Initial Study/ Environmental Assessment

2023 Tehama-Colusa Canal Authority In-Basin Water Transfers California

CGB-EA-2023-005

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

Tehama-Colusa Canal Authority
Willows, California

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Section 1 Introduction

This Initial Study (IS) and Environmental Assessment (EA) for water transfers in contract year 2023[1] was prepared by the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) and the Tehama-Colusa Canal Authority (TCCA). This joint IS/EA document satisfies (1) 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); and (2) the requirements of the National Environmental Policy Act (NEPA) (42 United States Code [USC] §4231 et seq.), the Council of Environmental Quality (CEQ) implementing regulations (40 Code of Federal Regulations [CFR] §1500-1508), and the Department of the Interior's NEPA regulations (43 CFR Part 46). Reclamation is the federal lead agency responsible for NEPA review, through the EA, for the potential 2023 TCCA water transfers, and the TCCA is the state lead agency responsible for CEQA review, through the IS, for the potential 2023 TCCA water transfers.

This IS/EA describes the potential direct, indirect, and cumulative effects[2] 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 (U.S.) (for Base Supply[3] and Central Valley Project (CVP) Water[4] ["Project Water"]). This IS/EA also identifies mitigation measures that have been incorporated to minimize or avoid project-related impacts. The water transfers included in this document are only those involving Base Supply or CVP facilities. These water transfers would require approval from Reclamation, which necessitates compliance with NEPA. These water transfers would also require CEQA compliance for the buyers and sellers.

Other water 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 completed an Environmental Impact Statement / Environmental Impact Report (EIS/EIR) on Long-Term Water Transfers from 2015 to 2024 (Reclamation and SLDMWA 2015). The document has been updated in the Revised Draft Environmental Impact Report / Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) for transfers from 2019 to 2024 (Reclamation and SLDMWA 2019). Reclamation signed the Record of Decision (ROD) in April 2020. This ROD was amended in May 2021 to clarify the Endangered Species Act (ESA) Interagency Cooperation

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[1] Water Service contract year is March 1, 2023, through February 29, 2024. Sacramento River Settlement contract year is April 1, 2023, through October 31, 2023.

[2] CEQA Guidelines Section 15063(d)(3) and Appendix G requires discussion of "cumulatively considerable impacts."

[3] Article 1 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.

[4] Article 1 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.

responsibilities as they pertain to transfers involving cropland idling and crop shifting (Reclamation 2021). The RDEIR/SDEIS includes some of the same water sources as this IS/EA, but the water would be transferred to different potential buyers and also limited to less than 250,000 acre-feet (AF) in any one year; that is, the sellers have only the amounts of water listed in Chapter 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 Chapter 2. Also, State Water Project (SWP) contractors may engage in water transfers to augment supply. The upper limits for sellers presented under the Proposed Action is consistent with the limits in Long-Term Water Transfers Biological Opinion (United States Fish and Wildlife Service [USFWS] 2019).

1.1 Background

The Member Units of the TCCA may experience water shortages in 2023 and are soliciting willing sellers to transfer surface water to them. 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 volumes of water to be made available for transfer 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 IS/EA to inform decision-makers and the public of the potential environmental effects of the potential 2023 TCCA water transfers and determine whether the transfers may result in significant environmental impacts that warrant the preparation of an EIR under CEQA.

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 or CVP facilities are involved. 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 or involving CVP facilities; these transfers constitute the "Proposed Action" to be addressed under NEPA. Reclamation is using this IS/EA to evaluate the potential environmental effects of the Proposed Action.

Transfers of water would occur from sellers in the Sacramento River area to buyers that divert Project Water[5] from the Tehama-Colusa or Corning Canals (Canals). The Project Water is diverted from the Sacramento River at the Red Bluff Pumping Plant. Construction of the Red Bluff Pumping Plant was completed in 2012 and includes a fish screen and pumping capacity of up to 2,000 cubic feet per second (cfs) into the Canals (with potential future capacity of 2,500 cfs) (TCCA 2012). Water released from Shasta Reservoir to the sellers would be diverted by TCCA at the Red Bluff Pumping Plant under the Proposed Action. These diversions would typically occur at the same times as it would have been released to the sellers under the No Action Alternative. Depending on the requested delivery schedule and fishery conditions in the Sacramento River, Reclamation may reoperate CVP facilities to change the pattern of water releases from storage. Reclamation would

[5] Article 1(u) of the Water Service/Repayment 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.

only consider these operational changes if they would not adversely affect downstream conditions for fish or the ability to meet flow and water quality standards. Reclamation would review and approve, as appropriate, potential water transfers in accordance with a Seller's Sacramento River Settlement Contract (Settlement Contract), the *DRAFT Technical Information for Preparing Water Transfer Proposals (Water Transfer White Paper)* (Reclamation and California Department of Water Resources [DWR 2019]), and state and federal law.

1.2 Need for the Proposal and Project Objectives

Hydrologic conditions and precipitation are unpredictable. As of January 23, 2023, the seasonal average rainfall to date has been 149 percent of the historical seasonal average (DWR 2023). However, extreme dry conditions in Water Years 2021 and 2022 resulted in statewide drawdown of reservoir storage to 60 percent of average by the end of the water year (DWR 2021). The current drought from 2020 to 2022 is now the driest 3-year period on record (DWR 2022). Because of the reduced reservoir storage levels statewide, TCCA Member Units are concerned that they may not have adequate supplies to maintain their permanent crops in 2023.

The Member Units of the TCCA anticipate that they may need up to 87,281 AF[6] of water to irrigate permanent crops to prevent potential long-term impacts of allowing these crops to die. Reclamation would need to review and approve, if appropriate, the transfer of Base Supply that may require the use of CVP facilities, consistent with the Settlement Contract, the *Water Transfer White Paper* (Reclamation and DWR 2019), and state and federal law.

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 IS checklist adapted from the CEQA Guidelines, Appendix G. While CEQA requires a determination of significance for each impact discussed in an IS based on the significance criteria, NEPA does not require this for an EA. For NEPA, preparation of an EIS is triggered if a federal action has the potential to "significantly affect the quality of the human environment," which is based on the significance of the whole of the action. The significance thresholds used in this IS/EA are used to assess the significance of the action per CEQA Guidelines, while the accompanying analysis considers the effects the action as required by NEPA. The CEQA Checklist does not incorporate all discussions required by Department of the Interior Regulations, Executive Orders, and Reclamation guidelines when preparing environmental documentation; Chapter 4 includes these additional discussions. A list of acronyms, references and document preparers can be found in Appendix A.

[6] The total transfers combined for the Member Units of the TCCA evalauted in this IS/EA and SLDMWA member agencies evalauted in the Long-Term Water Transfers EIS/EIR, would be limited to less than 250,000 acre-feet in any one year.

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Section 2 Alternatives

2.1 No Action

For the No Action Alternative, the TCCA, on behalf of the Member Units, during contract year 2023, would not buy water from willing sellers who require Reclamation approval in order to transfer water to the Member Units. Agricultural water users could experience shortages in contract year 2023. If supplies are constrained, users may take alternative water supply actions in response to shortages, including increased groundwater pumping, cropland idling, reduction of landscape irrigation or permanent crop irrigation, or water rationing. Water users may also seek to transfer water from other sellers not listed in this document, 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.

Normally, there may be subtle differences in the No Action Alternative and existing conditions, and the baseline from a NEPA and CEQA perspective would be slightly different. In those circumstances, there would be a discussion of the No Action Alternative for NEPA purposes, and the Proposed Action and Proposed Project (referred to herein as the Proposed Action) would be compared to the No Action Alternative to determine effects of the action. 43 CFR Part 46.310(b) reinforces that responsible officials only need to consider the Proposed Action when there are no unresolved conflicts associated with use of the resource, and there is no need to look at the No Action Alternative. For this IS/EA, the No Action Alternative would not differ from existing conditions as described in this document, and no further discussion of effects of the No Action Alternative are necessary as the effects are discussed in terms of changes to the existing condition.

2.2 Proposed Action / Proposed Project

The Proposed Action is Reclamation's written consent, pursuant to Article 3(e) of the applicable Sacramento River Settlement (Settlement) Contract, to the sale and transfer of Base Supply in contract year 2023 from willing sellers to Member Units of the TCCA. Reclamation has approval authority over transfers of Base Supply or transfers of water that involve the use of CVP facilities.

The Proposed Action includes potential transfers of up to 87,281 AF of Base Supply from 25 Settlement Contractors, listed in Table 2-1 and shown in Figure 2-1, to Member Units of the TCCA. The quantities in Table 2-1 summarize the maximum potential transfer quantities. These water transfers also include transfers of water between "common landowners" that own land in multiple water districts that may want to move water from one district to another to preserve permanent crops. Table 2-1 shows potential upper limits for transfers of water if Settlement Contractors receive 100 percent of the Contract Total,[7] or if the Contract Total is reduced by 25

[7] 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.

percent. This list represents those agencies with whom the TCCA may negotiate agreements for the transfer of water. For analytical purposes, the full 87,281 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 Member Units of the TCCA, or how much water would ultimately be transferred to Member Units of the TCCA. For this reason, modeling and environmental analysis considers the upper transfer quantities provided in Table 2-1 for 100 percent of the Contract Total in order to display the impacts that would be associated with the transfer of water from each seller. The potential water made available for transfer adds up to more than the Member Units of the TCCA's transfer demand of 87,281 AF, so the analysis provides a conservative description of potential environmental impacts by assessing impacts of all potential water transfers. Member Units of the TCCA, however, would only acquire a subset of the water made available for transfer. As discussed in Chapter 1, the Long-Term Water Transfers EIS/EIR includes some of the same water sources as other transfer-related environmental documents, but the sellers would not sell the same quantities to multiple recipients (just one buyer). Additionally, the upper limit for rice idling would be limited to 60,693 acres based on the limits in the Long-Term Water Transfers Biological Assessment Proposed Action (Reclamation 2018).

Reclamation would evaluate each proposal individually, as it is received, to determine if it meets the terms of the Settlement Contract, the *DRAFT Technical Information for Preparing Water Transfer Proposals* (Reclamation and DWR 2019), and state and federal law. Reclamation has followed this process in past years when consenting to the transfer of water (such as when approving the transfer of water in 2013, 2014, 2015, 2020, and 2021). Reclamation may reoperate CVP facilities to change the pattern of water releases from storage to deliver water made available for transfer to Member Units of the TCCA.

2.2.1 Sellers

Table 2-1 lists agencies that have expressed interest in making water available for transfer in 2023, the maximum amount of water to be transferred if the Settlement Contractors receive 100 percent of the Contract Total or if the Contract Total is reduced by 25 percent, and the method by which the sellers could make water available for transfer. Many agencies are uncertain about which method of making water available for transfer would be used, and have therefore included potential upper limits in Table 2-1 for both methods which are evaluated in this IS/EA. While the entity making water available could use one or both methods for making water available, or may request approval to shift the volume of water made available during a particular period to a different period for transfer, the overall amount of water transferred would not exceed the maximum volumes listed in Table 2-1. As discussed above, these transfer volumes are assessed in this IS/EA to allow the transfer of water to move forward if Reclamation does not declare contract year 2023 a Critical Year. This analysis is conservative because it uses 100 percent of the Contract Total transfer volumes which would have greater potential for environmental impact than the lessor transfer volumes under a Critical Year. Because the hydrology for the remainder of the water year is uncertain, Table 21 also shows the maximum transfer volumes for each method of making water available if the Contract Total is reduced by 25 percent in a Critical Year.

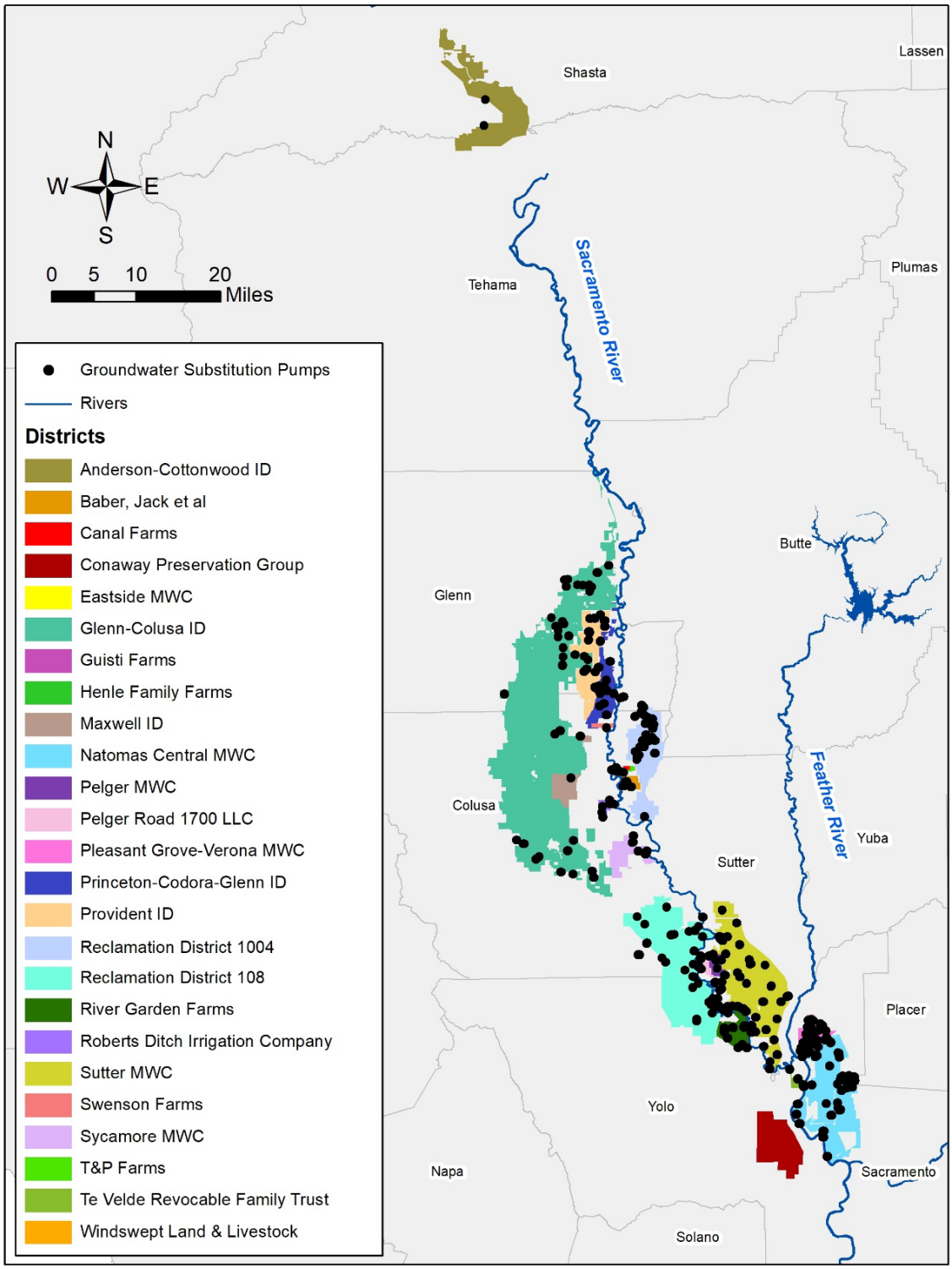

Figure 2-1. Potential Selling Entities

Table 2-1. Potential Methods of Making Water Available for Transfer by Seller (Upper Volume Limits)

	100 Percent of Contract Total (AF)			75 Percent of Contract Total (AF)		
Water Agency	Groundwater Substitution	Cropland Idling/ Crop Shifting	Maximum Transfer Volume[1]	Groundwater Substitution	Cropland Idling/ Crop Shifting	Maximum Transfer Volume[1]
Anderson-Cottonwood ID	4,800	0	4,800	4,800	0	4,800
Baber, Jack, et al.	0	2,310	2,310	0	2,310	2,310
Canal Farms	1,000	635	1,000	1,000	635	1,000
Conaway Preservation Group	0	21,350	21,350	0	16,014	16,014
Eastside MWC	2,230	1,800	2,230	2,000	1,481	2,000
Giusti Farms	1,000	0	1,000	1,000	0	1,000
Glenn-Colusa ID	11,495	60,000	44,300	11,495	60,000	44,300
Henle Family Ltd. Partnership	700	0	700	700	0	700
Maxwell ID	3,000	5,000	8,000	3,000	5,000	8,000
Natomas Central MWC	20,000	0	20,000	20,000	0	20,000
Pelger MWC	4,670	2,538	4,670	4,000	1,903	4,000
Pelger Road 1700 LLC	5,200	0	5,200	5,200	0	5,200
Pleasant Grove-Verona MWC	15,000	12,000	15,000	15,000	12,000	15,000
Princeton-Codora-Glenn ID	6,600	6,600	13,200	6,600	6,600	13,200
Provident ID	10,000	9,900	19,900	10,000	9,900	19,900
Reclamation District 108	15,000	40,000	35,000	15,000	40,000	35,000
Reclamation District 1004	7,175	20,000	27,175	5,400	15,000	20,400
River Garden Farms	10,000	10,000	16,000	10,000	10,000	16,000
Roberts Ditch Irrigation Company	4,100	1,800	4,100	3,100	1,800	3,100
Sutter MWC	18,000	18,000	36,000	15,000	10,000	25,000
Swenson Farms[2]	1,300	1,300	1,300	1,300	1,300	1,300
Sycamore MWC	8,000	10,000	15,000	8,000	10,000	15,000
T&P Farms	1,200	890	1,200	1,170	667	1,170
Te Velde Revocable Family Trust	7,094	6,975	5,387	2,925	1,548	4,473
Windswept Land & Livestock	2,000	0	2,000	2,000	0	2,000
Total[3]	**159,564**	**231,098**	**306,122**	**148,690**	**206,158**	**280,167**

Notes: ID= Irrigation District, MWC= Mutual Water Company; LLC= Limited Liability Company

[1] The total transfers combined for the Member Units of the TCCA evaluated in this IS/EA and SLDMWA member agencies evaluated in the Long-Term Water Transfers EIS/EIR, would be limited to less than 250,000 AF in any one year. The sum of transfers in Table 2-1 equals more than this amount, but the buyers (TCCA and SLDMWA) would not purchase transfer water from all of these parties for the full amount.

