BUREAU OF RECLAMATION

Environmental Assessment

Purchase of Water for Support of Fish and Wildlife on the Sacramento River

California Great Basin - Interior Region CGB-EA-2022-040

Mission Statements

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated Island Communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Contents

Tables

Figures

Appendices

List of Abbreviations and Acronyms

AF	acre-feet
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CVP	Central Valley Project
CVSR Chinook salmon	Central Valley spring-run Chinook salmon
Delta	Sacramento-San Joaquin Delta
DOC	California Department of Conservation
DPS	distinct population segment
DWR	California Department of Water Resources
EA	Environmental Assessment
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FONSI	Finding of No Significant Impact
FR	Federal Register
GGS	giant garter snake
GSA	groundwater sustainability agency
GSP	groundwater sustainability plan
IEP	Interagency Ecological Program for the San Francisco Bay/Delta Estuary
IS	Initial Study
ITAs	Indian Trust Assets
LSZ	low salinity zone
LTO	Long-Term Operation
LTWT	Long-Term Water Transfers
MAF	million acre-feet
MBTA	Migratory Bird Treaty Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NASS	National Agricultural Statistics Service
NCWA	Northern California Water Association
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
Reclamation	Bureau of Reclamation
ROD	Record of Decision
sDPS	southern distinct population segment

Settlement Contracts	Sacramento River Settlement Contracts
Settlement Contractors	Sacramento River Settlement Contractors
SGMA	Sustainable Groundwater Management Act
SRSCC	Sacramento River Settlement Contractor Non-Profit Corporation
SRWR Chinook salmon	Sacramento River winter-run Chinook salmon
State Board	California State Water Resources Control Board
SWP	State Water Project
TAF	thousand acre-feet
TMP	Temperature Management Plan
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WY	Water Year
2019 BiOps	Reintiation of Consultation for Long-Term Operations of the CVP and SWP 2019 Biological Opinions

Section 1 Introduction

1.1 Background

In conformance with the National Environmental Policy Act of 1969 (NEPA), Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1500-1508), and Department of Interior Regulations (43 CFR Part 46), the Bureau of Reclamation (Reclamation) prepared this Environmental Assessment (EA) to evaluate and disclose potential environmental impacts associated with the proposed purchase of water for support of fish and wildlife on the Sacramento River and provide more flexibility in operations to support temperature management into water year (WY) 2023[1] that may have benefits for Sacramento River Winter-Run Chinook Salmon and work to stabilize flows in October and early November for Sacramento River Fall-Run Chinook Salmon.

The State of California is in a third consecutive year of severe drought. Water levels in Reclamation and the California Department of Water Resources (DWR) reservoirs were near historic lows in March 2022. Following a promising start to the water year in October and again in December of 2021, the next three months of January, February, and March of 2022 were the driest consecutive three months in the Sacramento River watershed on record (DWR 2022a). This was particularly acute in the watershed above Shasta Dam where the late 2021 storms largely did not improve storage levels. Shasta Reservoir storage, at the beginning of the WY 2022 was 1.08 million acre-feet (MAF) and the estimated Shasta Reservoir unimpaired inflow as of June 1, 2022, was 2.980 MAF, which was proceeded by the worst unimpaired runoff in the 70 years prior of 2.479 MAF (Reclamation 2021; DWR 2022b).

Shasta Reservoir is the State of California's largest reservoir with the ability to store up to 4.552 MAF creating a deep and well stratified cold-water pool behind Shasta Dam. This cold-water pool is used to maintain temperatures and flows in the Sacramento River downstream of Shasta in most years. Following two consecutive dry years and with the hydrology in 2022 being potentially one of the worst on record, measures to protect cold-water pool in Shasta Reservoir were necessary in order to provide preferred in-river temperatures to support egg/fry emergence, and limit juvenile mortality of Winter-run Chinook salmon in the Sacramento River and benefit other species. In coordination with State and Federal fish agencies and the California State Water Resources Control Board (State Board), Reclamation drafted, and the State Board conditionally approved, the Shasta Temperature Management Plan (TMP) in May of 2022 (State Board 2022; Reclamation 2022). The TMP, among other things, outlines Reclamation's commitment to provide temperature management of the Sacramento River for the longest and most beneficial period. The TMP also outlines procedures and coordination actions Reclamation will take if hydrology or other factors prohibit Reclamation from providing preferred temperatures in the Sacramento River.

Key provisions of the TMP for WY 2022 limited releases from Keswick Reservoir to 4,500 cubic feet per second (cfs) throughout the summer months (May through September) with any increases to this amount carefully considered and reviewed by several affected parties. This was a historically low release for operations of the Sacramento River. As a result of these constraints, the difference between the water released from Keswick Dam, along with other minimal inflows from Sacramento

[1] Water Year 2022 extends from October 1, 2021 through September 30, 2022.

River tributaries, and the flow targets at Wilkins Slough was available for diversions by water users on the Sacramento River.

The Sacramento River Settlement Contractors (Settlement Contractors) have established contracts with Reclamation that allow them to divert Base Supply[2] and Central Valley Project (CVP) Water (Project Water)[3] annually from April 1 through October 31 of each Year. Figure 1-1 shows the location of the Settlement Contractors along the Sacramento River. The aggregate water supplies provided under the Sacramento River Settlement Contracts (Settlement Contracts) constitutes approximately 2.11 MAF during non-Critical years. Consistent with the provisions in the Settlement Contracts, on February 15, 2022, Reclamation made a determination of a Critical Year for contract year 2022. This determination was based on forecasted natural inflow into Shasta Reservoir. When a Critical Year determination is made, the Settlement Contracts provide that the Base Supply and Project Water diverted during the period April through October will be reduced by 25 percent. In a Critical Year, the Contract Total, the sum of Base Supply and Project Water, is approximately 1.582 MAF.

However, as a result of the historically dry conditions in WY 2022, Reclamation informed the Settlement Contractors that the actual water supply conditions were such that approximately 18 percent of the Contract Total, or approximately 380 thousand acre-feet (TAF), would be available for diversion during the period May 1 through October 31. In Reclamation's letter of April 14, 2022, to the Settlement Contractors, Reclamation agreed that due to constrains in the system, for contract year 2022, the Settlement Contractors could reschedule any unused monthly quantity of water that would otherwise be diverted in a particular month during the 2022 contract year to a succeeding month without incurring the Base Supply Rescheduling Fee as required in Article 3(c)(1) of the Settlement Contract. Water available to the Settlement Contractors during contract year 2022 is approximately 380 TAF, which is approximately 18 percent of the aggregated Contract Total. While constraints have limited potential delivery of water to approximately 18 percent of the Contract Total, many Settlement Contractors have taken additional measures to conserve or reduce demand through the summer months. Based on current measured diversions and projected delivery schedules for the remainder of the 2022 contract year, the Settlement Contractors have delivered 330 TAF[4], which is 15 percent of the aggregated Contract Total from April 1 through October 31. This includes 50 TAF diverted from April 1 through May 10, that Reclamation did not count against the 18 percent Contract Total, thereby freeing up some of the 18% to be and that could be rescheduled for delivery later in the year. In order to protect storage in Shasta Reservoir for WY 2023, Reclamation proposes to enter into a contract with the Sacramento River Settlement Contractor Non-Profit Corporation (SRSCC), acting on behalf of willing Settlement Contractor participants, to purchase up to 100 TAF of conserved water which has been rescheduled and that could otherwise be furnished in October of 2022. This would allow for diversions of Settlement Contract water quantities through the remainder of the Contract Year ending October 31, 2022, while preventing additional releases from storage of the conserved and rescheduled water which will

[2] Base Supply is defined in the Settlement Contracts as the quantity of Surface Water established in Articles 3 and 5 which may be diverted by the Contractors from its Source of Supply each month during the period April through October of each Year without payment to the United States for such quantities diverted.

[3] Project Water is defined in the Settlement Contracts 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.

[4] Total delivered 330 TAF from April 1 through October 31 with 50 TAF delivered from April 1 through May 10 and an additional 280 TAF delivered from May 10 through October 31.

help contribute to Shasta Reservoir storage at or higher than projected levels. End-of-September storage in Shasta Reservoir is currently forecasted to be 1.45 MAF which will continue to decrease through October. The proposed action would allow for up to 100 TAF of conserved water that could otherwise be delivered during October, the 2022 contract year, to remain in Shasta Reservoir to contribute to storage for WY 2023. This additional storage may benefit cold-water pool and instream temperature management for WY 2023 and may have additional fish and wildlife benefits as may be needed to meet flow objectives for fish and wildlife on the Sacramento River.

Reclamation was appropriated $200,000,000.00 in the fiscal year 2022 government funding continuing resolution (Public Law 117-43) for activities to address drought as determined by the Secretary of the Interior. Consistent with Section 101(c) of the Reclamation States Emergency Drought Relief Act of 1991, as amended, Reclamation proposes to use appropriations from Public Law 117-43 to purchase water conserved by the Settlement Contractors and to utilize the conserved water to increase end of year storage in Shasta that could have otherwise been delivered which may improve temperature management in the Sacramento River for WY 2023 which may help Sacramento River Winter-run Chinook Salmon and other species as well as help meet fall and winter flow objectives on the Sacramento River. This EA evaluates the effects of Reclamation's proposed Purchase of Water from the Settlement Contractors. for improving storage in Shasta Reservoir following the end of the WY 2022 for fish and wildlife.

1.2 Need for the Proposed Action

The Proposed Action is to acquire water that would have otherwise been diverted during October of the contract year 2022 and make it available to contribute to higher level of storage in Shasta Reservoir than would otherwise occur if water had been released for the Settlement Contractors. The acquisition of water would support a 2023 TMP and 2023 interim operations plan by increasing the Shasta Reservoir storage level beginning in WY 2023. The water acquired is needed to help with future drought conditions which may benefit cold water pool development and instream temperature management for WY 2023.

