RECLAMATION

Managing Water in the West

Draft Environmental Assessment/Initial Study and Finding of No Significant Impact/Mitigated Negative Declaration

Pelger Mutual Water Company Groundwater Production Element Project and Sutter Mutual Water Company Groundwater Monitoring Project – Integrated Regional Water Management Program

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

Reclamation District No. 1500
15904 Cranmore Road
Robbins, CA 95676

September 2011

WBG072211183752RDD_Pelger

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.

The mission of Pelger Mutual Water Company is to develop, divert, purchase, and otherwise acquire, and to distribute, supply, and deliver water for irrigation use to its shareholders at actual cost in the most efficient and environmentally sound manner possible.

Contents

Contents, Continued

Contents, Continued

Contents, Continued

Page

Figures

Acronyms and Abbreviations

AB	Assembly Bill
ac-ft	acre-foot
APE	area of potential effects
AQMD	air quality management district
bgs	below ground surface
BMP	best management practice
CAA	Clean Air Act
CARB	California Air Resources Board
CCR	*California Code of Regulations*
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CFR	*Code of Federal Regulations*
cfs	cubic feet per second
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
District	Reclamation District No. 1500
DOC	California Department of Conservation
DOF	California Department of Finance
DWR	California Department of Water Resources
EA	Environmental Assessment
EDD	California Employment Development Department
EPA	U.S. Environmental Protection Agency
FRAQMD	Feather River Air Quality Management District
GGS	giant garter snake

GHG	greenhouse gas
gpm	gallons per minute
HFC	hydrofluorocarbon
IRWMP	Integrated Regional Water Management Program
IS	Initial Study
ITA	Indian Trust Asset
lb/day	pounds per day
µg/m^3	micrograms per cubic meter
NAAQS	National Ambient Air Quality Standards
NRHP	National Register of Historic Places
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_x	Nitrogen oxide
OHP	Office of Historic Preservation
PFC	perfluorocarbon
$PM_{2 5}$	particulate matter less than 2.5 micrometers in aerodynamic diameter
PM_{10}	particulate matter less than 10 micrometers in aerodynamic diameter
PMWC	Pelger Mutual Water Company
ppm	parts per million
RD 1500	Reclamation District No. 1500
Reclamation	Bureau of Reclamation
ROG	reactive organic gas
SACFEM	Sacramento Valley Finite-Element Groundwater Model
SF6	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMWC	Sutter Mutual Water Company
SO_2	sulfur dioxide
SVGB	Sacramento Valley Groundwater Basin

SWPPP	stormwater pollution prevention plan
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

SECTION 1

Introduction/Purpose and Need

This Environmental Assessment (EA)/Initial Study (IS) was jointly prepared by the Bureau of Reclamation (Reclamation) and Reclamation District No. 1500 (RD 1500 or District) to respectively satisfy the requirements of both the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). RD 1500 is acting as lead agency because both Pelger Mutual Water Company (PMWC) and Sutter Mutual Water Company (SMWC) are private entities.

1.1 Background

The PMWC Groundwater Production Element and SMWC Groundwater Monitoring Project (proposed project) would include installing one groundwater production well to supplement existing PMWC surface water and groundwater supplies (PMWC), and one groundwater monitoring well (SMWC). The proposed project is supported by both state and federal grant funding. State funding is made available through California Proposition 50 Integrated Regional Water Management funds administered by the California Department of Water Resources (DWR), whereby the Northern California Water Association is the grantee. The grant provides $9.5 million of funding to support the implementation of 11 projects throughout the Sacramento Valley. Federal funding is also being provided to seven districts to support their implementation of the Sacramento Valley Integrated Regional Water Management Program (IRWMP). Although the projects funded by this grant are generally similar in nature, each project has independent utility, and will be implemented by each grantee to supplement their current surface water supplies in both normal and dry years, as determined appropriate by each project proponent. Any future facilities constructed using Proposition 50 grant funds, for purposes other than supplementing a given district's water supply sources (such as a water transfer), would need to be addressed (once such actions are fully defined) and compliant with both NEPA and CEQA.

PMWC is located within the Sutter Subbasin and diverts water from the Sacramento River during the irrigation season in accordance with the terms of a water rights settlement contract with Reclamation. PMWC was formed in March 1965, and executed a water rights settlement contract with the United States in May of 1965. PMWC has one pumping facility, the Pelger Pump Station, located on the Sacramento River at River Mile 111.72.

PMWC is a long-term Sacramento River Settlement Contractor with Reclamation. In 2005, PMWC renewed its long-term contract with Reclamation, which authorizes the continued annual delivery of 8,860 acre-feet until March 31, 2045. Of that total, 7,110 acre-feet are provided as base supply[1], and 1,750 acre-feet are provided as Project water[2]. In a critical

[1]Base supply is defined as the quantity of surface water established in Articles 3 and 5 of the contract between Reclamation and PMWC that may be diverted by the Contractor from the Sacramento River each month during April through October of each year without payment to the United States for such quantities diverted.

water year, the base supply and project water can be reduced by 25 percent. PMWC also developed a recycling and recovery system that captures water from RD 1500 drains and helps with conservation and efficiency. Additional sources of supply come from three privately owned groundwater production wells within PMWC boundaries that are used to supplement surface water supplies during critical years or to support water transfers for state project and federal contractors to meet California's irrigation needs. PMWC does not provide water service for municipal and industrial use within its boundaries.

SMWC is also located within the Sutter Subbasin, approximately 45 miles northwest of Sacramento, California. SMWC was formed in 1919, encompasses approximately 50,000 acres, and serves 150 landowners. SMWC boundaries encompass the town of Robbins. The SMWC operates four pumping plants at three locations: Tisdale Pumping Plant (960-cubic-feet-per-second [cfs] capacity), State Ranch Bend Pumping Plant (128 cfs), and Portuguese Bend Pumping Plant (106 cfs). SMWC also has nine booster pump sites (they typically operate four to five in any given year) and one internal recirculation system with a total combined capacity of 290 cfs per day. These facilities are used for drainwater reuse and are located in the central and northeast portions of SMWC. SMWC does not provide water service for municipal and industrial use.

1.2 Scope, Project Location, and Setting

The proposed PMWC production well would be in Sutter County, California (Township 13 North, Range 01 East, 121° 48′ 36.00″ West longitude, 38° 57′ 53.00″ North latitude in the U.S. Geological Survey [USGS] Kirkville 7.5-minute quadrangle), approximately 9 miles northwest of the town of Robbins, west of Cranmore Road, and adjacent to an existing concrete-lined irrigation canal (see Figure 1-1; figures are located at the end of the section in which they are first referenced).

Three potential groundwater monitoring well sites are proposed in this EA/IS for SMWC (see Figure 1-2). One of the three following options would be selected:

- **Option 1 –** The proposed monitoring well would be located in a 0.6-acre area, in Sutter County, California (Township 14 North, Range 02 East, Section 33, 121° 44′ 35.89″ West longitude, 39° 01′ 14.44″ North latitude in the USGS Gilziser Slough 7.5-minute quadrangle), approximately 10 miles north of the town of Robbins.
- **Option 2 –** The proposed monitoring well would be located in a 0.4-acre area, in Sutter County, California (Township 14 North, Range 02 East, Section 32, 121° 46′ 53.93″ West longitude, 39° 01′ 28.93″ North latitude in the USGS Tisdale Weir 7.5-minute quadrangle), approximately 11 miles north of the town of Robbins.
- **Option 3 –** The proposed monitoring well would be located in a 0.5-acre area, in Sutter County, California (Township 13 North, Range 02 East, Section 16, 121° 44′ 35.89″ West longitude, 39° 01′ 14.44″ North latitude in the USGS Kirkville 7.5-minute quadrangle), approximately 8 miles north of the town of Robbins.

[2] Project water is defined as all surface water diverted or scheduled to be diverted each month during April through October of each year by the Contractor from the Sacramento River that is in excess of the base supply.

1.3 Purpose and Need and Project Goals and Objectives

1.3.1 Purpose and Need

The purpose of the proposed project is to augment surface water supplies for PMWC by installing and operating one groundwater production well, and to increase the understanding of aquifer characteristics within the SMWC service area by installing one groundwater monitoring well. These projects were made possible through a funding partnership with DWR (Proposition 50 IRWMP Implementation funding) and the Reclamation Act of 1902 (32 Stat. 388), as amended and supplemented; Public Law 108-361, Section 103(d)(5), Section 9504(a). Under the Sacramento Valley IRWMP Grants Program, Reclamation provides financial assistance to support activities that promote the preparation and revision of written regional water management and conservation plans, implement activities identified in written water management plans, demonstrate new or previously unknown water management technologies and practices, and promote improved understanding of good water use practices and principles. Reclamation is providing financial assistance to PMWC and SMWC for Sacramento Valley IRWMP revision and implementation.

The need for these projects is based on a desire to improve the flexibility and reliability of the Companies' water supply, particularly during dry and critically dry water years, and to gain a better understanding of local aquifer characteristics while also helping to reduce local and regional water supply conflicts. SMWC would install the proposed monitoring well as part of its initial planning phase to develop a reliable supplemental groundwater program. This phase of work would enable SMWC to evaluate the potential for future conjunctive groundwater/surface water use and the potential need for expanding groundwater monitoring in the SMWC service area in the future.

1.3.2 Project Goals and Objectives

The primary objective for PMWC is to improve water delivery flexibility and reliability to the PMWC service area by installing a groundwater production well. The project goals are as follows:

- Increase system reliability and flexibility on a local and regional basis
- Offset reductions in Sacramento River diversions during drought and designated critical years
- Periodically reduce Sacramento River diversions, when feasible
- Increase in-stream Sacramento River flows, resulting in ecological benefits
- Adequately expand existing and developing network of groundwater monitoring infrastructure within the local service area

The primary objective for SMWC is to develop a groundwater monitoring well that would provide the necessary data to determine the next course of action in developing a reliable supplemental groundwater source. The project goals are as follows:

- Initiate the redevelopment of a Sutter Subbasin network of groundwater monitoring infrastructure
- Enhance subbasin conflict resolution capabilities by updating local policies
- Provide a roadmap for groundwater infrastructure development

1.4 Applicable Regulatory Requirements and Required Coordination

Federal laws, permits, licenses, and policy requirements have directed, limited, or guided the NEPA and CEQA analyses and decision-making process of this EA/IS and include the following (full discussions of these related authorizations are provided in Section 4, Consultation and Coordination):

- **U.S. Fish and Wildlife Service (USFWS) –** Federal Endangered Species Act (ESA)
- **California Department of Fish and Game (CDFG) –** California Endangered Species Act
- **Regional Water Quality Control Board –** National Pollutant Discharge Elimination System permit
- **State Historic Preservation Officer (SHPO) –** Section 106 consultation
- **Sutter County Well Installation Permits**
- **RD 1500 Groundwater Management Plan**

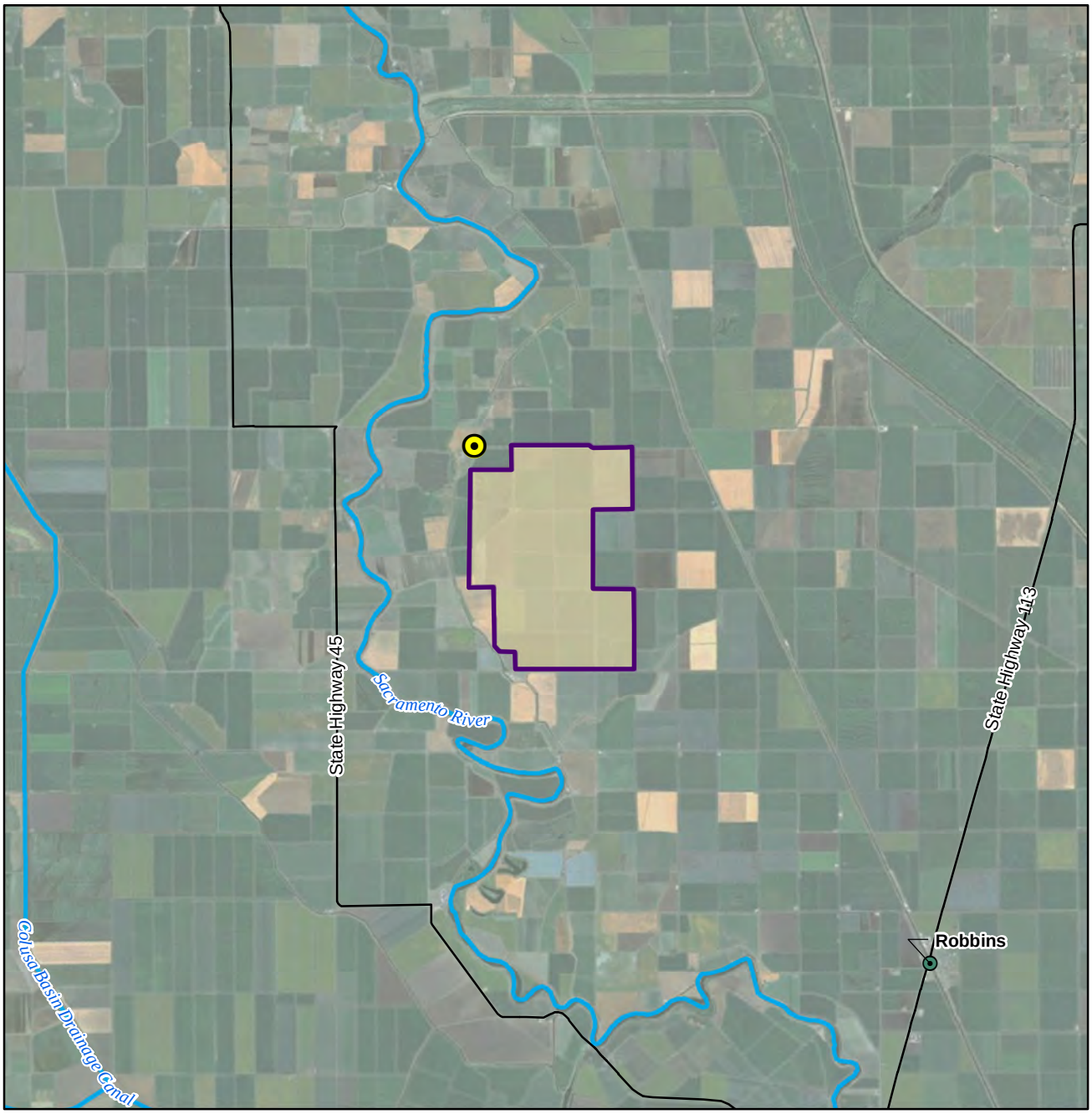
1.5 Potential Environmental Issues

This EA/IS analyzes potential impacts and cumulative effects associated with the proposed action to the following:

- Water resources
- Land use/agricultural resources
- Biological resources
- Cultural resources
- American Indian Trust Assets (ITAs)
- Environmental justice
- Socioeconomic resources
- Air quality
- Global climate change

The CEQA analysis provides discussions for the environmental issues listed above and includes the following:

- Aesthetics
- Agriculture and forestry resources
- Geology and soils
- Hazards and hazardous materials
- Mineral resources
- Noise
- Population and housing
- Public services
- Recreation
- Transportation and traffic
- Utilities and service systems