[2] Swenson Farms (Green Valley Corporation) holds two separate contracts with Reclamation. The 1,300 AF transfer limit would be split 645 AF for Contract No. 14-06-200-5210A-R-1 and 646 AF for Contract No. 14-06-200-5211A-R-1 (Reclamation 2016).

[3] 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.

Surface water would be made available for transfer between April and September, subject to contract limitations, as specified in Article 3(c)(2) of the Settlement Contract. Under certain conditions and with prior approval by Reclamation, water could be backed up into Shasta Reservoir and delivered in October and November to provide irrigation after harvest, when needed. If water is delivered in October or November, the overall amount of water made available would not change. If water is conveyed in October and November, the overall totals from April through November would still stay within the upper limits provided in Table 2-1.

2.2.2 Buyers

Table 2-2 identifies entities that may be interested in buying water made available for transfer. 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 may be asked to reoperate the CVP to deliver the water made available for transfer, 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 the CVP at specific times to accommodate water transfers.

Table 2-2. Potential Buyers

Member Units of the TCCA
4-M Water District
Colusa County Water District
Corning Water District
Cortina Water District
Davis Water District
Dunnigan Water District
Glenn Valley Water District
Glide Water District
Holthouse Water District
Kanawha Water District
LaGrande Water District
Orland-Artois Water District
Westside Water District

2.2.3 Potential Methods of Making Water Available for Transfer

This IS/EA analyzes transfers of water made available from groundwater substitution and cropland idling/crop shifting actions, which are further described below. No other methods of making water available for transfer are covered by the evaluation in this IS/EA.

Reclamation will only consent to water transfers that are consistent with provisions of state and federal law that protect against injury to third parties as a result of water transfers. Additionally, the water transfer will have no significant adverse effect on the ability of the CVP to deliver Project Water, the water made available for transfer will be limited to water that would have been consumptively used or irretrievably lost to beneficial use, and the water transfer will not adversely affect water supplies for fish and wildlife purposes. Also, Settlement Contractors must transfer water consistent with their Settlement Contracts. Reclamation would not consent to water transfers for which these basic principles have not been met.

In 2023, some water transfers may be accomplished through forbearance agreements. Under such agreements, a Settlement Contractor 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 2023 for use on lands within the Settlement Contractor's service area. This forbearance would be undertaken in a manner that allows Reclamation to pick up the forborne water supply as Project Water and deliver it 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 water 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 State Water Resource Control Board (SWRCB) staff document titled *A Guide to Water Transfers – Draft* (SWRCB 1999).

2.2.3.1 Groundwater Substitution

Transfer of water made available through groundwater substitution actions 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 for transfer through groundwater substitution actions are agricultural users. Water could be made available for transfer by the agricultural users during the irrigation season of April through September. Some small amount of water could be made available for transfer in October when needed.

The conveyance infrastructure used to deliver water made available for transfer, to the Member Units of the TCCA, would depend on the seller's location. Some sellers, like Glenn-Colusa Irrigation District (ID), utilize existing conveyance facilities that also deliver Project Water to Member Units of the TCCA. These conveyance facilities are used to deliver water to Glenn-Colusa ID from the Tehama-Colusa Canal. During a transfer, the deliveries to the sellers would be reduced and additional water would stay in the TCCA area. Most of the agencies making water available for transfer through groundwater substitution actions typically divert surface water from the Sacramento River downstream of the Red Bluff Pumping Plant and the Tehama-Colusa Canal. Delivering water to the TCCA at the Red Bluff Pumping Plant instead of downstream to 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 water transfers do not affect the flow requirements in the Sacramento River. Because the TCCA diversion is downstream from the Sacramento River temperature compliance points, potential changes in flows would not affect temperature compliance in the Sacramento River.

Water made available for transfer through groundwater substitution actions would temporarily decrease levels in groundwater subbasins near the participating wells. Water produced from wells initially comes from groundwater storage. Groundwater storage would refill (or "recharge") over time, which affects surface water sources. Groundwater pumping may capture some groundwater that would otherwise discharge to streams as baseflow and may also induce recharge from streams to the groundwater system. Once pumping ceases, this stream depletion continues, replacing the pumped groundwater slowly over time until the depleted storage fully recharges. Therefore, the amount of water actually transferred is less than the substitution pumping volume. The Proposed Action includes measures that would reduce the amount of water that Member Units of the TCCA actually receive by an estimated 13-percent depletion factor to mitigate any adverse impacts associated with groundwater / surface water interaction.

2.2.3.2 Cropland Idling/Crop Shifting

Cropland idling actions would make water available for transfer that would have otherwise been consumptively used by a crop absent the transfer. Typically, the proceeds from the water transfer would pay growers to idle land that they would have otherwise placed into production. Rice has been the crop idled most frequently in previous transfer programs and is the crop that is most likely to be idled to make water available for transfer in contract year 2023.

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 used by the crop. For 2023, this IS/EA only analyzes cropland idling from rice crops, which have an ETAW of 3.0 AF/acre (Reclamation and DWR 2021). In doing so, this IS/EA evaluates the highest land acreage that could be idled. Therefore, the impacts associated with rice idling represent the greatest extent of potential impacts associated with idling any of the crops listed below in Table 2-3.

For a transfer of water made available through a crop shifting action, water is made available when a grower shifts from growing a higher water use crop to a lower water use crop. The difference between the ETAW values would be the amount of water that can be transferred. Transfers of water in 2023 could include water made available by shifting from rice to a crop with a lower water use. Table 2-3 provides a listing of the estimated ETAW values for crops suitable for shifting.

Water made available through cropland idling or crop shifting actions would be available at the beginning of the season (May) and would be available for transfer on the same pattern as it would otherwise have been used by the crop. Water would be delivered to the Member Units of the TCCA on pattern; that is, in the same volume and at the same time as it would have been consumptively used by the crop, absent the transfer. Under certain conditions and with approval from Reclamation, water made available May through September could be backed up in Shasta Reservoir for release in October and November. If water is delivered in October or November, the overall amount of water made available would not change. While the IS/EA analyzes cropland idling transfers from multiple sources, the total amount of water made available through cropland idling actions would not be more than 87,281 AF, which equates to 29,094 acres of rice land idled.

Table 2-3. Estimated ETAW Values for Crops Suitable for 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	3.0[2]
Sugar Beets	2.5
Sunflower	1.4
Tomato	1.8
Vine Seed/ Cucurbits	1.1
Wild Rice	2.0

Source: Reclamation and DWR 2019; Reclamation and DWR 2021

Key: ETAW = evapotranspiration of applied water; AF = acre-feet

Notes:

[1] Only alfalfa grown in the Sacramento Valley floor north of the American River will be allowed to be a crop which is eligible to make water available for transfer based on crop shifting. 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.

[2] Transfer Factor for Rice is based on 2021 Transfer Factor for Rice Field Idling (Reclamation and DWR 2021).

Consistent with the provisions contained in Water Code Section 1018, potential sellers are encouraged to incorporate measures into their cropland idling actions 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 made available for transfer through cropland idling actions.

Crop shifting may reduce potential environmental effects that are more likely associated with cropland idling. The agencies interested in making water available for transfer through crop shifting actions are also interested in making water available for transfer through cropland idling actions but are not sure of the distribution between the two methods. To be conservative that the potential impacts are fully addressed, this IS/EA analyzes the effects as if all water made available for transfer was made available from cropland idling actions because cropland idling actions have the greater potential for effects.

Section 3 Environmental Impacts

The following sections present the environmental setting and environmental impacts. 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 the transfer of water. Additional details regarding relevant existing environmental conditions are provided in the analysis of potential impacts. The environmental impact analysis uses 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. Since the project area is not near State Responsibility Areas (SRAs) or lands classified as very high fire hazard severity zones, wildfire impacts are not discussed in this Section.

I. AESTHETICS

Except as provided in Public Resources Code Section 21099, 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 within a state scenic highway?	☐	☐	☐	☒
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced form publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

Environmental Setting

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.

a, b, d) No Impact. The 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 include any construction or new structures that could damage scenic resources (e.g., trees, rock outcroppings, historic buildings) or produce notable sources of light or glare.

c) Less than Significant. Water made available for transfer through cropland idling actions under the Proposed Action would temporarily increase the amount of idled lands in the sellers' area (in a non-urbanized area). However, the amount of potentially idled cropland under the Proposed Action would be limited when compared to the amount of active cropland in the area. Idled lands, visually similar to fallowed fields, 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 or quality of the sites and 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 Department 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?	☐	☐	☐	☒
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	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				

a, b) No Impact. One-year water transfers under the Proposed Action would temporarily take land out of production in the sellers' area but would not affect the long-term agricultural uses of the land. Cropland idling for a single year would be similar to fallowing a field under a normal crop rotation and would not convert any land to non-agricultural use. Cropland idling would not affect Williamson Act contracts or the long-term designations of Prime Farmland or other Farmland Mapping and Monitoring Program classifications.

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

e) No Impact. The Proposed Action could result in increased cropland idling and could temporarily take land out of production. Temporary cropland idling would not convert any agricultural land to non-agricultural use. The Proposed Action would not affect existing forest lands and would therefore not convert any forest lands to non-forest use.

III. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management district 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) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard?	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

Environmental Setting

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 and Yolo/Solano AQMD.

In the Sacramento Valley Air Basin, ozone (O_3) and inhalable particulate matter (PM_{10}) 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 2-4 summarizes the attainment status for the counties located in the Sacramento Valley.

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 characterized by hot dry summers and mild rainy winters.

Most of the predominant land use in the sellers' service area is agricultural. Farming practices, including land preparation and harvest, contribute to pollutant emissions, primarily particulate matter. Groundwater pumping with diesel and propane-fueled engines also emits air pollutants through exhaust. The primary pollutants emitted by diesel and propane 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.

Table 2-4. State and Federal Attainment Status

County	O_3 CAAQS	$PM_{2.5}$ CAAQS	PM_{10} CAAQS	CO CAAQS	O_3 NAAQS	$PM_{2.5}$ NAAQS	PM_{10} NAAQS	CO NAAQS
Colusa	A	A	N	U	A	A	A	A
Glenn	A	A	N	U	A	A	A	A
Sacramento	N	A	N	A	N [3,4]	N [6]	M	M
Shasta	N-T[6]	A	A	U	A	A	A	A
Sutter	N	A[6]	N	A	N [2,3,4]	M	A	A
Tehama	N	U	N	U	A[5]	A	A	A
Yolo	N-T	U	N	A	N [3,4]	N [6]	A	M

Source: 17 California Code of Regulations §60200-60210; 40 CFR 81; CARB 2020a; USEPA 2022a

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] 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).

[3] 8-hour O_3 classification (2008 NAAQS) = severe

[4] 8-hour O_3 classification (2015 NAAQS) = serious

[5] The Tuscan Buttes portion of Tehama County is classified as marginal nonattainment; however, the Project area is located within the attainment region of Tehama County (USEPA 2022a).

[6] CARB is proposing amendments to area designations, which includes revising the attainment status for O_3 in Shasta County and $PM_{2.5}$ in Sutter County to nonattainment. These amendments are pending and yet to be finalized (CARB 2022a).

Key:
A = attainment (background air quality in the region is less than (has attained) the ambient air quality standards)
CO = carbon monoxide
M = maintenance (background air quality in the region is less than (has attained) the ambient air quality standards and a maintenance plan is in place)
N = nonattainment (background air quality exceeds the ambient air quality standards)
N-T = nonattainment/transitional (a subcategory of nonattainment where an area is close to attainment, has only two days exceeding standards, and is projected to meet standards within three years)
O_3 = ozone
PM_{10} = inhalable particulate matter
$PM_{2.5}$ = fine particulate matter
U = unclassified/attainment (area does not have enough monitors to determine the background concentrations; treated the same as attainment)

a) Less than Significant with Mitigation Incorporation

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 actions taken to make water available for transfer are associated with the actions taken to reduce consumptive use.

The Proposed Action would use a combination of electric-, diesel-, and propane-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 under the Proposed Action 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, including the ATCM.

As part of the planning efforts, several of the air districts developed significance thresholds for mass daily or annual emission rates of criteria pollutants to assess whether a Proposed Action would violate air quality standards or contribute substantially to an existing or projected air quality violation. 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 and the general conformity *de minimis* thresholds.

Table 3-1. CEQA and General Conformity Operational Significance Thresholds

Air District	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Sacramento Metropolitan AQMD	65 lbs/day	65 lbs/day	–	–	80 lbs/day	82 lbs/day
Yolo-Solano AQMD	10 tpy	10 tpy	–	–	80 lbs/day	–
Feather River AQMD	25 lbs/day	25 lbs/day	–	–	80 lbs/day	–
De Minimis Threshold (General Conformity)	25 tpy	25 tpy	100 tpy	100 tpy	100 tpy	100 tpy

Source: Feather River AQMD 2010; Sacramento Metropolitan AQMD 2020; Yolo-Solano AQMD 2007, 40 CFR 93.153(b).

Note:

The Sacramento Metro ozone nonattainment area is designated severe nonattainment under the 2008 O_3 NAAQS (25 ton per year *de minimis* threshold) and serious nonattainment for the 2015 O_3 NAAQS (50 ton per year *de minimis* threshold). Because the 2008 NAAQS has not been revoked, the lower *de minimis* threshold is used in this analysis.

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 pumping could increase air emissions in the seller area. Cropland idling actions could reduce vehicle exhaust emissions but could also increase fugitive dust emissions. Cropland idling actions could offset some of the emissions from groundwater substitution pumping, but cropland idling actions may not occur up to the upper limits and therefore cannot be counted on to reduce impacts of groundwater substitution pumping. This section only analyzes impacts from groundwater substitution pumping to estimate the maximum potential emissions that could occur under the Proposed Action.

Table E-3 through Table E-8 in Appendix E summarizes the maximum daily emissions that would be estimated to occur in each water agency subject to a daily significance threshold. Table E-9 through Table E-14 in Appendix E summarizes the annual emissions that would occur in each water agency subject to an annual significance threshold. Significance was determined for individual water agencies.

As shown Appendix E, Pleasant Grove-Verona Mutual Water Company and Sutter Mutual Water Company would exceed the daily VOC for the Feather River AQMD (Tables E-3). Natomas Central Mutual Water Company, Pleasant Grove-Verona Mutual Water Company, and Sutter Mutual Water Company would exceed the daily NOx thresholds for the Feather River AQMD (Table E-4). The other sellers would be below the daily and annual emissions thresholds. 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 making water available for transfer through cropland idling and

groundwater substitution actions 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 1 AF of groundwater pumped (Byron & Buck 2009). Agencies may also decide to replace old diesel wells with cleaner (i.e., higher emission tier) diesel pumps or electric wells to reduce emission below the thresholds.

Any selling agency with potentially significant emissions, as determined by this IS/EA, will be required to submit information, prior to making water available for transfer through groundwater substitution actions, that documents the wells that would be pumped to stay below the thresholds. The selling agency must also maintain recordkeeping logs that document the specific engine to be used for making water available for transfer through groundwater substitution actions, 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. In the annual report, the selling agencies will be required to submit documentation specifying that the wells would only be pumped in accordance with the transfer proposals.

Mitigated emissions for VOC and NOx are provided in E-70 and E-71 of Appendix E. Implementation of the above mitigation measure would reduce VOC and NOx emissions to less than significant. In addition, the water made available for transfer through groundwater substitution actions from diesel and propane wells would be limited to a smaller amount than described in Table 2-1.

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). Figure E-1 in Appendix E shows the CO maintenance area; Figure E-2 in Appendix E shows the O_3 nonattainment area; Figure E-3 in Appendix E shows the PM_{10} maintenance area; and Figure E-4 in Appendix E shows the $PM_{2.5}$ nonattainment area.

Because the mitigation measures would be a requirement of project implementation, mitigated emissions for the Proposed Action were compared to the general conformity *de minimis* thresholds, where no criteria pollutants exceeded *de minimis* thresholds. Table E-68 in Appendix E summarizes the general conformity applicability evaluation.

b) Less than Significant

Proposed Action: The majority of counties affected by the Proposed Action are located in areas designated nonattainment for the PM_{10} CAAQS. Additionally, Sacramento, Sutter, and Tehama Counties are designated nonattainment for the O_3 CAAQS, while Shasta and Yolo Counties are 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 VOCs and NOx; 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.

As previously discussed, the general conformity regulations apply to nonattainment and maintenance areas and are intended to demonstrate that a federal action would comply with the SIP and would not cause the air quality in the region to be degraded. Therefore, if the total of direct and indirect emissions is less than the general conformity *de minimis* thresholds, then the project would not be cumulatively considerable because the ambient air quality standards would continue to be maintained. As shown in Appendix E, Table E-68, emissions that would occur in the nonattainment and maintenance areas in the region are less than the general conformity *de minimis* thresholds.

However, emissions would also occur in air districts that are in attainment of the NAAQS and CAAQS. Therefore, the cumulative impact of the engines operating within the individual air districts were compared to a significance threshold of 100 tons per year. This threshold was selected because it is the threshold at which a permitted source would be categorized as a major source. The threshold is therefore considered to be sufficient to evaluate if the total emissions from a project could cause the air quality standards to be exceeded.