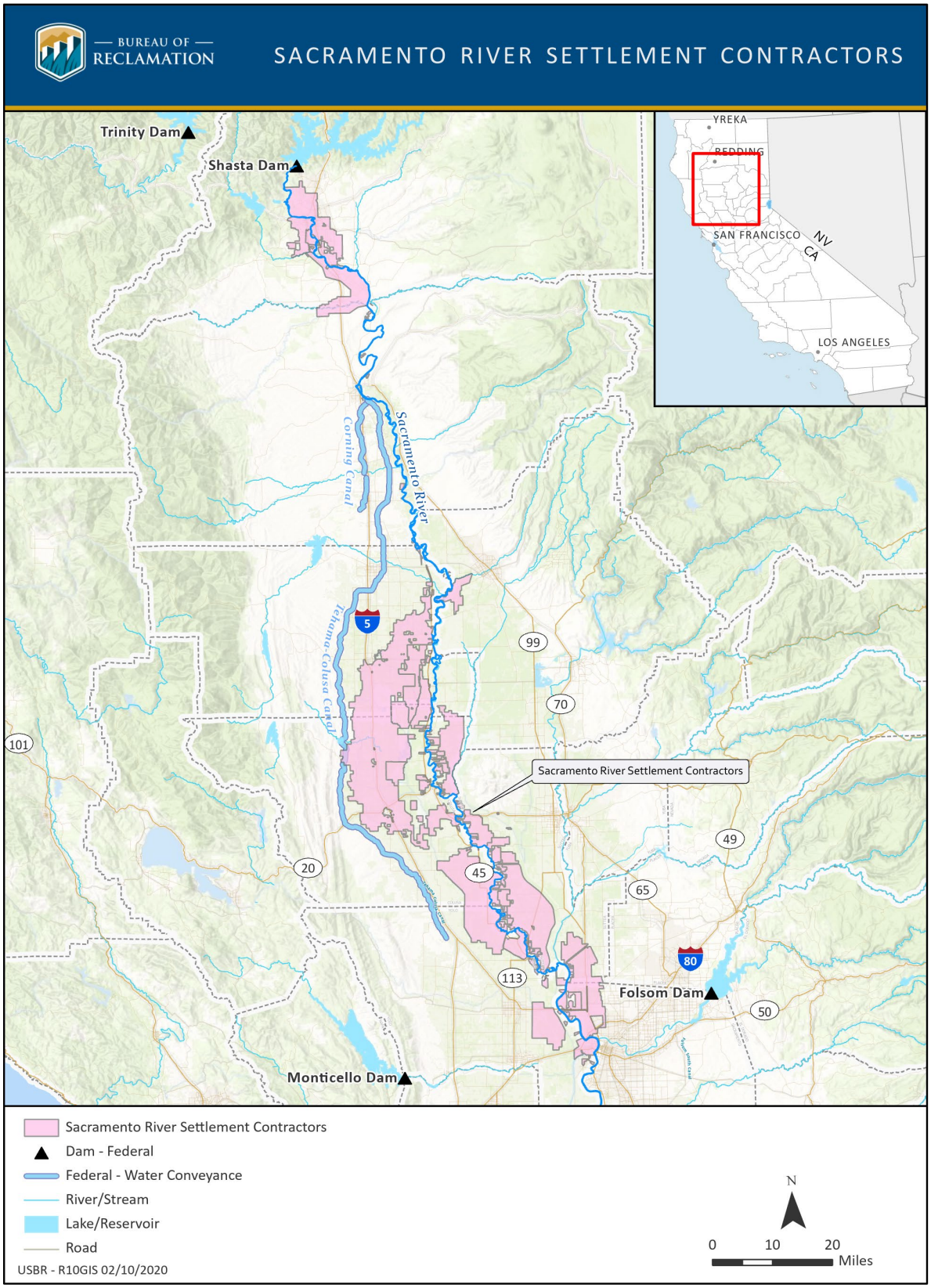


Figure 1-1. Sacramento River Settlement Contractors Map

Section 2 Alternatives Including the Proposed Action

California and the Western United States are enduring a third year of critically low rainfall and warmer than usual temperatures (DWR 2022a). Shasta Reservoir storage at the beginning of WY 2022 was 1.08 MAF, and the estimated Shasta Reservoir unimpaired inflow as of June 1, 2022, was 2.980 MAF which was proceeded by the worst unimpaired runoff in the prior 70 years of 2.479 MAF (Reclamation 2021; DWR 2022b).

Exhibit A of the Settlement Contracts list monthly volumes of water, which the Settlement Contractors are authorized and entitled to divert each month from April 1 to October 31 of each Year. In Reclamation's letter of April 14, 2022, to the Settlement Contractors, Reclamation agreed that due to constraints in the system, for contract year 2022, the Settlement Contractors could reschedule any unused monthly quantity of water that would otherwise be diverted in a particular month during the 2022 contract year to a succeeding month without incurring the Base Supply Rescheduling Fee as required in Article 3(c)(1) of the Settlement Contract. Water available to the Settlement Contractors during contract year 2022 is approximately 380 TAF, which is approximately 18 percent of the aggregated Contract Total. While constraints have limited potential delivery of water to approximately 18 percent of the Contract Total, many Settlement Contractors have taken additional measures to conserve or reduce demand through the summer months. Based on current measured diversions and projected delivery schedules for the remainder of the 2022 contract year, the Settlement Contractors have delivered 330 TAF, which is 15 percent of the aggregated Contract Total from April 1 through October 31. This includes 50 TAF diverted from April 1 through May 10, that Reclamation did not count against the 18 percent Contract Total, thereby freeing up some of the 18% to be rescheduled for delivery later in the year. Reclamation proposes to enter into a contract with the SRSCC, acting on behalf of willing Settlement Contractor participants, to purchase up to 100 TAF of water that the Settlement Contractors would otherwise divert in October, consistent with the Settlement Contracts. This purchase would support improved water conditions supporting cold-water pool development in Shasta Reservoir going into WY 2023.

2.1 No Action Alternative

Under the No Action Alternative, Reclamation would not use drought-relief funding to purchase up to 100 TAF of water the Settlement Contractors would otherwise divert in October, consistent with Settlement Contracts to provide for increased storage in Shasta Reservoir going into WY 2023. Consequently, storage levels in Shasta Reservoir would be reduced by this amount of water going into WY 2023; and Reclamation may have reduced flexibility to meet cold water and temperature management targets for WY 2023.

Under the No Action Alternative, the Settlement Contractors would divert the 100 TAF of conserved water in Shasta Reservoir, during the month of October, consistent with Settlement Contracts. Since this water would be diverted in October, the water could be used to irrigate permanent crops, or winter flooding for rice decomp, or for field flooding of fallowed crop lands that is expected to benefit groundwater recharge. Due to the current dry conditions of the Settlement Contractor water conveyance systems (includes systemwide irrigation canal and ditches), a significant portion of the water diverted during the month of October would be accounted towards conveyance losses.

2.2 Proposed Action

Under the Proposed Action, Reclamation would enter into a contract with the SRSCC, acting on behalf of willing participants, to purchase up to 100 TAF of water the Settlement Contractors could have otherwise diverted in October 2022, consistent with Settlement Contracts. The contract between Reclamation and the SRSCC (or other willing Settlement Contractor participants,) would outline the roles and responsibilities of both parties and would identify the quantity and price of the water that Reclamation would purchase. The water acquired by Reclamation under the contract would remain in Shasta Reservoir and would increase the Shasta Reservoir storage level going into WY 2023. This higher reservoir elevation may promote better cold-water pool and temperature management in WY 2023. Additionally, this purchase would also support a steady release schedule from Keswick Reservoir through mid-October to help avoid dewatering Sacramento River winter-run Chinook salmon redds and help developing Sacramento River fall-run Chinook Salmon avoid late season dewatering when fall releases at Keswick drop to minimums. For the analysis in this EA, it is assumed that the SRSCC would enter into a contract with Reclamation on behalf of all the Settlement Contractors; thus, all of the Settlement Contractors would forgo delivery of water in October 2022. Under the Proposed Action, the Settlement Contractors would not divert up to 100 TAF of water that could otherwise be delivered in October 2022.

Section 3 Affected Environment and Environmental Consequences

This section addresses the affected environment and environmental consequences of the Proposed Action when compared to the No Action Alternative including the effects, or impacts, of the Proposed Action. Since individual Settlement Contractors must opt-in to participate in the Proposed Action, the affected environment in the service area of all Settlement Contractors was considered in evaluating potential environmental impacts.

CEQ NEPA regulations provide that tiering (CFR Section 1501.11) includes incorporating by reference (CFR Section 1501.12) general discussions from broader EIS analyses and focusing on specific issues to the document being prepared. Reclamation, in accordance with Department of the Interior NEPA regulations 43 CFR Part 46.120(d), should "make the best use of existing NEPA documents by supplementing, tiering to, incorporating by reference, or adopting previous NEPA environmental analysis to avoid redundancy and unnecessary paperwork." The related environmental documents listed below contain analysis and assumptions that are appropriate for the analysis in this EA and are hereby incorporated by reference (43 CFR Part 46.135).

- Long-Term Water Transfers (LTWT) Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) (2019 LTWT EIS/EIR) and Record of Decision (ROD), May 7, 2021 https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=18361
- 2021 Tehama-Colusa Canal Authority In-Basin Water Transfers Initial Study (IS)/EA (2021 TCCA IS/EA) and Finding of No Significant Impact (FONSI), April 15, 2021 https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=49404
- Long-Term Operation (LTO) of the CVP and State Water Project (SWP) EIS (2019 LTO EIS) and ROD, February 19, 2020 https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=39181
- 2021 Groundwater Actions to Offset Surface Water Diversions from the Sacramento River in Response to Drought in 2021 and FONSI signed August 4, 2021. https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=50127

In cases where the impacts of the Proposed Action "…are identified and analyzed in the broader NEPA document, or no effects are anticipated to the resources, no further analysis is necessary…" (43 CFR Part 46.140(a)). Reclamation determined that the Proposed Action did not have the potential to cause effects or to cause adverse effects beyond those analyzed in the previous studies on the resources presented in Table 3-1. These resources have been eliminated from further consideration in this EA and the reasoning behind each elimination is detailed in Table 3-1.

Table 3-1. Resources Eliminated from Further Consideration

Resource	Reason Eliminated
Aesthetics	The Proposed Action would have no effect on scenic resources or public views.
Geology, Soils, & Mineral Resources	The Proposed Action would occur within existing facilities and there would be no ground disturbing activities.
Land Use	The Proposed Action would occur within existing facilities and there would be no ground disturbing activities or changes in land use.
Population & Housing	The Proposed Action would not result in changes to populations or population growth and will not displace existing people or housing, and therefore will have no effects on population and housing.
Transportation & Traffic	The Proposed Action would occur within existing facilities and there would be no changes in transportation or traffic.
Recreation	The Proposed Action would occur within existing facilities and there would be no changes in recreational resources.
Hazards & Hazardous materials	The Proposed Action would not result in the use or transport of hazardous materials.
Cultural Resources	The Proposed Action would occur within existing facilities and there would be no ground disturbing activities, land alteration, or construction that would affect existing or potential cultural resources.
Public Services & Utilities	The Proposed Action would occur on private property using private utilities and would not result in changes to the use of public services or utilities. The Proposed Action would not create a new demand on services or utilities.
Air Quality and Greenhouse Gas Emissions	The Proposed Action would not result in changes to air quality and not contribute to greenhouse gas emissions.
Noise	The Proposed Action would not result in changes to noise levels in the affected area.