LEGEND

WELL LOCATION

PELGER MUTUAL WATER CO. DISTRICT BOUNDARY

VICINITY MAP

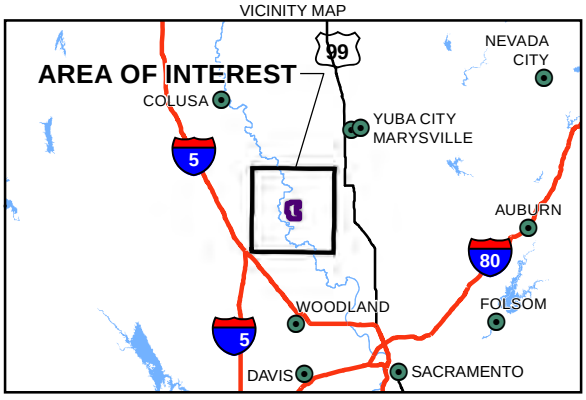


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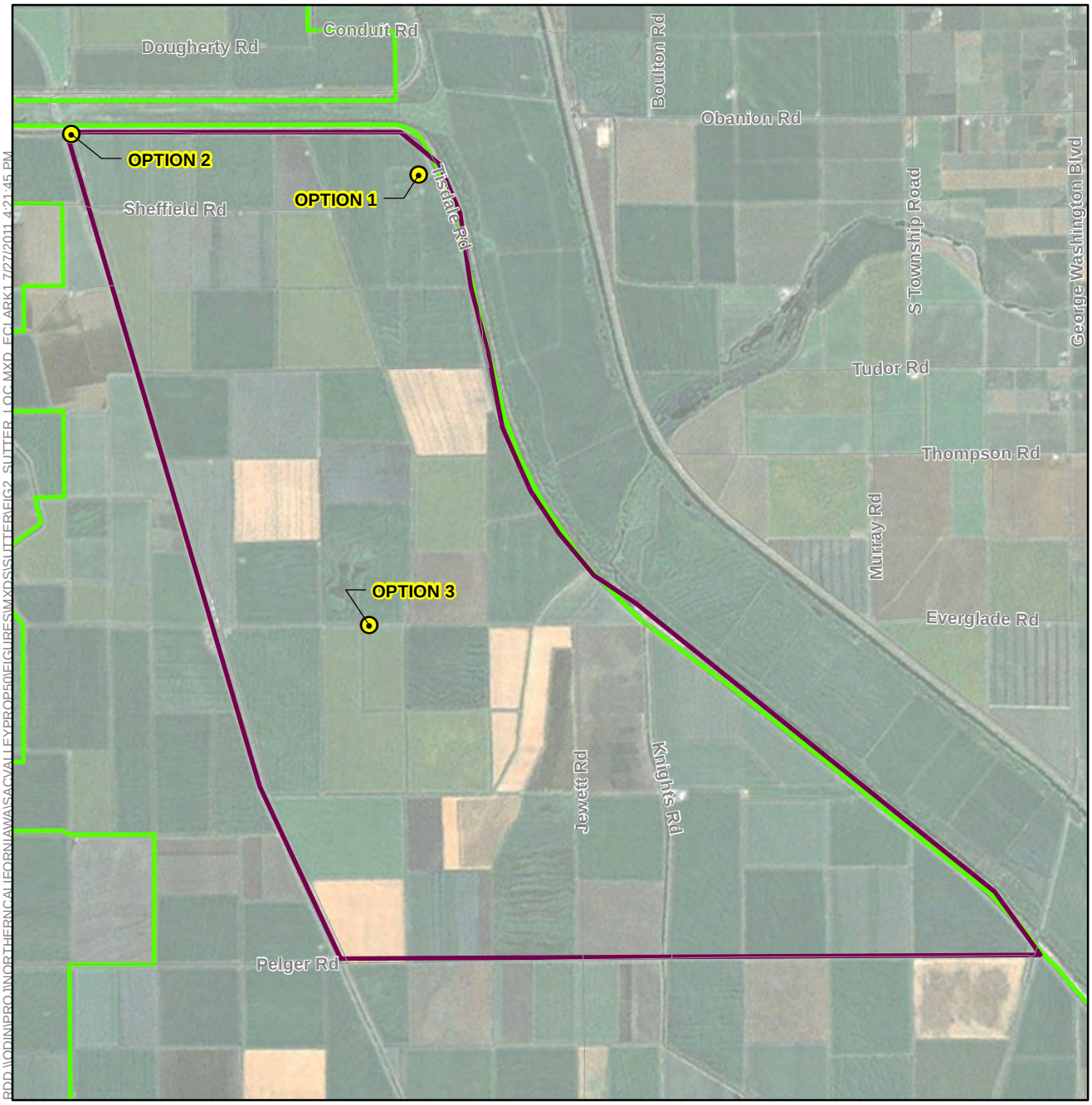
FIGURE 1-1
PELGER MUTUAL WATER COMPANY
PROJECT VICINITY MAP
EA/IS AND FONSI/MND FOR PMWC GROUNDWATER PRODUCTION ELEMENT PROJECT AND SMWC GROUNDWATER MONITORING PROJECT



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LEGEND

- MONITORING WELL
- AREA OF INTEREST
- SMWC WATER DISTRICT BOUNDARY

VICINITY MAP

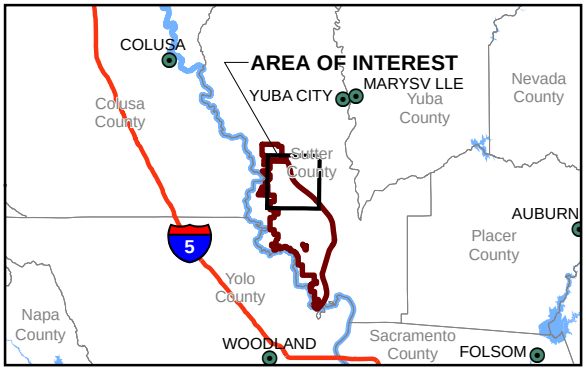

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FIGURE 1-2
SUTTER MUTUAL WATER COMPANY
PROPOSED MONITORING WELL OPTION LOCATIONS

EA/IS AND FONSI/MND FOR PMWC GROUNDWATER PRODUCTION ELEMENT PROJECT AND SMWC GROUNDWATER MONITORING PROJECT

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SECTION 2

No Action Alternative and Proposed Action

This EA/IS considers two possible actions: the no action alternative and the proposed action. The no action alternative reflects future conditions without the proposed action and serves as a basis of comparison for determining potential effects on the natural and human environment.

2.1 No Action Alternative

The no action alternative assumes that PMWC and SMWC would continue to implement their current water management and groundwater monitoring programs. PMWC would continue to operate under the provisions of its contract with Reclamation, and face cutbacks of up to 25 percent of its base and project water supply during critical water years[3]. As water shortages occur, PMWC anticipates that groundwater pumping would increase both within the service area and in adjacent areas to meet future water demands. Additionally, groundwater monitoring programs within and around the Sutter Subbasin (that is, PMWC and SMWC) would continue. Under the no action alternative, it is assumed neither water company would implement the proposed action/proposed project or construct any wells.

2.2 Proposed Action/Proposed Project

2.2.1 Pelger Mutual Water Company

2.2.1.1 Project Location

The proposed PMWC production well would be located within a 0.5-acre area, in Sutter County, California (Township 13 North, Range 01 East, 121˚ 48’ 36.00” West longitude, 38˚ 57’ 53.00” North latitude in the USGS Kirkville 7.5-minute quadrangle), approximately 9 miles northwest of the town of Robbins, west of Cranmore Road, adjacent to an existing concrete-lined irrigation canal (see Figure 2-1).

2.2.1.2 Construction Activities

The proposed well would require an 80-foot by 300-foot construction staging area. The final footprint of the well would not exceed 25 feet by 25 feet, with an estimated maximum well depth of 600 feet. A maximum 40 feet of discharge piping, 12 to 14 inches in diameter, would be installed at the production well. The piping would discharge directly into an existing concrete-lined canal via an open-ended aboveground discharge, with a 45- to 60-degree elbow at the end.

[3] Critical year is defined as: (1) the forecast full natural inflow to Shasta Lake for the current water year, as made by the United States on or before February 15 and reviewed as frequently thereafter as conditions and information warrant, is equal to or less than 3.2 million acre-feet or (2) the total accumulated deficiencies below 4 million acre-feet, in the immediately prior water year or series of successive prior water years, each with inflows of less than 4 million acre-feet and together with the forecast deficiency for the current water year exceeding 800,000 acre-feet.

The proposed well would be powered by electricity and could require a maximum 300 feet of overhead service line and one new power pole, approximately 12 inches in diameter, within 50 feet of the new well. Existing power poles from which electricity would take off are identified on Figure 2-1. Access to the well would be via existing roads, none of which would require improvements. Also, a 12-inch-diameter service pole with a three-phase, 440-volt electrical controls panel box would be placed within 10 feet of the pump. Drill cuttings and fluids would be disposed of onsite at a location previously agreed to by the property owner.

The following equipment is expected to be required for production well installation:

- Self-propelled or trailer-mounted reverse circulation drilling rig
- Pipe trailer
- Support trailer/doghouse
- Backhoe
- Fluid containment tanks
- Concrete delivery trucks
- Geophysical logging van
- Pump setting rig
- Up to three crew-member vehicles
- Fuel delivery vehicles

2.2.1.3 Construction Schedule

Construction is expected to occur between December 2011 and January 2012. Installing the 600-foot-deep production well would require approximately 30 working days, 10 of which would be 24-hour shifts. The remaining 20 working days would require 10- to 12-hour shifts. Personnel requirements for the first 10 days of well installation would include two crews, each consisting of one rig operator and two laborers. One construction superintendant would oversee both crews. Well development and testing would require one operator, two laborers, and one construction superintendant working a maximum 12-hour shift per day (that is, one shift).

Engineering construction management and contractor personnel would be required to install conveyance piping. Constructing aboveground facilities, including the conveyance pipeline, would take up to 10 working days and would require two operators, two laborers, and one construction superintendant. Total personnel for each well installation would not likely exceed 12 people on any given day. On an average day, five people would be onsite.

2.2.1.4 Project Operations

The proposed production well would have a target capacity of 4,000 gallons per minute (gpm) and would require a 100- to 150-horsepower pump motor. The well would operate 24 hours per day during the peak irrigation season (July, August, and September) during below-normal water years (dry[4] and critical).

[4] PMWC receives its full Sacramento River Settlement Contract amount in all years other than years designated as Shasta Critical Years. For this document, water years were assessed using the Sacramento Valley 40-30-30 Index as established by DWR. The 40-30-30 Index defines five water-year types including two dry classifications (dry and critical). The simulation period (water years 1970 through 2003) used to assess impacts for this document identifies six dry water-year designations and seven critical water-year designations during the 1970 through 2003 period.

2.2.2 Sutter Mutual Water Company

2.2.2.1 Project Location

SMWC would install one groundwater monitoring well. Three potential groundwater monitoring well sites are proposed in this EA/IS. The selected monitoring well would be used to monitor groundwater levels and water quality. One of the three following options would be selected:

- **Option 1 –** The proposed monitoring well would be located in a 0.6-acre area, in Sutter County, California (Township 14 North, Range 02 East, Section 33, 121˚ 44′ 35.89″ West longitude, 39˚ 01′ 14.44″ North latitude in the USGS Gilziser Slough 7.5-minute quadrangle), approximately 10 miles north of the town of Robbins (see Figure 2-2).
- **Option 2 –** The proposed monitoring well would be located in a 0.4-acre area, in Sutter County, California (Township 14 North, Range 02 East, Section 32, 121˚ 46′ 53.93″ West longitude, 39˚ 01′ 28.93″ North latitude in the USGS Tisdale Weir 7.5-minute quadrangle), approximately 11 miles north of the town of Robbins (see Figure 2-3).
- **Option 3 –** The proposed monitoring well would be located in a 0.5-acre area, in Sutter County, California (Township 13 North, Range 02 East, Section 16, 121˚ 44′ 35.89″ West longitude, 39˚ 01′ 14.44″ North latitude in the USGS Kirkville 7.5-minute quadrangle), approximately 8 miles north of Robbins (see Figure 2-4).

2.2.2.2 Construction Activities

The final footprint of the selected monitoring well would not exceed 10 feet by 10 feet. The estimated maximum monitoring well depth is 600 feet. The monitoring well would not require electrical connections, and access to the monitoring well would be via existing roads, none of which would require improvements. Drill cuttings and fluids would be disposed of onsite at a location previously agreed to by the property owner.

The following equipment is expected to be required for monitoring well installation:

- Self-propelled or trailer-mounted reverse circulation drilling rig
- Pipe trailer
- Support trailer/doghouse
- Backhoe
- Fluid containment tanks
- Concrete delivery trucks
- Geophysical logging van
- Pump setting rig
- Up to three crew-member vehicles
- Fuel delivery vehicles

2.2.2.3 Construction Schedule

Construction is expected to occur between December 2011 and January 2012. Installing the 600-foot-deep monitoring well would require approximately 15 working days, consisting of 10- to 12-hour shifts. Personnel would include one rig operator and two laborers. One construction superintendant would oversee the crew.

2.2.2.4 Project Operations

Because this proposed well would be used for monitoring purposes, there would be no project operational effects.

2.3 Environmental Commitments Incorporated into the Proposed Action/Proposed Project

Several environmental commitments associated with the siting and operation of the proposed wells are included as part of this project.

2.3.1 Well-siting Criteria

New wells and related facilities generally would be located within previously disturbed areas that are currently used for agricultural purposes. The proposed well locations were surveyed to identify any potential historical or biological resources (species and habitat). The survey data for the selected well location were used to confirm compliance with state and federal laws for historical and biological resources. The following measures have been incorporated into the project design to minimize potential impacts:

- Groundwater – Monitoring and remedial action plans would be implemented.
- Surface water – The contractor would be required to develop and implement a stormwater pollution prevention plan (SWPPP) to reduce the potential for any offsite discharge.
- Land use – Project design assumes cooperation and coordination with willing landowners to site the wells.
- Biological resources – Preconstruction siting surveys were performed April 18, 2011, to confirm avoidance or minimization of impacts on sensitive habitat and species.
- Cultural – Preconstruction siting surveys were performed April 18, 2011, to confirm avoidance or minimization of impacts on cultural resources. A cultural resources investigation was conducted, and Section 3.4, Cultural Resources, summarizes the results. The cultural resources investigation report is a confidential report on file with Reclamation and is available upon request.
- Air quality – Proposed wells would be electrically powered. Construction exhaust emissions would be controlled using mitigation measures established by Feather River Air Quality Management District (FRAQMD).

2.3.2 Specific Actions to Minimize Potential Impacts on Groundwater Resources

PMWC is a signatory to the monitoring program RD 1500 initiated in 1997, to collect existing water-level data and surface water quality information within the Sutter Subbasin. PMWC's current groundwater activities are consistent with the 1997 Groundwater Management Plan. These activities support PMWC's intent to be good neighbors and good stewards of the water resource, which includes groundwater.