As shown in Table 3-2, total criteria pollutant emissions would not exceed the cumulative emissions threshold in either the Colusa County or Glenn County APCDs. In addition, only electric engines are proposed to be operated in the Shasta County AQMD. Because emissions would neither exceed the general conformity *de minimis* threshold in nonattainment or maintenance areas, nor the major source threshold in attainment areas, emissions from the project would not be cumulatively considerable.

Table 3-2. Cumulative Emissions in Attainment Areas

Air District	VOC (tpy)	NOx (tpy)	CO (tpy)	SOx (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Colusa County APCD	6	66	24	6	1	1
Feather River AQMD[1]	<1	19	6	2	<1	<1
Glenn County APCD	5	59	13	4	1	1
Yolo/Solano AQMD	1	6	3	<1	<1	<1

Notes:

[1] Sutter County, which is located within the Feather River AQMD, is partially located in the Sacramento Metro O_3 nonattainment region and partially located within an O_3 attainment area. Pelger Mutual Water Company and Sutter Mutual Water Company are the only water agencies with non-electric engines located in the attainment portion of Sutter County. However, because Sutter Mutual Water Company has engines located in both the attainment and nonattainment portions of Sutter County, all of its emissions were evaluated under general conformity to be conservative. Therefore, this table only summarizes emissions from Pelger Mutual Water Company because all other agencies with engines in Sutter County are applicable to the general conformity regulations.

Key:

APCD = air pollution control district; CO = carbon monoxide; 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

c) Less than Significant

Proposed Action: The proposed engines would either be 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.

d) Less than Significant

Proposed Action: The use of diesel engines during groundwater substitution pumping 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 U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c) Have a substantial adverse effect on state or federally protected wetlands (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?	☐	☐	☒	☐

Environmental Setting

The project area includes the Sacramento River watershed. Natural communities associated with the Sacramento River include valley/foothill riparian and natural seasonal wetland. In the Sacramento Valley, seasonally flooded agriculture, particularly rice fields, provide important foraging habitat for a variety of animal species. Flooded agriculture within the Sacramento Valley typically accounts for approximately 57 percent of the food resources available to waterfowl (Petrie and Petrick 2010).

Rice fields provide foraging, resting, breeding, and wintering habitat for shorebirds and wading birds, in addition to providing foraging habitat for raptors. Flooded agricultural fields also provide important foraging, refuge, and dispersal habitat for numerous reptile, amphibian, and mammal species. Migratory birds protected by the Migratory Bird Treaty Act also rely on agricultural fields for habitat in the Central Valley. There are typically approximately 500,000 acres of rice fields in the Sacramento Valley which, along with natural wetlands, support millions of waterfowl migrating along the Pacific Flyway (California Rice 2022). However, as a result of severe drought conditions, the amount of rice fields planted in the Sacramento Valley in 2022 was reduced to approximately 250,000 acres (Matthews 2022). Although rice is typically planted in a fairly even distribution on both the east and west sides of the Sacramento Valley, in 2022, the west side accounted for less than 10 percent of the total planted acres in the Sacramento Valley (Matthews 2022).

Special-status wildlife species with the potential to occur in the project area are listed in Appendix B. As described in the appendix, five special-status species have the potential to be affected by rice idling and are further evaluated in Chapter 3. This includes the following species: giant garter snake (GGS) (*Thamnophis gigas*), western pond turtle (*Actinemys marmorata*), greater sandhill crane (*Grus canadensis tabida*), black tern (*Chlidonias niger*), and tricolored blackbird (*Agelaius tricolor*). 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; western pond turtle – species is under review for listing under the Federal ESA and considered a State Species of Concern by the California Department of Fish and Wildlife; greater sandhill crane – listed as threatened under the California ESA and is fully protected under the California Fish and Game Code Sections 3511, 4700, 5050, and 5515; black tern – listed as a State Species of Concern; and tricolored blackbird – listed as threatened under the California ESA and considered a State Species of Concern by the California Department of Fish and Wildlife (CDFW) (CDFW 2022a).

Appendix B also summarizes fish species of management concern within the project area. The California drought from 2011 through 2015 resulted in limited water storage and a corresponding reduction of the cold-water pool in Shasta Reservoir. The drought resulted in elevated temperatures in the upper reaches of the Sacramento River, which contributed to low survival rates for wild juvenile winter-run Chinook salmon (*Oncorhynchus tshawytscha*) in 2014 and 2015 (SWRCB 2015). According to the National Marine Fisheries Service (NMFS), the drought also had a biologically significant effect on the abundance of natural-origin spawning winter-run Chinook salmon, with the lowest level on record occurring in 2017 (NMFS 2021). NMFS has identified Sacramento River winter-run Chinook salmon as a "Species in the Spotlight" because it is one of the eight most at-risk species in the country (NMFS 2016). In 2015, NMFS developed a five-year action plan (2016–2020) to identify priority actions to help the species. In April 2021, NMFS released a priority action plan under the "Species in the Spotlight" initiative to outline actions needed to halt declines and stabilize populations of Sacramento River winter-run Chinook salmon (NMFS 2021).

The Sacramento River Temperature Management Plan, which is required annually, guides the release of water from Shasta Reservoir to maintain healthy fisheries during the summer and fall when air and water temperatures rise. Temperature management in the Sacramento River has been especially important for maintaining temperatures supportive of Sacramento River winter-run Chinook salmon survival in recent years, as California experienced a dry year in 2020 and a critically dry year in 2021. California entered into its third consecutive year of severe drought in Water Year (WY) 2022. At the beginning of WY 2022, Shasta Reservoir storage was extremely low at 1.08 million acre-feet (MAF). The Final Sacramento River Temperature Management Plan was approved by SWRCB on May 6,

2022, with the condition that Reclamation take all actions within its reasonable control to improve temperature conditions for the Sacramento River winter- and fall-run Chinook salmon and minimize temperature dependent mortality to winter-run Chinook salmon through 2022 and into 2023 (SWRCB 2022a). The Proposed Action would be implemented in compliance with the 2022 Final Temperature Management Plan (Reclamation 2022).

Special-status plant species with potential to occur are listed in Appendix C. Based on the analysis presented in the appendix, no special-status plants would be affected by the project.

Groundwater-dependent ecosystems (GDEs) are plant and animal communities that solely or partially depend on the availability of groundwater to maintain their structure and function. Species in GDEs depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface. GDEs function to purify water, provide recreational opportunities, regulate climate, support pollinators, and provide habitat for endangered species (The Nature Conservancy 2021). Types of GDEs within the project area include wetlands, rivers, streams, and terrestrial vegetation. Terrestrial plants that use groundwater for their water supply are often located in wetlands or along streams (called riparian plants). While these plants also may rely on soil water that is recharged by precipitation, or by surface waters at different times of the year, they are still considered groundwater-dependent because groundwater provides a portion of their water needs (The Nature Conservancy 2022). These terrestrial vegetation GDEs are located in the project area along streams and other waterways.

a) Less than Significant Impact with Mitigation Incorporation

Proposed Action:

Fishery Resources

Under the Proposed Action, water made available for transfer would be released from Shasta Reservoir based on agricultural irrigation patterns and in compliance with the SWRCB Water Rights Orders 90-5 and 91-1. The Orders establish in-stream temperature criteria to manage the cold-water storage within Shasta Reservoir and make cold-water releases from Shasta Reservoir to maintain suitable temperatures for winter-run Chinook salmon, spring-run Chinook salmon, California Central Valley steelhead (*Oncorhynchus mykiss*), and the Southern Distinct Population Segment of North American green sturgeon (*Acipenser medirostris*) in the Sacramento River between Keswick Dam and Bend Bridge, while retaining sufficient carryover storage to manage for the following year's winter-run Chinook salmon cohort. In addition, to the extent feasible, another objective is to maintain suitable temperatures and flows for naturally spawning fall-run/late-fall-run Chinook salmon.

Water made available for transfer to Member Units of the TCCA could be delivered on the same pattern as it would have been diverted by the sellers in the absence of transfers or it could be backed up in Shasta Reservoir from May through September for release in October and November. Based on the delivery pattern, the largest volume of water made available for transfer would be in June. Sacramento River flows would slightly decrease from the TCCA point of diversion at the Red Bluff Pumping Plant to the point of diversion of the seller, located downstream (except for Anderson-Cottonwood ID's point of diversion), during the transfer period. The largest change in flow could

be approximately 380 cfs[8] in June. For comparison, flows in the Sacramento River near Colusa from 2009 to 2022 averaged 7,796 cfs in June (DWR 2022a). 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. Flow reductions of up to 380 cfs in the Sacramento River (4.9 percent of average June flows from 2009 to 2022) would not be substantial enough to affect special-status fish species. If water is backed up in Shasta Reservoir, there could be a small increase in flows downstream of Shasta Reservoir into the Sacramento River in October and November. Adult migration by special-status fish species, including Chinook salmon, steelhead, and green sturgeon, would not be adversely affected by slightly decreased flows. Further, the magnitude of the expected flow decrease would not reduce spawning habitat availability, affect egg development, increase the potential for redd dewatering or juvenile stranding, or reduce the suitability of habitat conditions for juvenile rearing. In addition, Reclamation would continue to comply with the SWRCB Orders under the Temperature Management Plan to meet temperature requirements in the Sacramento River.

Groundwater Substitution Water made available through groundwater substitution actions under the Proposed Action would reduce groundwater levels and could potentially deplete surface water flows in affected rivers and creeks (Section IX (b)). Surface water depletions in the Sacramento and American rivers resulting from groundwater substitution actions 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 special-status fish species presence in the following creeks, and therefore, any streamflow depletion would have no effect on special-status fish species (CDFW 2022b): 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).

The Proposed Action could have an adverse impact on existing fish habitat functions if resultant flow reductions were to substantially affect riverine or riparian habitat conditions, hinder fish movement, or limit access to spawning areas. For the purposes of this analysis, the threshold for adverse flow-related effects is identified as both a minimum decrease in flow of 1 cfs and a 10-percent decrease in mean (average) monthly flow (where quantitative flow data were available). A qualitative assessment was applied in instances where quantitative flow data were not available. The 1 cfs minimum flow threshold was used as a conservative measure of detectability by fish. The 10-percent threshold was used to determine measurable flow changes based on several major environmental documents in the Central Valley related to fisheries (Trinity River Mainstem Fishery Restoration Record of Decision, December 19, 2000; San Joaquin River Agreement Record of Decision in March 1999; Freeport Regional Water Project Record of Decision, January 4, 2005; Lower Yuba Accord EIR/EIS). If either of these thresholds were reached, a further evaluation of fishery impacts would be conducted to determine adverse impacts.

Streamflow depletion impacts were assessed based on SACFEM2013 model simulations of the contemplated 2022 TCCA Water Transfers (i.e., groundwater substitution locations and volumes).

[8] This value is determined by calculating the daily transfer volume (in AF) and converting this volume to cfs.

The results of these simulations were compared to historical baseline monthly flows to estimate streamflow depletion.

For the following creeks known to support special-status fish species, the groundwater modeling indicates that there would be a less than a 1 cfs reduction in average monthly flow: Big Chico Creek, 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.

Based on groundwater modeling, there would be flow reductions greater than 1 cfs in Colusa Basin Drain, Coon Creek, Eastside Cross Canal, Cache Creek, and Butte Creek. Historical streamflow information from the U.S. Geological Survey was gathered, where available, and used to characterize baseline flows. For locations where historical flow data were unavailable, a quantitative analysis was not possible; thus, a qualitative discussion of potential impacts is included for these locations.

Based on a comparison of groundwater modeling results and historical flow data, reductions in streamflow in Colusa Basin Drain and Butte Creek would be less than 10 percent of monthly average streamflows. In Colusa Basin Drain, monthly decreases in flows resulting from the Proposed Action would range from 0 percent to 0.3 percent of monthly historical flows from 1997 to 2021. In Butte Creek, SACFEM2013 model simulation showed monthly decreases in flows resulting from the Proposed Action would range from 0 percent to 0.5 percent of monthly historical flows from 2007 to 2021. Given that flow reductions would be less than 10 percent, habitat for special-status fish species in these waterbodies would not be substantially affected by the Proposed Action.

In Cache Creek, groundwater modeling indicates that there would be a decrease in flow of over 1 cfs in January (1.8 cfs), February (1.6 cfs), and December (1.5 cfs) following transfers of water made available through groundwater substitution actions. However, decreased flows resulting from the Proposed Action would be less than 10 percent, ranging between 0 and 9.5 percent of the monthly historical average across all water year types. Additionally, under low-flow conditions (when the greatest percent decreases in streamflow would occur), there is no passable connection for fish between the Delta and mouth of Cache Creek (Sacramento River Watershed Program 2022). Therefore, impacts on special-status fish species in Cache Creek would be less than significant.

Historical flow data were limited for Coon Creek; and were only available for a 3-year period—2003 to 2005. Based on the Sacramento Valley Hydrologic Index, 2003 and 2005 were above normal years and 2004 was a below normal year. Between 2003 and 2005, December through March flows ranged from 50 cfs to 200 cfs. Flows in April and May ranged from 20 to 40 cfs (Bergfeld, pers. comm., 2014). Based on the groundwater modeling, decreases in flow of over 1 cfs would occur in the month of March (up to 4.8 cfs) following the transfers. Even if Coon Creek flows are at the low end of the historical range (i.e., 50 cfs), flow reductions in March resulting from the Proposed Action would be less than 10 percent (i.e., 9.6 percent). Therefore, effects of the Proposed Action on fisheries resources in Coon Creek would be less than significant.

Historical flow data were not available for the East Side / Cross Canal, which serves as a flood management structure. A major levee on the west side of the canal intercepts all of the flow from the watersheds north of the community of Pleasant Grove in Sutter County, including Coon Creek, Markham Ravine, and Auburn Ravine. The canal collects flood waters, natural flows, and agricultural return flows and has a design capacity of up to 16,000 cfs (DWR 2010). Riparian

vegetation is generally absent because of periodic levee maintenance and herbicide applications on adjacent farmlands. However, the channel does contain a variety of rooted aquatic vegetation, such as cattails and riparian shrubs, including willows. The area provides a variety of habitats for fish and animal species (County of Placer 2002). The Cross Canal is the outlet channel for all of the flows from the watersheds intercepted by the East Side Canal and those from the south, including Curry Creek, and Pleasant Grove Creek (County of Placer 2002). The groundwater model estimates up to a 12.1 cfs reduction in flow in August and a 11.0 cfs reduction in flow in January. Based on the number of water bodies that drain into the East Side / Cross Canal, and the large design capacity of the canal, it is unlikely that a 11.0 to 12.1 cfs flow reduction would substantially decrease fish habitat in the canal. Therefore, effects of the Proposed Action on fisheries resources in East Side / Cross Canal would be less than significant.

Terrestrial Resources

Cropland Idling

The following is a discussion of the effects of rice-idling actions on special-status wildlife species that are present in the sellers' area. 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 B and C list the special-status animal and plant species, respectively, that could be present in the project area and the rationale for the no effect determination. As described in Section 2.3.3, the following five special-status species have the potential to be affected by rice idling and are further evaluated below: GGS, western pond turtle, greater sandhill crane, black tern, and tricolored blackbird.

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 29,094 acres of rice land could be idled in Colusa, Glenn, Sutter, and Yolo counties based on the potential transfer volumes in Table 2-3 and an ETAW of 3.0 AF per acre for rice. Table 3-3 shows the annual harvested rice acreages in each county from 2009 to 2020.

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

Year	Glenn	Colusa	Sutter	Yolo	Total
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
2013	85,300	149,000	116,000	38,400	388,700
2014	73,300	111,000	75,900	39,300	299,500
2015	60,400	100,200	92,400	–	253,000
2016	73,700	149,000	119,000	32,000	373,700
2017	73,700	134,900	78,200	–	286,800
2018	80,300	139,600	107,600	–	327,500
2019	79,500	133,500	104,500	–	317,500
2020	77,000	125,700	110,200	–	312,900

Year	Glenn	Colusa	Sutter	Yolo	Total
2021	61,100	100,700	80,000	17,800	259,600
Average (2009–2021)	77,822	134,538	102,813	36,062	337,365

Source: U.S. Department of Agriculture (USDA) 2008–2017, USDA 2022

Rice harvested acreage in California decreased in 2014 and 2015 because of the drought and water restrictions. Rice harvested acreage subsequently rebounded in 2016, 2018, 2019, and 2020. California's prolonged dry conditions are expected to result in a decrease in annual harvested rice acreage in the sellers' areas and throughout the Sacramento Valley.

Giant Garter Snake

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

Rice idling would affect GGS habitat availability. The GGS displaced from idled rice fields would need to find other areas to live. This displacement may lead to indirect effects such as increased risk of predation, reduced food availability, increased competition, reduced condition prior to the start of the overwintering period, and potentially reduced fecundity. GGS inhabiting rice fields are within an active rice growing region that regularly experiences environmental changes resulting from annual variations in rice production and farming activities. Therefore, they are already subject to these risks. If water levels in major canals in the sellers' areas decrease, GGS may experience a decrease in aquatic habitat, prey availability, and movement corridors.

