RECLAMATION
Managing Water in the West

Final
Environmental Assessment

American Recovery and Reinvestment Act of 2009 New Wells Project—Region 4

MERCED COUNTY

U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region, Sacramento, California

August 2010

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.

Final
Environmental Assessment

American Recovery and Reinvestment Act of 2009 New Wells Project—

Region 4

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Acronyms and Abbreviations

µS/cm	microSiemens per centimeter
AB 3030	Assembly Bill 3030
AB 32	Assembly Bill 32
AF	acre-feet
AF/yr	acre-feet per year
APE	area of potential effects
ARRA	American Recovery and Reinvestment Act
BBID	Byron-Bethany Irrigation District
CAA	federal Clean Air Act
CAAA	1990 Clean Air Act Amendments
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCAR	California Climate Action Registry
CDC	California Department of Conservation
CDF	California Department of Finance
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2e	carbon dioxide equivalents
Construction General Permit	NPDES General Permit for Construction Activities
CVHM	USGS Central Valley Hydrologic Model
CVP	Central Valley Project
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DFG	California Department of Fish and Game
DMC	Delta-Mendota Canal
DOI	U.S. Department of the Interior
DPM	diesel particulate matter
DPSs	distinct population segments
DPWD	Del Puerto Water District
Drought Act	Reclamation States Emergency Drought Relief Act of 1991, as amended
DWR	California Department of Water Resources

EA	Environmental Assessment
EC	electrical conductivity
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	federal Endangered Species Act
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FPPA	Farmland Protection Policy Act
FRA	Federal Railroad Administration
FSWD	Fresno Slough Water District
FTA	Federal Transit Administration
GGS	giant garter snake
GHGs	greenhouse gases
GPS	global positioning system
GRCD	Grassland Resource Conservation District
GWD	Grassland Water District
hp	horsepower
HUD	Housing and Urban Development
ISAC	Invasive Species Advisory Committee
ITAs	Indian Trust Assets
JID	James Irrigation District
kV	kilovolt
kWh	kilowatt hours
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
L_{min} and L_{max}	minimum and maximum sound levels
L_{xx}	percentile-exceeded sound levels
maf	million acre feet
MBTA	Migratory Bird Treaty Act
mg/l	milligrams per liter
MOU	memorandum of understanding
msl	above mean sea level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NISC	National Invasive Species Council
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System

NRHP	National Register of Historic Places
PG&E	Pacific Gas and Electric Company
PM2.5	particulate matter 2.5 microns in diameter or less
PM10	particulate matter 10 microns in diameter or less
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RGL	Regulatory Guidance Letter
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SLDMWA	San Luis and Delta-Mendota Water Authority
SLWD	San Luis Water District
SO_2	sulfur dioxide
State Water Board	State Water Resources Control Board
SWP	State Water Project
SWPPP	stormwater pollution prevention plan
taf	thousand acre-feet
TDS	total dissolved solids
TID	Tranquillity Irrigation District
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WA	Wildlife Area
WSID	West Stanislaus Irrigation District

Chapter 1 Purpose and Need for Action

1.1 Background

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) has developed the Drought Relief Program to participate in efforts to mitigate the impacts of sustained drought in California. One area that has been significantly impacted from reduced water supplies during this period of time is San Joaquin Valley Wildlife Areas and private wetlands (refuges). Development of additional groundwater pumping capacity in the Grassland Resources Conservation District (GRCD) and the California Department of Fish and Game North Grassland Wildlife Area is expected to alleviate these current and likely future drought impacts by helping provide alternative water supplies for refuges when Reclamation is not able to purchase water from willing sellers in order to satisfy critical refuge water needs.

1.2 Purpose and Need

California's Central Valley recently has experienced historic drought conditions, which has significantly limited the amount of refuge water supply available to meet incremental level 4 water needs. This is incremental water in addition to the refuge water used for fall-winter flooding of managed wetlands (level 2) that is used during the spring and summer for full habitat development as mandated by Section 3406(d)(3) of the Central Valley Project Improvement Act (CVPIA).

The Reclamation States Emergency Drought Relief Act of 1991, as amended (Drought Act), authorizes the Secretary of the Interior to undertake construction, management, and conservation activities that will minimize, or can be expected to have an effect on minimizing, losses and damages resulting from drought conditions. Construction activities are limited to temporary facilities, except that wells may be permanent facilities. Included in this authority are the protection and restoration of fish and wildlife resources. Consistent with this authority, Reclamation is planning to use $40 million from the American Recovery and Reinvestment Act (ARRA) to fund emergency drought relief projects that can quickly and effectively mitigate the consequences of the current drought in the San Joaquin Valley. Along with preserving permanent crops, minimizing economic loss for the surrounding community, and preserving employment, ARRA funds are intended to protect refuges by supplementing water supplies. The overall program assists Reclamation in its management of the Central Valley Project (CVP) and the drought relief program. The primary benefit is to offset the effects of the drought to refuges that would otherwise receive surface water from

Reclamation through the CVP. Further, the purposes of the Drought Relief Act could not be accomplished without the use of private wells.

Reclamation proposes to provide funding under Title IV of the ARRA for up to six new wells, referred to for the purposes of this analysis as Region 4. The purpose of these wells is to supplement water supply in years when surface water allocation is constrained.

1.3 Scope of Analysis

Up to six wells and related power and water supply connections would be constructed and operated.

The water from each new well is intended to provide water for managed wetlands and refuges. The pumped groundwater would be delivered through the existing refuge conveyance facilities or district canals and/or pipelines. More information about the specific location of the wells, their associated infrastructure facilities, and location of use is provided in Chapter 2. No new irrigation delivery systems would be constructed through this project. The majority of pumping from these new wells would occur in May through February.

1.4 Potential Issues

The resources potentially affected by the Proposed Action and therefore analyzed in this environmental assessment (EA) are:

- Water Resources
- Land Use
- Biological Resources
- Air Quality and Climate Change
- Noise
- Cultural Resources
- Indian Trust Assets
- Utilities and Infrastructure
- Socioeconomic Resources
- Environmental Justice
- Cumulative Effects

1.5 Resources Not Evaluated in This Environmental Assessment

The following resources are not expected to be affected by the Proposed Action and therefore are not analyzed further in this EA.

1.5.1 Aesthetics

Each of the well sites is located in a rural area with existing infrastructure similar to the proposed new wells and associated infrastructure. Construction equipment would be present for a short period of time, but this equipment is similar to the equipment used for normal refuge activities. The presence of this equipment and new wells would not represent a change from the current visual character of the area.

1.5.2 Traffic and Transportation

The slight increase in the number of vehicles on local roadways associated with construction of the new wells would be temporary and minimal. Wells are located throughout the region, and increased traffic would not be concentrated in any one area. Any change in traffic would be negligible because the wells are located in areas where vehicles currently travel on a daily basis.

1.5.3 Growth-Inducing Effects

The Proposed Action would supplement water supplies within the refuges in the Grassland RCD. As such, there would be no additional water supply available to support growth or remove an obstacle to growth. There would be no effect.

1.6 Reclamation's Authority and Jurisdiction for the Proposed Action

As described above, Reclamation is providing ARRA funds for the construction of new wells pursuant to Section 101(a), which authorizes construction, management, and conservation activities that will minimize losses and damages resulting from drought conditions. Construction activities are limited to temporary facilities, except for wells.

Chapter 2 Alternatives

2.1 Introduction

As described in Chapter 1, Reclamation is funding a drought relief program through the ARRA. The new wells portion of the drought relief program is intended to improve water supply during droughts. San Joaquin Valley refuges have been significantly impacted from reduced water supply during recent drought conditions. As such, the alternatives to meet the purpose and need involve providing access to supplemental water supplies. Improving groundwater supplies can be accomplished by constructing new wells or enhancing existing wells.

When appropriate, enhancing existing wells was also considered and analyzed through a separate environmental document (Reclamation, Mid-Pacific Region, *NEPA Categorical Exclusion Checklist for American Recovery and Reinvestment Act (ARRA) Drought Relief Well Enhancements Project*, approved November 9, 2009). The No Action Alternative and the Proposed Action are evaluated in this EA.

2.2 No Action Alternative

The No Action Alternative assumes that south-of-Delta CVP contractors would continue to use existing water supplies to meet demand.

2.3 Proposed Action

2.3.1 Well Locations and Facilities

Region 4 and its associated proposed new wells are shown in Figure 2-1. A total of up to six new wells and related power and water supply connections and appurtenant structures would be constructed and operated for use by GRCD. Four out of the six wells proposed are within the Grassland Water District. The other two wells are proposed to be constructed in the California Department of Fish and Game North Grassland Wildlife Area. One well is proposed to be located in the China Island Unit and the other well is proposed to be located in the Gadwall Unit.

The aboveground facilities at each well site would occupy an area of approximately 30 feet by 30 feet (well pad). The features of each well would include:

- A new 16-inch-diameter well that would be operated for 10 months per year (i.e., May through February).
- An aboveground pump to operate the well. Power to the pump motors would come from an adjacent overhead power line.

- A discharge pipe connecting the well to an existing irrigation system adjacent to the well. An integrated flow meter would be installed on the discharge pipe to record pumping use.

Table 2-1 identifies each of the proposed new wells and their specific characteristics proposed in Region 4. Figures 2-2 to 2-7 show detailed maps (scale of one inch:3,200 feet) using U.S. Geological Survey (USGS) 1:24,000 topographic sheets as the base map for each individual well location and the connection to power and water conveyance.

GRCD and Grassland Water District (GWD) boundaries are nearly coincident, and GWD was established to deliver water to the GRCD. The new wells would discharge to adjacent water delivery canals operated by GWD for distribution throughout the area, or directly to adjacent wetlands. Wells that would discharge to water delivery canals would be connected with an aboveground or belowground pipeline, installed in trenches and backfilled where the discharge pipelines cross levee roads. Wells that would discharge to adjacent wetlands would simply pump into the wetlands using a short discharge pipe.

Table 2-1. Locations and Well Characteristics for New ARRA Wells in Region 4

Well ID Number	Anticipated Well Depth (feet)	Casing Diameter (inches)	Above/Below Corcoran Clay	Estimated Annual Production (AF)	Required Power (HP)	Estimated Distance to Power Lines	Estimated Number of Power Poles
G-1	800	16	Below	1,100	125	unknown	1
G-2	800	16	Below	1,100	125	60 feet	2
G-3	800	16	Below	1,100	125	30 feet	2
G-4	800	16	Below	1,100	125	150 feet	2
G-5	800	16	Below	1,100	125	75 feet	2
G-6	800	16	Below	1,100	125	unknown	1

2.3.2 Construction Activities

Construction activities would include the well construction and connection (i.e., trench for pipeline) to the water distribution canal or pipeline and the connection to the power supply. In addition, construction activities would involve vegetation removal, soil excavation and trenching, grading, stockpiling and spreading of excavated material, installation of well and pipeline facilities, constructing a temporary percolation pond, and backfilling materials into excavated areas. These activities would result in the temporary disturbance of approximately 10,000 square feet at each well location, plus minor additional disturbance associated with the construction of power and water connections.

A temporary settling pond approximately 50 feet by 50 feet in size would be constructed at each well site by creating earthen berms around the pond area. It is probable that the settling ponds will be much smaller than 50 feet by 50 feet. The purpose of the pond would be to store water and sediment discharged from the well during the drilling and development activities. Sediment and well drilling debris would remain in the pond. Water generated from the well drilling would be discharged to the pond and would percolate from the pond to the shallow groundwater. Clean water from well testing would be discharged into the pond or to an adjacent irrigation system. Another option would be to use above ground storage tanks to store the water and sediment discharged from the well. If a pond is constructed within 200 feet of giant garter snake habitat exclusion fencing will be installed to ensure snakes do not enter the aquatic habitat. Either the pond or above ground storage tank option will be at the discretion of the contractor with the caveat of avoiding all sensitive resources including wetlands.

The well discharge pipeline would connect to either an onsite private distribution system or to a district facility through an underground pipeline. The pipeline would be installed by excavating a small trench, generally 12 to 16 inches wide, to a depth of approximately 42 inches. A trencher or small excavator would be used to dig the trench, and materials would be stockpiled alongside the trench. Bedding material, such as gravel or engineered fill, would be laid at the bottom of the trench. The pipe would be laid on top of the bedding material and covered with additional bedding material and with excavated material. Excess material excavated from the trench would be disposed of on site. Storage of pipeline materials would occur at the well construction site.

The power line for each well would require the installation of new wooden poles, each approximately 30 to 45 feet high. No on-the-ground structural features would be required at the tie-in points, and equipment required for conductor pulling at each end of the power line would use existing access areas. The power poles would be installed in augered holes using truck-mounted equipment. The number of poles for each well are shown in Table 2-1.

Equipment expected to be used during construction would include:

- a drill rig,
- a backhoe,
- a pipe trailer,
- a pump setting rig,
- welding equipment for well casing construction, and
- semitrailer trucks for material delivery.

Chemicals associated with maintaining drill rig operation (lubrication oil, diesel, gasoline, etc.) would be stored on the site. During drilling, bentonite (drilling mud) and additives (e.g., soda ash, polymers) would be stored and used at the site and disposed of in the temporary pond. After well construction is completed, the temporary earthen berms used to form the temporary settling pond would be filled back into the pond area. Five construction workers would be at the project site throughout the eight-week project construction period. During the six-week well drilling, construction, and development period, it is expected that no more than 20 material and equipment deliveries would occur. After the well is constructed, an additional five deliveries would be made over a two-week period to test the well, install the permanent pump, and connect the well to the water distribution system.

Construction Schedule

Construction of the Proposed Action is anticipated to begin no earlier than September 2010. Installation of each well is expected to take no more than two months. Construction of multiple wells can occur simultaneously, however, it is anticipated that construction activities could continue for up to two years. Well installation consists of the following phases.

- Site clearing and percolation pond excavation (two days).
- Well drilling and well construction (4 weeks). Drilling would occur seven days a week, 24 hours a day for two weeks, and well construction would occur seven days a week, 12 hours a day for two weeks.
- Well development and pumping tests (two weeks). Well development and pumping tests are expected to occur for 12 hours each day, then for two 24-hour days.
- Installation of the permanent pump and startup testing (one week). Installation of the permanent pump and startup testing would occur during the day only.
- Connection of the new well to the water delivery system (one week). The pipe construction (with welding) would occur during the day only.

Well Operation

Each new well would supplement existing water supplies and would be operated in years when Reclamation is not able to purchase water from willing sellers in order to satisfy critical refuge water needs. The anticipated water production for each well is listed in Table 2-1. The general operational constraints for these wells are described below.

- Pumping would occur May through February.
- Operation of the new wells would be consistent with existing groundwater management plans for the district.
- All new wells would be metered and records would be provided by GWD and/or landowners to the San Luis and Delta-Mendota Water Authority (SLDMWA) and/or Reclamation for groundwater monitoring and planning efforts. Access to the well site would be provided to SLDMWA and/or Reclamation staff for periodic water-level and water-quality monitoring. At a minimum, the monitoring would consist of groundwater levels, electrical conductivity, selenium, and boron.

2.3.3 Environmental Commitments

Conduct Mandatory Biological Resources Awareness Training for All Project Personnel and Implement General Requirements

Before any ground-disturbing work (including vegetation clearing and grading) occurs in the construction area, a USFWS-approved biologist will conduct a mandatory biological resources awareness training for all construction personnel regarding special-status species. The training will include the natural history, representative photographs, and legal status. Proof of personnel attendance will be provided to USFWS within one week of the training. If new construction personnel are added to the project, the contractor will ensure that the new personnel receive the mandatory training before starting work. The subsequent training of personnel can include videotape of the initial training and/or the use of written materials rather than in-person training by a biologist. Requirements that will be followed by construction personnel are listed below.

- The contractor will clearly delineate the construction limits through the use of survey tape, pin flags, orange barrier fencing, or other means, and prohibit any construction-related traffic outside these boundaries.
- Construction speed limits of 15 miles per hour will be enforced within the construction area to minimize potential for increased traffic volumes to result in increased incidence of road-kill of giant garter snake during project construction. Speed limits would be posted on project-controlled

roads leading to the construction area. These signs would alert drivers to the potential presence of snakes. Additionally, the worker awareness training would inform all workers of the need to watch for and avoid snakes that may be present along roadways.

- Project-related vehicles and construction equipment will restrict off-road travel to the designated construction areas.
- The contractor will provide closed garbage containers for the disposal of all food-related trash items (e.g., wrappers, cans, bottles, food scraps). All garbage will be collected daily from the action area and placed in a closed container that will be emptied weekly at an approved off-site location. Construction personnel will not feed or otherwise attract fish or wildlife.
- No debris, soil, etc., other than that already present within the well shall be allowed to enter the water.
- No equipment shall be operated in stream channels.
- No intentional harassment, killing, or collection of plants or animals at or around the work sites is allowed.
- No pets will be allowed in the action area.
- No firearms will be allowed in the action area.
- If vehicle or equipment maintenance is necessary, it will be performed in the designated staging areas.
- Storage of hazardous material, such as fuel, oil, etc. shall not be allowed within 150 feet of waterways. Any chemical spills must be cleaned up immediately and reported to the Service as soon as possible.

Any worker who inadvertently injures or kills a giant garter snake or San Joaquin kit fox or finds one dead, injured, or entrapped immediately will report the incident to the construction foreman or biological monitor. The construction foreman or monitor will immediately notify Reclamation, who will immediately notify the USFWS Endangered Species Office in Sacramento (917-414-6600) and California Department of Fish and Game (DFG). Reclamation will follow up with written notification to USFWS within five working days of the incident. The biological monitor will also independently and immediately notify USFWS of any unanticipated harm to giant garter snake or San Joaquin kit fox associated with the Proposed Action. All observations of these species will be recorded on CNDDB field sheets and sent to DFG by Reclamation or representative biological monitor.

Conduct Preconstruction Den Surveys for San Joaquin Kit Fox and American Badger and Avoid or Protect Dens

Reclamation would retain a qualified biologist (as approved by the U.S. Fish and Wildlife Service [USFWS] [1999a, 1999b]) to conduct a preconstruction survey no more than 30 days before the beginning of ground disturbance or any activity that may affect San Joaquin kit fox or American badger. The biologist would survey the proposed construction area and a 200-foot buffer area around the construction area to identify suitable dens (USFWS 1999a). The work area includes all areas where ground disturbance would occur, access roads, staging areas, and spoils storage areas. The biologist would conduct den searches and classify dens according to USFWS protocol (1999a). Written results of the surveys would be submitted to USFWS and the DFG within one week of the completion of surveys and prior to the beginning of ground disturbance and/or construction activities that could affect San Joaquin kit fox or American badger.

After preconstruction den searches and before the commencement of construction activities, a qualified biologist would establish and maintain the following exclusion zones measured in a radius outward from the entrance or cluster of entrances of each den.

- Potential and atypical dens: A total of four–five flagged stakes would be placed 50 feet from the den entrance(s) to identify the den location.
- Known den: Orange construction barrier fencing would be installed between the construction work area and the known den site at a minimum distance of 100 feet from the den. The fencing would be maintained until all construction-related disturbances have been terminated. At that time, all fencing would be removed to avoid attracting subsequent attention to the den.
- Natal/pupping den: USFWS would be contacted immediately if a natal or pupping den is discovered at or within 200 feet of the boundary of the construction area.

Construction and other project activities would be prohibited or greatly restricted within these exclusion zones. Only essential vehicle operation on existing roads and foot traffic would be permitted. All other construction activities, vehicle operation, material and equipment storage, and other surface-disturbing activities would be prohibited in the exclusion zones.

All project effects on San Joaquin kit fox would be avoided. If a well pad or utility location is in conflict with an identified kit fox den, the well pad or utility would be moved.

Provide Escape Ramps or Cover Open Trenches at the End of Each Day to Avoid Entrapment of Giant Garter Snake, San Joaquin Kit Fox, and American Badger

To avoid entrapment of giant garter snake, San Joaquin kit fox, and American badger, all excavated steep-walled holes or trenches more than one foot deep would be provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each workday. If escape ramps cannot be provided, holes or trenches would be covered with plywood or similar materials. Providing escape ramps or covering open trenches would prevent injury or mortality of foxes and badgers resulting from falling into trenches and becoming trapped. The biological monitor would thoroughly inspect trenches for the presence of trapped species at the beginning of each workday.

