Environmental Assessment/Initial Study

2015 Tehama-Colusa Canal Authority Water Transfers

California

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

Tehama-Colusa Canal Authority
Willows, California

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Abbreviations and Acronyms

2010-2011 WTP EA	2010-2011 Water Transfer Program Environmental Assessment
AF	acre-feet
APCD	Air Pollution Control District
AQAP	Air Quality Attainment Plan
AQMD	Air Quality Management District
ATCM	Airborne Toxic Control Measure
BA	Biological Assessment
bgs	below ground surface
BMOs	Basin Management Objectives
BO	biological opinion
C2VSim	Central Valley Groundwater-Surface Water Simulation Model
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CVHM	Central Valley Hydrologic Model
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
dB	decibels
dBA	A-weighted decibels
DFW	Department of Fish and Wildlife
DWR	Department of Water Resources
EA	Environmental Assessment
EDD	Employment Development Department
eGRID	Emissions & Generation Resource Integrated Database
EIS/EIR	Environmental Impact Statement/Environmental Impact Report
ESA	Endangered Species Act
ETAW	evapotranspiration of applied water

FONSI	Finding of No Significant Impact
GGS	giant garter snake
GHG	greenhouse gas
GIS	geographic information system
GMPs	Groundwater Management Plans
GSPs	Groundwater Sustainability Plans
GWP	global warming potential
HCP	Habitat Conservation Plans
hp	horsepower
ID	Irrigation District
IS	Initial Study
ITAs	Indian Trust Assets
Ldn	day-night average sound level
MCL	maximum contaminant level
mg/L	milligrams per liter
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NCCP	Natural Community Conservation Plans
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOx	nitrogen oxides
NRCS	Natural Resources Conservation Service
NSVPA	Northern Sacramento Valley Planning Area
O_3	ozone
PM_{10}	inhalable particulate matter
$PM_{2.5}$	fine particulate matter
SACFEM2013	Sacramento Valley Groundwater Model
SIP	state implementation plan
SLDMWA	San Luis & Delta-Mendota Water Authority
SWP	State Water Project
SWRCB	State Water Resources Control Board
TCCA	Tehama-Colusa Canal Authority
TCR	The Climate Registry
TDS	total dissolved solids
TUC	temporary urgency change
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency

USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WY	water year

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Chapter 1
Introduction

This Environmental Assessment (EA) and Initial Study (IS) for water transfers in contract year 2015[1] was prepared by the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) and the Tehama-Colusa Canal Authority (TCCA). This joint EA/IS document satisfies the requirements of the National Environmental Policy Act (NEPA) (42 United States Code [USC] §4231 et seq.), the Council of Environmental Quality implementing regulations (40 Code of Federal Regulations [CFR] §1500-1508), the Department of the Interior's NEPA regulations (43 CFR Part 46), the California Environmental Quality Act (CEQA), and the Governor's Office of Planning and Research regulations to implement CEQA (Sections 15000-15387 of the California Code of Regulations). Reclamation is the federal lead agency responsible for NEPA review, through the EA, of the proposed water transfers, and the TCCA is the state lead agency responsible for CEQA review, through the IS, of the proposed water transfers.

This EA/IS describes the potential direct, indirect, and cumulative effects of transferring water from willing sellers, resulting from actions taken by the sellers to make water available for transfer, to the Member Units of the TCCA. The sellers hold water rights on northern California waterways or contracts with the United States (for Base Supply[2] and Central Valley Project (CVP) Water[3] ("Project Water")). This EA/IS also identifies measures that have been incorporated to minimize or avoid project-related impacts. The transfers included in this document are only those involving Project Water or Base Supply or CVP facilities. These transfers would require approval from Reclamation, which necessitates compliance with NEPA. These transfers would also require CEQA compliance for the buyers and sellers.

Other transfers not involving the TCCA and its Member Units could occur during the same time period. The San Luis & Delta-Mendota Water Authority (SLDMWA) and Reclamation released a Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) on Long-Term Water

[1] Water Service Contract Year is March 1, 2015 through February 28, 2016. Sacramento River Settlement Contract Year is April 1, 2015 through October 31, 2015.

[2] Article 1(b) of the Sacramento River Settlement Contract defines Base Supply as the quantity of Surface Water established in Articles 3 and 5 which may be diverted by the Contractor from its Source of Supply each month during the period April through October of each Year without payment to the United States for such quantities diverted.

[3] Article 1(n) of the Sacramento River Settlement Contract defines Project water as all Surface Water diverted or scheduled to be diverted each month during the period April through October of each Year by the Contractor from its Source of Supply which is in excess of the Base Supply.

Transfers from 2015 to 2024. The EIS/EIR includes some of the same water sources but the water would be transferred to different potential buyers; that is, the sellers have only the amounts of water listed in Section 2 available for transfer, but the water could be purchased by SLDMWA or TCCA members. SLDMWA may purchase water from sources in addition to those described in Section 2. Also, State Water Project (SWP) contractors may engage in water transfers to augment supply.

1.1 Background

The TCCA and its Member Units may experience severe water shortages in 2015 and are soliciting willing sellers to transfer surface water. A number of entities that use surface water from the Sacramento River have expressed interest in transferring water to Member Units of the TCCA. The TCCA would negotiate with these sellers, on behalf of the Member Units, to identify potential transfers and the specifics of each transfer arrangement, which, collectively, constitute the "proposed project" to be addressed under CEQA. The TCCA and these willing sellers are using this EA/IS to inform decision-makers and the public of the potential environmental effects of the proposed water transfers and determine whether the transfers may result in significant environmental impacts that warrant the preparation of an Environmental Impact Report under CEQA. Because of the extremely dry conditions, the environment and agricultural community are already being impacted; this EA/IS focuses on the incremental impacts beyond those already anticipated.

To facilitate the transfer of water throughout the State, Reclamation is considering whether it should approve and facilitate water transfers between willing sellers and buyers when Base Supply, Project Water, or CVP facilities are involved in the transfer. Reclamation will not take part in the transfer negotiation process, nor will Reclamation develop a "program" to connect buyers and sellers. Reclamation would focus on the approval and facilitation of individual transfers of water involving Base Supply and/or Project Water or involving CVP facilities; these transfers constitute the "proposed action" to be addressed under NEPA. Reclamation is using this EA/IS to evaluate the potential environmental effects of the proposed action and determine whether it may result in significant environmental impacts.

Transfers would occur from sellers in the Sacramento River area to buyers that receive water from the Tehama-Colusa or Corning Canals, which divert Project Water[4] from the Sacramento River at the Red Bluff Pumping Plant. To deliver transferred water to Member Units of the TCCA, Reclamation may reoperate CVP facilities to change the pattern of water releases from storage and may also request the California Department of Water Resources (DWR) to reoperate

[4] Article 1(u) of the Water Service Contract defines Project Water as all water that is developed, diverted, stored, or delivered by the Secretary in accordance with the statutes authorizing the Project and in accordance with the terms and conditions of water rights acquired pursuant to California law.

SWP facilities. Reclamation would review and approve, as appropriate, proposed water transfers in accordance with the *DRAFT Technical Information for Preparing Water Transfer Proposals* (Reclamation and DWR 2014), state law, and the *Draft Interim Guidelines for Implementation of the Water Transfer Provisions of the Central Valley Project Improvement Act* (Title 34 of Public Law 102-575).

1.2 Need for Proposal and Project Objectives

While the 2015 water year, which extends from October 1, 2014 through September 30, 2015, is only partially complete, the hydrologic conditions so far have been dry. These conditions are worsened by the dry conditions statewide in 2012 through 2014, which affected reservoir storage coming into water year 2015. For example, storage in Shasta Reservoir was about 2,598,000 acre-feet (AF) on February 26, 2015, which is 79 percent of average at this time of year (California Data Exchange Center 2015). While it is too early in 2015 to know with certainty the final water supplies, as of January of this year, SWP water service contractors' initial allocations are 15 percent (DWR 2015). The CVP's initial declaration of water made available for 2015 to agricultural water service contractors is zero percent of their contract quantity.

As a result of the significantly reduced water supplies available from Reclamation, the TCCA is in need of approximately 98,000 AF of water to irrigate permanent crops to prevent the long-term impacts of allowing these crops to die. Reclamation's need is to review and approve (if appropriate) the transfer of Base Supply or Project Water that may require the use of CVP facilities, consistent with state and federal law, the Sacramento River Settlement Contract, and the *Interim Guidelines for Implementation of the Water Transfer Provisions of the Central Valley Project Improvement Act* (Title 34 of Public Law 102-575).

1.3 Document Structure

To consider environmental impacts of the Proposed Action pursuant to both NEPA and CEQA, Chapter 3 includes the analysis of possible effects to resources using an initial study checklist adapted from the CEQA Guidelines, Appendix G. Discussion of potential impacts for the No Action Alternative and Proposed Action are addressed in more detail following each checklist section. The CEQA Checklist does not incorporate all resource areas required by NEPA; Chapter 4 includes NEPA-specific components.

The Draft EA/IS was released for public comment on March 3, 2015 to March 23, 2015. Appendix A includes responses to the public comment letters received and Appendix B includes full copies of the comment letters.

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Chapter 2
Alternatives

2.1 No Action

For the No Action Alternative, the TCCA, on behalf of the Member Units, would not buy water from willing sellers that required Reclamation approval during contract year 2015. Agricultural and urban water users anticipate shortages in the absence of water transfers. While it is too early in 2015 to know with certainty the final water supply made available by Reclamation, as of January of this year, SWP water service contractors' initial allocations are 15 percent (DWR 2015). The CVP's initial declaration of water made available for 2015 to agricultural water service contractors is zero percent of their contract quantity. If supplies are reduced, users may take alternative water supply actions in response to shortages, including increased groundwater pumping, cropland idling, reduction of landscape irrigation, or water rationing. Water users may also seek to transfer water from others, which may require additional NEPA or CEQA analysis. In the absence of transfers, growers may not have enough water to meet demands, and some permanent crops could be lost.

2.2 Proposed Action/Proposed Project

The Proposed Action and Proposed Project (referred to herein as the Proposed Action) is the transfer of surface water in contract year 2015 to the Member Units of the TCCA. Reclamation has approval authority over potential transfers of Base Supply and Project Water, or transfers that involve the use of CVP facilities.

The Proposed Action includes potential transfers of up to 98,000 AF of surface water from 20 entities, listed in Table 2-1 and shown in Figure 2-1, to TCCA Member Units. (Figure 2-1 shows selling agencies, but individual farms that could sell water are not included.) These transfers also include transfers between "common landowners" that own land in multiple water districts that may want to move water between different parcels to preserve permanent crops. If dry conditions persist, TCCA may not be able to obtain the full 98,000 AF through transfers. Table 2-1 shows potential upper limits for transfers if Sacramento River Settlement Contractors receive 100 percent of the Contract Total[1], or if the Contract Total is reduced by 25 percent. This list represents those agencies with whom the TCCA may negotiate the transfer of water. For

[1] Contract Total is defined as the sum of the Base Supply and Project Water available for diversion by the Contractor for the period April 1 through October 31.

analytical purposes, the full 98,000 AF is assumed to be available; however, it is not possible to determine which negotiations would be successful, what combination of sellers would ultimately transfer water to the TCCA, or how much water would ultimately be transferred to the TCCA. For this reason, modeling and environmental analysis considers the quantities provided in Table 2-1 for 100 percent supplies to display the impacts that would be associated with transfers from each seller. These transfers add up to more than the TCCA's transfer demand of 98,000 AF, so the analysis provides a conservative description of potential environmental impacts.

Table 2-1. Maximum Potential Transfer by Seller (AF)

Water Agency	Maximum Transfer Based on 100 Percent of Contract Total	Maximum Transfer Based on 25 Reduction to Contract Total
Anderson-Cottonwood Irrigation District	4,800	4,800
Burroughs Farms	2,000	3,330
Canal Farms	1,000	1,000
Conaway Preservation Group	26,718	21,382
Eastside Mutual Water Company	2,230	2,000
Glenn-Colusa Irrigation District	76,000	76,000
Maxwell Irrigation District	6,000	7,500
Natomas Central Mutual Water Company	20,000	20,000
Pelger Mutual Water Company	4,670	4,000
Pelger Road 1700 LLC	3,400	3,400
Pleasant Grove-Verona Mutual Water Company	15,000	15,000
Princeton-Codora-Glenn Irrigation District	8,000	8,000
Provident Irrigation District	9,000	9,000
Reclamation District 108	35,000	35,000
Reclamation District 1004	19,675	14,780
River Garden Farms	12,500	9,500
Sutter Mutual Water Company	18,000	10,000
Sycamore Mutual Water Company	18,000	14,000
T&P Farms	1,200	1,170
Te Velde Revocable Family Trust	5,387	4,473
Total	**288,580**	**264,335**

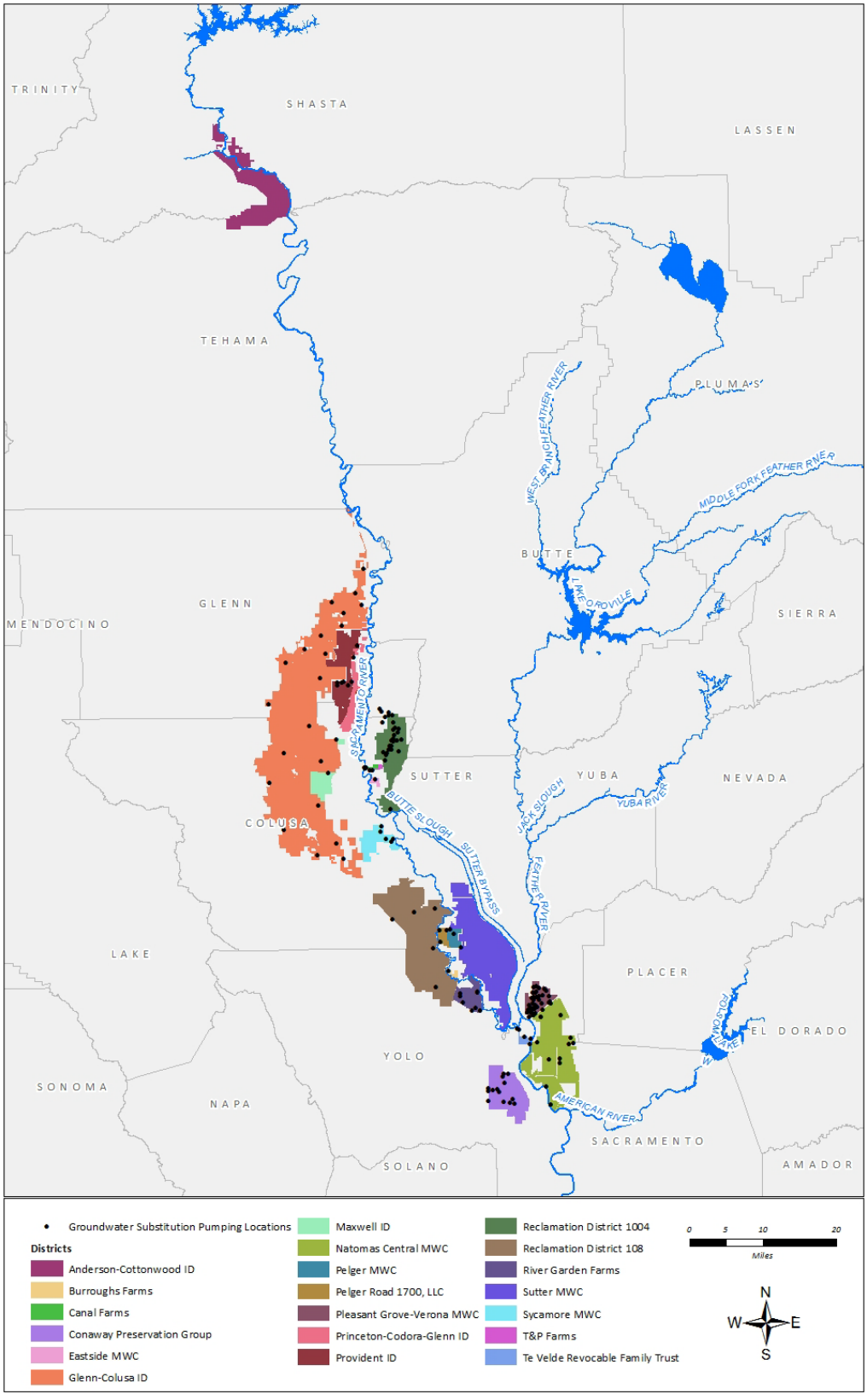


Figure 2-1. Potential Selling Entities

Reclamation would evaluate each proposal individually, as it is received, to determine if it meets state law and Central Valley Project Improvement Act (CVPIA) requirements. Reclamation has followed this process in past years when approving transfers (such as the Drought Water Bank in 2009 and water transfers in 2013 and 2014). Reclamation may reoperate CVP facilities to change the pattern of water releases from storage to deliver transferred water to TCCA Member Units; DWR may also reoperate SWP facilities to help facilitate delivery of transferred water.

2.2.1 Sellers

Table 2-1 lists agencies that have expressed interest in making water available for transfer in 2015 and the maximum transfer amounts under current and potentially increased water supplies from Reclamation. Table 2-2 shows the methodology by which the sellers could make water available for transfer if they receive full CVP water supplies. Because of the hydrologic conditions, many agencies are uncertain about which transfer type would be used, and have therefore included potential upper limits for both types of transfers in Table 2-2. While the entity making water available could use one or a combination of methods for making water available, or may shift the quantity made available during a particular period, the overall amount transferred would not exceed the values in Table 2-1. As discussed above, these transfer quantities are assessed in this EA/IS to allow transfers to move forward if Reclamation can deliver 100 percent of water supplies. This analysis is conservative because these larger transfers would have greater potential for environmental impact than the smaller transfers based on water supplies less than 100 percent.

Because the hydrology for the remainder of the season is uncertain, Table 2-3 shows the maximum transfer amounts for each transfer type if water supplies from Reclamation are reduced by 25 percent in a Critical Year. Similar to Table 2-2, sellers in both of these tables have included multiple transfer types to allow flexibility, but the overall amount transferred would not exceed the values in Table 2-1. The quantities of surface water made available through groundwater substitution proposed for the April to June period and the July to October period, as shown in Tables 2-2 and 2-3, may be shifted between those periods.