3.1 Required Resource Discussions

Department of the Interior Regulations, Executive Orders, and Reclamation guidelines require a discussion of Indian sacred sites, Indian Trust Assets (ITAs), and Environmental Justice when preparing environmental documentation.

3.1.1 Indian Trust Assets

ITAs are legal interests in assets that are held in trust by the United States for federally recognized Indian tribes or individuals. The Proposed Action area is comprised of eight counties in California: Shasta, Colusa, Yolo, Glenn, Tehama, Butte, Sacramento, and Sutter counties (Reclamation and San Luis and Delta-Mendota Water Authority (SLDMWA) [SLDMWA 2019]). Six of the eight counties in the Proposed Action area contain ITAs (Sacramento and Sutter counties do not contain any reservations or Rancherias). The relevant ITAs are listed below, by county.

- Shasta County: Big Bend, Burney Tract, Montgomery Creek, Redding, and Roaring Creek Rancherias

- Colusa County: Colusa and Cortina Rancherias
- Yolo County: Rumsey Rancheria
- Glenn County: Grindstone Creek Rancheria
- Tehama County: Paskenta Band of Nomlaki Indians
- Butte County: Mooretown, Chico, and Berry Creek Rancherias

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. Although there are ITAs present within the Proposed Action area, implementation of the Proposed Action would not adversely affect the use, quality, character, or nature of the six tribes' trust assets located in the Proposed Action area. Therefore, there would be no impacts to the above-listed ITAs.

3.1.2 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.

3.1.3 Environmental Justice

Executive Order 12898 requires each Federal agency to identify and address disproportionately high and adverse human health or environmental impacts, including social and economic effects of its program, policies, and activities on minority populations and low-income populations.

The Proposed Action area encompasses Shasta, Tehama, Butte, Glenn, Colusa, Sutter, Yolo, and Sacramento counties. As shown in Table 3-2, 35 percent of the Proposed Action Area is considered low-income, compared to 31 percent of the population of the state of California. The minority population within the Proposed Action Area is 49 percent, as compared to the state of California with a 63 percent minority population.

Under the "meaningfully greater" analysis, an environmental justice population would be present if either of the following criteria are met: (1) a population contains 50 percent or more minority persons or 25 percent or more low-income person; or (2) the percentage of minority or low-income populations within the Proposed Action area is more than 10 percent greater than the average of the surrounding state. This analysis relied on data provided by the USEPA's EJ Screen tool (USEPA 2022). Based on the data in Table 3-2 and a "meaningfully greater" analysis of percentages in the Proposed Action Area in comparison to the State of California, the Proposed Action area would be considered to contain an environmental justice low-income population because it contains a low-income population greater than 25 percent. With a minority population of 49 percent, the Proposed Action Area is just under the 50 percent threshold for being considered an environmental justice minority population. However, the Proposed Action area contains a minority population 14 percent lower than the State of California, which is greater than the 10 percent threshold.

Table 3-2. Environmental Justice Demographics for the Project Action Area, 2015-2019

Area	Minority Population[1] (%)	Low-Income Population[2] (%)	Population below Poverty[3] (%)
Proposed Action Area[4]	49	35	15
California	63	31	13

Source: Data representing the minority population and low-income population were sourced from EPA's Environmental Justice Screen (EJ Screen) (USEPA 2022).

Notes:

Data representing the population below poverty were sourced from the US Census Bureau American Community Survey 5-Year Estimates Subject Tables (US Census 2020). Data have been rounded to the nearest whole percent for presentation in this document.

[1] The USEPA's EJ Screen tool considers "minority populations" to include people who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino. That is, all people other than non-Hispanic white-alone individuals would be included as a "minority" (USEPA 2019).

[2] The USEPA's EJ Screen tool considers "low-income populations" to include those households where the household income is less than or equal to twice the federal poverty level. The rationale for using twice the federal poverty level by EJ Screen is that today's poverty thresholds are too low to adequately capture the populations adversely affected by low-income levels, especially in high-cost areas (USEPA 2019).

[3] The "population below poverty" includes individuals whose poverty status has been determined to be below the federal poverty level within the past 12 months, as reported in the 2020 US Census (US Census 2020).

[4] The Proposed Action Area is comprised of the populations from eight counties: Shasta, Tehama, Butte, Glenn, Colusa, Sutter, Yolo, and Sacramento counties.

Under the No Action Alternative, Reclamation would not use drought-relief funding to purchase water from the Settlement Contractors that the Settlement Contractors would otherwise divert in October for retention in Shasta Reservoir. Due to the current conditions and prolonged drought conditions, grower in the Settlement Contract service areas chose to idle their fields at the start of the irrigation season and approximately 80 percent of estimated acreage in the Settlement Contractor service area was idled at the start of the 2022 contract year. Under No Action Alternative the diversion of water through October by the Settlement Contractors would support other consumptive use purposes and groundwater recharge through field flooding and would not return idled fields to production. Under the No Action Alternative, the Settlement Contractors that depend on producing and selling crops to support their employees and/or their own livelihoods may experience financial/economic hardship as a result of the prolonged drought conditions.

Under the Proposed Action, Reclamation would provide Settlement Contractors with compensation to not divert up to 100 TAF of water that could otherwise be diverted in October 2022. This compensation could provide economic relief to the Settlement Contractors that may be experiencing financial/economic hardship as a result of the prolonged drought conditions. Consequently, the Proposed Action would not result in an adverse and disproportionately high effect on minority and low-income population in the Settlement Contractor service area.

3.2 Agricultural Resources

3.2.1 Affected Environment

Agriculture accounts for the largest land use in each of the counties in the Settlement Contractors' service area. According to the California Department of Conservation (DOC) Farmland Mapping and Monitoring Program Important Farmland Map, most of the land in the affected environment is farmland.

In times of drought, farmers may choose to take land out of production for one or two years or remove land from agricultural production for the long-term if water shortages are expected to prolong and increase. If the land fallowed is left idle for four consecutive years, it is reclassified out of Important Farmland. Table 3-3 shows the change in important farmland for each county within the study area from 2016 to 2018.

Table 3-3. Change in Important Farmland by County, 2016-2018

County	Total Acreage 2016	Total Acreage 2018	2016-18 Acres Lost (-)	2016-18 Acres Gained (+)	2016-18 Total Acreage Changed	2016-18 Net Acreage Changed
Butte County	237,437	238,871	729	2,163	2,892	1,434
Colusa County	547,088	543,608	8,211	4,731	12,942	-3,480
Glenn County	347,652	349,444	4,653	6,445	11,098	1,792
Sacramento County	207,482	201,596	13,751	7,865	21,616	-5,886
Shasta County	19,010	18,930	687	607	1,294	-80
Sutter County	281,181	278,010	4,647	1,476	6,123	-3,171
Tehama County	232,625	233,262	4,565	5,202	9,767	637
Yolo County	365,852	356,944	19,884	10,976	30,860	-8,908

Source: DOC 2018.

The Sacramento Valley is an important agricultural region for the State of California and the United States. California's top 20 crop and livestock commodities accounted for $42.1 billion in value in 2020 (California Department of Food and Agriculture 2021). While the Sacramento Valley produces a wide variety of crops including grains, tomatoes, field crops, fruits, and nuts, the region is well known for its production of rice, making up 95 percent of the state's total rice production (City of Sacramento 2022). Table 3-4 presents acreage of crops in each county in the Sacramento Valley and the acreage of fallowed/idled cropland. Rice production in the Sacramento Valley ranged from 478,717 acres to 366,388 acres over the last four years making up approximately 12-20 percent of irrigated farmland in the valley. Other annual crops such as pastures, alfalfa, vegetable crops (tomatoes, corn, cucumbers), safflower, and wheat make up approximately 75 percent of the irrigated farmland in the valley.

Cropland idling in the Sacramento Valley ranged from 213,914 acres to 392,803 over the last four years. While official crop county estimates for 2022 are not yet available, the estimated acreage for all crops fallowed on the west-side of the Sacramento Valley is 370,000 acres out of the 450,000 acres in the Settlement Contractors' service area, with most of the fallowed acres occurring in Colusa and Glenn Counties (Northern California Water Association [NCWA] 2022).

Table 3-4. Top Annual Crop Acreage and Idled Cropland by County, 2018-2021

County	Category	2021 (Acres)	2020 (Acres)	2019 (Acres)	2018 (Acres)
Butte	Grass/Pasture	160,961	122,633	121,143	152,341
	Rice	83,320	106,423	95,533	80,245
	Other Hay/Non-Alfalfa	1,649	1,403	1,847	4,367
	Clover/Wildflowers	1,267	901	1,522	1,623
	Alfalfa	2,627	2,760	2,649	1,069
	Tomatoes	980	748	1,102	782
	Sunflowers	846	731	601	717
	Winter Wheat	3,293	1,178	1,690	576
	Corn	343	428	240	373
	Cotton	20	4	87	222
	Top 10 Crop Total	255,307	237,208	226,414	242,315
	Fallow/Idle Cropland	60,729	41,091	58,558	84,577
	Total Acreage	316,036	278,299	284,972	326,892
Colusa	Rice	103,279	128,613	137,968	140,288
	Grass/Pasture	139,711	132,616	127,738	120,911
	Sunflowers	8,653	7,850	9,164	13,956
	Tomatoes	16,509	16,512	14,744	13,803
	Other Hay/Non-Alfalfa	4,400	4,225	5,336	6,948
	Alfalfa	8,337	8,460	9,738	6,705
	Winter Wheat	7,047	5,269	7,842	5,569
	Corn	1,550	3,501	3,715	2,721
	Dry Beans	1,586	2,144	2,197	2,212
	Cucumbers	350	189	1,201	1,778
	Top 10 Crop Total	291,422	309,378	319,641	314,890
	Fallow/Idle Cropland	73,485	48,658	46,339	60,524
	Total Acreage	364,907	358,037	365,980	375,414
Glenn	Grass/Pasture	212,183	198,910	204,718	222,514
	Rice	66,746	79,442	82,645	81,695
	Other Hay/Non-Alfalfa	7,987	8,800	10,952	22,935
	Alfalfa	9,252	8,549	9,643	7,642
	Corn	2,787	5,107	5,715	6,425
	Sunflowers	2,778	4,920	3,510	5,817
	Cotton	858	1,573	2,741	2,999
	Winter Wheat	8,984	4,099	4,069	2,740
	Tomatoes	1,989	2,627	2,248	1,231
	Dbl Crop Oats/Corn	440	57	327	952
	Top 10 Crop Total	314,004	314,082	326,569	354,950
	Fallow/Idle Cropland	38,811	25,704	27,198	47,818
	Total Acreage	352,815	339,787	353,767	402,768