Avoid and Minimize Effects on Giant Garter Snake

The following practices would be implemented to minimize environmental impacts to giant garter snake during project construction and implementation:

- Conduct all construction activity within giant garter snake upland habitat in and around agricultural ditches during the active period for giant garter snake, in order to reduce direct impacts on the species by allowing snakes to move out of the way of construction activities. The active period is generally between May 1 and October 1.
- Flag and designate avoided giant garter snake habitat within or adjacent to the project area as Environmentally Sensitive Areas. This area should be avoided by all construction personnel.
- Install exclusion fencing for giant garter snake from neonate to adult body size such as silt fencing that would prohibit entry or perhaps accidental entrapment of the giant garter snake for any temporary settling ponds that are within 200 feet of aquatic habitat.
- Do not place cuttings from well construction in an area that may impact giant garter snake individuals, their aquatic or upland habitat (i.e., within 200 feet of aquatic habitat).

Install Erosion Control Measures near Aquatic Habitat

Erosion control measures will be installed adjacent to suitable habitats for giant garter snake to prevent soil or other materials from entering aquatic habitat. Erosion control features will be placed in areas that are upslope of or within 200 feet of suitable aquatic habitat to prevent any soil or other materials from entering aquatic habitat. The locations of erosion control features will be reviewed by a qualified biologist and identified on the final grading plans and construction specifications. Natural/biodegradable erosion control measures (e.g., coir rolls,

straw wattles, hay bales) will be used. Plastic monofilament netting (erosion control matting) will not be allowed because snakes can become caught in this type of erosion control material.

Monitor Initial Ground-Disturbing Activities and Vegetation Removal in Suitable Habitat for Giant Garter Snake

A USFWS-approved biological monitor will remain on site during initial ground-disturbing activities (grading, excavation, and vegetation removal activities). During construction, the biological monitor will make periodic visits to the construction site to ensure that fences around aquatic habitats are in good working order and that holes are not being left uncovered overnight. The construction area will be resurveyed whenever there is a lapse in construction activity of two weeks or more.

Once all initial ground-disturbing activities are completed, the biological monitor will perform spot checks of the site at least once a month for the duration of construction in order to ensure that construction barrier fences are in good order, trenches are being covered, project personnel are conducting checks beneath parked vehicles prior to their movement, and that all other required biological protection measures are being complied with. The biological monitor will document the results of monitoring on construction monitoring log sheets, which will be provided to USFWS within one week of each monitoring visit.

Restore Temporary Loss of Upland Habitat for Giant Garter Snake

Construction activities would involve vegetation removal, soil excavation and trenching, grading, stockpiling and spreading of excavated material, installation of well and pipeline facilities, constructing a temporary percolation pond, and backfilling materials into excavated areas. These activities would result in the temporary disturbance of approximately 10,000 square feet (0.23 acre) of upland habitat at each well location, plus minor additional disturbance associated with the construction of power and water connections.

Reclamation will restore the 1.4 acres of temporarily disturbed annual grassland upon completion of construction activities with a noninvasive native and naturalized grass and forb seed mix. Grassland restoration will be performed by the construction contractor according to the construction documents (i.e., plans and specifications). The construction documents will describe the process for restoration, which will include stockpiling the topsoil and replacing soil layers in the same order they were removed, restoring the grade, and reseeding with a noninvasive native and naturalized grass and forb seed mix. Restoring grassland in this manner will replace the habitat value that was temporarily lost as a result of construction activities. The restoration plan will be provided to USFWS and

CDFG at least four weeks prior to the planned project implementation date to allow for review and approval prior to the start date.

Chapter 3 Affected Environment and Environmental Consequences

This chapter describes the potential environmental effects of implementing the No Action Alternative and Proposed Action. The following resources are evaluated: water resources, land use, biological resources, air quality and climate change, cultural resources, noise, Indian Trust Assets, utilities and infrastructure, socioeconomic resources, and environmental justice.

3.1 Water Resources

3.1.1 Affected Environment

Land Surface Topography

GWD and surrounding areas (Region 4) is located west of the San Joaquin River on relatively flat terrain at low elevations, 70 to 130 feet (Quinn et al. 2004). As a result of its low elevation and position near the San Joaquin River, the region has historically supported and continues to support a large number of wetlands (along with pasture and cropland). In fact, much of the water delivered to the region is used for wetland habitat and the region is a major stopping point for birds migrating along the Pacific Flyway. The region contains several natural creeks (Los Banos Creek, Mud Slough, and Salt Slough) and many canals. Average annual rainfall near Los Banos is about nine inches (AECOM 2009).

Water Supply and Uses

Four of the proposed wells are located within GWD and the other two wells are proposed to be constructed in the California Department of Fish and Game North Grassland Wildlife Area. However, the wells would be operated by GWD, which is a member of the SLDMWA. GWD and the North Grassland Wildlife Area are generally composed of managed wetlands that are flooded for waterfowl in the fall and winter, with some irrigated crop production for waterfowl food in the spring and summer. As part of the CVP Improvement Act wildlife refuge water supply provisions, GWD water supply reliability was improved. However, additional water supply is needed in the spring and summer for crop and grass irrigation and must be purchased by Reclamation. This supply is less reliable.

GWD covers approximately 51,500 acres and is divided into a northern and a southern region that are separated by the town of Los Banos. Multiple state and federal wildlife areas are adjacent to GWD. Currently GWD receives most of its water from the CVP via the DMC.

Regulations and Management Plans

Regional Groundwater Management Plan

Assembly Bill 3030 (AB 3030), signed in 1992, established procedures for existing local agencies to develop and implement groundwater management plans.

The SLDMWA adopted an AB3030 groundwater management plan (GMP) for both the northern and southern DMC region. GWD is a member of the SLDMWA and they comply with the GMP.

Water Quality Regulations

Section 401 of the Clean Water Act (CWA) requires applicants for an activity that may result in fill or placement of pollutants in a water of the United States first obtain water quality certification from the Regional Water Quality Control Board. CWA regulates discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program. Most construction activities that disturb more than one acre of land are required to obtain a General Permit for Construction Activities (General Construction Permit), which requires a stormwater pollution prevention plan (SWPPP). Installation of each well will require disturbing less than one acre of land; therefore, Section 402 is not applicable.

Section 404 of the CWA regulates the discharge of dredged and fill materials into waters of the United States, including wetlands. Project proponents must obtain a permit from the U.S. Army Corps of Engineers (USACE) for all discharges of dredged or fill material into waters of the United States. Before any actions that may affect surface waters are carried out, a delineation of potentially jurisdictional waters of the United States must be completed, following USACE protocols, to determine whether the project area encompasses wetlands or other waters of the United States. As described below under the Biological Resources section, no fill is expected in any jurisdictional waters and therefore no CWA permits are required.

Hydrogeology and Aquifers

As the sediments that constitute the top 2,000 feet of the groundwater basin accumulated during the last 24 million years, the San Joaquin Valley occasionally

contained large lakes or seas that resulted in the deposition of laterally extensive clay layers. These layers form significant barriers to the vertical movement of groundwater in the basin. The most extensive of these is the Corcoran Clay, which is 20–100 feet thick in most areas and divides the groundwater basin vertically into a deep, lower, confined aquifer system and an upper, semi-confined aquifer system. Although there are some regions where the Upper Zone is semi-confined, the Upper Zone is commonly referred to here and elsewhere as the unconfined aquifer.

Potential groundwater production wells identified for Region 4 are located in the Delta-Mendota groundwater subbasin. In this subbasin, the Corcoran Clay layer lies between 100 and 500 feet below the surface (DWR 2006). The Corcoran Clay along the San Joaquin River is about 200 to 300 feet below the surface. The unconfined aquifer in this region contains a mixture of Coastal Ranges and Sierra alluvial sediment overlain by floodplain clays. The new wells are anticipated to be drilled to a depth of 800 feet, below the Corcoran Clay.

Groundwater Levels and Pumping

Groundwater pumping has been occurring in the San Joaquin Valley for the past century. California Department of Water Resources (DWR) Bulletin 118 reports that about 30 percent of the total water used (long-term average) is from groundwater pumping (DWR 2003). Total groundwater pumping from the San Joaquin Valley groundwater basin (Westlands Water District north to Tracy) is more than six million acre-feet (maf) in dry years, with about two maf pumped from some areas every year. Along the west side of the San Joaquin River in the vicinity of the proposed new ARRA wells, there is about 500 thousand acre-feet (taf) of groundwater pumping in dry years and about 100 taf of pumping in every year (based on input to the USGS Central Valley Hydrologic Model [CVHM], Faunt et al. 2009). The six new wells proposed for Region 4 represent roughly 1.5 percent of the historical volume of additional water pumped during dry years in the Delta-Mendota subbasin (approximately 400 wells assuming one taf per well).

The USGS CVHM was used to simulate groundwater elevations in the San Joaquin Valley (Faunt et al. 2009). Figure 3.1-1 shows simulated historical groundwater elevations for September 1992, a time when groundwater elevations were at one of the lowest points between 1970 and 2010. These simulated groundwater elevations represent the piezometric water surface elevations in wells (well elevations under non-pumping conditions). For an unconfined aquifer, the elevations of the piezometric surface are roughly the same as those of the groundwater table. However, for confined aquifers, such as the aquifer below the Corcoran Clay, the groundwater elevations may be considerably different than the top of the aquifer.

In the groundwater model, Layer 3 represents the semi-confined depth interval above the Corcoran Clay and Layer 6 represents the aquifer below the Corcoran Clay. Groundwater elevations in Layer 6 typically are lower than those in Layer 3. Under September 1992 historical conditions, simulated groundwater elevations in Region 4 generally ranged from 50 to 100 feet for both Layers 3 and 6.

The general trends in groundwater levels in the San Joaquin Valley roughly correspond to the levels observed in two wells of the Grassland area (data from DWR 2010; Figure 3.1-2). One of these wells is located near the north end of the GWD and the other is located near the south end. The groundwater elevation in these wells is approximately 75 and 100 feet, respectively, and is fairly close to the ground surface (which ranges from elevations of 70 to 130 feet in the region). The main difference in the water levels observed in these two wells is that the northern well shows gradual changes with time, whereas the elevations in the southern well seems to hold steady until low water availability caused sudden relatively deep declines of 15 to 20 feet, as occurred in 1977, 1991, and 2009.

It should be noted that these fluctuations in groundwater level are fairly small compared to fluctuations at many other well sites, particularly those located away from the valley trough. Groundwater levels at these two wells may be relatively steady because of their location near the trough of the valley and near the San Joaquin River and/or because of relatively low levels of groundwater pumping in the region.

Subsidence

Land subsidence, a lowering of the ground surface over a large area, can be caused by several processes. Subsidence along the western side of the San Joaquin Valley has resulted almost entirely from compaction of clay layers in the groundwater basin as a result of groundwater withdrawal. Subsidence in this area has been studied extensively by the USGS (Bull 1975; Bull and Miller 1975; Bull and Poland 1975; Poland and Lofgren 1984). Although land subsidence from historical pumping in the southern San Joaquin Valley is well-documented, little land subsidence has been reported for Region 4 (Faunt et al. 2009). Between 1961 and 1975 land subsidence in Region 4 was estimated to be less than two feet (Williamson et al. 1989).

Groundwater Quality

Chemical constituents of concern in the groundwater of the San Joaquin Valley include nitrate, boron, chloride, arsenic, molybdenum, iron, mercury, and uranium. In addition, agricultural herbicides and pesticides have been detected in the groundwater throughout the region (DWR 2003; Planert and Williams 2010). However, selenium and salinity are the constituents of greatest concern because selenium concentration in agricultural runoff has been high enough to harm

waterfowl and the buildup of salinity in the soil has rendered some land unsuitable for agriculture. Salinity is expressed as total dissolved solids (TDS) or can be assessed with measurements of electrical conductivity (EC). TDS and selenium found in the western portion of the San Joaquin groundwater basin originate from groundwater recharge in areas of marine sediments in the Coast Ranges.

Groundwater quality in the San Joaquin Valley is variable and depends on factors such as depth in the aquifer (including location above or below the Corcoran Clay), soil composition, surface water quality, and agricultural practices. Because measurements generally come from functioning wells (i.e., wells with adequate water quality), the water quality assessment is inherently biased toward better water quality. The confined aquifer below the Corcoran Clay generally has lower TDS than the unconfined or semiconfined aquifer above the Corcoran Clay. However, the bottom of the confined aquifer is saline, so the depth of useable water in the confined aquifer is uncertain in Region 4. Water quality in the unconfined aquifer above the Corcoran Clay is more variable and less well-documented than the water quality in the confined aquifer below the Corcoran Clay.

Shallow groundwater (either perched or at the top of the unconfined layer) in the western San Joaquin Valley is often of poor quality. A number of factors such as shallow layers of impermeable clay, leaching from marine sediments, and concentration of chemical constituents as a result of irrigation and evaporation, have resulted in excessive levels of boron, chromium, mercury, and selenium (Planert and Williams 2010) in shallow groundwater of the western San Joaquin Valley. As a result, shallow groundwater often is not a suitable source of water.

Along the western San Joaquin Valley, TDS concentrations in groundwater are relatively high. In Region 4, TDS concentration in wells is relatively high and tends to vary between about 500 milligrams per liter (mg/L) to more than 1,500 mg/L (Bertoldi et al. 1991).

3.1.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, surface water supplies would continue to be limited in some years and dependent on upstream water supply and Delta regulations. Historical water resource conditions would continue, including reduced water supply in drought years.

Proposed Action

Under the Proposed Action, up to six wells would be constructed in Region 4 that would each be capable of pumping about 1,000 acre-feet during the 10-month extended irrigation and wetlands flooding season (May–February). In addition to temporary and localized construction impacts, increased groundwater pumping during drought conditions could cause the following impacts in the water districts:

- Hydraulic interference (e.g., increased depth to water table) at nearby wells;
- groundwater pumping overdraft (more than average sustainable recharge);
- land subsidence caused by pumping to below historical minimum water table level;
- increased salinity of water supply and soils;
- increased salinity of drainage and shallow groundwater; and
- reduced surface water (e.g., wetlands) as a result of groundwater pumping.

These potential impacts on water resources from the Proposed Action are discussed in the following impact assessment sections.

Impact Water-1: Temporary Impact on Water Quality from Construction Activities

The Proposed Action would include the construction of six new wells and the addition of conveyance connections and appurtenant structures.

In general, the severity of construction-related water quality impacts depends on soil erosion potential; construction practices; the frequency, magnitude, and duration of precipitation events; and the proximity of construction to stream channels or water bodies. Construction of the Proposed Action would occur on relatively flat terrain in areas of low precipitation, so erosion potential would be very low. The Proposed Action would not result in a significant impact on water quality due to temporary construction activities.

Impact Water-2: Interference with Water Level in Nearby Wells

The USGS CVHM was used to investigate the potential groundwater impacts of the dry year pumping from these new wells on regional water table elevations. This model simulates monthly groundwater elevations in one–square mile cells (Faunt et al. 2009). The model simulates the historical groundwater conditions from April 1961 to September 2003 (42 years). The monthly groundwater elevations in the aquifer above the Corcoran Clay (i.e. model Layer 3) and the hydraulic elevations in the aquifer below the Corcoran Clay (i.e. model Level 6) have been compared to the historical pumping that would occur under the No

Action Alternative (no new wells) and the Proposed Action pumping (with six new wells in Region 4). The historical pumping varies spatially and temporally within the San Joaquin Valley between wet years with lowest pumping and dry years with the most pumping.

The possible impact of the new wells interfering with the existing wells in the region can be described using the simulated effects of the new pumping on groundwater levels in the aquifers above and below the Corcoran Clay. The new wells were simulated to be operated in about half of the years between 1961 and 2002, and the effects are greater in periods when the wells are used for multiple years. Simulated changes in water elevations in 1992, at the end of the six year drought of 1987–1992, provide an indication of the largest expected impact from the new wells at the end of an extended dry period.

Figure 3.1-3 shows the simulated groundwater elevations changes caused by pumping of the six new wells. Because there are two distinct aquifers in Region 4, the changes in water elevations are shown for above the Corcoran Clay (Layer 3) and below the Corcoran Clay (Layer 6). For Region 4 there are no wells that would be screened above the Corcoran Clay; all the six new wells would be screened below the Corcoran Clay.

In the unconfined aquifer (Layer 3), the simulated changes in groundwater elevations for September 1992 were less than one foot for all of Region 4 because the new wells were screened in the confined aquifer below the Corcoran Clay. The simulated changes in the confined aquifer hydraulic elevation were less than one foot at the boundaries of the GWD (and adjacent wildlife refuges). Only in the grid cells with new wells were the groundwater elevations in the confined aquifer reduced about 10 to 20 feet during months of pumping. Because this hydraulic effect was simulated only in months with pumping, and fully recovered each year during two months without pumping, this localized drawdown is not a significant impact.

The CVHM has a model grid resolution of one square mile. The result is that groundwater-level changes that occur at scales less than one square mile cannot be adequately simulated by the CVHM. One example of this is the groundwater levels that occur close to a production well. In reality, the operation of a production well creates a steep cone of depression in the water table centered on the pumping well, and water levels increase with increasing distance from the well. Yet, CVHM reports the average simulated groundwater elevation that would occur over the entire square mile grid cell. In most cases, the square mile grid spacing is adequate to simulate the regional effects of increased groundwater pumping on groundwater levels. However, if a domestic or agricultural well lies within a quarter-mile or half-mile from a proposed pumping well, the potential exists for a new well to create a cone of depression that would interfere with these wells. This potential lowering of groundwater elevations in the vicinity of existing wells is not a significant impact because it is assumed that adjacent wells are

constructed to operate within the historical fluctuations that have occurred over the modeled period, existing wells also create cones of depression and pumps are set low enough in the well to deal with this phenomenon, and the districts and landowners would continue to operate according to the guidelines provided in the approved GMP whereby the districts participate in monitoring groundwater levels and adjusting well use to ensure all users have an available supply.

Impact Water-3: Increased Pumping Contributes to Overdraft of Regional Groundwater Basin

Groundwater overdraft of a groundwater basin is caused by long-term pumping that is greater than the long-term recharge of the groundwater storage. A reduction in the groundwater elevations during dry periods (Figure 3.1-3), with increased groundwater elevations in normal or wet years is the expected and sustainable conjunctive water use pattern for Region 4. Figure 3.1-4 shows representative simulated groundwater elevation time-series (hydrographs) for the unconfined aquifer and the confined aquifer in Region 4 for some of the model grid cells most affected by the new wells.

The top graph shows the simulated groundwater elevations with historical pumping (No Action Alternative) and with project pumping from a model grid cell with large project-related reductions in groundwater elevation. The historical groundwater elevations varied only slightly from about 100 feet above mean sea level (msl) in 1992 to a maximum of about 108 feet msl in the early 1970s and the late 1990s (wet periods). The variations in the unconfined aquifer appear to follow the regional changes in irrigation recharge and drainage towards the river and are not directly influenced by pumping from the unconfined aquifer. No significant changes in the water table elevation are simulated from the Proposed Action.

The bottom graph of Figure 3.1-4 shows the simulated groundwater elevations in the confined aquifer with historical pumping (No Action Alternative) and with the six new wells from the model grid cell with the greatest simulated project-related reduction in groundwater elevations. The historical groundwater elevations varied by less than five feet, indicating there was little or no simulated historical pumping in this region. The simulated reduction in groundwater elevations from the new wells was about 15 feet every year under Proposed Action pumping conditions, but the elevations returned to the historical elevations once Proposed Action pumping ceased for two months each year.

The simulated rapid reduction in groundwater elevations each year during the pumping season is the expected temporary local hydraulic effect of the six new wells screened in the confined aquifer. The recovery of the simulated groundwater elevations in both the upper and lower aquifers indicates that there would be no

permanent groundwater overdraft effects from the new wells, and therefore there would be no significant effect.

Impact Water-4: Increased Pumping Contributes to Land Subsidence

Subsidence is unlikely to be a significant Proposed Action impact because historical subsidence was not a large problem in Region 4. In addition, because the simulated groundwater elevations were maintained under the GMP, future subsidence is unlikely. Therefore, this impact would not be significant.

Impact Water-5: Increased Pumping Increases Salinity of Applied Water and Soil Water and Damages Sensitive Crops

Some crops and wetlands plants are more sensitive to salinity than others, but most crops and wetlands plants can produce maximum yields with salinity of less than 500 mg/l in the applied water. A salinity of 2,000 mg/l is considered an upper limit for acceptable applied water, with severe salinity problems above this salinity level. The water quality of each well would be tested for salinity and other parameters as part of the established SLDMWA GMP monitoring program, and the landowner (or district) would decide whether to develop and use the well.