The United States Geologic Services (USGS) is leading a multi-year GGS study to assess the effects of rice idling on occupancy dynamics of GGS in the Sacramento Valley (USGS 2017). The primary purpose of the study is to examine the effects of water transfers, particularly rice idling, on GGS distribution and occupancy, and assess the effectiveness of the measures that could reduce effects on GGS. During the first year of the study (May 2016 through September 2016), the primary objective was to determine whether sites associated with active and fallowed rice fields differ in probability of GGS occurrence. Distribution, occurrence, and detection probability of GGS were also evaluated for several other biological variables, including the percent cover of submerged vegetation, capture rate of fish, and capture rate of frogs. The first year of surveys (May to September 2016) included 83 sample sites across five survey basins (American, Butte, Colusa, Sutter, and Yolo). The study found 91 snakes at 51 sites. Related to rice production, preliminary results for 2016 indicate that there is a positive correlation between GGS occupancy and the presence of rice within a 1, 2, and 3 kilometer buffer distance from survey sites. The probability of occurrence appears to level off at its highest when rice fields comprise at least 60 percent of the surrounding area within a 3 kilometer buffer (USGS 2017). The USGS study also suggests that GGS are most likely to occur within areas of historical tule marsh, and that the likelihood of encountering GGS drops substantially with increased distance from historical marsh habitat (Halstead et al. 2014).

Additional studies have been, and are currently being, conducted to gather information on the distribution and occurrence of GGS in rice lands. Studies conducted by CDFW and USGS have documented GGS in portions of the rice-producing regions of the Sacramento Valley, particularly the Colusa Basin. Data collected by USGS during GGS surveys in 2022 are currently being analyzed to assess the ongoing effects of drought and land fallowing on GGS. Preliminary findings of the surveys indicate that approximately 85 percent of the sites sampled in 2022 are currently occupied by GGS. Additionally, the probability of GGS occurrence was found to be related to tadpole capture rate, but not to any other prey or habitat variables. However, the models used by USGS to evaluate the effects of decreased rice production on GGS do so in the interval between sampling events. Therefore, the effects of decreased rice production in the Sacramento Valley in 2022 on GGS occupancy, colonization, extirpation, abundance, density, and survival cannot be evaluated until after data collection occurs in 2023.

No more than approximately 8.6 percent of average annual rice acreage from 2009 to 2021 would be affected by the Proposed Action. However, rice idling to make water available for transfer could have significant effects on GGS if idling occurs in (or near) areas with known populations of GGS or in areas that provide suitable aquatic habitat for GGS. Implementation of Mitigation Measure VEG and WILD-1 (presented at the end of this section) would reduce these effects by minimizing the idling of lands adjacent to areas with a high likelihood of GGS occurrence. Implementation of the mitigation measures would also protect movement corridors for GGS by maintaining water depths of at least 2 feet in major irrigation ditches and drainage canals, thereby keeping emergent aquatic vegetation intact for GGS escape, cover, and foraging. Maintaining water in agricultural ditches could allow GGS to successfully relocate to alternate forage, cover, and breeding areas during idling events. The mitigation measure also includes voluntary training, by sellers, to continue GGS best management practices, including educating maintenance personnel to recognize and avoid contact with GGS, cleaning only one side of a conveyance channel per year, and implementing other measures to enhance habitat for GGS.

The incorporation of Mitigation Measure VEG and WILD-1 would reduce impacts of rice idling under the Proposed Action to a less than significant impact on GGS because it would avoid or minimize the potential indirect impacts associated with displacement and habitat loss. Therefore, potential effects on GGS resulting from actions required to make water available for transfer through the cropland idling would be less than significant with mitigation.

Western Pond Turtle

Western pond turtles also use rice fields and associated ditches and drains for foraging and dispersal. As with GGS, cropland idling would affect habitat availability for pond turtles and displaced turtles could be affected through increased risk of predation, reduced food availability, increased competition, reduced reproductive success, and potentially reduced fecundity. Pond turtles are likely to use some of the same natural areas, including wildlife refuges, and major irrigation ditches and drainage canals as GGS populations in the project area.

While no more than approximately 8.6 percent of average annual rice acreage from 2009 to 2021 would be affected by the Proposed Action, cropland idling to make water available for transfer could have significant effects on pond turtles through direct loss of aquatic habitat and indirect effects resulting from displacement, as described previously for GGS. The implementation of Mitigation Measure VEG and WILD-1 would reduce these effects by minimizing the idling of lands

adjacent to natural habitats and refuges and by protecting movement corridors for pond turtles by maintaining water depths of at least 2 feet in major irrigation ditches and drainage canals.

The incorporation of Mitigation Measure VEG and WILD-1 would reduce impacts of cropland idling under the Proposed Action to a less than significant impact on pond turtles because it would avoid or reduce the potential indirect impacts associated with loss of habitat and displacement of pond turtles. Therefore, potential effects on the western pond turtle resulting from actions required to make water available for transfer through the cropland idling would be less than significant with mitigation.

Black Tern

Black terns use flooded rice fields and associated emergent vegetation in the spring and summer for foraging and nesting. As with GGS, rice idling and crop shifting associated with water transfers could result in the loss of aquatic habitat for black terns. Because the decisions regarding rice idling/shifting would have already been made prior to the onset of the black tern's breeding season (May through August), black terns returning to the area would be able to select appropriate nesting sites for that year. The maximum amount of rice idling would be 29,094 acres, which is approximately 8.6 percent of the average acreage (337,365 acres) of rice harvested in the project vicinity. Therefore, foraging and nesting habitat would be available in active rice fields nearby. Black terns in the Seller Service Area would also benefit from Mitigation Measures VEG and WILD-1, which would ensure that adequate water is maintained in major irrigational canals that support insect prey and would prohibit crop idling of rice fields (source of forage) abutting established wildlife refuges where there is a higher likelihood of tern nesting activity. Therefore, potential effects on the black tern associated with the cropland idling action would be less than significant with mitigation.

Sandhill Crane

Sandhill cranes use cropland in the project area for foraging in the winter, typically returning to the same location each year (Zeiner et al. 1990). Sandhill cranes are likely to use some of the same natural areas, including wildlife refuges, and major irrigation ditches and drainage canals as GGS populations occurring in the project area. Idling rice fields or crop shifting within areas that sandhill cranes have historically returned to may affect their wintering distribution patterns through reduced forage availability on idled or crop shifted fields. Although sandhill cranes would disperse as food sources diminish, rice idling 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. There may be localized significant effects on some birds that use historical roost sites adjacent to rice fields if those fields have been idled. Overall, the effects on sandhill cranes would be minor because the maximum reduction in rice production would be within the historical range of variation in food availability. Implementation of Mitigation Measure VEG and WILD-1 includes avoiding crop idling near wildlife refuges and established wildlife areas that provide core wintering areas for the sandhill crane. Therefore, potential effects on sandhill crane associated with the rice-idling action would be less than significant with mitigation.

Tricolored Blackbird

Tricolored blackbirds forage in rice fields near their nesting colonies. Although the rice plants are not tall or sturdy enough to support nests, the seasonally flooded fields provide resources required for breeding colony locations, including open access to water and suitable foraging space with insect prey. Tricolored blackbirds may use rice fields year-round and also 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. Rice idling could affect the species' foraging distribution and behavioral patterns and could reduce foraging and breeding habitat availability. However, since cropland idling would be dispersed across the Seller Service Area, impacts on tricolored blackbird foraging habitat would be less than significant. Additionally, tricolored blackbirds would benefit from Mitigation Measure VEG and WILD-1, which would ensure that adequate water is maintained in major irrigational canals that support insect prey. Mitigation Measure VEG and WILD-1 would prohibit the idling of rice fields abutting established wildlife refuges where the potential for tricolored blackbird nesting is highest given that such areas tend to provide large, continuous tracts of freshwater marsh habitat, which are strongly preferred by the species for nesting. Therefore, potential effects on tricolored blackbird associated with the rice-idling action would be less than significant with mitigation.

Migratory Birds

Many migratory bird species use seasonally flooded agricultural land for nesting and foraging habitat during the summer rearing season. Additionally, numerous raptor species forage in the summer or winter over rice fields where they prey on various wildlife, including waterfowl. A reduction in migratory bird habitat or in the abundance of waterfowl, or other raptor prey, could affect local populations.

As discussed previously for special-status bird species, the decisions regarding crop idling/shifting would have already been made prior to the onset of most migratory bird species' breeding season (May through August). Therefore, migratory birds returning to the area would be able to select appropriate nesting sites for that year. The maximum amount of rice idling would be 29,094 acres, which is approximately 8.6 percent of the average acreage of rice harvested in the project vicinity. Therefore, foraging and nesting habitat would be available in active rice fields nearby. In addition, Mitigation Measure VEG and WILD-1 prohibits rice idling/shifting adjacent to important habitat areas for migratory birds. Mitigation Measure VEG and WILD-1 also includes measures to maintain water levels in major irrigation canals that support emergent wetland and riparian vegetation, which provides the predominant nesting substrate for migratory birds in agricultural landscapes. Retaining these habitats by continuing to supply water to these canals will prevent substantial loss of vegetation and open water used by migratory birds for nesting and foraging. Therefore, potential effects on migratory birds associated with the rice-idling action would be less than significant with mitigation.

For the millions of birds that use rice fields during winter migration, the approximate 8.6-percent reduction in harvested rice acreage is not expected to substantially affect the amount of post-harvest flooded agriculture that provides important winter forage for migratory birds, particularly waterfowl and shorebirds. In normal water years, approximately 270,000 acres of post-harvest rice fields are flooded; however, current drought conditions have restricted the amount of available water, and it is expected that approximately 20 percent of the normally flooded fields were flooded in 2022 (California Ricelands Waterbird Foundation 2022). The decision to flood cropland postharvest is not based on what was produced for the year but instead is determined by the availability of fall and winter water. Growers divert a separate water supply, pursuant to state water rights, in fall and winter for rice decomposition. Particularly during drier years (when transfers occur), the amount of land flooded is limited by availability of fall water supply rather than the amount of land that was planted during the irrigation season. Because the Proposed Action does not include transfers of water that would otherwise be used for rice decomposition or otherwise affect the availability of fall

and winter water, it would not change the availability of water for post-harvest flooding, and therefore would not result in a reduction of winter foraging and resting habitat for migrating birds.

Mitigation Measure VEG and WILD-1: Protect Existing Habitat for Wildlife

Mitigation Measure VEG and WILD-1 includes measures to avoid potentially significant impacts on wildlife species associated with cropland idling transfers and to reduce any potential impacts to less than significant levels:

1. As part of the review and approval process for potential water transfers, Reclamation will have access to the land to verify how the water for transfer is being made available and to verify that actions to protect the GGS are being implemented.
2. Movement corridors for aquatic species (including western 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 2 feet of water will be considered sufficient.
3. Maintaining water in smaller drains and conveyance infrastructure supports key habitat attributes such as emergent vegetation for GGS escape, cover, and foraging habitat. If cropland idling/shifting occurs, Reclamation will work with sellers to document that adequate water remains in drains and canals. Documentation may include flow records, photo documentation, or other means of documentation subject to approval by Reclamation and USFWS.
4. Fields abutting, or immediately adjacent to, areas with known important GGS populations (Appendix G) will not be permitted to participate in cropland idling/shifting transfers. Important GGS populations are defined for purposes of this mitigation measure as populations previously identified by biologists from USFWS, USGS, and possibly contract biologists. These populations of GGS were identified early on as identified in previous consultations and are in, or connected to, areas that are considered public or protected. Most of these areas have specific management plans for GGS either for mitigation or as wildlife refuges. One factor influencing the importance of these areas is that they can provide a refuge for GGS independent of rice production. Fields abutting or immediately adjacent to the following areas are considered important GGS habitat:
    - 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
    - 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
    - Lands in the Natomas Basin

5. At the end of the water transfer year, Reclamation will prepare an annual monitoring report that contains the following:
    a. Maps of rice production and all cropland idling actions within the seller district that occurred within the range of potential transfer methods analyzed
    b. Results of current scientific research, summary of monitoring pertinent to water transfer actions, and new GGS detections
    c. Discussion of conservation measure effectiveness
    d. Cumulative history of crop idling and crop shifting specifically to make water available for transfers within the sellers' area

    The report will be submitted to USFWS no later than January 31 of the year following the year in which the transfer occurred.

6. Reclamation will establish annual meetings with USFWS to discuss the contents and findings of the annual report. These meetings will be scheduled following the distribution of the monitoring report and prior to the last day of February.
7. If, upon Reclamation's review of monitoring reports or other scientific literature, it appears that the Project is having unanticipated effects on the GGS, Reclamation will contact USFWS to discuss the information available and effectiveness of Project conservation measures.
8. Reclamation will monitor the effectiveness of the conservation measures by funding GGS distribution and occupancy research. The research, conducted by USGS, includes annual sampling of GGS within the project area and focuses on their distribution and occupancy dynamics. The research is designed to evaluate the effectiveness of the conservation measures to maintain GGS occupancy at sites making water available for transfer in accordance with this IS/EA.

b, c) Less than Significant Impact with Mitigation Incorporation

Proposed Action: Under the Proposed Action, Reclamation would deliver the water made available for transfer to the Member Units of the TCCA on the same pattern that it would have been diverted by the seller if no transfer occurred. This operation would result in a small change in flow between the Red Bluff Pumping Plant and the point where water would have been diverted by the seller absent the transfer. The largest reduction in flow would be about 380 cfs in June, in comparison, flows in the Sacramento River near Colusa from 2009 to 2022 averaged 7,796 cfs in June (DWR 2022a). The water 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. The Proposed Action would have minor effects on riparian habitat along affected waterways. However, root zones would not be dewatered to such an extent as to cause dieback of riparian vegetation. Therefore, impacts would be less than significant.

As discussed in (a), water made available for transfer through groundwater substitution actions could result in streamflow depletion in rivers and creeks, which could directly impact GDEs and other natural communities by changing the timing and volume of streamflow. GDEs including valley/foothill riparian and managed and natural seasonal wetlands could be affected.

An initial screening evaluation of modeled flows in several smaller creeks was conducted. If the flow reduction caused by implementing the transfer would be 1 cfs in 1 month or less, then no further analysis was required because the effect was considered too small to have a substantial effect on natural communities and terrestrial species. Based on these criteria, the evaluation concluded that impacts on natural communities along 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), Auburn Ravine, Honcut Creek, Freshwater Creek, Funks Creek, Stony Creek, Putah Creek, Spring Valley Creek, Dry Creek (tributary to Bear River), Walker Creek, North Fork Walker Creek, Big Chico Creek, Little Chico Creek, and the South Fork of Willow Creek.

If flow reductions were estimated to be greater than 1 cfs in 1 month, then a second screening evaluation was conducted to evaluate effects on natural communities. Similar to the fisheries analysis described above, flow reductions greater than a 10-percent change in mean monthly flow were assumed to have a potential impact on GDEs and other natural communities and required further evaluation.

Groundwater modeling indicates that reductions in flows greater than 1 cfs would occur in Colusa Basin Drain, Coon Creek, Eastside Cross Canal, Cortina Creek, Cache Creek, Butte Creek, Lower Sycamore Slough, Willow Creek, and Stone Corral Creek from November to March, which could affect GDEs and other existing natural communities.

Based on available streamflow data, mean monthly reductions in flow in Colusa Basin Drain and Butte Creek would be less than 10 percent; therefore, reductions in streamflow would not be substantial enough to affect natural communities and impacts would be less than significant. As such, impacts remain less than significant.

Measured flow data were not available for Stone Corral Creek. Glenn-Colusa ID supplements flows to Stone Corral Creek during the irrigation season and fall months by releasing irrigation water. Therefore, flows would be maintained and would not affect existing natural communities. Thus, impacts on Stone Corral Creek would be less than significant.

As described above, historical flow data are limited for Coon Creek. However, even if Coon Creek flows are at the low end of the range of historical values, flow reductions resulting from the Proposed Action would be less than 10 percent. Therefore, it is concluded that effects of the Proposed Action on natural communities within and along Coon Creek would be less than significant.

Historical flow data were not available for the East Side / Cross Canal. As described above, the East Side / Cross Canal is an actively managed flood management structure that collects flood waters, natural flows, and agricultural return flows from several water bodies. Riparian vegetation is generally absent because of periodic levee maintenance and herbicide applications on adjacent farmlands. However, the channel does have a variety of rooted aquatic vegetation, such as cattails, and riparian shrubs, including willows. The groundwater model estimates up to a 12.1 cfs reduction in flow in August and a 11.0 cfs reduction in flow in January. Because vegetation is managed near the canal, natural communities would not be affected. Aquatic vegetation in the canal would not be affected because the canal is a large flood facility that collects substantial drainage and a 11.0 to 12.1 cfs decrease would not likely be of a magnitude sufficient to affect vegetation in the canal. As a

result, it is concluded that effects of the Proposed Action on natural communities in and along the East Side / Cross Canal would be less than significant.

In Cache Creek, monthly decreases in flow resulting from the Proposed Action would range from 0 percent to 9.5 percent of monthly historical flows recorded from 1905 to 2021. The decrease of 9.5 percent occurs only once in below normal years in July, when Cache Creek average streamflow is low, approximately 1.9 cfs, and the Proposed Action would decrease flows by approximately 0.18 cfs. The reduction in streamflow would be so small that it would not likely affect existing riparian natural communities or GDEs.

Historical flow data are not available for Lower Sycamore Slough, Cortina Creek, and Willow Creek. Therefore, the percent change in flow for these streams resulting from the Proposed Action could not be determined. Flow reductions as a result of groundwater declines would be observed at monitoring wells in the region, and adverse effects on riparian vegetation would be mitigated by the implementation of Mitigation Measure GW-1, described in Section X Hydrology and Water Quality, because it requires the monitoring of wells and implementing a mitigation plan if the seller's monitoring efforts indicate that the operation of the wells for groundwater substitution pumping are causing substantial adverse impacts. With implementation of Mitigation Measure GW-1, effects on existing natural communities and GDEs would be less than significant.