County	Category	2021 (Acres)	2020 (Acres)	2019 (Acres)	2018 (Acres)
Sacramento	Grass/Pasture	172,952	171,670	169,193	183,913
	Other Hay/Non-Alfalfa	25,934	31,993	28,213	37,614
	Corn	18,416	15,977	22,906	25,177
	Alfalfa	30,314	28,725	26,513	19,525
	Rice	10,217	9,910	7,438	9,070
	Winter Wheat	12,794	12,790	15,805	8,019
	Safflower	1,198	4,646	2,877	5,347
	Clover/Wildflowers	2,452	2,842	3,255	3,447
	Triticale	6,678	5,857	4,062	2,780
	Tomatoes	3,579	2,894	2,693	2,198
	Top 10 Crop Total	284,533	287,303	282,954	297,088
	Fallow/Idle Cropland	18,070	12,063	29,596	36,243
	Total Acreage	302,603	299,365	312,550	333,331
Shasta	Grass/Pasture	332,973	227,625	227,417	208,251
	Other Hay/Non-Alfalfa	11,005	12,614	11,718	23,601
	Winter Wheat	1,530	1,674	1,308	2,708
	Alfalfa	2,989	3,745	3,650	2,449
	Other Crops	23	1,257	1,809	2,057
	Barley	77	129	118	1,321
	Mint	406	4	231	222
	Garlic	52		105	188
	Oats	56	12	50	103
	Clover/Wildflowers	44	51	54	59
	Top 10 Crop Total	349,155	247,109	246,461	240,958
	Fallow/Idle Cropland	1,681	987	593	4,280
	Total Acreage	350,836	248,096	247,054	245,238
Sutter	Rice	82,320	115,720	109,397	112,580
	Grass/Pasture	22,079	22,073	21,292	28,624
	Sunflowers	14,097	10,074	9,839	16,323
	Tomatoes	14,218	14,917	13,283	11,632
	Dry Beans	1,228	2,638	4,135	7,736
	Alfalfa	7,186	7,898	10,061	6,322
	Corn	2,631	5,020	3,980	5,690
	Other Hay/Non-Alfalfa	3,750	3,463	3,083	5,367
	Winter Wheat	8,741	6,050	8,434	4,315
	Safflower	893	1,981	1,156	2,247
	Top 10 Crop Total	157,143	189,833	184,662	200,835
	Fallow/Idle Cropland	68,620	35,839	56,502	60,392
	Total Acreage	225,763	225,672	241,164	261,227

County	Category	2021 (Acres)	2020 (Acres)	2019 (Acres)	2018 (Acres)
Tehama	Grass/Pasture	462,932	474,572	486,547	705,651
	Other Hay/Non-Alfalfa	4,494	4,027	6,172	15,589
	Alfalfa	3,197	2,799	2,983	2,231
	Clover/Wildflowers	1,514	1,114	1,535	1,841
	Barley	345	2,687	1,068	1,798
	Corn	16	446	747	715
	Oats	919	301	680	367
	Winter Wheat	2,292	534	431	280
	Sunflowers	172	229	123	275
	Rice	210	338	91	245
	Top 10 Crop Total	476,092	487,047	500,377	728,991
	Fallow/Idle Cropland	3,780	1,562	2,895	6,933
	Total Acreage	479,872	488,609	503,272	735,925
Yolo	Grass/Pasture	93,015	91,255	82,439	93,545
	Rice	20,296	38,271	32,767	40,624
	Sunflowers	21,396	20,933	22,757	32,380
	Tomatoes	35,665	35,470	37,273	30,671
	Other Hay/Non-Alfalfa	13,277	13,519	16,698	27,789
	Alfalfa	32,310	32,444	35,087	24,802
	Winter Wheat	40,483	25,287	33,411	19,253
	Safflower	5,653	9,496	8,636	11,274
	Clover/Wildflowers	7,896	8,310	8,001	7,711
	Corn	4,294	7,669	4,333	7,470
	Top 10 Crop Total	274,283	282,653	281,401	295,519
	Fallow/Idle Cropland	66,549	48,010	71,134	92,036
	Total Acreage	340,831	330,663	352,535	387,555

Source: United States Department of Agriculture, National Agricultural Statistics Service. (USDA NASS) 2021.
Key: Dbl= Double

3.2.2 Environmental Effects

3.2.2.1 No Action Alternative

Under the No Action Alternative, the Settlement Contractors would divert the 100 TAF of conserved water that was rescheduled into October consistent with the Settlement Contracts. Since this water would be delivered near the end of the irrigation season, this water could be used to irrigate permanent crops, or winter flooding for rice decomp or for field flooding or fallowed crop lands that would be expected to help groundwater recharge.

3.2.2.2 Proposed Action Alternative

Under the Proposed Action, the conserved water the Settlement Contractors could have otherwise diverted in October, consistent with Settlement Contracts, would continue to be stored in Shasta Reservoir going into WY 2023. As noted in Section 3.2.1, grower planting decisions were made at the start of the irrigation season and approximately 80 percent of estimated acreage in the Settlement Contractor service area was idled at the start of the 2022 contract year. Diversion of 100 TAF in

October would not change the status of agricultural lands in the Settlement Contractors service area. Similar to the No Action Alternative, the Proposed Action would have negligible impact on agricultural lands in the Settlement Contractors service area given its timing in October.

3.3 Biological Resources

3.3.1 Affected Environment

Fish and wildlife species are protected by state laws that regulate hunting, trapping, fishing, and habitat alteration. Specific species are also protected by federal laws such as the Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), and the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The evaluation of special-status (i.e., those protected by state and federal laws) aquatic and terrestrial resources (including migratory birds) is presented in the following sections.

3.3.1.1 Aquatic Resources

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. § 1801 et seq.) defines essential fish habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH designations include descriptions of the physical and biological environment and the location of all necessary habitats. The MSA (16 U.S.C. § 1801 *et seq.*) designates Essential Fish Habitat (EFH) for certain commercially managed marine and anadromous fish species and is intended to protect the habitat of these species from being lost due to disturbance and degradation. A review of the National Oceanic and Atmospheric Administration (NOAA) Fisheries EFH Mapper indicates that while Shasta Reservoir is not designated as EFH, the entirety of the Sacramento River within the Proposed Action area is designated as EFH for Chinook salmon (NOAA Fisheries 2021).

Although Shasta Reservoir does not support federally listed or anadromous fish species, operation of Shasta Dam is required to maintain temperature conditions that support the existence of special-status fish species in the Sacramento River mainstem downstream of Shasta Dam. As the largest reservoir in California, Shasta can store up to 4.552 MAF of water. This large volume of stored water results in the formation of a deep and well-stratified cold-water pool behind Shasta Dam. This cold-water pool is used to maintain temperature and flows in the Sacramento River mainstem downstream of Shasta Dam necessary to support winter-run Chinook salmon egg incubation, fry emergence, and juvenile rearing and to benefit other federally listed species (discussed in depth below).

California is in its third consecutive year of drought, and WY 2022 was classified as a "Critical Year" because of low inflow into Shasta Reservoir. To ensure adequate protection of the cold-water pool in Shasta Reservoir amidst continuing drought conditions, the TMP was developed in May 2022 to describe Reclamation's commitment to providing temperature management of the Sacramento River for the longest and most beneficial time period possible by maintaining the Shasta cold-water pool in compliance with the Interim Operations Plan. The TMP establishes temperature targets in the Sacramento River. Table 3-5 presents the projected temperature targets at locations in Shasta Reservoir and along the Sacramento River as compared to the actual temperatures that were recorded at those locations (Reclamation 2022). The TMP also outlines a plan for water releases from the Shasta and Keswick reservoirs. Monthly forecasted releases into the Sacramento River as well as end-of-month Shasta Reservoir storage estimates during the fall, as outlined in the TMP, are presented in Table 3-6. At the end of August, Shasta Reservoir storage was approximately 1.590

TAF as compared to the 1.565 TAF that was predicted by the TMP (DWR 2022b). USFWS, NMFS, and Reclamation are currently reviewing increasing releases in September above the monthly average of 4,000 cfs to avoid dewatering Sacramento River winter-run Chinook Salmon redds. Flow releases are expected to be maintained at 4,100 cfs through mid-October to avoid winter-run Chinook Salmon redd dewatering.

Although implementation of the TMP maintained consistent flow rates in the Sacramento River through the summer months, the flows prescribed by the TMP were extremely low compared to normal summertime flows as a result of the drought conditions in California (Reclamation 2022).

Table 3-5. Projected and Actual Water Temperatures in the Sacramento River

Month	Projected[1]/Actual[2]	Shasta	Keswick	SAC	CCR
May	Projected[1]	55.4	57.5	57.6	58.5
	Actual[2]	51.9	54.5	55.3	56.2
June	Projected[1]	48.2	52.5	53.0	54.5
	Actual[2]	49.6	52.4	53.9	55.2
July	Projected[1]	49.2	53.0	53.5	54.9
	Actual[2]	49.7	52.3	53.7	55.0
August	Projected[1]	49.0	53.5	54.1	55.9
	Actual[2]	50.2	52.6	54.0	55.4
September	Projected[1]	50.5	53.9	54.2	55.4
October	Projected[1]	54.9	56.5	56.2	57.0
November	Projected[1]	54.0	53.7	57.3	53.9

Notes:
All numbers presented in degrees Fahrenheit. HEC-5Q modeling was used to identify these target temperatures. HEC-5Q does not perform well after mid-September under low storage conditions (indicated by the grey boxes), so water temperatures may be warmer than these targets and HEC-5Q results.
[1] Projected temperature data sourced from Reclamation 2022.
[2] Actual temperature data sourced from DWR California Data Exchange Center 2022c. "Actual" temperatures presented are the temperature averages for each month.
Key: SAC = Highway 44 bridge gage; CCR = Sacramento River above Clear Creek

Table 3-6. Monthly Forecasted Releases into Sacramento River and Shasta Reservoir End-of-Month Storage for Fall 2022

	Aug	Sep	Oct	Nov	Dec
Sacramento River Releases (TAF/ cfs)	277 4,500	238 4,000	200 3,250	193 3,250	200 3,250
Shasta Reservoir End-of-Month Storage (TAF)	1,565	1,479	1,505	1,539	1,598

Source: Reclamation 2022.
Key: cfs = cubic feet per second; TAF = thousand acre-feet

The Sacramento River watershed is inhabited by a variety of federally listed fish species. Table 3-7 presents the federally listed species that inhabit the waterways within the Proposed Action area and summarizes expected habitat use by these species within the Proposed Action area. Details regarding the life histories and habitat needs of these species are discussed below.

