to implementation of the Proposed Action.