The level of pumping associated with the proposed action/proposed project is not anticipated to adversely affect local users. Promptly addressing potential impacts through open communication with local groundwater users would result in mitigation of impacts. Upon notification of a potential adverse impact, PMWC would (within 5 days) contact the affected party and obtain available information as to the nature and extent of the potential impact. After the party has been contacted and relevant information received regarding the potential impact, PMWC would evaluate whether an impact had actually occurred and whether the impact appears related to operation of the PMWC project. PMWC would then take one of the following actions:

- If PMWC and the affected party mutually determine that the reported adverse impact resulted from implementation of the project, PMWC would mitigate the impact in a mutually agreeable manner, possibly including a temporary reduction in groundwater pumping.
- If PMWC determines that the reported impact was not likely caused by implementation of the project, then PMWC would provide information to the affected party that reasonably demonstrates the lack of causation between the specific project and the reported impact.

2.3.3 Specific Actions to Minimize Potential Impacts on Surface Water Resources

Soil erosion or loss of topsoil during construction activities would be minimized through adherence of best management practices (BMP) and preventive measures as outlined in the contractor's SWPPP. The contractor would file a Notice of Intent with the State Water Resources Control Board in accordance with the General Permit for Stormwater Discharges Associated with Construction Activity. PMWC and SMWC would confirm that the SWPPP is kept on the project site and that water quality standards are maintained. The SWPPP would incorporate sediment and erosion controls such as silt fences and erosion control blankets. Following the completion of construction activities, disturbed areas would be stabilized. BMPs would include, but not be limited to the following:

- Activities that increase erosion potential would be restricted, to the extent practicable, to the summer and early fall to minimize potential for rainfall events to transport sediment to the adjacent surface water features. If these activities must take place during the late-fall, winter, or spring, then temporary erosion and sediment control BMPs would be placed and operational at the end of each construction day, and maintained until permanent erosion control features are in place.
- When construction is complete, stabilizers such as weed-free mulch would be applied to disturbed areas within 10 days to reduce the potential for short-term erosion. Prior to a rain event or when there is a greater than 50 percent possibility of rain forecast by the National Weather Service during the next 24 hours, soil stabilizers would be applied to exposed areas upon completion of the day's activities. Soils would not be left exposed during the rainy season.

- BMPs such as filter fences and catch basins would be placed below construction activities near any open water to intercept sediment before it reaches the waterway. These structures would be installed prior to any clearing or grading activities.
- Spoil sites would be located where they do not drain directly into a surface water feature. Temporary spoil sites would be protected from erosion using BMPs.
- Sediment control measures would be in place prior to the onset of the rainy season and would be monitored and maintained in good working condition until disturbed areas have been stabilized.
- Erosion and sediment control measures listed in project permits would be implemented.

2.3.4 Specific Actions to Minimize Potential Impacts on Land Use

The proposed well locations were selected through cooperation and coordination with willing landowners to site the wells either (1) on PMWC/SMWC-owned lands in areas that would not substantially interfere with agricultural operations or require rezoning or substantial local approvals or (2) in mutually agreeable locations on private land.

2.3.5 Specific Actions to Minimize Potential Impacts on Biological Resources

During the planning and design phase for the proposed action/proposed project, a qualified biologist visited the proposed locations to determine the occurrence of native habitats, including vernal pools, wetlands, riparian habitat, and special-status species. To the extent possible, new facilities and construction support areas (for example, new temporary access roads, new staging areas, and new stockpile areas) would be situated outside a 250-foot buffer from wetland habitat.

This habitat avoidance measure would minimize impacts on special-status species; however, such species may use non-native habitats, require larger habitat buffers, or require seasonal restrictions. To further minimize impacts, the potential for suitable habitat for listed or proposed species to occur at the project site was assessed. New facilities and construction activities would be located, to the extent possible, outside species-specific buffer areas around native habitats (such as vernal pools, wetlands, riparian vegetation, native grasslands, and oak woodlands). Table 2-1 lists these buffer areas.

TABLE 2-1
Avoidance Distances and Restrictions for Listed Species

Species	Buffer	Seasonal Restrictions
GGS (*Thamnophis gigas*)	200 feet from banks of aquatic habitat, unless buffers are reduced during consultation with USFWS	Construction activities in snake habitat would be conducted between May 1 and October 1 unless appropriate measures have been taken to assure no adverse impacts on GGS in coordination with USFWS.

TABLE 2-1
Avoidance Distances and Restrictions for Listed Species

Species	Buffer	Seasonal Restrictions
Swainson's Hawk (*Buteo swainsoni*)	0.5 mile from an active nest in non-urban area	No construction activities in buffer area would be conducted between March 1 and September 15, or until the young have fledged, unless appropriate measures have been taken to assure no adverse impacts on Swainson's hawk in coordination with CDFG.

Note:
GGS = giant garter snake

The following measures are recommended to help avoid impacts on known listed species potentially occurring within the project area:

- USFWS would be consulted regarding GGS because the PMWC and SMWC proposed well sites are within the 200-foot upland buffer for this species. Implementation of USFWS mitigation measures, exclusion fencing around well activity, and a worker environmental training program would minimize impacts on this species.
- A qualified biologist would conduct preconstruction surveys for GGS no more than 24 hours prior to any construction activities.
- If construction occurs during the nesting season, a qualified biologist would perform preconstruction surveys within 14 days before construction to detect the presence of any nesting birds within or adjacent to the proposed well locations. If construction occurs during the non-breeding season for nesting birds (September 1 through February 14), preconstruction surveys would not be required.
- The survey area would include a survey buffer of 500 feet. Surveys specifically for nesting Swainson's hawk would be conducted within 0.5 mile of designated disturbance areas that contain appropriate nesting habitat (such as, well Options 1 and 2).
- If active Swainson's hawk nests are detected during the survey, a no-disturbance buffer zone (protected area surrounding the nest, the size of which is to be determined by a qualified biologist or in consultation with CDFG for certain other state-listed species) would be established, and a nest monitoring plan would be developed for active nests.
- CDFG would be consulted for any construction that would occur within 0.5 mile of an active Swainson's hawk nest to make sure that no take of Swainson's hawk occurs during project construction. Follow-up surveys or onsite monitoring would occur as determined by CDFG.

2.3.6 Specific Actions to Minimize Potential Impacts on Air Quality

Proposed new wells would be powered by electricity to eliminate air quality impacts associated with emissions from diesel generators.

The following minimization measures would be implemented to reduce construction emissions from fugitive dust and exhaust:

1. Implement FRAQMD Fugitive Dust Control Plan (see Appendix A).
2. Construction equipment exhaust emissions would not exceed FRAQMD Regulation III, Rule 3.0, Visible Emissions limitations (40 percent opacity or Ringelmann 2.0).
3. The contractor would confirm that construction equipment is properly tuned and maintained prior to and for the duration of onsite equipment operation.
4. Idling time would be limited to 5 minutes for commercial diesel vehicles and off-road diesel vehicles (in accordance with 13 *California Code of Regulations* [CCR] Chapter 10 Section 2485 and 13 CCR Chapter 9, Article 4.8 Section 2449).
5. Existing power sources (for example, power poles) or clean-fuel generators would be used rather than temporary diesel generators.
6. Portable engines and portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, may require California Air Resources Board (CARB) Portable Equipment Registration with the state or a local permit. The owner/operator would be responsible for arranging appropriate consultations with CARB or the local agency to determine registration and permitting requirements prior to equipment operation at the site.

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VICINITY MAP

LEGEND

- PRODUCTION WELL
- EXISTING POWER POLE
- PROPOSED POWER POLE
- ACCESS ROUTE
- PROPOSED ACCESS ROAD
- PROPOSED CONVEYANCE LINE
- PROPOSED POWER LINE
- PROJECT AREA

N

0 150
Feet

FIGURE 2-1
PELGER MUTUAL WATER COMPANY
PRODUCTION WELL LOCATION
EA/IS AND FONSI/MND FOR PMWC GROUNDWATER PRODUCTION ELEMENT PROJECT AND SMWC GROUNDWATER MONITORING PROJECT

CH2MHILL

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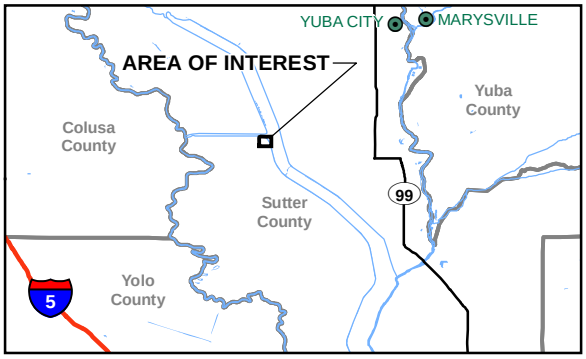
LEGEND

- MONITORING WELL
- EXISTING ACCESS ROUTE
- PROJECT AREA

VICINITY MAP



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Feet

FIGURE 2-2
SUTTER MUTUAL WATER COMPANY MONITORING WELL LOCATION OPTION 1
EA/IS AND FONSI/MND FOR PMWC GROUNDWATER PRODUCTION ELEMENT PROJECT AND SMWC GROUNDWATER MONITORING PROJECT

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LEGEND

- MONITORING WELL
- EXISTING ACCESS ROUTE
- PROJECT AREA

VICINITY MAP

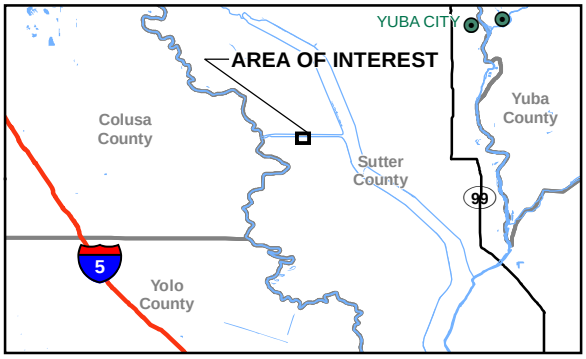

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FIGURE 2-3
SUTTER MUTUAL WATER COMPANY
MONITORING WELL LOCATION
OPTION 2

EA/IS AND FONSI/MND FOR PMWC GROUNDWATER PRODUCTION ELEMENT PROJECT AND SMWC GROUNDWATER MONITORING PROJECT

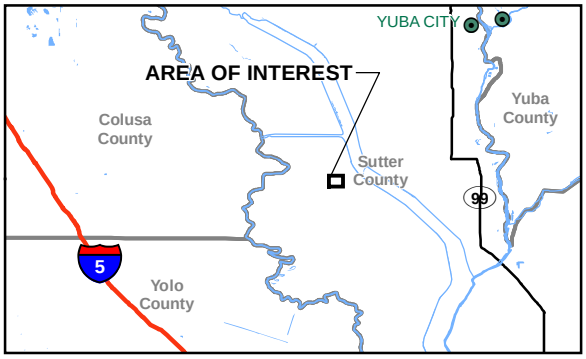
CH2MHILL

RDD:\ODIN\PROJ\NORTHERNCALIFORNIA\WAISACVALLEYPROP50\EIGURES\MXDS\SUTTERFIG2-4_SUTTER_LOC_OPTION3.MXD ECLARK1 9/21/2011 11:57:39 AM

LEGEND

- MONITORING WELL
- EXISTING ACCESS ROUTE
- PROJECT AREA

VICINITY MAP



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Feet

FIGURE 2-4
SUTTER MUTUAL WATER COMPANY MONITORING WELL LOCATION OPTION 3

EA/IS AND FONSI/MND FOR PMWC GROUNDWATER PRODUCTION ELEMENT PROJECT AND SMWC GROUNDWATER MONITORING PROJECT

CH2MHILL

SECTION 3

National Environmental Policy Act – Affected Environment and Environmental Consequences

This section of the EA/IS includes the NEPA analysis portion of the potentially affected environment and the environmental consequences involved with the proposed action and the no action alternative.

3.1 Water Resources

3.1.1 Affected Environment

The Sacramento River Hydrologic Region is the main water supply source for much of California's urban and agricultural areas. The proposed project is located in the Sacramento Valley Groundwater Basin (SVGB), which extends from the Red Bluff Arch to the Sacramento-San Joaquin Delta and includes portions of Tehama, Glenn, Colusa, Yolo, Solano, Butte, Sutter, Yuba, Placer, and Sacramento Counties (DWR, 2003a). The 4,900-square-mile SVGB is bordered to the east by the Sierra Nevada and Cascade Ranges and to the west by the Coast Range. The land surface regionally slopes south and toward the main surface water feature in the basin – the Sacramento River. The land surface topography is locally also affected by smaller scale features, such as lakes and tributaries of the Sacramento River, and by a variety of constructed features and structures. Land surface elevations generally occur in the range of hundreds of feet above mean sea level, near the north end and periphery of the SVGB, to tens of feet above mean sea level, near the south end and interior of the SVGB.

The SVGB has mild winters with hot, dry summers. Average annual precipitation in the basin ranges from 13 to 26 inches, with the greatest precipitation occurring along the eastern and northern edges of the basin. Typically, 80 to 90 percent of the basin's precipitation occurs from November to April (Bertoldi, 1991).

3.1.1.1 Hydrology

Annual runoff in the hydrologic region averages approximately 22.4 million acre-feet, which is nearly one-third of the state's total natural runoff (DWR, 2003b). The Sacramento River has three major tributaries draining the Sierra Nevada, including the Feather, Yuba, and American Rivers. Stony, Cache, and Putah Creeks are the primary western tributaries of the Sacramento River. The Sutter and Yolo Bypasses are major tributaries during periods of high streamflow. Several factors affect streamflow in the Sacramento River Hydrologic Region, including reservoir releases, climatic cycles, stream diversions, and groundwater levels. The Sacramento River and its major tributaries flow year-round and can provide a source of recharge to the aquifer system. Many of the smaller (and some larger) western tributaries have significantly reduced streamflow (for example, less than 1 cubic foot per second) or go dry during the summer and fall, particularly during drought conditions.

3.1.1.2 Hydrogeology

The SVGB is a north- to northwestern-trending, asymmetrical trough filled with as much as 10 miles of both marine and continental rocks and sediment (Page, 1986). On the eastern side, the basin overlies basement bedrock that rises relatively gently to form the Sierra Nevada; and on the western side, the underlying basement bedrock rises more steeply to form the Coast Ranges. Overlying the basement bedrock are marine sandstone, shale, and conglomerate rocks, which generally contain brackish or saline water (DWR, 2003a). More recent continental deposits, overlying the marine sediments, contain fresh water. These continental deposits are generally 2,000 to 3,000 feet thick (Page, 1986). The depth to the base of fresh water typically ranges from 1,000 to 3,000 feet below ground surface (bgs) (Bertoldi, 1991).

PMWC lies within the western portion of the Sutter Subbasin, which is located in the central portion of the SVGB. Groundwater in the Sutter Subbasin recharges through deep percolation of applied water and precipitation, infiltration from surface water bodies, and lateral inflow along the subbasin boundaries. Groundwater levels near the proposed project are generally within 10 feet of the land surface (DWR, 2003c; 2003d). Most of the subbasin's groundwater system is full and discharges excess groundwater to streams. Seasonally, groundwater levels typically decline during the hot, dry summer months when regional groundwater production occurs at its seasonal maximum, but these levels recover each year during the wet season. California has experienced a variety of climate conditions since 1980, including a 6-year drought from approximately 1987 through 1992. During this drought, groundwater levels decreased across much of the SVGB; however, after the drought ended, groundwater levels generally recovered.