Table 3-7. Habitat Use by State and Federally Listed Fish Species within the Proposed Action Area

Water Body	Winter-run Chinook Salmon	Spring-run Chinook Salmon	Fall-/Late fall-run Chinook Salmon	Central Valley Steelhead	Green Sturgeon	Delta Smelt	Longfin Smelt
Shasta Reservoir	--	--	--	--	--	--	--
Sac River from Keswick to R.B.	S, R, M	S, R, M	S, R, M	S, R, M	S, R, M	--	--
Sac River from R.B. to Delta	M	M	S, R, M	M	S, R, M	S, R, M	S, R, M

Source: Reclamation and SLDMWA 2019.

Key: M = migration corridor; R = rearing habitat; R.B. = Red Bluff Diversion Dam; S = spawning habitat; Sac = Sacramento

Sacramento Valley Winter-Run Chinook Salmon

The Sacramento River winter-run (SRWR) Chinook salmon Evolutionarily Significant Unit (ESU) was federally listed as endangered in 1994 (59 Federal Register [FR] 440; 70 FR 37160). The current range of SRWR Chinook salmon has been greatly reduced in comparison to the ESU's historical distribution, currently this ESU only inhabits the Sacramento River and is not found in any of its tributaries. This has resulted in very limited availability of potential spawning and rearing habitat, increasing the ESU's risk of extinction due to local catastrophe or poor environmental conditions. Critical habitat for winter-run Chinook salmon has been designated within the Proposed Action area in the Sacramento River mainstem south of Keswick Dam (NOAA Fisheries 2014).

Adult SRWR Chinook salmon immigrate from the ocean to the Sacramento River from December through July. Prior to spawning, adults hold in suitable habitat (waters ranging from 59 to 60 degrees Fahrenheit) for several months. Adults typically spawn during the summer months (late April through mid-August) when air temperatures approach their yearly maximum. As a result, SRWR Chinook salmon require cold water to protect embryos from warm ambient conditions. Spawning occurs within the Sacramento River upstream of the Red Bluff Division Dam and downstream of the Keswick Dam (NOAA Fisheries 2014).

Fry that emerge in the late summer and early fall may immediately begin to move downstream until reaching the Delta or may remain in the stream for a longer period of time—ranging from weeks to a year—where they typically occupy shallow-water habitats providing ample cover and food resources. As juvenile salmon grow, they move into deeper water with higher current velocity. Increases in flow within the upper Sacramento River are thought to encourage juvenile emigration. The lower reaches of the Sacramento River (downstream of the Red Bluff Division Dam) and the Delta serve primarily as rearing habitat and migration corridors for adults and juveniles (NOAA Fisheries 2014).

California entered into its third year of consecutive drought in 2022; in an effort to maintain the cold-water pool in Shasta Reservoir to allow for cold-water releases to prevent temperature-induced egg mortality during the 2022 winter-run Chinook salmon spawning season, the TMP was drafted and implemented from May to September. The TMP has prioritized the maintenance of water

temperatures in the Sacramento River that are conducive to successful embryo incubation, and it is expected that the fall months will yield higher rates of fry emergence than would have occurred without the implementation of the TMP. It is expected that the quality of Chinook salmon EFH, as designated under the Magnuson-Stevens Fisheries Management Act, was maintained under the TMP to the greatest extent possible given the current hydrologic conditions.

Central Valley Spring-Run Chinook Salmon

The Central Valley spring-run (CVSR) Chinook salmon ESU was federally listed as threatened in 1999 (65 FR 50394). The habitat requirements for CVSR Chinook salmon are similar to those described above for SRWR Chinook salmon. However, the two runs differ in the time of year that they use habitats to carry out their various life stages. CVSR Chinook salmon typically enter the Sacramento River between March and September then hold in deep pools of cool water for several months prior to spawning between mid-August and early October. The optimum water temperature for adult holding is approximately 60 degrees Fahrenheit, though they may be able to survive a temperature of up to 80 degrees Fahrenheit (San Joaquin River Restoration Program 2007). CVSR Chinook salmon spawn primarily in the tributaries to the Sacramento River. The only known streams that currently support self-sustaining populations of non-hybridized CVSR Chinook salmon in the Central Valley are Mill, Deer, and Butte creeks (NOAA Fisheries 2014). The length of time required for embryo incubation and emergence depends on water temperature – under ideal water temperatures, fry typically emerge between November and March. After emergence, juveniles may remain in the stream for 12 to 16 months or immediately emigrate to the Delta and the ocean beyond during the winter or spring. Critical habitat for CVSR Chinook salmon is designated in the Proposed Action area within the Sacramento River and its tributaries south of Keswick Dam. Warm water temperatures in these areas during adult immigration and holding pose an ongoing threat to the species' success (NOAA Fisheries 2014).

The Sacramento River temperature targets presented in the TMP (Table 3-5) are well below the upper thermal tolerance limit of CVSR Chinook salmon, which require temperatures of around 60 degrees Fahrenheit during their holding period in the summer months. As shown in Table 3-5, implementation of the TMP successfully maintained water temperatures conducive to the success of CVSR Chinook salmon throughout the summer.

Fall-/Late Fall-Run Chinook Salmon

The Central Valley fall- and late fall–run Chinook salmon (*Oncorhynchus tshawytscha*) ESU includes all naturally spawned populations of fall- and late fall–run Chinook salmon in the Sacramento and San Joaquin River basins and their tributaries east of Carquinez Strait, California (64 FR 50394). On April 15, 2004, the Central Valley fall- and late fall–run Chinook salmon ESU was identified by NMFS as a Species of Concern (69 FR 19975). Although the Central Valley ESU is not listed under CESA, fall-/late fall-run Chinook salmon is designated as a California species of special concern (Moyle et al. 1995).

Adult fall-run Chinook salmon migrate upstream from July through December and spawn in freshwater from early October through late December. Late fall-run Chinook salmon migrate into the rivers from mid-October through December and spawn from January through mid-April. The majority of juveniles migrate to the ocean during the first few months of emergence, although some may remain in freshwater and migrate to the ocean as yearlings. (California Department of Fish and Wildlife [CDFW] [CDFW 2022a]).

Fall-run Chinook salmon are currently the most abundant of the Central Valley Chinook salmon runs, contributing to large commercial and recreational fisheries. Five major Central Valley hatcheries raise and release more than 32 million smolts each year (CDFW 2022a).

Central Valley Steelhead

The Central Valley steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS) was initially listed as federally threatened in 1998 (63 FR 13347) This listing was reaffirmed in 2006 (71 FR 833). Critical habitat for Central Valley steelhead occurs throughout the Proposed Action area south of Keswick Dam. Within the Proposed Action area, Central Valley steelhead spawning primarily occurs in the Sacramento River mainstem and in major tributaries below dams between Keswick Dam and the Red Bluff Division Dam. The stretch of the Sacramento River south of the Red Bluff Diversion Dam functions primarily as rearing and migration habitat.

Adult steelhead immigration from the ocean to freshwater systems typically begins in August and continues into March, peaking in January and February. Spawning typically occurs from December through April and peaks in January through March. In spring and early summer, juvenile steelhead migrate to the ocean. Consequently, throughout most of the summer months steelhead generally occur in low numbers within the Proposed Action area (NOAA Fisheries 2014). During juvenile rearing and emigration, steelhead can survive where daytime water temperatures range from approximately 32 degrees to 81 degrees Fahrenheit (NOAA Fisheries 2014).

Because Central Valley steelhead generally occur in low numbers within the Sacramento River during the summer months, it is expected that the implementation of the TMP from May to September had little direct impact on this species, though the unavoidable lower-than-normal flow conditions within the river may have decreased the occurrence of juvenile out-migration in spring and early summer. Water temperatures within the Sacramento River during the summer were well within the thermal tolerance range of Central Valley steelhead.

Green Sturgeon

The southern DPS (sDPS) of green sturgeon (*Acipenser medirostris*) was federally listed as threatened in 2006 (71 FR 17757). The sDPS of green sturgeon includes fish that spawn in the Sacramento, Feather, and Yuba Rivers. Adults typically enter the San Francisco Bay between February and May to migrate up the Sacramento River. Spawning typically occurs in cool sections of the upper Sacramento River in deep pools (approximately 26 to 30 feet deep) during the summer months (NOAA Fisheries 2018). Post-spawn adults generally migrate downstream between May and June or hold for several months before out-migrating between November and January (Colborne et al. 2022), while juveniles rear in the Delta for a few years before entering the ocean. Optimal larval growth requires water temperature ranging between approximately 51.8 and 59 degrees Fahrenheit (NOAA Fisheries 2018).

The Sacramento River temperature targets presented in the TMP (Table 3-5) are well below the upper thermal tolerance limit of the sDPS green sturgeon, which successfully spawn at temperatures between 49.3-63.7 degrees Fahrenheit (Poytress et al. 2015). The implementation of the TMP maintained water temperatures conducive to successful sDPS green sturgeon spawning.

Delta Smelt and Longfin Smelt

The Delta smelt (*Hypomesus transpacificus*) was federally listed as threatened in 1993 (58 FR 12854-12864), and the San Francisco Bay-Delta DPS of longfin smelt (*Spirinchus thaleichthys*) is a candidate for listing under the ESA (77 FR 19756). Both Delta smelt and longfin smelt inhabit the San Francisco Bay and Delta, rearing in the low salinity zone (LSZ)[5] before migrating to freshwater in the lower reaches of the Sacramento River (south of Sacramento) to spawn (Interagency Ecological Program for the San Francisco Bay/Delta Estuary [IEP] 2015; United States Fish and Wildlife Service [USFWS] 1996).