Because groundwater from the new wells would be used for flooded wetlands, water use would be restricted only by the requirements of the wetland plants or forage crops and the availability of surface water to blend with the groundwater. High levels of TDS or selenium in groundwater could be a concern for wetland managers. Because landowners would be able to blend well water with surface water, most new wells are expected to have acceptable water quality with TDS of less than 1,500 mg/l. Direct salinity impacts of the Proposed Action on wetland plants or forage crops would not be significant.

Impact Water-6: Increased Pumping Increases Salinity of Drainage Water and Groundwater

Groundwater pumping of higher-salinity water would increase the salinity near the top of the unconfined aquifer (or shallow perched aquifer) because the wetland drainage water salinity would be higher than the pumped water salinity because of evaporation and transpiration losses. The Proposed Action would not cause significant overall deterioration of water quality in shallow groundwater because the amount of additional groundwater pumping represents only a small fraction of the total amount of water applied to the wetlands and associated crops in Region 4. Poor water quality (salinity, selenium, and boron) in shallow groundwater is a problem in some regions of the San Joaquin Valley, but the problem would not be substantially increased by the Proposed Action. This impact would not be significant.

Impact Water-7: Reduced Surface Water as a Result of Groundwater Pumping

The additional groundwater pumping associated with the Proposed Action is not expected to significantly draw down the aquifer as a whole, but pumping at individual wells could cause local depressions in the groundwater elevation, which potentially could affect local surface water (i.e., ponds or wetlands). This effect would occur only if there is a hydraulic connection between the aquifer and the surface water. If the surface water is isolated from the groundwater either by dry soil or by an impermeable clay layer, groundwater pumping is unlikely to affect surface water.

Because the new Region 4 wells would be screened below the Corcoran Clay there would be almost no effect on groundwater elevations in the unconfined aquifer (Figures 3.1-3 and 3.1-4). This impact would not be significant.

Cumulative Effects

Groundwater overdraft, subsidence, and groundwater quality are cumulative water resources issues of concern in the San Joaquin Valley. This cumulative analysis relied primarily on the CVHM and was based on the Proposed Action combined with the additional 43 wells proposed by Reclamation for Regions 1, 2, and 3. The location of these wells is shown in Figure 3.1-5. There are insufficient data on other potential groundwater development projects to be included in the model. The Proposed Action could contribute slightly to these potential problems.

This slight contribution may be overstated because some of these wells could be constructed in the absence of funding provided by Reclamation. However, it was assumed that no wells would be constructed under the No Action Alternative because it is difficult to determine how many wells would be constructed in the future, and where they would be constructed. Based on personal communications with the participating districts and the last two years of drought where many wells have been constructed in the San Joaquin Valley without ARRA funding, this assumption may exaggerate the incremental contribution of the Proposed Action.

The CVHM model (Faunt et al. 2009) was used to simulate the long-term variations in San Joaquin Valley groundwater conditions, including the cumulative effects of the 49 ARRA new wells (six within Region 4) on the groundwater elevations of the unconfined aquifer above the Corcoran Clay and the confined aquifer below the Corcoran Clay. The long-term changes in groundwater elevations indicate the effects of drought conditions (increased pumping) and wet year conditions (increased recharge) in the conjunctive water use patterns within the region of the ARRA new wells. The cumulative impacts assessment also relies on the existing GMPs that require water elevation monitoring and are intended to assist managers in maintaining aquifer water elevations within the recent historical range, to prevent long-term groundwater overdraft and minimize additional land subsidence.

Figure 3.1-5 shows the cumulative drawdown estimated for the end of the six-year drought of 1987–1992. There were a total of 28 new wells above the Corcoran Clay (shown on left-side map) and a total of 21 new wells below the Corcoran Clay (shown on right-side map). The simulated reductions in water elevations in the unconfined aquifer were generally less than five feet. The simulated incremental reductions in groundwater elevations in the unconfined aquifer due to cumulative pumping were less than five feet throughout most of the area shown on Figure 3.1-5. The simulated reductions in the groundwater elevations in the confined aquifer were less than 10 feet throughout most of the area shown on Figure 3.1-5, except in the vicinity (within a mile) of the new wells. The overlap of hydraulic effects from wells in each of the four regions was generally small because the regions are generally separated from each other by at least 10 miles. The changes in the groundwater elevations caused by historical pumping between wet years (with minimum groundwater pumping) and dry years (with five times the minimum groundwater pumping) are much larger than the cumulative effects from these 49 new wells (six within Region 4). Because the simulated groundwater elevations within the confined and unconfined aquifers returned to the historical groundwater elevations after the drought period, there would not be any cumulative impacts from the Proposed Action, as further described below.

Groundwater Overdraft

Groundwater overdraft is unlikely because these new wells would be part of a GMPs (Boyle 2007; AECOM 2009) for conjunctive drought water supply (i.e., during most years irrigation with surface water supplies would be augmenting the aquifer recharge). The simulated cumulative groundwater elevations returned to historical elevations after the drought period. Therefore, the contribution of Region 4 pumping to cumulative impacts on aquifer overdraft would not be significant.

Land Subsidence

The Proposed Action is not expected to result in land subsidence which is often associated with lowered groundwater elevations caused by groundwater pumping in areas with high clay content. Because pumping from the ARRA new wells would be part of the conjunctive GMPs and did not cause groundwater elevations to drop below historical elevations, there would be no cumulative effect on subsidence.

Increased Shallow Groundwater Salinity

Groundwater pumping of water with higher salinity than surface irrigation water would increase the salinity applied to flooded wetlands and associated crops. The

salinity of the drainage water also would be slightly higher. Increased salinity of the shallow groundwater is a cumulative impact for the San Joaquin Valley groundwater basin, but the Proposed Action would not cause substantial deterioration of water quality in drainage water or shallow groundwater because the amount of groundwater pumping associated with the Proposed Action represents less than 2 percent of the total amount of dry year conjunctive pumping in the vicinity of the new ARRA wells, and most of the wells would be used in only about half of the years (Region 4 wells would be used every year). Furthermore, the majority of the applied water in Region 4 is from surface water with a much lower salinity. This cumulative shallow groundwater salinity impact would not be substantially increased by the Proposed Action.

3.2 Land Use

3.2.1 Affected Environment

Region 4 is located in the San Joaquin Valley of California, in Merced County. As part of the Proposed Action, six wells would be constructed in the region.

Environmental Setting

Merced County

Public/quasi public land is the second largest land use in Merced County, totaling approximately 131,582 acres (10.8 percent) of unincorporated land and is generally located in the central portion of the county (Merced County 2007). Open space lands total approximately 40,826 acres (3.4 percent) of unincorporated Merced County land. Six project wells would be constructed in Merced County, which has a total of 593,494 acres of important farmland (CDC 2008). Five of the six wells, Wells G-2, G-3, G-4, G-5, and G-6, are located within the boundaries of the Grassland Ecological Area, which is composed of private wetlands and grasslands, as well as federal and state lands (USFWS 2010). Perpetual conservation easements have been placed on the private lands, and the landowners are responsible for land management. Some of the parcels are devoted to grazing and the production of “wildlife-friendly” grains. All six wells are managed as duck ponds in wetland areas. Wells G-1 and G-6 are located on land owned by CDFG, and the remaining wells are proposed on properties owned by duck clubs. Table 3.2-1 provides land use information for each well, including the county zoning designation, the California Department of Conservation (CDC) farmland mapping designation, whether the proposed well would be constructed on a property under Williamson Act contract (defined below under the Regulatory Setting section), and the water district of which the land is a part.

Table 3.2-1. Merced County Land Characteristics

Well No.	Zoning	Farmland Designation	Williamson Act Contract
G-1	Public/Quasi Public	Farmland of Local Importance	No
G-2	Open Space	Grazing	No
G-3	Open Space	Grazing	No
G-4	Open Space	Grazing	No
G-5	Open Space	Grazing	No
G-6	Public/Quasi Public	Grazing	No

Regulatory Setting

Farmland Protection Policy Act

The purpose of the Farmland Protection Policy Act (FPPA) is to minimize the extent to which federal programs contribute to the irreversible conversion of farmland to nonagricultural uses, and to ensure that federal programs are administered in a manner that will be compatible with state, local, federal, and private programs and policies to protect farmland. For the purpose of the FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be used currently for agriculture. These lands may be forest land, pasture land, cropland, or other land but may not be water or urban built-up land.

Farmland Designations

The CDC produces maps used for analyzing impacts on California's agricultural resources. Agricultural land is rated according to soil quality and irrigation status. Prime farmland has the best combination of physical and chemical characteristics to sustain long-term agricultural production. Farmland of statewide importance is similar to prime farmland, but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Unique farmland consists of lesser-quality soils used for the production of the state's leading agricultural crops and usually is irrigated. Farmland of local importance is land that does not meet the definitions of prime, statewide, or unique, but is or has been used for irrigated pasture, dryland farming, confined livestock, aquaculture, and grazing land.

Williamson Act

The Williamson Act enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. No wells in Region 4 are located on properties under Williamson Act contracts.

Merced County General Plan

The Merced County General Plan has an Open Space/Conservation Element that contains goals and policies to preserve open space lands for future generations while supporting the county's anticipated population growth.

3.2.2 Environmental Consequences

This section quantitatively describes the land use effects of constructing and operating the six groundwater wells in Region 4.

No Action Alternative

Under the No Action Alternative, the six wells would not be constructed, and significant effects on land use, such as reduction of wetlands, would be expected to occur during water shortages.

Proposed Action

Impact LU-1: Permanent Conversion of Important Farmland

Under the Proposed Action only one well (Well G-1) would be constructed in an area that is considered important farmland. The well would permanently occupy an area of approximately 30 feet by 30 feet, which would mean a total permanent loss of approximately 0.02 acre of important farmland. The permanent conversion of important farmland would be negligible compared to the total important farmland in Merced County. Also, while there may be a permanent loss of important farmland, the purpose of the wells is to supply water in dry years to sustain wetlands and duck ponds, which would maintain the current land use. As such, this impact is not significant.

Impact LU-2: Temporary Loss of Important Farmland

Under the Proposed Action, Well G-1 would have a temporary disturbance area of approximately 10,000 square feet in an area designated as important farmland. However, because the area around the proposed well is not currently used for

agriculture, there would be no loss of production. Also, similar to the effects of Impact LU-1, the total amount of important farmland that would be temporarily disturbed would be negligible compared to the total amount of important farmland in the county. Additionally, the disturbance area would be only temporary, and the area would be returned to its original use following the completion of construction activities. As such, this impact is not significant.

Impact LU-3: Compromise Management of Wetland Habitats

Under the Proposed Action, GWD would have increased water supply during dry years. This increase in supply would allow the GRCD to have better management of refuges during years when they have lower surface water elevations, which would help maintain their use under their conservation easement. As such, this impact is beneficial.

Impact LU-4: Conversion of Open Space and Public/Quasi Public Land

Under the Proposed Action, five wells would be located in either open space or public/quasi public land, which would permanently affect approximately 0.10 acre. However, water supply from the wells would help sustain the refuges in the surrounding area during dry years, which would not be a conflict with existing land use. Additionally, the proposed wells would not conflict with adjacent land uses, as the surrounding lands are used for similar purposes. As such, this impact is not significant.

Cumulative Effects

The Proposed Action involves only a minor conversion of open space, public/quasi public, and CDC-designated important farmland. The wells would be consistent with existing surrounding land uses, and their operation would enhance recreation. Combined with other projects, there would not be any significant cumulative impacts.

3.3 Biological Resources

This section describes the existing environmental conditions and the consequences of constructing the Proposed Action alternatives on biological resources. For the purpose of this EA, biological resources include vegetation, wildlife, and waters of the United States. There is no suitable aquatic habitat for fisheries resources in the action area and therefore, fisheries resources (including federally listed fish) are not discussed in this section.

Table 3.3-1 provides a summary of the sensitive biological resources associated with each well and associated power and water tie-ins.

Table 3.3-1. Sensitive Biological Resources Identified as Potentially Occurring in Proposed Action Study Area

Well ID #	Well	Water Tie-In	Power Tie-In	Habitat in Study Area	Resources
G-1	X	X	X	Fallow agricultural field; canal; Gadwall Unit (CDFG managed)	Potential habitat present for SJKF/BUOW/AMBA Observed red-tailed hawk nest approximately0.5 mile southeast on access road (4 fledged hawks were observed on ground near nest)
G-2	X	X	X	Grassland; alkali wetlands; canal	Potential habitat present for SJKF/BUOW/GGS/AMBA USACE-jurisdictional wetlands delineated in the study area
G-3	X	X	X	Canal; alkali wetlands	Potential habitat present for SJKF/BUOW/GGS/AMBA USACE-jurisdictional wetlands delineated in the study area
G-4	X	X	X	Canal; irrigation ditch; alkali wetlands	Potential habitat present for SJKF/BUOW/GGS/AMBA USACE-jurisdictional wetlands delineated in the study area
G-5	X	X	X	Canal; irrigation ditch	Potential habitat present for SJKF/BUOW/GGS/AMBA
G-6	X	X	X	Ruderal grassland; cement-lined ditch adjacent to alkali wetlands	Potential habitat present for SJKF/BUOW/GGS/AMBA USACE-jurisdictional wetlands delineated in the study area

3.3.1 Affected Environment

Action Study Area

The biological study area included the following Proposed Action elements: the temporary construction footprint, the permanent well structure and pad, connection of the well power source to existing Pacific Gas and Electric Company (PG&E) electrical transmission lines, and connection of well sites to existing

water conveyances. No downstream effects would occur because the water from the new wells would be going into distribution canals or applied directly to wetlands. The temporary construction footprint at each proposed well location was assumed to encompass approximately 10,000 square feet, with additional temporary access to water and power, where necessary, whereas the permanent well and pad are expected to encompass up to 1,100 square feet. However, Reclamation expects that the actual permanent footprint would be much less than 1,100 square feet in size. Construction staging is assumed to be sited within the temporary construction footprint. The study area included an additional 250 feet outside these Proposed Action elements to support an evaluation of the total area of potential effect on biological resources.

Sources of Information

The key sources of information consulted to prepare this biological resources section are listed below.

- A California Natural Diversity Database (CNDDB) records search for the action area. (Appendix B) (2010. RareFind 3, Version 3.1, March 2010 update) Sacramento, California: California Department of Fish and Game.).
- A USFWS list (dated May 14, 2010) of endangered, threatened, and candidate plant species for the San Luis Ranch, Los Banos, and Gustine USGS 7.5-minute quadrangles (Appendix B; USFWS 2010).
- The California Native Plant Society's (CNPS's) 2010 online Inventory of Rare and Endangered Plants of California (2010. Inventory of Rare and Endangered Plants of California. Available: <http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi>. Accessed: April 2010.)
- Hickman, J. C., ed. 1993. *The Jepson Manual: Higher Plants of California*. Berkeley, CA: University of California Press.
- USFWS. 1996a. *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants*. September 23. Sacramento, CA.
- Aerial imagery source: ESRI I3 Prime Imagery

Field Survey

Biological field surveys were conducted in the study area (as defined above) on April 29, May 24, and June 11, 2010. Biologists also met with Steve Miyamoto, CDFG wildlife manager for the North Grasslands Wildlife Management Area, on May 21, 2010. Mr. Miyamoto provided access and background information for two well sites: G-1, which is in the Gadwall Unit, and G-6, which is in the China

Island Unit. The team used a combination of aerial photograph interpretation, pedestrian surveys at select well and water and power tie-ins, and driving along access roads to these project elements. In general, the purpose of the field surveys was to:

- Characterize existing conditions, habitat types, and wildlife habitat uses.
- Evaluate the potential for occurrence of special-status species and locate special-status species or signs of those species that may have been identifiable during the April and May field visits.
- Determine the need for additional field surveys (e.g., return botanical surveys to identify late-blooming special-status species).
- Identify and map areas that may qualify as waters of the United States and subject to regulation by the USACE under Section 404 of the CWA.
- Gather enough baseline information to assist Reclamation in identifying measures to avoid effects on sensitive biological resources (including special-status species habitat and USACE-jurisdictional wetlands and other waters).

3.3.2 Existing Conditions

Habitat Types

The action area is dominated by natural and managed wetland systems that are associated with private wetlands and the CDFG's North Grasslands Wildlife Management Area. The four primary habitat types found in the Proposed Action study area and described below are annual grassland, agriculture, wetlands, and irrigation ditches and canals. As indicated in Table 3.3-1 and described below, wetlands occur in the Proposed Action study area but not within the direct impact area. As described under *Environmental Consequences*, wetlands that occur adjacent to the well pads and water and power tie-ins will be avoided as part of the Proposed Action.

Annual Grassland

Annual grassland occurs in upland inclusions with managed wetland areas, fallow fields, canals, and along public and private agricultural roads in the action area. Annual grasses are the dominant species and consisted of soft chess (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), slender wild oat (*Avena barbata*), and Italian ryegrass (*Lolium multiflorum*). Other nonnative annual grasses observed were foxtail barley (*Hordeum murinum* spp. *leporinum*) and rattail fescue (*Vulpia myuros* var. *myuros*). Nonnative forbs that tend to colonize disturbed area quickly also were well represented, and species observed were yellow star-thistle (*Centaurea solstitialis*), stinkweed (*Dittrichia graveolens*),

Russian thistle (*Salsola tragus*), black mustard (*Brassica nigra*), prickly lettuce (*Lactuca serriola*), bristly ox-tongue (*Picris echioides*), and Mediterranean mustard (*Hirschfeldia incana*).

Annual grasslands provide breeding and foraging habitat for small mammals, birds, amphibians, and reptiles. Annual grasslands also provide foraging habitat for coyote (*Canis latrans*) and many birds, including red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), great horned owl (*Bubo virginianus*), and western meadowlark (*Sternella neglecta*). Grasslands near open water also may be used by a wide variety of waterfowl and wading birds that require resting, breeding, and foraging areas close to water. Annual grassland provides habitat for special-status wildlife, including northern harrier (*Circus cyanus*), San Joaquin kit fox (*Vulpes macrotis mutica*), and American badger (*Taxidea taxus*).

Agriculture

Agricultural lands occur adjacent to the action area and include alfalfa, orchards, and fallow fields. Many species of rodents and birds have adapted to agricultural lands, but they are often controlled by fencing, trapping, and poisoning to prevent excessive crop losses. However, certain agricultural lands have become important habitats for wintering waterfowl and breeding and wintering raptors.

Wildlife species associated with agricultural lands include mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), Brewer's blackbird (*Euphagus cyanocephalus*), sandhill crane (*Grus canadensis*), various raptor species, egrets, and many species of rodents (Mayer and Laudenslayer 1988). Special-status wildlife that may forage in alfalfa fields in the study area include northern harrier (*Circus cyaneus*), Swainson's hawk (*Buteo swainsoni*) and San Joaquin kit fox.

Wetlands

A variety of natural and managed wetland systems occur adjacent to the Proposed Action study area. Wetland systems were delineated within the study areas for Well #G-2, G-3, G-4, and G-6. Most of these wetlands appear to be alkali wetlands and occur in low-lying, seasonally inundated areas and are dominated by a variety of seasonal and perennial plant species. Alkali wetland areas typically have a high groundwater table and the soil surface is often covered with a salty crust. Species associations vary at each of the well sites and include species that can tolerate the high salt content found in the regions soils. Typical species include saltgrass (*Distichlis spicata*), pickleweed (*Salicornia* spp.), alkali heath (*Frankenia salina*), alkali mallow (*Malvella leprosa*), alkali cordgrass (*Spartina gracilis*), alkali sacaton (*Sporobolis airoides*), Mediterranean barley (*Hordeum marrinum* ssp. *gussoneanum*), common spikeweed (*Centromadia pungens*), large-

flowered sand spurry (*Spergularia macrotheca*), and iodine bush (*Allenrolfea occidentalis*).

Seasonal wetlands provide unique habitat for a variety of aquatic invertebrates that in turn provide food for other wildlife species, including great blue heron (*Ardea herodias*), killdeer (*Charadrius vociferus*), American avocet (*Recurvirostra americana*) black-necked stilt (*Recurvirostra americana*), and greater yellowlegs (*Tringa melanoleuca*) (Zeiner et al. 1990a: 32, 192, 200, 202). In addition, amphibians such as Pacific tree frog and western toad (*Bufo boreas*) use seasonal wetlands for breeding and feeding (Zeiner et al. 1988: 64, 78). Seasonal wetlands provide suitable habitat for special-status wildlife, including vernal pool fairy shrimp (*Branchinecta lynchi*), longhorn fairy shrimp (*Branchinecta longiantennae)* and Conservancy fairy shrimp (*Branchinecta conservatio).* However, seasonal wetlands within the Proposed Action area are managed for waterfowl with fluctuating water levels that make them unsuitable for federally listed shrimp species.