The majority of the surface water would be transferred between April and September, but a small amount of water could also be transferred in October to provide irrigation after harvest, when needed. Generally, groundwater substitution transfers could provide some water in October; however, the overall amount of water made available would not change. If water were made available in October, the overall totals from April through October would still stay within the upper limits provided in Table 2-1.

Table 2-2. Potential Transfer Types by Seller Based on 100 Percent of Contract Total (Upper Limits in AF)

Water Agency	April – June Groundwater Substitution	April – June Cropland Idling/Crop Shifting	July – October Groundwater Substitution	July – October Cropland Idling/Crop Shifting
Anderson-Cottonwood Irrigation District	2,400	0	2,400	0
Burroughs Farms	1,000	0	1,000	0
Canal Farms	575	235	425	400
Conaway Preservation Group	5,368	7,900	0	13,450
Eastside Mutual Water Company	1,067	683	1,163	1,163
Glenn-Colusa Irrigation District	5,000	24,420	5,000	41,580
Maxwell Irrigation District	1,330	888	2,270	1,512
Natomas Central Mutual Water Company	10,000	0	10,000	0
Pelger Mutual Water Company	2,000	939	2,670	1,599
Pelger Road 1700 LLC	1,700	0	1,700	0
Pleasant Grove-Verona Mutual Water Company	8,000	3,330	7,000	5,670
Princeton-Codora-Glenn Irrigation District	2,000	1,110	3,000	1,890
Provident Irrigation District	3,000	1,110	3,000	1,890
Reclamation District 108	7,500	7,400	7,500	12,600
Reclamation District 1004	0	4,625	7,175	7,875
River Garden Farms	4,000	1,300	5,000	2,200
Sutter Mutual Water Company	0	6,660	0	11,340
Sycamore Mutual Water Company	5,000	3,700	6,300	6,300
T&P Farms	650	330	550	560
Te Velde Revocable Family Trust	2,700	2,581	4,394	4,394
Total[1]	**63,290**	**67,211**	**70,547**	**114,423**

Note:

[1] These totals cannot be added together. Agencies could make water available through groundwater substitution, cropland idling, or a combination of the two; however, they will not make the full quantity available through both methods. Table 2-1 reflects the total upper limit for each agency.

Table 2-3. Potential Transfer Types by Seller Based on 25 Percent Reduction to Contract Total (Upper Limits in AF)

Water Agency	April – June Groundwater Substitution	April – June Cropland Idling/Crop Shifting	July – October Groundwater Substitution	July – October Cropland Idling/Crop Shifting
Anderson-Cottonwood Irrigation District	2,400	0	2,400	0
Burroughs Farms	1,000	0	1,000	0
Canal Farms	575	235	425	400
Conaway Preservation Group	5,368	5,925	0	10,089
Eastside Mutual Water Company	1,067	548	933	933
Glenn-Colusa Irrigation District	5,000	24,420	5,000	41,580
Maxwell Irrigation District	2,300	2,775	2,400	4,725
Natomas Central Mutual Water Company	10,000	0	10,000	0
Pelger Mutual Water Company	2,000	704	2,000	1,199
Pelger Road 1700 LLC	1,700	0	1,700	0
Pleasant Grove-Verona Mutual Water Company	8,000	3,330	7,000	5,670
Princeton-Codora-Glenn Irrigation District	2,000	1,110	3,000	1,890
Provident Irrigation District	3,000	1,110	3,000	1,890
Reclamation District 108	7,500	7,400	7,500	12,600
Reclamation District 1004	0	3,470	5,400	5,910
River Garden Farms	3,000	1,300	3,000	2,200
Sutter Mutual Water Company	0	3,700	0	6,300
Sycamore Mutual Water Company	4,000	3,700	4,000	6,300
T&P Farms	750	247	420	420
Te Velde Revocable Family Trust	1,950	573	975	975
Total[1]	**61,610**	**60,547**	**60,153**	**103,081**

Note:

[1] These totals cannot be added together. Agencies could make water available through groundwater substitution, cropland idling, or a combination of the two; however, they will not make the full quantity available through both methods. Table 2-1 reflects the total upper limit for each agency.

2.2.2 Buyers

Table 2-4 identifies entities that may be interested in buying transfer water. Not all of these potential buyers may end up actually purchasing water from the sellers. Purchase decisions depend on a number of factors, including, but not limited to, hydrology, water demands, availability of other supplies, and transfer costs. Reclamation and DWR may need to reoperate the CVP and SWP to deliver the transferred water, and the reoperation could be limited based on specific hydrologic conditions, biological conditions, or water quality issues. Reclamation cannot guarantee that it will be able to reoperate systems at specific times to accommodate transfers.

Table 2-4. Potential Buyers

Tehama-Colusa Canal Authority Member Units
Colusa County Water District
Corning Water District
Cortina Water District
Davis Water District
Dunnigan Water District
4-M Water District
Glenn Valley Water District
Glide Water District
Kanawha Water District
Orland-Artois Water District
Westside Water District

2.2.3 Potential Water Transfer Methods

This EA/IS analyzes transfers from groundwater substitution and cropland idling/crop shifting, which are further described below. No other types of water transfers are covered by the evaluation in this EA/IS.

Reclamation approves transfers consistent with provisions of state and federal law that protect against injury to third parties as a result of water transfers. Several important principles include requirements that the transfer will not violate the provisions of federal or state law, will have no significant adverse effect on the ability to deliver Project Water, will be limited to water that would be consumptively used or irretrievably lost to beneficial use, and will not adversely affect water supplies for fish and wildlife purposes. Also, CVP contractors must transfer water consistent with their CVP contracts, including clauses that indicate that water used and transfers out of the districts cannot exceed the quantity of water available. Reclamation would not approve water transfers for which these basic principles have not been met.

In 2015, some transfers may be accomplished through forbearance agreements rather than transfers that involve the State Water Resources Control Board

(SWRCB). Under such agreements, a CVP seller would forbear (i.e., temporarily suspend) the diversion of some of their Base Supply, which in the absence of forbearance, would have been diverted during 2015 for use on lands within the CVP seller's service area. This forbearance would be undertaken in a manner that allows Reclamation to deliver the forborne water supply as Project Water to Member Units of the TCCA. A forbearance agreement would not change the way that water is made available for transfer, conveyed to buyers, or used by the buyers; therefore, it would not change the environmental effects of the transfer.

Additional information about water rights protection and water transfers is located at http://www.waterboards.ca.gov/waterrights/water_issues/programs/water_transfers/docs/watertransferguide.pdf in a SWRCB staff document titled A Guide to Water Transfers - Draft (SWRCB 1999).

2.2.3.1 Groundwater Substitution

Groundwater substitution transfers occur when sellers choose to pump groundwater in lieu of diverting surface water supplies, thereby making the surface water available for transfer. Sellers making water available through groundwater substitution actions are agricultural users. Water could be made available for transfer during the irrigation season of April through October.

The conveyance infrastructure used to deliver transferred water to the TCCA would depend on the seller's location. Some sellers, like Glenn-Colusa Irrigation District (ID), have conveyance structures that can deliver water to the TCCA. The conveyance structures are typically used to deliver water to Glenn-Colusa ID from the Tehama-Colusa Canal. During a transfer, these deliveries would be reduced and additional water would stay in the TCCA area. Most of the groundwater substitution transfers are from agencies that typically divert water downstream on the Sacramento River from the Tehama-Colusa Canal. Delivering water to the TCCA instead of downstream users on the Sacramento River could reduce flow in the Sacramento River between the diversion points. Reclamation would work closely with the TCCA to make sure that these transfers do not affect the flow or temperature requirements in the Sacramento River.

An objective in planning a groundwater substitution transfer is to ensure that groundwater levels recover to their seasonal high levels before transfers begin. Because groundwater levels generally recover at the expense of streamflow, the wells used in a groundwater substitution transfer should be sited and pumped in such a manner that the streamflow losses resulting from pumping are primarily during the wet season, when losses to streamflow minimally affect other legal users of water. For the purposes of this EA/IS, the streamflow losses are estimated to be 12 percent of the groundwater pumped to make surface water available for transfer. The quantity of surface water available for transfer would be reduced by these estimated streamflow losses.

2.2.3.2 Cropland Idling/Crop Shifting

Cropland idling would make water available for transfer that would have been used for agricultural irrigation absent the transfer. Typically, the proceeds from the water transfer would pay growers to idle land that they would have otherwise placed in production. Rice has been the crop idled most frequently in previous transfer programs, and is the crop that could be idled for 2015 transfers.

The quantity of water made available for transfer through cropland idling actions would be calculated based on the evapotranspiration of applied water (ETAW). ETAW is the portion of applied surface water that is evaporated from the soil and plant surfaces and actually used by the crop. For 2015, this EA/IS only analyzes cropland idling from rice crops, which have an ETAW of 3.3 AF/acre (Reclamation and DWR 2014).

For crop shifting transfers, water is made available when farmers shift from growing a higher water use crop to a lower water use crop. The difference in ETAW values would be the amount of water that can be transferred. Transfers in 2015 could include water made available by shifting from rice to a crop with a lower water use. Table 2-5 provides a listing of the estimated ETAW values for crops suitable for idling or shifting.

Table 2-5. Estimated ETAW Values for Crops Suitable for Idling or Shifting

Crop	ETAW (AF/acre)
Alfalfa[1]	1.7 (July – Sept)
Bean	1.5
Corn	1.8
Cotton	2.3
Melon	1.1
Milo	1.6
Onion	1.1
Pumpkin	1.1
Rice	3.3
Sudan Grass	3.0
Sugar Beets	2.5
Sunflower	1.4
Tomato	1.8
Vine Seed/ Cucurbits	1.1
Wild Rice	2.0

Source: Reclamation and DWR 2014

Notes:

[1] Only alfalfa grown in the Sacramento Valley floor north of the American River will be allowed for transfers. Fields must be disced on, or prior to, the start of the transfer period. Alfalfa acreage in the foothills or mountain areas is not eligible for transfer.

Water made available through cropland idling or crop shifting actions would be available at the beginning of the season (April or May) and would be available

for transfer on the same pattern as would otherwise be used by the crop. Water would be delivered to the TCCA on pattern; that is, in the same volume and at the same time as would have been consumptively used by the crop absent the transfer.

Consistent with the provisions contained in Water Code Section 1018, potential sellers are encouraged to incorporate measures into their crop idling transfer to protect habitat value in the area to be idled. Idled land cannot be irrigated during the transfer season, but vegetation that is supported only through precipitation or that has begun to senesce may remain on the idled fields. Excessive vegetation supported by seepage from irrigation supplies or shallow groundwater would result in a decrease in the amount of water available for cropland idling transfer.

Crop shifting would generally reduce potential environmental effects associated with cropland idling. The agencies interested in crop shifting are also interested in cropland idling, but are not sure of the distribution between the two methods. To be conservative, this EA/IS analyzes the effects as if all transfers were from crop idling because crop idling has the greater potential for effects.

2.3 Recent Environmental Documents

In 2010, Reclamation completed the *2010-2011 Water Transfer Program Environmental Assessment* (2010-2011 WTP EA) (Reclamation 2010). The 2010-2011 WTP EA provided an assessment of potential impacts to Surface Water Resources, Groundwater Resources, Water Quality, Power Generation, Cultural Resources, Socioeconomics, Indian Trust Assets, Environmental Justice, Climate Change, Visual Resources, Growth Inducing Impacts, and Cumulative Effects associated with potential groundwater substitution water transfers as well as cropland idling/crop shifting water transfers. The 2010-2011 WTP EA evaluated annual groundwater substitution transfers of up to 110,409 AF from the Sacramento and American River areas and cropland idling/crop shifting transfers of up to 109,469 AF from the Sacramento River area.

On February 26, 2010, Reclamation signed a Finding of No Significant Impact (FONSI) that included Reclamation's findings in accordance with NEPA. The FONSI described the key mitigation and monitoring actions necessary to support Reclamation's decision. To address some of the most prevalent comments received during the comment period concerning potential impacts to groundwater resources, Reclamation included well reviews and monitoring and mitigation plans to be implemented under the Proposed Action to minimize potential effects to groundwater resources. All plans were to be coordinated and implemented in conjunction with local ordinances, basin management objectives, and all other applicable regulations. The reviews and plans were to be required from sellers for review by Reclamation, and Reclamation would not approve transfers without adequate mitigation and monitoring plans.

Reclamation found that the approval of proposed water transfers in support of the 2010-2011 Water Transfer Program was not a major Federal action that would significantly affect the human environment; therefore, an environmental impact statement was not required. Ultimately, however, no transfer proposals were submitted to Reclamation for approval under the 2010-2011 Water Transfer Program Proposed Action.

In 2013, Reclamation developed an EA for one-year transfers from sellers in the Sacramento River basin to SLDMWA. The EA analyzed up to 37,715 AF of groundwater substitution transfers. The 2013 Water Transfers EA included a detailed assessment of potential impacts to Surface Water Resources, Groundwater Resources, Air Quality, and Biological Resources. On June 21, 2013, Reclamation signed a FONSI with similar findings to those on the 2010-2011 WTP EA. Reclamation found that the 2013 water transfers would not significantly affect the human environment and an environmental impact statement was not required. Approximately 29,217 AF were transferred under actions and approvals addressed and cleared by this environmental document. As part of the monitoring plans required by the EA, the transferring parties collected monitoring data starting prior to the transfer. The monitoring data indicated that the groundwater aquifer recovered to pre-transfer levels, as described in the EA (Reclamation District 1004, 2014; Pleasant Grove-Verona Mutual Water Company [MWC] 2014; Te Velde Revocable Family Trust 2014; Pelger MWC 2014; Eastside MWC 2014; Conaway Preservation Group 2014).

In 2014, Reclamation and TCCA developed a joint EA/IS to analyze the potential impacts of groundwater substitution and cropland idling/crop shifting transfers from eighteen entities in the Sacramento Valley to TCCA Member Units. The EA/IS analyzed potential impacts from a maximum transfer of 155,000 AF. Reclamation approved a FONSI for this effort on April 22, 2014. Also, on April 22, 2014, Reclamation approved a FONSI for a joint EA/IS analyzing the potential impacts of approving one-year water transfers from the Sacramento Valley to Participating Members of the SLDMWA. Under the Proposed Action, the EA/IS analyzed up to 175,226 AF of water transfers through groundwater substitution, cropland idling, or crop shifting. Both EA/IS documents included environmental commitments to reduce potential impacts related to effects on groundwater hydrology, land subsidence, and other potential impacts from groundwater substitution transfers. In addition to potential impacts related to groundwater substitution transfers, the environmental documents prepared for the SLDMWA and TCCA included in-depth analysis on potential impacts to water resources; air quality; geology and soils; biological resources (including special status species, fisheries, and riparian/wetland areas); and, socioeconomics. Reclamation found that the water transfers would not significantly affect the human environment and an environmental impact statement was not required.

2.4 Environmental Commitments

This section presents the Environmental Commitments included in the Proposed Action to reduce potential environmental impacts from water transfers in contract year 2015. These Environmental Commitments will also be included in the Biological Assessment (BA) prepared for the Proposed Action. Appendix D includes the Mitigation Monitoring and Reporting Program, which describes how the lead agencies will monitor the implementation of mitigation measures, environmental commitments, and minimization measures.

2.4.1 Groundwater Substitution Transfers

- In groundwater basins where sellers are in the same groundwater subbasin as protected aquatic habitats, such as giant garter snake (GGS) preserves and conservation banks, groundwater substitution will be allowed as part of the water transfers if the seller can demonstrate that any impacts to water resources needed for special-status species protection have been addressed. In these areas, sellers will be required to address these impacts as part of their mitigation plan.

2.4.2 Cropland Idling Transfers

- As part of the approval process for water transfers, Reclamation will have access to the land to verify how the water transfer is being made available and to verify that actions to protect the GGS are being implemented. At the end of the water transfer year, Reclamation will prepare a monitoring report that contains the following:

  – Maps of all cropland idling actions that occurred within the range of potential transfer activities analyzed in this EA/IS,

  – Results of any newly available scientific research and monitoring results pertinent to water transfer actions, and

  – A discussion of conservation measure effectiveness.

  The report will be submitted to the U.S. Fish and Wildlife Service (USFWS) and shared with California Department of Fish and Wildlife (CDFW) in February, prior to the next year of potential transfers. Reclamation will coordinate with USFWS and CDFW on the contents and findings of the annual report prior to additional transfers.

- Reclamation will provide a map(s) to the USFWS in June of each year showing the parcels of rice land that are proposed for the purpose of transferring water for that year. These maps will be prepared to

comport to Reclamation's geographic information system (GIS) standards.

- Movement corridors for aquatic species (including pond turtle and GGS) include major irrigation and drainage canals. The water seller will keep adequate water in major irrigation and drainage canals. Canal water depths should be similar to years when transfers do not occur or, where information on existing water depths is limited, at least two feet of water will be considered sufficient.

- Sellers proposing water transfers made available from idled rice fields will ensure that adequate water is available for priority habitat with a high likelihood of GGS occurrence. The determination of priority habitat will be made through coordination with GGS experts, GIS analysis of proximity to historic tule marsh, and GIS analysis of suitable habitat. The priority habitat areas are indicated on the priority habitat maps for participating water agencies and will be maintained by Reclamation. As new information becomes available, these maps will be updated in coordination with USFWS and CDFW. In addition to mapped priority habitat, fields abutting or immediately adjacent to federal wildlife refuges will be considered priority habitat.

- Maintaining water in smaller drains and conveyance infrastructure supports key habitat attributes such as emergent vegetation for GGS for escape cover and foraging habitat. If crop idling/shifting occurs in priority habitat areas, Reclamation will work with contractors to document that adequate water remains in drains and canals in those priority areas. Documentation may include flow records, photo documentation, or other means of documentation agreed to by Reclamation and USFWS.