The current primary threat to the success of both species is a reduction in freshwater flows into the Delta resulting from increased upstream storage and water diversions in combination with severe drought conditions (USFWS 1996). Decreased freshwater flows into the Delta have the potential to alter the size and location of the LSZ, consequently altering the distribution of Delta smelt (IEP 2015). However, the distribution of species that juvenile Delta smelt rely on for food has not shifted in the same way as that of the Delta smelt, resulting in a shortage of food for juveniles within their rearing habitat (United States Environmental Protection Agency [USEPA] [USEPA 2010]). Longfin smelt may face the same risk of experiencing a spatial or temporal mismatch between their location and that of their prey, though the main threat to longfin smelt is rising temperatures in their rearing habitats as a result of a reduction in freshwater flows (CDFW 2022b). Water temperatures approaching the longfin smelt's upper thermal tolerance within Suisun Bay may force longfin smelt to move further upstream into the Sacramento River and its tributaries to reach cooler waters.

The TMP made assumptions regarding necessary freshwater inflows to meet Delta outflow and water quality objectives, which are established in the Sacramento-San Joaquin Bay-Delta Estuary Decision 1641 (State Board 2022b). Major increases in freshwater flows required to meet Delta water quality objectives were first made available through releases from other reservoirs, and then through releases from Shasta when necessary to maintain salinity control. Additionally, the West False River salinity barrier, which was constructed in 2021 as a temporary solution to the drought conditions in California, has been in place throughout WY 2022 with the purpose of slowing the movement of saltwater into the central and south Delta and reducing freshwater inflows from upstream reservoirs necessary to maintain Delta salinity objectives through WY 2022 (DWR 2022c). Data regarding compliance with the Delta salinity objectives established by the State Board have not yet been finalized for summer of 2022, but in April 2022 DWR and Reclamation reported an exceedance of the habitat protection outflow objective (as measured by X2[6]) at Collinsville (State Board 2022b).

3.3.1.2 Terrestrial Species and Migratory Birds

As discussed in Section 3.2.1, the majority of land within the Proposed Action area is composed of farmland (DOC 2022), and one of the most prevalent crops within the Sacramento Valley is rice (City of Sacramento 2022). Seasonally flooded rice fields provide important foraging habitat for a variety of common and special-status animal species (described below). 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 within the Proposed Action area also provide

[5] The low salinity zone (LSZ) is the transition area between saline waters and fresh water. The LSZ is typically located within Suisun Bay and the western Delta (Kimmerer 2004).

[6] X2 is the distance from the Golden Gate to the point where daily average salinity is 2 parts per thousand at 1 meter off the bottom of the waterbed (Delta Stewardship Council 2022).

important foraging, refuge, and dispersal habitat for numerous reptile, amphibian, and mammal species. Additionally, water drained from rice fields prior to harvest, referred to as tailwater, provides an important source of water for many of the Central Valley's wetlands (Petrie and Petrik 2017). An estimated 56 percent of seasonal wetlands (nearly 45,000 acres) in the Sacramento Valley are flooded in the fall by rice tailwater.

Because of dry hydrologic conditions, Settlement Contractor deliveries were limited to 18 percent of Contract Total in contract year 2022. Consequently, the landowners chose to idle annual cropland, including rice fields, for the 2022 irrigation season. As further described in Section 3.2.1, unofficial estimates for 2022 suggest that approximately 370,000 acres out of the 450,000 acres in the Settlement Contractors' service area were idled in 2022 (NCWA 2022).

Migratory and Special-Status Birds

The MBTA of 1918 provides a program for the conservation of migratory birds that fly through lands of the United States. The lead federal agency for implementing the MBTA is USFWS. The law requires federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any migratory birds or result in the destruction or adverse modification of designated critical habitat of such species. The law makes it illegal for anyone to "take[7]," possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or their parts, feathers, nests, or eggs.

Migratory birds protected by the MBTA use managed wetlands and flooded agriculture within the Proposed Action area. As of 2018, there were approximately 460,000 acres of rice fields in the Sacramento Valley which, along with natural wetlands, support millions of waterfowl migrating along the Pacific Flyway (United States Department of Agriculture [USDA] National Agricultural Statistics Service [NASS] [USDA NASS 2021]). These habitats and their associated water conveyance features (canals and ditches) provide critical nesting and wintering habitat for millions of migratory birds, particularly waterfowl, that migrate to the Sacramento Valley. These open-water habitats and associated vegetation provide food, cover, and resting sites for migrating birds. The Colusa, Butte, Sutter, and American drainage basins (all located within the Proposed Action area), support approximately 50 percent of all waterfowl found within the Central Valley. Additionally, rice fields alone provide over 60 percent of all waterfowl food resources within the Central Valley (Petrie and Petrik 2017).

Other special-status bird species that rely on managed wetlands and flooded agriculture fields within the Proposed Action area are: the greater sandhill crane (*Grus canadensis tabida*), which is listed as threatened under the CESA and is fully protected under California Fish and Game Code (CDFW 2022c; CDFW 2022d); the black tern (*Chlidonias niger*), which is listed as a State Species of Concern (CDFW 2022d); and the tricolored blackbird, which is listed as threatened under the CESA (CDFW 2022d). Sandhill cranes use cropland in the Proposed Action area for foraging in the winter, typically returning to the same location each year (Zeiner et al. 1990); cropland idling 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. Black terns use flooded rice fields and associated emergent vegetation in the spring and summer for foraging and nesting, and

[7] "Take" is defined in the regulation (50 CFR 10.12) as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities."

tricolored blackbirds rely on open access to water in rice field and wetland habitats to provide suitable foraging habitat.

Current hydrologic conditions have resulted in an estimated 82 percent of cropland within the Sacramento Valley being idled. It has been found that a 25 percent loss of rice acreage would reduce the Central Valley's capacity to support duck populations by approximately 500,000 birds, and a 50 percent loss would double that figure to approximately 1 million ducks (Petrie and Petrik 2017). Additionally, USFWS announced that the Sacramento National Wildlife Refuge Complex received a 55 percent reduction in water allocations this year as a result of California's hydrologic conditions (USFWS 2022). As a result, USFWS is planning to flood only half the number of wetland units that they typically would between September and November 2022. This reduction in availability of suitable habitat (flooded agricultural land and wetlands) in the Sacramento Valley is expected to result in higher-than-average concentrations of migratory birds using each available habitat unit. Higher concentrations of birds within a small habitat area may increase the risk of avian disease outbreaks in winter of 2022 when many migratory waterfowl species are typically present (USFWS 2022). The wintering distribution of greater sandhill cranes is likely to be impacted by the reduction in irrigated annual cropland, and black terns and tricolored blackbirds are also expected to experience a loss of foraging and nesting habitat due to current hydrologic conditions.

Giant Garter Snake and Western Pond Turtle

The giant garter snake (GGS) (*Thamnophis gigas*) was listed as threatened under the ESA in 1993 (58 FR 54053), and the western pond turtle (*Actinemys marmorata*) is under review for listing under the ESA and considered a State Species of Concern by CDFW (Thomson et al. 2016). GGS are endemic to the wetlands of the Sacramento and San Joaquin Valleys of California and their preferred habitat is natural wetland areas with slow-moving water. Because of the loss of historical natural wetland habitats due to agricultural development, rice fields and their associated canals and drainage ditches have become important habitat for GGS during the summer months when GGS are active and require an aquatic habitat component. A key requirement of GGS habitat includes maintenance of connectivity between habitats; GGS rely on water-filled canals and ditches as movement corridors for daily movement within their home range. From November to mid-March, GGS are dormant and occupy hibernacula, including burrows made by small mammals in upland areas. GGS are known to exist in the Proposed Action area (USFWS 2017). Western pond turtles also use rice fields and associated ditches and drains for foraging and dispersal.

Cropland idling, specifically rice field idling, in response to 2022 drought conditions as described in Section 3.2.1 has the potential to affect GGS and western pond turtle habitat availability. Both of these species require an aquatic component in their habitat during their active phases, so idling rice fields and other croplands has the potential to remove this aquatic component and therefore reduce the amount of suitable foraging habitat for these species. This may force individuals to relocate from to find other areas to live, which could result in relocated individuals facing an increased risk of predation, reduced food availability, increased competition, and potentially reduced fecundity.

3.3.2 Environmental Effects

3.3.2.1 No Action Alternative

Aquatic Resources

Under the No Action Alternative, Reclamation would not purchase water from the Settlement Contractors, that the Settlement Contractors would otherwise divert in October 2022, for retention in Shasta Reservoir going into Water Year 2023; and the Settlement Contractors would divert up to 100 TAF from the Sacramento River in October 2022. Under this alternative, approximately 4,876 cfs of water would be released from Shasta Reservoir during the month of October. Table 3-8 compares the expected releases into the Sacramento River and Shasta reservoir storage under the No Action Alternative and Proposed Action. Sacramento River releases and Shasta storage under the Proposed Action would be the same as the TMP. The only difference between No Action Alternative and Proposed Action would be in the month of October. A discussion of the potential effects of the No Action Alternative on the species identified in Section 3.3.1.1 is provided in the following sections.

Table 3-8. Predicted Releases into the Sacramento River and End-of-Month Shasta Storage Under the No Action Alternative and TMP

	Aug	Sep	Oct	Nov	Dec
TMP/ Proposed Action Alternative					
Sacramento River Releases (TAF/cfs)	277 4,500	238 4,000	200 3,250	193 3,250	200 3,250
Shasta Reservoir End-of-Month Storage (TAF)	1,565	1,479	1,505	1,539	1,598
No Action Alternative					
Sacramento River Releases (TAF/cfs)	277 4,500	238 4,000	300 4,876	193 3,250	200 3,250
Shasta Reservoir End-of-Month Storage (TAF)	1,565	1,479	1,405	1,439	1,498

Source: Reclamation 2022.

Key: cfs = cubic feet per second; TAF = thousand acre-feet

The release of up to 100 TAF from Shasta Reservoir under the No Action Alternative would increase Sacramento River flows from Shasta Dam to the Settlement Contractors' point(s) of diversion during the month of October. These releases would be conducted in accordance with the ramping rates consulted on in the 2019 Reinitiation of Consultation for Long-Term Operations of CVP and SWP Biological Opinions (2019 BiOp) (USFWS 2019 and NOAA Fisheries 2019).

Sacramento River Winter-Run Chinook Salmon

As described in Section 3.3.1.1, SRWR Chinook salmon fry typically emerge in late summer and early fall and either immediately move downstream to the Delta or remain in the stream for a longer period of time. Under No Action Alternative, flow releases to the Sacramento Settlement Contractors within the upper Sacramento River during October could facilitate juvenile out-migration, as noted in the 2019 Biological Opinion. Ramping rates presented in the 2019 Biological Opinion – designed to minimize stranding risks – would be adhered to under this alternative (see Section 3.5). Therefore, any loss of SRWR Chinook salmon due to stranding would be within the

range of effects evaluated in the 2019 Biological Opinion. Additionally, the release of up to 100 TAF of water from Shasta Reservoir under this alternative could decrease the likelihood that sufficient storage would be maintained to protect the cold-water pool needed to provide river temperatures supportive of successful winter-run Chinook salmon spawning during the 2023 spawning season. Nevertheless, cold-water levels would be consistent with the range of effects consulted in the 2019 Biological Opinion.