Irrigation Ditches and Canals

The Proposed Action study area contains a variety of irrigation ditches and large water conveyance systems. Well #G-4, G-5, and G-6 contain irrigation ditches that support emergent wetland habitat along their banks. Dominant species include cattail (*Typha* spp.), tule (*Scirpus* spp.), poison hemlock (*Conium maculatum*), and rabbit's foot grass (*Polypogon monspeliensis*).

Open water portions of irrigation ditches and canalss provide foraging habitat for aquatic bird species such as double-crested cormorant (*Phalacrocorax auritus*) and grebes (Podicepedidae), and waterfowl. Open water habitat also may provide foraging habitat for other bird species, including belted kingfisher (*Ceryle alcyon*), swallows (Hirundinidae), and black phoebe (*Sayornis nigricans*). Emergent wetlands associated with open water habitat provide potential breeding habitat for Pacific tree frog (*Hyla regilla*) and other amphibians. Emergent wetlands also provide foraging habitat for passerine and wading birds, and small mammals. Emergent wetlands provide habitat for special-status wildlife, including giant garter snake, tricolored blackbird (nesting), and western pond turtle.

Special-Status Species

For the purpose of this EA, special-status species are those that are legally protected under the federal Endangered Species act (ESA), California Endangered Species Act (CESA), or other applicable federal or state statutes (e.g., Migratory Bird Treaty Act [MBTA]) and include the following:

- Species listed or proposed for listing as threatened or endangered under the ESA (50 CFR 17.12 [listed plants], 50 CFR 17.11 [listed animals], various notices in the *Federal Register* [proposed species]).
- Species that are candidates for possible future listing as threatened or endangered under the ESA (73 FR 75176, December 10, 2008).Species protected under the MBTA (16 USC 703), which enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds.
- Species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5).
- Animal species of special concern to the CDFG (CDFG 2009).
- Animals fully protected in California (California Fish and Game Code Sections 3511 [birds], 4700 [mammals], and 5050 [amphibians and reptiles]).

Special-Status Wildlife

Twenty-five special-status wildlife species are known or have the potential to occur in the project vicinity. The status, distribution, habitat, and potential for occurrence in the study area for each of these species are listed in Table 3.3-2. Fifteen of the 25 species identified have potential to occur in the study area based on the presence of suitable habitat or known occurrences (vernal pool fairy shrimp, longhorn fairy shrimp, Conservancy fairy shrimp, giant garter snake, western pond turtle, northern harrier, golden eagle, Swainson's hawk, white-tailed kite, western burrowing owl, loggerhead shrike, tricolored blackbird, pallid bat, San Joaquin kit fox, and American badger).

All potential habitat for fairy shrimp is greater than 250 feet from the Proposed Action and would be avoided. In addition, seasonal wetlands within the action area are managed and water levels fluctuate throughout the year making them unsuitable for fairy shrimp. There would be no significant effects on these species.

Losses of foraging habitat for northern harrier, golden eagle, Swainson's hawk, white-tailed kite, loggerhead shrike, and tricolored blackbird would be small relative to existing amount in the surrounding area. Therefore, there would be no significant effects on special-status birds' foraging habitat. Preconstruction surveys for special-status migratory birds will be conducted in all well locations that will be under construction during the breeding season.

Additionally, non-special-status migratory birds could nest in the study area (e.g., red-tailed hawks). Although these species are not considered special-status

wildlife, their occupied nests and eggs are protected by California Fish and Game Code 3503 and 3503.5 and the MBTA.

Special-Status Plants

The alkali wetlands in the action area provide suitable habitat for a variety of non-state and federally listed species. However, only one state-listed and one federally listed plant species was identified as having the potential to occur in the action area (Table 3.3-3). After conducting the field survey and reviewing existing species lists and databases for the geographic region (USFWS lists, CNDDB, CNPS Inventory of Rare and Endangered Vascular Plants of California), it was determined that the Proposed Action area has low potential to support these two species because suitable habitat is not present on the sites. In addition, no special-status plants have been recorded on or near the well sites and none were observed during the field surveys (CNDDB 2010).

Therefore, this analysis assumes that no state or federally listed special-status plants occur in the action area and none would be affected by the Proposed Action. Special-status plants are not discussed further in this section.

Table 3.3-2. Special-Status Wildlife Identified as Having the Potential to Occur in the Region 4 Study Area

Species Name	Status[1] Fed/State	Distribution	Habitat	Potential to Occur in Study Area
Invertebrates				
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/–	Streamside habitats below 3,000 feet throughout the Central Valley.	Riparian and oak savanna habitats with elderberry shrubs; elderberries are the host plant.	Would not occur—no elderberry shrubs in study area.
Conservancy fairy shrimp *Branchinecta conservatio*	E/–	Disjunct occurrences in Solano, Merced, Tehama, Ventura, Butte, and Glenn Counties.	Large, deep vernal pools in annual grasslands.	Known to occur in study area—potential habitat is more than 250 feet from study area and species would not be affected by the Proposed Action.
Longhorn fairy shrimp *Branchinecta longiantenna*	E/–	Eastern margin of central Coast Ranges from Contra Costa County to San Luis Obispo County; disjunct population in Madera County.	Small, clear pools in sandstone rock outcrops of clear to moderately turbid clay- or grass-bottomed pools.	Known to occur in study area—potential habitat is more than 250 feet from study area and species would not be affected by the Proposed Action.
Vernal pool fairy shrimp *Branchinecta lynchi*	E/–	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County. Isolated populations also in Riverside County.	Common in vernal pools; also found in sandstone rock outcrop pools.	Known to occur in study area—potential habitat is more than 250 feet from study area and species would not be affected by the Proposed Action.
Vernal pool tadpole shrimp *Lepidurus packardi*	E/–	Shasta County south to Merced County.	Vernal pools and ephemeral stock ponds.	Would not occur—study area outside species range
Amphibians				
California tiger salamander *Ambystoma californiense*	T/T	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Butte County south to northeastern San Luis Obispo County.	Small ponds, lakes, or vernal pools in grass-lands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy.	Would not occur—no suitable habitat in study area

Species Name	Status[1] Fed/State	Distribution	Habitat	Potential to Occur in Study Area
California red-legged frog *Rana draytonii*	T/SSC	Found along the coast and coastal mountain ranges of California from Marin County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County.	Permanent and semipermanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation. May aestivate in rodent burrows or cracks during dry periods.	Would not occur—study area outside species range
Western spadefoot *Scaphiopus hammondii*	–/SSC	Sierra Nevada foothills, Central Valley, Coast Ranges, coastal counties in southern California.	Shallow streams with riffles and seasonal wetlands, such as vernal pools in annual grasslands and oak woodlands.	Would not occur—no suitable habitat in study area
Reptiles				
Blunt-nosed leopard lizard *Gambelia (=Crotaphytus) sila*	E/E	Presently known from Merced County south through Kern County and along the eastern edges of San Luis Obispo and San Benito Counties	Open habitats with scattered low bushes on alkali flats, and low foothills, canyon floors, plains, washes, and arroyos; substrates may range from sandy or gravelly soils to hardpan	Would not occur—no suitable habitat in study area
Western pond turtle *Actinemys marmorata*	–/SSC	Occurs throughout California west of the Sierra-Cascade crest. Found from sea level to 6,000 feet. Does not occur in desert regions except for along the Mojave River and its tributaries.	Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests	May occur— small drainages and canals provide suitable habitat but will not be affected by the Proposed Action
Coast (California) horned lizard *Phrynosoma coronatum* (*frontale* population)	–/SSC	Sacramento Valley, including foothills, south to southern California; Coast Ranges south of Sonoma County; below 4,000 feet in northern California	Grasslands, brushlands, woodlands, and open coniferous forest with sandy or loose soil; requires abundant ant colonies for foraging	Unlikely to occur—grassland in study area is low quality.
Giant garter snake *Thamnophis gigas*	T/T	Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno.	Sloughs, canals, low-gradient streams and freshwater marsh habitats where there is a prey base of small fish and amphibians; also found in irrigation ditches and rice fields; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter.	May occur—suitable aquatic habitat in canals and drainages and suitable upland within 200 feet of aquatic habitats.

Species Name	Status[1] Fed/State	Distribution	Habitat	Potential to Occur in Study Area
San Joaquin whipsnake *Masticophia flagellum ruddocki*	–/SSC	From Colusa County in the Sacramento Valley southward to the Grapevine in the San Joaquin Valley and westward into the inner coast ranges; isolated population occurs at Sutter Buttes; known elevation range from 66 to 2,953 feet (20 to 900 meters)	Occurs in open, dry, vegetative association with little or no tree cover; occurs in valley grassland and saltbush scrub associations; often occurs in association with mammal burrows.	Unlikely to occur—grassland in study area is low quality.
Birds				
Northern harrier *Circus cyaneus*	–/SSC	Occurs throughout lowland California. Has been recorded in fall at high elevations.	Grasslands, meadows, marshes, and seasonal and agricultural wetlands.	May occur— suitable nesting and foraging habitat present. Loss of small amount of foraging habitat would not be a significant effect.
Golden eagle *Aquila chrysaetos*	PR/FP	Foothills and mountains throughout California; uncommon nonbreeding visitor to lowlands such as Central Valley	Nests on cliffs and escarpments or in tall trees overlooking open country; forages in annual grasslands, chaparral, and oak woodlands with plentiful medium and large-sized mammals.	May occur—no suitable nesting habitat in study area but suitable foraging habitat is present. Loss of small amount of foraging habitat would not be a significant effect.
Swainson's hawk *Buteo swainsoni*	–/T	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley. Highest nesting densities occur near Davis and Woodland, Yolo County.	Nests in oaks or cottonwoods in or near riparian habitats. Forages in grasslands, irrigated pastures, and grain fields.	Known to occur in study area—suitable nesting and foraging habitat in study area. Loss of small amount of foraging habitat would not be a significant effect.
White-tailed kite *Elanus leucurus*	–/FP	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills to western San Diego County at the Mexico border.	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands for foraging.	May occur in study area—suitable nesting and foraging habitat is present in study area. Loss of small amount of foraging habitat would not be a significant effect.

Species Name	Status[1] Fed/State	Distribution	Habitat	Potential to Occur in Study Area
Western burrowing owl *Athene cunicularia hypugea*	–/SSC	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. Rare along south coast.	Level, open, dry, heavily grazed or low-stature grassland or desert vegetation with available burrows.	Known to occur in study area—suitable nesting and foraging habitat present.
Loggerhead shrike *Lanius ludovicianus*	–/SSC	Resident and winter visitor in lowlands and foothills throughout California. Rare on coastal slope north of Mendocino County, occurring only in winter.	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches.	May occur in study area—suitable nesting and foraging habitat in the study area. Loss of small amount of foraging habitat would not be a significant effect.
Tricolored blackbird *Agelaius tricolor*	–/SSC	Permanent resident in the Central Valley from Butte County to Kern County. Breeds at scattered coastal locations from Marin County south to San Diego County; and at scattered locations in Lake, Sonoma, and Solano Counties. Rare nester in Siskiyou, Modoc, and Lassen Counties.	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields. Habitat must be large enough to support 50 pairs. Probably requires water at or near the nesting colony.	Known to occur in study area—suitable nesting and foraging habitat in study area. Loss of small amount of foraging habitat would not be a significant effect.
Mammals				
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelson*	–/T	Western side of the San Joaquin Valley from southern Merced County south to Kern and Tulare Counties; also found on the Carrizo Plain in San Luis Obispo County and the Cuyama Valley in San Luis Obispo and Santa Barbara Counties	Arid grasslands from 200 to 1,200 feet, with loamy soils and moderate shrub cover of atriplex and other shrub species	Unlikely to occur in study area—no suitable habitat in study area

Species Name	Status[1] Fed/State	Distribution	Habitat	Potential to Occur in Study Area
Pallid bat *Antrozous pallidus*	–/SSC	Occurs throughout California except the high Sierra from Shasta to Kern County and the northwest coast, primarily at lower and mid elevations.	Occurs in a variety of habitats from desert to coniferous forest. Most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California. Relies heavily on trees for roosts but also uses caves, mines, bridges, and buildings.	May occur—suitable crevices for roosting may be present in overcrossings along canals; may forage in study area.
Western mastiff bat *Eumops perotis californicus*	–/SSC	Occurs along the western Sierra primarily at low to mid elevations and widely distributed throughout the southern coast ranges. Recent surveys have detected the species north to the Oregon border.	Found in a wide variety of habitats from desert scrub to montane conifer. Roosts and breeds in deep, narrow rock crevices, but also may use crevices in trees, buildings, and tunnels	Unlikely to occur—no suitable roosting habitat (crevices in cliff faces, cracks in boulders, buildings, trees, and tunnels).
San Joaquin kit fox *Vulpes macrotis mutica*	E/T	Occurs principally in the San Joaquin Valley and adjacent open foothills to the west; recent records from 17 counties extending from Kern County to Contra Costa County.	Saltbush scrub, grassland, oak, savanna, and freshwater scrub.	Known to occur in study area—suitable habitat present in the study area.
American badger *Taxidea taxus*	–/SSC	Found throughout most of California except in northern North Coast area.	Suitable habitat is characterized by herbaceous, shrub, and open stages of most habitats with dry, friable soils. Dig burrows in friable soils for cover.	May occur—suitable habitat present in the study area.

Species Name	Status[1] Fed/State	Distribution	Habitat	Potential to Occur in Study Area

Notes:

Species listed in table are generated from the USFWS species list (2010) and CNDDB records (2010).

[1] Status:

Federal

E = Listed as endangered under ESA.
T = Listed as threatened under ESA.
PR = Protected under the Bald and Golden Eagle Protection Act.
– = No federal status.

State

T = Listed as threatened under CESA.
C = Candidate for listing under CESA
SSC = California species of special concern.
FP = Fully protected under California Fish and Game Code.
– = No state status.

Table 3.3-3. Federal and State Special-Status Plants With their Potential to Occur within the Region 4 Study Area

Common and Scientific Name	Legal Status[a] Federal/State	Geographic Distribution/Floristic Province	Habitat Requirements	Blooming Period	Potential to Occur in Study Area
Hoover's spurge *Chamaesyce hooveri*	T/–	Central Valley from Butte County to Tulare County	Below the high-water marks of large northern hardpan and volcanic vernal pools, below 800 feet (25–250 meters)	July–August	None. Suitable habitat not present within study area.
Delta button-celery *Eryngium racemosum*	–/E/	Northern San Joaquin Valley, adjacent Sierra Nevada foothills	Riparian scrub in vernally mesic clay depressions; 10–98 feet (3–30 meters)	June–September	None. Suitable habitat not present within study area.

Notes:

[a] Status explanations:

Federal

T = listed as threatened under ESA.

– = no listing.

State

E = listed as endangered under CESA.

– = no listing.

Regulatory Setting

State and federal regulations and laws that apply to the biological resources present in the Proposed Action area are described in this subsection.

Endangered Species Act

The ESA protects fish and wildlife species and their habitats that have been identified by the USFWS as threatened or endangered. *Endangered* refers to species, subspecies, or distinct population segments (DPSs) that are in danger of extinction through all or a significant portion of their range. *Threatened* refers to those likely to become endangered in the near future.

The ESA is administered by USFWS and the National Marine Fisheries Service (NMFS). In general, NMFS is responsible for protection of ESA-listed marine species and anadromous fishes, whereas other listed species are under USFWS jurisdiction. Provisions of Sections 7 and 9 of ESA are relevant to this project and are summarized below.

Section 7: Endangered Species Act Authorization Process for Federal Actions

Section 7 provides a means for authorizing take of threatened and endangered species by federal agencies. It applies to actions that are conducted, permitted, or funded by a federal agency. Under Section 7, the federal agency conducting, funding, or permitting an action (the federal lead agency) must consult with USFWS, as appropriate, to ensure that the proposed action will not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat.

Lead agencies determine the extent to which a proposed action would affect listed species or designated critical habitat. For the Proposed Action, Reclamation will determine whether it would result in effects. If a proposed action “may affect” a listed species or designated critical habitat, the lead agency is required to prepare a biological assessment evaluating the nature and severity of the expected effect.

If a proposed action is “not likely to adversely affect,” the lead agency drafts a letter to the USFWS or NMFS describing the proposed action and the reasons for determining that the action is not likely to adversely affect a federally listed species or designated critical habitat.

Section 9: Endangered Species Act Prohibitions

Section 9 prohibits the take of any wildlife species federally listed as endangered. Take of threatened species also is prohibited under Section 9, unless otherwise authorized by federal regulations.[1] *Take,* as defined by ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification." In addition, Section 9 prohibits removing, digging up, cutting, and maliciously damaging or destroying federally listed plants on sites under federal jurisdiction

Migratory Bird Treaty Act

The MBTA (16 USC 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703; 50 CFR 21; 50 CFR 10). Most actions that result in taking or in permanent or temporary possession of a protected species constitute violations of MBTA. USFWS is responsible for overseeing compliance with MBTA, and the U.S. Department of Agriculture's Animal Damage Control Officer makes recommendations on related animal protection issues.

Executive Order (EO) 13186 (January 10, 2001) directs each federal agency taking actions having or likely to have a negative impact on migratory bird populations to work with USFWS to develop a memorandum of understanding (MOU) that will promote the conservation of migratory bird populations. Protocols developed under the MOU must include the following agency responsibilities.

- Avoid and minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.
- Restore and enhance habitat of migratory birds, as practicable.
- Prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable.

The EO is designed to assist federal agencies in their efforts to comply with MBTA and does not constitute any legal authorization to take migratory birds. The Proposed Action would not result in a negative impact on migratory bird populations and therefore Reclamation would not need to enter into an MOU with USFWS.

[1] In some cases, exceptions may be made for threatened species under Section 4[d]. In such cases, USFWS or NMFS issues a "4[d] rule" describing protections for the threatened species and specifying the circumstances under which take is allowed.

Clean Water Act

As described above under Water Resources, the CWA operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit. Permit review is the CWA's primary regulatory tool. No fill is expected in any jurisdictional waters and therefore no CWA permits are required.

Many of the well sites occur immediately adjacent to irrigation ditches and canal systems. These ditches and canals are human-made features that convey water to an ultimate irrigation use or place of use. As defined in the in the USACE Regulatory Guidance Letter (RGL) 07-02 (dated July 4, 2007), irrigation ditches include the distribution system or parts thereof, consisting of manmade canals, laterals, ditches, siphons, and pump systems. Construction and maintenance of "irrigated ditches" are exempt from regulation

Under Section 404(f)(1)(C) of the CWA, discharges of fill material associated with construction or maintenance of irrigation ditches are not subject to regulation under Section 404 of the CWA. Ditch construction activities are defined in RGL 07-02 and include new work or work that result in an extension or expansion of an existing structure (including ditch relocation, ditch conversion into pipe, ditch lining, and placement of new control structures). Ditch maintenance is also defined under RGL 07-02 and includes excavation, re-shaping, bank stabilization, armoring, lining, and piping, and replacement of existing control structures.

Based on this guidance letter and the types of activities that are being proposed as part of the Proposed Action, the discharge of fill into irrigation ditches (including canals) would be exempt from regulation under Section 404 of the CWA. In addition, the Proposed Action would not result in a significant discernible alteration in flow or circulation, or a reduction in reach of waters of the United States.

Therefore, a Section 404 permit (e.g., Nationwide Permit [NWP] authorization) to discharge fill material into canals and irrigation ditches would not be required.

Executive Order 13112: Prevention and Control of Invasive Species

EO 13112, signed February 3, 1999, directs all federal agencies to prevent and control introductions of invasive species in a cost-effective and environmentally sound manner. The EO established the National Invasive Species Council (NISC), which is composed of federal agencies and departments and a supporting Invasive Species Advisory Committee (ISAC) composed of state, local, and private entities. The NISC and ISAC prepared a national invasive species management plan (NISC 2008) that recommends objectives and measures to implement the EO and to prevent the introduction and spread of invasive species. The EO requires consideration of invasive species in NEPA analyses, including their identification

and distribution, their potential impacts, and measures to prevent or eradicate them. Invasive species are not an issue within the action area which is heavily managed for weed control.