The nature of surface water-groundwater interaction across the SVGB is complex, both spatially and temporally; but in most areas, shallow groundwater levels lead to ground-water discharge to surface streams. Groundwater levels may decline to a level, as a result of pronounced drought conditions or groundwater production (such as Sacramento County), such that streams that formerly gained streamflow from groundwater discharge now recharge the groundwater system through streambed infiltration. If streams dry up (either seasonally or during drought conditions), they would no longer provide a source of recharge to the underlying aquifer system.

3.1.1.3 Water Use

Municipal, industrial, and agricultural water demands in the hydrologic region are approxi-mately 8 million acre-feet (DWR, 2003b). Major water supplies in the hydrologic region are provided through surface storage reservoirs, mainly Reclamation's Shasta Reservoir (Central Valley Project facility) on the upper Sacramento River and DWR's Oroville Reservoir (State Water Project facility) on the Feather River. Groundwater is also a major source of water supply in the hydrologic region. The exact quantity of annual groundwater pumping in the SVGB is unknown; however, estimates suggest that approximately 2.5 million acre-feet of water are pumped annually from municipal, industrial, and agricultural production wells (DWR, 2003b). Agricultural, industrial, and municipal groundwater users in the SVGB pump primarily from deeper continental deposits, and domestic groundwater users in the basin generally pump from shallower deposits.

Municipal, industrial, and irrigation well yields in the Sutter Subbasin average approximately 730 gpm (Olmsted and Davis, 1961; DWR, 2003c); however, groundwater production from wells within PMWC have yielded approximately 2,000 to 4,000 gpm during recent conjunctive water management programs (MBK, 2010). Municipal and irrigation wells in the Sutter Subbasin range in depth from 60 to 672 feet bgs, averaging 205 feet bgs (DWR, 2003c). Domestic wells in the subbasin range in depth from 35 to 320 feet bgs, averaging 121 feet bgs. Seasonal fluctuations in groundwater levels in the Sutter Subbasin are generally less than 5 feet and can be up to 25 feet or more during drought years (DWR, 2003a; 2003d).

3.1.1.4 Land Subsidence

Land subsidence is the decline in ground-surface elevation resulting from natural forces (such as earthquakes) and anthropogenic activities (for example, groundwater, oil, and gas extraction). Land subsidence can be elastic (temporary compaction of subsurface material that rebounds as groundwater levels recover) or inelastic (permanent compaction of subsurface material). The magnitude of land subsidence in the SVGB is generally minimal and confined to limited areas of the basin. In these limited areas, land subsidence is likely the result of groundwater extraction. Yolo County has experienced the most subsidence within the SVGB outside the Delta region, with the greatest subsidence reported between Zamora and Knights Landing (approximately 7 feet between 1949 and 2002, which is 0.13 foot per year).

3.1.1.5 Groundwater Quality

Groundwater quality in the SVGB is generally good and sufficient for municipal, agricultural, domestic, and industrial uses (DWR, 2003b); however, some localized groundwater quality problems exist. Total dissolved solids levels are generally below the California and U.S. Environmental Protection Agency (EPA) secondary drinking water standards in most of the SVGB. The total dissolved solids levels tend to be higher between the confluence of the Sacramento and Feather Rivers, and south of the Sutter Buttes.

3.1.2 Environmental Consequences

3.1.2.1 Environmental Commitments Incorporated into the Project

Groundwater. See Section 2.3.2 for specific actions to minimize potential impacts on groundwater resources.

Surface Water. See Section 2.3.3 for specific actions to minimize potential impacts on surface water resources.

3.1.2.2 Assessment Methods

Groundwater of economic importance moves through the subsurface from a place of groundwater recharge to a place of groundwater discharge. When a pump is operated and lifts water to the land surface, through its riser pipe inside a groundwater well, it is removing groundwater from aquifer storage and intercepting groundwater that would have otherwise moved to a different place of groundwater discharge. Thus, groundwater temporarily discharged from a groundwater well is initially removed from storage in the aquifer, which is eventually balanced by a temporary loss of water from somewhere else. The decline in the water level inside the pumping well creates a hydraulic gradient (slope)

toward the well within the surrounding groundwater system outside the well. This slope causes groundwater from the surrounding groundwater system to flow radially (laterally and vertically) to the well, resulting in a declining water table (unconfined aquifer) or potentiometric surface (confined aquifer) in the surrounding aquifer. The feature formed by the decline in surrounding groundwater levels from groundwater pumping is referred to as the "cone of depression." Operation of existing production wells, located within the cone of depression of a proposed well, and streams that overlie this cone of depression, have the potential to be adversely affected.

Potential effects on groundwater and surface water resources were forecast using a numerical groundwater flow model, known as the Sacramento Valley Finite-Element Groundwater Model (SACFEM) (Appendix B). SACFEM was developed using the MicroFEM (Hemker, 2011) modeling code, which is capable of simulating three-dimensional, transient, single-density groundwater flow in layered systems. SACFEM was developed specifically to evaluate potential effects on surface water and groundwater resources associated with proposed conjunctive water management projects across the valley.

SACFEM is composed of a groundwater model and a surface water budgeting module that computes monthly agricultural pumping and groundwater recharge due to applied water and precipitation. The model is calibrated to groundwater levels measured in monitoring wells during a 34-year period (water years[5] 1970 through 2003). Forecasts of project-related effects can be evaluated for a broad range of hydrologic conditions because this calibration period includes a variety of year types such as severe drought periods (for example, 1976 and 1977, and 1987 through 1992) and extremely wet years (such as 1983). Appendix B presents complete documentation of SACFEM. Appendix C provides a discussion of technical details associated with the proposed action simulations using SACFEM.

Pre-existing production wells (such as municipal, industrial, or agricultural wells) in the SVGB are typically spaced apart at least 0.25 mile. It is assumed in the groundwater impact evaluation that proposed well locations are also at least 0.25 mile from any active pre-existing production wells. Therefore, the approach for forecasting groundwater-level effects of the proposed action includes evaluating the incremental drawdown[6], at distances of 0.25 mile and greater, from a project well against the groundwater-related significance criteria.

Operation of the proposed project could also result in reduced streamflow by increasing streambed infiltration, intercepting groundwater that would have otherwise discharged to surface water bodies, or some combination thereof. Streams with the greatest potential of impact were identified by delineating areas with forecast incremental drawdowns in the

[5] A water year runs from October 1 of the previous calendar year through September 30 of the current calendar year (for example, water year 1976 includes the period of October 1, 1975 through September 30, 1976).

[6] For this evaluation, incremental drawdown was computed through the following method: A SACFEM simulation was initially conducted over the water years 1970-2003 simulation period and referred to as the baseline simulation. A project simulation was then conducted with the baseline model, but with the proposed project pumping added at the appropriate monthly rates, locations, and depths. The incremental drawdown was then computed by subtracting the project groundwater levels from baseline groundwater levels at each model node and for each month over the water years 1970-2003 simulation period. Forecasting groundwater level-related impacts in this manner facilitates assessment of incremental project-related impacts on groundwater and surface water resources with consideration of dynamic hydrologic conditions (such as droughts and wet periods).

shallow aquifer of 1 foot or greater due to implementing the proposed action. Available historical streamflow data were obtained for streams located within these areas and compared with simulated streamflow depletions to assess the potential magnitude of streamflow effects.

Model simulations were performed to forecast potential effects that could result from implementing the proposed action. The PMWC project would include groundwater production from July 1 through September 30 during dry and critical water years, with an assumed total project volume of approximately 1,600 acre-feet per year (proposed pumping rate of 4,000 gpm apportioned over the 92-day pumping period). Model results were used to forecast the incremental drawdown that could occur in both the shallow (upper 50 feet of the unconfined aquifer associated with typical domestic well depths) and regional (depth interval associated with the majority of groundwater production) aquifers. It was assumed that the PMWC proposed action well would pump groundwater from multiple screened intervals between approximate 100- and 500-foot-bgs intervals, which is similar to the pumping intervals associated with typical area wells.

3.1.2.3 No Action

Under the no action alternative, PMWC would continue to operate under the provisions of its contract with Reclamation and face cutbacks of up to 25 percent of its base and project water supply during critically dry water years. PMWC would continue to implement its current water management program, which includes the use of three privately owned groundwater production wells. Annual domestic and agricultural groundwater use has been estimated at 3,900 and 171,400 acre-feet, respectively, in the Sutter Subbasin (DWR, 2003b). PMWC anticipates that, as water shortages continue to occur, groundwater pumping would increase both within the service area and in adjacent areas to meet future water demands.

3.1.2.4 Proposed Action

Construction. Effects on surface water quality could occur during the construction phase of the proposed project because of stockpile erosion and spoil piles, which, if not properly placed and managed, could result in sedimentation and associated effects on water quality. Prior to commencing construction activities, the contractor would develop and implement an SWPPP to reduce sediment discharged from the site. Implementing the SWPPP in conjunction with BMPs, as outlined in Section 2.3.3, would reduce potential effects on surface water quality resulting from construction activities to a less than significant level.

No effects on local groundwater levels are anticipated as part of the well drilling and installation process.

Operation. The proposed SMWC monitoring well would have no operational effects on groundwater, surface water, land subsidence, or groundwater quality. The remainder of this discussion focuses on the proposed PMWC groundwater production well.

Groundwater. Figure 3-1 presents the forecast maximum incremental drawdown in the regional aquifer that occurs at the end of September 1992, corresponding to the end of a 6-year drought (consistent with the 1987 through 1992 period). Incremental drawdown, resulting from project implementation in the regional aquifer, is forecast to be no more than

approximately 11 feet by the end of the pumping season, with an incremental drawdown typically not exceeding 5 to 10 feet in most areas (see Figure 3-1). The maximum incremental drawdown of 11 feet is forecast at 0.25 mile from the proposed well. This incremental drawdown is forecast to dissipate to approximately 3.5 feet within 1 mile of the well.

This magnitude of incremental drawdown would not affect groundwater levels such that yields of pre-existing nearby wells would decrease to a rate that would not support existing land uses. Additionally, groundwater elevations would return to pre-project levels, because the subbasin would refill each spring, with the possible exception of multi-year droughts. Forecast incremental drawdown in the shallow aquifer would not exceed 5 feet and would have no adverse effects on shallow aquifer drawdown.

Surface Water. No streams are located within the area of forecast incremental drawdown of 1 foot or greater in the shallow aquifer near the proposed well; however, because the Sacramento River is the largest stream in the vicinity of the proposed well, forecast stream effects are compared with available measured streamflow data. The peak reduction of streamflow in the Sacramento River that could occur because of the proposed action would represent a very small percentage (less than 0.5 percent) of the total streamflow, and would have no adverse effect on surface water within the project area.

Land Subsidence. The proposed action would not cause a permanent lowering of groundwater levels, because the subbasin would refill each spring, with the possible exception of multi-year droughts. Given the forecast minimal drawdown effects, no inelastic land subsidence is anticipated to occur.

Groundwater Quality. Implementation of the proposed action would not result in regional changes in groundwater flow patterns in the SVGB; thus, it is not anticipated that operation of the proposed production well would alter the pre-existing distribution of poor-quality groundwater in the SVGB.

3.1.2.5 Cumulative Effects

Potential cumulative effects were analyzed assuming all individual proposed groundwater production projects funded by Proposition 50 grants associated with the Sacramento Valley IRWMP were simultaneously active (excluding the Anderson-Cottonwood Irrigation District project, which is located in the Redding Groundwater Basin and was evaluated using the Redding Groundwater Basin Finite-Element Model [CH2M HILL, 2011]). Appendix C provides a detailed description of the SACFEM analysis process and a map of all wells participating in the IRWMP groundwater production element.

Groundwater. Model simulations were performed to forecast potential effects that could result from simultaneous implementation of all proposed Proposition 50-funded projects. Appendix C provides proposed operational parameters for each well participating in the Sacramento Valley IRWMP (excluding Anderson-Cottonwood Irrigation District). Model results were used to forecast the incremental drawdown that could occur in both the shallow (water levels within the upper 50 feet of the unconfined aquifer) and regional aquifer levels. The regional aquifer was divided into a middle pumping zone and a deeper pumping zone for the cumulative analysis.

Figures 3-2 through 3-4 present the forecast maximum incremental drawdown in the shallow and regional aquifer systems from all of the IRWMP projects. No interference drawdown among individual projects is forecast because of the distance between proposed wells in each company. Figures 3-2 through 3-4 present the forecast maximum incremental drawdown that occurred in October 1992, which corresponds to the end of a 6-year drought (consistent with the 1987 through 1992 period).

The forecast incremental drawdown in the shallow aquifer is no more than 18.5 feet, not exceeding 5 feet in most areas (see Figure 3-2). The maximum incremental drawdown of 18.5 feet is forecast at a distance of 0.25 mile from the proposed Meridian Farms Water Company well and is forecast to dissipate to 4.5 to 8 feet within 1 mile of the well. The incremental drawdown in the shallow aquifer is forecast to dissipate to less than 5 feet within 1 mile of the other groundwater production wells. The magnitude of incremental drawdown effects is reduced where stream seepage provides a recharge source to the aquifer.

Incremental drawdown, resulting from project implementation in the mid-depth pumping zone of the regional aquifer, is projected to not exceed 5 to 10 feet in most areas (see Figure 3-3). The maximum incremental drawdown of approximately 30 feet is forecast at 0.25 mile from a Reclamation District 108 well; however, the incremental drawdown is forecast to dissipate to 9 to 10 feet within 1 mile of the well. Incremental drawdowns ranging from 3 to 21 feet at 0.25 mile from the other groundwater production wells are forecast to dissipate to between 2 and 8 feet within 1 mile of the wells.

Forecast incremental drawdown, resulting from project implementation in the deep pumping zone of the regional aquifer, is projected to be no more than approximately 12 feet by the end of the pumping season, with incremental drawdown near the groundwater production projects typically not exceeding 5 to 10 feet in most areas (see Figure 3-4). A maximum incremental drawdown of approximately 12 feet is forecast at a distance of 0.25 mile from the Glenn-Colusa Irrigation District wells, and is forecast to dissipate to 4.5 to 8 feet within 1 mile of the wells. Incremental drawdown at a distance of 0.25 mile from other groundwater production wells ranges from 3 to 11 feet and is forecast to dissipate to 2.5 to 7 feet within 1 mile of the other groundwater production wells.

It is assumed that no pre-existing production wells operate within 0.25 mile of the Meridian Farms Water Company, Reclamation District 108, and Glenn-Colusa Irrigation District wells. Because the forecast incremental drawdowns dissipate within a relatively short distance from the proposed wells, and groundwater elevations would return to pre-project levels (because the SVGB would refill each spring, with the possible exception of during multi-year droughts), the magnitude and distribution of incremental drawdowns are not anticipated to reduce yields of nearby pre-existing wells enough to affect existing land uses. As a result, cumulative impacts to the shallow, mid-depth pumping zone of the regional aquifer and deep pumping zone of the regional aquifer are considered to be less than significant.

Surface Water. Model results were used to forecast the stream effects that could occur in response to simultaneous operation of all of the proposed projects within the SVGB. The following streams are located within the area of forecast incremental drawdown of 1 foot or greater in the shallow aquifer: Sacramento River, Feather River, Willow Creek, the South

Fork of Willow Creek, Walker Creek, Wilson Creek, French Creek, Colusa Basin Drain, and Glenn-Colusa Irrigation District canal. There is no simulated reduction in streamflow to Walker Creek, the South Fork of Willow Creek, and French Creek. A time series of measured streamflow data for Willow Creek, Wilson Creek, and the Glenn-Colusa Irrigation District canal is unavailable; therefore, potential effects on these streams were not estimated. According to SACFEM, peak streamflow reductions would represent less than 0.5 percent of the total streamflow measured individually within the Sacramento River, Feather River, and Colusa Basin Drain. This percent-reduction forecast represents a small fraction of the total streamflows and would have no adverse effects on local surface water.

Land Subsidence. Simultaneous operation of all groundwater production wells would not cause a permanent lowering of groundwater levels because the subbasin would refill each spring, with a possible exception of multi-year droughts. Given the forecast minimal drawdown effects, no cumulative inelastic land subsidence is anticipated to occur, even in multi-year drought conditions.

Groundwater Quality. Implementation of the proposed wells would not result in regional changes in groundwater flow patterns in the SVGB, and it is not anticipated that operation of the proposed wells would alter the pre-existing distribution of poor-quality groundwater in the SVGB.

3.2 Land Use/Agricultural Resources

3.2.1 Affected Environment

PMWC, located in Sutter County, lies east of the Sacramento River and is bounded on the east by SMWC. The service area encompasses approximately 2,900 acres, and is divided among rice, alfalfa, corn, and tomatoes.

SMWC is located east of PMWC. The service area encompasses approximately 50,000 acres and serves 150 landowners. The primary crops include rice, wheat, corn, safflower, beans, and tomatoes.

3.2.1.1 Sutter County

In 2000, Sutter County had an estimated population of 102,380. Forecasts show that by the year 2020, Sutter County's population will reach approximately 141,160 (California Department of Finance [DOF], 2007). Since 1990, 9,333 acres of farmland have gone out of production, and 2,354 acres of new urban land have been created (California Department of Conservation [DOC], 2002). Of the 389,439 acres mapped in Sutter County in 2000, 352,187 were in agricultural use; 11,360 acres were urbanized; 1,848 acres were water; and 24,044 acres were other (DOC, 2002). Approximately 165,820 acres in Sutter County are Prime Farmland, comprising nearly 43 percent of the total land area. From 2004 to 2006, the total Prime Farmland acreage in Sutter County decreased by 385 acres. Table 3-1 summarizes land use and change by land use category. Table 3-2 shows Sutter County land use conversion experienced from 2004 to 2006.

TABLE 3-1
Sutter County Land Use Summary and Change by Land Use Category

Land Use Category	Total Acreage Inventoried		2004 to 2006 Acreage Changes			
	2004	2006	Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	166,202	165,817	658	273	931	-385
Farmland of Statewide Importance	107,742	107,194	704	156	860	-548
Unique Farmland	19,480	19,245	436	201	637	-235
Farmland of Local Importance	0	0	0	0	0	0
Important Farmland Subtotal	293,424	292,256	1,798	630	2,428	-1,168
Grazing Land	50,636	51,516	336	1,216	1,552	880
Agricultural Land Subtotal	344,060	343,772	2,134	1,846	3,980	-288
Urban and Built-up Land	12,582	12,928	25	371	396	346
Other Land	30,914	30,856	504	446	950	-58
Water Area	1,883	1,883	0	0	0	0
Total Area Inventoried	389,439	389,439	2,663	2,663	5,326	0

Source: DOC, 2010.

3.2.1.2 Pelger Mutual Water Company Well

The PMWC proposed production well would be approximately 15 miles southwest of Yuba City in Sutter County, California. The Sutter County Planning Department designated land use as General Agriculture, 40 acre minimum; and land use is bound in a Williamson Act Contract. The project site is surrounded by agricultural lands, which are designated by Sutter County Planning Department for agriculture as well. The proposed project site and surrounding areas are designated as "Urban and Built-up Land" by the DOC, Division of Land Resource Protection (DOC, 2008).

3.2.1.3 Sutter Mutual Water Company Well Option 1

SMWC Well Option 1 would be approximately 10 miles southwest of Yuba City in Sutter County, California. The Sutter County Planning Department designated land use as General Agriculture, 80 acre minimum; and land use is bound in a Williamson Act Contract. The project site is surrounded by agricultural lands, which are designated by Sutter County Planning Department for agriculture as well. The proposed project site is designated as "Farmland of Statewide Importance," and the surrounding areas are designated as "Prime Farmland" by DOC, Division of Land Resource Protection (DOC, 2008).

TABLE 3-2
Sutter County Land Use Acreage Conversion from 2004 to 2006

Land Use Category		Prime Farmland	Farmland of Statewide Importance	Unique Farmland	Farmland of Local Importance	Subtotal Important Farmland	Grazing Land	Total Agricultural Land	Urban and Built-up Land	Other Land	Water Area	Total Converted to Another Use
Prime Farmland	to:	--	0	1	0	1	287	288	85	285	0	658
Farmland of Statewide Importance	to:	2	--	0	0	2	506	508	120	76	0	704
Unique Farmland	to:	0	0	--	0	0	402	402	0	34	0	436
Farmland of Local Importance	to:	0	0	0	--	0	0	0	0	0	0	0
Important Farmland Subtotal		2	0	1	0	3	1,195	1,198	205	395	0	1,798
Grazing Land	to:	91	25	106	0	222	--	222	63	51	0	336
Agricultural Land Subtotal		93	25	107	0	225	1,195	1,420	268	446	0	2,134
Urban and Built-up Land	to:	10	15	0	0	25	0	25	--	0	0	25
Other Land	to:	170	116	94	0	380	21	401	103	--	0	504
Water Area	to:	0	0	0	0	0	0	0	0	0	--	0
Total Acreage Converted	**to:**	273	156	201	0	630	1,216	1,846	371	446	0	2,663

Source: DOC, 2011.

3.2.1.4 Sutter Mutual Water Company Well Option 2

SMWC Well Option 2 would be approximately 10 miles southwest of Yuba City in Sutter County, California. The Sutter County Planning Department designated land use as General Agriculture, 80 acre minimum. The project site is surrounded by agricultural lands, which are designated by Sutter County Planning Department for agriculture as well. The proposed project site is designated as "Other Land," and the surrounding areas are designated as "Prime Farmland" by DOC, Division of Land Resource Protection (DOC, 2008).

3.2.1.5 Sutter Mutual Water Company Well Option 3

SMWC Well Option 3 would be approximately 10 miles southwest of Yuba City in Sutter County, California. The Sutter County Planning Department designated land use as General Agriculture, 80 acre minimum. The project site is surrounded by agricultural lands, which are designated by Sutter County Planning Department for agriculture as well. The proposed project site and surrounding areas are designated as "Prime Farmland" by DOC, Division of Land Resource Protection (DOC, 2008).

3.2.2 Environmental Consequences

3.2.2.1 Environmental Commitments Incorporated into the Projects

Analysis of potential effects on land use/agricultural resources associated with implementing the proposed action assumes cooperation and coordination with willing landowners to site the wells either (1) on PMWC/SMWC-owned lands in areas that would not substantially interfere with agricultural operations or require rezoning or substantial local approvals, or (2) in mutually agreeable locations on private land.

3.2.2.2 No Action

Under the no action alternative, surrounding land uses would remain consistent with current uses, and land uses within the PMWC service area would continue to adjust according to water availability within the PMWC. Although Sutter County anticipates annual population growth rates of up to 3.8 percent, the majority of this growth centers around Yuba City and land that would be developed for urban uses (Sutter County, 2010a). Future non-agricultural development within Sutter County is anticipated to be limited to residential growth in the rural communities of Sutter Pointe and East Nicolaus Trowbridge (Sutter County, 2010a).

3.2.2.3 Proposed Action

Construction. No impacts on land use would result from constructing the proposed project. The proposed well locations are both unoccupied and currently used for agricultural purposes. No other projects are anticipated on these locations in the near future; thus, construction would not hinder the existing or planned use of either project site.

Operation. Operation of the proposed action would have no effects on land use. The proposed action would be implemented to support existing agricultural land uses, which would be a beneficial effect.

3.2.2.4 Cumulative Effects

No cumulative effects on land use or agricultural resources are anticipated given no effects on these resources are expected from implementing the proposed action.

3.3 Biological Resources

3.3.1 Affected Environment

Reconnaissance-level field surveys were conducted April 18, 2002, to assess the potential for wildlife occurrence. During this field reconnaissance, biological resources information (such as dominant vegetation type, bird species present, and overall site conditions) was recorded. The results of the survey are summarized below and provided in Appendix D. Figures 3-5 through 3-8 show the species identified within each project area.

3.3.1.1 Flora

Pelger Mutual Water Company Production Well. The proposed well location is in a highly compacted and disturbed area between a dirt access road and a deeply cut drainage/ irrigation canal to the north, and a constructed wetland sanctuary to the south. A winter wheat field is directly north of the drainage/irrigation canal. The predominant vegetation on the well pad site includes non-sensitive ruderal species such as globe mallow (*Malvaceae* sp.), ripgut brome (*Bromus diandrus*), soft chess brome (*Bromus hordeaceus*), redstem fillaree (*Erodium cicutarium*), and perennial pepperweed (*Lepidium latifolium*) in very low-coverage quantities. Vegetation along the canal consists of ruderal and wetland plant species such as perennial pepperweed, ripgut brome, blue vervain (*Verbena hastata*), cattails (*Typha latifolia*), mugwort (*Artemisia vulgaris*), bulrush (*Schoenoplectus acutus* var. *acutus*), curly dock (*Rumex crispus*), and black mustard (*Brassica nigra*). The wetland habitat to the south is predominated by obligate wetland species such as bulrush and cattails. To the southwest of the site is a narrow band of riparian trees, mainly valley oaks (*Quercus lobata*). Attachment 2 (Table 2-1) to Appendix D lists the plant species observed within the project area.

Sutter Mutual Water Company Monitoring Well Option 1. Two proposed sites for this well are in proximity to each other. The following information is pertinent to both well sites for Well Option 1. The area is highly disturbed rice production fields, access roads, and irrigation canals, including the SMWC main canal. The area is routinely maintained through spraying, mowing, and disking. The predominant vegetation type observed within the project area includes disked rice fields and low-growing ruderal species such as globe mallow, soft chess brome, and ripgut brome. To the east of the well site is a well-developed riparian forest along the Sutter Bypass. Riparian species consist of Fremont cottonwood (*Populus fremontii*) and Gooding's willow (*Salix gooddingii*). Attachment 2 (Table 2-1) to Appendix D lists the plant species observed within the project area.

Sutter Mutual Water Company Monitoring Well Option 2. The proposed well site is a highly disturbed wide area along the main dirt access road (Tilsdale Road). The SMWC main irrigation canal borders the north edge of the access road. North of the canal is the Sutter Bypass, which has a well-developed, narrow band of riparian species consisting of Fremont cottonwoods and Gooding's willow. Corn fields are to the south of the access road. To the west of the well site are two narrow bands of large eucalyptus trees that follow the margin

of an overflow canal in a southerly direction. The proposed well site is devoid of vegetation. The well location is routinely maintained through herbicide application and grading. Attachment 2 (Table 2-1) to Appendix D lists the plant species observed within the project area.

Sutter Mutual Water Company Monitoring Well Option 3. The proposed well site is along Everglade Road. The area includes highly disturbed rice production fields, row crops, dirt access roads, and irrigation canals. Vegetation is minimal due to routine maintenance and grading/farming practices.

3.3.1.2 Sensitive Habitats

Pelger Mutual Water Company Production Well. The agricultural drainages, irrigation canals, and wetlands are considered suitable aquatic habitats that would support GGS, a federal and California State threatened species. The narrow riparian band of oaks southwest of the site provides habitat suitable for GGS, and potential nesting and roosting for Swainson's hawk, a California State threatened species that uses riparian forests and other large trees for nesting. Figure 1a in Appendix D shows documented special-status species near the project location.

Sutter Mutual Water Company Monitoring Well Options 1, 2, and 3. The agricultural drainages, rice fields, and irrigation canals are considered suitable aquatic habitats that could support GGS. The riparian habitat along Sutter Bypass and the eucalyptus trees in the area provides nesting opportunities for Swainson's hawk. Field observation and review of the results from database searches indicate sensitive species potentially occurring within the project vicinity include GGS and Swainson's hawk. Figures 2d, 2e, and 2f in Appendix D show documented special-status species near the proposed well option locations.

3.3.1.3 Wetlands

Pelger Mutual Water Company Production Well. The proposed well location is approximately 60 feet north of a privately owned wetland sanctuary. The wetland is separated by a concrete-lined irrigation canal owned and operated by PMWC. Two fence lines separate the wetland from the proposed well site. The cement-lined canal provides a barrier between the well and the wetland. This configuration would not allow migration of sediments or fill to enter the wetland.

Sutter Mutual Water Company Monitoring Well Options 1, 2, and 3. None of the proposed SMWC monitoring well locations have wetland habitat within the well construction areas of potential effects (APE).

3.3.1.4 Fauna

Pelger Mutual Water Company Production Well. The following fauna species were observed at the proposed well site and adjacent habitats: American bittern (*Bonaurus lentiginosus*), Greater white front goose (*Anser albifrons*), mallard duck (*Anas platyrhynchos*), northern harrier (*Circus cyaneus*), ring-necked pheasant (*Phasianus colchicus*), western scrub jay (*Aphelocoma californica*), marsh wren (*Cistothorus palustris*), red-winged blackbird (*Agelaius phoeniceus*), western kingbird (*Tyrannus verticalis*), California ground squirrel (*Spermophilus*

beecheyi), and pocket gopher (*Thomomys* sp.). Attachment 3 (Table 3-2) to Appendix D lists the wildlife species observed within the project area.

Sutter Mutual Water Company Monitoring Well Options 1, 2, and 3. Few fauna species were observed at the three optional locations because of agricultural activities in the area during the field visit. Species observed within the vicinity consisted of Swainson's hawk, turkey vulture (*Cathartes aura*), mallard duck, European starling (*Sturnus vulgaris*), and red-wing blackbird. Attachment 3 (Table 3-2) to Appendix D lists the wildlife species observed within the project areas.

3.3.1.5 Special-status Species

3.3.1.6 Rare Plants

Rare plants that have the potential to occur within the project area were identified using the CDFG California Natural Diversity Database (CNDDB) and California Native Plant Society (CNPS) database and are listed in Attachment 2 to Appendix D. Eleven plants species were identified on the Sutter Causeway, Gilsizer Slough, Kirkville, Dunnigan, Grimes, and Tisdale Weir USGS 7.5-minute quadrangles. Ten of the plant species are not likely to occur with the project sites because of unsuitable habitat. The proposed PMWC and all options of the SMWC well sites are routinely maintained through mechanical means such as mowing, pesticide application, and agricultural cultivation.

Although not observed during the site visit, the round-leaved filaree (*California macrophylla*) a CNPS 1B species has the potential to occur within the three project areas. CNPS status codes are defined in Attachment 2 (Table 2-1) to Appendix D. Round-leaved filaree occurs in valley and foothill grasslands and cismontane woodlands with clay soils, and also occurs in disturbed soils.

3.3.1.7 Fishery Resources

Because no waterways that support fisheries are near any of the proposed well sites, no fishery resources are associated with PMWC or SMWC proposed well locations.

3.3.1.8 Raptors and Migratory Birds

Proposed well sites were inspected for raptors and migratory birds and suitable nesting habitat. As identified above, both the PMWC and SMWC sites have the potential to support ground- and tree-nesting birds, such as killdeer (*Charadrius vociferus*), red-tailed hawk, and Swainson's hawk during the breeding season. The majority of bird species are protected under the Migratory Bird Treaty Act.

Pegler Mutual Water Company Production Well. The PMWC proposed well site has a potential for nesting Swainson's hawk; however, no active nests were observed.

Sutter Mutual Water Company Monitoring Well Options 1, 2, and 3. As described above, several raptors including the Swainson's hawk were observed at or near SMWC proposed ground-water well Options 1 through 3. Several raptor-size nest sites were observed within the cottonwood and willow riparian canopy along Sutter Bypass for proposed well Options 1 and 2. Swainson's hawks were observed at both of these sites, and the sites potentially support nesting activity.

3.3.1.9 Roosting Bats

No structures or other suitable features exist close to any of the proposed well sites that would provide roosting sites for special-status bat species. No special-status bat species were identified in the CNDDB search. Therefore, the PMWC and SMWC proposed well locations are not expected to affect roosting bat species.

3.3.2 Environmental Consequences

3.3.2.1 Environmental Commitments Incorporated into the Projects

See Section 2.3 for environmental commitments incorporated into the proposed action.

3.3.2.2 No Action

Effects on biological resources would be similar to what is presently occurring within each company's boundaries under the no action alternative.

3.3.2.3 Proposed Action

Construction. Construction effects within the 200-foot upland buffer for the GGS would require adherence with the ESA, and could be considered to have an adverse effect. Coordination with USFWS under the ESA would be conducted for GGS to gain agreement on the proposed avoidance and minimization measures identified in Section 2.3.5. Implementing these measures and others agreed to by USFWS would reduce the overall impact such that no adverse effect on GGS would occur.

Construction within the 0.5-mile buffer of an active Swainson's hawk nest during the nesting season would require adherence with the California Endangered Species Act, and would be considered to have an adverse effect. Construction activities within nesting habitat for other special-status bird species could result in a violation of the Migratory Bird Treaty Act, and would be considered to have an adverse effect if not addressed. Adherence to the proposed avoidance and minimization measures would protect nesting bird species that could be affected by the project and would reduce the impact such that no adverse effect on nesting birds would occur.

Operation. No effects on biological resources as a result of operational activities associated with this project.

3.3.2.4 Cumulative Effects

With the implementation of the avoidance and minimization measures identified above (including consultation with USFWS), no adverse cumulative effects on biological resources are anticipated.

3.4 Cultural Resources

Cultural resources is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. The National Historic Preservation Act (NHPA) of 1966 is the primary federal legislation that outlines the federal government's responsibility as it relates 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, or eligible for

inclusion, in the National Register of Historic Places (NRHP). Those resources that are in or eligible for inclusion in the NRHP are referred to as historic properties.

The Section 106 process is outlined in the *Code of Federal Regulations* (CFR) in 36 CFR Part 800. These regulations describe the process that the federal agency (in this case, Reclamation) takes to identify cultural resources, and the level of effect that the proposed undertaking would have on historic properties. In summary, Reclamation must first determine if the action has the potential to affect historic properties. If the action is of a type that would affect historic properties, Reclamation must identify the APE, determine if historic properties are present within that APE, determine the effect that the undertaking would have on historic properties, and consult with the SHPO to seek concurrence on Reclamation's findings. In addition, Reclamation is required through the Section 106 process to consult with American Indian Tribes concerning the identification of sites of religious or cultural significance, and consult with individuals or groups who are entitled, or have requested, to be consulting parties.

3.4.1 Affected Environment

3.4.1.1 Central California Prehistory

The general trend throughout California prehistory has been an increase in human population density over time, coupled with greater sedentism and the use of a greater diversity of food resources. The earliest sites in the Sacramento Valley are Fluted Point Tradition and Western Pluvial Lakes Tradition sites, thought to be 11,500 to 7,500 years old. Following the Fluted Point and Western Pluvial Lakes Traditions in time in central California is a cultural period characterized by what is called the Windmiller Pattern. The majority of known Windmiller Pattern sites date to approximately 5,000 to 2,250 years ago (Fredrickson, 1974) and are characterized by tools related to hunting, fishing, and milling. The subsequent Berkeley Pattern dates to approximately 2,500 to 1,250 years ago (Fredrickson, 1974), and subsistence relied less on hunting and fishing than the Windmiller Pattern, and more on acorns. The Augustine Pattern dates from about 1,250 to 250 years ago. Augustine Pattern sites are much more widespread than Berkeley Pattern sites and are characterized by intensive fishing, hunting, and acorn gathering (Fredrickson, 1974).

3.4.1.2 Ethnography

The PMWC and SMWC are located in an area used by both the Patwin and Nisenan Indians.

There were two major territorial, and possibly linguistic, divisions of the Patwin: the River Patwin and Hill Patwin. The River Patwin occupied the area around the PMWC APE. Many Patwin were subjected to forced missionization or died from epidemics introduced by European trappers in the 1830s. The advent of the Gold Rush further decimated Patwin populations; the 1972 Bureau of Indian Affairs census listed only 11 Patwins (Johnson, 1978).

The Nisenan, also referred to as the Southern Maidu, occupied territory from the west bank of the Sacramento River and throughout the drainages of the Yuba, Bear, and American Rivers. In 1833, large portions of the Nisenan population died in epidemics. In the early 1850s, gold was discovered near one of the villages of the Hill Nisenan, and the area was quickly overrun with thousands of miners. As of the 1970s, a few Hill Nisenan families still

lived in their traditional area in the foothills (Wilson and Towne, 1978). The conversion of land and intensive farming practices in and around the APE over the last century has likely disturbed many Native American cultural sites as well as other cultural resources.

The present character of the APE and its surrounding area seems to derive primarily from the development of agriculture, beginning with the Mexican land grants and progressing through the rural towns and farms of the early 1900s. One of the primary necessities for such development revolved around water, water rights, and the infrastructure to convey that water for agricultural and residential development. In the Sacramento Valley, the Central Irrigation District was created under the Wright Act in 1887, and the Browns Valley Irrigation District was created under this Act in 1888. Many of the first districts failed. In January 1909, two major storms hit the area around Knight's Landing, and the Sacramento River rose approximately 20 feet, breaking levees and washing away buildings, railroad tracks, and livestock. This flooding prompted the signing of the California Reclamation Act in 1911 (Dow, 2008). One of the goals of this Act was to drain 1.5 million acres of land in nine counties for reclamation. One of these reclamation districts is Reclamation District No. 1500 (RD 1500). The boundaries of RD 1500 roughly encompass the PMWC and SMWC service areas. RD 1500 was formed in 1913, and SMWC was formed in 1919. PMWC was formed in March 1965 and executed a water rights settlement contract with the United States in May 1965.

3.4.1.3 Historic Era

In 1542, Juan Rodriguez Cabrillo explored the California coast by ship. The Mission Period began with the establishment of Spanish Colonial military outposts. In 1821, Mexico gained independence from Spain, beginning the Mexican Period; and in 1848, the United States formally obtained California in the Treaty of Guadalupe Hidalgo (Cleland, 1962), beginning the American Period.

In 1902, President Theodore Roosevelt signed the federal Reclamation Act, also known as the Newlands Act, which allowed for the federal government to fund and construct irrigation projects in 16 states and territories in the West (Pisani, 2002). The Central Valley Project, originally conceived and designed by the State of California, was intended to move water into the San Joaquin Valley, control flooding in the Sacramento Valley, improve navigation along the major rivers in the Central Valley, and provide hydroelectric power to a number of the state's industries.

The Wright Act of 1887 allowed for the formation of irrigation districts. Severe flooding in January 1909, in the area around Knight's Landing prompted the signing of the California Reclamation Act in 1911 (Dow, 2008) to drain and reclaim 1.5 million acres of land in nine counties. One of the reclamation districts formed under the act was RD 1500 in 1913. The boundaries of RD 1500 roughly encompass PMWC and SMWC. SMWC was formed in 1919. PMWC was formed in March 1965, and executed a water rights settlement contract with the United States in May 1965.

3.4.1.4 Identification Efforts

In an effort to identify historic properties, the PMWC contracted CH2M HILL to complete an inventory and evaluation of cultural resources within the APE. CH2M HILL requested a records search at the Northeast Information Center on February 22, 2011 for PMWC and on

May 10, 2011 for SMWC, which identified no previous studies that encompass the APE. However, the review of historic maps identified the following historic feature within the PMWC APE: a lateral of the West Side Canal, Lateral SL-17S; and the following features within the SMWC APE: the Sutter Main Canal and Everglade Road. A pedestrian survey of the APE was conducted on April 26, 2011, by CH2M HILL archaeologist Natalie Lawson. Four cultural resources were identified and recorded during the pedestrian survey (see Table 3-3). One historical water conveyance feature, the Lateral SL-17S, was recorded during the pedestrian survey of the PMWC APE. This lateral would be connected to the proposed well via a conveyance line and therefore is inside the APE. The segment recorded measures 300 feet. Two small foundations were recorded during the pedestrian survey of the SMWC APE for Option 1. One segment of the Sutter Main Canal was recorded during the pedestrian survey of the SMWC APE for Option 2. This canal is adjacent to the proposed monitoring well within the APE. Everglade Road was recorded during the pedestrian survey of the SMWC APE for Option 3. This road is visible on historical maps and provides access to the Option 3 location.

California Department of Parks and Recreation forms were prepared for the four historic features previously described. The segment of the Sutter Main Canal is outside the APE for the Option 2 monitoring well, and therefore, this structure was not evaluated for inclusion on the NRHP.

TABLE 3-3
Cultural Resources Recorded During the Pedestrian Survey

Resource Name	Location in APE	Eligibility for the NRHP
Lateral SL-17S	PMWC APE	Eligible
Historic Foundations	SMWC APE, Option 1	Not eligible
Sutter Main Canal	SMWC APE, Option 2	Not evaluated
Everglade Road	SMWC APE, Option 3	Eligible

Lateral SL-17S is within the PMWC APE and was constructed by SMWC between 1915 and 1919. The PMWC, which was later incorporated, took over use and maintenance of this lateral in the 1970s.

The NRHP criteria of evaluation (36 CFR Part 60.4) were applied to Lateral SL-17S. This lateral is recommended as eligible for listing on the NRHP under Criterion A for its association with the history of early settlement, reclamation, and agriculture in rural Sutter County. The lateral is also recommended as eligible under Criterion B for its association with George S. Maddox, a person important to local history. The Lateral SL-175 segment within the APE is eligible as a contributing element of the canal as a whole.

The segment of Lateral SL-17S within the APE has retained integrity of location, design, setting, and association. Heavy repairs to the concrete and a relatively late-dating gate have resulted in some loss of integrity of design, workmanship, and materials. This lateral is in an area with orchards and agricultural fields and moves irrigation water for crops and trees.

This lateral has remained a part of the water conveyance system within an agricultural landscape. The lateral exhibits the same, or similar, structural design to convey water for agricultural purposes. Given the lateral's association with PMWC, and its original association with SMWC, as well as the continuity of water conveyance that has contributed to the economic development of the area, the portion of the lateral segment within the APE is recommended eligible for listing on the NRHP under Criterion A on the local level.

Overall, the SMWC system was designed by civil engineer George S. Maddox. Maddox is considered locally important; he was one of the first managers of the SMWC and important to the development of the SMWC and, as a result, the development of water conveyance, reclamation, and agriculture in the Sutter Basin. The railroad station at Robbins was originally named after Maddox. Therefore, this lateral is associated with the life of a significant person and appears to be eligible under Criterion B.

This lateral segment is a simple concrete-lined canal that does not exhibit distinct characteristics of a type, period, or method of construction. Such canals are common throughout California. The gate structure is found in all types of ditches and canals and does not exhibit a unique method of construction. Therefore, this lateral segment appears to be ineligible for listing on the NRHP under Criterion C.

Given the nature of canal construction for this lateral segment, there is little potential to provide additional information about the lateral or the history of the area; therefore, this does not appear eligible for listing on the NRHP under Criterion D. The canal segments were recorded in accordance with the *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines* (National Park Service, 2011).

The NRHP criteria of evaluation (36 CFR Part 60.4) were applied to the foundations within the SMWC APE for Option 1. These foundations are not eligible for listing on the NRHP under any criterion.

These small, crumbling foundations, possibly for pump houses, are in poor condition and do not retain integrity of design, workmanship, materials, or association. Although the foundations retain some integrity of location and setting, they are incomplete, and several pieces have been removed from the area. No artifacts can be definitively related to any significant historic events, and the original purpose and function of these foundations are not known. Thus, these foundations do not appear to be eligible under Criterion A.

The physical characteristics of these foundations do not specifically relate to a notable individual or company. Therefore, these foundations do not appear to be eligible for listing on the NRHP under Criterion B.

Little of these foundations remains, and they do not exhibit distinct characteristics of a type, period, or method of construction. Therefore, these foundations do not appear eligible for listing on the NRHP under Criterion C.

Finally, there is little potential to provide additional information about these foundations or the history of the area; therefore, these foundations do not appear to be eligible for listing on the NRHP under Criterion D.

These foundations were recorded in accordance with the *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines* (National Park Service, 2011).

SMWC Option 3 runs along Everglade Road, a historic road. This road was likely associated with reclamation activities during the 1910s or 1920s.

The NRHP criteria of evaluation (36 CFR Part 60.4) were applied to Everglade Road, and it is recommended that this road is eligible for listing on the NRHP under Criterion A for its association with the history of early settlement, reclamation, and agriculture in Sutter County. The segment within the APE is eligible as a contributing element of the overall road.

The segment of Everglade Road within the APE has retained its integrity of location, design, setting, workmanship, and association. The road has lost some of its integrity of workmanship and materials because much of the original paving is now gone. The road is within agricultural fields and serves as the access road for farms and agricultural fields. Therefore, the segment of Everglade Road within the APE appears to be eligible for listing on the NRHP under Criterion A on the local level.

The physical characteristics of the road do not specifically relate to a notable individual or company. Therefore, the road does not appear eligible for listing on the NRHP under Criterion B.

This road does not exhibit distinct characteristics of a type, period, or method of construction. Therefore, this road is ineligible for listing on the NRHP under Criterion C.

Given the nature of rural road construction, there is little potential to provide additional information about either road or the history of the area; therefore, the road segment is not eligible for listing on the NRHP under Criterion D.

Everglade Road was recorded in accordance with the *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines* (National Park Service, 2011).

3.4.1.5 Consultation

Reclamation identified the United Auburn Indian Community, Enterprise Rancheria of Maidu Indians, and the Mechoopda Indian Tribe of Chico Rancheria as tribes likely to have knowledge of historic properties in the area and who may attach religious and cultural significance to historic properties affected by the proposed undertaking pursuant to the regulations at 36 CFR § 800.3(f)(2). Reclamation sent letters to these tribes on July 17, 2011, to invite their assistance in identifying sites of religious and cultural significance pursuant to 36 CFR § 800.4(a)(4). The Maidu Band of Strawberry Valley Rancheria was identified as an Indian organization likely to have knowledge of historic properties in the area pursuant to the regulations at 36 CFR § 800.4(a)(3). Reclamation sent letters to request the Band's assistance in identifying historic properties that may be located within the APE. The Enterprise Rancheria responded on August 15, 2011, to request a site visit to the APE. No specific concerns have been identified regarding sites of religious or cultural significance or historic properties that may be affected by the proposed project. The Mechoopda Indian Tribe responded on August 16, 2011 to notify Reclamation that it had no concerns regarding cultural resources within the APE. If concerns arise during the consultation process, Reclamation will work with these Indian tribes or individuals to address their concerns.

3.4.1.6 Determination of Effects

Reclamation concludes that the both well construction projects will result in no adverse effects to historic properties pursuant to 36 CFR § 800.5(b). The proposed project will not alter the characteristics that make the segment of PMWC Lateral SL-17S or the segment of Everglade Road within the APE eligible for inclusion in the NRHP. Construction of the new wells will not diminish the integrity of design or appearance of either the canal segment, given that adding another discharge pipeline similar to other such existing facilities is consistent with the purpose and function for which the PMWC Lateral SL-17S as a whole was built, and will not affect the ability to deliver water. Everglade Road has remained an access road to facilitate the delivery of water, and no improvements to the road are necessary for well construction. The qualities of the rural agricultural location, setting, feeling, and association of both the PMWC Lateral SL-17S and Everglade Road will not change as a result of the well construction projects.

3.4.2 Environmental Consequences

3.4.2.1 No Action

Under the no action alternative, there would be no impacts on cultural resources because the well would not be constructed, and there would be no change in operations. Conditions related to cultural resources would remain the same as existing conditions.

3.4.2.2 Proposed Action

The proposed action is the type of activity that has the potential to affect historic properties. A records search, a cultural resources survey, and Tribal consultation identified historic properties within the APE. No project activities will adversely affect historic properties pursuant to 36 CFR Part 800.5(b). Constructing the proposed production and monitoring wells and connecting the PMWC production well discharge pipeline to the PMWC Lateral SL-17S will not diminish its structural integrity and will not adversely affect the historic characteristics that make the canal eligible for listing on the NRHP under Criterion A or Criterion B. The function of the canal will not change. Because no historic properties would be adversely affected, no cultural resources would be affected as a result of implementing the proposed action. Concurrence from the SHPO to conclude the Section 106 compliance process is pending.

3.4.2.3 Cumulative Effects

The proposed action has the potential to affect cultural resources. Because Reclamation concluded that no historic properties will be adversely affected, no cultural resources would be affected as a result of implementing the proposed action. Reclamation will consult with the SHPO regarding this determination. The project will not be implemented until the Section 106 compliance process has been completed.

3.5 Indian Trust Assets

ITAs are legal interests in assets that are held in trust by the United States government for federally recognized Indian tribes or individuals. The trust relationship usually stems from a treaty, executive order, or act of Congress. The Secretary of the Interior is the trustee for

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

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

3.5.1 Affected Environment

No ITAs are located near the proposed action area.

3.5.2 Environmental Consequences

3.5.2.1 No Action

Under the no action alternative, PMWC and SMWC would continue to implement their current water management programs. Continued operation would have no effect on ITAs.

3.5.2.2 Proposed Action

There would be no effects on ITAs because no ITAs are within the proposed action area.

3.5.2.3 Cumulative Effects

Because no ITAs are within the proposed action area, there would be no adverse cumulative effects on ITAs.

3.6 Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," dated February 11, 1994, requires agencies to identify and address disproportionately high and adverse human health or environmental effects of their actions on minorities and low-income populations and communities, as well as the equity of the distribution of the benefits and risks of their decisions. Environmental justice addresses the fair treatment of people of all races and incomes with respect to actions affecting the environment. Fair treatment implies that no group of people should bear a disproportionate share of negative impacts from an environmental action. To comply with the environmental justice policy established by the Secretary of the Interior, all U.S. Department of Interior agencies are to identify and evaluate any anticipated effects, direct or indirect, from the proposed project, action, or decision on minority and low-income populations and communities, including the equity of the distribution of the benefits and risks. Accordingly, this section examines the anticipated impacts associated with the alternatives with respect to potentially affected minority and economically disadvantaged groups.

3.6.1 Affected Environment

PMWC is located in Sutter County. In 2009, the U.S. Census reported a total population in Sutter County of 92,614. The vast majority of people living in Sutter County are white (approximately 79 percent). Persons of Latino or Hispanic origin and Asian persons make up the majority of the remaining population in the county. The majority of Sutter County's population is located in Yuba City.

The unemployment rate in Sutter County was reported to be approximately 21.5 percent in 2010, which was significantly higher than the state estimate of 12.3 (California Employment Development Department [EDD], 2011). The medium household income for Sutter County was $49,146, less than California's medium income level of $61,017. The 2008 estimated poverty level in Sutter County was at 15.5 percent, over 2 percent higher than the state average.

The 2007 Census of Agriculture reported that of the 2,028 farms in Sutter County, 167 of them were principally operated by women, and 175 were principally operated by Spanish, Hispanic, or Latino operators. Most farms in the county were reported as operated by whites (1,639 farms), with the next highest number of farms (353 farms) operated by Asians. The market value of all products sold in Sutter County in 2007 was $317,607,000, with the majority of the sales occurring for crops.

3.6.2 Environmental Consequences

3.6.2.1 No Action

Under the no action alternative, general employment, income, and demographic trends would continue. Continued operation would have no effect related to environmental justice.

3.6.2.2 Proposed Action

Construction. Construction activities associated with the proposed action would require a local or regional contractor who would likely employ local or regional workers. Also, if workers were temporarily relocated into the area during the construction phase, the construction effort would likely result in local expenditures for lodging, food, and construction-related materials and equipment. Accordingly, construction-related environmental justice effects are expected to be positive; no adverse effects would occur.

Operation. Implementing the proposed action would increase water supply reliability, resulting in beneficial effects on agricultural production-related employment. Accordingly, project-related environmental justice effects are expected to be positive; no adverse effects would occur.

3.6.2.3 Cumulative Effects

No substantial cumulative environmental justice effects are anticipated given no effects on this resource are expected from implementing the proposed action.

3.7 Socioeconomic Resources

3.7.1 Affected Environment

3.7.1.1 Population and Housing

Historical trends in population since 1990 for the Yuba City, Sutter County, and the State of California are shown in Table 3-4. Population trends indicate that Yuba City has had the highest percentage growth, especially from 2000 to 2010. Annexations represent a significant share of Yuba City's population growth (Yuba City, 2004). In 2009, there was an estimated 33,480 housing units in Sutter County (U.S. Census Bureau, 2011a).

TABLE 3-4
Population Estimates and Growth in Yuba City, Sutter County, and the State of California

Area Evaluated	Population Estimates			Average Percentage Growth
	1990	2000	2010	
Yuba City	27,385	36,758	65,372	35
Sutter County	64,415	78,930	99,154	19
California	29,758,213	33,873,086	38,648,090	12

Source: DOF, 2007.

3.7.1.2 Economic Base

Table 3-5 provides the employment profile for Sutter County compared to the State of California, as of December 2009.

TABLE 3-5
Population Estimates and Growth in Sutter County and the State of California

Area	Total Civilian Labor Force	No. of Employed (Civilian)	No. of Unemployed (Civilian)	Unemployment Percentage	Total Farm	Total Non-farm
Sutter County	41,800	33,600	8,200	19.5	5,200	36,600
California	18,366,300	16,025,600	2,340,700	12.7	423,000	13,782,800

Source: EDD, 2011.

The reported unemployment rate for Sutter County is higher than the state average. Table 3-6 shows estimated employment by industry for each county compared to California as of July 2010.

TABLE 3-6
Sutter County and State of California Employment by Industry Sector and Percent of Total Employment by Industry Sector, December 2009

	Sutter County Employment		California Employment	
Industry[a]	Total	Percent of Total	Total	Percent of Total
Total, All Industries	25,400		14,205,800	
Total Farm	2,200	9	423,000	3
Total Non-farm	23,200	91	13,782,800	97
Goods Producing	2,500	10	1,835,100	13
Mining and Logging	200	1	26,200	0.2
Construction	1,000	4	563,100	4
Manufacturing	1,300	5	1,245,800	9
Service Providing	20,700	81	11,947,700	84
Information	300	1	447,400	3
Financial Activities	1,000	4	780,100	5
Professional and Business Services	1,900	7	2,052,000	14
Educational and Health Services	3,800	15	1,726,600	12
Leisure & Hospitality	2,400	9	1,509,800	11
Other Services	700	3	481,900	3
Government	4,700	19	2,375,700	17

[a]Industry employment is by place of work; excludes self-employed individuals, unpaid family workers, household domestic workers, and workers on strike.

Source: EDD, 2010.

The majority of the workforce in both Sutter County and the State of California is in the service-providing industry. Compared to the state, Sutter County has a larger per capita percentage of farm employment, representing 9 percent of the total industry employment.

3.7.2 Environmental Consequences

3.7.2.1 Assessment Methods

Potential impacts on socioeconomic resources are identified by how implementing the proposed action could alter existing socioeconomic conditions either locally or regionally. The extent of the potential socioeconomic impact that could occur is related to the operation of the proposed groundwater production well and associated drawdown and pumping costs. To estimate the potential impacts on socioeconomic resources, the potential increase in pumping costs per acre-foot (ac-ft) of lift was estimated for electric and diesel pumps using a pumping cost formula (Anderson, 1961) in combination with the anticipated maximum increment of anticipated additional drawdown/pumping. For electric pumps, the estimated cost per ac-ft is approximately $0.38 for 1 foot of lift. Dollars per kilowatt-hour are based on

an average of the estimated blended rates published by Pacific Gas and Electric Company for small agricultural users, $0.26 per kilowatt-hour (Pacific Gas and Electric Company, 2011). Estimated cost per ac-ft for diesel pumps is also projected to be approximately $0.38 for 1 foot of lift. The price of diesel fuel per gallon was obtained from the U.S. Department of Energy's Monthly Retail On-Highway Diesel Prices for California (2011). For the last 5 years ending in April 2011, the average price of a gallon of diesel fuel was $3.22. Pump efficiency is assumed to be 82 percent and motor efficiency 85 percent for both electric and diesel pumps.

Table 3-7 shows the estimated increase in pumping costs per ac-ft of groundwater for the range of groundwater surface elevations changes anticipated to occur during operation of the proposed well (see Section 3.1, Water Resources). The estimated increase in pumping cost would be greatest adjacent to the production well, because this is where drawdown would be the greatest. The magnitude of costs would decrease with increased distance from the proposed production well.

TABLE 3-7
Estimated Increase in Per-acre-foot Pumping Costs

	Change in Pumping Cost Per Acre-foot with a Change in Groundwater Surface Elevation	
Energy Type	**10-foot Elevation Change**	**15-foot Elevation Change**
Electric	$3.77	$5.65
Diesel	$3.85	$5.77

Note:

Although the cost per ac-ft per foot lift is the same for both pump types, variation occurs when evaluating a range of lifts because of to rounding.

3.7.2.2 No Action

In general, agricultural economies in the proposed action area are not anticipated to substantially change. It is anticipated that some lands, primarily those near urban areas in Sutter County, would be converted to non-agricultural use, in accordance with local general plans and zoning constraints; however, the conditions under the no action alternative would generally reflect current conditions.

3.7.2.3 Proposed Action

Construction. Construction of the proposed production and monitoring wells would result in temporary beneficial effects as a result of increased labor needs for construction and increased spending at local businesses. Small construction crews would work for specific periods, resulting in increased spending by workers at local businesses and to local suppliers. Additionally, materials and equipment needed for construction, as well as actual facilities (for example, pumps, piping, and motors), would be obtained from the project area wherever feasible and available. Construction of the proposed action would result in minor beneficial impacts on the local economy.

Operation. Increased drawdown near the proposed groundwater production well would be anticipated to increase groundwater pumping costs. The projected shallow aquifer

drawdown resulting from implementation is expected not to exceed 5 feet, with drawdown decreasing as distance from the proposed groundwater production well increases.

Effects on socioeconomic conditions would be significant if the proposed action resulted in displacement of a business or residence from its established location or resulted in substantial disruption of existing agricultural operations. The potential significance of the increase in groundwater pumping costs was based on the change in groundwater pumping costs relative to baseline agricultural conditions. The average operating cost, net revenue, groundwater, and applied water use were estimated for agricultural production in the study area (see Table 3-8).

TABLE 3-8
Agricultural Conditions in the Study Area

Agricultural Conditions	Parameter
Percent of Crop Water Demand Met with Groundwater[a]	28 percent
Average Agricultural Operating Costs[b]	$1,654/acre
Average Agricultural Net Revenue[c]	$720/acre
Average Agricultural Applied Water Use[d]	3.36 ac-ft/acre

[a]DWR, 2010.

[b]University of California Cooperative Extension, 2011; DWR, 2007.

[c]University of California Cooperative Extension, 2011; DWR, 2007; U.S. Department of Agriculture, 2011.

[d]DWR, 2007.

The percentage of groundwater used to meet total crop demand and crop type would create varying effects. On average, the estimated increases in operating costs resulting from increased pumping costs would be less than 1 percent. Increases in operation costs would be only local in nature.

Land surrounding the proposed groundwater production wells is primarily agricultural; however, domestic wells in the study area could also be affected. The average annual water use per household is typically less than 1 ac-ft per year (DWR, 2010). The change in groundwater pumping costs would, at most, increase domestic water use costs for a typical household by less than $6.00 a year, which represents less than 1 percent of median household income in the study area (U.S. Census Bureau, 2011b).

The relatively minimal increase in pumping costs would not be expected to threaten the economic viability of crop production or adversely affect groundwater pumping for domestic use. Effects would be limited to the local area; no regional effects would occur. The area affected by the proposed action would remain productive farmland, despite a marginal increase in pumping costs, and would not adversely affect socioeconomic resources.

3.7.2.4 Cumulative Effects

The proposed action would likely result in small but beneficial social and economic effects during the construction phase. No cumulative socioeconomic effects are anticipated given no effects on this resource are expected from implementing the proposed action.

3.8 Air Quality

3.8.1 Affected Environment

The proposed action is located in Sutter County, which is within FRAQMD. FRAQMD regulates air quality within Sutter and Yuba Counties. Sutter County lies within the Sacramento Valley Air Basin, which is bordered by mountain ranges to the west, north, and east, with prevailing winds that generally blow from the south to north direction.

Table 3-9 summarizes the attainment status for Sutter County. The Sutter County *General Plan Draft Environmental Impact Report* states that "a wide variety of activities contribute to the emission of criteria air pollutants including fuel combustion, petroleum production, farming operations, and motor vehicles. Other contributions come from waste disposal, cleaning and surface coatings, solvent evaporation, and natural sources. Natural sources make up approximately five percent of Sutter County's emissions totals. It should also be noted that farming operations in Sutter County contribute approximately 42 percent to the total particulate matter emissions (11.51 tons of particulate matter per day from farming operations with 27.26 tons of particulate matter per day for the entire county)" (Sutter County, 2010a).