Central Valley Spring-Run Chinook Salmon

CVSR Chinook salmon typically hold in deep, cool pools from August through October and primarily spawn during September and October. Although CVSR Chinook salmon primarily spawn in the tributaries to the Sacramento River, they also spawn in the upper reaches of the mainstem Sacramento River (downstream of Keswick Dam). Successful spawning can occur in water temperatures between 50 and 59 degrees Fahrenheit. However, temperatures above the 53.5 degrees would result in decreased egg survival (NMFS 2019). Consequently, the No Action Alternative could decrease the likelihood that sufficient storage would be maintained to protect the cold-water pool needed to provide river temperatures supportive of successful CVSR Chinook salmon spawning during the 2023 spawning season. As previously noted, ramping rates presented in the 2019 BiOp would be adhered to under the No Action Alternative. Thus, any stranding or loss redds from dewatering would be within the level of take anticipated from flow management in the upper Sacramento River described in the 2019 BiOp. Therefore, although the No Action Alternative would have adverse impacts on CVSR Chinook salmon, there would be no impacts outside the range of effects consulted on in the 2019 BiOp.

Fall-/Late Fall-Run Chinook Salmon

Adult fall-run Chinook salmon migrate upstream from July through December and spawn in freshwater from early October through late December. Late fall-run Chinook salmon migrate into the rivers from mid-October through December and spawn from January through mid-April. The increase in river flows that would occur in October under this alternative is not expected to impact adult migration, as a flow rate of 4,876 cfs is not out of the ordinary for adults to experience during their migration period. However, because spawning typically occurs beginning in early to mid-October, there is potential for redd dewatering and juvenile stranding to occur when flows in the Sacramento River mainstem are reduced. As mentioned above, ramping rates would be consistent with those presented in the 2019 BiOp, which have been designed to minimize stranding risks.

Central Valley Steelhead

Central Valley steelhead typically immigrate from the ocean into the Sacramento River between August and March. The increase in river flows that would occur in October under this alternative is not expected to impact adult migration, as a flow rate of 4,876 cfs is not out of the ordinary for Central Valley steelhead to experience during their migration period. However, similar to Chinook salmon, juvenile steelhead stranding could result from fluctuations in flow due to this alternative. However, as previously noted, flow decreases would occur at a rate consistent with the down-ramping rates described in the 2019 BiOp. As such, no take of Central Valley steelhead is expected to occur as a result of flow fluctuations consistent with the 2019 BiOp. Therefore, the No Action Alternative would have no impacts outside of the range of effects consulted on in the 2019 BiOp.

sDPS Green Sturgeon

Post-spawn sDPS green sturgeon typically out-migrate from the Sacramento River into the ocean either before September or during late autumn and early winter (Colborne et al. 2022). Therefore, sDPS green sturgeon life history timing is such that it is unlikely that sDPS green sturgeon would be present in the upper Sacramento River in October when there is a difference between the No Action Alternative and the Proposed Action. Therefore, this alternative would have no impact on sDPS green sturgeon.

Delta Smelt and Longfin Smelt

Delta smelt typically migrate from the LSZ upstream into the lower reaches of the Sacramento River during the late fall and early winter, and longfin smelt migrate into the upper Suisun Bay and lower reaches of the Sacramento River throughout winter and spring. Because increased flows released into the Sacramento River in October under this alternative would be diverted by Settlement Contractors prior to reaching the southern stretch of the Sacramento River, this alternative would have no impact on Delta smelt, longfin smelt, or their habitats.

Essential Fish Habitat

The Sacramento River is designated as EFH for Chinook salmon (NOAA Fisheries 2021). Implementation of the No Action Alternative has the potential to result in depths and velocities in excess of those suitable for constructing redds. Also dpeths and velocities may not be suitable for redds that were previously built, which may be at risk of being scoured from the bed. As such, this alternative could have minor adverse effects on EFH. However, such effects were considered in the consultation with NMFS on EFH for the Long-Term Operations of the CVP and SWP (NMFS 2020). Therefore, the No Action Alternative would have no additional impacts on EFH for Chinook salmon.

Terrestrial Resources

Under the No Action Alternative, 100 TAF of water that was rescheduled and conserved in Shasta Reservoir to allow for implementation of the TMP over the summer would be diverted by the Settlement Contractors in October 2022. However, because of the dry hydrologic conditions in 2022, in Reclamation's April 14, 2022, letter, Reclamation stated "For all SRS Contractors, Reclamation estimates water available from Shasta Reservoir releases to be approximately 18 percent of Contract Total, unless otherwise notified by Reclamation". Consequently, landowners had no choice but to idle annual cropland, including rice fields, for the 2022 contract year. Water diversions in October 2022 under the No Action Alternative would not be used to irrigate annual crops. Instead, water would be distributed to landowners in the Sacramento Valley and used primarily for consumptive purposes such as irrigating permanent crops. Because wetland habitat would not be created or destroyed under this alternative, there would be no impact on common or special-status species that rely on wetland habitats within the Sacramento Valley (see Section 3.3.1.2).

3.3.2.2 Proposed Action

Aquatic Resources

Under the Proposed Action, Reclamation would purchase up to 100 TAF of water the Settlement Contractors could have otherwise diverted in October 2022 and would hold that acquired water in

Shasta Reservoir for release as described in the TMP (Table 3-6). The acquired water would result in higher Shasta reservoir levels in WY 2023 there by improve operational flexibility for cold water pool and water temperature management in WY 2023. Therefore, the Proposed Action could facilitate implementation of the TMP as required by the 2019 NMFS Biological Opinion. A discussion of the potential effects of the Proposed Action on the species identified in Section 3.3.1.1 is provided in the following sections.

Sacramento River Winter-Run Chinook Salmon

Under the Proposed Action, water would be released into the Sacramento River in October pursuant to the TMP. Compared to the No Action Alternative, flow rates throughout the fall months would be more consistent under the Proposed Action. The relatively consistent flow rates that would be achieved through implementation of the TMP may benefit SRWR Chinook salmon, as stable flows would maintain low-velocity conditions in shallow habitats typically preferred by early life stages of SRWR Chinook salmon, which are most vulnerable to sudden environmental changes. Additionally, the preservation of 100 TAF in Shasta Reservoir would increase the likelihood that sufficient cold-water pool volume would be maintained to protect SRWR Chinook salmon during the water temperature management season of WY 2023. Therefore, the Proposed Action would have minor beneficial impacts on SRWR Chinook salmon by facilitating implementation of the TMP as described in the 2019 BiOp. Implementation of the TMPS is aimed to support habitat conditions that are suitable for spawning and incubation

Central Valley Spring-Run Chinook Salmon

The CVSR Chinook salmon spawning season typically ends in October, and fry emergence typically begins in October and November. Most CVSR Chinook salmon spawn in the tributaries of the Sacramento River and would likely be unaffected by the implementation of the Proposed Action in comparison to the implementation of the No Action Alternative. However, some CVSR Chinook salmon do spawn in the mainstem Sacramento River downstream of Keswick Dam. Under the Proposed Action, water would be released into the Sacramento River in October pursuant to the TMP. As such, flows in the mainstem Sacramento River would be relatively consistent throughout the fall months. Consistent flow rates would minimize the potential for redd dewatering to occur. Additionally, the preservation of 100 TAF in Shasta Reservoir would increase the likelihood that sufficient cold-water pool volume would be maintained to protect SRWR Chinook salmon during the temperature management season of WY 2023. Therefore, the Proposed Action would have minor beneficial impacts on CVSR Chinook salmon by facilitating implementation of the TMP

Fall-/Late Fall-Run Chinook Salmon

Adult fall-run Chinook salmon migrate upstream from July through December and spawn in freshwater from early October through late December. Late fall-run Chinook salmon migrate into the rivers from mid-October through December and spawn from January through mid-April. Compared to the No Action Alternative, flow rates throughout the fall months would be more consistent under the Proposed Action. The relatively consistent flow rates that would be achieved through implementation of the TMP may benefit fall-/late fall-run Chinook salmon, as stable flows would minimize the potential for redd dewatering or juvenile stranding to occur. Therefore, the Proposed Action would have minor beneficial impacts on fall-/late fall-run Chinook salmon.

Central Valley Steelhead

Central Valley steelhead typically immigrate from the ocean into the Sacramento River between August and March. Compared to the No Action Alternative, flow rates throughout the fall months would be more consistent under the Proposed Action. The relatively consistent flow rates that would be achieved through implementation of the TMP would likely not impact adult migration but may minimize the potential for juvenile stranding. Therefore, the Proposed Action would have minor beneficial impacts on Central Valley steelhead by facilitating implementation of the TMP

sDPS Green Sturgeon

As discussed in Section 3.3.1.1, post-spawn sDPS green sturgeon are expected to out-migrate from the Sacramento River either between May and June or between November and January. Therefore, any changes in flow during the month of October that would occur under the Proposed Action relative to the No Action Alternative would not affect sDPS green sturgeon. Thus, implementation of the Proposed Action would have no impact on sDPS green sturgeon.

Delta Smelt and Longfin Smelt

As discussed in Section 3.3.2.1, Delta smelt and longfin smelt do not inhabit the portion of the Sacramento River that would be impacted by flow changes in the Sacramento River. As such, the proposed action should have no impact on Delta smelt and longfin smelt.

Essential Fish Habitat

Implementation of the Proposed Action would result in increased cold-water pool storage in Shasta Reservoir, which would allow for greater operational flexibility to meet temperature management requirements in WY 2023. The effects of temperature management operations on Chinook salmon EFH would be largely beneficial, including maintenance of suitable temperatures for winter-run Chinook salmon spawning and incubation.

Terrestrial Resources and Migratory Birds

Under the Proposed Action, Reclamation would acquire up to 100 TAF of water that the Settlement Contractors could have otherwise diverted in October and would hold that acquired water in Shasta Reservoir. As previously described, because of the dry hydrologic conditions in 2022, in Reclamation's April 14, 2022, letter, Reclamation stated "For all SRS Contractors, Reclamation estimates water available from Shasta Reservoir releases to be approximately 18 percent of Contract Total, unless otherwise notified by Reclamation". Consequently, growers in the Settlement Contractor service areas decided to idle their fields. Similar to the No Action Alternative, retaining the reschedule and conserved water in Shasta Reservoir would not result in any changes to cropland idling in Settlement Contractor service area. Implementation of the Proposed Action is not expected to create or destroy any wetland habitats in the Sacramento Valley. Therefore, the Proposed Action would have no impact on the common or special-status terrestrial species within the Proposed Action area.