Executive Order 11990: Protection of Wetlands

EO 11990 (May 24, 1977) requires federal agencies to prepare wetland assessments for proposed actions located in or affecting wetlands. Agencies must avoid undertaking new construction in wetlands unless no practicable alternative is available and the Proposed Action includes all practicable measures to minimize harm to wetlands. The Proposed Action would be located immediately adjacent to wetlands. However, wetlands would be completely avoided during construction of the wells and appurtenant structures and no features would result in fill of any wetlands.

3.3.3 Environmental Consequences

Impact Assumptions

Impacts on biological resources are associated primarily with construction activities. As discussed in Section 3.1, Water Resources, the additional groundwater pumping associated with the project wells is not expected to significantly draw down the aquifer as a whole, and pumping at individual wells would not cause local depressions in the groundwater elevation. In addition, the groundwater table elevations are not expected to be close enough to the land surface to cause effects on wetland communities. There would be no significant effects on wetland communities from operations.

In assessing the magnitude of possible construction-related effects, the following assumptions were used in this analysis:

- Construction activities would include vegetation removal, soil excavation and trenching, grading, stockpiling and spreading of excavated material, installation of well and pipeline facilities, constructing a temporary percolation pond, and backfilling of materials into excavated areas.
- All equipment and vehicle staging would occur within uplands in the study area.
- If any staging areas, laydown areas, office sites, or spoils areas are identified outside the study area, they will be located within previously graded, paved, or disturbed areas that do not support any special-status plants, wildlife, wetlands/other waters, or sensitive natural communities (e.g., riparian habitat).

- These staging areas will be evaluated and approved by Reclamation prior to the contractor's use of the area.
- All proposed wells and water and power connection alignments are accessible via existing access roads (e.g., there will be no new roads constructed).
- There will be no permanent habitat losses attributable to construction of power and water utilities.
- There will be a negligible amount of permanent habitat losses attributable to construction of power utilities (the number of poles installed ranges from one to two, assuming three square feet per pole that would be a range from 0.0002 to 0.0004 acres per well).
- All potential habitat for fairy shrimp is greater than 250 feet from the Proposed Action and would be avoided; there would be no adverse effects on these species from the Proposed Action.
- Construction of the wells is proposed to begin in September 2010 and is expected to last approximately six to 24 months. Each well will take approximately two months to construct.
- All wetlands will be avoided as part of the Proposed Action and any fill material that may be discharged into irrigation ditches and canals will not require a Section 404 permit authorization and is exempt from regulation by the USACE under Section 404(f)(1)(C).

No Action Alternative

Under the No Action Alternative, no wells would be constructed and therefore, no construction- or operation-related effects would occur. However, as described above under Land Use, adverse effects, including reduction in wetlands during dry years, may continue to occur.

Proposed Action

All of the well sites have habitat and potential for biological resources. See Table 3.3-1 for a summary of habitat types and biological resources by well site.

Impact BIO-1: Potential Disturbance, Injury, or Mortality of San Joaquin Kit Fox and American Badger

With implementation of the environmental commitments described in Chapter 2, the Proposed Action would avoid disturbance, injury or mortality of the San Joaquin kit fox and American badger. Damage to or destruction of dens, direct mortality from construction vehicles or heavy equipment, direct mortality from

den collapse and subsequent suffocation, temporary disturbance from noise and human presence associated with construction activities, and harassment by construction personnel would be avoided. Avoidance measures are also incorporated as part of the Proposed Action to ensure that no exposed pipes or large excavated holes are left open after construction has finished for the day. Hence San Joaquin kit foxes and American badgers moving through the construction area would not be entrapped. The Proposed Action would have no significant effects on these species.

Impact BIO-2: Permanent Loss of Suitable Habitat for San Joaquin Kit Fox and American Badger

The Proposed Action would permanently remove approximately 0.12 acre of suitable foraging and denning (grassland) habitat for San Joaquin kit fox and American badger at all six well sites combined. The amount of habitat affected is a very small portion of the total amount of annual grassland in the project region. The permanent loss of a small amount of suitable foraging and denning habitat would not significantly affect San Joaquin kit fox and American badger because grassland surrounding the Proposed Action would continue to provide foraging and denning opportunities for these species, such that they could continue to inhabit the area around the Proposed Action. Therefore, the minor permanent loss of suitable foraging and denning habitat would not be a significant effect.

Impact BIO-3: Potential Mortality or Disturbance of Western Burrowing Owl

The ruderal annual grassland in the study area is suitable breeding and wintering habitat for burrowing owl. This species has been observed in the study area in the past, and there are known records in the project vicinity. Construction in and adjacent to occupied burrows could result in mortality of or disturbance to nesting or wintering western burrowing owls. Construction of the Proposed Action would permanently remove approximately 0.12 acre of suitable foraging or burrow habitat for this species at all six wells combined. Nesting burrowing owls are protected under the MBTA and California Fish and Game Code Sections 3503 and 3503.5. Loss of active breeding or wintering burrows or disturbance of breeding burrows resulting in mortality of young and displacement of adults is considered an adverse effect. However, with implementation of the following mitigation measures, the Proposed Action would have no significant effects on this species.

Mitigation Measure BIO-MM-3: Conduct Preconstruction Surveys for Western Burrowing Owl

The CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG 1995) recommends that preconstruction surveys be conducted to locate active burrowing owl burrows in the construction work area and within a 500-foot-wide buffer zone

around the construction area. The work area includes all areas where ground disturbance would occur, access roads, staging areas, and spoils storage areas. Reclamation will retain a qualified biologist to conduct preconstruction surveys for active burrows according to the CDFG's guidelines. The preconstruction survey will include a breeding season survey (between April 15 and July 15). In addition to the seasonal survey, a preconstruction survey will be conducted within 30 days prior to construction to ensure that no additional owls have established territories since the initial surveys. If no burrowing owls or sign (e.g., feathers, white wash, prey remains) is detected, no further mitigation is required. If burrowing owls or their sign are found, Mitigation Measure BIO-MM-2b will also be implemented.

Mitigation Measure BIO-MM-4: Avoid and Minimize Effects on Western Burrowing Owl

Reclamation will avoid loss or disturbance of western burrowing owls and their burrows to the maximum extent possible. No burrowing owls will be disturbed during the nesting season (February 1 through August 31). A 250-foot buffer, within which no construction would be permissible, will be maintained between construction activities and nesting burrowing owls. The nesting owls will be monitored periodically by a qualified biologist to ensure that nesting activities are not being disrupted. This protected area will remain in effect until August 31 or, at the CDFG's discretion and based on monitoring evidence, until the young owls are foraging independently. If accidental take (disturbance, injury, or death of owls) occurs, the CDFG will be notified immediately.

During the wintering season (September 1 through January 31), if avoidance is not possible in the work area or within 160 feet of the work area, eviction of owls may be permitted pending an evaluation of eviction plans by CDFG. The guidelines require that one-way doors be installed at least 48 hours before construction at all active burrows in the construction area so that the burrows are not occupied during construction activities. The one-way doors will be installed at that time to ensure that the owls can get out of the burrows and cannot get back in. The guidelines also require the enhancement of unsuitable burrows (enlarging or clearing of debris), or the installation of two artificial burrows for each occupied burrow that is removed, and compensation for loss of habitat. Artificial burrows will be constructed prior to the installation of one-way doors.

Impact BIO-4: Potential Disturbance of Nesting Special-Status and Non-Special-Status Migratory Birds

There are no suitable nest trees for Swainson's hawk or white-tailed kite in the study area; however, suitable nest trees may be present within 0.5 mile of each well site. Suitable nesting habitat for northern harrier, tricolored blackbird, and loggerhead shrike are present in the study area. Raptors (e.g., kites, hawks, owls)

could nest within 0.5 mile of each well site, and other birds may nest in the study area. Migratory birds and their nests are protected under both California Fish and Game Code Section 3503 (active bird nests) and the MBTA. Removal of nests or suitable nesting habitat and construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to nest abandonment. Loss of raptor and other migratory bird eggs or nests, or any activities resulting in nest abandonment, would be considered a significant impact. However, with implementation of the following mitigation measure, the Proposed Action would have no significant impact on special-status or other migratory birds.

Mitigation Measure BIO-MM-5: Avoid Construction during the Nesting Season of Migratory Birds or Conduct Preconstruction Survey for Nesting Birds

To avoid disturbing any active ground-, tree-, or shrub-nesting migratory birds, including northern harrier, Swainson's hawk, white-tailed kite, tricolored blackbird, and loggerhead shrike, construction activities will be conducted during the non-breeding season (generally between September 1 and February 28). If construction activities cannot be avoided during the nesting season (generally between March 1 and August 30), a minimum of two preconstruction surveys will be conducted by a qualified biologist to determine whether there are active nests in the construction area (within 500 feet of construction area) or any raptor nests within 0.5 mile of the construction area. The construction area is defined as any area where work will occur and includes gravel and dirt access roads and staging areas. The surveys will include a search of all trees and shrubs, as well as annual grassland areas, for ground-nesting birds. One of the surveys will be conducted no more than 14 days prior to construction. Nest sites will be marked on an aerial photograph, and the locations will be recorded using global positioning system (GPS). If the biologist determines that the areas surveyed do not contain any active nests, construction activities can commence without any further mitigation. If construction activities cease and begin again during a 12-month period, they should be reinitiated before the next breeding season begins or another set of preconstruction surveys will be conducted.

If an active Swainson's hawk nest is found, construction activities that would result in the greatest disturbance to the active nest site will be deferred until as late in the breeding season as possible.

If active raptor nests or other migratory bird nests are located on or adjacent to the project site during the preconstruction survey, and construction must occur during the breeding season, construction will not occur within 500 feet of an active nest until the young have fledged, as determined by a qualified biologist, or until Reclamation receives written authorization from USFWS and/or CDFG to proceed.

Impact BIO-5: Potential Injury or Mortality of Giant Garter Snake

In the Proposed Action area, canals, drainages, and seasonal and perennial wetlands provide suitable aquatic habitat for giant garter snake. Upland habitat within the action area includes ruderal annual grassland and ditch and canal levees at Wells G-2 through G-6 that are located within 200 feet of suitable aquatic habitat.

Activities associated with the Proposed Action that have the potential to result in potential effects to giant garter snake include:

- Construction of the five 0.02-acre well pads would result in the permanent conversion of 0.10 acre of potential GGS upland habitat to non-habitat consisting of site facilities. The well pads are likely to be even less than the 0.02 acre assumed for this analysis.
- Preparation of the well pad site and utilities including grubbing and grading during site preparation work.
- Installation of underground water pipeline.
- Movement of construction equipment and temporary increase in traffic on access roads within suitable habitat areas.

If giant garter snakes are present in suitable upland habitats within the construction area, these activities could result in direct loss of individuals and disruption of movement during the breeding season. Additionally, ground disturbance (i.e., staging, grading, and excavation) and construction of permanent project features could result in removal of suitable giant garter snake upland habitat.

Construction access to the project site would be provided primarily on existing paved and dirt public and private roads. There would be no additional impacts on giant garter snake upland habitat from road construction.

The Proposed Action area occurs within a mostly rural setting that supports relatively low traffic volumes. Construction associated with the Proposed Action would result in an increase in traffic from construction equipment and work crews entering and leaving the work area. Because construction would occur during the giant garter snake active period, an increase in vehicle trips could result in giant garter snake vehicle strikes while snakes are moving between aquatic sites or basking on roadways adjacent to aquatic habitat. However, environmental commitments included in Ch 2 would avoid the potential for vehicle strikes.

The Proposed Action would not remove or disturb suitable aquatic habitat for giant garter snake but would affect upland habitat where giant garter snakes may be present at Wells G-2 through G-6. Mortality or injury of giant garter snakes in upland habitat could occur if burrows containing individuals are crushed by construction equipment or are buried under spoils; individuals are displaced from

burrows exposing them to predators and desiccation; or individuals encounter construction equipment while migrating through the work area. The potential effects on giant garter snake are considered less than significant because the environmental commitments described in Chapter 2 to avoid and minimize effects on giant garter snake would be implemented as part of the Proposed Action.

Cumulative Effects

Potential cumulative effects on biological resources could occur as a result of development projects, other changes in land use, and the implementation of an additional 43 wells in the San Joaquin Valley as proposed by Reclamation in Regions 1, 2, and 3. These projects could result in impacts on vegetation and wildlife resources. However, the total area of sensitive habitat affected by the 49 wells is small (0.30 acres of San Joaquin kit fox and American badger habitat, and 0.10 acres of giant garter snake habitat), would be located in primarily disturbed areas, are located throughout a large geographic areas and are not contiguous. Most of the proposed wells would not affect any biological resources and environmental commitments and mitigation measures would minimize and avoid effects. These measures include preconstruction surveys, construction of ramps for kit fox and American badger, and other avoidance measures for burrowing owl. Local development projects and other projects that could affect ruderal grasslands and agricultural lands or habitats for Swainson's hawk, San Joaquin kit fox, American badger, or Western burrowing owl, combined with the Proposed Action would result in only a minor loss of these habitat types. There would be no adverse cumulative effect.

3.4 Air Quality and Climate Change

This section describes the existing conditions pertaining to air quality and the potential environmental consequences that could result from implementation of the No Action and Proposed Action. Where appropriate, mitigation measures are presented to address potentially significant effects.

3.4.1 Affected Environment

Environmental Setting

Climate and Meteorology

The Proposed Action is located in the San Joaquin Valley Air Basin (SJVAB). The climate in the basin is characterized by warm, dry summers and cool winters. Summer high temperatures often exceed 100°F, averaging in the low 90s in the northern valley and high 90s in the south. Annual precipitation in the valley

decreases from north to south, with about 20 inches in the north, 10 inches in the middle, and less than six inches in the southern part of the valley.

Local Air Quality Conditions

The existing air quality conditions in the project area can be characterized by monitoring data collected in the region. Information collected for the SJVAB indicates that in the past three years (2006–2008), the region has experienced frequent violations of the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) for ozone and particulate matter (PM2.5 and PM10)[2] (CARB 2009a).

Areas are classified as either attainment or nonattainment with respect to NAAQS and CAAQS based on local monitoring data. If a pollutant concentration is consistently lower than the state or federal standard, the area is classified as being in attainment of the standard for that pollutant. If a pollutant violates the standard for several consecutive years, the area is considered a nonattainment area. Finally, regions previously designated nonattainment areas that since have obtained attainment are designated maintenance areas.

The EPA has classified the SJVAB as a serious nonattainment area for the federal ozone standard, a nonattainment area for the federal PM2.5 standard, and serious maintenance area for the federal PM10 standard (EPA 2010). The California Air Resources Board (CARB has classified the SJVAB as a nonattainment area for the state ozone, PM2.5, and PM10 standards (CARB 2009b).

Regulatory Setting

Criteria Air Pollutants

The federal Clean Air Act (CAA), enacted in 1963 and amended several times thereafter (most recently with the 1990 Clean Air Act Amendments [CAAA]), establishes the framework for modern air pollution control. The act directs the EPA to establish NAAQS for six pollutants: ozone, carbon monoxide (CO), lead, nitrogen dioxide (NO_2), particulate matter, and sulfur dioxide (SO_2). As discussed above, California also has established air quality standards to reduce pollutant concentrations within the state. Responsibility for achieving the CAAQS, which are more stringent than federal standards, is placed on the CARB and local air districts. The NAAQS and the CAAQS are shown in Table 3.4-1.

[2] PM10 refers to particulate matter less than 10 microns in diameter and PM2.5 refers to particulate matter less than 2.5 microns in diameter.

Table 3.4-1. Applicable Federal and State Ambient Air Quality Standards

			Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria	
Pollutant	**Symbol**	**Average Time**	**California**	**National**	**California**	**National**	**California**	**National**
Ozone*	O_3	1 hour	0.09	NA	180	NA	If exceeded	NA
		8 hours	0.070	0.075	137	147	If exceeded	If fourth highest 8-hour concentration in a year, averaged over three years, is exceeded at each monitor within an area
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than one day per year
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than one day per year
(Lake Tahoe only)		8 hours	6	NA	7,000	NA	If equaled or exceeded	NA
Nitrogen dioxide	NO_2	Annual arithmetic mean	0.030	0.053	57	100	If exceeded	If exceeded on more than one day per year
		1 hour	0.18	0.100	339	NA	If exceeded	NA
Sulfur dioxide	SO_2	Annual arithmetic mean	NA	0.030	NA	80	NA	If exceeded
		24 hours	0.04	0.14	105	365	If exceeded	If exceeded on more than one day per year
		1 hour	0.25	NA	655	NA	If exceeded	NA
Hydrogen sulfide	H_2S	1 hour	0.03	NA	42	NA	If equaled or exceeded	NA
Vinyl chloride	C_2H_3Cl	24 hours	0.01	NA	26	NA	If equaled or exceeded	NA

			Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria	
Pollutant	**Symbol**	**Average Time**	**California**	**National**	**California**	**National**	**California**	**National**
Inhalable particulate matter	PM10	Annual arithmetic mean	NA	NA	20	NA	NA	NA
		24 hours	NA	NA	50	150	If exceeded	If exceeded on more than one day per year
	PM2.5	Annual arithmetic mean	NA	NA	12	15	NA	If 3-year average from single or multiple community-oriented monitors is exceeded
		24 hours	NA	NA	NA	35	NA	If 3-year average of 98th percentile at each population-oriented monitor within an area is exceeded
Sulfate particles	SO_4	24 hours	NA	NA	25	NA	If equaled or exceeded	NA
Lead particles	Pb	Calendar quarter	NA	NA	NA	1.5	NA	If exceeded no more than one day per year
		30-day average	NA	NA	1.5	NA	If equaled or exceeded	NA
		Rolling 3-month average	NA	NA	NA	0.15	If equaled or exceeded	Averaged over a rolling 3-month period

Source: CARB 2010.

Notes:

All standards are based on measurements at 25ºC and 1 atmosphere pressure. National standards shown are the primary (health effects) standards.

NA = not applicable.

* The EPA recently replaced the 1-hour ozone standard with an 8-hour standard of 0.08 part per million. EPA issued a final rule that revoked the 1-hour standard on June 15, 2005. However, the California 1-hour ozone standard will remain in effect.

The CAAA requires that all federally funded projects conform to the appropriate State Implementation Plan (SIP) so that the project does not interfere with strategies employed to attain the NAAQS. The conformity rule applies to federal projects in areas designated as nonattainment areas for any of the six criteria pollutants and in some areas designated as maintenance areas. Project-level conformance with the SIP is demonstrated through a general conformity analysis.

As discussed above, the SJVAB is classified as federal nonattainment area for the ozone and PM2.5 standards, and a maintenance area for the federal PM10 standard. Consequently, a general conformity determination must be performed to demonstrate that total direct and indirect emissions of ozone and particulate matter would conform to the applicable SIP. More specifically, the general conformity analysis must identify whether emissions of ozone precursors (reactive organic gases [ROG] and nitrogen oxides [NO_X]), PM10, and PM2.5 meet the following criteria:

- emissions are below the appropriate *de minimis* threshold, which based on the nonattainment level of the SJVAB, is 50 tons per year for ozone emissions, 100 tons per year for PM10, and 100 tons per year for PM2.5 emissions (40 CFR 51.853); and
- emissions are regionally insignificant (total emissions are less than 10 percent of the area's total emissions inventory for that pollutant).

Climate Change Regulations

On December 7, 2009, the EPA Administrator found that current and projected concentrations of greenhouse gases (GHGs) threaten the public health and welfare. The Council on Environmental Quality (CEQ) also has issued a memorandum providing guidance on the consideration of the effects of climate change and GHG emissions under NEPA (Sutley 2010). The Draft Guidance suggests that the effects of projects directly emitting GHGs in excess of 25,000 tons annually be considered in a qualitative and quantitative manner.

The State of California also has several programs in place that reduce and minimize GHG emissions. The most stringent of these are EO S-3-05 and Assembly Bill 32 (AB 32). EO S-3-05 is designed to reduce California's GHG emissions to: (1) 2000 levels by 2010, (2) 1990 levels by 2020, and (3) 80 percent below 1990 levels by 2050. AB 32 sets the same overall reduction goals as EO S-3-05 while further mandating that CARB create a plan, which could include market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases."

While these federal and state actions represent important GHG reduction efforts, no specific thresholds have been published for determining NEPA effects related to climate change.

3.4.2 Environmental Consequences

Approach and Methods

As discussed in Chapter 2, the Proposed Action would require the construction of new wells, conveyance tie-ins, and associated well facilities. Emissions associated with these activities were estimated using information summarized in the project description and the URBEMIS2007, Version 9.2.4 model. More detailed information on the emissions modeling may be found in Appendix A.