- Mapped priority habitat known to be occupied by GGS and priority habitats with a high likelihood for GGS occurrence (60 percent or greater probability) will not be permitted to participate in cropland idling/shifting transfers. Water sellers can request a case-by-case evaluation of whether a specific field would be precluded from participating in water transfers. These areas include lands adjacent to naturalized lands and refuges and corridors between these areas, such as:

  – Fields abutting or immediately adjacent to Little Butte Creek between Llano Seco and Upper Butte Basin Wildlife Area, Butte Creek between Upper Butte Basin and Gray Lodge Wildlife areas, Colusa Basin drainage canal between Delevan and Colusa National Wildlife Refuges, Gilsizer Slough, Colusa Drainage Canal, the land side of the Toe Drain along the Sutter Bypass, Willow Slough and

Willow Slough Bypass in Yolo County, Hunters and Logan Creeks between Sacramento and Delevan National Wildlife Refuges; and

– Lands in the Natomas Basin.

- Sellers will perform GGS best management practices, including educating maintenance personnel to recognize and avoid contact with GGS, dredging only one side of a conveyance channel per year, and implementing other measures to enhance habitat for GGS. Implementation of best management practices will be documented by the sellers and verified by Reclamation and will be included in the annual monitoring report.

- In order to limit reduction in the amount of over-winter forage for migratory birds, including greater sandhill crane, cropland idling transfers will be minimized near known wintering areas that support high concentrations of waterfowl and shorebirds, such as wildlife refuges and established wildlife areas.

2.5 Environmental Setting

The environmental setting in which implementation of the No Action Alternative or Proposed Action would occur is summarized below for resources that could be affected by water transfers. Additional details regarding relevant existing environmental conditions are provided in Chapter 3, within the analysis of potential impacts.

2.5.1 Aesthetics

The Central Valley of California is primarily agricultural in nature, with Interstate 5 running from north to south through the valley floor. Views in the region from most major roadways and scenic routes are of agricultural fields or urban landscapes. The mix of orchard and row crop types, fallow fields, rice, and other irrigated crops and dry fields create the visual character for most of the project area. Urban centers, such as Sacramento and Redding break up the farmland that dominates the views in the Central Valley, creating some major nighttime light sources near the city centers.

2.5.2 Air Quality

Air quality in California is regulated by the U.S. Environmental Protection Agency (USEPA), the California Air Resources Board (CARB), and locally by Air Pollution Control Districts (APCDs) or Air Quality Management Districts (AQMDs). The following air districts regulate air quality within the project study area:

- Colusa County APCD
- Feather River AQMD
- Glenn County APCD
- Sacramento Metropolitan AQMD
- Shasta County AQMD
- Tehama County APCD
- Yolo/Solano AQMD

In the Sacramento Valley Air Basin, ozone (O_3), inhalable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$) are pollutants of concern because ambient concentrations of these pollutants exceed the California Ambient Air Quality Standards (CAAQS). Additionally, ambient O_3 and $PM_{2.5}$ concentrations exceed the National Ambient Air Quality Standards (NAAQS), while PM_{10} and carbon monoxide (CO) concentrations recently attained the NAAQS and are designated maintenance. Table 2-6 summarizes the attainment status for the counties located in the Sacramento Valley.

Table 2-6. State and Federal Attainment Status

County	O_3 CAAQS	$PM_{2.5}$ CAAQS	PM_{10} CAAQS	O_3 NAAQS	$PM_{2.5}$ NAAQS	PM_{10} NAAQS	CO NAAQS
Colusa	A	A	N	A	A	A	A
Glenn	A	A	N	A	A	A	A
Sacramento	N	A	N	N [2]	N	M	M
Shasta	N	A	N	A	A	A	A
Sutter	N-T [1]	A	N	N [2,3]	N	A	A
Tehama	N	U	N	A	A	A	A
Yolo	N	U	N	N [2]	N	A	M

Source: 17 California Code of Regulations §60200-60210; 40 CFR 81; CARB 2013; USEPA 2014

Notes:

[1] Nonattainment/transitional areas are defined as those areas that during a single calendar year, the State standards were not exceeded more than three times at any monitoring location within the area.

[2] 8-hour O_3 classification = severe

[3] The Sacramento Metro nonattainment area for Sutter County is defined as the "portion south of a line connecting the northern border of Yolo County to the southwestern tip of Yuba County and continuing along the southern Yuba County border to Placer County" (40 CFR 81.305).

Key:

A = attainment; CO = carbon monoxide; M = maintenance; N = nonattainment; N-T = nonattainment/transitional; O_3 = ozone; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; U = unclassified

The Sacramento Valley Air Basin is bounded by the North Coast Ranges on the west and the Northern Sierra Nevada Mountains on the east, forming a bowl-shaped valley. The Sacramento Valley has a Mediterranean climate, which is characterized by hot dry summers and mild rainy winters.

Most of the sellers' service area supports agricultural land uses. Crop cycles, including land preparation and harvest, contribute to pollutant emissions, primarily particulate matter. Groundwater pumping with diesel and natural gas-fueled engines also emits air pollutants through exhaust. The primary pollutants emitted by diesel pumps are nitrogen oxides (NOx), volatile organic compounds (VOC), CO, PM_{10}, and $PM_{2.5}$; NOx and VOCs are precursors to O_3 formation.

2.5.3 Biological Resources

The project area includes the Sacramento watershed. Although the Sacramento Valley is dominated by agricultural land, remnant grassland, savannah, riparian and wetland habitats remain. In the Sacramento Valley, seasonally flooded agriculture, in particular rice fields, provide important foraging habitat for a variety of wildlife species. Rice fields also provide resting, nesting, and breeding habitat similar to natural wetlands. Irrigation ditches can contain wetland vegetation such as cattails, which provide cover habitat.

Groundwater substitution transfers could affect stream flows in small tributaries and associated natural communities, including valley/foothill riparian, managed seasonal wetland, and natural seasonal wetland. Valley/foothill riparian natural community generally occurs along river and stream corridors on the east side of the Sacramento Valley. Trees typically associated with the valley/foothill riparian natural community include willows, Fremont cottonwood, valley oak, and western sycamore (*Platanus racemosa*) (Barbour et al. 2007). Many species of birds, mammals, reptiles, and amphibians depend on riparian habitats, such as woodpeckers, warblers, flycatchers, owls, and raptors. Other wildlife species that use riparian habitats include western fence lizard (*Sceloporus occidentalis*), Pacific tree frog, western toad, bullfrog, western skink (*Eumeces skiltonianus*), western whiptail (*Cnemidophorus tigris*), southern alligator lizard (*Elgaria multicarinata*), racer (*Coluber constrictor*), gopher snake (*Pituophis catenifer*), king snake (*Lampropeltis* sp.), garter snake (*Thamnophis* sp.), northern Pacific rattlesnake (*Crotalus oreganus oreganus*), opossum (*Didelphis virginiana*), black-tailed jackrabbit (*Lepus californicus*), western gray squirrel (*Sciurus griseus*), ringtail (*Bassariscus astutus*), river otter, striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), beaver, mule deer (*Odocoileus hemionus*), and a number of bat species. Managed seasonal wetland natural communities are often managed for waterfowl, such as mallards, northern pintails (*Anas acuta*), American widgeon, and Canada goose, and support a variety of wading birds and shorebirds. Natural seasonal wetlands support similar species as well as vernal pool species.

Terrestrial species potentially affected by the Proposed Action include GGS (*Thamnopphis gigas*), greater sandhill crane (*Grus canadensis tabida*), black tern (*Chlidonias niger*), tricolored blackbird, and pacific pond turtle (*Actinemys marmorata*). The following listings apply to the above species under the Federal and California Endangered Species Acts (ESA).

- GGS – listed as threatened under the Federal and California ESAs (Department of Fish and Wildlife [DFW] 2015a)

- Greater Sandhill Crane – listed as threatened under the California ESA and is fully protected under the California Fish and Game Code (DFW 2015a; DFW 2015b)

- Black Tern – listed as a State Species of Concern (DFW 2015c)

- Pacific Pond Turtle – status is under review under the Federal ESA and listed as a State Species of Concern (DFW 2015c)

- Tricolored Blackbird – listed as a State Species of Concern. On December 3, 3014, the California Fish and Game Commission granted emergency protections to the Tricolored blackbird. The action granted a 180-day period for DFW to determine whether to make the protections permanent. On February 3, 2015, the Center for Biological Diversity petitioned the Secretary of the Interior to list the tricolored blackbird as endangered under the Federal ESA (University of California Davis 2015)

Table 2-7 summarizes fish species of concern in rivers and tributaries upstream from the Delta in the sellers' area.

Table 2-7. Fish Species of Management Concern

Status	Species	Primary Management Consideration
Special- Status	Winter-run Chinook Salmon	FE,SE
	Spring-run Chinook Salmon	FT,ST
	Central Valley Steelhead	FT, Recreation
	Green sturgeon	FT,
	Hardhead	SSC
	Sacramento splittail	SSC
	Fall/late-fall Chinook Salmon	SSC, Commercial, Recreation
Other	Striped bass	Recreation
	American shad	Recreation
	White sturgeon	Commercial, Recreation

Source: USFWS 2015; DFW 2015b; DFW 2015c
Key:
FE = Federal endangered
FT = Federal threatened
SE = State endangered
ST = State threatened
SSC = State Species of Special Concern
Recreation = non-listed commercially important species of management concern.
Commercial = non-listed recreationally important species of management concern.

2.5.4 Geology and Soils

The Central Valley consists of mostly flat terrain associated with low gradient river valleys. There are some earthquake faults in the region, but earthquakes are generally associated with coastal California, west of the Central Valley. Strong seismic shaking is not common in the Central Valley, and liquefaction and other seismic-related ground failure are not major hazards in the region. Landslides and other hazards associated with unstable soil are uncommon due to the flat terrain. Dust from agricultural activities, such as plowing, grading, and discing, is a common occurrence in the Central Valley agricultural area, including the project area, and is a normal part of the agriculture practice in the region.

2.5.5 Greenhouse Gas Emissions

The greenhouse gas (GHG) analysis focuses on the following three pollutants: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The other two pollutant groups commonly evaluated in various GHG reporting protocols, hydrofluorocarbons and perfluorocarbons, are not expected to be emitted in large quantities as a result of the alternatives and are not discussed further in this section.

California is the second highest emitter of GHG emissions in the United States, only behind Texas; however, from a per capita standpoint, California has the 45th lowest GHG emissions among the states. Worldwide, California is the 20th largest emitter of CO_2 if it were a country; on a per capita basis, California would be ranked 38th in the world (CARB 2014). Agricultural emissions represented approximately eight percent of California's GHG emissions in 2012. Agricultural emissions represent the sum of emissions from agricultural energy use (from pumping and farm equipment), agricultural residue burning, agricultural soil management (the practice of using fertilizers, soil amendments, and irrigation to optimize crop yield), enteric fermentation (fermentation that takes place in the digestive system of animals), histosols (soils that are composed mainly of organic matter) cultivation, manure management, and rice cultivation.

2.5.6 Hydrology and Water Quality

2.5.6.1 Surface Water

The Sacramento River flows south for 447 miles through the northern Central Valley and enters the Delta from the north. The major tributaries to the Sacramento River are the Feather, Yuba, and American rivers. Reclamation owns and operates the CVP, which has major reservoirs on the Sacramento River (Shasta Reservoir) and American River (Folsom Reservoir). DWR owns and operates the SWP, which has a major reservoir on the Feather River (Oroville Reservoir).

2.5.6.2 Surface Water Quality

While surface water quality in the Sacramento River system is generally good, several water bodies within the area of analysis have been identified as impaired by certain constituents of concern and appear on the most recent 303(d) list of impaired waterways under the Clean Water Act (SWRCB 2011).

2.5.6.3 Groundwater

Redding Groundwater Basin

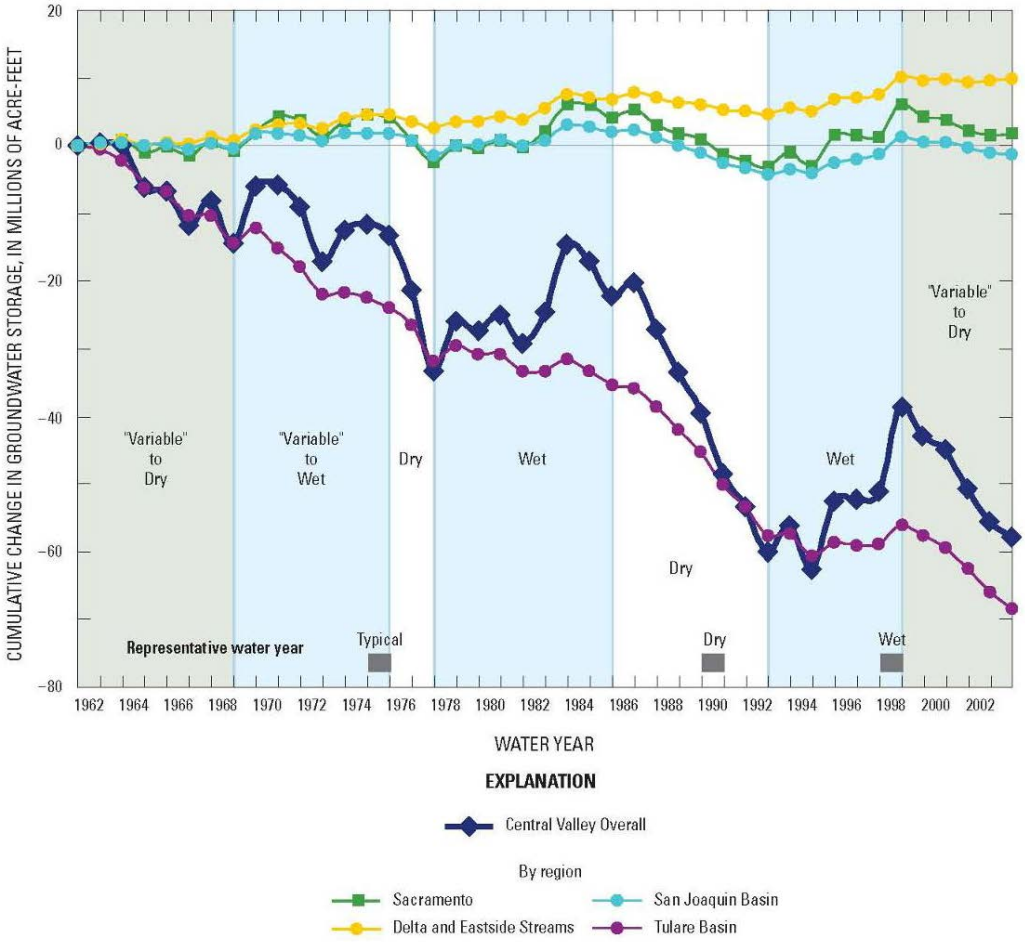
Historically, groundwater levels have remained stable within the Redding Groundwater Basin. Seasonal fluctuations in groundwater levels are generally less than five feet and can be up to 16 feet during drought years (Anderson-Cottonwood ID 2011). These declines are usually followed by recovery to pre-drought levels after several successive normal or above-normal precipitation events have occurred (CH2M HILL 2007). Appendix C includes groundwater monitoring data in the Anderson-Cottonwood ID area (the potential selling entity in the Redding Basin).

Land Subsidence. Land subsidence has not been monitored in the Redding Area Groundwater Basin. However, there would be potential for subsidence in some areas of the basin if groundwater levels were substantially lowered. The groundwater basin west of the Sacramento River is composed of the Tehama Formation, which has exhibited subsidence in Yolo County.

Groundwater Quality. Groundwater in the Redding Groundwater Basin area of analysis is typically of good quality, as evidenced by its low total dissolved solids (TDS) concentrations, which range from 70 to 360 milligrams per liter (mg/L). Areas of high salinity (poor water quality), are generally found on the western basin margins, where the groundwater is derived from marine sedimentary rock. Elevated levels of iron, manganese, nitrate, and high TDS have been detected in some areas (DWR 2003).

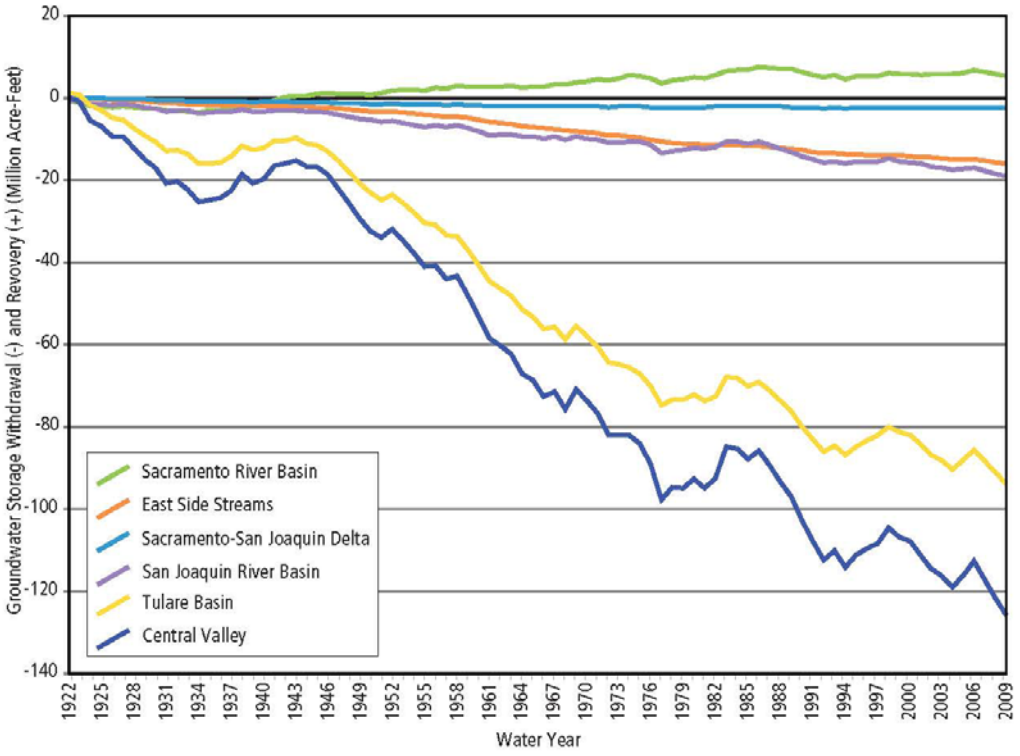
Sacramento Valley Groundwater Basin

The Sacramento Valley Groundwater Basin includes portions of Tehama, Glenn, Butte, Yuba, Colusa, Placer, and Yolo Counties. Under normal hydrologic conditions, groundwater accounts for less than 30 percent of the annual supply used for agricultural and urban purposes within the Sacramento Valley. Urban pumping in the Sacramento Valley increased from approximately 250,000 AF annually in 1961 to more than 800,000 AF annually in 2003 (Faunt 2009). As shown in Figures 2-2 and 2-3, respectively, the U.S. Geological Survey's (USGS's) Central Valley Hydrologic Model (CVHM) and DWR's Central Valley Groundwater-Surface Water Simulation Model (C2VSim) show groundwater storage in the Sacramento Valley Groundwater Basin has been relatively constant over the long term. Storage tends to decrease during dry years and increase during wetter periods.



Source: Faunt 2009

Figure 2-2. Cumulative Annual Change in Storage as Simulated by the USGS's Central Valley Hydrologic Model



Source: Brush et al 2013

Figure 2-3. Cumulative Annual Change in Storage as simulated by DWR's California Central Valley Groundwater-Surface Water Simulation Model

Groundwater levels in the Sacramento Valley Groundwater Basin have declined considerably over the last decade (spring 2004 to spring 2014), by approximately 40 feet (see figure in Appendix C). These decreases in groundwater levels have caused wells to go dry in parts of the valley. Table 2-8 below summarizes the number of wells reported dry in 2014. Persistent dry weather conditions since 2006 have been partially responsible for these steep declining trends. Water Year (WY) 2011 has been the only year since 2006 classified as a wet year. Though the Sacramento Valley Groundwater Basin and other parts of California are currently noticing declining groundwater level trends, past groundwater trends are indicative of groundwater levels declining moderately during extended droughts and recovering to pre-drought levels after subsequent wet periods. For example, changes in groundwater elevations in the Sacramento Valley Groundwater Basin between spring 2010 and spring 2011 (DWR 2015) indicates an overall increasing trend up to eight feet in the shallow aquifer (less 200 feet below ground surface [bgs]). Recovery in the intermediate aquifer (between 200 to 600 feet bgs) was approximately +7.5 feet. Recovery in the deep aquifer (greater than 600 feet bgs) was lower (up to +4.5 feet). Increases in groundwater levels in 2011 occurred after four consecutive years of dry or critically dry conditions in the Sacramento Valley Groundwater Basin (WY 2007 to WY 2010). Appendix C includes groundwater monitoring

data to further characterize groundwater levels in the Sacramento Valley Groundwater Basin near the potential selling entities.

Table 2-8. Summary of Dry Wells Reported in 2014

Counties	Number of wells reported dry in 2014	Information received as of:
Shasta	3	9/16/2014
Tehama	34	10/2/2014
Glenn	26	10/23/2014
Butte	60	12/4/2014
Colusa	8	7/7/2014
Sutter	Data not available	Data not available
Yuba	Data not available	Data not available
Solano	1	11/12/2014
Yolo	2*	10/21/2014
Sacramento	1	10/16/2014

Source: Data collected by University of California Davis
*Number of dry wells reported includes data only for October; data for prior months not reported

Land Subsidence. Historically, land subsidence occurred in the eastern portion of Yolo County and the southern portion of Colusa County, owing to groundwater extraction and geology. Due to groundwater withdrawal over several decades, as much as four feet of land subsidence has occurred east of the town of Zamora. In Yolo County within Conaway Ranch, DWR observed land subsidence estimated at approximately 0.2 foot from 2012 to 2013 and an additional 0.6 foot from 2013 to 2014 (DWR 2014a). In comparison, slightly less than 0.1 foot of subsidence occurred over the previous 22 years (1991-2012). The area between Zamora, Knights Landing, and Woodland has been most affected (Yolo County 2012). Subsidence in this region is generally related to groundwater pumping and subsequent consolidation of loose aquifer sediments.

Groundwater Quality. Groundwater quality in the Sacramento Valley Groundwater Basin is generally good and sufficient for municipal, agricultural, domestic, and industrial uses. However, there are some localized groundwater quality issues in the basin. Some of the water quality issues within the Sacramento Valley may include occurrences of saltwater intrusion or elevated levels of nitrates, naturally occurring boron, and other introduced chemicals (DWR 2003).

2.5.7 Noise

Noise is generally measured in decibels (dB), which are measured on a logarithmic scale so that each increase in 10 dB equals a doubling of loudness. The letter "A" is added to the abbreviation (dBA) to indicate an "A-weighted" scale, which filters out very low and very high frequencies that cannot be heard by the human ear.

The buyers and sellers areas are primarily agricultural; major noise sources include traffic, railroad operations, airports, industrial operations, farming operations, and fixed noise sources. Common noise sources associated with farming operations include tractors, harvesting equipment and spray equipment (Glenn County 1993). Typical noise levels created by a range of farm equipment are presented in Table 2-9.

Table 2-9. Typical Noise Levels Associated with Farm Equipment

Equipment	Distance (feet)	Sound Level (dB)
Diesel Wheel Tractor		
- with Disc	150	72-75
- with Furrow	50	69-79
Weed Sprayer (1-cylinder)	50	74-75
Aero Fan 391 Speed Sprayer	200	74-76
Diesel Engine	50	75-85

Source: Brown-Buntin Associates, Inc. in Glenn County 1993
Key: dB = decibel

A Community Noise Survey conducted in Glenn County indicated that typical noise levels in noise sensitive areas, including rural areas, are relatively quiet and fall in the range of 48 dB to 60 dB Ldn[2] (Glenn County 1993). These noise levels would be reflective of conditions in the other counties.

[2] The day-night average sound level (Ldn) is the average noise level, expressed in decibels, over a 24-hour period.

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Chapter 3
Environmental Impacts

The following sections use the checklist from Appendix G of the CEQA Guidelines as a template to assess potential environmental effects under both CEQA and NEPA. The discussion for each resource focuses on potential impacts; resources that would not be affected are briefly discussed.

I. AESTHETICS
-- Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings, or other locally recognized desirable aesthetic natural feature within a city-designated scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

a, b, d) No Impact. The No Action Alternative and Proposed Action would not affect any scenic vista, damage scenic resources, or create a new light source. The Proposed Action would not affect scenic vistas relative to rivers or reservoirs because there would be no changes beyond historical or seasonal fluctuations in flows or water levels. The Proposed Action does not result in any construction or new structures that could damage scenic resources (i.e., trees, rock outcroppings, historic buildings, etc.) or produce notable sources of light or glare.

c) Less than Significant. Cropland idling transfers in the Proposed Action would temporarily increase the amount of idled lands in the sellers' area. The No Action Alternative may also increase cropland idling in response to water shortages associated with the dry hydrologic conditions. Idled lands are typical features of agricultural landscapes as part of normal cultivation practices. The crop pattern resulting from the Proposed Action would likely be indistinguishable from those under normal cropping patterns. This impact would be less than significant as there would be no substantial changes or degradation to the visual character and quality of the sites or their surroundings.

II. AGRICULTURE AND FOREST RESOURCES:
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:

	Potentially Significant Impact	**Less Than Significant with Mitigation Incorporation**	**Less Than Significant Impact**	**No Impact**
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

a, b, e) No Impact. One-year water transfers under the Proposed Action temporarily take land out of production, but would not affect the long-term agricultural uses of the land. The No Action Alternative could also result in increased cropland idling in 2015 in response to reduced surface water supplies from the CVP and SWP. Idling cropland for a single year would be similar to fallowing a field under a normal crop rotation. Cropland idling would not affect the long-term designations of Prime Farmland or other Farmland Mapping and Monitoring Program classifications or affect Williamson Act contracts.

c, d) No Impact. The No Action Alternative and Proposed Action would have no impact to existing forest lands or timber, as the proposed water transfer methods do not pertain to such lands or resources.

III. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non--attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

a) Less than Significant Impact

No Action Alternative: Under the No Action Alternative, growers may idle rice or pump groundwater to supplement reduced surface water supplies. Crop idling actions could increase fugitive dust emissions. Although there could be emission increases under the No Action Alternative, the emissions would be consistent with existing trends in air quality and would be the same as existing conditions; therefore, emissions could not impede implementation of any air quality plan.

Proposed Action: The air districts associated with the counties of Shasta, Tehama, Glenn, Butte, Colusa, Sutter, and Yuba comprise the Northern Sacramento Valley Planning Area (NSVPA). The NSVPA has jointly committed to preparing and adopting an Air Quality Attainment Plan (AQAP) to achieve and maintain healthful air in these counties. The Sacramento Metropolitan AQMD and the Yolo/Solano AQMD have also adopted various air

quality plans for the pollutants for which they are currently designated nonattainment. As part of these plans, several control measures were adopted by the various counties to attain and maintain air quality standards. These control measures are then promulgated in the rules and regulations at each air district; therefore, if a Proposed Action is consistent with the air districts' and State regulations, then the project is in compliance with the AQAP. The air quality impacts from water transfer actions are associated with the actions taken to reduce consumptive use.

The Proposed Action would use a combination of electric, diesel, and natural gas driven groundwater pumps depending on the specific water agency. All diesel-fueled engines are subject to CARB's Airborne Toxic Control Measure (ATCM) for Stationary Ignition Engines (17 California Code of Regulations [CCR] 93115). The ATCM does not expressly prohibit the use of diesel engines for agricultural purposes; therefore, diesel engines may be used for groundwater pumping associated with groundwater substitution transfers as long as they are replaced when required by the compliance schedule.

All pumps proposed to be used by the water agencies would operate in compliance with all rules and regulations at the federal, state, and local levels; therefore, any activities associated with water transfers would be consistent with the AQAPs and the ATCM. As such, impacts would be less than significant.

b) Less than Significant with Mitigation

No Action Alternative: Under the No Action Alternative, growers would leave some crops idle, which would leave bare soils susceptible to fugitive dust emissions from windblown dusts. Growers would also continue to pump groundwater for irrigation, which releases emissions if diesel pumps are used. These actions in response to surface water shortages would continue under the No Action Alternative. There would be no change to emissions relative to existing conditions.

Proposed Action: To assess whether a proposed project would violate any air quality standards or contribute substantially to an existing or projected air quality violation, several of the air districts developed significance thresholds for mass daily and/or annual emission rates of criteria pollutants. Colusa, Glenn, and Shasta counties do not have published significance thresholds; therefore, the threshold used to define a "major source" in the Clean Air Act (100 tons per year) was used to evaluate significance. Table 3-1 summarizes the significance thresholds used by each air district.

Table 3-1. CEQA Operational Significance Thresholds

Air District	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Sacramento Metropolitan AQMD	65 lbs/day	65 lbs/day	--	--	--	--
Yolo-Solano AQMD	10 tpy	10 tpy	--	--	80 lbs/day	--
Feather River AQMD	25 lbs/day	25 lbs/day	--	--	80 lbs/day	--

Source: Feather River AQMD 2010; Sacramento Metropolitan AQMD 2014a; Yolo-Solano AQMD 2007.

Key:

-- = no threshold; AQMD = air quality management district; CO = carbon monoxide; lbs/day = pounds per day; NOx = nitrogen oxides; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; SOx = sulfur oxides; tpy = tons per year; VOC = volatile organic compounds

In addition to the CEQA significance thresholds, the federal general conformity regulations apply to a proposed federal action in a nonattainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutants caused by the proposed action equal or exceed certain de minimis amounts (40 CFR 93.153). Conformity means that such federal actions must be consistent with a state implementation plan's (SIP's) purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of those standards.

Groundwater substitution could increase air emissions in the seller area. Cropland idling transfers could reduce vehicle exhaust emissions, but increase fugitive dust emissions. Cropland idling transfers could offset some of the emissions from groundwater substitution transfers, but the quantity of water transferred under each mechanism could be much less than what is included in Table 2-3. Because cropland idling transfers may not occur up to the upper limits, they cannot be counted on to reduce impacts of groundwater substitution. Therefore, impacts were only evaluated for groundwater substitution to estimate the maximum potential emissions that could occur because of the Proposed Action.

Some of the groundwater substitution transfers could go to users who would have pumped groundwater in response to surface water shortages in the No Action Alternative. The emissions from the reduction compared to the No Action Alternative could offset some of the emissions in the Proposed Action, but the quantity of the offset is uncertain. Therefore, this offset is also not considered within the analysis.

Table 3-2 summarizes the maximum daily emissions that would be estimated to occur in each water agency subject to a daily significance threshold. Table 3-3 summarizes the annual emissions that would occur in each water agency subject to an annual significance threshold. Significance was determined for individual water agencies.

Table 3-2. Unmitigated Peak Daily Emissions (lbs/day)

Water Agency	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Feather River AQMD						
Burroughs Farms	electric	electric	electric	electric	electric	electric
Natomas Central Mutual Water Company [1]						
Pelger Mutual Water Company	1	19	25	6	1	1
Pelger Road 1700 LLC	electric	electric	electric	electric	electric	electric
Pleasant Grove-Verona Mutual Water Company	30	272	138	35	8	8
Reclamation District 1004 [2]	No Eng.	No Eng.	No Eng.	No Eng.	No Eng.	No Eng.
Sutter Mutual Water Company	No GW	No GW	No GW	No GW	No GW	No GW
CEQA Significance Threshold	25	25	n/a	n/a	80	n/a
Sacramento Metropolitan AQMD						
Natomas Central Mutual Water Company [1]	2	3	30	11	<1	<1
CEQA Significance Threshold	65	65	n/a	n/a	n/a	n/a
Yolo/Solano AQMD						
Conaway Preservation Group [3]	4	80	45	16	3	3
Reclamation District 108 [4]	electric	electric	electric	electric	electric	electric
River Garden Farms [3]	electric	electric	electric	electric	electric	electric
Te Velde Revocable Family Trust [3]	electric	electric	electric	electric	electric	electric
CEQA Significance Threshold	n/a	n/a	n/a	n/a	80	n/a

Notes:
[1] Natomas Central Mutual Water Company is split into two different air districts; therefore, only emissions for Sutter County and Sacramento County are included in the summaries for Feather River AQMD and Sacramento Metropolitan AQMD, respectively.
[2] Reclamation District 1004 is split into three different air districts; therefore, only emissions from Sutter County are included.
[3] Conaway Preservation Group, River Garden Farms, and Te Velde Revocable Family Trust are split into two different air districts; therefore, only emissions from Yolo County are included.
[4] Reclamation District 108 is split into three different air districts; therefore, only emissions from Yolo County are included.

Key:
AQMD = air quality management district; CEQA = California Environmental Quality Act; CO = carbon monoxide; electric = all electric engines; lbs/day = pounds per day; n/a = not applicable; No Eng. = no engines operating in county; No GW = no groundwater substitution; NOx = nitrogen oxides; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; SOx = sulfur oxides; VOC = volatile organic compound

Table 3-3. Unmitigated Annual Emissions (tons per year)

Water Agency	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Colusa County APCD						
Canal Farms	<1	<1	<1	<1	<1	<1
Eastside Mutual Water Company	<1	2	2	1	<1	<1
Glenn-Colusa Irrigation District [1]	6	74	16	5	1	1
Maxwell Irrigation District	electric	electric	electric	electric	electric	electric
Princeton-Codora-Glenn Irrigation District [1]	No Eng.	No Eng.	No Eng.	No Eng.	No Eng.	No Eng.
Provident Irrigation District [1]	No Eng.	No Eng.	No Eng.	No Eng.	No Eng.	No Eng.
Reclamation District 108 [2]	electric	electric	electric	electric	electric	electric
Reclamation District 1004 [2]	1	18	5	2	<1	<1
Sycamore Mutual Water Company	electric	electric	electric	electric	electric	electric
CEQA Significance Threshold	100	100	100	100	100	100

Water Agency	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Glenn County APCD						
Glenn-Colusa Irrigation District [3]	8	99	21	7	2	2
Princeton-Codora-Glenn Irrigation District [3]	2	21	11	2	<1	<1
Provident Irrigation District [3]	1	13	4	1	<1	<1
Reclamation District 1004 [4]	<1	1	<1	<1	<1	<1
CEQA Significance Threshold	100	100	100	100	100	100
Shasta County AQMD						
Anderson-Cottonwood Irrigation District	electric	electric	electric	electric	electric	electric
CEQA Significance Threshold	100	100	100	100	100	100
Yolo/Solano AQMD						
Conaway Preservation Group [5]	<1	2	1	<1	<1	<1
Reclamation District 108 [6]	electric	electric	electric	electric	electric	electric
River Garden Farms [5]	electric	electric	electric	electric	electric	electric
Te Velde Revocable Family Trust [5]	electric	electric	electric	electric	electric	electric
CEQA Significance Threshold	10	10	n/a	n/a	n/a	n/a

Notes:
[1] Glenn-Colusa Irrigation District, Princeton-Codora-Glenn Irrigation District, and Provident Irrigation District are split into two different air districts; therefore, only emissions from Colusa County included.
[2] Reclamation District 108 and Reclamation District 1004 are split into two different air districts; therefore, only emissions from Colusa County included.
[3] Glenn-Colusa Irrigation District, Princeton-Codora-Glenn Irrigation District, and Provident Irrigation District are split into two different air districts; therefore, only emissions from Glenn County included.
[4] Reclamation District 1004 split into three different air basins; therefore, only emissions form Glenn County included.
[5] Conaway Preservation Group, River Garden Farms, and Te Velde Revocable Family Trust are split into two different air districts; therefore, only emissions from Yolo County are included.
[6] Reclamation District 108 is split into three different air districts; therefore, only emissions from Yolo County are included.