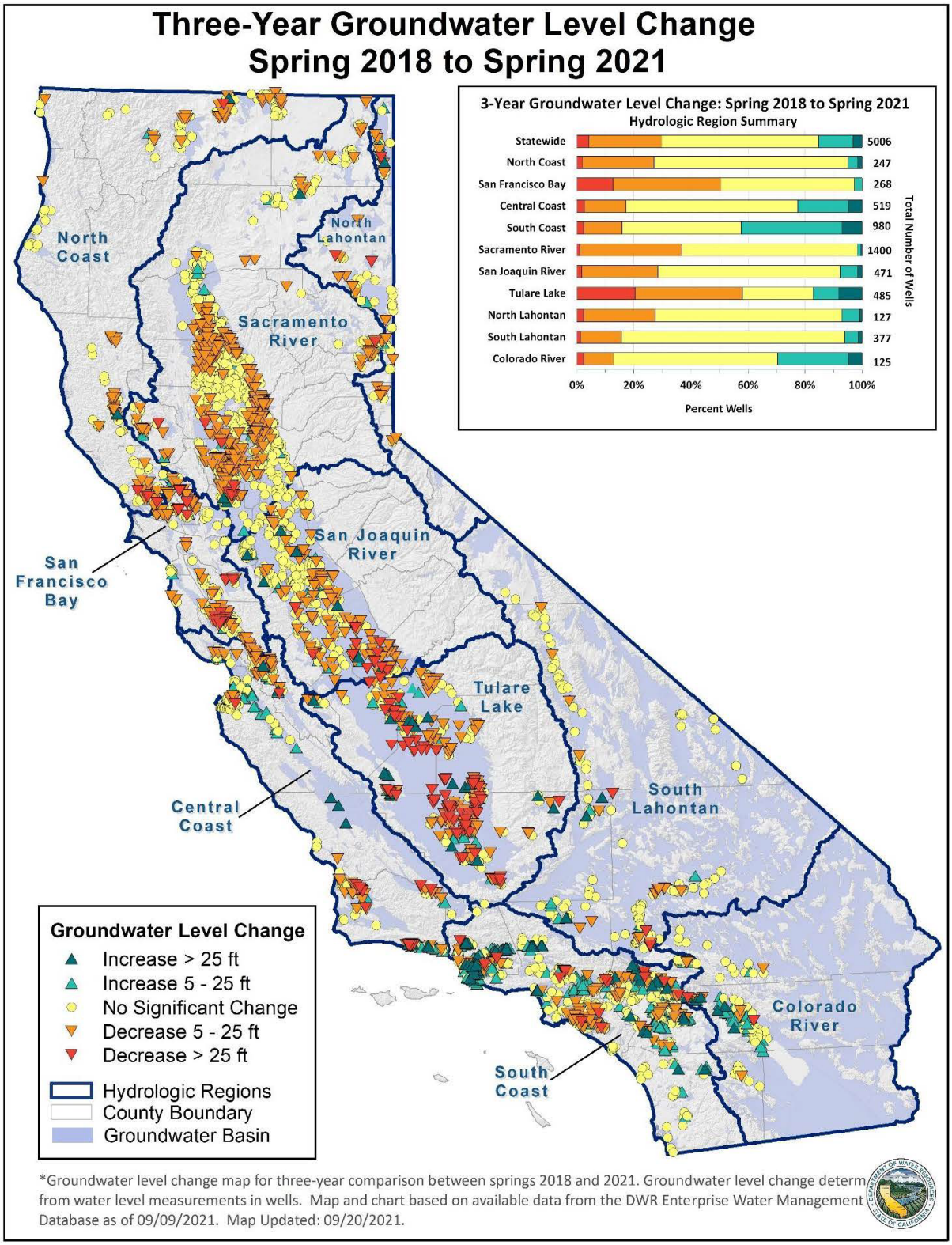
3.4 Groundwater Resources

3.4.1 Affected Environment

The affected environment for the Proposed Action includes the Redding Area Groundwater Basin (Section 3.3.1.2.1; 2019 LTWT EIS/EIR) and the Sacramento Valley Groundwater Basin (Section 3.3.1.2.2; 2019 LTWT EIS/EIR). Groundwater levels in Redding Area Groundwater Basin and Sacramento Valley Groundwater Basin have declined during the recent persistent dry weather conditions (2018 through 2021). Land use changes since 2004 (e.g., dry farming/grazing and annual/truck crop acreage converted to permanent crops), especially in areas without surface water on the west side of the Sacramento Valley in Colusa, Glenn, and Tehama counties, and the groundwater pumping associated with this change, have also contributed to the decline in groundwater levels in the northern Sacramento Valley Groundwater Basin (DWR 2021). Figure 3-1 and Figure 3-2 shows the change in groundwater elevation at each DWR groundwater monitoring well from Spring 2018 to Spring 2021 and from Fall 2018 through Fall 2021, respectively. As shown in the Figure 3-1, approximately 40 percent of the monitored groundwater well within the Sacramento Valley measured a decline in groundwater levels. Groundwater levels declines further in the Fall with approximately 60 percent of the monitored groundwater wells showing a decline.

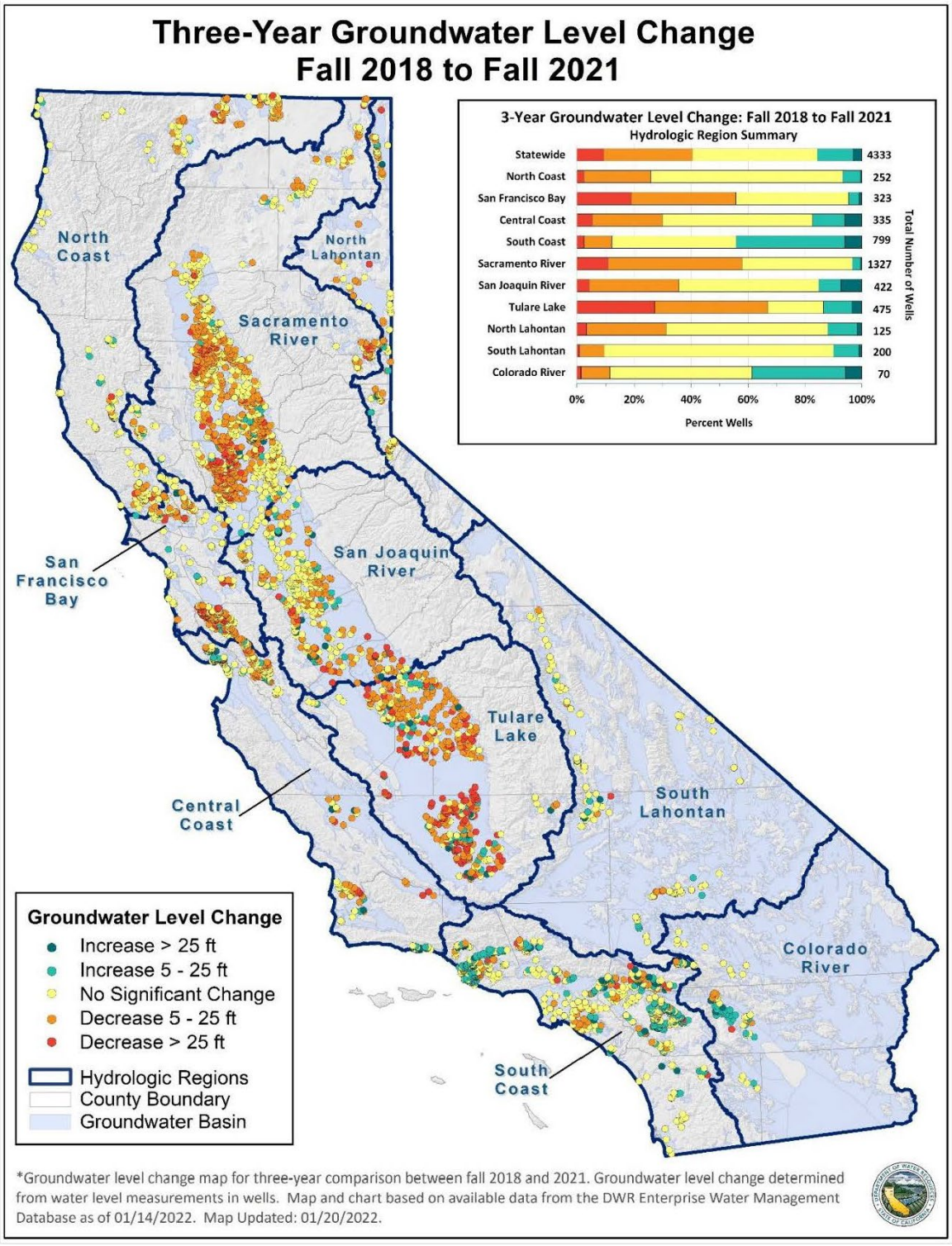
3.4.1.1 Sustainable Groundwater Management Act

Table 3-9 provides a summary of the Sustainable Groundwater Management Act (SGMA) basin prioritization for each subbasin within the Settlement Contractors area. High- and medium-priority groundwater subbasins were required to have Groundwater Sustainability Plans (GSP) developed and submitted to DWR for review by January 31, 2022. GSPs for all the subbasins in the project area were adopted by the groundwater sustainability agencies (GSAs) and submitted to DWR. All GSAs in the Settlement Contractor service areas are managing groundwater subbasins to the GSPs.



Source: DWR 2021d.

Figure 3-1. Spring 2018 to Spring 2021 Change in Groundwater Elevation, Statewide



Source: DWR 2022d.

Figure 3-2. Fall 2018 to Fall 2021 Change in Groundwater Elevation, Statewide

Table 3-9. Sustainable Groundwater Management Act Basin Prioritization

Basin / Subbasin	Groundwater Sustainability Agency/Agencies (GSA)	Priority
Redding Area / Anderson	Enterprise-Anderson GSA	Medium
Redding Area / Enterprise	Enterprise-Anderson GSA	Medium
Sacramento Valley / Colusa	Reclamation District No. 1004 GSA - Colusa Colusa Groundwater Authority GSA - Colusa Glenn Groundwater Authority GSA County of Glenn GSA – Colusa	High
Sacramento Valley / