

Appendix A – Bureau of Reclamation EIS Scoping Report

Mendota Pool Group

Environmental Scoping for the Extension of the 2005 Mendota Pool Exchange Agreements

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The proposed 20-year extension of the 2005 Mendota Pool Exchange Agreements (Exchange Agreements) will be subject to review by the US Bureau of Reclamation (Reclamation) for compliance with the National Environmental Policy Act (NEPA). The following scope of work is designed to provide information to the Mendota Pool Group (MPG) and Reclamation regarding changes in circumstances since the 2004 Environmental Impact Statement (EIS) and the probable scope of future required environmental review under NEPA. This environmental review considers each section of the 2004 EIS, identifying areas that may need to be updated based on changes to regulations and the physical environment and outlining elements that need to be considered. This document follows the format of the EIS and performs the following functions: provides an updated project description, reviews project alternatives, evaluate each of the impact categories. This review also considers potential changes in the Mendota Pool area due to the San Joaquin River Restoration Program, and the possible impacts of this program.

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1 INTRODUCTION

This scoping paper has been prepared to assist the Bureau of Reclamation (Reclamation) and the Mendota Pool Group (MPG) in understanding the potential environmental impacts associated with authorizing a 20-year extension to the 2005 Mendota Pool 10-year Exchange Agreements (Exchange Agreements). This paper provides information and analysis to support Reclamations' initial review of the proposed project under the National Environmental Policy Act (NEPA) and to aid in determining the appropriate scope and type of NEPA-compliant environmental documentation required for the proposed project. This analysis reviews and builds upon a 2004 Environmental Impact Statement (EIS) prepared for the original Exchange Agreements as well as subsequent detailed groundwater monitoring reports prepared by the MPG. MPG is currently performing a review to determine whether a CEQA analysis will be necessary as well: to date, a CEQA analysis does not appear to be required.

2 PROJECT DESCRIPTION

The MPG is proposing a 20-year long extension of the existing Exchange Agreements that would allow the continued exchange of up to 25,000 acre-feet (AF) of water per year (AFY) between Reclamation and the MPG. The extension would allow MPG farmers to continue the exchange for an additional 20-year period starting in 2015, when the existing agreements expire.

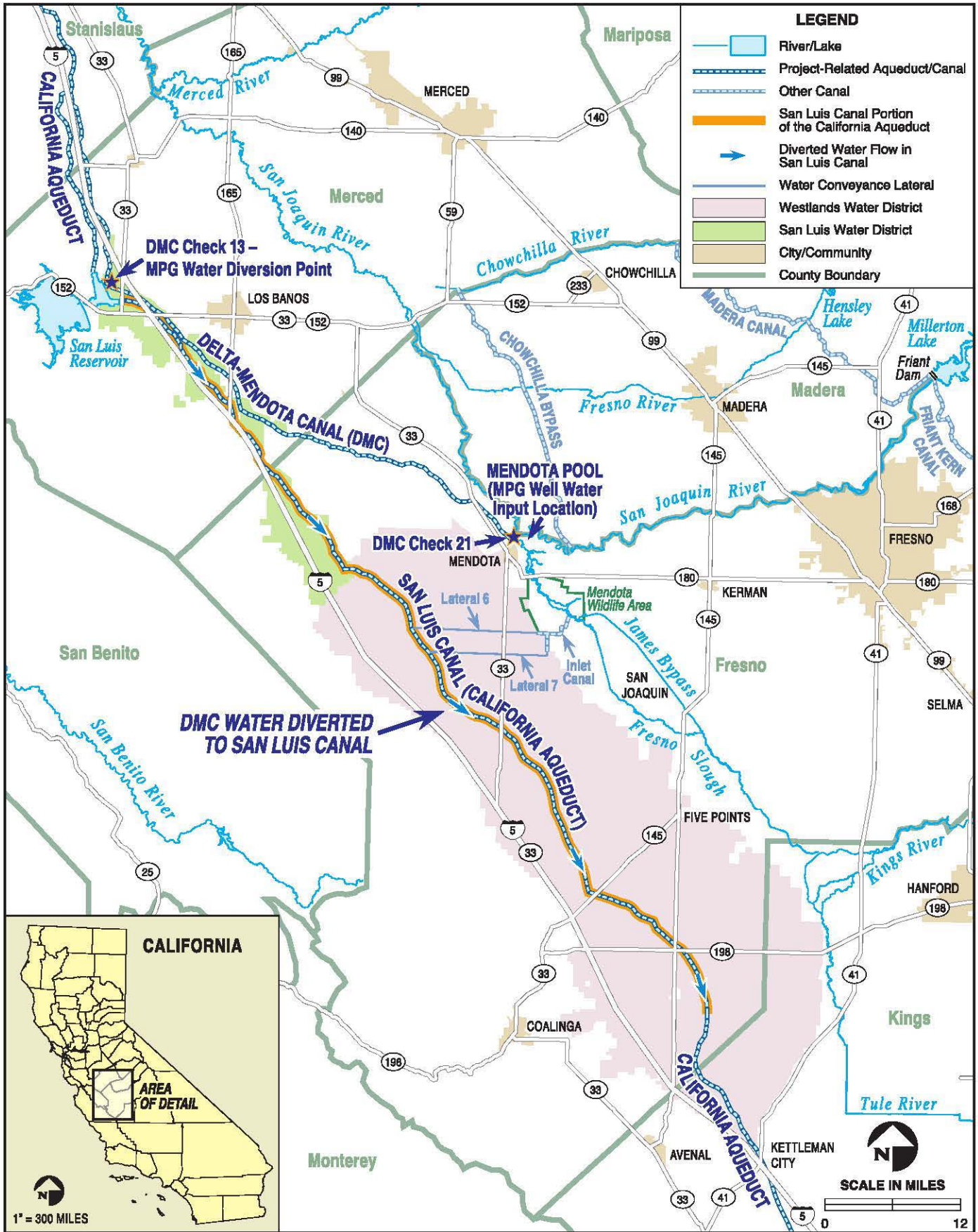
The MPG is an 11-member unincorporated association of farmers located in the San Joaquin Valley. The group has members located in the San Luis Canal (SLC) service area of San Luis Water District (SLWD) and Westlands Water District (WWD) with approximately 50,000 acres of historically irrigated farmland. The MPG also has members located near Mendota Pool in WWD and Farmers Water District (FWD) with approximately 65 groundwater wells.



The Mendota Pool is formed by Mendota Dam, constructed in 1871. Mendota Pool is fed by water from the Delta Mendota Canal, San Joaquin River and Fresno Slough. The pool is a key element of the proposed Exchange Agreements, receiving water from surrounding wells owned by MPG farmers.

The proposed extension of the Exchange Agreements for 20 years (2015-2034) would allow MPG farmers in the Mendota Pool area to continue to deliver groundwater of suitable quality to the Pool in exchange for Central Valley Project (CVP) irrigation water delivered to the SLC for use by MPG farmers in the SLC service area of SLWD and WWD. MPG farmers would be permitted to use up to 25,000 AFY of CVP water from the SLC as long as this demand is offset by delivery of 26,250 AFY of non-CVP groundwater pumped into the Mendota Pool from MPG-owned wells¹. CVP water moving south down the Delta Mendota Canal (DMC) would be transferred at or near DMC Check 13 to the SLC through the San Luis Reservoir, located approximately 40 miles upstream of the DMC termination point at the Mendota Pool (refer to Figure 1).

¹ Existing Exchange Agreements require that 5% of the water pumped into the Mendota Pool under these agreements be retained in the Pool.



**Regional Location
Proposed Mendota Pool
Exchange Agreement Extension**

**FIGURE
1**

2.1 EXISTING CONDITIONS

The proposed project area encompasses farmland and wells located in Fresno County. In addition, the project would include water input into the San Joaquin River and the Mendota Pool in Fresno County and water conveyance through management and transfer facilities such as the DMC and SLC located in Merced, Madera, and Fresno Counties (Figure 1). Existing MPG wells in Fresno County draw groundwater from the San Joaquin Groundwater Basin that underlies Fresno and other counties. The DMC carries water from the Sacramento – San Joaquin River Delta 117 miles south through the San Joaquin Valley and terminates at the Mendota Pool. The SLC, the federal portion of the California Aqueduct, carries water that is released from San Luis and O’Neill reservoirs south to supply farms within southern Fresno County and to farms further south in Kings County; the SLC portion of the California Aqueduct terminates at Kettleman City in Kings County. The Mendota pool is formed by Mendota Dam located at the confluence of the San Joaquin River and the North Fork of the Kings River through the Fresno Slough along the Fresno County-Madera County line. The Mendota Pool receives water from the DMC and, depending on the time of year and rainfall conditions, from the San Joaquin River and Kings River as well. The majority of the 50,000 acres of farmland irrigated under the existing Exchange Agreements is located within WWD along the SLC from 5 to 50 miles west and south of the Mendota Pool (Figure 2).