Cropland idling to make water available for transfer would result in the idling of approximately 8.6 percent of the average planted rice acreage (337,365) in the seller area. Additionally, cropland idling would only reduce agricultural diversions by the amount of water consumptively used by the crop (when planted), and the remaining water that typically runs off as tailwater would still remain in the agricultural delivery system (canals and waterways leading into the fields). As a result, wetlands would continue to receive irrigation tailwater flows. Therefore, incremental effects on wetlands under the Proposed Action would be less than significant.

d) Less Than Significant Impact with Mitigation Incorporation

Proposed Action: Species that use irrigated rice fields and drainage ditches for habitat, such as GGS and western pond turtle, would need to relocate to other suitable habitat in response to cropland idling, and in doing so, could be exposed to adverse effects, as described above. Idling rice may affect these species' ability to move from one place to another if available movement corridors dry to the extent that they and no longer support vegetation providing cover and refuge. This impact could be potentially significant. Mitigation Measure VEG and WILD-1 would require sellers to maintain water depths of at least 2 feet in major irrigation canals/ drainage canals and prohibits crop idling of rice fields abutting established wildlife refuges. Mitigation Measure VEG and WILD-1 also prohibits transfers from areas with important GGS populations, thereby maintaining protected habitats and movement corridors for use by several populations of GGS and western pond turtle. Therefore, impacts would be less than significant with mitigation.

e, f) Less Than Significant Impact

Proposed Action: Cropland idling to make water available for transfer under the Proposed Action would not conflict with the conservation objectives of the Yolo Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP), which is applicable to portions of the project area within Yolo County, because of the limited amount of crop acreage that would be idled compared to the amount of active cropland available.

Water transfers under the Proposed Action would have a less than significant impact on the natural communities that are covered in the Yolo HCP and NCCP 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 small change in flows would not adversely affect riparian habitat or wetlands associated with the Sacramento River, Shasta Reservoir, or small streams or have adverse effects on special-status species that use these habitats. Mitigation Measure GW-1 also requires sellers to address third-party impacts in lieu of groundwater pumping to make surface water available for transfer, specifically in areas where groundwater subbasins include conservation banks or preserves for GGS. The Proposed Action would not conflict with Yolo HCP and NCCP provisions. Impacts would be less than significant.

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 pursuant to §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA §15064.5?	☐	☐	☐	☒
c) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒

a-c) No Impact

Proposed Action. The decline of water surface elevations in Shasta Reservoir 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 Interim Operations Plan of the CVP/SWP and D1641. Diversions of water, that were made available for transfer through cropland idling/shifting or groundwater substitution actions, would not result in the release of any additional water from Shasta Reservoir.

These water transfers would occur within existing facilities and there would be no ground-disturbing activities, changes in land use, or construction proposed that could disturb historic properties associated with the Proposed Action. This is the type of undertaking that does not have the potential to cause effects to historic properties, should such properties be present, pursuant to the Title 54 U.S.C. § 306108, commonly known as Section 106 of the National Historic Preservation

Act regulations codified at 36 CFR § 800.3(a)(1). Reclamation has no further obligations under Section 106, pursuant to 36 CFR § 800.3(a)(1).

VI. ENERGY

– Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

a) Less than Significant Impact

Proposed Action: Making water available for transfer through groundwater substitution actions would involve increased energy use for the groundwater pumps. This pumping would not be a wasteful use of energy and would not result in significant impacts.

b) No Impact.

Proposed Action. California has a "Renewable Energy Program" focused on development of new utility-level renewable energy sources and rebates for consumers installing facilities. California also has an "Energy Efficiency Strategic Plan" that includes goals to improve agricultural irrigation energy efficiency and improve use of renewable energy (California Public Utilities Commission 2008). The Proposed Action would not result in the construction of new facilities, so it would not conflict with these statewide plans or local general plans.

VII. GEOLOGY AND SOILS

– Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Directly or indirectly cause 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?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
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 direct or indirect risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒

Environmental Setting

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 owing 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.

a) No Impact. There are no new facilities or construction proposed, and no existing facilities fall within an Alquist-Priolo Earthquake Fault Zone, as shown in the Revision of Special Publication 42 of the Department of Conservation, Earthquake Fault Zones in California (California Department of Conservation 2018). Therefore, the 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

Proposed Action: Increased cropland idling in the Sacramento Valley to make water available for transfer is not likely to substantially increase erosion of sediments. Buyers are likely to use transferred water on permanent crops (such as orchards). The soils underlying these fields have a low risk of erosion due to wind; therefore, continued cultivation is not likely to substantially increase erosion.

c) Less than Significant with Mitigation Incorporation. The project area is underlain by clay and is located in flat terrain. No new construction or ground–

d) disturbing actions are proposed that could result in an on- or off-site landslide, lateral spreading, liquefaction, or collapse.

Water made available for transfer through groundwater substitution actions could reduce groundwater levels in the seller areas, which could decrease pore-water pressure and result in a loss of structural support for clay and silt beds. This loss of structural support could result in lowering of the ground surface elevation (land subsidence). Groundwater-pumping-related land subsidence is analyzed in more detail in the groundwater section of Hydrology and Water Quality (Section X). The analysis finds that the potential for land subsidence from increased groundwater pumping (under the Proposed Action) could be significant if groundwater levels fall below historical low water levels. Significant impacts would be reduced to less than significant with Mitigation Measure GW-1, described in Section X Hydrology and Water Quality. Therefore, the effect on potential land subsidence after mitigation would be less than significant.

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

VIII. 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?	☐	☐	☒	☐

Environmental Setting

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 because of the Proposed Action and are not discussed further in this section.

Agricultural emissions represented approximately 8.6 percent of California's GHG emissions in 2020, mainly from methane and nitrous oxide (CARB 2022b). 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.

a, b) Less than Significant

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 propane fuel emission factors from The Climate Registry (TCR 2022)
- Electric utility CO_2 emission factors from TCR (2021)
- Emissions & Generation Resource Integrated Database (eGRID) CH_4 and N_2O emission factors from USEPA (USEPA 2022b)
- "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 pumping. 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 2000-2020 GHG Emissions Trends and Indicators Report (CARB 2022c). 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.

In the seller area, groundwater substitution pumping could increase GHG emissions while cropland idling could reduce vehicle exhaust emissions. Cropland idling could offset some of the emissions from groundwater substitution pumping, but the quantity of water made available for transfer under each method could be much less than what is included in Table 2-1. Therefore, impacts were evaluated for the full volume of water made available through groundwater substitution actions, without regard for any potential offsets from idled land. Table F-1 in Appendix F summarizes the GHG emissions associated with the Proposed Action. Appendix F, Climate Change Analysis Emission Calculations also provides detailed GHG Emission calculations.

Emissions from groundwater substitution would be up to 12,675 metric tons CO_2e per year (detailed calculations are provided in Appendix F), which is lower than the CARB cap-and-trade threshold of 25,000 metric tons CO_2e per year. 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.

IX. 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) For a project located within an airport use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	☐	☐	☐	☒

a-g) No Impact. The 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 Proposed Action would not occur on a hazardous materials site and therefore would not create a risk to the public or environment. The Proposed Action would not affect a public airport or private air strip. The Proposed Action would not interfere with an adopted emergency response plan or emergency evacuation plan. There are no new structures or buildings included in the Proposed Action; therefore, no people or structures would be exposed to a significant risk of loss, injury, or death, such as wildland fires, as a result of implementation.

X. 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 or otherwise substantially degrade surface or groundwater quality?	☐	☐	☒	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☒	☐	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surface, in a manner which would:				
i) Result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
iii) 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?	☐	☐	☐	☒
iv) Impede or redirect flood flows?	☐	☐	☐	☒
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

Environmental Setting

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 the American River (Folsom Reservoir).

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 2022b). Listed water bodies in the area of analysis include the Sacramento River (Red Bluff to Knights Landing), Butte Creek, Colusa Basin Drain, and the Sutter Bypass.

Groundwater

Redding Area Groundwater Basin

The Redding Area Groundwater Basin includes portions of Shasta and Tehama counties and consists of Anderson, Bowman, Enterprise, Millville, and South Battle Creek subbasins. Appendix D includes groundwater elevation monitoring data in the Anderson-Cottonwood ID area (the potential selling entity in the Redding Area Groundwater Basin). Historically, groundwater levels have remained stable within the Redding Area 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). During the recent drought from 2012 to 2016, water levels in the Redding Area Groundwater Basin, and in particular the Anderson subbasin, decreased up to 18 feet (Mount et al. 2019). Figure D-3-4 in Appendix D shows the change in groundwater elevation at groundwater monitoring wells from Spring 2012 to Spring 2022 in the Northern Sacramento Valley Seller Area. As shown in Table D-2 in Appendix D, the average groundwater elevations have decreased 0.6 feet in the shallow aquifer zones, 2.3 feet in the intermediate aquifer zones, and 5.6 feet in the deep aquifer zones from Spring 2012 to Spring 2022 in the Anderson and Enterprise subbasins of the Redding Area Groundwater Basin (DWR 2022b).

Figure D-4-in Appendix D shows the change in groundwater elevation at groundwater monitoring wells from Spring 2017 to Spring 2022 in the Northern Sacramento Valley Seller Area. As shown in Table D-4 in Appendix D, groundwater elevations have decreased 6.9 feet in the shallow aquifer zones, 3.7 feet in the intermediate aquifer zones, and 6.9 feet in the deep aquifer zones from Spring 2017 to Spring 2022 in the Anderson and Enterprise subbasins of the Redding Area Groundwater Basin (DWR 2022b).

Figure D-5-12 Appendix D shows the change in groundwater elevation at groundwater monitoring wells from Spring 2021 to Spring 2022 in the Northern Sacramento Valley Seller Area. As shown in Table D-6 in Appendix D, groundwater levels in the Anderson and Enterprise subbasins of the Redding Area Groundwater Basin show an average decrease of 0.6 and 1.6 feet in the shallow and intermediate aquifer zones, respectively, and an average decrease of 5.3 feet in the deep aquifer zone between Spring 2021 and Spring 2022 (DWR 2022b). Overall, groundwater levels have shown some recovery during recent wet conditions in WY 2017 and WY 2019 and below normal conditions in WY 2018 in the Anderson subbasin. Overall, groundwater-level declines were due to five consecutive drought years and only two wet years where partial recovery occurred.

Land Subsidence. DWR has measured less than 0.2 feet of subsidence between 2008 and 2017 in the Redding Area Groundwater Basin (DWR 2018).

Groundwater Quality. Groundwater in the Redding Area Groundwater Basin area of analysis is typically of good quality, as evidenced by its low total dissolved solids (TDS) concentrations, with a maximum concentration of 640 milligrams per liter (mg/L) (SWRCB 2021). Areas of high salinity (i.e., poor water quality) are generally found on the western basin margins where the groundwater is in contact with marine sedimentary rock. Elevated levels of iron, manganese, nitrate, and TDS have been detected in some areas throughout the basin (SWRCB 2021). Localized high concentrations of boron have been detected in the northern portion of the basin (SWRCB 2021).

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 approximately 34 percent of the annual supply used for agricultural and urban purposes within the Sacramento Valley (DWR 2021c).

Groundwater levels in the northern Sacramento Valley Groundwater Basin have declined over the last 10 years (Spring 2012 to Spring 2022) coinciding with the persistent dry weather conditions. Land use changes since 2004 (e.g., dry farming/grazing and annual/truck crop acreage converted to permanent crops), and the groundwater pumping associated with this change, have also contributed to the decline in groundwater levels in the northern Sacramento Valley Groundwater Basin, especially in areas without surface water on the west side of the Sacramento Valley in Colusa, Glenn, and Tehama counties (DWR 2021d). Figure D-3-in Appendix D shows the change in groundwater elevation at groundwater monitoring wells from Spring 2012 to Spring 2022 in the Northern Sacramento Valley Seller Area. As shown in Table D-3 in Appendix D, the average groundwater elevations have declined 11.0 feet in the shallow aquifer zones, 18.8 feet in the intermediate aquifer zones, and 22.7 feet in the deep aquifer zones from Spring 2012 to Spring 2022 in the Colusa, North American, Sutter and Yolo subbasins of the Sacramento Valley Groundwater Basin (DWR 2022b).

More recently there has been an increase in wet weather conditions, with WY 2017 classified as the wettest year since 1983. However, dry weather conditions returned in the past few years, with WY 2020 classified as a dry year and WY 2021 classified as a Critical Year (DWR 2021e). Although WY 2022 has not yet been classified by DWR, according to the DWR report "Water Year 2022: The Drought Continues," WY 2022 was a dry year, though not as extreme as WY 2021 (DWR 2022c). In general, Spring 2022 groundwater levels in the Northern Sacramento Valley Groundwater Basin are lower in comparison to Spring 2017 levels. Figure D-4 in Appendix D shows the change in groundwater elevation at groundwater monitoring wells from Spring 2017 to Spring 2022 in the Northern Sacramento Valley Seller Area. As shown in Appendix D, Table D-5, on average, from Spring 2017 to Spring 2022, in the shallow, intermediate, and deep aquifer zones, groundwater elevations have declined 10.2, 15.1, and 15.3 feet, respectively in the Colusa, North American, Sutter and Yolo subbasins of the Sacramento Valley Groundwater Basin (DWR 2022b).

Figure D-5 in Appendix D shows the change in groundwater elevation at groundwater monitoring wells from Spring 2021 to Spring 2022 in the Northern Sacramento Valley Seller Area. As shown in Appendix D, Table D-7, groundwater levels in the Colusa, North American, Sutter and Yolo subbasins of the Sacramento Valley Groundwater Basin show an average decrease of 2.8 and 3.7 feet in the shallow and intermediate aquifer zones, respectively, and an average decrease of 6.1 feet in the deep aquifer zone between Spring 2021 and Spring 2022 (DWR 2022b). WY 2021 was a Critical Year and, on average, Spring 2022 groundwater levels across the Northern Sacramento Valley showed decreases in comparison to Spring 2021 groundwater levels.

Overall, Sacramento Valley Groundwater Basin average groundwater levels in 2022 have declined since 2012, with some recovery since 2016. Past groundwater measurements suggest groundwater levels decline moderately during extended droughts and recover to pre-drought levels after subsequent wet periods (DWR 2021c). Change in groundwater elevation for Spring 2004 to Spring 2015 for shallow, intermediate, and deep wells indicate groundwater levels decreased from 2004 through 2015 (DWR 2021b). This period included several years of dry hydrologic conditions with six years classified as Dry or Critical (DWR 2021e). In the subsequent wetter years of 2017 and

2019, groundwater levels recovered, with DWR noting an average increase in groundwater elevation of 1.6 feet in Spring 2019 (DWR 2021b). Figure D-6 in Appendix D shows the change in groundwater elevation at groundwater monitoring wells from Spring 2016 to Spring 2019 in the Northern Sacramento Valley.

Appendix D (Figures D-7 through D-30) includes groundwater-level monitoring data to further characterize groundwater levels in the Sacramento Valley Groundwater Basin near the potential selling entities. These figures show the groundwater level recorded over time (hydrograph) at a specific well for each of the potential groundwater substitution sellers. The hydrographs typically show a drop in water levels in the summer/irrigation season and an increase in the winter/wet season.

Appendix I1 includes monitoring data reports from the 2020 transfer period. Appendix I2 includes monitoring data reports from the 2021 transfer period. There were no TCCA water transfers in 2022. Groundwater-level hydrographs in Appendices I1 and I2 show groundwater levels at the participating pumping wells and nearby monitoring wells. Groundwater-level trends during the 2020 and 2021 transfer season (April through October) indicate substantial declines in groundwater levels during the transfer period (up to 200 feet of decline at some participating pumping wells). Following the 2020 transfer season (Appendix I1), groundwater levels at all participating wells recovered to pre-transfer levels within 1 to 3 months following transfers and generally continued to remain stable. As shown in Appendix I2, following the 2021 transfer season there are several locations that recovered to pre-transfer levels, or showed a trend toward recovery.

Land Subsidence. Historically, as much as four feet of land subsidence has occurred in the eastern portion of Yolo County and the southern portion of Colusa County, primarily due to groundwater extraction and the underlying geology. The area between Zamora, Knights Landing, and Woodland has been most affected (Yolo County 2012). Ground surface elevation at the Zamora gauge has declined steadily over the past two decades (Figure D-31 in Appendix D). Because of groundwater withdrawal over several decades, between 0.5 to 1.5 feet of land subsidence has been recorded east of the town of Zamora between 2008 and 2022 (DWR 2022d). At the Conaway Ranch gauge in Yolo County, ground surface elevation decreased sharply in 2013 and 2014, a dry period (Figure D-32 in Appendix D). There was little to no recovery of ground surface elevation in the following years. DWR measured land subsidence at approximately 0.2 foot from 2012 to 2013 and an additional 0.6 foot from 2013 to 2014 (DWR 2022e). Ground surface elevation trends at these two locations suggest inelastic (i.e., permanent) land subsidence.

In Colusa County, approximately 2.1 feet of subsidence was measured in the Arbuckle area between 2008 and 2017 (DWR 2019). The annual rate of subsidence in Colusa County for WY 2022 was between 0.6 and 0.8 foot per year (DWR 2022c). In Glenn and Sutter counties, ground surface displacement was measured between 0.04 to 0.06 foot from 2008 through 2017 and 0.02 to 0.04 foot from 2008 through 2019; similar displacement measurements were recorded in WY 2022 for Glenn and Sutter counties (DWR 2022f; DWR 2022c). At the Sutter extensometer, land surface elevation decreased between 2008 and 2016, a period of dry conditions (Figure D-33 in Appendix D). The ground surface elevation at this location increased following the low elevation in 2015, during generally wetter hydrologic conditions. The trends at the Sutter extensometer suggest that at least a portion of the observed subsidence is elastic (i.e., temporary) and a portion may be inelastic (i.e., permanent); however, a definite conclusion is difficult to make. Subsidence in these regions is generally related to groundwater pumping and subsequent consolidation of loose aquifer sediments.