TABLE 3-9
Attainment Status for the Sutter County

	Designation/Classification	
Pollutant	**State Standard**	**Federal Standard**
Ozone – 1-hour	Southern portion of county: serious nonattainment	N/A
	Remaining: nonattainment – transitional	
Ozone – 8-hour	Nonattainment – transitional	Southern portion of county: severe nonattainment
		Sutter Buttes> 2,000 feet: nonattainment
		Remaining: unclassified/attainment
PM_{10}	Nonattainment	Unclassified
$PM_{2\,5}$	Attainment	Nonattainment
CO	Attainment	Unclassified/attainment
NO_2	Attainment	Unclassified/attainment
SO_2	Attainment	Unclassified/attainment
Sulfates	Attainment	N/A
Lead (Particulate)	Attainment	N/A
Hydrogen Sulfide	Unclassified	N/A
Visibility-reducing Particles	Unclassified	N/A

Source: FRAQMD, 2010a.

Notes:
CO = carbon monoxide
N/A = not applicable
$PM_{2\,5}$ = particulate matter 2.5 micrometers or less in aerodynamic diameter
PM_{10} = particulate matter 10 micrometers or less in aerodynamic diameter
SO_2 = sulfur dioxide

3.8.1.1 Federal Regulations

The federal Clean Air Act (CAA) requires EPA to establish and maintain National Ambient Air Quality Standards (NAAQS), used to manage air quality across the country. Pollutants for which standards have been established are termed "criteria" pollutants, because the standards are based on criteria that show a relationship between pollutant concentrations and impacts on health and welfare. EPA and the state establish acceptable pollutant concentration levels to serve as ambient air quality standards (see Table 3-10).

If ambient concentrations of any of the criteria pollutants in an area exceed the state or federal standards established for those pollutants, the area is designated a "nonattainment" area. The CAA requires states with nonattainment areas to develop plans, known as State Implementation Plans (SIP), that describe the measures the state would take to achieve attainment with NAAQS. Local air districts and other agencies prepare SIP elements for the areas under their regulatory jurisdiction and submit these elements to CARB for review and approval. CARB incorporates the individual air district elements into a statewide SIP, and the plan is then submitted to EPA for approval and publication in the Federal Register.

TABLE 3-10
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
			Primary[c]	Secondary[d]
Ozone	1-hour	0.09 ppm	---	Same as primary
	8-hour	0.070 ppm	0.075 ppm	
PM_{10}	24-hour	50 $\mu g/m^3$	150 $\mu g/m^3$	Same as primary
	Annual arithmetic mean	20 $\mu g/m^3$	---	
$PM_{2.5}$	24-hour	---	35 $\mu g/m^3$	Same as primary
	Annual arithmetic mean	12 $\mu g/m^3$	15.0 $\mu g/m^3$	
CO	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	
NO_2	Annual arithmetic mean	0.030 ppm	0.053 ppm (100 $\mu g/m^3$)	Same as primary
	1-hour	0.18 ppm	0.100 ppm (188 $\mu g/m^3$)	None
SO_2	24-hour	0.04 ppm	---	---
	1-hour	0.25 ppm	0.075 ppm (196 $\mu g/m^3$)	---
Lead	30-day average	1.5 $\mu g/m^3$	---	---
	Calendar quarter	---	1.5 $\mu g/m^3$	Same as primary
	Rolling 3-month average	---	0.15 $\mu g/m^3$	
Visibility-reducing Particles	8-hour	See note e	---	---
Sulfates	24-hour	25 $\mu g/m^3$	---	---

TABLE 3-10
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
			Primary[c]	Secondary[d]
Hydrogen Sulfide	1-hour	0.03 ppm	---	---
Vinyl Chloride	24-hour	0.01 ppm	---	---

[a]California standards for ozone, CO, SO_2 (1-hour and 24-hour), NO_2, and suspended particulate matter (PM_{10}, $PM_{2.5}$, and visibility-reducing particles) are values that are not to be exceeded. All others are not to be equaled or exceeded.

[b]National standards, other than ozone, particulate matter, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once per year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, is equal to or less than the standard.

[c]National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[d]National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[e]In sufficient amounts to produce an extinction coefficient of 0.23 per kilometer due to particles, when the relative humidity is less than 70 percent.

Notes:

-- = no established standard
$\mu g/m^3$ = micrograms per cubic meter
NO_2 = nitrogen dioxide
ppm = parts per million (by volume)

Air quality management districts (AQMD) or air pollution control districts issue permits to construct and operate stationary emission sources and implement regulations for new or modified stationary emission sources. Air boundaries are based on meteorological and geographic conditions and, where possible, jurisdictional boundaries such as county lines. Mobile sources, such as vehicles, and off-road engines, such as construction equipment and agricultural pump engines, are subject to emissions standards developed by EPA and CARB.

3.8.1.2 General Conformity

The General Conformity Rule was established under Section 176(c) of the CAA and makes sure that federal activities in nonattainment and maintenance areas meet the federal air quality standards. Under the conformity provisions of the CAA, no federal agency can approve a project unless the project has been demonstrated to conform to the applicable SIP. These conformity provisions were put in place to make sure that federal agencies would contribute to the efforts of attaining the NAAQS. EPA has issued two types of conformity guidelines: transportation conformity rules that apply to transportation plans and projects, and general conformity rules that apply to all other federal actions. A conformity

determination[7] is only required for the alternative that is ultimately selected and approved. A project is assumed to conform if the total net project-related emissions are less than the de minimis thresholds established by the rule. A project that produces emissions that exceed conformity thresholds is required to demonstrate conformity with the SIP through mitigation or other accepted practices. The de minimis thresholds applicable to the proposed action are presented in Table 3-11.

TABLE 3-11
General Conformity De Minimis Thresholds Applicable to the Proposed Action

Pollutant	Attainment Status Designation	De Minimis Rates (tons per year)
$PM_{2.5}$	Nonattainment	100
NO_x	Precursor to $PM_{2.5}$	100

Source: 40 CFR 93.153; EPA, 2010a.

Notes:

The proposed action is located in the northern portion of Sutter County that is designated as unclassified/attainment of the federal ozone standard.

NO_x = nitrogen oxide

3.8.2 Environmental Consequences

3.8.2.1 Environmental Measures Incorporated into the Projects

See Section 2.3.6 for specific actions to minimize potential air quality effects.

3.8.2.2 No Action

Local and regional groundwater use each year and the resulting impacts on air quality would remain the same as existing conditions and would vary by year type under the no action alternative.

3.8.2.3 Proposed Action

Construction. Air quality effects were evaluated in terms of daily and annual emissions from construction. Construction activities such as excavation, grading, and vehicle travel would create a short-term increase in PM_{10} and $PM_{2.5}$ from dust and exhaust emissions. Exhaust emissions of NO_x and reactive organic gases (ROG) from construction can contribute to ozone formation. Emissions were estimated for construction of the proposed PMWC production well and SMWC monitoring well. Construction of the PMWC well was assumed to occur over a 30-day period, and construction of the SMWC well was assumed to occur over a 15-day period. Emissions were estimated assuming the construction duration for both wells would overlap. Construction equipment emissions were estimated using URBEMIS2007 (Rimpo and Associates, 2007). Emissions from vehicles, such as concrete trucks, were estimated using EMFAC2007 emission factors. It was assumed that 0.5 acre

[7]A conformity determination is a process that demonstrates how an action would conform to the applicable SIP. If the emissions cannot be reduced sufficiently, and if air dispersion modeling cannot demonstrate conformity, then either a plan for mitigating or a plan for offsetting the emissions would need to be pursued.

would be temporarily disturbed for the PMWC well construction and 0.6 acre would be temporarily disturbed for the SMWC well construction. Appendix E contains the construction emission calculations and URBEMIS2007 output.

Construction emissions were evaluated by comparison to the FRAQMD thresholds and the applicable general conformity de minimis thresholds (FRAQMD, 2010b). Tables 3-12 and 3-13 present the daily and annual construction emissions, respectively. The average daily and annual construction emissions would be less than the FRAQMD thresholds; therefore, construction of the proposed action would not have an adverse effect on air quality. In addition, annual emissions would be less than the de minimis thresholds; therefore, the proposed action does not require a conformity determination.

TABLE 3-12
Average Daily Construction Emissions

	Emissions (lb/day)			
Emission Source	**NO_x**	**ROG**	**PM_{10}**	**$PM_{2.5}$**
Construction Activities	20	2	5	2
FRAQMD Threshold[a]	25	25	80	NA

[a]The FRAQMD threshold for NO_x and ROG emissions from construction is 25 lb/day averaged over the project length.

Notes:

lb/day = pounds per day

NA = not applicable

TABLE 3-13
Annual Construction Emissions

	Emissions (tons/year)			
Emission Source	**NO_x**	**ROG**	**PM_{10}**	**$PM_{2.5}$**
Construction Activities	0.3	0.04	0.07	0.03
General Conformity De Minimis Threshold	100	NA	NA	100
FRAQMD Threshold[a]	0.375	0.375	NA	NA

[a]The FRAQMD threshold for NO_x and ROG emissions from construction is 25 lb/day averaged over the project length, not to exceed 4.5 tons/year. For the proposed action, this equates to an allowable rate of 0.375 tons/year (results were calculated using the following equation: 25 lb/day * 30 day project length * 1 ton/2000 lbs).

Note:

NA = not applicable

Operation. Operation of the proposed PMWC well would require electricity to operate the pump and would not generate onsite emissions. The proposed SMWC well would be used for monitoring so there would be no operational features. Therefore, the proposed action would not have an adverse effect on air quality.

3.8.2.4 Cumulative Effects

Construction of the proposed action would result in a minor, short-term increase in emissions as shown in Table 3-13. Therefore, construction would not have adverse cumulative effects on air quality. Operation of the project involves operation of electric-powered pumps and would not result in an adverse cumulative effect on air quality.

3.9 Global Climate Change

3.9.1 Affected Environment

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from the following (EPA, 2011):

- Natural factors, such as changes in the sun's intensity or slow changes in Earth's orbit around the sun
- Natural processes within the climate system (for example, changes in ocean circulation)
- Human activities that change the atmosphere's composition (for example, through burning fossil fuels) and the land surface (for example, deforestation, reforestation, urbanization, and desertification)

Greenhouse gases (GHG) include the following pollutants (EPA, 2011):

- Carbon dioxide (CO_2) is a naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land use changes, and other industrial processes. It is the principal anthropogenic GHG that affects Earth's radiative balance.
- Methane has a global warming potential approximately 20 times that of CO_2. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.
- Nitrous oxide has a global warming potential approximately 300 times that of CO_2. Major sources of nitrous oxide include soil cultivation practices (especially the use of commercial and organic fertilizers) fossil fuel combustion, nitric acid production, and biomass burning.
- Hydrofluorocarbons (HFC) are compounds containing only hydrogen, fluorine, chlorine, and carbon. HFCs have been introduced as a replacement for the chlorofluorocarbons identified as ozone-depleting substances.
- Perfluorocarbons (PFC) are compounds containing only fluorine and carbon. Similar to HFCs, PFCs have been introduced as a replacement for chlorofluorocarbons. PFCs are also used in manufacturing and emitted as by-products of industrial processes. PFCs are powerful GHGs.
- Sulfur hexafluoride (SF6) is a colorless gas that is soluble in alcohol and ether, and slightly soluble in water. SF6 is a very powerful GHG used primarily in electrical transmission and distribution systems, and dielectrics in electronics.

3.9.1.1 Regulatory Background – Federal

The EPA Mandatory Reporting Rule became effective on December 29, 2009, and sources required to report were to begin collecting data on January 1, 2010. In general, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of carbon dioxide equivalent (CO_2e) emissions are required to submit annual reports to EPA. The EPA reporting requirements continue to be updated.

In addition, the Supreme Court decision in *Massachusetts et al. v. Environmental Protection Agency et al.* (Supreme Court Case 05-1120) found that EPA has the authority to list GHGs as pollutants and to regulate emissions of GHGs under the federal CAA. On April 17, 2009, EPA found that CO_2, methane, nitrous oxide, HFC, PFC, and SF6 may contribute to air pollution and may endanger public health and welfare.

3.9.1.2 Regulatory Background – State and Regional

In 2006, the California State Legislature signed the Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32), which provides the framework for regulating GHG emissions in California under AB 32. This law requires CARB to design and implement emission limits, regulations, and other measures such that statewide GHG emissions are reduced in a technologically feasible and cost-effective manner to 1990 levels by 2020. The statewide 2020 emissions limit is 427 million metric tons CO_2e (CARB, 2007). CO_2 emissions account for approximately 90 percent of the statewide GHG emissions (CARB, 2007). Methane, nitrous oxide, HFC, PFC, and SF6 emissions account for the remainder of the statewide GHG emissions (CARB, 2007).

Part of CARB's direction under AB 32 was to develop a scoping plan that contains the main strategies California would use to reduce GHG emissions that cause climate change. The scoping plan includes a range of GHG reduction actions, which include direct regulations, alternative compliance mechanisms, monetary and nonmonetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 cost of implementation fee regulation to fund the program (CARB, 2008). The first regulation adopted by CARB pursuant to AB 32 was the regulation requiring mandatory reporting of GHG emissions. The regulation requires large industrial sources emitting more than 25,000 metric tons of CO_2 per year to report and verify their GHG emissions from combustion of both fossil fuels and biomass-derived fuels.

Sutter County has prepared a climate action plan to address reducing GHG emissions as part of the County's land use planning (Sutter County, 2010b). The climate action plan includes a range of reduction measures that include state-mandated energy efficiency requirements along with other types of energy-efficient construction techniques, such as installation of energy-efficient lighting, windows, water heaters, light-colored paving, and planting trees.

3.9.2 Environmental Consequences

3.9.2.1 No Action

Groundwater use each year and the resulting impacts on global climate change would remain the same as existing conditions and would vary by year type under the no action alternative.

3.9.2.2 Proposed Action

Construction and operation of the proposed action may generate GHG emissions. Construction would include activities that emit GHGs, such as the use of heavy equipment and vehicles. Construction would result in a minor, short-term increase in GHG emissions (total of approximately 50 metric tons of CO_2). Operation of the proposed action would include use of an electricity-operated pump. Operation of the proposed PMWC well is not expected to generate additional indirect GHG emissions associated with the electricity used for the pump to the extent that it would cause an adverse effect. The proposed SMWC well would be used for monitoring, so there would be no operational features. According to the draft NEPA guidance for considering direct GHG emissions, a value of 25,000 metric tons of CO_2e would be an indication of whether a qualitative or quantitative assessment may be meaningful for decision makers under NEPA (Council on Environmental Quality, 2010). Emissions from electricity use are considered indirect emissions; the proposed action would not include a direct GHG emissions source, such as an onsite stationary source. Therefore, construction and indirect emissions from the electricity use for operation of the proposed PMWC well would be less 25,000 metric tons CO_2 and would not have an environmental effect.

3.9.2.3 Cumulative Effects

Cumulative GHG effects are not anticipated given the proposed action would not result in an appreciable increase in GHG emissions during construction or operation of the project.