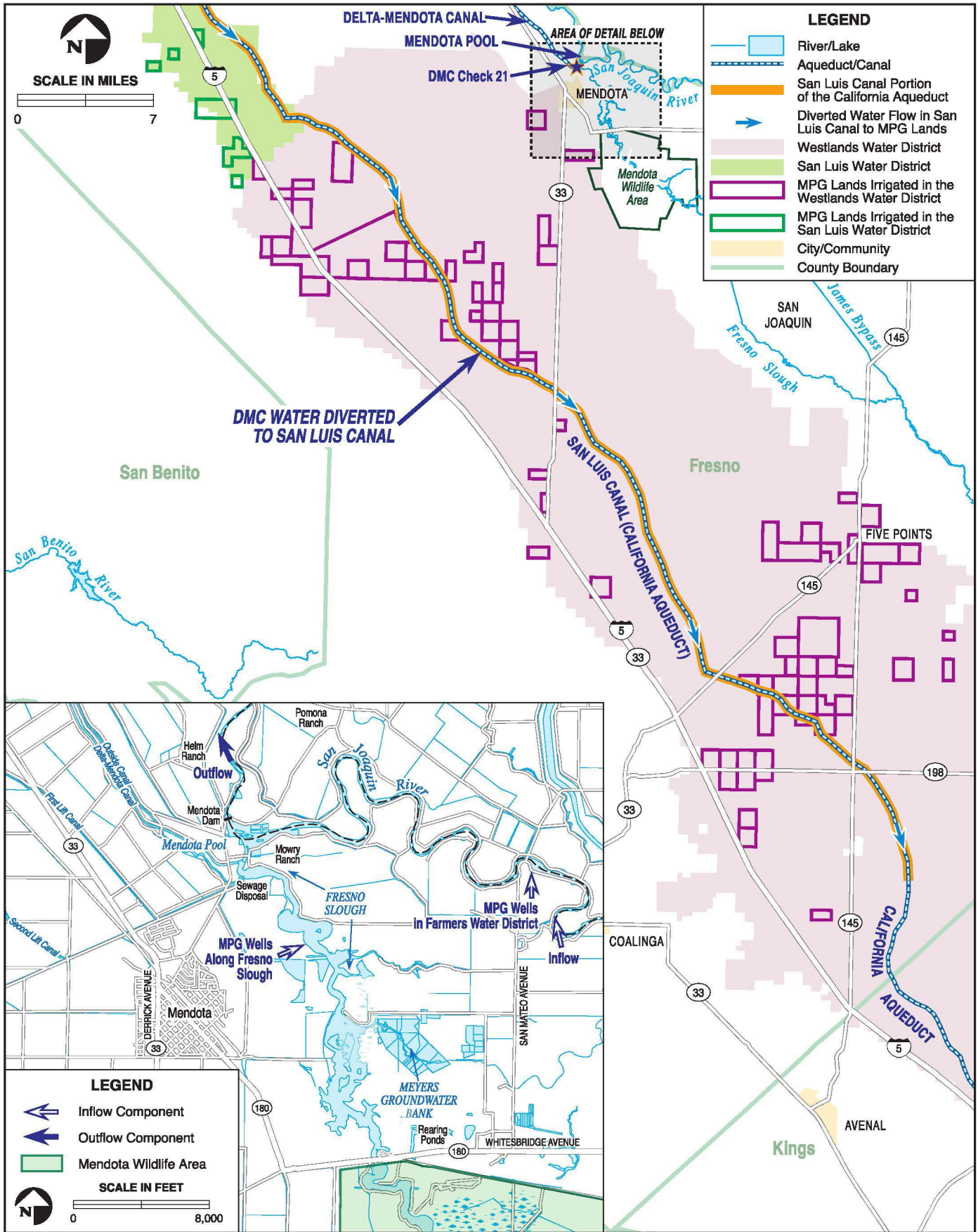


The Delta Mendota Canal (DMC) carries water for 117 miles south to the southern San Joaquin Valley from the Sacramento River Delta and terminates at Mendota Pool. Water would be diverted from the DMC at check 13, more than 40 miles upstream of Mendota Pool, to the O’Neil Forebay of the San Luis Reservoir for delivery to the San Luis Canal and use downstream on MPG farmlands in the San Luis and Westlands Water Districts.

2.2 PURPOSE AND NEED

The MPG proposes to extend the Exchange Agreements with Reclamation to ensure continued water availability to MPG farmers in the SLC service area of SLWD and WWD. Exchange water helps ensure the reliability of irrigation water deliveries to MPG farmers by supplementing deliveries from the CVP to the SLC without affecting CVP deliveries from the DMC to the Mendota Pool. The agreements allows the MPG to pump non-CVP water from their groundwater wells and deliver it to the Mendota Pool in exchange for water from the CVP at or near Check 13 of the DMC. This exchanged water would be delivered to land owned by MPG members elsewhere within the CVP service area, allowing for efficient delivery and re-allocation of water.

The exchange would happen through the CVP, which is administered by Reclamation. Reclamation would issue a series of annual or multi-year exchange agreements over the 20-year period. The amount of water to be exchanged each year would vary based on a number of factors, including review of the annual monitoring data from previous years and the concurrence of the proposed annual program by the San Joaquin River Exchange Contractors Water Authority (Exchange Contractors) and Paramount Farming Company (PFC). The action is needed to make up for shortfalls in the contracted amounts of water delivered via the CVP.



**Project Location
Proposed Mendota Pool
Exchange Agreement Extension**

**FIGURE
2**



2.2.1 NEED FOR THE ACTION

Reclamation's purpose in authorizing this action is to continue enabling the efficient delivery and re-allocation of water to facilitate environmental and economic benefits as authorized by the Central Valley Project Improvement Act (CVPIA) while limiting potential adverse effects to groundwater levels in the Mendota Pool area. The need for the proposed authorization is to maintain the reliability of irrigation water delivery to SLC at or near Check 13 on the DMC without affecting CVP water deliveries at the Mendota Pool. The proposed action offsets reductions in CVP irrigation water supplies as a more balanced distribution of water among competing uses is sought.

Since 1989, water supplies to CVP agricultural users have been substantially reduced in a mandatory effort to balance competing nonagricultural benefits of the CVP. Between 1980 and 1989, water deliveries to WWD averaged 103 percent of WWD's entitlements. However, deliveries since that time have averaged 63 percent, with deliveries over the last five-year period from 2007 to 2011 averaging 45 percent. Full water allocations (> 90 percent) have only been provided during 1995 through 1998 and in 2006, which were hydrologically wet years (WWD 2012). This reduction in water deliveries from the CVP has required that agricultural users obtain a large portion of their water requirements from supplemental sources such as groundwater.

MPG members own approximately 50,000 acres of historically irrigated farmland in WWD and SLWD located along the SLC. These lands are not adjacent to the Mendota Pool and depend on deliveries from the SLC for irrigation water. There are limited other regularly reliable and affordable supplemental sources of surface water that can be used for these lands. However, although groundwater resources are available in WWD, where the subject irrigated acres are located, and could potentially be used, shallow groundwater (above the Corcoran Clay) in this area of the basin is typically of poor quality. Further, pumping of deeper groundwater below the Corcoran Clay in this area has the potential to cause significant land subsidence. WWD has taken numerous steps to obtain additional sources of irrigation water and to ensure that comprehensive water conservation practices are being followed (WWD 2008). Similarly, SLWD has instituted water conservation actions. Nevertheless, water supplies in certain years are still inadequate to provide reliable and cost-effective irrigation water to historically irrigated lands within the SLC service area. In order to maintain production on historically irrigated lands, MPG members in the SLC service area desire to supplement their water deliveries with affordable good quality water, pumped from an area that the irrigated acres do not overly. The Exchange Agreements have been providing MPG farmers with the option of using exchange water for this purpose.

2.2.2 PURPOSE OF THE ACTION

The purpose of the proposed action is to enable the MPG to maintain production on historically irrigated lands by obtaining sufficient good quality water at cost-effective prices to offset fluctuations in CVP deliveries. The action is not intended to increase the amount of water for farming activities but would continue to replace water allocated for other CVP purposes. This program would enable participants to:

- Increase water supply reliability relative to water exports from the Delta.
- Deliver water to farms for an average cost that approximates the cost of contract water and does not exceed the costs of supplemental water on the open market.
- Maintain production on lands with long-term water supply contracts that have regularly produced agricultural commodities.

- Avoid or minimize, through incorporation of design constraints and management practices, impacts to environmental resources such as surface water, groundwater levels, land subsidence, groundwater quality and biological resources including sensitive species.

2.3 EXISTING AND PROPOSED PROJECT

The Mendota Pool 10-year Exchange Agreements that are currently in place span the years 2005 to 2014, and an extension of the agreements is necessary for MPG farmers to continue this exchange after 2014. The MPG has determined that a 20-year extension of the existing Exchange Agreements program should be pursued. The MPG intends to consult with interested parties to gather input on the proposed extension and coordinate with Reclamation and other parties on completing the necessary environmental documentation.

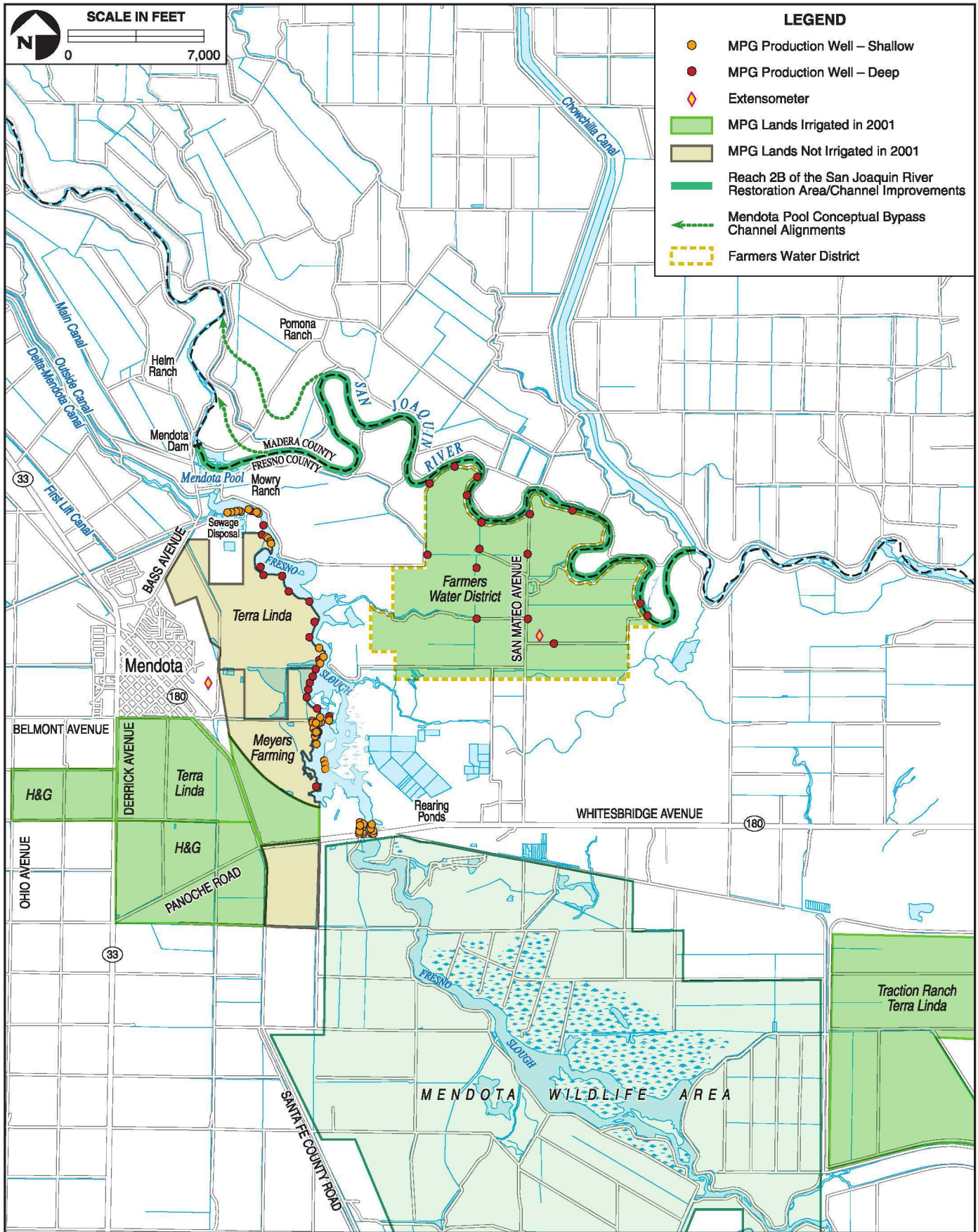
The original project design was based on discussions between the MPG, Reclamation, the Exchange Contractors, local water districts, the Regional Water Quality Control Board, Fresno and Madera Counties, the City of Madera, U.S. Fish and Wildlife Service, California Department of Fish and Game, and adjacent landowners from the early 1990's until the project's approval. Prior to executing the existing Exchange Agreements, Reclamation completed an environmental impact statement (EIS) which evaluated the impacts to groundwater levels, land subsidence, groundwater quality, surface water quality, sediment quality, biological resources, CVP operations, archeological and cultural resources, land use and traffic, air quality, noise, environmental justice, and socioeconomics. Mitigation actions that address potential impacts of the exchange were included in the design constraints of the program. The original Exchange Agreements include a baseline pumping program, design constraints, a monitoring program, and an adaptive management approach, all of which would be continued or expanded upon with the 20 year-long extension of the Exchange Agreements. Additional design constraints and management measures may be required as certain regional circumstances have changed significantly since the Mendota Pool Exchange Agreements were approved.

2.3.1 EXISTING AGREEMENTS

The existing Exchange Agreements are modeled after the transfer pumping program outlined in the 2001 Settlement Agreement for Mendota Pool Transfer Pumping Project (Settlement Agreement). The Settlement Agreement outlined a program that was mutually agreeable between the MPG, the Exchange Contractors, and Newhall Land Farming (NLF). The agreement included mitigation measures that were based on the results of the test pumping monitoring program conducted in 1999; these mitigation measures were incorporated in the Exchange Agreements. The Settlement Agreement was updated in the 2011 Agreement No. 2 for Mendota Pool Transfer Pumping Project (Agreement No. 2) between the MPG, the Exchange Contractors, Paramount Land Company LLC, and Paramount Pomegranate Orchards LLC. The proposed extension of the Exchange Agreements also incorporates changes that were introduced in Agreement No. 2.

The Exchange Agreements currently allow the MPG to exchange up to 26,250 AFY of non-CVP groundwater pumped into the Mendota Pool for 25,000 AFY of CVP water delivered elsewhere in the CVP service area. This groundwater is pumped from MPG wells that draw from both shallow and deep aquifers above the Corcoran Clay². MGP wells are primarily clustered along the west side of the Fresno

² Four of the wells in FWD are composite wells completed above and below the Corcoran Clay; however, due to their design, most of the water pumped by these wells is from the aquifer above the Corcoran Clay.



**MPG Wells and Properties
in the Vicinity of Mendota Pool**

**FIGURE
3**

Slough, near the Mendota Pool, and along and south of the San Joaquin River (Figure 3). The water that the MPG pumps into the Mendota Pool is made available to Reclamation to offset existing water contract obligations at the Mendota Pool. Reclamation is then able to reduce deliveries to the Pool via the DMC by an amount corresponding to the quantity exchanged with the MPG. In exchange, Reclamation makes up to 25,000 AF of CVP water available to the members of the MPG for irrigation purposes at or near Check 13 of the DMC for diversion south along the SLC.

The pumping programs for the Exchange Agreements are adaptively managed to minimize environmental impacts. The MPG pumping programs are developed, reviewed and approved on an annual basis to allow for year-to-year variations in hydrologic conditions and they are defined in the spring, prior to the start of pumping. Each year's pumping program is based on consideration of several factors including the design constraints (e.g., water quality at Exchange Contractor's canal intakes or at Mendota Wildlife Area [MWA]), the results of the previous year's monitoring program, the extent of groundwater level recovery, hydrologic conditions, and any Reclamation contractor's rescheduling of CVP deliveries from the previous water year.

Adjustments are made to the pumping program if and when the monitoring program indicates that actions need to be taken to prevent significant impacts such as groundwater overdraft, land subsidence, or water quality degradation in the Mendota Pool. The results of the annual monitoring programs are used as input to a series of groundwater and surface water models used to forecast subsidence and water quality impacts, design the subsequent year's pumping program, and ensure that all design constraints are met. The models are periodically reviewed and improved as more data become available.