Groundwater Quality. Groundwater quality in the Sacramento Valley Groundwater Basin is sufficient for municipal, agricultural, domestic, and industrial uses. However, some localized groundwater quality issues exist in the basin including occurrences of saltwater intrusion, elevated levels of nitrates, naturally occurring boron, and other introduced chemicals (Northern California Water Association 2014). The Groundwater Ambient Monitoring and Assessment (GAMA) Program studied water quality at 49 wells in 2017. Established drinking water benchmarks were utilized to provide context for evaluating the quality of groundwater. A concentration above the maximum contamination level (MCL) for a given constituent is defined as high, while moderate concentrations are less than the MCL.[9] The GAMA study found one or more inorganic constituents present at high concentrations in about 10 percent of the sampled groundwater wells, with arsenic present in high concentrations and hexavalent chromium present in moderate concentrations. In addition, manganese or iron was present at high concentrations in about 16 percent of the groundwater wells and about 12 percent of the sampled wells had moderate concentrations of nitrate. Organic constituents were not present in high concentrations in the groundwater resources (USGS and SWRCB 2019).

a) Less than Significant

Proposed Action: Under the Proposed Action, Reclamation would deliver the water made available for transfer to Member Units of the TCCA on the same pattern as it would have been diverted by the seller if no transfer occurred. In addition, water made available May through September could be backed up in Shasta Reservoir for release in October and November. This operation would result in a small change in flow between the Red Bluff Pumping Plant and the point where water would have been diverted by the seller absent the transfer. The largest change in flow could be approximately 380 cfs in June. For comparison, flows in the Sacramento River near Colusa from 2009 to 2022 averaged 7,796 cfs in June (DWR 2022a). The water 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. Changes in flows would not violate any existing water quality standards or worsen any water quality and flow standard violation.

b) Less than Significant with Mitigation Incorporation

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 (e).

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 service area. Declining groundwater levels resulting from increased groundwater substitution pumping could cause: (1) increased groundwater pumping costs owing to increased pumping depth; (2) decreased yield from groundwater wells owing to reduction in the saturated thickness of the aquifer; (3) decline of the

[9] Moderate concentrations are less than benchmark, but greater than one-half (for inorganic constituents) or one-tenth (for organic constituents) of the benchmark.

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 surface water made available for transfer through groundwater substitution pumping actions would be delivered to users within the same groundwater basin, and therefore could offset the groundwater substitution pumping associated with the Proposed Action. The amount of offset is uncertain, so to be conservative, the analysis considers impacts to groundwater without this offset.

Groundwater Levels

Redding Area Groundwater Basin

Municipal, industrial, and agricultural water demands in the Sacramento River Hydrologic Region are approximately 8-million AF per year (DWR 2021c). Groundwater is a major source of water supply within the Redding Area Groundwater Basin watershed. Some of the surface water made available for transfer through groundwater substitution actions would originate from the Redding Area Groundwater Basin (Anderson and Enterprise subbasins) in Shasta County through actions taken by Anderson-Cottonwood ID. DWR conducted a statewide groundwater basin assessment and prioritized Anderson and Enterprise subbasins as medium priority owing to strong surface water and groundwater interaction in the area and concerns about endangered Sacramento River salmon runs (DWR 2021f). According to the timeline set forth by California's Sustainable Groundwater Management Act (SGMA), medium priority basins were required to have Groundwater Sustainability Plans (GSP) developed by January 31, 2022. The Enterprise-Anderson Groundwater Sustainability Agency (GSA) developed a GSP for the Anderson and Enterprise subbasins. The GSP was submitted to DWR in January 2022 and is currently under review and yet to be approved (DWR 2022g). The proposed Anderson-Cottonwood ID transfer would withdraw up to 4,800 AF of groundwater from production wells (Table H-1 in Appendix H1 contains details about the number of wells and pumping capacity). Unlike other transfers of water made available through groundwater substitution actions, 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 Area 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 2014). Anderson-Cottonwood ID used the same wells each year for groundwater substitution transfers in 2013, 2014, 2015, 2020, and 2021. In the months after these transfers occurred, groundwater monitoring conducted in the vicinity of the production wells indicates groundwater levels recovered in 2013, 2014, 2015, 2020, and 2021 to pre-transfer levels (Anderson-Cottonwood ID 2014, MBK Engineers 2016). Monitoring consisted of depth to groundwater readings from production wells and monitoring wells, flowmeter readings from production wells, and water quality monitoring (temperature and electrical conductivity). Based on the results of the monitoring data collected as part of previous transfers, water made available for transfer through groundwater substitution actions 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 under Mitigation Measure GW-1.

Sacramento Valley Groundwater Basin

In the Sacramento Valley Groundwater Basin, past groundwater-level measurements suggest groundwater levels decline during extended droughts and recover after subsequent wet periods (Appendix D). As required by Assembly Bill 1152, DWR and other monitoring entities extensively monitor groundwater levels in the Basin. Some of the surface water made available for transfer through groundwater substitution actions would originate from the Sacramento Valley Groundwater Basin (Colusa, Sutter, Yolo, and the North American subbasins). DWR conducted a statewide groundwater basin assessment and prioritized the Sutter subbasin as medium priority; the Colusa, Yolo, and the North American subbasins have been prioritized as high priority (DWR 2021f). GSPs for all four subbasins have been submitted and are under review and yet to be approved by DWR (DWR 2022g). Further information on SGMA basin prioritization is provided in Appendix D, Table D-1.

Groundwater drawdown impacts associated with the groundwater substitution pumping that would occur under the Proposed Action were evaluated using the SACFEM2013 groundwater model. The model simulated the changes in groundwater levels from water transfers based on WY 1976[10] hydrologic conditions. WY 1976 was selected because it was a critically dry year and presents what could occur under very dry conditions. The effects of concurrent groundwater substitution pumping from 278 wells that are part of the Proposed Action have been modeled to estimate effects to groundwater resources. Appendix H1 summarizes (1) key characteristics of the SACFEM2013 groundwater model; (2) simulated drawdown of groundwater levels under September 1977 hydrologic conditions; and (3) groundwater head hydrographs at 34 selected locations and seven simulated model layers (varying depths throughout the model) at or near the Seller Service Areas. The groundwater substitution pumping was modeled to occur from May through September, but groundwater substitution pumping could also occur in October. If groundwater pumping continued into October, groundwater drawdown impacts may also extend into October. However, even if groundwater pumping was extended into October, the total amount of water transferred would be the same quantity that was modeled, and pumping would not exceed the maximum volumes listed in Table 2-2. Because the same volume of groundwater substitution pumping may occur over a longer period of time, when compared to the shorter groundwater modeling period, impacts to groundwater levels, interaction with surface water, and land subsidence would be less than those modeled and described below. Overall, a longer duration in pumping for the same quantity that was modeled would decrease the depth of the drawdown impacts.

Groundwater drawdown impacts were assessed based on SACFEM2013 model simulations of the contemplated 2022 TCCA Water Transfers[11] (i.e., groundwater substitution well locations and pumping volumes). These simulation results were used to determine the effects to groundwater resources. Almost all of the well locations planned for the 2022 transfer are the same well locations that would be used in potential 2023 water transfers. The 2023 well locations include the addition of 14 wells and the removal of 1 well compared to 2022. Figure H-1 shows the location of the modeled 2022 groundwater substitution pumping well locations and groundwater substitution pumping well locations for the 2023 Proposed Action.

The 34 modeled hydrograph locations throughout the Sacramento Valley are shown in Figures H-2 through H-8 in Appendix H1, noted with the magenta triangles. Figure 3-1 shows the decrease in

[10] Water Year 1976 extends from October 1976 through September 1977
[11] Note that none of the 2022 TCCA Water Transfers were executed.

groundwater head at Location 21 at varying depths to illustrate the simulated groundwater drawdown and recovery process within the Sacramento Valley Groundwater Basin. Location 21 was selected because most areas in the model exhibit similar declines to those shown in Location 21 (a simulated drawdown is shown in Figures H-2 through H-8 in Appendix H1). Location 21 is near Sycamore Mutual Water Company (MWC) and is in the northwestern portion of the Sacramento Valley approximately four miles from the Sacramento River and Butte Creek confluence and two miles from the Sacramento River and Sycamore Creek confluence. Approximately 60 percent of the pumping near Sycamore MWC (8,000 AF) was concentrated in aquifer model layers 5 and 6 (approximately 480 to 910 feet below ground surface). The pumping in aquifer layers 5 and 6 resulted in approximately 10 feet of drawdown owing to the contemplated 2022 TCCA Water Transfers, in addition to baseline conditions. Most of the recovery near the pumping zone occurs in the year following the transfer event. Recovery at the water table was more gradual. Groundwater recovery is highly dependent on (1) hydrology of the years following the transfer; (2) proximity of a transfer well to surface water; (3) pumping in the year following the transfer; and (4) aquifer properties. Appendix H2 includes simulated groundwater head hydrographs for the 34 locations throughout the Sacramento Valley noted in Appendix H1 with the magenta triangles.

Groundwater substitution pumping under the Proposed Action could result in temporary drawdown. Model results show that increased groundwater pumping owing to the Proposed Action could cause localized declines of groundwater levels, or cones of depression, which in some instances extend beyond the boundaries of the seller areas (a simulated drawdown is included in Figures H-2 through H-8 in Appendix H1). Groundwater substitution pumping could result in groundwater declines in excess of seasonal variation and these effects on non-participating wells could be significant. In addition, while the pumping volumes in potential 2023 water transfers would be the same as the contemplated 2022 pumping volumes, the addition of 14 wells in 2023 would increase the level of drawdown impacts in some areas (where wells were added versus 2022) when compared to the modeled 2022 wells. To reduce these significant effects to less than significant, the Mitigation Measure GW-1 specifies that transferring agencies establish monitoring and mitigation programs for transfers based on groundwater substitution actions. The requirements of GW-1 would require monitoring of groundwater levels within the local pumping area and if effects occurred, the participating seller agencies in the Sacramento Valley Groundwater Basin would reduce pumping or compensate non-participating well owners for effects until the groundwater basin recharges as specified in GW-1. Mitigation Measure GW-1 would reduce the impacts to less than significant.

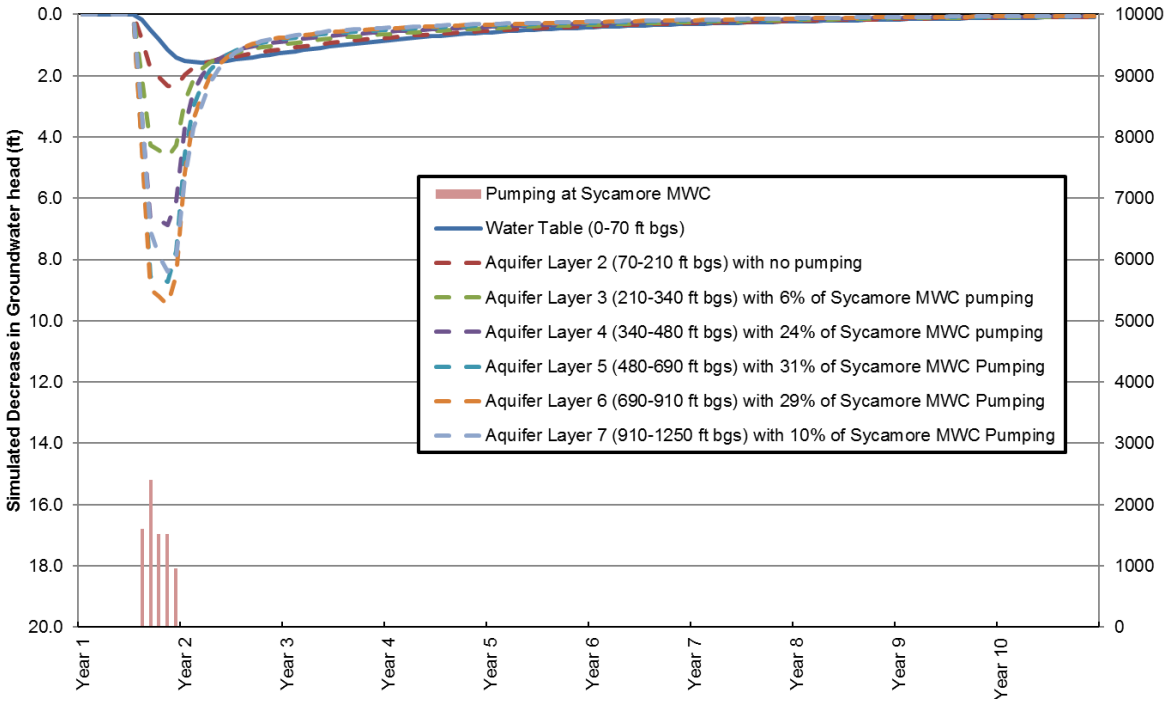

Figure 3-1. Simulated Decrease in Groundwater Head at Location 21 (Figure H-2b contains the location) under the Proposed Action

Groundwater / Surface Water Interaction

The implementation of groundwater substitution pumping can lower the groundwater table and may change the relative difference between the groundwater and surface water levels. Compared to the contemplated 2022 groundwater substitution well locations, the well locations for a potential 2023 water transfer include additional wells along the Sacramento River. The 2023 well locations, including the additional wells along the Sacramento River, are shown in Figure H-1. This change could reduce the amount of surface water, as compared to pre-pumping conditions, due to two mechanisms. The mechanisms are:

- Induced leakage. Lowering the groundwater table causes a condition where the groundwater table is lower than the surface water level. This condition causes leakage out of a surface water body and could also increase percolation rates on irrigated lands.
- Interception of groundwater. A pumping well used for groundwater substitution pumping can intercept groundwater that would have discharged to the surface water absent the pumping.

Because these mechanisms may result in a depletion of streamflow, the volume of water actually transferred is not the same as the volume of groundwater pumped through a substitution action. The amount of water that can justifiably be transferred is the volume of substitution pumping less the amount of induced leakage and the amount of intercepted groundwater flow. The Proposed Action includes measures that would reduce the amount of water made available for transfer and which the Member Units of the TCCA receive by an estimated 13-percent depletion factor to

prevent any adverse impacts associated with groundwater / surface water interaction.[12] This would mitigate potential stream depletion as a result of the Proposed Action. Additionally, the potential effects to fish and riparian vegetation from decreased streamflows are assessed in the Biological Resources section.

Land Subsidence

Excessive groundwater extraction from unconfined and confined aquifers could lower groundwater levels and decrease pore-water pressure in the aquifer. The reduction in pore-water pressure could result in a loss of structural support within clay and silt beds in the aquifer. The loss of structural support could cause the compression of clay and silt beds resulting in a lowering of the ground surface elevation (land subsidence). The compression of fine-grained deposits, such as clay and silt, is largely permanent. Infrastructure damage and alteration of drainage patterns are possible consequences of land subsidence.

Redding Area Groundwater Basin. There is potential for subsidence in some areas of the Redding Area Groundwater Basin if groundwater levels were substantially lowered. The portion of the Redding Area Groundwater Basin west of the Sacramento River is composed of the Tehama Formation. The Tehama Formation has exhibited subsidence in Yolo County. This same formation occurs in the Redding Area Groundwater Basin and could be conducive to subsidence.

The potential for subsidence as a result of the Proposed Action is small since the groundwater substitution pumping is small compared to overall pumping in the region. While the potential for subsidence is minimal, Anderson-Cottonwood ID will implement the Monitoring Program and Mitigation Plan described under Mitigation Measure GW-1, which includes subsidence monitoring. The subsidence monitoring will measure changes in the ground surface elevation and will help determine whether subsidence is short-term or long-term. The monitoring and mitigation actions would verify that this impact would be less than significant.

Sacramento Valley Groundwater Basin. Most areas of the Sacramento Valley Groundwater Basin have not experienced land subsidence that has caused impacts to the overlying land. As discussed in Section 2, portions of Colusa and Yolo counties have experienced subsidence. Specifically in Yolo County, subsidence has been measured at Conaway Ranch. Subsidence in this region is generally related to groundwater pumping and subsequent consolidation of loose aquifer sediments. The Proposed Action does not include a groundwater substitution action within Conaway Ranch.

Groundwater substitution pumping within the Sacramento Valley Groundwater Basin could increase the potential for land subsidence to cause significant impacts when groundwater levels fall below historical low levels. Significant impacts would be reduced to less than significant with Mitigation Measure GW-1. Therefore, the effect on potential land subsidence in the Sacramento Valley Groundwater Basin after mitigation would be less than significant.

[12] The following formulas are from the DRAFT Technical Information for Preparing Water Transfer Proposals (Water Transfer White Paper, document p. 33) (Reclamation and DWR 2019):
Gross Transfer Pumping = Transfer Year Groundwater Substitution Pumping – Baseline Groundwater Pumping.
Surface Water Made Available for Transfer = Gross Transfer Pumping – Estimated Streamflow Reduction.

Mitigation Measure GW-1: Monitoring Program and Mitigation Plan

The objective of Mitigation Measure GW-1 is to avoid potentially significant adverse environmental effects from groundwater-level declines such as (1) impacts to other legal users of water; (2) land subsidence; (3) adverse effects to groundwater-dependent vegetation; or (4) migration of reduced quality groundwater. The mitigation measure also requires prompt corrective action so that impacts discussed previously will be reduced to less than significant in the event unanticipated effects occur. The measure accomplishes this by monitoring groundwater levels and land subsidence in the period during which groundwater is being pumped in-lieu of diverting surface water. Additionally, the mitigation plan identifies necessary preventative action measures if monitoring shows that identified groundwater-level triggers are reached during transfer-related pumping.

Reclamation will verify that sellers implement the Monitoring Program and Mitigation Plan to avoid potentially significant adverse effects of transfer-related groundwater extraction. In addition, each entity making surface water available for transfer through groundwater substitution actions must confirm that the proposed groundwater pumping will be compatible with state and local regulations and Groundwater Management Plans (GMPs). As GSPs are developed by GSAs pursuant to SGMA, potential sellers must confirm that the proposed pumping and the following Monitoring Program and Mitigation Plan, verified by Reclamation, is compatible with applicable GSPs.

Well Review Process

Potential sellers must submit well data for Reclamation review as part of the transfer approval process. The *DRAFT Technical Information for Preparing Water Transfer Proposals (Water Transfer White Paper)* (Reclamation and DWR 2019) can be consulted to understand the information that is necessary for Reclamation to approve a transfer.

Monitoring Program

Potential sellers must complete and implement a monitoring program subject to Reclamation's approval that shall include, at a minimum, the following components:

Monitoring Well Network

The monitoring program shall incorporate a sufficient number of monitoring wells, as determined by Reclamation, to accurately characterize groundwater levels from the appropriate aquifers and their response in the area before, during, and after transfer-related substitution pumping takes place. Depending on local conditions, additional groundwater-level monitoring may be required near ecological resource areas. Monitoring well networks have been established for some of the participating pumping wells (those wells being used in-lieu of diverting surface water that is being made available for transfer) that have also participated in water transfers in previous years. For wells that have not participated in water transfers previously, sellers must identify, in the transfer proposal, suitable monitoring wells as defined below for review and approval by Reclamation. If a suitable monitoring well(s) is not identified for a participating pumping well, the well will not be allowed to participate in a water transfer until a suitable monitoring well(s) is identified.

The monitoring well network would include the participating pumping well and a suitable groundwater-level monitoring well(s) in the vicinity of the participating pumping well(s). Suitable monitoring well(s) would: (1) be within a 2-mile radius of the seller's groundwater substitution pumping well; (2) be located within the same Bulletin 118 subbasin as the groundwater substitution pumping well; and (3) have a screen depth(s) in the same aquifer level (shallow, intermediate, or

deep) as the groundwater substitution pumping well. Wells with short historical records could be considered, but short records (i.e., does not include data prior to 2014) could limit the transfer because the measured historical low groundwater level would not reflect the persistent dry conditions from 2011 to 2015. In this situation, the lowest groundwater level for the short period of record would be used, but because the groundwater level would likely be higher than the historical low during the prior drought period, the groundwater-level triggers (described below) would be more restrictive (i.e., the lowest recorded groundwater level could be reached more quickly during transfer-related groundwater substitution pumping than occurred in the short period of record when groundwater levels were higher).

Monitoring requirements at the participating groundwater substitution pumping well and suitable monitoring well(s) would detect impacts to third parties and land subsidence. Monitoring and mitigation for impacts to groundwater-dependent deep-rooted vegetation and migration of reduced quality groundwater are discussed under "Other Monitoring."

Groundwater-Level Monitoring

Sellers will collect measurements of groundwater levels in both the participating wells (those wells being used in-lieu of diverting surface water that is being made available for transfer) and monitoring wells. Groundwater-level measurements will be used to identify potential concerns for both third-party impacts and inelastic (irreversible) subsidence based on the identified groundwater-level triggers. Groundwater-level monitoring will include measurements before, during, and after transfer-related substitution pumping. The seller will measure groundwater levels as follows:

- Prior to transfer: Groundwater levels will be measured in both the participating pumping well(s) and the monitoring well(s) monthly from March in the year of the proposed transfer-related substitution pumping until the start of the transfer pumping. Monitoring will also be conducted on the day that the transfer pumping begins, prior to the pump being turned on.
- During transfer-related substitution pumping: Groundwater levels will be measured, in both the participating pumping well(s) and the monitoring well(s), weekly throughout the pumping period.
- Post-transfer pumping: Groundwater levels will be measured, in both the participating well(s) and the monitoring well(s), weekly, for one month after the end of transfer-related pumping, after which groundwater levels will be measured monthly through March of the year following the end of the pumping.

Groundwater-Level Triggers

The primary criteria used to identify potentially significant impacts to groundwater levels are the basin management objectives (BMOs) set by GMPs. In the Sacramento Valley, Shasta, Tehama, Glenn, Butte, Colusa, Sutter, Yuba, Nevada, Placer, Sacramento, and Yolo counties have established GMPs to provide guidance in managing the resource.

In areas where quantitative BMO groundwater-level triggers exist, sellers will manage groundwater levels to these triggers and initiate the mitigation plan (discussed in a later subsection) if groundwater levels reach the trigger. In areas where quantitative BMOs do not exist, sellers will manage groundwater levels to maintain them above the identified historical low groundwater level (trigger) and will initiate the mitigation plan (discussed in a later subsection) if groundwater levels reach the trigger. Most of the quantitative BMOs within the Seller Service Area are tied to historical low

groundwater levels. Therefore, the use of historical low groundwater levels in areas without quantitative BMOs is consistent with the approach for areas with quantitative BMOs. As part of a seller's transfer proposal subject to Reclamation's review and approval, the seller will need to identify the monitoring wells and the specific groundwater-level trigger for each well (established through the local BMO or the historical low groundwater level for that well).

Groundwater-level declines due to pumping occur initially at the pumping well and then propagate outward from that location. The magnitude of groundwater-level decline caused by pumping also decreases with increasing distance from the pumping well. Therefore, groundwater-level declines caused by transfer-related substitution pumping would be measured first at the pumping well and subsequently at the monitoring well. The decline would be greatest at the participating well and lower at the monitoring well. Therefore, it is likely that groundwater levels in the participating well would decline to the historical low level sooner than at the monitoring well(s). The monitoring well(s) would provide information surrounding the participating well to avoid potential cumulative impacts.

Other Monitoring

Groundwater Quality. For municipal sellers, the comprehensive water quality testing requirements of Title 22 are considered sufficient for the water transfer monitoring program. Agricultural sellers shall measure specific conductance in samples from each participating production well. Samples shall be collected when the seller first initiates pumping, monthly during the pumping period, and at the termination of transfer-related pumping.

Groundwater Pumping Measurements. All groundwater wells pumping to replace surface water made available for transfer shall be configured with a permanent instantaneous and totalizing flowmeter capable of accurately measuring well discharge rates and volumes. Flowmeters will be installed and calibrated in accordance with manufacturer's recommendations and the relevant documentation will be submitted by the seller to Reclamation. Flowmeter readings will be recorded just prior to initiation of transfer-related substitution pumping and no less than monthly throughout the duration of the pumping period, as close as practical to the last day of the month. Readings will also be recorded just after cessation of pumping.

Shallow Groundwater-Level Monitoring for Deep-Rooted Vegetation. To avoid significant effects to vegetation and allow sellers to modify actions before significant effects occur, sellers will monitor groundwater-level data to verify that significant adverse effects to deep-rooted vegetation are avoided. This monitoring is only required in areas with deep-rooted vegetation (i.e., oak trees and riparian trees that would have tap roots greater than 10 feet deep) within a 0.5-mile radius of the participating well and areas where groundwater levels are between 10 to 25 feet below ground surface prior to starting transfer-related pumping. This monitoring is not required in areas with no deep-rooted vegetation (i.e., oak trees and riparian trees that would not have tap roots greater than 10 feet deep) within 0.5 mile of the participating wells or in areas where vegetation is located along waterways or irrigated fields that will continue to have water during the period of transfer.

In their transfer proposal to Reclamation, the seller would be required to identify if monitoring for deep-rooted vegetation is a requirement. Existing resources such as The Nature Conservancy's groundwater-dependent ecosystem map (https://gde.codefornature.org/#/home) or any existing

biological survey data in the area, and aerial imagery (e.g., Google Maps) could be used to identify deep-rooted vegetation near the participating pumping well.

If deep-rooted vegetation is identified near the participating well, a groundwater-level monitoring well with the following requirements would need to be identified and monitored: (1) monitoring well is within a 0.5-mile radius of the deep-rooted vegetation; and (2) monitoring well would measure shallow groundwater-level changes (within the interval between 10 to 25 feet below ground surface). The participating pumping well can function as the monitoring well if the previously mentioned requirements are met. If monitoring data at the monitoring well indicate that groundwater levels have dropped below root zones of deep-rooted vegetation (i.e., more than 10 feet, where groundwater was 10 to 25 feet below ground surface prior to starting the surface water transfer), the seller must implement actions set forth in the mitigation plan. However, if historical data show that groundwater levels in the area have typically fluctuated by more than this amount annually during the proposed transfer period, then the transfer may be allowed to proceed. Prior to transfer pumping, the seller must submit to Reclamation historical data showing groundwater fluctuations in the area of the deep-rooted vegetation.

If no monitoring wells with the requirements discussed in the previous paragraph exist, monitoring would be based on visual observations by a qualified plant ecologist/certified arborist of the health of these areas of deep-rooted vegetation until it is feasible to obtain or install shallow groundwater monitoring. Monitoring of these areas would include a pre-pumping vegetation assessment within a 0.5-mile radius of the pumping well followed by an assessment near the end of the pumping season but prior to fall/autumn leaf-drop. The assessment of post-pumping impacts on deep-rooted vegetation will be conducted by a qualified plant ecologist/arborist and will take into account the existing health conditions of the vegetation prior to pumping, species present, size-class of trees, and rainfall data from the previous water years. If the qualified plant ecologist/certified arborist determines, based on site-specific circumstances, that groundwater pumping has caused significant adverse impacts to deep-rooted vegetation (that is, any loss of the deep-rooted vegetation), the seller must implement restoration actions set forth in the mitigation plan. Findings from the pre-pumping and post-pumping assessment will be reported to Reclamation.

Coordination Plan

The monitoring program will include a plan to coordinate the collection and organization of monitoring data. This plan will describe how input from third-party well owners will be incorporated into the monitoring program and will include a plan for communication with Reclamation as well as other decision makers and third parties.

Additionally, Reclamation, Member Units of the TCCA, and potential seller(s) will coordinate closely with potentially affected third parties to collect and monitor groundwater data. If a third-party expects that it may be affected by a proposed transfer, that party should contact Reclamation and the seller with its concern. The burden of collecting groundwater data will not be the responsibility of the third-party. If warranted, additional groundwater-level monitoring to address the third-party's concern may be incorporated into the monitoring and mitigation plans required by Mitigation Measure GW-1.

Evaluation and Reporting

The monitoring program will describe the method of reporting monitoring data. At a minimum, sellers will provide data summary tables to Reclamation, both during and after transfer-related

substitution pumping. Post-transfer reporting will continue through March of the year following the transfer. Sellers will provide a final summary report to Reclamation evaluating the effects of the water transfer. The final report will identify transfer-related effects on groundwater and surface water (both during and after pumping), and the extent of effects, if any, on local groundwater users. It shall include groundwater-level contour maps for the area in which the transfer-related pumping is located, showing pre-transfer groundwater levels, groundwater levels at the end of the transfer period, and recovered groundwater levels in March of the year following the transfer. Groundwater-level contour maps for different aquifer depths should also be included where data are available. The summary report shall also identify the extent of transfer-related effects, if any, to ecological resources such as fish, wildlife, and vegetation resources.

Mitigation Plan

Potential sellers must complete and implement a mitigation plan to avoid potentially significant groundwater impacts and ensure prompt corrective action in the event unanticipated effects occur. This plan must document the planned actions if there are unanticipated impacts to groundwater resources or groundwater-dependent vegetation. This plan must be submitted to Reclamation as part of the transfer approval process.

Groundwater Resource Mitigation

If groundwater-level triggers are reached at the participating pumping well(s) or the suitable monitoring well (s) (either BMO triggers or historical low groundwater levels), transfer-related pumping would stop from the participating pumping well that reached the trigger. Transfer-related pumping could not continue from this well (in the same year or a future year) until groundwater levels recovered to above the groundwater-level trigger. Implementation of the mitigation plan thus avoids any potentially significant groundwater impacts. Other corrective actions could include:

- Lowering of pumping bowls in non-transferring wells affected by substitution pumping
- Reimbursement to non-transferring third parties for significant increases in their groundwater pumping costs owing to the groundwater substitution pumping action, as compared with their costs absent the transfer
- Reimbursement to non-transferring third parties for modifications to infrastructure that may be affected
- Other appropriate actions based on local conditions

Deep-Rooted Vegetation Mitigation

If shallow groundwater-level monitoring indicates that groundwater levels have dropped below root zones of deep-rooted vegetation (i.e., more than 10 feet, where groundwater was 10 to 25 feet below ground surface prior to starting the transfer-related pumping), the seller must stop transfer-related pumping at the participating pumping well and cannot resume pumping until groundwater levels have recovered to levels above the root zones. However, if historical data at the location indicate shallow groundwater levels typically declined during the transfer period and remained below the root zone then the transfer may be allowed to proceed.

In areas where visual monitoring is conducted to monitor health of deep-rooted vegetation, the seller must stop transfer-related pumping at the participating well if the qualified plant ecologist/arborist, determines a loss or substantial risk of loss of vegetation.

If adverse impacts to deep-rooted vegetation occur, the seller will perform restoration activities by replanting similar vegetation at a 1:1 ratio at the location loss occurs (for every 1-inch diameter at breast height [dbh] lost, 1-inch dbh will be planted). For example, if 12-inch dbh of oak is lost, then the seller would have to plant twelve 15-gallon oak saplings at around 1-inch dbh each. Therefore, the seller would plant more trees than lost. The seller will plant, irrigate, maintain, and monitor restoration of vegetation for three years to replace the loss(es). All plantings will be fitted with exclusion cages or other suitable protection from herbivores. Plantings will be irrigated for 3 years or until the survival criterion is met. If 75 percent of the plants survive at the end of the 3-year monitoring period, the revegetation will be considered successful. If the survival criterion is not met at the end of the monitoring period, planting and monitoring will be repeated after mortality causes have been identified and corrected. Annual monitoring reports, prepared by a qualified plant ecologist/arborist, will document the status of the plantings and recommendations for remediation as necessary. The monitoring reports will be provided to the seller and Reclamation by August 31 following each year of monitoring (generally beginning July 1 through June 30th of the following year) to allow time for additional planting activities, if necessary.

Transfer-related pumping could not continue at the subject well while vegetation restoration activities consistent with the requirements above are ongoing (i.e., 3 years or until the survival criterion is met). Transfer-related pumping at the subject well could not resume after restoration unless the seller provides evidence that resuming pumping will not affect deep-rooted vegetation (such as data from the installation of a new shallow groundwater-level monitoring well within a 0.5-mile radius of the deep-rooted vegetation that indicates stable shallow groundwater levels at less than 10 feet).

c (i) Less than Significant

Proposed Action: The Proposed Action could include cropland idling, which has the potential to increase sediment erosion into nearby waterways. Growers would implement measures to prevent the loss of topsoil. Additionally, the rice crop cycle and the soil textures in the sellers' areas reduce the potential for erosion due to wind in this region. The process of rice cultivation includes incorporating the leftover rice straw into the soils after harvest through discing. Once dried, the combination of decomposed straw and clay texture soils typically produces a hard, crust-like surface. If left undisturbed, this surface texture would remain intact throughout the summer, when erosion due to wind would be expected to occur, until winter rains begin. This surface type would not be conducive to soil loss from erosion due to wind. During the winter rains, the hard, crust-like surface typically remains intact and the amount of sediment transported through winter runoff would not be expected to increase. Therefore, there would be little to no increase in sediment transport or siltation resulting from erosion due to wind or due to winter runoff from idled rice fields under the Proposed Action and the resultant impact would be less than significant.

c(ii), c(iii), c(iv), d) No Impact. The Proposed Action would not involve any actions that would result in flooding or create runoff water that would exceed the capacity of existing drainage systems, impede or redirect flood flows or provide a substantial source of polluted runoff.

e) Less Than Significant. Changes in groundwater levels and the potential change in groundwater flow directions could cause a change in groundwater quality through a number of mechanisms. One mechanism is the potential mobilization of areas of poorer quality water, drawn down from shallow

zones, or drawn up into previously unaffected areas. Changes in groundwater gradients and flow directions could also cause (or speed) the lateral migration of poorer quality water.

Proposed Action:

Redding Area Groundwater Basin. Groundwater in the Redding Area Groundwater Basin is typically of good quality, as evidenced by its low TDS concentrations, which range from 70 to 640 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 throughout the basin (SWRCB 2021b).

Groundwater extraction under the Proposed Action would be limited to withdrawals during April through October of the 2023 contract year. Since groundwater in the Redding area is of good quality, adverse effects from the migration of reduced groundwater quality would be anticipated to be minimal.

Sacramento Valley Groundwater Basin. 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. Arsenic was detected above the MCL in 22 percent of the primary aquifers within the Sacramento Valley. Nutrient concentrations within the central Sacramento Valley region were above the MCLs in about 3 percent of the primary aquifers. In the southern portion of the basin, nutrients were detected above the MCLs in about 1 percent of the primary aquifers (Bennett et al. 2011).

Groundwater extraction under the Proposed Action would be limited to withdrawals during the irrigation season of the 2023 contract year. Extraction near areas of reduced groundwater quality would not be expected to result in a permanent change to groundwater quality conditions. Consequently, effects from the migration of reduced groundwater quality would be less than significant.

XI. LAND USE AND PLANNING

– Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

a, b) No Impact. The Proposed Action would not involve any construction or new structures that could divide a community or conflict with land use plans, policies, or zoning.

XII. MINERAL RESOURCES

– Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

a, b) No Impact. The Proposed Action does not require construction or other activities that would result in the loss of availability of known mineral resources or mineral resource recovery sites.

XIII. NOISE

– Would the project result in:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c) For a project located within the vicinity of a private airstrip or 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, expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Environmental Setting

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. 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[13] (Glenn County 1993). These noise levels would be similar to conditions in the other counties.