Once construction is completed, the wells would operate independently and require little to no maintenance. Criteria pollutant emissions associated with operation of the Proposed Action therefore were assumed to be negligible. No further quantification or analysis was preformed.

Water conveyance and electricity usage for pumping would generate long-term GHG emissions. These emissions were estimated using the California Energy Commission's (CEC's) water-energy proxy for the San Joaquin River and emissions factors obtained from PG&E and the California Climate Action Registry (CCAR) (CEC 2006; PG&E 2007; CCAR 2009). More detailed information on the emissions calculations may be found in Appendix A.

No Action Alternative

Under the No Action Alternative, it was assumed no wells would be constructed. Consequently, no construction or operational emissions would be generated.

Proposed Action

Impact AIR-1: Generation of Construction Emissions in Excess of Federal de Minimis Thresholds

Construction activities associated with the Proposed Action would generate short-term emissions of ROG, NO_X, CO, PM10, PM2.5, and GHGs. Emissions would originate from mobile and stationary construction equipment exhaust, employee vehicle exhaust, and dust from site grading. Construction-related emissions would vary depending on the level of activity, specific construction operations, types of equipment, number of personnel, and climatic conditions.

Table 3.4-2 provides a summary of the total emissions associated with the construction of six wells in the region. Please refer to Appendix A for additional details on the modeling methods.

Table 3.4-2. Summary of Construction Emissions (tons) under the Proposed Action

	ROG	NO_X	CO[a]	Total PM10[b]	Total PM2.5[b]	CO_2e[a,c]
Construction Emissions	0.42	3.63	1.63	0.19	0.17	418
de minimis Threshold	50	50	–	100	100	–
10% Regional Emissions[d]	13,476	20,663	–	10,939	3,843	–
Adverse?	*No*	*No*	–	*No*	*No*	–

[a] Region in attainment; no conformity analysis required.

[b] Includes emissions from dust and exhaust.

[c] Refers to carbon dioxide equivalents in which all GHGs are normalized on a scale that recasts total emissions in terms of carbon dioxide (CO_2). Please see Appendix A for more information. Emissions are presented in metric tons.

[d] CARB 2009c.

Based on Table 3.4-2, construction emissions are expected neither to exceed the federal *de minimis* thresholds nor to be regionally significant (i.e., more than 10 percent of the regional emissions inventory). Therefore, this impact is not considered to be significant.

Impact AIR-2: Expose Sensitive Receptors to Substantial Amounts of Diesel Particulate Matter

DPM, which is classified as a carcinogen by the ARB, is the primary pollutant of concern with regard to health risks to sensitive receptors. Sensitive receptors include residences, hospitals, schools, parks, and places of worship. The primary sensitive land uses in the project area are rural residences. Table 3.6-4 in Section 3.6, Noise, identifies the distances between residences and the various construction sites.

Cancer health risks caused by exposure to diesel exhaust typically are associated with chronic exposure, in which a 70-year exposure period is assumed. Although diesel-powered equipment would operate at each well site, construction is anticipated to last for only two months at each well site, which is well below the recommended cancer risk–assessment period. Moreover, DPM emissions at each site would be minimal and dissipate as a function of distance. Therefore, concentrations would be even lower at the closest rural residence (see Section 3.6, Noise). Thus, because construction would last only two months and emit minimal levels of DPM, elevated cancer risks are not anticipated. There is no significant impact.

Impact AIR-3: Generation of a Significant Level of Greenhouse Gas Emissions

GHG emissions generated by the Proposed Action can be divided into those emitted during construction and those emitted during project operations. The Proposed Action would not be affected by climate change conditions. In fact, the increased flexibility in water supply for the San Joaquin Valley may help limit the effects of climate change on agriculture in the valley.

Project Construction

GHG emissions from construction activities are primarily the result of fuel use by construction equipment and worker trips. Table 3.4-2 indicates that construction of the Proposed Action would generate 418 metric tons of GHG emissions. The emissions are equivalent to adding approximately 279 typical passenger cars to the road during the construction period (EPA 2009). These emissions are minuscule compared to state, national, and federal GHG emissions and would cease once construction activities are complete. Moreover, GHG emissions are more appropriately evaluated on a regional, state, or even national scale rather than on an individual project level. Consequently, there is no significant impact.

Project Operations

Operational GHG emissions would be emitted from electricity required to pump and convey the well water. GHG emissions associated with electricity usage are presented in Table 3.4-3. Additional details on the calculation methods may be found in Appendix A.

Table 3.4-3. GHG Emissions from Project Operations (metric tons per year)

CO_2	CH_4	N_2O	Total GHG (CO_2e)
556	0.03	0.01	558

CH_4 = methane.
N_2O = nitrous oxide.
Please refer to Appendix A for additional modeling information.

Based on Table 3.4-3, operation of the Proposed Action would generate 558 metric tons of GHG emissions per year. These emissions are equivalent to adding approximately 373 typical passenger cars to the road (EPA 2009).

Unlike criteria air pollutants, GHG emissions from project operations tend to accumulate in the atmosphere because of their relatively long lifespan. As a result, their effect on climate change is more appropriately evaluated on a regional, state, or even national scale rather than on an individual project level. Further, it is unlikely that the GHGs emitted as part of the Proposed Action would have an individually discernable effect on global climate change. There is no significant

effect. Please refer to Section 3.11, Cumulative Impacts, for additional discussion on operational GHG emissions.

Cumulative Effects

The cumulative analysis for air quality and climate change is quantitative for the cumulative emissions of the Proposed Action combined with Regions 1, 2, and 3. Other projects, including current operations, in the area likely would generate emissions, but they could not be quantified due to insufficient data.

Criteria Pollutants

Construction emissions would be short-term. As cumulative impacts, by definition, are long-term in nature, construction emissions are not anticipated to result in a cumulatively considerable impact on air quality. Because operational criteria pollutants would be minimal, they are not expected to result in cumulatively considerable emissions.

Greenhouse Gases

Because of their relatively long life span, GHG emissions tend to accumulate in the atmosphere and combine with other gasses emitted from projects in the region and state. While scientific consensus is that the cause of global climate change is the increased production of GHGs, emissions produced by the 49 wells are minuscule compared to those emitted by complex land use or development projects. Moreover, because this and the other regional analyses assume the wells would be operating at full capacity, the estimated emissions would be produced only in extreme drought years. In other words, the analyses likely overestimate the wells' contribution to global climate change.

To date, specific thresholds to evaluate adverse effects pertaining to GHG emissions have not been established by local decision-making agencies, the state, or the federal government (see Section 3.4.1). The CEQ has proposed a reference point of 25,000 tons to identify projects that warrant additional consideration in terms of their potential to contribute to global climate change. While 25,000 tons is not proposed as a threshold, it is a useful benchmark for considering possible effects of the Proposed Action.

Based on the analysis presented above for the Proposed Action and in the EAs for Regions 1, 2, and 3, the operation of all 49 wells would generate 3,881 metric tons of GHGs, which is a fraction of 25,000 tons. Considering that these emissions would be produced in about half of the drought years, the intensity of the Proposed Action is considered minor. Combined with emissions from other

development projects in the region, the wells' contribution to global climate change therefore would be negligible. There is no significant cumulative effect.

3.5 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 (NRHP). Those resources that are on or eligible for inclusion in the NRHP are referred to as historic properties.

The Section 106 process is outlined in the Federal regulations at 36 CFR 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 Officer (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. Reclamation utilizes the Section 106 process to assess an analyze effects to cultural resources.

3.5.1 Affected Environment

The San Joaquin Valley is rich in historical and prehistoric cultural resources. Cultural resources in this area would be generally prehistoric in nature and include remnants of native human populations that existed before European settlement. Prior to the eighteenth century, many Native American tribes inhabited the Central Valley. It is possible that cultural resources lie undiscovered across the San Joaquin Valley. The lands affected by the Proposed Action consist of lands that have been historically farmed for many years. Any archaeological resources that may be present have likely been impacted by the agricultural practices.

Cultural resource surveys of the project area resulted in eight cultural resources being identified. All of these resources are features of the built environment with

no evidence of archaeological resources within the project area. All the resources identified within the project area were either determined eligible or were assumed eligible for inclusion in the NRHP.

3.5.2 Environmental Consequences

No Action Alternative

Under this alternative, south-of-Delta CVP contractors would continue to use existing water supplies to meet demand. The No Action Alternative would not rise to the level of an undertaking as defined by Section 301(7) of the NHPA, therefore Reclamation would not initiate the Section 106 process. Existing conditions would prevail and effects on cultural resources would remain the same. Reclamation's decision to implement the No Action Alternative would result in no impacts to cultural resources.

Proposed Action

Under the Proposed Action, Reclamation has an undertaking pursuant to Section 301(7) of the NHPA. As a result, Reclamation has initiated Section 106 consultation with the SHPO seeking their concurrence on a finding that the proposed action will have no adverse effect to historic properties, real or assumed, within the project area. Following concurrence by the SHPO on Reclamation's finding, Reclamation will conclude the Section 106 process. Because resources will not adversely be affected pursuant to 36 CFR 800.5(b), the preferred alternative will result in no impacts to cultural resources as evaluated through the Section 106 process. Similarly, the Proposed Action would result in no impacts on cultural resources if one well were constructed and operated under the No Action Alternative.

3.6 Noise

This section describes the environmental setting for noise, the noise effects that could result from the alternatives, and any necessary mitigation measures that would reduce potentially significant effects.

3.6.1 Affected Environment

Noise Terminology

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound

waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale is used to quantify sound intensity. Because sound pressure can vary enormously within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called *A-weighting* (dBA). In general, human sound perception is such that a change in sound level of three dB is just noticeable, a change of five dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving sound level.

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level (L_{eq}), the minimum and maximum sound levels (L_{min} and L_{max}), percentile-exceeded sound levels (L_{xx}), the day-night sound level (L_{dn}), and the community noise equivalent level (CNEL). Below are brief definitions of these measurements and other terminology used in this chapter:

- **Sound.** A vibratory disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Ambient Noise.** The composite of noise from all sources near and far in a given environment exclusive of particular noise sources to be measured.
- **Decibel (dB).** A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Equivalent Sound Level (L_{eq}).** The average of sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level that in a stated period would contain the same acoustical energy as the time-varying sound that actually occurs during the same period.
- **Exceedance Sound Level (L_{xx}).** The sound level exceeded XX percent of the time during a sound level measurement period. For example L_{90} is the sound level exceeded 90 percent of the time and L_{10} is the sound level exceeded 10 percent of the time.
- **Maximum and Minimum Sound Levels (L_{max} and L_{min}).** The maximum and minimum sound levels measured during a measurement period.

- **Day-Night Level (L_{dn}).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period with five dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

L_{dn} and CNEL values rarely differ by more than one dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment.

Regulatory Setting

Federal Regulations

Noise Control Act of 1972

The federal Noise Control Act of 1972 (Public Law 92-574) established a requirement that all federal agencies administer their programs to promote an environment free of noise that would jeopardize public health or welfare. The EPA was given the responsibility for:

- providing information to the public regarding identifiable effects of noise on public health and welfare,
- publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety,
- coordinating federal research and activities related to noise control, and
- establishing federal noise emission standards for selected products distributed in interstate commerce.

U.S. Environmental Protection Agency

In 1974, in response to the requirements of the federal Noise Control Act, EPA identified indoor and outdoor noise limits to protect public health and welfare (communication disruption, sleep disturbance, and hearing damage). Outdoor L_{dn} limits of 55 dB and indoor L_{dn} limits of 45 dB are identified as desirable to protect against speech interference and sleep disturbance for residential, educational, and healthcare areas. Sound-level criteria to protect against hearing damage in commercial and industrial areas are identified as 24-hour L_{eq} values of 70 dB (both outdoors and indoors).

The Noise Control Act also directed that all federal agencies comply with applicable federal, state, interstate, and local noise control regulations. Although the EPA was given a major role in disseminating information to the public and coordinating federal agencies, each federal agency retains authority to adopt noise regulations pertaining to agency programs. The EPA can, however, require other federal agencies to justify their noise regulations in terms of Noise Control Act policy requirements. Key federal agencies that have adopted noise regulations and standards are:

- Housing and Urban Development (HUD): Noise standards for federally funded housing projects,
- Federal Aviation Administration (FAA): Noise standards for aircraft noise,
- Federal Highway Administration (FHWA): Noise standards for federally funded highway projects,
- Federal Transit Administration (FTA): Noise standards for federally funded transit projects, and
- Federal Railroad Administration (FRA): Noise standards for federally funded rail projects.

Federal Highway Administration

The FHWA has developed methods for evaluating construction noise. FHWA methods are discussed in the document entitled *Roadway Noise Construction Model User's Guide* (FHWA 2006). FHWA does not recommend specific noise level criteria for construction-type activities.

Federal Transit Administration

The FTA has developed methods for evaluating construction noise. FTA methods are discussed in the document entitled *Transit Noise and Vibration Impact Assessment* (FTA 2006). In addition, FTA (2006) recommends noise criteria for residential uses exposed to construction noise (Table 3.6-1).

Table 3.6-1. FTA Recommended Construction Noise Criteria for Residential Uses

1-hour L_{eq} (day)	1-hour L_{eq} (night)	8-hour L_{eq} (day)	8-hour L_{eq} (night)	L_{dn} (30-day average
90	80	80	70	75
Note: All values are A-weighted decibels. Day: 7:00 a.m. to 10:00 p.m. Night: 10:00 p.m. to 7:00 a.m.				

State Regulations

California requires each local government to implement a noise element as part of its general plan. California Administrative Code, Title 4, has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. Table 3.6-2 lists the state land use compatibility guidelines for land uses that apply to the proposed alternatives.

Table 3.6-2. State Land Use Compatibility Standards for Community Noise Environment

Land Use Category	Community Noise Exposure—Ldn or CNEL (dB)													
	50		55		60		65		70		75		80	
Residential—Low-Density Single Family, Duplex, Mobile Homes														
Industrial, Manufacturing, Utilities, Agriculture														

	Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, normally will suffice.
	Normally Unacceptable: New construction or development generally should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
	Clearly Unacceptable: New construction or development generally should not be undertaken.

Source: California Governor's Office of Planning and Research, November 1998.

Local Regulations

Merced County General Plan Noise Element

The Merced County General Plan is being updated. The Noise Element does not contain specific noise standards (Mintier & Associates 2007).

Merced County Noise Ordinance

Merced County's Municipal Code, Section 10.60.030, states that no person shall create any sound level that exceeds the background sound level by at least 10 dBA during daytime hours (7 a.m. to 10 p.m.) or by at least five dBA during nighttime hours (10 p.m. to 7 a.m.) when measured at or within the real property line of the receiving property. If the background sound level cannot be determined, the absolute sound level limits are as set forth in Table 3.6-3.

Table 3.6-3. Merced County Maximum Permissible Sound Levels

Residential	Nonresidential
65 dBA, L_{dn} or 75 dBA, L_{max}	70 dBA, L_{dn} or 80 dBA, L_{max}

In addition, construction noise is exempt in Merced County between the hours of 7:00 a.m. and 6:00 p.m., provided that equipment is properly muffled and maintained.

Existing Noise Conditions

Primary noise sources in the project area are cars and trucks on roads and freeways and noise from agricultural activity.

Noise-Sensitive Land Uses

Noise-sensitive land uses generally are defined as locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Noise-sensitive land uses typically include residences, hospitals, schools, guest lodging, libraries, and certain types of recreational uses.

The project area is primarily zoned Public/Quasi Public and Open Space with a few rural residences scattered throughout. The main noise-sensitive land uses in the project area are rural residences. The wells in Region 4 are all more than 1,500 feet from the nearest rural residence.

3.6.2 Environmental Consequences

Assessment Methods

The following impact discussion analyzes construction activity that could take place near various wells throughout Merced County. As discussed in Chapter 2, the Proposed Action would require the construction of new wells, conveyance tie-ins, and associated well facilities.

The noise from potential construction activities was evaluated using methodology developed by the FTA (2006) and the FHWA (2006). Operational impacts from pump noise are discussed quantitatively. The noise from potential pump activity was evaluated using methodology developed by Hoover and Keith (2000).

A noise impact would be considered adverse if it would result in:

- exposure of persons to or generation of construction noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; or
- a substantial permanent increase in ambient noise levels in the project vicinity that exceeds local general plan or noise ordinance standards, or applicable standards of other agencies.

No Action Alternative

Under the No Action Alternative, no construction or new operations would occur and noise levels would not be affected.

Proposed Action

Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Temporary Construction Noise

Construction activities would include well construction and connection, soil excavation and trenching, grading, stockpiling, and spreading of excavated material, installation of well and pipeline facilities, construction of temporary percolation ponds, and backfilling materials into excavated areas.

Construction noise was analyzed based on construction equipment that is anticipated to be used. Typical noise levels (dBA) from construction equipment pieces are shown in Table 3.6-4. To evaluate a reasonable worst-case scenario, noise from the three loudest pieces of equipment likely to operate at the same time has been evaluated. The three loudest pieces of equipment likely to be used are a truck, a backhoe, and a welder. Noise levels for these pieces of equipment were entered into a spreadsheet model based on FHWA 2006 guidelines to generate noise levels at graduated distances. Well drilling also would generate noise during

project construction, and would occur seven days a week, 24 hours a day for two weeks.

Table 3.6-4. Construction Equipment Noise

Equipment	Typical Noise Level (dBA) 50 Feet from Source
Auger drill rig	84
Truck	88
Backhoe	878
Welder	74
Source: FHWA 2006.	

Noise impacts resulting from construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance and shielding between construction noise sources and noise-sensitive areas. Individual types of construction equipment are expected to generate noise levels ranging from 74 to 88 dBA at a distance of 50 feet. Combined noise from the three loudest pieces of equipment likely to be used could reach 92 dB, L_{eq} at 50 feet.

Construction noise levels attenuate at a rate of about six dBA per doubling of distance between the source and receptor. In addition, ground effect attenuation reduces noise levels by about two dBA per doubling of distance. Table 3.6-5 shows the calculated maximum (L_{max}) and L_{eq} sound levels that would result from project construction at graduated distances and at the nearest residences. As stated above, drilling would occur seven days a week, 24 hours a day. Therefore drilling was analyzed separately from other construction activity because the drilling would occur at night. Noise levels from drilling are shown in Table 3.6-6.

Table 3.6-5. Calculated Construction Noise Levels

Distance between Source and Receiver (feet)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated L_{max} Sound Level (dBA)	Calculated L_{eq} Sound Level (dBA)
50	0	0	92	89
100	-6	-2	85	81
200	-12	-4	77	73
300	-16	-5	72	69
400	-18	-6	69	65
500	-20	-6	66	63
600	-22	-7	64	61
700	-23	-7	62	59
800	-24	-7	61	57
900	-25	-8	60	56
1,000	-26	-8	58	55
2,000	-32	-10	50	47
3,000	-36	-11	46	42
4,000	-38	-12	43	39
5,000	-40	-12	40	37
6,000	-42	-13	38	35

Table 3.6-6. Calculated Construction Noise Levels from Auger Drill Rig

Distance between Source and Receiver (feet)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated L_{max} Sound Level (dBA)	Calculated L_{eq} Sound Level (dBA)
50	0	0	84	84
100	-6	-2	76	76
200	-12	-4	68	68
300	-16	-5	64	64
400	-18	-6	60	60
500	-20	-6	58	58
600	-22	-7	56	56
700	-23	-7	54	54
800	-24	-7	52	52
900	-25	-8	51	51
1,000	-26	-8	50	50
2,000	-32	-10	42	42
3,000	-36	-11	37	37
4,000	-38	-12	34	34
5,000	-40	-12	32	32
6,000	-42	-13	30	30

As stated above, there are no noise-sensitive land uses within 1,500 feet of the wells in Region 4. Tables 3.6-5 and 3.6-6 indicate that construction and drilling noise would not exceed Merced County noise standards for residential areas within 1,500 feet. At 50 feet, drilling could exceed 75 L_{max}. However, because noise would not affect any sensitive uses, this impact would not be significant.

Impact NOI-2: Exposure of Noise-Sensitive Land Uses to Noise from Project Operations

As described in Chapter 2, each well would include a submersible, electric pump that would operate the well. The pumps would range in size from 25 horsepower (hp) to 75 hp. Pump noise at 50 feet was calculated using methodology from Hoover and Keith (2000). Noise levels for the pumps were entered into the spreadsheet model based on FHWA (2006) guidelines to generate noise levels at nearby receptors.

Table 3.6-7. Calculated Construction Noise Levels from Operational Pumps

Distance between Source and Receiver (feet)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated L_{max} Sound Level (dBA)	Calculated L_{eq} Sound Level (dBA)
50	0	0	71	71
100	-6	-2	63	63
200	-12	-4	62	62
300	-16	-5	55	55
400	-18	-6	52	52
500	-20	-6	49	49
600	-22	-7	47	47
700	-23	-7	44	44
800	-24	-7	42	42
900	-25	-8	41	41
1,000	-26	-8	39	39
2,000	-32	-10	38	38
3,000	-36	-11	37	37
4,000	-38	-12	29	29
5,000	-40	-12	24	24
6,000	-42	-13	21	21

As shown in Table 3.6-7, noise from operational pumps is not anticipated to exceed Merced County noise standards within 1,500 feet of nearby residences. This impact would not be significant.

Cumulative Effects

Noise generated during construction of the wells would be short-term. Because construction activity would be temporary, noise from these activities is not expected to result in any significant cumulative noise conditions. Likewise, operational pumps would not exceed thresholds and no other projects are anticipated to generate a cumulative effect when combined with the Proposed Action as noise effects are localized.

3.7 Indian Trust Assets

This section describes the existing environmental conditions and the consequences of constructing and operating the Proposed Action alternatives on Indian Trust Assets (ITAs).

ITAs are legal interests in property held in trust by the United States for federally recognized Indian tribes or individual Indians. An Indian trust has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset. ITAs can include land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, and instream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally recognized Indian tribes with trust land; the United States is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the United States. The characterization and application of the United States trust relationship have been defined by case law that interprets Congressional acts, executive orders, and historical treaty provisions.

Reclamation's ITA policy and NEPA-implementing procedures provide for the protection of ITAs from adverse impacts resulting from federal programs and activities.

3.7.1 Affected Environment

The nearest ITA to the Proposed Action in Region 4 is the Santa Rosa Rancheria, located approximately 77 miles southeast of the project location.

3.7.2 Environmental Consequences

Assessment of effects on ITAs was conducted by evaluating the effects described in the various preceding resource sections and determining whether any would directly or indirectly affect the Santa Rosa Rancheria or other ITAs.

Regulatory Setting

Consistent with President William J. Clinton's 1994 memorandum, "Government-to-Government Relations with Native American Tribal Governments," Reclamation assesses the effect of its programs on tribal trust resources and federally recognized tribal governments. Reclamation is tasked with actively engaging federally recognized tribal governments and consulting with such tribes on a government-to-government level (59 FR 1994) when its actions affect ITAs.

The U.S. Department of the Interior (DOI) Departmental Manual Part 512.2 ascribes the responsibility for ensuring protection of ITAs to the heads of bureaus and offices (DOI 1995). Part 512, Chapter 2 of the Departmental Manual states that it is the policy of the DOI to recognize and fulfill its legal obligations to identify, protect, and conserve the trust resources of federally recognized Indian tribes and tribal members. All bureaus are responsible for, among other things, identifying any impact of their plans, projects, programs or activities on ITAs; ensuring that potential impacts are explicitly addressed in planning, decision, and

operational documents; and consulting with recognized tribes who may be affected by proposed activities.

Consistent with this, Reclamation's Indian trust policy states that Reclamation will carry out its activities in a manner that protects ITAs and avoids adverse impacts when possible, or provides appropriate mitigation or compensation when it is not. To carry out this policy, Reclamation incorporated procedures into its NEPA compliance procedures to require evaluation of the potential effects of its proposed actions on trust assets (Reclamation July 2, 1996). Reclamation is responsible for assessing whether the Intertie has the potential to affect ITAs. Reclamation will comply with procedures contained in Departmental Manual Part 512.2, guidelines, which protect ITAs.

Reclamation's ITA policy states that Reclamation will carry out its activities in a manner that protects ITAs and avoids adverse impacts when possible. When Reclamation cannot avoid adverse impacts, it will provide appropriate mitigation or compensation.

No Action Alternative

Potential impacts on ITAs resulting from the No Action Alternative have been reviewed, and no significant effects on ITAs would occur. The wells that could be constructed under the No Action alternative are more than 77 miles from the Santa Rosa Rancheria.

Proposed Action

Potential impacts on ITAs resulting from implementation of the Proposed Action have been reviewed, and no significant effects on ITAs would occur as a result of the Proposed Action. The nearest ITA is more than 77 miles away and the Proposed Action would not affect the Santa Rosa Rancheria.

3.8 Utilities and Infrastructure

This section describes the existing environmental conditions and the consequences of constructing and operating the Proposed Action alternatives on utilities and infrastructure. These resources include water conveyance, natural gas, electricity, and stormwater drainage.

3.8.1 Affected Environment

Water Conveyance

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The primary conveyance facilities in the Proposed Action area that will be used to convey water are the J Lateral, the Main, San Luis, Santa Fe, Outside, Delta-Mendota and Arroyo canals, and the Camp 13 and Almond Drive ditches.. The DMC or CA would not be used to convey water from the proposed new wells.

Electricity

PG&E is the primary provider of electricity in the project area (CEC 2010b). PG&E transmission lines in the region are primarily 60–92 kilovolt (kV) and are interspersed through the project area. Wells G-1, G-2, and G-5 are located near these lines, but would connect into smaller kV lines for a power source.

Natural Gas

PG&E owns and operates natural gas pipelines that run along the western side of the project area, parallel to Interstate 5 (CEC 2010a). These pipelines consist of one 19- to 26-inch pipe, one 33- to 42-inch pipe, and two smaller 2- to 12-inch pipes that branch from the main pipelines and run toward Los Banos. Chevron and TOSCO own petroleum pipelines that run parallel to Interstate 5.

Stormwater Drainage

Flooding is a normal occurrence in the San Joaquin Valley because it is a natural drainage basin for the Sierra and Diablo foothill and mountain lands. The San Joaquin Valley is also the floodplain of the San Joaquin and Merced Rivers. Drainage facilities consist primarily of roadside ditches and private ponds. Localized flooding or ponding occurs more frequently in these rural areas, where drainage facilities are inadequate. Impervious surfaces in the project area are limited to roads, other small sections of pavement, and areas covered by rural residential or agricultural structures. Local drainage is dictated largely by an extensive system of agricultural ditches and drains. Because the project area is used for duck ponds, the area of each well site is flooded habitat for most of the year.

3.8.2 Environmental Consequences

This section qualitatively describes the effects related to utilities and infrastructure from the construction and operation of six proposed groundwater wells.

No Action Alternative

Under the No Action Alternative, no new wells would be constructed, and supplemental water would not be made available during dry periods. Under the No Action Alternative, there would be no new facilities constructed or operated and no construction or operation effects on utilities and infrastructure.

Proposed Action

Under the Proposed Action, six wells with conveyance connections and appurtenant structures would be constructed. Electricity to power the submersible pumps would be provided from adjacent overhead power lines, and discharge pipes would connect the wells to existing adjacent irrigation systems for use within or outside the water district. For wells with levee roads the pipeline would be trenched under the road and refilled.

Impact UTL-1: Disruption to Transmission Lines during Well Construction

The Proposed Action would involve tying into existing utility lines in order to connect four well pumps to a power source. Localized planned temporary electrical outages would be necessary to tie into the electrical line, which would result in short-term loss of power for utility users in the area of the wells. The pumps would tie into lower kV lines in order to minimize the reach of the electrical outages and affect as few users as possible. Few users would be affected as the area is largely rural, and only six wells would need to be connected. PG&E would coordinate the outages and notify users of the temporary loss of electricity. Given the factors that would minimize the outages, this impact is not significant.

Impact UTL-2: Increased Electricity Use

The Proposed Action would increase the kWh of electricity used in Merced County to run the six groundwater pumps. Table 3.8-1 shows the total electricity required to run the pumps compared to the most recent county consumption total (2007), and the percentage increase in consumption.

Table 3.8-1. Increase in Electricity Use

County	Number of Pumps	kWh Required	Current County Use (kWh)	Percentage Increase
Merced	6	1,485,520	4,102,716,003	0.036%
Source: Energy Consumption Data Management System 2008.				

The increase in electricity consumption related to the Proposed Action for Merced County would be relatively low. Given the relatively low energy use for this

primarily agricultural county, these increases are negligible and would not raise usage to a level that would adversely affect utilities in the county. This impact is not significant.

Cumulative Effects

When combined with other projects that could occur simultaneously, the impacts on utilities and infrastructure that would result from the Proposed Action alternatives would be minimal and likely would not exceed the impacts described for the Proposed Action. No other projects are expected to result in outages that would affect the same users at the same time. For any other projects that may require planned outages, the outages would be scheduled so they would not overlap and increase the amount of users affected. Additionally, the Proposed Action would increase electricity usage a negligible amount, and would not represent a significant increase when combined with increased energy demands from other projects in the area.

3.9 Socioeconomic Resources

This section describes the socioeconomic conditions in the Region 4 study area and potential effects that could occur if the proposed groundwater wells are construction and placed in operation. For purposes of this assessment, the Region 3 study area is composed of Merced County. This section describes the population, employment and income, and value of agricultural production in Merced County. Short-term socioeconomic effects would occur during construction of the wells. Long-term socioeconomic effects would occur once the wells are placed in operation.

3.9.1 Affected Environment

Population

Population in Merced County was estimated to total 259,000 persons in January 2010 (California Department of Finance [CDF] 2010a). This represents an increase of 23 percent from 2000. Approximately 31 percent of Merced County's population resides in the city of Merced followed by approximately 14 percent living in Los Banos (CDF 2010a, 2010b). Approximately 31percent of Merced County's the population is 18 years old or younger and 10 percent is 65 or older (U.S. Department of Commerce, Bureau of the Census 2010a).

Of persons residing in Merced County, approximately 85 percent report their ethnicity as white, 7 percent as Asian, 4 percent as black, and 2 percent as American Indian. Approximately 53 percent of Merced County's residents

identify themselves as being of Hispanic or Latino origin. (U.S. Department of Commerce, Bureau of the Census 2010a.)

Employment and Income

Full and part-time employment in Merced County totaled approximately 66,600 jobs in 2009, an increase of approximately 4 percent from 2000. Between 2000 and 2009, employment in Merced County peaked at 70,100 jobs in 2007. Nonfarm employment represented approximately 82 percent of total employment in 2009, and farm employment represented the remaining 18 percent. The unemployment rate in 2009 was approximately 17 percent (California Employment Development Department 2010a).

Personal income totaled approximately $6.8 billion in Merced County in 2008 (U.S. Department of Commerce, Bureau of Economic Analysis 2010a). Per capita personal income totaled approximately $27,900 in 2008 (U.S. Department of Commerce, Bureau of Economic Analysis 2010b). This is substantially less than the statewide average of approximately $44,000.

Recreation

Land management activities in the Proposed Action Area support consumptive and nonconsumptive recreation activities, including forage crops for waterfowl and migratory birds.

The Grassland Ecological Area generates more than 300,000 of the 550,000 visits per year made to Merced County for hunting, fishing, and nonconsumptive wildlife recreation. Of the 300,000 visits, approximately 64 percent is made be visitors participating in nonconsumptive recreation activities. Typical annual expenditures made by recreationists participating in activities in the Grassland Ecological Area are about $11.4 million. (Grassland Water District 2001.)

3.9.2 Environmental Consequences

This section qualitatively describes the socioeconomic effects of constructing and operating the six wells.

No Action Alternative

Under the No Action Alternative, the six wells would not be constructed and supplemental water would not be made available during dry periods. The GWD would have to rely on existing surface water and groundwater supplies. Water shortages in the district could result in an adverse effect on wetland habitats and the abundance of fish and wildlife species that are important to support

consumptive and nonconsumptive recreation opportunities. An adverse effect on employment and income could occur if recreationists reduce the number of visits made to the Grassland Ecological Area in response to less abundant fish and wildlife.

Proposed Action

Impact SOC-1: Short-Term Change in Employment and Income

Constructing and placing into operation the six wells in Region 4 would increase employment and income as a result of expenditures made to drill and place the wells into operation and to design and construct pumps, pipes, and controls. Although beneficial, the change in employment and income is not expected to be substantial compared to the overall economic activity occurring in Merced County because only six wells would be installed and construction would be completed within a few months.

Impact SOC-2: Long-Term Change in Employment and Income

Operating the six wells in Region 4 would enhance the supply of water used for refuges within and potentially outside of the Proposed Action area. Because water produced by the wells is considered a supplemental water supply, it would benefit employment and income generated in the recreation sector and the sectors that supply goods and services to recreation by helping ensure that wetland habitats are maintained during water shortages. Maintaining the quality of wetland habitats would help maintain related economic activities in Merced County.

3.10 Environmental Justice

This section describes the existing environmental conditions and the consequences of constructing and operating the Proposed Action on environmental justice. EPA defines environmental justice as the fair treatment of all people regardless of race, color, nation of origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EO 12898, signed into law by President Clinton on February 11, 1994, requires federal agencies to incorporate environmental justice into their agency missions to ensure that their actions do not disproportionately affect minority and low-income populations. Section 101 of EO 12898 calls on all federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

3.10.1 Affected Environment

Sources of information

The following key source of information was used in the preparation of this section:

- U.S. Department of Commerce, Census Bureau, American Community Surveys, 2006–2008.

Demographics

The Proposed Action is located in Merced County. The percentage of minorities residing in Merced County is 37.9. For the state of California, 39.1 percent of the population is considered to be a minority race. Table 3.10-1 illustrates the percentage of races residing in the counties. Percentages for the state of California are included for comparison.

Table 3.10-1. Race/Origin Characteristics, American Community Survey 2006–2008

	Merced County (%)	State of California (%)
Race		
White	62.2	60.9
Black or African American	3.7	6.2
American Indian or Alaska Native	1.1	0.8
Asian	6.8	12.3
Native Hawaiian and Other Pacific Islander	0.3	0.4
Some other race	22.7	16.0
Two or more races	3.3	3.4
Origin		
Hispanic	52.4	36.1

Source: U.S. Department of Commerce, Census Bureau, American Community Survey, 2006–2008.

Percentages may total more than 100% because individuals may report more than one race. Hispanic is considered an origin by the U.S. Census Bureau; therefore, those of Hispanic origin are also counted in one of the race categories.

As shown in Table 3.10-2 below, the percentage of households determined to have an income below the poverty level was 17.7 in Merced County. In the state of California, 9.6 percent of the population is determined to have an income below the poverty level.

Table 3.10-2. Race/Origin Characteristics, American Community Survey 2006–2008

	Merced County	State of California
Percent of households below poverty level	17.7	9.6
Source: U.S. Department of Commerce, Census Bureau, American Community Survey, 2006–2008.		

3.10.2 Environmental Consequences

Methods

The following methodology is based on the EPA's Environmental Justice Guidelines (EPA 1998), which states that a two-step screening process should be incorporated to determine potential impacts in the Proposed Action area (EPA 1998). The screening analysis consists of examining two questions:

1. Does the potentially affected community include minority or low-income populations (that exceed 50 percent of the population)?
2. Are the environmental impacts likely to fall disproportionately on minority and/or low-income members of the community and/or tribal resources?

When asking the above questions, the EPA provides guidance on classifying minority populations. Minority populations are those considered to be more than 50 percent of the affected area. Additionally, a minority population may be present if "the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis." (EPA 1998.)

Based on the above guidance, demographic data for Merced County were compared to data for the state of California, which was the next highest unit of analysis, to determine whether these areas had meaningfully greater minority or low-income populations. The data examined were from the U.S. Census Bureau's 2006–2008 American Community Surveys, and the key population characteristics analyzed were percentage of:

- minority population (black or African American, American Indian or Alaskan Native, Asian Native Hawaiian or other Pacific Islander, some other race, and two or more races);
- persons of Hispanic origin; and
- the population below the poverty level.

The above data indicate that Merced County has a higher percentage of some minority populations, persons of Hispanic origin, and populations living below the poverty level than the state of California.

No Action Alternative

Under the No Action Alternative, it is assumed that GWD would continue to use existing water supplies to meet demand. Potential impacts on minority and low-income populations resulting from the No Action Alternative have been reviewed, and no populations, including minority or low-income populations, would bear a disproportionate environmental or human-health effect as a result of the No Action Alternative.

Proposed Action

Impact EJ-1: Short-Term Impacts on Minority and Low-Income Populations

The Proposed Action for Region 4 would involve the construction and operation of six new wells, with conveyance connections and appurtenant structures. Potential impacts on minority and low-income populations resulting from implementation of the Proposed Action have been reviewed, and no population, including minority or low-income populations, would bear a disproportionate environmental or human-health effect as a result of the Proposed Action. Therefore, there would be no environmental justice effects resulting from the Proposed Action.

Impact EJ-2: Long-Term Change on Minority and Low-Income Populations

As noted in the previous section on Socioeconomic Resources, operating the six new wells in Region 4 would enhance water supply for refuges and wetlands. This would not result in any adverse effects on any minority or low-income population. There would be no effect.

Chapter 4 Consultation and Coordination

This chapter describes the consultation and coordination associated with the Proposed Action.

4.1 Agency Consultation and Coordination

Reclamation is required to comply with various federal laws and executive orders as part of the construction of the new wells. GWD and landowners would be responsible for operation of the wells and additional non-federal approvals and permits may be required. Table 4-1 summarizes the status of consultation and other requirements that must be met by Reclamation before the project can be completed.

Table 4-1. Summary of Environmental Compliance the New Wells Project, Region 4

Requirement	Status of Compliance
National Environmental Policy Act	Ongoing as part of this Environmental Assessment.
Federal Endangered Species Act	Concurrent with the preparation of this EA for the project, Reclamation coordinated with USFWS on San Joaquin kit fox. Reclamation determined that the Proposed Action would have no effect on kit fox. Reclamation coordinated with USFWS on giant garter snake. USFWS concurred with Reclamation that the Proposed Action would not likely adversely affect giant garter snake.
Fish and Wildlife Coordination Act	The Proposed Action does not require consultation per the Fish and Wildlife Coordination Act
Migratory Bird Treaty Act	Constructing and operating the wells will not result in an effect on migratory birds.
National Historic Preservation Act	Reclamation consulted with the SHPO. Constructing and operating the wells will not result in an adverse effect on historic properties within the study area.
Clean Air Act	Reclamation performed a conformity analysis and concluded that the project would not result in adverse air quality effects.
Clean Water Act	The project would not result in placing fill or discharge to waters of the United States.
Executive Order 11988 – Floodplain Management	The project elements would not adversely affect flood channel capacity or risk to infrastructure from flooding.
Executive Order 11990 – Protection of Wetlands	The project elements would not occur in or discharge to wetlands.

4.2 Public Review of this Environmental Assessment

The Draft EA was circulated to interested parties for a 15-day public review period that began June 17, 2010 and ended July 1, 2010. The Draft EA was posted on Reclamation's Mid-Pacific (MP) Region NEPA website. Comment letters were received from the USFWS. The response to comments is attached as Appendix C.

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Chapter 5 List of Preparers

5.1 Introduction

Following is a list of persons who contributed to preparation of this EA. This list is consistent with the requirements set forth in NEPA (Sec. 1502.17).

5.2 U.S. Department of the Interior, Bureau of Reclamation

Name	Expertise	Project Role
Shelly Hatleberg	Biological Resources	Project Manager
Janice Piñero	Environmental Regulatory Compliance	Contract Officer Representative/ Review
Kevin Clancy	Regional Drought Coordinator	ARRA Drought Projects Manager
Carolyn Bragg	Environmental Regulatory Compliance	Technical Lead
Russell W. Grimes	Environmental Regulatory Compliance	Senior Review
Adam Nickels	Archaeology and Cultural Resources	Review

5.3 CH2M HILL

Name	Expertise	Project Role
Matt Franck	CEQA/NEPA Compliance	Project Manager
Peter Lawson	Hydrogeology	CVHM Modeling
Nate Brown	Hydrogeology	CVHM Modeling
Lisa Porta	Hydrogeology	CVHM Modeling

5.4 ICF International

Name	Expertise	Project Role
Gregg Roy	NEPA compliance, economics (natural resources), water resource planning	Project Director, Socioeconomics
Jennifer Pierre	Environmental regulatory compliance, NEPA compliance, document preparation	Project Manager, Indian Trust Assets, Cumulative
Stefanie Lyster	Community affairs	Project Coordinator, Environmental Justice
Russ Brown, PhD	Hydrology	Water Resources
Anne Huber	Water quality	Water Resources
Andrew Humphrey	Water resource planning	Land Use, Utilities
Stephanie Myers	Wildlife biology	Biological Resources
Sue Bushnell-Bergfalk	Botany	Biological Resources
Karen Crawford	Archaeology	Cultural Resources
Laura Smith	Air quality/climate change	Air Quality/Climate Change
Lindsay Christensen	Noise	Noise
Matt Ewalt	Geographic information systems	GIS Support
Alan Barnard	Graphic arts	Graphic Design and Web Publication
Darle Tilly	Technical writing and editing	Lead Editor
Carol-Anne Hicks	Publications	Document Coordination and Publication

Appendix A – Air Quality Technical Information

Appendix A - Air Quality Technical Information

The purpose of this technical appendix is to describe the modeling techniques used to estimate criteria pollutant and GHG emissions associated with construction and operation of the Proposed Action.

5.5 Project Construction

5.5.1 Criteria Air Pollutants

Construction of the Proposed Action would generate short-term emissions of ROG, NOX, CO, PM10, and PM2.5. These emissions were estimated using the URBEMIS2007, Version 9.2.4 model. It was assumed that construction of each well would begin in June 2010 and last approximately 2 months. [3]

Construction is expected to occur in four phases, and none would occur concurrently. Each phase has the following estimated duration:

- Site Preparation—1 day
- Well Drilling—14 days
- Well Consturction—30 days
- Pump Installation—7 days

Based on the information summarized in the project description, the following assumptions were made for the emissions modeling:

- Each well would disturb an area of approximately 0.23 acres (100 foot by 100 foot)
- A daily maximum of 0.06 acres would be disturbed (a default assumption of one-quarter the total acreage; this ensures a conservative analysis of a worst-case scenario).

Table A-1 summarizes the pieces of diesel-powered construction equipment assumed in the emissions modeling. URBEMIS default values were used for equipment horsepower and load factors.

[3] While construction of each individual well will require approximately 2 months, not all 6 wells will be built concurrently. Rather, construction of the proposed wells will occur over a 6-24 month period.

Table A-1. Diesel-Powered Construction Equipment

Equipment		Number	Hours/day	Horsepower	Load Factor
Site Preparation					
	Backhoe	1	12	108	0.55
Well Drilling					
	Drill Rig	1	24	291	0.75
Well Construction					
	Crane	1	4	339	0.43
	Backhoe	1	4	108	0.55
	Pump	1	24	53	0.74
	Water Truck	1	8[a]	189	0.5
Pump Installation					
	Backhoe	1	8	108	0.55
	Crane	1	8	339	0.43
	Other Equipment	1	8	190	0.62
	Water Truck	1	8[a]	189	0.50

[a] URBEMIS default.

In addition to the diesel-powered construction equipment summarized in Table A-1, one light-duty gasoline-powered truck will travel one mile onsite per day during all construction phases. Emissions associated with this vehicle were quantified using URBEMIS.

Emissions from on-road workforce traffic and off-road diesel-powered delivery trucks were estimated using the number of workers per phase and the estimated delivery truck vehicle miles traveled (VMT). It was assumed that each phase would require 5 employees and that each employee would make 2 trips per day to the construction site (total of 10 trips per day). During the well construction and installation phases, it was assumed that one diesel-powered delivery truck would travel 40 miles offsite per day.

Because 6 wells would be construction in Region 4, the emissions estimated by URBMIES for the construction of a single well were multiplied by 6 to obtain total emissions for the Proposed Action.

5.5.2 GHG Emissions

GHG emissions from construction activities are primarily the result of fuel use by construction equipment and worker trips. The primary GHG emissions generated

by construction activities are carbon dioxide (CO_2), methane (CH_4), and nitrous oxides (N_2O).

CO_2 emissions were estimated using URBEMIS2007 and the assumptions described above. URBEMIS does not quantify CH_4 and N_2O emissions from off-road equipment or worker commutes. Emissions of CH_4 and N_2O from diesel equipment were determined by scaling the construction CO_2 emissions predicted by URBEMIS by the ratio of CH_4/CO_2 and N_2O/CO_2 emissions expected per gallon of diesel fuel according to CCAR (CCAR 2009). GHG emissions from worker and vendor commutes were determined by dividing the annual CO_2 emissions from construction worker and vendor commutes by 0.95. This statistic is based on EPA's recommendation that CH_4, N_2O, and other GHG emissions account for 5% of on-road emissions (EPA 2009).

In order to simplify reporting and analysis, methods have been set forth to describe emissions of GHGs in terms of a single gas. The most commonly accepted method to compare GHG emissions is the "global warming potential" (GWP) methodology defined in the Intergovernmental Panel on Climate Change (IPCC) reference documents (IPCC 1996, 2001). The IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of CO_2 equivalents (CO_2e), which compares the gas in question to that of the same mass of CO_2 (CO_2 has a GWP of 1 by definition).

Calculated emissions of CO_2, CH_4, and N_2O were converted to CO_2e and multiplied by 6 to obtain total construction emissions for the Proposed Action.

5.6 Project Operations

5.6.1 Criteria Air Pollutants

Given the limited nature and extent of maintenance activities, criteria pollutant emissions associated with operation of the Proposed Action were assumed to be minimal and were not quantified.

5.6.2 GHG Emissions

Operational-GHG emissions would be produced by electricity usage required for well pumping. The water-related energy proxy for the San Joaquin River (California Energy Commission 2006) was used to estimate annual electricity usage for each well based on their yearly production capacity (Table A-2).

Table A-2. Yearly Production Capacity and Estimated Annual Electricity Usage for Region 4 Wells

Well ID	Production (AF/Yr)	Electricity (MW/Yr)
8.01	1,100	321
8.02	1,100	321
8.03	1,100	321
8.04	1,100	321
8.05	1,100	321
8.06	1,100	321
	Total	**1,927**

Because the project would receive electricity generated by Pacific Gas and Electric Company (PG&E), the PG&E CO_2 emission factor was used to calculate CO_2 emissions (PG&E 2007). State-specific emission factors for CH_4 and N_2O were obtained from CCAR as PG&E currently does not calculate these emission factors (CCAR 2009). Table A-3 summarizes the GHG emission factors used in this analysis.

Table A-3. GHG Emission Factors for Electricity Consumption

Greenhouse Gas	Emission Factor (pounds per mega-hour)
Carbon Dioxide	635.67
Methane	0.0302
Nitrous Oxide	0.0081
Sources: PG&E 2007; CCAR 2009	

The emissions calculated for each well were converted to CO_2e and summed to obtain total operational emissions for the Proposed Action.

5.7 References

California Climate Action Registry. 2009. Climate Action Registry General Reporting Protocol Version 3.1. January. Available: <http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf>. Accessed: April 19, 2010.

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Appendix B – USFWS and CNDDB Special-Status Species Lists

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 100514032505

Database Last Updated: April 29, 2010

Quad Lists

Listed Species

Invertebrates

Branchinecta conservatio

Conservancy fairy shrimp (E)

Branchinecta lynchi

vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus

valley elderberry longhorn beetle (T)

Lepidurus packardi

vernal pool tadpole shrimp (E)

Fish

Acipenser medirostris

green sturgeon (T) (NMFS)

Hypomesus transpacificus

Critical habitat, delta smelt (X)

delta smelt (T)

Oncorhynchus mykiss

Central Valley steelhead (T) (NMFS)

Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha

Central Valley spring-run chinook salmon (T) (NMFS)

winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Ambystoma californiense

California tiger salamander, central population (T)

Rana draytonii

California red-legged frog (T)

Critical habitat, California red-legged frog (X)

Reptiles

Gambelia (=Crotaphytus) sila

blunt-nosed leopard lizard (E)

Thamnophis gigas

giant garter snake (T)

Birds

Vireo bellii pusillus
Least Bell's vireo (E)

Mammals

Dipodomys nitratoides exilis
Fresno kangaroo rat (E)

Neotoma fuscipes riparia
riparian (San Joaquin Valley) woodrat (E)

Sylvilagus bachmani riparius
riparian brush rabbit (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Amsinckia grandiflora
large-flowered fiddleneck (E)

Proposed Species

Amphibians

Rana draytonii
Critical habitat, California red-legged frog (PX)

Quads Containing Listed, Proposed or Candidate Species:

HOWARD RANCH (404A)
CROWS LANDING (424A)
PATTERSON (424B)
NEWMAN (424D)
WESTLEY (443C)
VERNALIS (444A)
TRACY (444B)
SOLYO (444D)

County Lists

No county species lists requested.

Key:

(E) *Endangered* - Listed as being in danger of extinction.

(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.

(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.

(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.

Critical Habitat - Area essential to the conservation of a species.

(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.

(C) *Candidate* - Candidate to become a proposed species.

(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.

(X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our Protocol and Recovery Permits pages.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

  During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The

Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. More info

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be August 12, 2010.

California Department of Fish and Game
Natural Diversity Database
Selected Elements by Scientific Name - Portrait
ARRA Wells Region 1, 5/14/2010

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1	Actinemys marmorata western pond turtle	ARAAD02030			G3G4	S3	SC
2	Agelaius tricolor tricolored blackbird	ABPBXB0020			G2G3	S2	SC
3	Ambystoma californiense California tiger salamander	AAAAA01180	Threatened	unknown code...	G2G3	S2S3	SC
4	Amsinckia grandiflora large-flowered fiddleneck	PDBOR01050	Endangered	Endangered	G1	S1	1B.1
5	Anthicus sacramento Sacramento anthicid beetle	IICOL49010			G1	S1	
6	Antrozous pallidus pallid bat	AMACC10010			G5	S3	SC
7	Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1			G1T1	S1.1	1B.2
8	Athene cunicularia burrowing owl	ABNSB10010			G4	S2	SC
9	Atriplex cordulata heartscale	PDCHE040B0			G2?	S2.2?	1B.2
10	Atriplex minuscula lesser saltscale	PDCHE042M0			G1	S1.1	1B.1
11	Atriplex persistens vernal pool smallscale	PDCHE042P0			G2	S2.2	1B.2
12	Blepharizonia plumosa big tarplant	PDAST1C011			G1	S1.1	1B.1
13	Branta hutchinsii leucopareia cackling (=Aleutian Canada) goose	ABNJB05035	Delisted		G5T4	S2	
14	Buteo swainsoni Swainson's hawk	ABNKC19070		Threatened	G5	S2	
15	California macrophylla round-leaved filaree	PDGER01070			G3	S3.1	1B.1
16	Caulanthus coulteri var. lemmonii Lemmon's jewel-flower	PDBRA0M0E0			G4T2	S2.2	1B.2
17	Ceratochrysis menkei Menke's cuckoo wasp	IIHYM71050			G1	S1	
18	Cirsium crassicaule slough thistle	PDAST2E0U0			G2	S2.2	1B.1
19	Coastal and Valley Freshwater Marsh	CTT52410CA			G3	S2.1	
20	Coccyzus americanus occidentalis western yellow-billed cuckoo	ABNRB02022	Candidate	Endangered	G5T3Q	S1	
21	Coreopsis hamiltonii Mt. Hamilton coreopsis	PDAST2L0C0			G2	S2.2	1B.2
22	Desmocerus californicus dimorphus valley elderberry longhorn beetle	IICOL48011	Threatened		G3T2	S2	
23	Eremophila alpestris actia California horned lark	ABPAT02011			G5T3Q	S3	

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
24	Eriastrum tracyi Tracy's eriastrum	PDPLM030C0		Rare	G1Q	S1.1	1B.2
25	Eryngium racemosum Delta button-celery	PDAPI0Z0S0		Endangered	G2Q	S2.1	1B.1
26	Eschscholzia rhombipetala diamond-petaled California poppy	PDPAP0A0D0			G1	S1.1	1B.1
27	Eumops perotis californicus western mastiff bat	AMACD02011			G5T4	S3?	SC
28	Falco columbarius merlin	ABNKD06030			G5	S3	
29	Falco mexicanus prairie falcon	ABNKD06090			G5	S3	
30	Great Valley Cottonwood Riparian Forest	CTT61410CA			G2	S2.1	
31	Great Valley Valley Oak Riparian Forest	CTT61430CA			G1	S1.1	
32	Lanius ludovicianus loggerhead shrike	ABPBR01030			G4	S4	SC
33	Lasiurus cinereus hoary bat	AMACC05030			G5	S4?	
34	Lytta moesta moestan blister beetle	IICOL4C020			G2	S2	
35	Madia radiata showy golden madia	PDAST650E0			G2	S2.1	1B.1
36	Malacothamnus hallii Hall's bush-mallow	PDMAL0Q0F0			G1Q	S1.2	1B.2
37	Masticophis flagellum ruddocki San Joaquin whipsnake	ARADB21021			G5T2T3	S2?	SC
38	Neotoma fuscipes riparia riparian (=San Joaquin Valley) woodrat	AMAFF08081	Endangered		G5T1Q	S1	SC
39	Perognathus inornatus inornatus San Joaquin pocket mouse	AMAFD01061			G4T2T3	S2S3	
40	Phacelia phacelioides Mt. Diablo phacelia	PDHYD0C3Q0			G1	S1.2	1B.2
41	Phrynosoma blainvillii coast horned lizard	ARACF12100			G4G5	S3S4	SC
42	Pogonichthys macrolepidotus Sacramento splittail	AFCJB34020			G2	S2	SC
43	Rana boylii foothill yellow-legged frog	AAABH01050			G3	S2S3	SC
44	Rana draytonii California red-legged frog	AAABH01022	Threatened		G4T2T3	S2S3	SC
45	Spea hammondii western spadefoot	AAABF02020			G3	S3	SC
46	Sycamore Alluvial Woodland	CTT62100CA			G1	S1.1	
47	Sylvilagus bachmani riparius riparian brush rabbit	AMAEB01021	Endangered	Endangered	G5T1	S1	

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
48	Symphyotrichum lentum Suisun Marsh aster	PDASTE8470			G2	S2	1B.2
49	Taxidea taxus American badger	AMAJF04010			G5	S4	SC
50	Tropidocarpum capparideum caper-fruited tropidocarpum	PDBRA2R010			G1	S1.1	1B.1
51	Vulpes macrotis mutica San Joaquin kit fox	AMAJA03041	Endangered	Threatened	G4T2T3	S2S3	

Appendix C Response to Comments on the Draft Environmental Assessment

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
81420-2010-TA-0794

JUN 23 2010

Memorandum

To: Regional Resources Management Division, Bureau of Reclamation, Mid-Pacific Regional Office

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

Subject: Draft Environmental Assessment and Finding of No Significant Impact for the Construction of Six New Wells in the Grasslands Water District, Merced County, California

This memorandum is in response to the Bureau of Reclamation's (Reclamation) Draft Environmental Assessment and Finding of No Significant Impact (DEA/FONSI) for the proposed construction of six new wells. Reclamation proposes to provide under the American Recovery and Reinvestment Act (ARRA) of 2009, funds for the purpose of constructing six new ground water pumping wells within the Grasslands Water District (GWD), a district that is a member of the San Luis Delta-Mendota Water Authority (SLDMWA) in the County of Merced, California. According to Reclamation's press release, the two week comment period closes July 1, 2010. As described in the DEA/FONSI, the proposed new wells are within habitat for the following federally-listed species: the San Joaquin kit fox (*Vulpes macrotis mutica*), the giant garter snake (*Thamnophis gigas*), the vernal pool fairy shrimp, (*Branchinecta lynchi*), the Conservancy fairy shrimp (*Branchinecta conservatio*), and the Longhorn fairy shrimp (*Branchinecta* longiantenna). The Service is providing comments pursuant the Endangered Species Act of 1973, as amended (Act).

In order to consider the effects of the new wells to listed species, the Service recommends that Reclamation provide additional information with regard to water quality. The document would benefit from, for example, data on water quality for existing conditions including but not limited to existing deep and shallow wells (i.e. above and below the Corcoran clay layer) and conveyance or canal structures. Reclamation asserts in the document that poor water FWS-1

quality effects would not be an issue because of "blending" with existing water. If the document disclosed, for example, water quality conditions for the following wells: north 08S09E10E001M and south 10S11E32N001M, and the water quality in the conveyance structures in the area, this assertion could be analyzed. FWS-1 cont'd

With regard to vernal pool listed species, effects as described in the document are unclear. According to the DEA on page 3-20,

> "Seasonal wetlands provide suitable habitat for special-status wildlife, including vernal pool fairy shrimp (*Branchinecta lynchi*), longhorn fairy shrimp (*Branchinecta longiantennae)* and Conservancy fairy shrimp (*Branchinecta conservatio).* However, seasonal wetlands within the Proposed Action area are managed for waterfowl with fluctuating water levels that make them unsuitable for federally listed shrimp species." FWS-2

Then, on page 3-23 of the DEA, the following is stated:

> "[vernal pool species are] known to occur in study area—potential habitat is more than 250 feet from study area and species would not be affected by the Proposed Action."

A distance of 250 feet is insufficient reason to assert no effect to vernal pool species. The micro-topography and direction of surface water flow should be analyzed.

The document would benefit as well from a more thorough examination of effects to the giant garter snake. When the canals and conveyance structures associated with proposed wells 4, 5, and 6 are described as having wetland vegetation consisting of tules and cattails, we can assume a likelihood of giant garter snake presence. Proposed well one is located adjacent to the California Department of Fish and Game's Gadwall Unit an area that was, at one time inhabited by the giant garter snake. With improved water quality, and improved water management, the Gadwall Unit may be restored to suitable habitat for the snake in the future and play an important role in the recovery of this species. FWS-3 FWS-4

The Service appreciates Reclamation's coordination of current and future water projects in the San Joaquin Valley. We look forward to continuing toward efforts of successful coordination that will benefit listed species in the San Joaquin Valley as well as the wildlife of the area's national refuges. If you have questions about this memorandum, please contact Daniel Russell at (916) 414-6600.

Appendix C Response to Comments on the Draft Environmental Assessment

This appendix provides responses to comments from the U.S. Fish and Wildlife Agency on the Region 4 Draft Environmental Assessment (Draft EA).

C.1 Response to Comment FWS-1

As part of the Proposed Action, test wells will be drilled prior to well construction. The test wells will provide baseline information regarding constituents that are of concern for wildlife habitat. If the test wells provide data that indicate that water quality is not suitable for wetland management, the proposed wells would not be constructed. As discussed in the Draft EA, all new wells constructed would be metered and records provided to the San Luis and Delta-Mendota Water Authority and/or U.S. Department of the Interior, Bureau of Reclamation (Reclamation) on an annual basis for groundwater monitoring and planning efforts. Water-quality monitoring would be determined based on the water use of the particular well. At a minimum, the monitoring for the proposed new wells in Region 4 would consist of groundwater levels, electrical conductivity, selenium and boron.

Unfortunately, Reclamation is unsure of the location of the wells referenced in this comment. However, once more information is provided to identify those wells, Reclamation can provide any available data gathered on those wells and any other data relevant to the Proposed Action can be provided as it becomes available.

C.2 Response to Comment FWS-2

Seasonal wetlands within the Proposed Action area are managed for waterfowl with fluctuating water levels that make them unsuitable for federally listed shrimp species or giant garter snakes. Fairy shrimp have seasonal water requirements for water including a dry down time in late spring through fall. Refuges water management is strictly for wintering waterfowl and is not usually consistent with shrimp requirements; the water is applied too early and drains too early. Giant garter snakes are active and require water starting in spring and continuing through the summer which is when the wetlands are typically dried down. This information is also provided in the Biological Assessment submitted to the FWS for the Proposed Action.

C.3 Response to Comment FWS-3

The biological assessment (BA) includes a description of giant garter snake potential upland habitat at all 6 well sites in the action area. The canals associated with each well site include some vegetation cover suitable for garter snake. The Gadwall unit itself is completely dry and may or may not be restored to wetlands because of mosquito issues with the City of Los Banos, per California Department of Fish and Game (Miyamoto pers. comm.). The canals can be wet or dry depending on water needs and Grassland Water District's delivery schedule, and they are not managed for garter snake, which would likely move out of the area when the canals dry up. Because garter snake are known to occur in the project vicinity and there is a possibility that water would be present in these canals when construction occurs, the analysis in the BA assumes that garter snake could be present and that all well sites have potential aquatic and upland habitat suitable for garter snake.

C.4 Response to Comment FWS-4

We concur that the restoration of the Gadwall unit and its management for garter snake would be a positive benefit and aid in the recovery effort for the species. As described in the response to comment FWS-3, restoration of Well G-1 would depend on mosquito abatement discussions between the City of Los Banos and California Department of Fish and Game.

References:

Miyamoto, Steve. Wildlife Manager for the North Grasslands Wildlife Management Area. California Department of Fish and Game. May 21, 2010—Field meeting at Wells #G-1 and G-6.