2.3.2 EXISTING EXCHANGE AGREEMENTS DESIGN CONSTRAINTS

Key design constraints included in the existing Exchange Agreements are intended to minimize the potential environmental impacts of the pumping program. The constraints apply to the annual pumping programs and to triggers based on the results of the annual monitoring program. The current program design constraints will be continued and expanded upon with the extension of the program, and include the following measures:

- Pump MPG wells along the west side of the Fresno Slough only when flow in the Fresno Slough is to the south. Wells in FWD could pump irrespective of flow direction in the Mendota Pool.
- Shut off MPG wells if electrical conductivity (EC) measurements at the Exchange Contractors' canal intakes exceed that of the DMC by 90 $\mu\text{mhos/cm}$ for a period of three days or more. If the MPG wells are shut off for this reason, they would not be turned back on until the EC at the canal intakes returns to a level that is no more than 30 $\mu\text{mhos/cm}$ above the DMC inflow.
- Minimize deep zone drawdown by reducing MPG deep zone transfer pumping during the summer months when the majority of non-MPG irrigation pumping occurs in the Mendota area.
- Limit total transfer pumping from the deep zone to 12,000 AFY to reduce subsidence, reduce water level impacts, and minimize the rate of groundwater quality degradation that would otherwise occur. Deep wells are defined as those with a perforated interval greater than 130 feet deep, while shallow wells are defined as those with a perforated interval less than 130 feet deep.
- Limit deep zone drawdown throughout the pumping program to limit subsidence at the Yearout Ranch and Fordel extensometers caused by transfer pumping to less than an average of 0.005 foot per year over each 10-year period. Compaction data collected from the extensometers are used along with model results to estimate the amount of subsidence cause by MPG pumping each year.

- Reduce transfer pumping if groundwater monitoring performed by MPG as reported to and overseen by BOR reveals evidence that transfer pumping is causing long-term overdraft.
- Modify the pumping program based on the results of the surface water monitoring program to reduce overall surface water quality degradation, particularly with respect to salinity [total dissolved solids (TDS) or EC]. This will ensure that the quality of water supplied to the MWA and other users in the southern portion of the Mendota Pool will meet applicable water quality criteria. Wells with TDS concentrations greater than 2,000 mg/L will not be pumped into the Mendota Pool. During the fall pumping period, when there is reduced flow in the Mendota Pool and water quality at the MWA is most critical, wells with TDS higher than 1,200 mg/L will not be pumped for transfer.
- Shut off wells with selenium concentrations equal to or greater than the water quality criterion of 2 µg/L.
- Minimize groundwater quality degradation by modifying the pumping program to reduce or cease pumping of selected wells, based on the results of the groundwater monitoring program and predictive modeling of the effects of the pumping program.

In addition to these measures, the MPG financially compensates the other major groundwater pumpers in the Mendota area for increased power and other additional costs due to drawdown estimated to have been caused by the MPG transfer pumping.

The MPG will also consider expanded measures and possible design constraints to ensure sustainability of the pumping program. The MPG will consider:

- A groundwater augmentation/ recharge program with defined goals that would replenish supplies to mitigate for potential adverse impacts from the extension of the Exchange Agreements on groundwater levels and groundwater quality in the Mendota Pool area.
- The addition of program constraints that limit pumping to times when there is a southerly flow in the Fresno Slough in order to protect water quality at times of low water demand.
- Improved coordination with export pumpers through information sharing on ground and surface water conditions and coordinated responses to water management issues in the study area when setting maximum allowable pumpage limits.

2.3.3 PROPOSED AGREEMENTS

The MPG proposes to extend the Exchange Agreements for an additional 20-year period, following similar guidelines as in the existing agreements. The extension would allow for the exchange of up to 25,000 AFY using annual or multi-year exchange agreements, which would include Reclamation's review of monitoring data and oversight of any needed remedial actions and the recommendation and concurrence of the Exchange Contractors and PFC. The MPG would continue to comply with all of the design constraints incorporated in the existing Exchange Agreements, along with any constraints that are added through the course of the program and the additional analysis conducted as part of the extension environmental document preparation. The program would continue the use of the monitoring program and adaptive management approach in order to continually improve the program. As part of future environmental review, the MPG will consider possible effects of transfer pumping on San Joaquin River flows. This would include an analysis of how operation of Mendota Pool is impacted by the San Joaquin River Restoration Program (SJRRP) and MPG pumping (if at all) and how MPG pumping could

potentially impact recapture of Interim and Restoration Flows at the Pool or downstream from the Pool; MPG would identify potential design constraints to include in the project as needed (refer to Figure 3).

The MPG would be authorized to pump a maximum of 420,000 AF of groundwater for transfer through the Exchange Agreements over the 20-year period from wells located adjacent to the Mendota Pool into the Pool. A maximum of 400,000 AF would be exchanged with Reclamation over the 20-year period since the agreement stipulates that five percent of the transfer water must be left in the Mendota Pool. The maximum volume of water that the MPG can pump each year may be further limited based on hydrologic supply conditions and the design constraints of the Exchange Agreements.

The MPG would be authorized to pump up to an additional 14,000 AFY into Mendota Pool for use on lands that are presently under irrigation around the Mendota Pool, referred to as adjacent use. If pumping for adjacent use exceeds 14,000 AFY, transfer pumping must be reduced by a corresponding amount unless the cumulative pumping impacts are less than predicted.

By March 1st of each year, the MPG shall declare its intent to conduct transfer pumping for that year and to provide a proposed schedule and amounts for that year based on the expected surface water supplies to be available to members of the MPG that year.

The MPG may pump water for transfer from the deep zone (over 130 feet deep and above Corcoran Clay) and the shallow zone (less than 130 feet deep), subject to the following constraints:

1. Deep zone pumping shall not exceed 12,000 AFY.
2. No transfer pumping from the deep zone is performed from June through August of any year unless expressly permitted by the Exchange Contractors and Paramount Farming Co.³
3. Deep zone transfer pumping shall be conducted primarily from March through May and from September through November.
4. Deep zone pumping shall not exceed an amount that will cause subsidence at the Yearout Extensometer due to transfer pumping to average more than 0.005 feet per year.
5. Shallow zone pumping shall not be conducted during more than 10 months of any year.
6. The amount of transfer pumping from the shallow zone shall be subject to adjustment, based on results of the monitoring program.
7. Total transfer pumping from the deep and shallow zones shall not exceed 26,320 AF (25,000 AF exchange) during any year.

Groundwater pumped by the MPG from wells within FWD for use on adjacent overlying lands shall only be used on adjacent overlying lands within FWD. If any non-MPG member pumps groundwater from a well within FWD, the amount of such water pumped in any year shall be deducted from the amount of water permitted to be pumped from wells within FWD for the Exchange Agreements. If such non-MPG

³ This constraint was added based on the 2001 monitoring report. A similar constraint was included in the 2004 EIR, but it allowed for June pumping in years that the program did not begin pumping until after April 1st; however, there have not been any transfer years that commenced that late in the season.

pumping causes water quality degradation, subsidence or other impacts to exceed the limitations of the Exchange Agreements, transfer pumping shall be reduced until such conditions no longer exist.

Additional wells or other facilities may be constructed as part of the extension of the Exchange Agreements, as needed. For example, normal irrigation practices may require refurbishing or replacement of existing wells. Some wells may be taken out of service during this program due to water quality impacts. The MPG may replace these wells with others that have better water quality. In addition, an unknown number of MPG wells along the San Joaquin River may be affected or removed from service due to the changes associated with the SJRRP.

If replacement wells are installed by the MPG at a significant distance away from the original wells or completed in different zones than the original wells, their potential impact to hydrogeological conditions in the area would be evaluated. Replacement wells may need to undergo additional site-specific environmental analysis by Reclamation prior to use in the exchange program. This analysis would include consideration of how the SJRRP could be impacted by the MPG and how the SJRRP could impact the MPG and other projects in the Mendota Pool area. Replacement wells would conform to existing environmental standards at the time of construction, including any potential additional future requirements that may emerge due to potential amendments to the San Joaquin Valley Unified Air Pollution Control District rules and regulations regarding the type of engine that may be used to power groundwater pumps. The environmental document would also include review of power demand and calculation of resultant emissions from well pumping associated with the Exchange Agreements as need to disclose any potential impacts.

3 REVIEW OF PROJECT ALTERNATIVES

In the absence of the Exchange Agreements, MPG farmers in the SLC service area would need to secure water from other sources or reduce and possibly discontinue irrigation of historically cultivated agricultural lands. Aside from CVP deliveries, there are limited regularly reliable and affordable surface supplies that can be accessed by this group of farmers.

3.1 PROJECT ALTERNATIVES CONSIDERED IN THE 2004 EIR

Two other alternatives that were considered in the 2004 EIR were the construction of new groundwater wells in the SLC service area and land fallowing. MPG farmers in SLWD and WWD that do not have direct access to the Mendota Pool would perform these alternatives. As a result, the environmental impacts of these alternatives would occur in the SLC service area of SLWD and WWD, rather than in the Mendota Pool area.

According to the 2004 EIS, based on an average well capacity of 2.5 cubic feet per second, the MPG would need to drill an additional 55 to 125 groundwater wells to compensate for the 25,000 AF shortfall in the absence of the Exchange Agreements. The report stated that wells would be around 1,000 feet deep, and would each be powered by a 250 horsepower electric motor, with associated increased demand on deep aquifers in on the western side of the San Joaquin Valley. The 2004 EIS also estimated the results of land fallowing as an alternate response to the 25,000 AF shortfall, and found that 10,000 acres would need to be fallowed on an annual basis. This conclusion was based on average water needs of 3 AF per acre per year on actively farmed land and 0.5 AF per acre per year for weed suppression on fallowed land. A review of Fresno County agricultural water needs based on existing crops in the area revealed that

average water needs specific to this area are approximately 2.76 AFY; therefore, approximately 11,050 acres of agricultural land would need to be fallowed in response to the 25,000 AF shortfall.⁴

4 EVALUATION OF POTENTIAL IMPACTS

The 2004 EIS evaluated six primary categories of potential impacts—groundwater levels, land subsidence, groundwater quality, surface water quality, sediment quality, and biological resources. The report also evaluated six other impact categories that were not considered to have potential to create significant impacts—CVP operations, archeological and cultural resources, land use and traffic, air quality, noise, and environmental justice and socioeconomics. The 2004 EIS concluded that the proposed project would have less-than-significant impacts to all resource categories except for groundwater quality.

The analysis in this scoping paper briefly reviews each of the impacts categories to assist Reclamation in determining whether the proposed extension of the Exchange Agreements could create potentially significant impacts due to changes in the proposed project, the existing physical environment or applicable regulations. It also addresses the potential need for inclusion of new impact categories. For each impact category the following elements are included in the analysis:

- Overview of the original status of the impact category according to the 2004 EIS
- Relevant changes to applicable regulations and the physical environment
- Determination of whether or not the change is significant and requires further review and analysis of potential design constraints or management practices to address such impacts

Five of the primary impact categories are evaluated on an annual basis as part of the monitoring program, including groundwater levels, land subsidence, groundwater quality, surface water quality, and sediment quality. Information about the present conditions for these impact categories is included in the *Mendota Pool Group Pumping and Monitoring Program: 2010 Annual Report* (2010 Annual Report).

4.1 GROUNDWATER LEVELS

The 2004 EIS predicted that groundwater withdrawal from the shallow aquifer would only impact local groundwater levels, while groundwater withdrawal from the deeper aquifer could generate impacts up to 3.5 miles away. The monitoring program includes a 6-mile radius to ensure it tracks all of the potential groundwater level impacts from MPG pumping. The design constraints of the Exchange Agreements require that the MPG reduce transfer pumping if there is evidence that it is causing long-term overdraft.

The results of the groundwater monitoring conducted by the MPG and reported in annual reports indicate that groundwater levels in the vicinity of the MPG wells have experienced seasonal and year-to-year fluctuations, but have remained generally stable since 2004. Seasonal drawdowns are larger in deep wells than in shallow wells, but most wells in the western portion of the MPG study area experience full recovery at the end of each year. The principal exception is in the northern and eastern portions of the PFC service area, located north of FWD, where groundwater levels in most wells typically show slight residual drawdowns at the end of the year. This results in a long-term trend of groundwater level declines.

⁴ Crop distribution and applied water figures in Fresno County were obtained from the Department of Water Resources website at <http://www.water.ca.gov/landwateruse/anaglwu.cfm#>. The average water needs were calculated as a weighted average based on specific needs by crop and total acres of each crop type. This average was calculated based on applied water in 1999, 2000, and 2001 because the agency has not published figures since this time period.

Groundwater levels declines are greater in the portion of Madera County east of the Chowchilla Bypass, which has experienced overdraft for decades. The MPG evaluated the potential effects of MPG transfer pumping on groundwater declines in this area in the 2004 EIS. The results of the evaluation indicate that the primary cause of overdraft is groundwater pumping within Madera County, but deep zone pumping in Fresno County can have an effect since some water pumped by these wells would otherwise flow to cones of depression in Madera County.

The Mendota Pool area has experienced changes in water supply since the 2004 EIS. Efforts to restore the San Joaquin River have included continuous releases from Friant Dam that have provided recharge water to many wells in the Mendota Pool area. Continued efforts to restore the San Joaquin River may result in additional recharge to groundwater supplies from the river. However, there is a potential that seasonal drawdowns due to future MPG pumping could affect river flows. Additionally, groundwater banking activities at Meyers Water Bank and Wildlife Project have also caused localized increases in groundwater levels. Please see Changes in Regional Environmental Setting section below.

FINDING: Although there have been seasonal fluctuations, groundwater levels have remained relatively stable in the western portion of the MPG study area but have declined in the northeast. Design constraints and management practices are included in the existing Exchange Agreements to address long-term groundwater level concerns, and these measures have proven generally effective over the course of the existing program. The changes in groundwater levels that have occurred during this program are not significant from an overall groundwater supply perspective, but may incrementally contribute to groundwater overdraft in Madera County, resulting in a potentially cumulatively significant impact. Further evaluation of this potential impact is recommended, particularly in light ongoing overdraft and installation of permanent crops (e.g., orchards) in Madera County. Further evaluation of the potential effect of MPG pumping on San Joaquin River flows and the potential positive effects of recharge from the SJRRP on groundwater levels and supplies in the study area is also recommended. Please see Changes in Regional Environmental Setting section below. To address concerns over increased pressure on groundwater levels and groundwater supply in the area, MPG will review and consider additional design constraints or management actions (e.g., groundwater recharge/ augmentation).

4.2 SUBSIDENCE

The 2004 EIS identified potential impacts of land subsidence associated with groundwater pumping, but found that design constraints involving groundwater monitoring, use of extensometers and cessation of pumping when required could reduce potential subsidence to acceptable levels. Subsidence monitoring is conducted on either side of the Fresno Slough at the Yearout Ranch and Fordel Extensometers. The design constraints of the Exchange Agreements require that subsidence caused by MPG transfer pumping measured at the extensometers is limited to less than an average of 0.005 foot per year over the 10 year period.

The 2010 Annual Report evaluated subsidence at both the Yearout Ranch and Fordel extensometers. The report found that the MPG has remained within the program guidelines for subsidence. The cumulative inelastic compaction at the Yearout Ranch extensometer that has been attributed to MPG pumping since 2000 amounts to an average of 0.0028 feet per year, well below the Design Constraint limit of 0.005 feet per year. The inelastic compaction attributed to all sources at the Fordel extensometer, including MPG pumping as well as other sources, amounts to an average of 0.0022 feet per year: this level of compaction is also well below the design constraint limit.

The report also discussed subsidence measurements that were taken using high-definition GPS equipment on the Meyers Farm property, south of the City of Mendota. These measurements indicated about 0.28 feet of total inelastic compaction between 2004 and 2010, significantly higher measurements than at Yearout Ranch and Fordel extensometers; however, the additional compaction appears to be occurring below the Corcoran clay layer, indicating that it would not be attributed to MPG pumping, which almost entirely occurs above this layer.⁵

FINDING: Changes in the environmental and regulatory setting since the 2004 EIS are not significant, and extension of the Exchange Agreements would not appear to significantly impact subsidence or require detailed assessment in an EIS. Mitigation measures are included in the Exchange Agreements to address subsidence concerns, and these measures should continue to suffice for the extension of the program. However, given the level of compaction below the Corcoran Clay layer on the Meyers Farm property, more specific information should be provided regarding MPG withdrawals from the composite wells that extend below the Corcoran layer.

4.3 GROUNDWATER QUALITY

The 2004 EIS predicted that groundwater quality would be negatively impacted by MPG pumping due to easterly movement of a saline front. Groundwater quality degradation has occurred for decades in the western portion of the MPG study area due to northeasterly movement of a front of saline groundwater, which is present west of the Fresno Slough and the San Joaquin River. Migration of the saline front is exacerbated by MPG pumping because groundwater pumping increases the hydraulic gradient and intercepts a portion of the surface water recharge. The Exchange Agreements include mitigation measures to ensure these impacts were kept to a minimum, including limiting the quantity and the timing of transfer pumping.

According to the MPG annual reports, groundwater quality in the Mendota area is highly variable with the primary concern being elevated salinity. The shallow MPG wells west of the Fresno Slough show higher salinity concentrations in the central and southern portion of the well field, and most wells in this area have experienced some degradation due to movement of the saline front. Salinity concentrations are lower and generally stable in the northern portion of the MPG well field. In some areas, wells located near the western portion of the Spreckels Sugar Co. property have benefited from high quality surface water recharge into the Meyers Farm Water Bank.

Deep wells west of the Fresno Slough and the San Joaquin River have also experienced salinity increases for decades due to the saline front. Movement of the saline front is due primarily to a northeasterly gradient for groundwater flow caused by pumping depressions in Madera County. However, the rate of movement is believed to have increased slightly in recent years due to deep zone MPG pumping. Deep wells in the MPG well field west of the Fresno Slough have experienced significant degradation, and deep wells in the central and southern portion of the well field have been removed from service. Wells east of the Fresno Slough are not affected by the saline front but the southern wells in FWD are being impacted by high salinity wastewater moving north from Spreckels Sugar Co. Wells in the northern portion of FWD and the southern portion of PFC service area receive recharge from the San Joaquin River and have very good water quality. Wells located further north in PFC receive little surface and have experienced salinity increases due to irrigation practices. Wells near the Chowchilla Bypass had also shown increasing

⁵ The only MPG withdrawals from below the Corcoran layer are from the four composite wells in FWD, which are perforated above and below the Corcoran Clay; however, due to their design, most of the water pumped by these wells is from the aquifer above the Corcoran Clay.

salinity, but this trend has reversed in recent years due to recharge from the Bypass and PFC recharge ponds in this area.

In addition to changes in the physical environment, there have been changes in the regulatory environment regarding water quality. In 2005 the U.S. Environmental Protection Agency (EPA) published changes to the National Recommended Water Quality Criteria and added pollutants to the Human Health Criteria List that were not addressed in the 2004 EIS (EPA 2012-1). Additionally, the EPA is currently planning to propose changes to the Water Quality Standards Regulation early this year. The agency is considering providing clarity in the following key areas: 1) anti-degradation implementation methods, 2) Administrator's determination, 3) designated uses, 4) variances to water quality standards; 5) triennial review scope and requirements, and 6) updating the regulation to reflect court decisions (EPA 2012-2).

FINDING: Changes in the existing regulatory and the physical environmental setting since the 2004 EIS are significant and require further review. Groundwater quality in the area west of the Mendota Pool and Fresno Slough has declined due to the northeasterly movement of a saline front. This movement may be partially attributed to MPG pumping activities, and an extension of the Exchange Agreements may have the potential to contribute to additional groundwater quality decline. In addition, the EPA has implemented changes to water quality criteria and may implement additional changes in the coming year. Further, the SJRRP has the potential to materially affect groundwater quality within the study area though increased recharge of high quality water into the region of the Mendota Pool and Fresno Slough. These changes would require further analysis to assess the level of present and future groundwater degradation attributed to the MPG pumping program and to ensure that new water quality standards will be met.

4.4 SURFACE WATER QUALITY

The 2004 EIS evaluated surface water quality in terms of potential impacts on irrigation use, protection of aquatic species, and refuge water supply, and found that the Exchange Agreements would have a less than significant effect on surface water quality. The EIS outlined water quality constituents of concern—arsenic, boron, molybdenum, selenium, and salinity—and determined the most conservative quality criteria or guidelines for the area. The EIS determined that water quality in the Fresno Slough in terms of salinity, boron, and molybdenum was generally better in the northern portion and declined toward the southern portion of the Slough. Higher salinity in the south is due primarily to groundwater pumping into the Mendota Pool by the MPG and others; however, the Exchange Agreements include design constraints and adaptive management measures to mitigate the impacts and ensure sufficient surface water quality. Design constraints include limiting MPG pumping to periods when the flow in the Fresno Slough is to the south and discontinuing pumping from any MPG wells that do not meet quality standards. Additionally, the pumping program may be modified based on results from the monitoring program in order to maintain surface water quality.

The MPG annual monitoring reports indicate that MPG transfer pumping has not had any significant impacts on surface water quality in the northern portion of the Pool since the 2004 EIS was approved. There have been short periods where the EC at one or more of the northern canal intakes exceeded DMC values by more than 90 $\mu\text{mhos/cm}$ but these either lasted for less than three days or were not caused by MPG transfer pumping. In 2011, for example, the MPG did not pump for transfer, but the EC at one of the canal intakes was elevated for 16 days in late March 20 and early April due to a northerly flow direction resulting from Kings River inflows.

The MPG annual monitoring reports also indicate that MPG pumping impacts on surface water quality in the southern portion of the Mendota Pool have increased in recent years due to reduced flow in the Fresno Slough. The southerly flow of water in the Slough has decreased due to reduced diversions by WWD and other users in the southern portion of the Slough.

Concentrations of trace elements were low in both the northern and southern portion of the Mendota Pool, with the exception of elevated selenium concentrations in some of the daily composite samples from the DMC. The elevated selenium concentrations are caused by the discharge of drain water to the DMC upstream of the Mendota Pool and are not related to MPG pumping.

The Mendota Pool and Fresno Slough may face changes in flow and water quality in future years due to the implementation of the SJRRP. This program allows for the capture of interim flows in several locations, including the Mendota Pool. Recaptured water at the Mendota Pool would replace supplies that are normally delivered through the DMC (SJRRP 2011-1).

As mentioned in the *Groundwater Quality* section above, there have been changes in the regulatory environment regarding water quality. In 2005 the EPA published changes to the National Recommended Water Quality Criteria and added pollutants to the Human Health Criteria List that were not addressed in the 2004 EIS (EPA 2012-1). Additionally, the EPA is currently planning to propose changes to the Water Quality Standards Regulation early this year. The agency is considering providing clarity in the following key areas: 1) antidegradation implementation methods, 2) Administrator's determination, 3) designated uses, 4) variances to water quality standards; 5) triennial review scope and requirements, and 6) updating the regulation to reflect court decisions (EPA 2012-2).

FINDING: Changes in the existing regulatory and the physical environmental setting since the 2004 EIS are substantial and require further review. Reduced flow in the Fresno Slough caused by reduced diversions in the southern portion of the Fresno Slough has potentially increased surface water quality impacts from MPG pumping due to reductions in dilution of groundwater pumped into the Mendota Pool. The development of the SJRRP may also affect the water quality in the Mendota Pool and Fresno Slough. In addition to changes in the physical environment, the EPA has implemented changes to water quality criteria subsequent to completion of the 2004 EIS and may implement additional changes in the coming year. These changes would require further analysis to ensure that existing program design constraints will continue to protect surface water quality and that new water quality standards will be adhered to.

4.5 SEDIMENT QUALITY

The 2004 EIS included measurements for sediment quality at eight sample locations that act as the baseline measurements for the sediment quality monitoring. The monitoring program is designed to track special distribution of EC, arsenic, boron, molybdenum, and selenium in the sediment. At the time of the EIS, sediment quality guidelines were available from the EPA for only arsenic and selenium, and from the USFWS for selenium at Grasslands Watershed⁶. The sediment quality was within EPA guidelines for arsenic at all sample locations and within USFWS guidelines for selenium at seven of the eight sample locations: all eight locations met guidelines in the two following samples.

The 2010 Annual Report provided updated information on sediment quality. The report explains that arsenic and selenium are still the only two constituents with stated guidelines from the EPA and USFWS. Arsenic and selenium levels were within the guidelines, with the exception of one selenium sample from the DMC. Concentrations for boron and molybdenum were also low at all sampling locations.

FINDING: Changes in the environmental and regulatory setting since the 2004 EIS are not significant and extension of the Exchange Agreements would not appear to significantly impact Sediment Quality or require detailed assessment in an EIS.

4.6 BIOLOGICAL RESOURCES

The 2004 EIS found that the Exchange Agreements would have no significant impact on biological resources. The primary concern addressed in the EIS regarding biological resources was maintaining sufficient water quality, particularly surface water quality, to support plant and animal life. The EIS determined that the MPG pumping program would not have significant impacts because: (1) selenium and other constituents in both the surface water and the wells do not exceed EPA and USFWS target values, (2) increases in salinity minimized through design constraints and will maintain concentrations below target levels, (3) MPG pumping does not reduce sediment quality, and (4) potentially toxic concentrations of salts and trace elements will not be present in surface waters or sediments.

Changes to the special status species list has occurred for the Fresno County area since 2004. Additionally, boundaries for critical habitat that have special federal protections have changed in regards to some of these species, including the Fresno kangaroo rat, the western yellow-billed cuckoo, the California red-legged frog, and the Pacific fisher. The region may also experience renewed flows along the San Joaquin River, reestablishment of riparian habitats and reintroduction of Chinook salmon as part of the SJRRP.

FINDING: The environmental document would review any changes in special status species designations in the area (e.g. the giant garter snake) along with changes in critical habitat boundaries or designations for special status species. Additionally, changes in the existing regulatory setting and pending changes to the physical setting (i.e., re-watering of the San Joaquin River) since the 2004 EIS are significant and require further review. The potential impacts of MPG pumping on river flows, reestablished riparian habitats and the reintroduction of Chinook salmon to Reach 2B of the San Joaquin River near the Mendota Pool should be considered as part of the biological resource evaluation. Potential impacts of concern may be affects on San Joaquin River flows and surface water quality in the Fresno Slough.

⁶ The Grasslands Watershed is north of Mendota Pool and supports the Grasslands Wildlife Management Area, which is why USFWS has set specific water quality limits for the area. It contains one of the largest remaining blocks of wetlands in the Central Valley

4.7 CLIMATE

The 2004 EIS addressed the climate in California, but it did not take into account anticipated changes due to climate change. In 2009 President Obama signed Executive Order 13514, setting sustainability goals for Federal agencies (CEQ 2012). Section 8 (i) of the order calls for Federal agencies to “evaluate agency climate-change risks and vulnerabilities to manage the effects of climate change on the agency's operations and mission in both the short and long term (Obama 2009).” In order to both satisfy the requirements of Executive Order 13514 and plan for future water supply conditions in the San Joaquin Valley, the MPG should include an analysis of potential impacts of climate change.

FINDING: Change in both the understanding of the effect of climate change on California’s water supply and delivery system and in the regulatory setting since the 2004 EIS is significant and requires further review. Global climate change was not addressed in the 2004 EIS and requires analysis, including any effects on rainfall patters, snowmelt run-off timing and quantity, resultant long term water supply and quality. Pending completion of further review, it is unclear if climate change related impacts would be substantial.

4.8 CENTRAL VALLEY PROJECT OPERATIONS

The 2004 EIS found that there is sufficient capacity in the San Luis Reservoir and the SLC to store and convey water for the Exchange Agreements, and that project operations would not impact other users of the CVP. The available federal capacity in the SLC is approximately 4,000 cubic feet per second during peak discharge while the maximum rate of MPG pumping is 95 to 100 cubic feet per second. Additionally, the San Luis Reservoir was found to have more than sufficient storage capacity if necessary. The capacity of the SLC has not changed since the 2004 assessment (Reclamation 2012), and the quantity of water being exchanged will remain the same for the extension of the Exchange Agreements.

FINDING: Changes in the environmental and regulatory setting since the 2004 EIS are not significant and an extension of the Exchange Agreements would not appear to significantly impact CVP operation or require detailed assessment in an EIS.

4.9 ARCHAEOLOGICAL AND CULTURAL RESOURCES

The 2004 EIS found no significant impact to archeological and cultural resources because the Exchange Agreements help maintain existing land uses. Additionally, the analysis found that no Indian lands of any type were found within the study area. Since the extension of the Exchange Agreements intends to fulfill the same purpose and also does not affect Indian land, there are no significant changes in this impact area.

FINDING: Changes in the environmental and regulatory setting since the 2004 EIS are not significant and extension of the Exchange Agreements would not appear to significantly impact Archaeological or Cultural Resources or require detailed assessment in an EIS.

4.10 LAND USE AND TRAFFIC

According to the 2004 EIS, land use and traffic are unaffected by the Exchange Agreements. The project does not require any change to, nor does it conflict with, current land use designations and zoning. It does not change land use or regional circulation and transportation. Since the extension of the project does not propose any changes to these elements and the land use designations have not changed, the extension of

the Exchange Agreements does not impact these categories. Therefore, this project does not include any significant changes in this impact area.

FINDING: Changes in the environmental and regulatory setting since the 2004 EIS are not significant and extension of the Exchange Agreements would not appear to significantly impact Land Use or Traffic or require detailed assessment in an EIS.

4.11 AIR QUALITY

The 2004 EIS predicted that the Exchange Agreements would have no impact on air quality, assuming that the farming operations are consistent with previous seasons and the groundwater pumps use electric motors. The Exchange Agreements do not effect farming operations in the Mendota Pool area and they enable continued farming of historically irrigated land in SLWD and WWD, so farming operations remain consistent in both areas. Assuming MPG well pumps use electric motors, emissions would not be generated at the project site, but would include potentially indirect impacts emission at source power generation stations. However, MPG uses both diesel and electric groundwater pumps, so local area emissions are higher than were predicted in the 2004 EIS.

Air quality is a great concern in the San Joaquin Valley Air Basin (SJVAB) because the current conditions across the valley are extremely poor and the basin is not in attainment of national and state air quality standards. SJVAB recently reached attainment of national PM-10 standards in 2008 (EPA 2008), but remains in nonattainment for 8-hr Ozone and PM-2.5 (Valley Air District 2012). The region is also in nonattainment of state air quality standards for 1-hr Ozone, 8-hr Ozone, PM-10, and PM-2.5 (Valley Air District 2012). The cities and counties of the San Joaquin Valley are working to reduce air pollutants through various measures outlined in their general plans.

Although the region is strengthening air quality control measures, the Exchange Agreements should not be greatly affected by these changes. However, MPG will need to include emission information for their existing mix of diesel and electric groundwater pumps during the environmental review. Additionally, an analysis of greenhouse gas emissions from both on-site and off-site power generation will need to be included in the review to meet current guidelines.

FINDING: Changes in the environmental and regulatory setting since the 2004 EIS are not significant; however, this section should be updated to more accurately reflect the existing mix of MPG groundwater pumps and to include greenhouse gas emission information.

4.12 NOISE

The 2004 EIS predicted that the Exchange Agreements would not have a significant impact on noise because the pumping locations are in agricultural areas that are not near sensitive receptors. The closest area of concern is the city of Mendota, which lies approximately one mile west of some of the MPG pumping locations. The proposed pumping locations in the extended agreement will continue to be located on agricultural land that is not in close proximity to noise-sensitive areas.

The city of Mendota is not highly sensitive to the noise from MPG pumping. The land on the east side of the city is zoned as Light Industrial, Heavy Industrial, and Public Facility. The Public Facility area currently includes the Mendota airport and a large area of undeveloped land disconnected from the residential zones of the city. This creates a large buffer between agricultural land and the noise-sensitive residential areas of Mendota. The city's general plan addresses noise concerns by avoiding placing noise-

sensitive receptors near high noise-generating land uses. Additionally, in areas where residences may be developed near agricultural land, the general plan requires full disclosure of potential noise sources to potential residents. The city protects agricultural rights and currently anticipates passing a right to farm ordinance that explicitly protects these rights (City of Mendota, 2009).

FINDING: Changes in the environmental and regulatory setting since the 2004 EIS are not significant and extension of the Exchange Agreements would not appear to significantly impact Noise or require detailed assessment in an EIS.

4.13 ENVIRONMENTAL JUSTICE AND SOCIOECONOMICS

The 2004 EIS reported a neutral or positive impact to environmental justice and socioeconomic resources due to the Exchange Agreements because they allow for continued farming in historically farmed areas. Without exchange water, MPG farmers may have reduced crop yield, resulting in lower employment of area residents. The majority of seasonal workers on the area's farms are migrant workers, generally of Hispanic origin. Thus, the Exchange Agreements help sustain jobs for local minority and disadvantaged populations.

The extension of the Exchange Agreements would allow for continued support for MPG farms, and therefore continued support for the area's seasonal jobs and workforce. The project would continue to have neutral or positive impacts on environmental justice and socioeconomic resources.

FINDING: Changes in the environmental and regulatory setting since the 2004 EIS are not significant and extension of the Exchange Agreements would not appear to significantly impact Environmental Justice or Socioeconomics or require detailed assessment in an EIS.

5 CHANGES IN REGIONAL ENVIRONMENTAL SETTING

The Mendota Pool area has experienced three significant changes in local water supply since the 2004 EIS was prepared: the development of the proposed SJRRP, the expansion of the Meyers Water Bank and Wildlife Project, and development of yet to mature permanent crops (e.g., Orchards) in Madera County and associated potential for future increases in groundwater overdraft. Both the SJRRP and the Meyers Water Bank have potential for positive impacts on water supply in the Mendota Pool area by recharging local groundwater; however, the potential interaction between ground and surface water supplies and MPG groundwater pumping may be of concern. Also, MPG pumping contributes additional pressure to groundwater overdraft in Madera County. These impacts should be considered in the design of the extension of the Exchange Agreements.

5.1 SAN JOAQUIN RIVER RESTORATION PROGRAM

The SJRRP was developed as a, "comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of the Merced River (Figure 1). The SJRRP would also restore a self-sustaining Chinook salmon fishery in the river while reducing or avoiding adverse water supply impacts from interim and restoration flows (SJRRP 2011)." This program was developed to satisfy the San Joaquin River Restoration Settlement, which received Federal court approval in 2006, and the Federal San Joaquin River Restoration Settlement Act of 2009 (SJRRP 2012-1). The potential implementation of

this program appears to constitute a significant change in circumstances in the Mendota Pool area since the time when the 2004 EIS was performed for the MPG Exchange Agreements.

Reach 2B of the SJRRP project runs along the northern boundary of FWD, is proximate to multiple MPG wells, and terminates at the Mendota Pool (Figure 3). Reach 2B of the SJRRP traverses the 6-mile radius groundwater monitoring zone for the MPG Exchange Agreements and is near areas that have experienced short to mid-term past groundwater drawdown associated with MPG pumping.

The San Joaquin River is typically dry upstream of the Mendota Pool since implementation of major water diversion programs over the last 40 years, except during flood conditions. The SJRRP currently includes a major two-part project in its first phase intended to address the section of river that has been dewatered and is impassable by migrating fish: the Mendota Pool Bypass and the Reach 2B Channel Improvements Project. Reach 2B is the section of river between the Chowchilla Bifurcation Structure and Mendota Dam, including the northern portion of the Mendota Pool. The intent of this project is to re-water Reach 2B and consider options to enable fish migration by creating a bypass channel alignment to divert migrating fish around the Mendota Pool (Figure 3). The project includes improvements to channel



A formerly dry reach of the San Joaquin River east of Mendota Pool and north of many of the MPG Exchange Agreement wells is proposed for environmental restoration and re-watering; initial re-watering flows are depicted above. Although inhibited by clay layers, the potential relationship of MPG groundwater withdrawals from this vicinity and river flows requires investigation.

structure, including new floodplain habitat and related riparian habitat, in order to ensure conveyance of at least 4,500 cubic feet per second through Reach 2B up to the Mendota Bypass (SJRRP 2010). The draft EIS and Environmental Impact Report (EIR) for the Mendota Pool Bypass and Reach 2B Channel Improvements Project will be released for public review this year (SJRRP 2012-2).

Current proposals to restore flow in the San Joaquin River are a significant change in circumstances from those present during preparation of the 2004 EIS, particularly with regard to the interaction between surface water and groundwater in the project area. The 2004 EIS included an analysis of this interaction, concluding that MPG wells had little impact on San Joaquin River flows. The EIS found that impacts due to drawdown from MPG's shallow wells were generally limited to the well field along the Fresno Slough and did not extend as far north as the river. Additionally, there is a clay layer beneath the Mendota Pool in the Fresno Slough branch that limits the percolation rate, reducing the effect of groundwater pumping on percolation. The San Joaquin River arm of the Mendota Pool, on the other hand, appears to have a direct connection between surface water and shallow groundwater; however, the MPG does not operate shallow wells in this area. The deep wells in this area are constructed below low permeability layers composed of clay and other materials that limit the connection between deep zone pumping and the shallow portion of the aquifer. Therefore, the EIS found that MPG pumping from the deep zone is unlikely to cause significant seepage from the San Joaquin River.

During the 2004 EIS analysis the San Joaquin River was generally dry upstream of the Mendota Pool except during flood events. Under the SJRRP this section is proposed to receive restored flows. The analysis for the deep zone pumping impacts in the 2004 EIS was relatively focused, based upon a limited

data set, and it was performed without the consideration of the potential changes in flow that are proposed as part of the SJRRP. The analysis was based on shallow monitoring wells that were put into service in 1999, so the interaction between deep zone pumping and water supply in the shallow portion of the upper aquifer were observed over a short time horizon. Deep zone pumping drawdown was shown to extend up to 3.5 miles and to cross to either side of the San Joaquin River. Although initial analysis indicates limited connectivity between the River and shallow aquifer and the deeper confined aquifer that MPG wells along the River draw from, some potential may exist for drawdown in these wells to affect the San Joaquin River rewatering efforts. A review of pertinent SJRRP documents revealed that project proponents are concerned about seepage losses in dry sections of the San Joaquin River; however, these documents do not discuss potential impacts of reduced flow in the river due to groundwater pumping. The primary concern addressed in SJRRP documents regarding surface water and groundwater interaction is the potential for increased seepage from restoration flows to raise the water table too high for agricultural use due to water-logging of crops in some areas: this problem is unrelated to MPG pumping. The documents included in this review are the 2011 SJRRP Draft EIS/EIR, the 2011 SJRRP Draft Public Final Annual Technical Report, the 2010 Mendota Pool Bypass and Reach 2B Improvements Project Initial Options Technical Memorandum, and the SJRRP website. Although these documents do not site groundwater pumping impacts as an immediate concern, the potential impacts may raise concerns in the future.

FINDING: Development of the SJRRP is a substantial change in circumstances within the MPG project area. Additional analysis of the interaction between both the shallow and deeper aquifers and the San Joaquin River may be required to determine the impacts of MPG Exchange Agreement well pumping on San Joaquin River flows. If hydrologic connectivity between MPG wells and the San Joaquin River can be shown to be minimal, (as supported by some evidence within the 2004 EIS), than the Exchange Agreements should not negatively affect SJRRP re-watering. Additionally, potential impacts of pumping new MPG wells that have been added since the 2004 EIS would also need to be included in the analysis. Finally, the positive effects of added recharge from this project and the use and disposition of potential resultant additional groundwater resources require study and consideration.

5.2 MEYER'S WATER BANK AND WILDLIFE PROJECT

The Meyer's Water Bank and Wildlife Project received their permits in 2002 and began pumping water from the Mendota Pool into settling ponds to recharge their groundwater supplies. The bank's current capacity is 35,000 AF, and they are in the process of permitting an expansion that will allow them to have a capacity of 60,000 AF (Reclamation 2011).

Finding: The effects of the Meyers Water Bank on groundwater levels and quality appear to be generally beneficial; however, the operation of the bank, its affect on local ground and surface water supply and quality, and its relationship to the MPG pumping program will be included as part of the environmental document.

5.3 MADERA COUNTY GROUNDWATER OVERDRAFT

Both the San Joaquin Valley Groundwater Basin and the Madera Subbasin have been in a state of overdraft for many years, with estimated average overdraft in Madera County of 100,000 AFY. The County of Madera has deep cones of groundwater depression approximately 10 miles north of Mendota Pool. As permanent crops (e.g., Orchards) within Madera County mature, associated increases in demand for groundwater may impact regional overdraft. This could further degrade groundwater supply and

quality in Madera County. The current northeasterly gradient for groundwater flow is caused by pumping depressions in Madera County; pumping from MPG wells may intercept water that would otherwise flow to these depressions.

Finding: MGP pumping may incrementally contribute to groundwater overdraft in Madera County. Further evaluation of this potential impact is recommended, particularly in light of ongoing overdraft and installation of permanent crops (e.g., orchards) in Madera County.

6 RECOMMENDED ENVIRONMENTAL DOCUMENT

Substantial changes to the physical and/or regulatory environment since the 2004 EIS have occurred with regard to groundwater levels, groundwater quality, surface water quality, biological resources, and climate change. Of particular potential concern, would be:

- Drawdown from MPG wells located in Fresno County can incrementally decrease groundwater flows north toward into Madera County where groundwater overdraft from other major users causes cones of depression that draw in water from the south. Extension of the Exchange Agreement should be reviewed for its potential to contribute to this trend.
- Groundwater quality in the area west of the Mendota Pool and Fresno Slough has declined due to the northeasterly movement of the saline front, which may be partially attributed to MPG pumping activities. Extension of the Exchange Agreement should be reviewed for its potential to continue or exacerbate this trend.
- Proposed restored flows in the San Joaquin River and proposals for restoration of riparian habitat and Chinook Salmon runs have the potential to be adversely affected if groundwater pumping results in decreased river flows. Extension of the Exchange Agreement should be reviewed for its potential effects on the SJRRP.
- Reduced flow in the Fresno Slough in 2010 has occurred due to reduced diversions in the southern portion of the Slough, which reduced mixing of lower salinity DMC water with MPG groundwater pumped into the Mendota Pool. Extension of the Exchange Agreement should be reviewed for its potential effects on surface water quality impacts from MPG pumping due to reductions in dilution of groundwater pumped into the Mendota Pool and eventually the Fresno Slough.

Given the discussion above, while many of the Design Constraints included in the Exchange Agreements have been successful in mitigating potential impacts, changes in environmental circumstances since approval of the 2004 EIS warrant preparation of an EIS focused on the following 4 key issue categories: Groundwater Levels, Groundwater Quality, Surface Water Quality and Biological Resources along the San Joaquin River. The EIS would also include an update of the remaining resource categories previously analyzed in the 2004 EIS, as well as the addition of a climate change analysis.

6.1 POTENTIAL ALTERNATIVE FOR CONSIDERATION

The new EIS may include consideration of developing a groundwater banking and storage program to enable capture and storage of supplemental surface water in the Mendota Pool area. Under this Alternative, MPG would utilize high flow supplemental surface water for groundwater recharge, possibly

including flood flows in the San Joaquin and Kings Rivers. These supplies would be captured and used to recharge groundwater supplies through the use of settling ponds or other recharge mechanisms. These supplies would then be delivered to Mendota Pool in exchange for CVP water in the SLC service area when MPG farmers are in need of supplementing water deliveries from the CVP. A groundwater banking and storage program would allow for storage of supplemental supplies in the groundwater basin for later use, while offsetting potential impacts to groundwater levels and groundwater quality in the Mendota Pool area associated with a 20 year extension of the program. This alternative may be considered as a separate alternative to the project or as an element of the proposed project.

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