The buyers' and sellers' areas are primarily agricultural; major noise sources include traffic, railroad operations, airports, industrial operations, farming operations, and fixed noise sources. Typical noise levels created by a range of farm equipment are presented in Table 3-4.

Table 3-4. 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) Less Than Significant. The Proposed Action would result in the temporary operation of existing electric-, diesel-, and propane-driven wells that would result in temporary increases in noise levels. All the wells would be located in rural areas, which are generally in a farm setting with typical noise from agricultural operations. The wells would be operated by a willing landowner; therefore, any localized noise levels would be approved by the landowner. Noise impacts from increased well operation would be less than significant.

b, c) No Impact. The Proposed Action would not result in groundborne vibration or noise and would not result in noise near a public or private airport. The Proposed Action would only rely on existing facilities and equipment. No new construction activities would be associated with the Proposed Action and no ground-disturbing actions with the potential to generate groundborne vibrations would occur. Certain wells may be located within an airport land use plan, but there would be no new permanent residents or workers near the wells that could be affected by any plane noise. For private airstrips, the Proposed Action would not expose people in the vicinity to excessive noise levels.

XIV. POPULATION AND HOUSING

– Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒

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

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a) No Impact. The Proposed Action would not induce population growth. Water transfers would help reduce water shortages and would not increase the maximum acreage under production or require more farm workers to meet labor demands. No housing would be constructed, demolished, or replaced as a result of water transfers.

b) No Impact. The Proposed Action would not include construction, demolition, or other activities that could displace existing housing or people and necessitate the construction of replacement housing.

XV. PUBLIC SERVICES

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Fire protection?	☐	☐	☐	☒
b) Police protection?	☐	☐	☐	☒
c) Schools?	☐	☐	☐	☒
d) Parks?	☐	☐	☐	☒
e) Other governmental facilities (including roads)?	☐	☐	☐	☒

a-e) No Impact. The Proposed Action would not create new demand for public services or require any existing public facilities to be altered. Water made available for transfer would be transported using existing conveyance facilities and pumping stations, and would not require the use of area roads, so there would be no impact to roads or other government facilities. Transferred water would not affect the supplies available to municipalities or other jurisdictions for fire protection, parks, or school use. Therefore, there would be no impact to public services or public facilities as a result of this project.

XVI. RECREATION

– Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

a, b) No Impact. The Proposed Action would not affect any recreation facilities or require construction or expansion of recreation facilities.

XVII. TRANSPORTATION

– Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Cause a conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☐	☒
b) Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?	☐	☐	☐	☒
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☐	☒

a-d) No Impact. The Proposed Action would not create new demand on transportation services. The Proposed Action has no construction activities that would increase the traffic on roads in the project area. The amount of water transferred would be less than what is supplied during normal water years, and so would not create an increase in farm activity in the buyer's area that could increase traffic. There would neither be an impact to the level of service or air traffic patterns in the project area, nor would there be an increase in hazards owing to design features, inadequate emergency access or parking capacity, or conflict with adopted policies supporting alternative transportation.

XVIII. TRIBAL 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 tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feather, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or	☐	☐	☐	☒
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒

a) No Impact. The Proposed Action would not include ground-disturbing activities, land alteration, or construction proposed that could disturb tribal cultural resources.

XIX. UTILITIES AND SERVICE SYSTEMS

– Would the project:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electrical power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☐	☒
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☒
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

a-e) No Impact. The Proposed Action would not create new demand on utilities or service systems. There would be no impact to utility or service systems resulting from implementing the Proposed Action. Transfers of water would not require the construction of new water or wastewater treatment facilities, as all transferred water would use existing facilities. There would be no increase in demand for wastewater treatment facilities that could exceed existing capacities, and no new stormwater drainage facilities would be required under the Proposed Action.

Water made available for transfer would be within the existing contractual entitlements and resources, and no new water supplies for the sellers would be required. Buyers would also not require new water supplies as the transferred water would provide agricultural water in lieu of the limited surface water supplies.

There would be no solid waste generated as a result of the Proposed Action; therefore, no landfill would be required. Thus, there would be no impact to utilities or other service systems as a result of the Proposed Action.

XX. MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☒	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

a) Less than Significant with Mitigation Incorporation. The Proposed Action would not have substantial incremental effects to habitat or species relative to the conditions that would occur in response to the dry hydrologic conditions. Mitigation Measures VEG and WILD-1 and GW-1 would reduce potential special-status species impacts to less than significant. The Proposed Action would not degrade the quality of the environment or eliminate examples of California history or prehistory.

b) Less than Significant with Mitigation Incorporation. This cumulative impacts analysis identifies past, present, and reasonably foreseeable future projects with the potential to contribute to cumulative effects, when combined with the Proposed Action. Appendix J summarizes the cumulative projects analyzed in this IS/EA. The conditions with these projects, including the Proposed Action, are referred to as the cumulative condition. Information used in this cumulative impacts analysis is based on the best information available at this time.

The Proposed Action could have potential cumulatively considerable impacts to air quality, biological resources, and groundwater resources. The cumulative analysis for these resources follows. The Proposed Action would not have cumulatively considerable impacts to other resources evaluated in this IS/EA.

Air Quality
All counties affected by the Proposed Action are located in areas designated nonattainment for the PM_{10} CAAQS, except for Shasta County which is designated attainment. Additionally, Sacramento, Tehama, and Sutter counties are designated nonattainment for the O_3 CAAQS and Shasta and Yolo counties are 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.

As previously discussed, the general conformity regulations apply to nonattainment and maintenance areas and are intended to demonstrate that a federal action would comply with the SIP and would not cause the air quality in the region to be degraded. Therefore, if the total of direct and indirect emissions is less than the general conformity *de minimis* thresholds, then the project would not be cumulatively considerable because the ambient air quality standards would continue to be maintained. Furthermore, if total emissions in attainment areas are less than 100 tons per year, the threshold for a "major source" in the New Source Review regulations, then emissions would not be cumulatively considerable.

As discussed in Section III Air Quality, total emissions would not exceed the general conformity *de minimis* thresholds in nonattainment and maintenance areas or the major source threshold in attainment areas. Therefore, air quality impacts would not be cumulatively considerable.

Biological Resources
The Proposed Action would result in a slight decrease in Sacramento River flows from the Red Bluff Pumping Plant to the sellers' points of diversion. Transfers from the cumulative projects discussed in Appendix J would result in increased flows downstream of the sellers' points of diversion to the Delta. Detailed analysis in the Long-Term Water Transfers EIS/EIR and

subsequent Revised EIR/Supplemental EIS concluded that cumulative change in flow due to transfers would not reduce the suitability of habitat conditions during adult immigration by Chinook salmon, steelhead, and green sturgeon (Reclamation and SLDMWA 2015, Reclamation and SLDMWA 2019). This magnitude of cumulative flow change would also not appreciably reduce spawning habitat availability and incubation, increase redd dewatering or juvenile stranding, or reduce the suitability of habitat conditions during juvenile rearing for these sensitive fish species because the increase in flow is so small compared to baseline flows. Other special-status fish species, including hardhead and Sacramento splittail would also not be affected by small changes in river flow.

The Proposed Action includes up to 29,094 acres of rice idling in Glenn, Colusa, Yolo, and Sutter counties. As discussed in Appendix J, some of same sellers could also make water available for transfer to other agencies, including, TCCA, East Bay Municipal Utility District (MUD), SWP contractors receiving water from the North Bay Aqueduct, and south of Delta buyers, including SLDMWA and Metropolitan Water District of Southern California. Additionally, some of the sellers (Settlement Contractors) could also make water available to meet flow measures as part of the Voluntary Agreements. However, the upper limit for rice idling would be limited to 60,693 acres based on the limits in the Long-Term Water Transfers Biological Assessment (Reclamation 2018). Other SWP sellers not analyzed in this document could also transfer water. However, sellers for the SWP transfers are located in the Feather River Basin and there would be minimal geographical overlap between SWP transfers and sellers under the Proposed Action. Consequently, transfers under the cumulative condition would result in the idling of more rice fields than those included in the Proposed Action. The actual quantity of water transferred in a given year, as evidenced by past dry years, would likely be less than the maximum quantities in Table J-2.

As described under IV. Biological Resources, rice fields provide habitat for GGS, western pond turtle, and migratory birds. For the GGS and pacific pond turtle, rice idling could result in reduced forage and cover habitat, hindered movement, and increased predation risk. For migratory birds, rice idling could reduce nesting, foraging, and rearing habitat. Additional rice idled under the cumulative condition could increase these effects relative to the Proposed Action.

Mitigation Measure VEG and WILD-1 includes best management practices to reduce potential effects to special-status species, including GGS and pacific pond turtle, and migratory birds. Other water transfers facilitated by Reclamation and DWR using federal and state facilities would be required to have similar measures in place to protect special-status species. As a result, cumulative impacts to these species would not be expected to be significant. Further, Mitigation Measure VEG and WILD-1 would reduce potential effects of the Proposed Action on special-status species under cumulative conditions, such that the Proposed Action's contribution to any such impacts would be minimal.

Water made available through groundwater substitution actions under the cumulative condition would also result in streamflow depletion and potentially affect flows for fish and natural communities. The transfers included in the cumulative impacts analysis (Table J-1 in Appendix J) include some of the same sellers that make water available for transfer to other agencies. However, the quantity of transfers would be limited to the quantity in Chapter 2. Other SWP transfers included in Table J-1 are generally in different areas of the Sacramento Valley than those included in the Proposed Action and would not substantially increase streamflow depletion in any one area. As a

result, any losses in streamflows would be minor and effects to fisheries or natural communities would be less than significant under the cumulative condition.

Groundwater Resources
The reduction in recharge owing to the decrease in precipitation and runoff in the past drought years in addition to the increase in the quantity of water made available for transfer through groundwater substitution actions transfers would lower groundwater levels. The groundwater modeling for the Proposed Action indicates that groundwater substitution pumping associated with the Proposed Action could result in significant effects to groundwater resources. Implementation of Mitigation Measure GW-1, however, will avoid any potentially significant effects on groundwater resources, and reduce impacts from transfer-related pumping to less than significant. With implementation of Mitigation Measure GW-1, the Proposed Action's incremental contribution to groundwater resources impacts is insubstantial and would not be cumulatively considerable. As discussed in Appendix J, the additional water made available for transfer through groundwater substitution actions, in the cumulative condition are in different areas of the Sacramento Valley (focused in the Feather and American River areas rather than the Sacramento River area); therefore, this addition to the cumulative condition is not likely to cause a significant cumulative impact.

Other groundwater substitution transfers facilitated by Reclamation and DWR using federal and state facilities would be required to have measures similar to Mitigation Measure GW-1 to protect groundwater resources. Reclamation will not approve and/or facilitate transfers if appropriate monitoring and mitigation programs are not in place and are not implemented. Monitoring and mitigation programs would reduce cumulative groundwater effects. Reclamation will verify that monitoring and mitigation are appropriately implemented and effects to groundwater do not occur. Coordination of groundwater programs in the Sacramento Valley would also minimize and avoid the potential for cumulative effects to groundwater resources. DWR is involved in multiple groundwater programs in the Sacramento Valley, including monitoring programs. Reclamation will work with DWR to track program activities, collect and combine data, and assess potential groundwater effects. Because of the required groundwater monitoring and mitigation for transfer approval and agency coordination, the Proposed Action would not result in a cumulatively considerable contribution to effects on groundwater.

c) No Impact. The Proposed Action would not result in environmental effects that cause substantial adverse impacts to human beings. Effects in the sellers' area would be temporary, occurring only in 2023, and do not present a substantial risk to water supplies to human beings. The Proposed Action would provide additional water to the buyers' area, which would benefit agricultural production and the regional economies in the buyers' area. There would be no long-term effects of the Proposed Action. The Proposed Action would be used to meet anticipated water supply shortages within the service area of the Member Units of the TCCA during drought conditions and would not permanently increase the Contract Total of the Member Units of the TCCA. Therefore, there would be no contribution to growth-inducing impacts.

Section 4 Other Reclamation Environmental Compliance Requirements

In addition to resources analyzed in Section 3, Department of the Interior Regulations, Executive Orders, and Reclamation guidelines require a discussion of the following additional items when preparing environmental documentation.

4.1 Indian Trust Assets (ITAs)

ITAs are defined as legal interests in property held in trust by the U.S. government for Indian tribes or individuals, or property protected under U.S. law for federally recognized Indian tribes or individuals. ITAs can include land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, and in-stream flows associated with a reservation or Rancheria. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the U.S. The following ITAs overlay the boundaries of the Sacramento Valley Groundwater Basin: Auburn Rancheria, Chico Rancheria, Colusa Rancheria, Cortina Rancheria, Paskenta Rancheria, and Rumsey Rancheria.

Groundwater substitution is the only method of making water available, under the Proposed Action, that could affect ITAs. Auburn Rancheria, Cortina Rancheria, and Rumsey Rancheria lie on the border of the basin where groundwater levels would be less affected by proposed groundwater substitution pumping. Groundwater modeling in the Sacramento Valley Groundwater Basin shows that there would be essentially no effect to groundwater table elevations from groundwater substitution pumping near the Chico Rancheria and Paskenta Rancheria sites (Figure H-9 in Appendix H1). The Colusa Rancheria is near an area of potential drawdown; however, the changes in groundwater levels near the Colusa Rancheria would be negligible and would not affect groundwater pumping within Colusa Rancheria.

The Redding Rancheria falls within the Redding Area Groundwater Basin, which is where Anderson-Cottonwood ID would make water available through groundwater substitution actions. The groundwater evaluation concludes that, although there would not be significant effects to groundwater elevations in the Redding Area Groundwater Basin based on past pump tests, that Anderson-Cottonwood ID would develop and implement a Monitoring Program and Mitigation Plan because of the uncertainty of changes in groundwater levels in a critical water year. As a result, there would be no effects to the Redding Rancheria.

Because groundwater substitution pumping would not significantly affect groundwater table elevations near the ITA sites, the Proposed Action would not affect ITAs.

4.2 Indian Sacred Sites

As defined by Executive Order 13007: Indian Sacred Sites, a sacred site "means any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian

individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." The affected environment for the Proposed Action does not include Federal land; therefore, there is no potential for Indian Sacred Sites to be affected by the Proposed Action.

4.3 Environmental Justice

Executive Order 12898 directs federal agencies to address disproportionately high and adverse human health and environmental effects on minority and low-income populations. Minority populations are American Indian or Alaskan Native, Asian or Pacific Islander, Black, or Hispanic individuals in the affected environment that either: a) exceed 50 percent, or b) these populations are meaningfully greater[14] than the minority population percentage in the state (Federal Interagency Working Group on Environmental Justice and NEPA Committee 2016). Low-income populations in an affected area are identified based on the poverty thresholds from the Bureau of the Census Current Population Reports, Series P-60 on Income and Poverty.

California is a diverse state and Table 4-1 shows the minority population in the project study area (Glenn, Colusa, Sutter, and Yolo counties) is similar to that of the State of California as a whole. During the 2016-2020 census period, the racial category with the highest percent of population in the project study area is white alone (62.8 percent). The ethnic category in the table of Hispanic or Latino represents those who self-identify themselves as "other Spanish, Hispanic, or Latino" on the census questionnaire. Colusa County had the highest percent of the population that self-identify as Hispanic or Latino of those in the project study area.

Table 4-1 also shows that the percent of low-income persons or families is not meaningfully greater than that of the rest California. Glenn County had the highest percent of families living below the poverty threshold.

Based on the data in Table 4-1 and a "meaningfully greater" analysis of percentages compared to the State of California, no minority or low-income populations are present in the study area that would be adversely affected by the proposal as described in this IS/EA. Therefore, the Proposed Action is not subject to the provisions of Executive Order 12898 and no further environmental justice analysis is required.

[14] Meaningfully Greater is a term used in "Appendix A, Text of Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Annotated with Proposed Guidance on terms," which is attached to CEQ's Environmental Justice Guidance under the National Environmental Policy Act (CEQ 1997).

Table 4-1. Demographic Characteristics of the Project Study Area, 2016–2020*

	Glenn, Colusa, Sutter, and Yolo	California
Population, Numbers	364,640	39,346,023
White alone	229,084	22,053,721
Black or African American alone	8,136	2,250,962
American Indian alone	3,351	311,629
Asian alone	48,659	5,834,312
Native Hawaii & Pacific Islands alone	1,650	149,636
Some other race alone	22,710	5,623,747
Two or more races	34,038	3,122,016
Hispanic or Latino (of any race)	124,110	15,380,929
Poverty Prevalence, Numbers		
People below Poverty	58,398	4,853,434
Families below Poverty	8,031	808,800
Percentage of Total		
White alone	62.8	56.1
Black or African American alone	2.2	5.7
American Indian alone	0.9	0.8
Asian alone	13.3	14.8
Native Hawaii & Pacific Islands alone	3.4	0.4
Some other race alone	6.2	14.3
Two or more races	9.3	7.9
Hispanic or Latino (of any race)	34.0	39.1
Poverty Prevalence, Percentage		
People below Poverty	16.5	12.6
Families below Poverty	9.6	9.0

Sources: U.S. Census Bureau 2020
** American Community Survey 5-Year Estimates*

4.4 Consultation and Coordination

4.4.1 Agencies and Persons Consulted

Reclamation consulted with the following agencies in preparing this IS/EA.

- Tehama-Colusa Canal Authority

Reclamation determined that approving water transfers that allowed idling of rice fields may affect, and was likely to adversely affect GGS. Reclamation provided the USFWS with a Biological Assessment in November 2018. The USFWS provided its biological opinion to Reclamation on May 17, 2019, for water transfers that included fallowing and idling rice fields. The Proposed Action evaluated in this IS/EA will adhere to the terms and conditions presented in the 2019 Biological Opinion.

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