Key:
APCD = air pollution control district; AQMD = air quality management district; CEQA = California Environmental Quality Act; CO = carbon monoxide; electric = all electric engines; n/a = not applicable; No Eng. = No Eng. = no engines operating in county; NOx = nitrogen oxides; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; SOx = sulfur oxides; VOC = volatile organic compound

As shown in the tables, Pleasant Grove-Verona Mutual Water Company would exceed the daily VOC and NOx thresholds (Table 3-2). The following mitigation measure would reduce the severity of the air quality impacts:

- AQ-1 – Selling agency would reduce pumping at diesel wells to reduce emissions to below the thresholds. If an agency is transferring water through cropland idling and groundwater substitution in the same year, the reduction in vehicle emissions can partially offset groundwater substitution pumping at a rate of 4.25 AF of water produced by idling to one acre-foot of groundwater pumped. Agencies may also decide to replace old diesel wells to reduce emission below the thresholds.

  If a selling agency, through the actions above, can reduce daily emissions below thresholds while operating wells 24 hours per day, then that agency must provide an analysis to Reclamation. This analysis should identify that all wells proposed for participation in a 2015 Water Transfer may be operated on a 24-hour per day basis without exceeding emission thresholds.

Alternately, if a selling agency with potentially significant emissions, as determined by this EA/IS, intends to operate wells less than 24 hours per day to reduce emissions below the thresholds, then that agency will be required to maintain recordkeeping logs that document the specific engine to be used for groundwater substitution transfers, the power rating (hp), and applicable emission factors. Emission calculations for daily emissions will be completed for comparison to the significance thresholds determined for each selling agency. The recordkeeping logs will be sent to Reclamation monthly for verification that emissions are within the allowable limits.

Reclamation will also work with the water agencies to inform individual growers of incentive funding available through the Natural Resources Conservation Service's Environmental Quality Incentives Program. Funded conservation practices include the replacement of internal combustion engines in irrigation pumps; therefore, the program may be used by growers to further reduce criteria pollutant emissions.

Mitigated emissions are provided in Table 3-4. Implementation of these mitigation measures would reduce VOC and NOx emissions to less than significant.

Table 3-4. Mitigated Peak Daily Emissions (lbs/day)

Water Agency	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Feather River AQMD						
Pleasant Grove-Verona Mutual Water Company	9	25	191	54	1	1
CEQA Significance Threshold	25	25	n/a	n/a	80	n/a

Key:
AQMD = air quality management district; CEQA = California Environmental Quality Act; CO = carbon monoxide; lbs/day = pounds per day; n/a = not applicable; NOx = nitrogen oxides; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; SOx = sulfur oxides; VOC = volatile organic compound

As discussed above, in addition to the CEQA significance thresholds, the federal general conformity regulations apply to a proposed federal action in a nonattainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutants caused by the proposed action equal or exceed certain de minimis amounts (40 CFR 93.153). Because the general conformity regulations and thresholds only apply to nonattainment or maintenance areas, emissions subject to general conformity are less than the total project emissions. Figure 3-1 shows the CO maintenance area; Figure 3-2 shows the O_3 nonattainment area; Figure 3-3 shows the PM_{10} maintenance area; and Figure 3-4 shows the $PM_{2.5}$ nonattainment area.

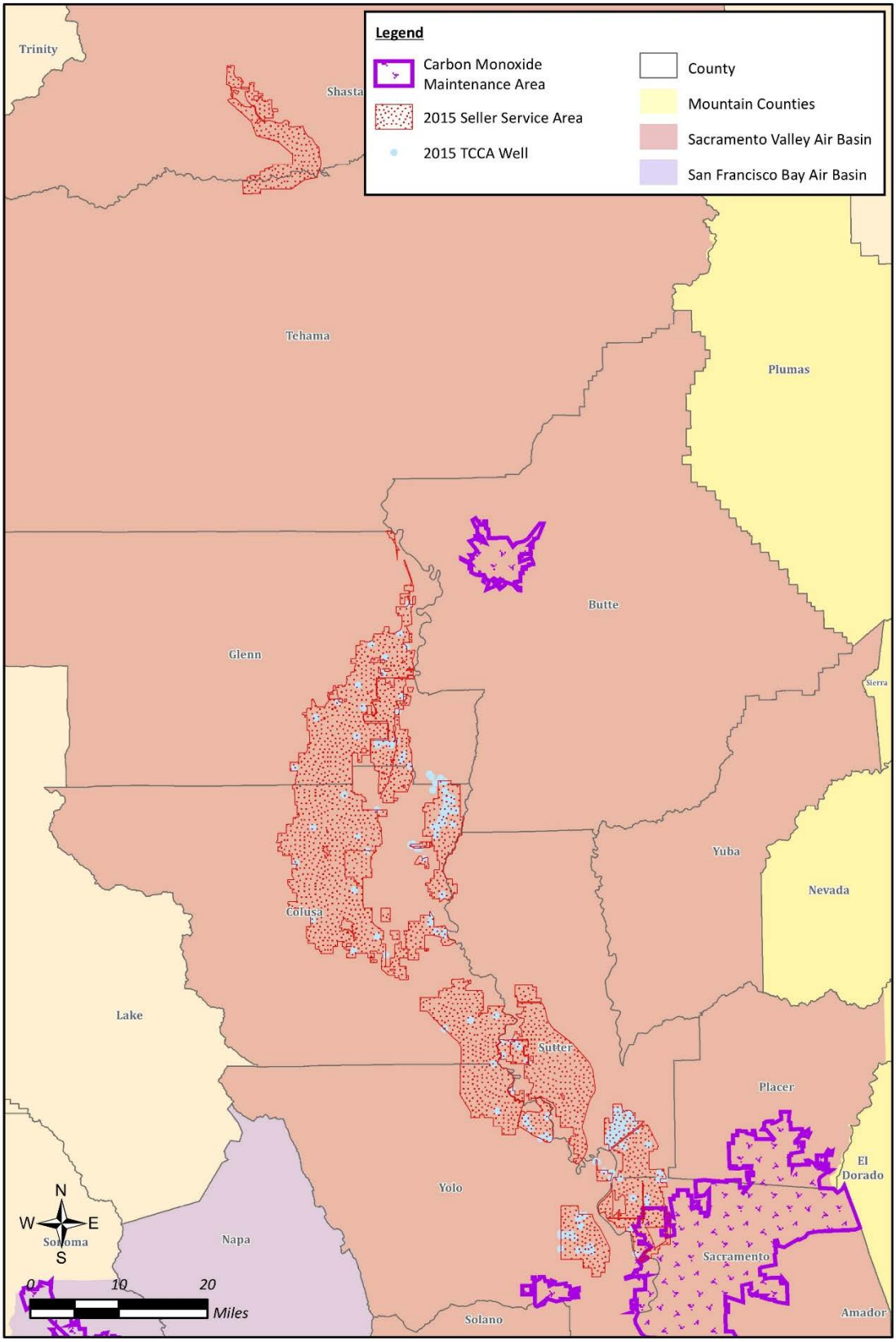

Figure 3-1. Location of CO Maintenance Area in Seller Service Area

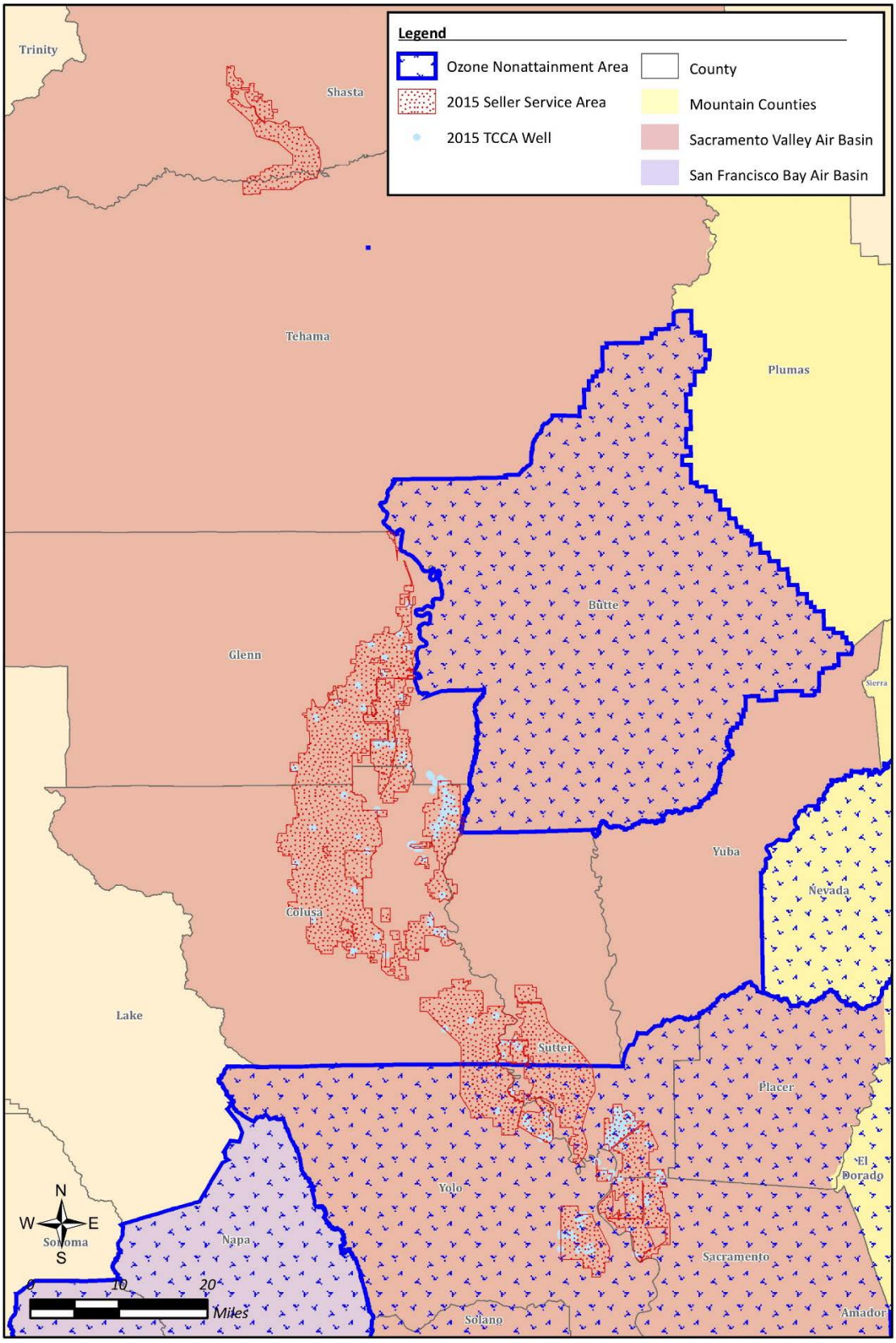

Figure 3-2. Location of O_3 Nonattainment Area in Seller Service Area

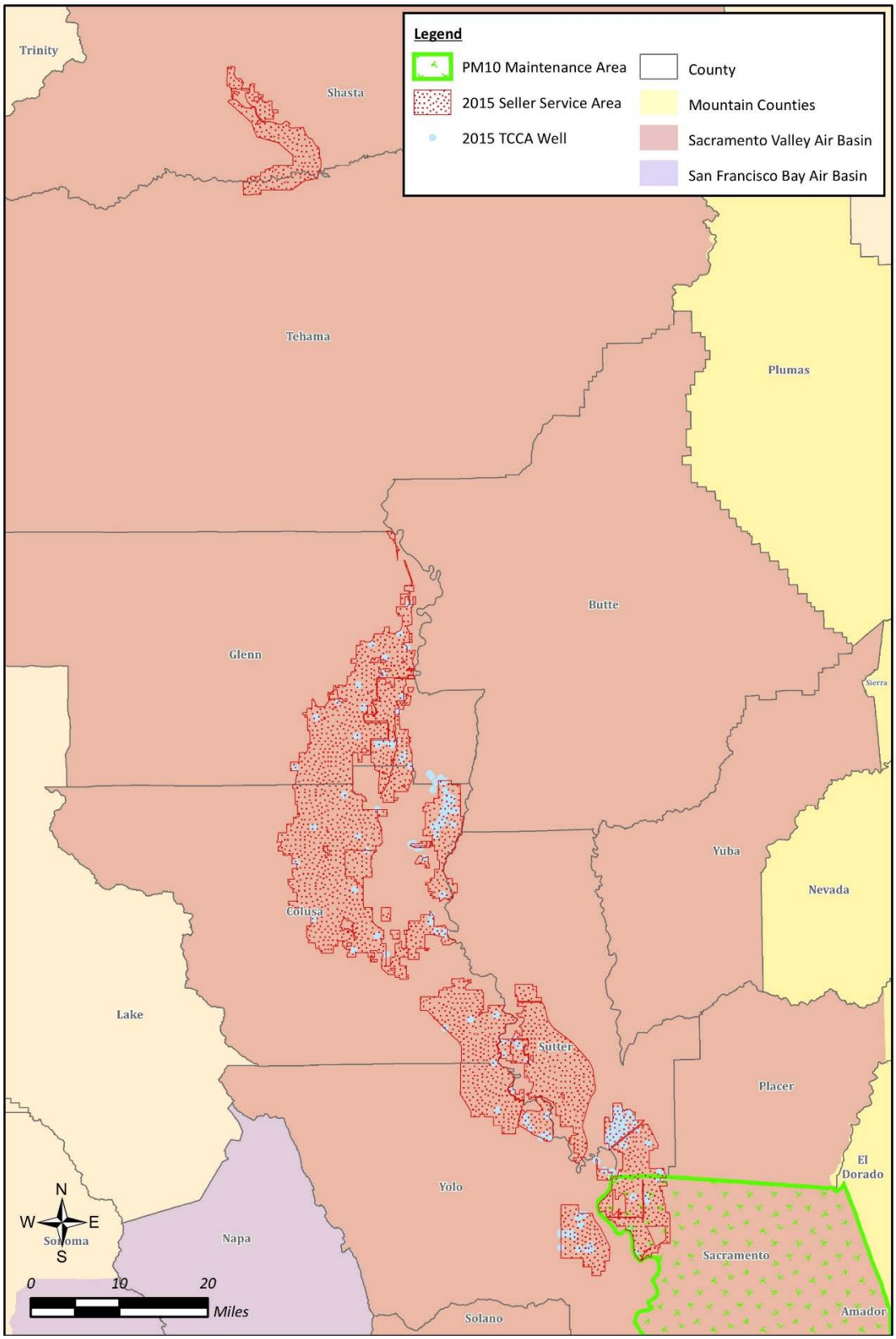

Figure 3-3. Location of PM_{10} Maintenance Area in Seller Service Area

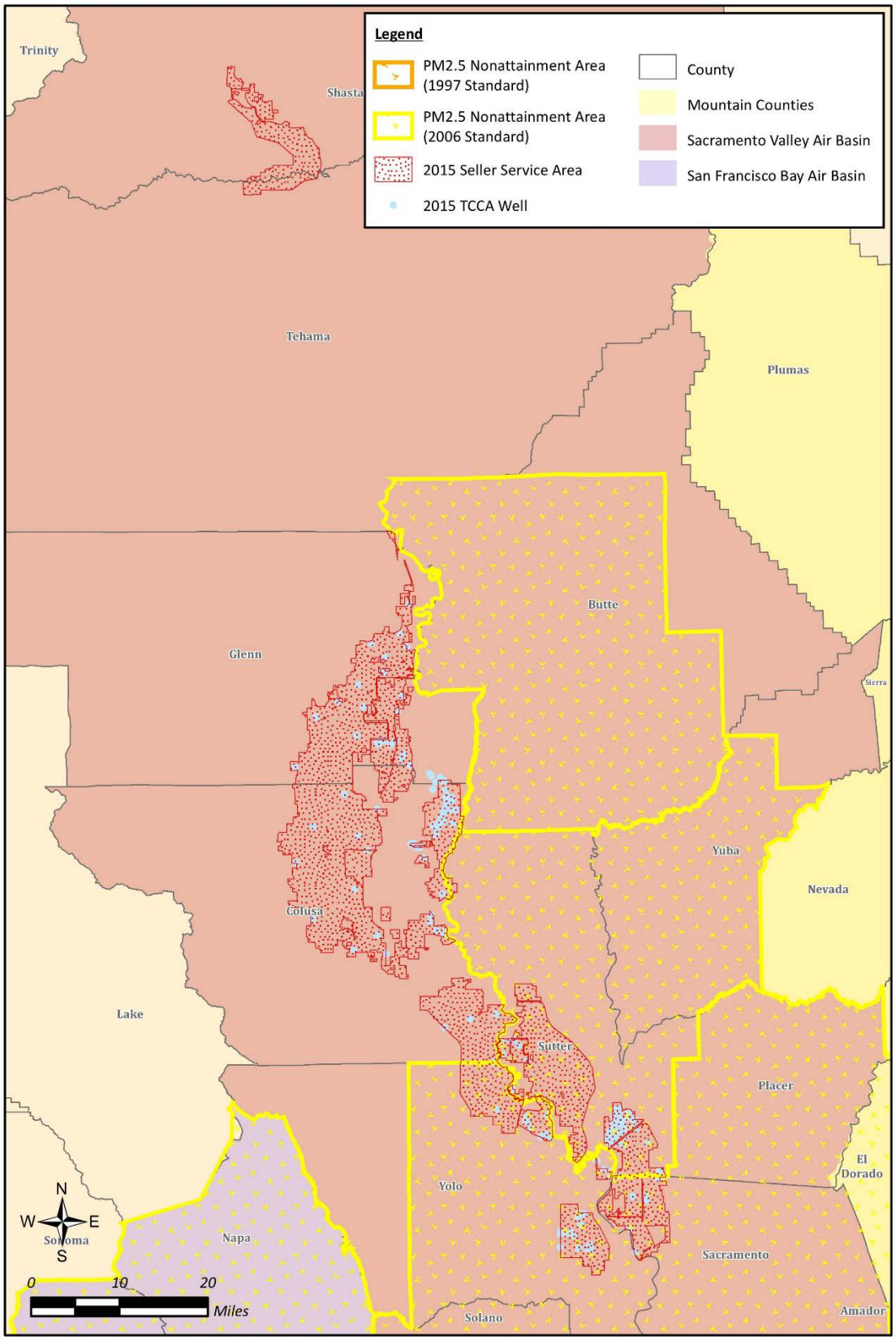

Figure 3-4. Location of $PM_{2.5}$ Nonattainment Area in Seller Service Area

Because the CEQA-related mitigation measures are fully enforceable under Cal. Pub. Res. Code §21081.6 and would be a requirement of project implementation, mitigated emissions for the Proposed Action were compared to the general conformity de minimis thresholds. Table 3-5 summarizes the general conformity applicability evaluation.

Table 3-5. General Conformity Applicability Evaluation (tons per year)

	VOC[1]	NOx[1]	CO[2]	SOx[3]	PM_{10}	$PM_{2.5}$[4]
Emissions[5]	1	4	4	3	<1	<1
Classification	Severe	Severe	Maintenance	PM2.5 Precursor	Maintenance	Nonattainment
De Minimis Threshold	25	25	100	100	100	100
Exceed Threshold?	No	No	No	No	No	No

Notes:

[1] The Sacramento Metro 8-hour O_3 nonattainment area consists of Sacramento and Yolo Counties and parts of El Dorado, Placer, Solano, and Sutter Counties. Emissions occurring within the attainment area of these counties are excluded from the total emissions.

[2] The Sacramento Area CO maintenance area is based on the Census Bureau Urbanized Area and consists of parts of Placer, Sacramento, and Yolo Counties. The general conformity applicability evaluation is based on emissions that would occur within the entire county to be conservative.

[3] All counties are designated as attainment areas for SO_2; however, since SO_2 is a precursor to $PM_{2.5}$, its emissions must be evaluated under general conformity.

[4] The 24-hour $PM_{2.5}$ nonattainment area for Sacramento includes Sacramento County and parts of El Dorado, Placer, Solano, and Yolo Counties. The general conformity applicability analysis assumes that all emissions that could occur within each county would occur within the Sacramento nonattainment area to be conservative.

[6] VOC and NOx emissions are excluded from Sutter County for Pelger Mutual Water Company and Reclamation District 1004 because they are located in areas designated as attainment for the federal 8-hour O_3 NAAQS.

Key:

CO = carbon monoxide; NOx = nitrogen oxides; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; SOx = sulfur oxides; VOC = volatile organic compound

Mitigated emissions would be less than the general conformity de minimis thresholds; therefore, no further action would be required under general conformity. Detailed calculations are provided in Appendix E.

c) Less than Significant

No Action Alternative: As described previously, the No Action Alternative would not change emissions relative to existing emissions. Because emissions would not increase, the No Action Alternative would not result in a cumulative impact to air quality.

Proposed Action: All counties affected by the Proposed Action are located in areas designated nonattainment for the PM_{10} CAAQS. Additionally, Sacramento, Shasta, Tehama, and Yolo Counties are designated nonattainment for the O_3 CAAQS, while Sutter County is designated nonattainment-transitional for the O_3 CAAQS. Nonattainment status represents a cumulatively significant impact within the area. O_3 is a secondary pollutant, meaning that it is formed in the atmosphere from reactions of precursor compounds under certain conditions. Primary precursor compounds that lead to O_3 formation include volatile organic compounds and nitrogen oxides; therefore, the significance thresholds established by the air districts for VOC and NOx are

intended to maintain or attain the O_3 CAAQS and NAAQS. Because no single project determines the nonattainment status of a region, individual projects would only contribute to the area's designation on a cumulative basis.

Several air districts, including the Sacramento Metropolitan AQMD (2014b), develop significance thresholds to determine if a project's individual emissions could result in a cumulatively considerable adverse contribution to the existing air quality conditions. Therefore, if an alternative would produce air quality impacts that are individually significant, then the alternative would also be cumulatively considerable. Conversely, if the alternative's emissions would be less than the significance thresholds, then the alternative would not be expected to result in a cumulatively considerable contribution to the existing significant cumulative impact.

The Proposed Action could exceed NOx and VOC standards (O_3 precursors) in areas that are in nonattainment for O_3, which would be a cumulatively considerable effect. However, implementation of mitigation measure AQ-1 would reduce individual impacts to less than significant and reduce the cumulative contribution. Therefore, air quality impacts would not be cumulatively considerable.

d) Less than Significant

No Action Alternative and Proposed Action: The proposed engines would either be remotely located in rural areas or would be located on existing agricultural land. The engines would not be located within one-quarter mile of a sensitive receptor. Additionally, emissions from individual engines would not exceed any district's significance criteria. Therefore, air quality impacts would be less than significant.

e) No Impact

No Action Alternative and Proposed Action: The use of diesel engines during groundwater substitution activities may generate near-field odors that are considered a nuisance. Diesel equipment emits a distinctive odor that may be considered offensive to certain individuals. The local air districts have rules (e.g., Sacramento Metropolitan AQMD Rule 402) that prohibit emissions that could cause nuisance or annoyance to a considerable number of people. All water agencies would operate their engines in compliance with the local rules and regulations. Therefore, the proposed operation of any diesel-fueled engines would have a less than significant impact associated with the creation of objectionable odors affecting a substantial number of people.

IV. BIOLOGICAL RESOURCES
– Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in City or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	☐	☒	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

a) Less than Significant Impact

No Action Alternative: Continued dry hydrologic conditions could affect special status fish species by reducing inflow to the Delta. Reclamation and DWR may have difficulty meeting the operational requirements of the Biological Opinions (BOs) on the Continued Long-term Operations of the CVP/SWP (National Marine Fisheries Service [NMFS] & USFWS BOs) and D1641. CVP and SWP operations on the Sacramento, Feather, and American rivers will be managed adaptively to meet environmental and water quality standards that are put in place throughout the water year. Reclamation and DWR developed a Drought Contingency Plan for the CVP and SWP that includes a temporary urgency change petition to the SWRCB to address continued dry conditions (Reclamation and DWR 2015). The temporary urgency change petition includes requests to change the minimum Net Delta Outflow Index, the minimum flows on the San Joaquin River at Airport Way Bridge, and the Delta Cross Channel gate closure requirements. Reclamation and DWR will continue to coordinate closely with the SWRCB to balance the need to provide water supplies south of the Delta, and protect water quality in the Delta.

Under No Action Alternative, growers in the sellers' area would idle crops if surface water supplies are reduced. Rice idling actions could have an adverse effect to GGS that use flooded rice fields for foraging and protective cover habitat during the summer months. Rice idling would have similar adverse effects to pacific pond turtle.

Because of the dry conditions, refuge surface water supplies may be reduced in 2015. A reduction in available water supply to refuges and rice growers would result in less available habitat for migratory bird species.

Proposed Action: Sacramento River flows would slightly decrease from the TCCA point of diversion at Red Bluff to the point of diversion of the seller, located downstream, during the transfer period. The changes in Sacramento River flows would not be substantial enough to affect special status fish species. Reclamation is consulting frequently with USFWS and NMFS on CVP and SWP operations relative to the BOs and special status fish species. Special status fish species in the Delta would not be affected by the Proposed Action because flows downstream of the sellers' points of diversion would not change from the No Action Alternative.

Groundwater substitution transfers under the Proposed Action would reduce groundwater levels and potentially deplete surface water flows in rivers and creeks (see Section IX (b)). Surface water depletions in the Sacramento and American rivers as a result of groundwater substitution transfers would not be substantial, nor would they be of sufficient magnitude to affect special status fish species.

Reduced surface water flows in smaller creeks could affect special status fish species. Based on a review of field sampling data and reports, this analysis concluded that there is no evidence of the presence of special-status fish species in the following creeks and any streamflow depletion would have no effects on special status fish species: Walker Creek, French Creek, Willow Creek, South Fork Willow Creek, Funks Creek, Stone Corral Creek, Lurline Creek, Cortina Creek, Sand Creek, Sycamore Slough (Colusa County), Wilkins Slough Canal, Honcut Creek, North Honcut Creek, South Honcut Creek, and Dry Creek (tributary of Bear River).

For creeks with the presence of special status fish species, there would be a less than 1 cfs reduction in average monthly flow in Stony Creek, Salt River, Little Chico Creek, and Putah Creek. A flow reduction of 1 cfs or less is not of sufficient magnitude to affect special status fish species. There would be no changes in flows in Colusa Basin Drain, Coon Creek, Eastside Cross Canal, Cache Creek, Butte Creek and Big Chico Creek. As a result, effects to special status fish species would be less than significant.

The following is a discussion of effects of rice idling actions on special status wildlife species that are present in the sellers' area. Environmental Commitments have been incorporated into the Proposed Action to reduce potential impacts to special status wildlife species. The Environmental Commitments are listed in Section 2.4. Additional special status animal and plant species have the potential to occur in the project area, but would not be affected by the Proposed Action. Appendices F and G list special status animal and plant species that could be present in the project area and the reason for the no effect determination.

Rice idling could affect special status species that use rice fields for forage, cover, nesting, breeding, or resting. Under the Proposed Action, a maximum of 55,041 acres of rice could be idled in Colusa, Glenn, Sutter and Yolo counties based on the transfer quantities in Table 2-3 and an ETAW of 3.3 acre-feet per acre. Table 3-6 shows the annual rice acreages in each county from 2002 to 2012.

Table 3-6. Annual Harvested Rice Acreage by County in Sellers' Area

Year	Glenn	Colusa	Sutter	Yolo	Total
2002	92,382	134,300	96,224	32,446	355,352
2003	87,793	127,350	93,654	37,303	346,100
2004	86,017	150,130	121,131	45,655	402,933
2005	88,876	136,400	97,801	34,670	357,747
2006	82,436	142,600	92,984	29,997	348,017
2007	82,668	148,550	108,241	32,660	372,119
2008	77,770	150,200	92,344	30,057	350,371
2009	89,483	152,400	109,766	36,593	388,242
2010	88,209	154,000	115,000	41,400	398,609
2011	84,900	149,000	112,000	42,500	388,400
2012	84,800	150,000	116,000	40,500	391,300
Average (2008-12)	85,032	151,120	109,022	38,210	383,384

Source: California Department of Food and Agriculture 2014; California Agricultural Statistics 2003-2013

Rice idling actions could affect the GGS that use flooded rice fields for foraging and protective cover habitat during the summer months. GGS require water during their active phase, extending from spring until fall. During the winter months, GGS are dormant and occupy burrows in upland areas. While the preferred habitat of GGS is natural wetland areas with slow moving water, GGS use rice fields and their associated water supply and tail water canals as habitat, particularly where natural wetland habitats are not available. Because of the historic loss of natural wetlands, rice fields and their associated canals and drainage ditches have become important habitat for GGS.

Rice idling would affect available habitat for GGS. The GGS displaced from idled rice fields would need to find other areas to live and may face increased predation risk, competition, and reduced food supplies. This may lead to increased mortality, reduced reproductive success, and reduced condition prior to the start of the overwintering period. Rice idling transfers would be subject to the Environmental Commitments described in Section 2.4, which include numerous measures to protect GGS.

As included in the Environmental Commitments, Reclamation will coordinate with USFWS and GGS experts to identify priority suitable habitat for GGS and discourage idling in those priority areas. Implementation of Environmental Commitments will also protect movement corridors for GGS by maintaining water in irrigation ditches and canals. Some GGS would successfully relocate to find alternate forage, cover, and breeding areas.

Rice idling under the Proposed Action would have a less than significant impact on GGS because the Environmental Commitments would avoid or reduce many of the potential impacts associated with displacement of GGS. Some individual snakes would be exposed to displacement and the associated increased risk of predation, reduced food availability, increased competition, and potentially reduced fecundity. The number of individual snakes affected is expected to be small because Environmental Commitments avoid areas known to be priority

habitat for GGS or where GGS populations are known to occur. The Environmental Commitment to maintain water in canals near idled fields would also protect GGS.

Migratory bird species use seasonally flooded agricultural land for nesting and forage habitat during the summer rearing season. The greater sandhill crane uses rice fields uses rice grain waste (and upland crop fields) for wintering and foraging habitat from October to early spring and it over winters when rice and corn are harvested (fall). Greater sandhill cranes exhibit site fidelity (Zeiner et al. 1990), typically returning to the same location each year to winter. Idling fields or crop shifting within areas that greater sandhill cranes historically return to, may affect their wintering distribution patterns due to reduced forage availability on idled or crop shifted fields. Although the birds would disperse as their main food source diminishes, crop idling and/or crop shifting could affect the timing of dispersal and could negatively affect those individuals that have not had sufficient time to prepare for winter migration (i.e., hyperphagia - dramatic increase in appetite and food consumption) (Smithsonian Institution 2012). Environmental Commitments includes avoiding crop idling near wildlife refuges and established wildlife areas that provide core wintering areas for greater sandhill crane, to reduce impacts to the crane population.

In the winter, tricolored blackbirds inhabit the Sacramento-San Joaquin Delta and central California coast. In the spring, they migrate to breeding locations in Sacramento County and throughout the San Joaquin Valley (Zeiner et al. 1990). Tricolored blackbirds generally breed from March to July, but have been observed breeding in the Sacramento Valley as early as October through December. The birds use breeding habitat adjacent to rice lands and will use shallow open water and rice land resources for foraging on small aquatic insects, emergent plants, and seeds. They also forage on cultivated grains (such as rice), on croplands and flooded fields, and forage for rice waste grain following harvest. In the winter, tricolored blackbirds inhabit the Sacramento-San Joaquin Delta and central California coast. In the spring, they migrate to breeding locations in Sacramento County and throughout the San Joaquin Valley (Zeiner et al. 1990). Tricolored blackbirds generally breed from March to July, but have been observed breeding in the Sacramento Valley as early as October through December. The birds use breeding habitat adjacent to rice lands and will use shallow open water and rice land resources for foraging on small aquatic insects, emergent plants, and seeds. They also forage on cultivated grains (such as rice), on croplands and flooded fields, and forage for rice waste grain following harvest. Studies have shown that rice can constitute up to 38 percent of the annual diet of tricolored blackbirds (Zeiner et al. 1990). Although the rice plants are not tall or sturdy enough to support nests, the seasonally flooded fields provide resources required for breeding colony locations, which consist of open access to water and suitable foraging space with insect prey. Tricolored blackbirds will use emergent vegetation in return ditches and irrigation canals associated with the seasonally flooded fields. The rice agriculture cycle provides insect forage in the flooded fields during the

summer and waste grain forage over winter. Because the species has specific breeding requirements and there are limited suitable breeding habitats, the same areas will often be used from year to year. Where changes in habitat prevent this, colonies are generally found in the vicinity of the previous year's colony (Zeiner et al. 1990). The primary concern for the tricolored blackbird's association with rice fields is the use of the habitat as a source of insects and waste grain forage. Cropland idling/ crop shifting would affect the populations foraging distribution behavior and patterns and would reduce foraging and breeding habitat. Implementing the environmental commitments would help avoid or minimize these potential impacts.

Black terns were formerly a common spring and summer migrant, and despite the presence of suitable habitat in rice farming areas and croplands, black tern numbers have declined throughout its range, especially in the Central Valley (Zeiner et al. 1990). Flooded agricultural fields have, in part, replaced the lost emergent wetland breeding and foraging habitat for this species. The rice production cycle coincides with the bird's seasonal behavior: field flooding would occur during the tern's Central Valley breeding season (May through August) and fields are drained when the birds migrate to other habitat (September and October). During breeding season the terns use flooded rice land and emergent vegetation for foraging (for insects and small vertebrates) and for nesting. This species constructs ground nests on dead vegetation; in rice fields, it will also nest on dikes that separate the patties. Reduction of seasonally flooded agricultural habitat could adversely affect local populations. However, the decisions regarding crop shifting/idling will have already been made prior to the onset of the species breeding season, and they would be able to select appropriate nesting sites for that year. Reclamation would review maps of areas proposed for crop idling/ crop shifting to ensure avoidance of core areas for black tern. This species would also benefit from environmental commitments aimed at the protection of giant garter snake.

For the millions of birds that use rice fields during winter migration, this small reduction in crops planted is not expected to affect the amount of post-harvest flooded agriculture that provides important winter forage for migratory birds, particularly waterfowl and shorebirds. Farmers in the Sacramento Valley only flood-up a fraction of the cropland planted; typically around 60 percent in normal water years (Miller et al 2010, Central Valley Joint Venture 2006) and as little as 15 percent in critically dry years (Buttner 2014). The decision on whether to flood is not based on what was produced for the year but instead is determined by the availability of fall and winter water. Because the Proposed Action does not include transfers of rice decomposition water, it will not reduce the availability of water for post-harvest flooding and therefore is not expected to result in a reduction of winter forage for migrating birds. The location of cropland idling does have the potential to affect the use of historic roost sites, particularly for sandhill cranes, if those areas are not available to flood up because they were not planted. The Proposed Action would have a less than significant impact on migratory birds, including special status species,

associated with seasonally flooded agriculture habitat because the maximum reduction in rice production would be within the historic range of variation, cropland idling/shifting would be minimized in known wintering areas that support high concentrations of wintering waterfowl and shorebirds, and water transfers will not include rice decomposition water and so will not reduce the availability of post-harvest forage. Ditches and drains associated with rice fields provide suitable habitat for the pacific pond turtle. Actions that result in the desiccation of aquatic habitat could result in the turtle migrating to new areas, which in turn puts them at an increased risk of predation. An Environmental Commitment requires drainage canals in areas where pacific pond turtle are known to occur not to be left completely dry. This Environmental Commitment minimizes impacts to pacific pond turtle. Therefore, effects to the pacific pond turtle of cropland idling transfers to would be less than significant.

b, c) Less than Significant Impact

No Action Alternative: Flow and elevation changes within the river and reservoirs due to the past years' dry weather conditions, lack of precipitation, and limited snow pack have resulted in existing adverse conditions for managed and unmanaged wetlands. As a result of decreased flow in rivers, there would be limited or no connection between the riparian areas and wetlands in floodplains associated with these rivers. Reservoir water surface elevations continue to fall and many of the large reservoirs, such as Shasta, Folsom, and Oroville, already have water levels hundreds of feet from their bathtub ring of wetlands and riparian areas. Also, wildlife refuges, which have the same reduction in surface water supplies as the Sacramento River Settlement Contractors, are likely to receive a reduced supply of water due to reduced water available to the CVP and SWP. Cropland idling in response to water shortages would also reduce the amount of tail water that flows to wetlands.

Proposed Action: Under the Proposed Action, Reclamation would deliver most of the transferred water to TCCA Member Units on the same schedule that it would have been delivered to the seller if no transfer occurred. This operation would result in a small change in flow between the TCCA diversion and the point where water would have been diverted without the transfer. The largest change in flow would be about 400 cfs in June (if the Sacramento River Settlement Contractors receive 100 percent of the Contract Total). During dry conditions in 1977, flows in the Sacramento River near Colusa averaged 6,244 cfs in June (USGS 2014). The transfers would not affect flows downstream of the point where water would have been diverted if a transfer did not occur, so flows into the Delta would not be affected. Reclamation may also back up transfer water into storage in Shasta Reservoir to help schedule water deliveries, and in so doing could reduce Sacramento River flows for a short period. Overall flow changes would be small; therefore, the changes in river flows would likely be a fairly small percent of the overall river flows. The Proposed

Action would result in minor effects to any riparian habitat near the rivers. Impacts would be less than significant.

Under the No Action Alternative, dry hydrologic conditions, reduced water supplies, and baseline idling would adversely impact wetlands. Rice idling transfers would reduce irrigation tail water flows to wetlands. Environmental Commitments limiting the amount of rice acres idled in historic tule marsh habitat and maintaining water in ditches would support flows to existing wetlands. The incremental effect to wetlands under the Proposed Action would be less than significant.

As discussed in (a), groundwater substitution transfers could result in streamflow depletion in rivers and creeks, which could directly impact natural communities by changing the timing and volume of flows within rivers. Natural communities potentially affected include valley/foothill riparian, managed and natural seasonal wetlands. In the Sacramento and American rivers, there would be minor changes in flow due to transfers and there would be no associated effects to natural communities.

An initial screening evaluation of modeled flows in several smaller creeks was conducted. If the flow reduction caused by implementing the transfer would be one cfs or less, then no further analysis was required because the effect was considered too small to have a substantial effect on terrestrial species. Based on these criteria, the evaluation concluded that impacts to terrestrial species in the following waterways are less than significant: Deer Creek, Antelope Creek, Paynes Creek, Seven Mile Creek, Elder Creek, Mill Creek (in Tehama County), Thomes Creek, Mill Creek (Thomes Creek tributary), Butte Creek, Auburn Ravine, Honcut Creek, Freshwater Creek, Colusa Basin Drain, Coon Creek, Cortina Creek, Eastside Cross Canal, Funks Creek, Stony Creek, Putah Creek, Cache Creek, Spring Valley Creek, Dry Creek (tributary to Bear River), Walker Creek, North Fork Walker Creek, Big Chico Creek, Little Chico Creek, the South Fork of Willow Creek, and Sycamore Slough.

Stone Corral Creek and Willow Creek could experience up to a 3 cfs average monthly reduction in flow, which could affect natural communities. Glenn-Colusa Irrigation District supplements flows to Stone Corral Creek during the irrigation season and fall months; therefore, flows would be maintained and would not affect natural communities. Flow reductions in Willow Creek would be 3 cfs in January and 2 cfs in February when base streamflows are generally at the highest of the year. A 2 to 3 cfs reduction in flow would not affect the natural communities during the winter months. Effects to natural communities would be less than significant.

d) Less than Significant Impact

No Action Alternative: The lack of available water due to critically dry conditions could affect movement corridors or nursery sites for GGS and other fish and wildlife. Wildlife that is dependent on water as a means of moving from one area to another may be unable to relocate due to the parched landscape. Snakes present in areas of rice idling would have to move across dewatered habitat to find suitable areas with water. Moving across dewatered areas could expose snakes to a number of potential impacts associated with the need to relocate. These include the energetic costs associated with relocation, a reduction in food supplies associated with the decrease in habitat, increased predation, potential for increased competition in new habitats, and potentially reduced reproduction and recruitment for those individuals displaced. Dewatered areas could also affect movement of the pacific pond turtle that occupy drainage ditches and irrigation canals. Dewatering could require the turtle to migrate to new areas, which in turn puts them at an increased risk of predation.

Proposed Action: The GGS individuals and other fish and wildlife would already be affected by the dry conditions, including those areas idling rice as a consequence of the reduced water supply. For species that use irrigated rice fields and drainage ditches for habitat, such as GGS and pacific pond turtle, these species would need to relocate to other suitable habitat and could be exposed to a number of potential impacts associated with the need to relocate, as described above. Any additional rice acreage idled to make water available for transfer may also affect the species' ability to move from one place to another. Areas idled as a consequence of the Proposed Action would be required to implement environmental commitments to maintain some habitat and movement corridors.

Limited data is available on how well displaced snakes can move to and assimilate into new habitats (USFWS 2010). GGS have been documented to move 0.25 to 0.5 miles per day in the course of the normal daily activities. Individuals have been documented to move up to five miles over the course of a few days in response to dewatering of habitat. Environmental Commitments discourage rice idling in areas of suitable habitat where GGS are likely to occur, such as areas where historic tule marsh has been converted to rice lands. If a seller chooses to idle lands within these priority habitat areas, the Environmental Commitments require that adequate water remain in the associated drains and canals. Maintenance water in smaller drains and conveyance infrastructure support key habitat attributes such as emergent vegetation which GGS utilize for escape cover and foraging habitat. Ensuring water remains in these key habitats reduces the potential impact to suitable habitat and the need for GGS individuals to relocate. Environmental Commitments would reduce potential impacts to movement corridors of GGS; therefore, impacts would be less than significant.

e, f) Less Than Significant Impact

No Action Alternative: Several adopted Habitat Conservation Plans (HCP) and Natural Community Conservation Plans (NCCP) exist within the project area, including the Natomas Basin HCP, South Sacramento HCP, and the Yuba-Sutter NCCP/HCP. These plans cover some of the potentially affected species and may have additional requirements for species conservation within their plan areas.

Increased groundwater pumping or cropland idling under the No Action Alternative would not conflict with the HCPs. However, wildlife preserves are likely to receive a reduced supply of water due to reduced water available to the CVP and SWP. Increases in groundwater pumping could also affect the water supplies needed to fulfill the water needs of the conservation banks and preserves established by some of these HCPs. For example, the Natomas Basin Habitat Conservation Plan, as implemented by the Natomas Basin Conservancy, relies on surface water supplies from Natomas Central Mutual Water Company and groundwater in water short years. Cropland idling in response to water shortages would also reduce the amount of tail water that flows to wetlands which are part of these HCPs.

Proposed Action: Water transfers under the Proposed Action would have a less than significant impact on the natural communities that are covered in these plans because of the temporary nature of the transfers and the minimal changes in flows and reservoir levels associated with water transfers, as described above for Impacts b and c. The Environmental Commitments under the Proposed Action would minimize impacts to special status species that are covered in the plans. The Environmental Commitments and GW-1 also require sellers to address third-party impacts from groundwater substitution specifically in areas where groundwater subbasins include conservation banks or preserves for GGS. The Proposed Action would not conflict with HCP and NCCP provisions.

V. CULTURAL RESOURCES
– Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in State CEQA §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA §15064.5?	☐	☐	☐	☒
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒

a-d) No Action. The water elevations of Shasta Reservoir are very low due to dry hydrologic conditions. Under the No Action, these conditions may lead to the exposure of cultural resources that have been inundated for many years. In some cases, these water surface elevations may be historically low and the receeding water may reveal cultural resources that have been inundated since 1977.

Proposed Action. The decline of water surface elevations in the reservoirs utilized for water transfers would be the result of the operation of those reservoirs to fulfill downstream regulatory requirements. Reclamation and DWR will release water from the CVP and SWP reservoirs to meet the operational requirements of the Biological Opinions on the Continued Long-term Operations of the CVP/SWP and D1641. Diversions for water transfer purposes would not result in release of any additional water from Shasta Reservoir. Operation of the reservoir would remain unchanged when compared to the No Action Alternative. There would be no ground disturbing activities, land alteration, or construction proposed that could disturb historical, archeological, or paleontologic resources associated with the No Action Alternative or the Proposed Action. Thus, there would be no disturbance impacts to existing or potential burial sites, cemeteries, or human remains interred outside of formal cemeteries.

A Reclamation archaeologist was consulted to ensure the Proposed Action would have no adverse impact on any historic properties. It was determined that this type of activity does not have the potential to cause effects on historic

properties, if present, and Reclamation has no further obligation under National Historic Preservation Act Section 106, pursuant to 36 CFR Part 800.3(a)(1).

VI. GEOLOGY AND SOILS
-- Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Exposure of people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒

VI. GEOLOGY AND SOILS
-- Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

a) No Impact. There are no new facilities or construction proposed for the No Action Alternative or Proposed Action, and no existing facilities fall within an Alquist-Priolo Earthquake Fault Zone, as shown in the Interim Revision of Special Publication 42 of the Division of Mines and Geology, Fault Rupture Zones in California (California Department of Conservation 2007). Therefore, the No Action Alternative and Proposed Action would not expose people or structures to impacts related to fault rupture, ground shaking, ground failure, liquefaction, or landslides.

b) Less than Significant

No Action Alternative: In 2015, surface water shortages may lead to increased cropland idling in both the seller and buyer districts. The soils in both buyer and seller areas consist of fine particles of clay, loam, some sand, and silty clays (U.S. Department of Agriculture [USDA] 2013a). These soils are susceptible to wind erosion but have a relatively low wind erodibility index. The Natural Resource Conservation Service estimated in the 2010 Natural Resources Inventory that approximately 0.68 tons per acre of topsoil are eroded annually by wind from cultivated land, and 0.36 tons per acre of topsoil are eroded annually from non-cultivated land (USDA 2013b).

Agricultural practices determine the amount of wind erosion to a greater extent than climate in the Sacramento Valley. Farming operations such as plowing, leveling, planting, weeding, mowing, cutting, and baling all increase wind erosion by stirring up or exposing top soil. Fallow fields experience a net reduction in wind erosion by avoiding these practices. Fine soils such as sand and silts erode at a higher rate than the clays and silty clays found in the project area. Therefore, the soils in the project area have a relatively low risk of wind erosion when left in a dry and unplanted condition.

Proposed Action: Similar to the No Action Alternative, increased cropland idling in the Sacramento Valley to make water available for transfer is not likely to substantially increase wind erosion of sediments. Buyers are likely to use transferred water on permanent crops (such as orchards and vineyards). The

soils underlying these fields have a low risk of wind erosion; therefore, continued cultivation is not likely to substantially increase erosion.

c) Less than Significant

No Action Alternative and Proposed Action: The project area is underlain by clay and is located in flat terrain. No new construction or ground disturbing actions are proposed for either the No Action Alternative or the Proposed Action that could result in on- or off-site landslide, lateral spreading, liquefaction, or collapse. Groundwater substitution transfers could reduce groundwater levels, which could decrease pore-water pressure and result in a loss of structural support for clay and silt beds. This impact is analyzed in more detail in the groundwater section of Hydrology and Water Quality. The analysis finds that the potential for land subsidence from increased groundwater pumping (under the No Action Alternative and the Proposed Action) would be small.

d, e) No Impact. There are no expansive soils known to exist in the project area. There are no septic tanks or alternative waste water disposal systems proposed or required for the No Action Alternative or Proposed Action. The Proposed Action does not include new construction, and thus no new waste water generation. Therefore, there would be no impact resulting from the implementation of the Proposed Action.

VII. GREENHOUSE GAS EMISSIONS - Would the project:

	Potentially Significant Impact	**Less Than Significant with Mitigation Incorporation**	**Less Than Significant Impact**	**No Impact**
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

a, b) Less than Significant

No Action Alternative: Dry conditions in 2015 may cause additional groundwater pumping and cropland idling in response to surface water shortages. These actions will generally follow the pattern of what has happened during previous dry periods under existing conditions.

Proposed Action: This analysis estimates emissions using available emissions data and information on fuel type, engine size (hp), and annual transfer amounts included in the proposed alternatives. Existing emissions data used in the analysis includes:

- Diesel and natural gas fuel emission factors from The Climate Registry (TCR 2014a)
- Electric utility CO_2 emission factors from TCR (2014b)
- Emissions & Generation Resource Integrated Database (eGRID) CH_4 and N_2O emission factors from USEPA (USEPA 2014b)
- "Comparison of Summertime Emission Credits from Land Fallowing Versus Groundwater Pumping" (Byron Buck & Associates 2009)

In 2009, Byron Buck & Associates completed a comparison of the relative reduction in emissions due to cropland idling activities versus groundwater substitution. Byron Buck & Associates estimated the gallons of fuel consumed by farm equipment that would be reduced per acre idled and the average quantity of fuel consumed by groundwater pumping. It was assumed that an agency would need 4.25 AF of water produced by idling to offset the equivalent emissions of one AF of groundwater pumped (Byron Buck & Associates 2009). Using this ratio, the expected reductions in vehicular exhaust emissions from cropland idling were estimated.

Each GHG contributes to climate change differently, as expressed by its global warming potential (GWP). GHG emissions are discussed in terms of CO_2 equivalent (CO_2e) emissions, which express, for a given mixture of GHG, the amount of CO_2 that would have the same GWP over a specific timescale. CO_2e is determined by multiplying the mass of each GHG by its GWP. This analysis uses the GWP from the Intergovernmental Panel and Climate Change Fourth Assessment Report (Forster et al. 2007) for a 100-year time period to estimate CO_2e. This approach is consistent with the federal GHG Reporting Rule (40 CFR 98), as effective on January 1, 2014 (78 Federal Register 71904) and California's 2000-2012 GHG Inventory Report (CARB 2014). The GWPs used in this analysis are 25 for CH_4 and 298 for N_2O.

CARB uses a threshold of 25,000 metric tons CO_2e per year as a threshold for including facilities in its cap-and-trade regulation (17 CCR 95800-96023). Because the goal of the regulation is to reduce GHG emissions statewide, this threshold was deemed appropriate to assess significance.

Groundwater substitution could increase GHG emissions in the seller area, while cropland idling transfers could reduce vehicle exhaust emissions. Cropland idling transfers could offset some of the emissions from groundwater substitution transfers, but the quantity of water transferred under each

mechanism could be much less than what is included in Table 2-3. Therefore, impacts were evaluated for the full quantity of groundwater substitution, without regard for any potential offsets from idled land. Table 3-7 summarizes the GHG emissions associated with the Proposed Action. Detailed calculations are provided in Appendix H, Climate Change Analysis Emission Calculations.

Table 3-7. Summary of Project GHG Emissions ($MTCO_2e$ per year)

Water Agency	CO_2	CH_4	N_2O	Total
Anderson-Cottonwood Irrigation District	151	<1	1	152
Burroughs Farms	82	<1	<1	82
Canal Farms	35	<1	<1	35
Conaway Preservation Group	428	1	1	430
Eastside Mutual Water Company	316	<1	1	317
Glenn-Colusa Irrigation District	6,379	6	15	6,401
Maxwell Irrigation District	97	<1	<1	97
Natomas Central Mutual Water Company	1,496	2	5	1,503
Pelger Mutual Water Company	222	<1	1	223
Pelger Road 1700 LLC	107	<1	<1	107
Pleasant Grove-Verona Mutual Water Company	1,336	2	4	1,341
Princeton-Codora-Glenn Irrigation District	1,228	1	3	1,233
Provident Irrigation District	794	1	2	797
Reclamation District 108	642	1	3	646
Reclamation District 1004	1,003	1	3	1,007
River Garden Farms	361	1	1	363
Sutter Mutual Water Company	n/a	n/a	n/a	n/a
Sycamore Mutual Water Company	261	<1	1	263
T&P Farms	33	<1	<1	33
Te Velde Revocable Family Trust	202	<1	1	203
Total	**15,172**	**17**	**42**	**15,232**

Note: Totals may not add up because of rounding.

Key:

CH_4 = methane; CO_2 = carbon dioxide; $MTCO_2e$ = metric tons carbon dioxide equivalent; N_2O = nitrous oxide; n/a = not applicable (no groundwater substitution)

Emissions from groundwater substitution would be 15,232 metric tons CO_2e per year (detailed calculations are provided in Appendix H). As a result, the Proposed Action would not conflict with any plan, policy, or regulation adopted for the purpose of reducing GHG emissions and impacts would be less than significant.

VIII. HAZARDS AND HAZARDOUS MATERIALS

-- Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) Located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) Within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

a-h) No Impact. The No Action Alternative and Proposed Action would not involve the transport or use of hazardous materials, nor change in any way public exposure to hazards or hazardous materials. The No Action Alternative and Proposed Action would not occur on a hazardous materials site that would create a risk to the public or environment. The No Action Alternative and Proposed Action would not affect a public airport or private air strip. There are no new structures or buildings included in the Proposed Action; therefore, no people or structures would be exposed to wildland fires as a result of implementation.

IX. HYDROLOGY AND WATER QUALITY
– Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

a) Less than Significant

No Action Alternative: The No Action Alternative would not violate any waste discharge requirements as no changes to waste discharges to surface waters would occur. CVP and SWP operations in the Delta will be managed adaptively to meet water quality standards that are put in place throughout the water year. Reclamation and DWR developed a Drought Contingency Plan for the CVP and SWP that includes a temporary urgency change petition to the SWRCB to address continued dry conditions (Reclamation and DWR 2015). The temporary urgency change petition includes requests to change the minimum Net Delta Outflow Index, the minimum flows on the San Joaquin River at Airport Way Bridge, and the Delta Cross Channel gate closure requirements. Reclamation and DWR will continue to coordinate closely with the SWRCB to balance the need to provide water supplies south of the Delta, and protect water quality in the Delta.

Proposed Action: Under the Proposed Action, Reclamation would deliver most of the transferred water to TCCA Member Units on the same schedule that it would have delivered to the seller if no transfer occurred. This operation would result in a small change in flow between the TCCA diversion and the point where water would have been diverted without the transfer. The largest change in flow could be approximately 400 cfs in June (if the Sacramento River Settlement Contractors receive 100 percent of the Contract Total). For comparison, flow in the Sacramento River near Colusa averaged 6,244 cfs in

June (USGS 2014) during the dry conditions in 1977. The transfers would not affect flows downstream of the point where water would have been diverted if a transfer did not occur, therefore flows into the Delta would not be affected. Reclamation may also back up transfer water into storage in Shasta Reservoir to help schedule water deliveries, which could reduce Sacramento River flows for a short period. Keeping water in storage in Shasta Reservoir could help conserve the cold water pool in a year where reservoir levels are low; however, the very small change in flow from the transfers would be a minor benefit. Changes in flows would not violate any existing water quality standards or worsen any water quality and flow standard violation.

b) Less than Significant

No Action Alternative: It is too early in 2015 to know the quantity of available surface water supply. It is likely that dry conditions may limit the quantity of water delivered to CVP and SWP water service contractors. The dry conditions may also result in reduced water supplies to Sacramento River Settlement Contractors. In the Sacramento Valley, supply reductions have historically resulted in increased groundwater pumping and decreased groundwater levels. However, groundwater levels have typically rebounded quickly after the dry periods (see Appendix C for historical groundwater monitoring data). The groundwater basin is likely to exhibit declining groundwater level trends similar to those that occurred during historic droughts (such as 1976-1977 and 1987-1992) caused by increased pumping to address reduced surface water supplies.

Proposed Action: Groundwater pumped in lieu of diverting surface water could affect groundwater hydrology. The potential effects could be short term declines in local groundwater levels, interaction with surface water, and land subsidence. Potential effects to water quality are discussed in Section (f) below.

Increased groundwater substitution pumping could result in temporary declines of groundwater levels. Groundwater substitution pumping could occur from April through October and the pumped groundwater would be used for crop irrigation within the seller's district. Declining groundwater levels resulting from increased groundwater substitution pumping could cause: (1) increased groundwater pumping costs due to increased pumping depth; (2) decreased yield from groundwater wells due to reduction in the saturated thickness of the aquifer; (3) decrease of the groundwater table to a level below the vegetative root zone, which could result in environmental effects; and 4) third-party impacts to neighboring wells.

Some of the transferred surface water would be delivered to users within the same groundwater basin, and could offset groundwater pumping in the Proposed Action Alternative to address shortages. The amount of offset is uncertain, so to be conservative, the analysis considers impacts to groundwater without this offset.

Groundwater Levels

Redding Groundwater Basin. Municipal, industrial, and agricultural water demands in the Redding Groundwater Basin area are approximately 8 million AF per year (DWR 2003). Groundwater is a major source of water supply within the Redding Groundwater Basin watershed. The exact quantity of groundwater that is pumped from the Redding Groundwater Basin is unknown; however, it is estimated that approximately 50,000 AF of water is pumped annually from domestic, municipal, industrial, and agricultural production wells (CH2M Hill 2003 as cited in Anderson-Cottonwood ID 2011). This magnitude of pumping represents approximately six percent of the average annual runoff (850,000 AF) in the basin. Agricultural, industrial, and municipal groundwater users in the Redding Groundwater Basin pump primarily from deeper continental deposits; whereas, domestic groundwater users in the basin generally pump from shallower deposits (Anderson-Cottonwood ID 2011).

Some of the surface water made available for transfer through groundwater substitution transfers would originate from the Redding Groundwater Basin in Shasta County through Anderson-Cottonwood ID. The proposed Anderson-Cottonwood ID transfer would withdraw up to 4,800 AF per year of groundwater from production wells (see Table 3-8 for details on number of wells and pumping capacity). Unlike other groundwater substitution transfers, Anderson-Cottonwood ID's proposed transfer was not simulated in the Sacramento Valley Groundwater Model (SACFEM2013) because the model area does not include the Redding Groundwater Basin. However, Anderson-Cottonwood ID has tested operation of the wells proposed for groundwater substitution under the Proposed Action in the past at similar production rates and has observed no substantial impacts on groundwater levels or groundwater supplies (Anderson-Cottonwood ID 2013). Additionally, Anderson-Cottonwood ID used the same wells for groundwater substitution transfers between July 1, 2013 and September 30, 2013. Groundwater monitoring conducted in the vicinity of the production wells indicates groundwater levels recover to pre-transfer levels by January 2014 (Anderson-Cottonwood ID 2014). Based on the results of the aquifer tests and monitoring data collected as part of 2013 transfers, groundwater substitution transfers are unlikely to have significant effects on groundwater levels. Because of the uncertainty of how groundwater levels could change, especially during a very dry year, Anderson-Cottonwood ID will implement the Monitoring Program and Mitigation Plan discussed below under Mitigation Measure GW-1.

Sacramento Valley Groundwater Basin. Sacramento Valley and other parts of California are currently noticing declining groundwater level trends due to persistent dry weather conditions. However, past groundwater trends are indicative of groundwater levels declining moderately during extended droughts and recovering to pre-drought levels after subsequent wet periods (see Appendix I). DWR and other monitoring entities, as defined by Assembly Bill 1152, extensively monitor groundwater levels in the basin.

Groundwater drawdown impacts associated with the groundwater substitution pumping that would occur under the Proposed Action were evaluated using the SACFEM2013 groundwater model. The effects of concurrent groundwater substitution pumping from 161 wells that are part of the Proposed Action have been modeled to estimate effects to groundwater resources. The locations and depths of these wells are specified in the model based on data collected from the potential groundwater substitution sellers.

Figures 3-5, 3-6, 3-7, and 3-8 show the simulated drawdown due to the Proposed Action under September 1977 hydrologic conditions. During dry years, surface water resources are limited and users have historically increased groundwater pumping to address shortages. Water transfers for 2015 were simulated in SACFEM2013 using September 1977 hydrologic conditions because this year represents the driest condition available during the SACFEM2013 simulation period. SACFEM2013 currently simulates conditions from Water Year (WY) 1970 to WY 2003. Simulating transfers during this period illustrates the potential to compound impacts from dry-year pumping as compared to the No Action Alternative. WY 2015 may be different than 1977, but data from 1977 represents the best information currently available for use in the model.

- Figure 3-5 shows the simulated drawdown at the water table based on results from the top layer of the SACFEM2013 model. This layer has a depth of up to 35 feet below ground surface (bgs).

- Figure 3-6 shows simulated drawdown at approximately 200 to 300 feet bgs.

- Figure 3-7 presents the simulated drawdown at approximately 300 to 400 feet bgs.

- Figure 3-8 presents the simulated drawdown at approximately 700 to 900 feet bgs.

Drawdown at the water table (Figure 3-5) represents the estimated decline in the groundwater surface within the shallow, unconfined portion of the aquifer (i.e., the height of water within a shallow groundwater well). The drawdown in the deeper portions of the aquifer (Figures 3-6 through 3-8) represents a change in hydraulic head (i.e., water pressure) in a well that is screened in this deeper portion of the aquifer.

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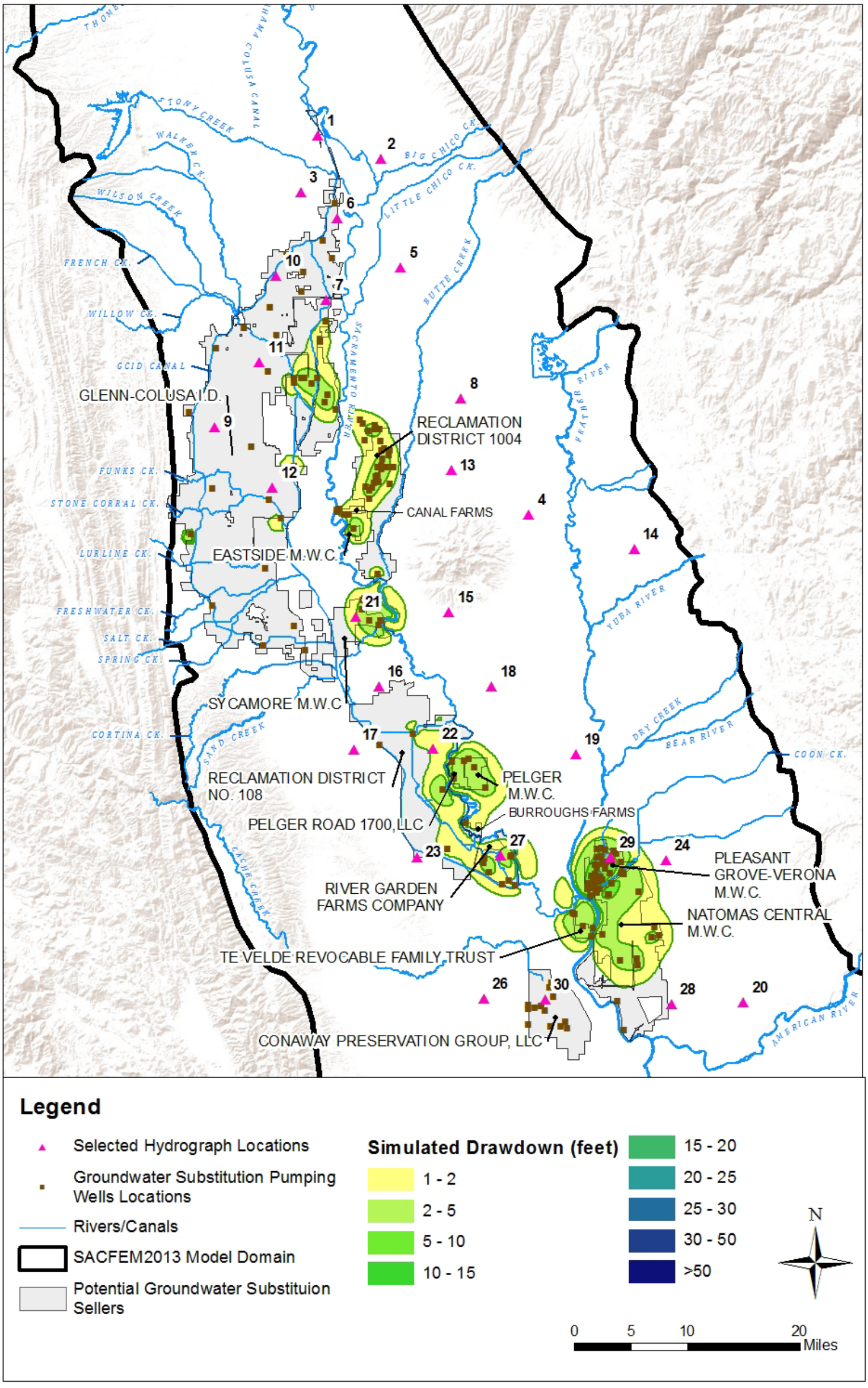

Figure 3-5. Simulated Change in Water Table Elevation (0 to approximately 35 feet bgs), Based on September 1977 Hydrologic Conditions

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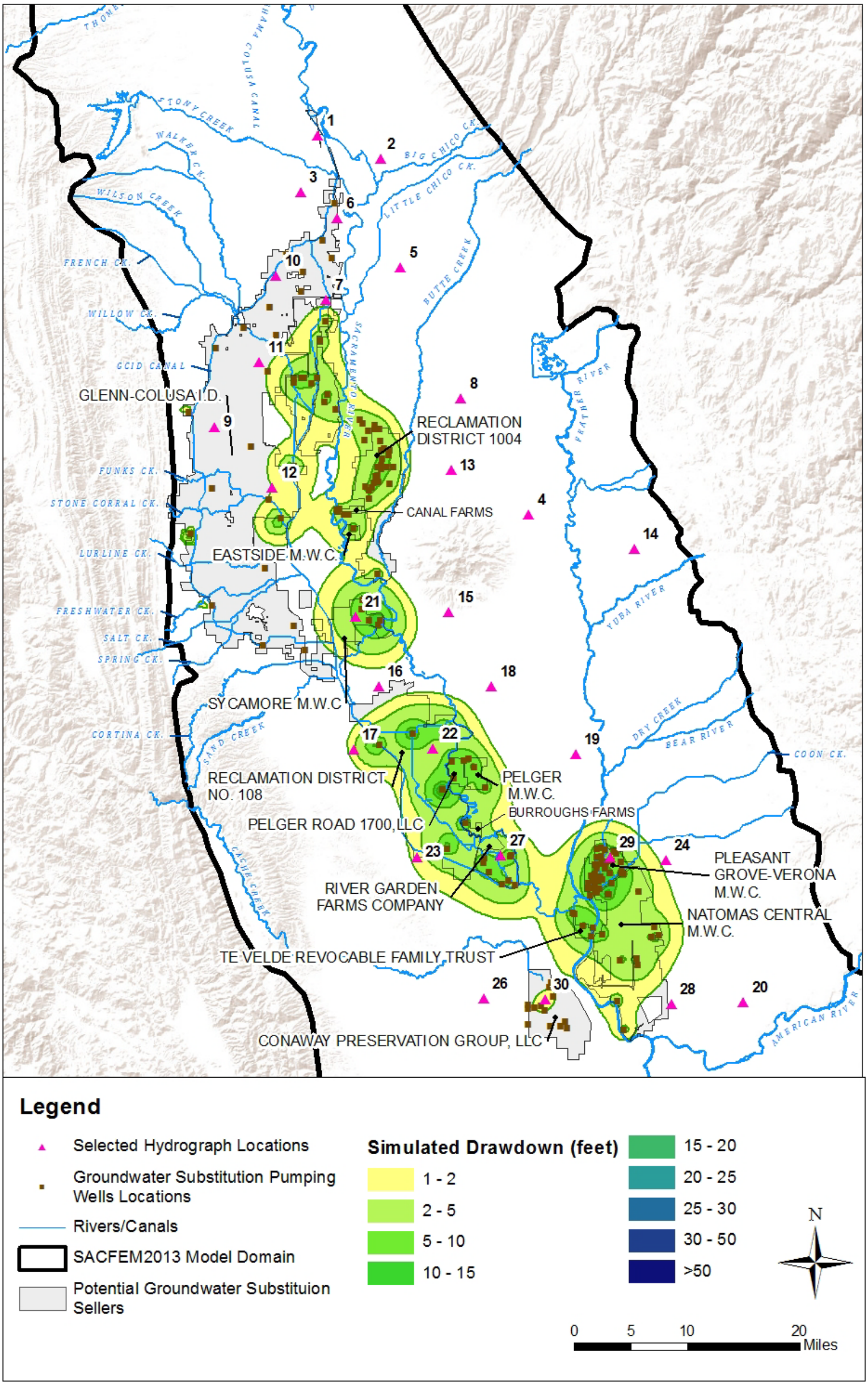

Figure 3-6. Simulated Change in Groundwater Head (approximately 200 to 300 feet bgs), Based on September 1977 Hydrologic Conditions

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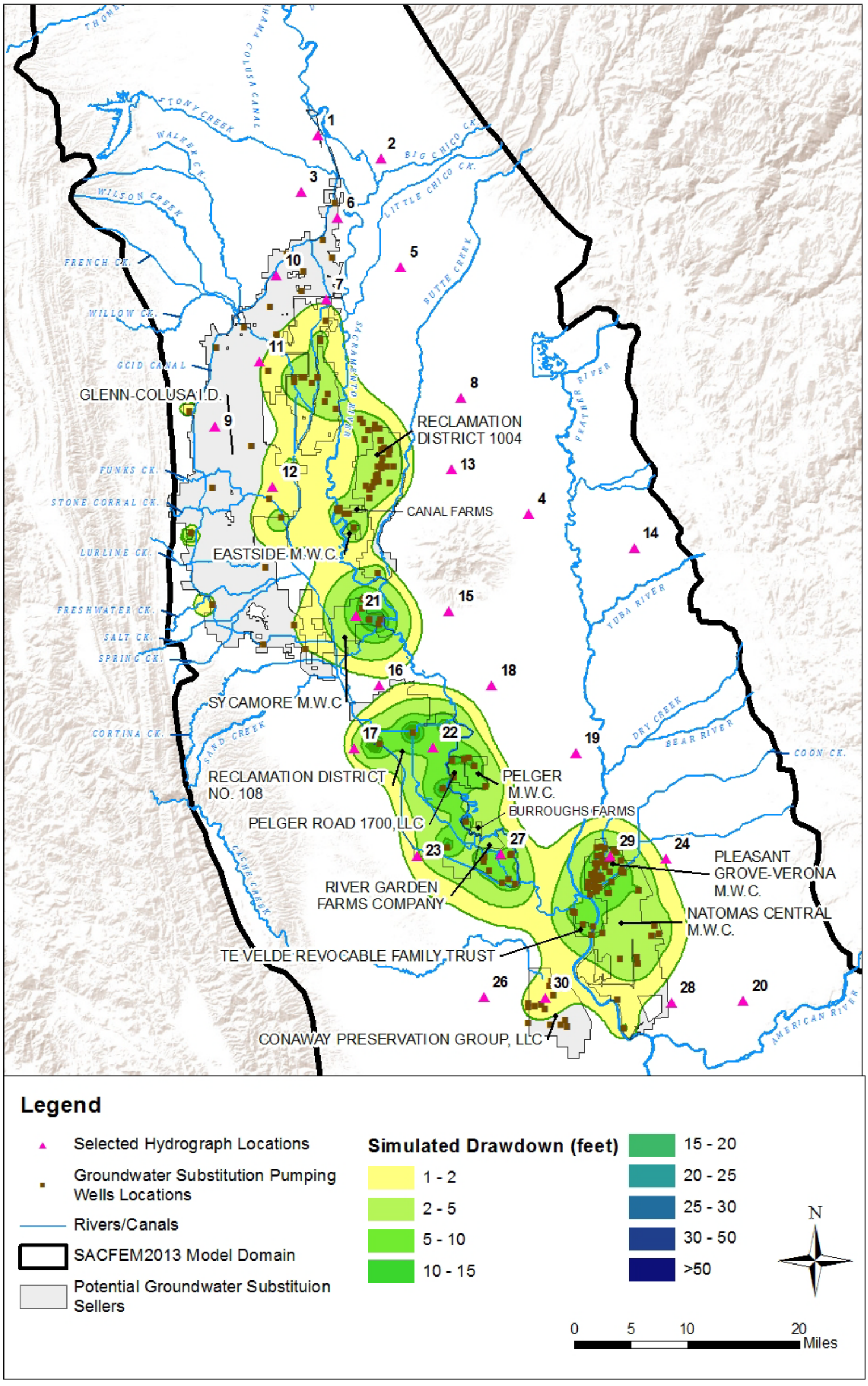

Figure 3-7. Simulated Change in Groundwater Head (approximately 300 to 400 feet bgs), Based on September 1977 Hydrologic Conditions

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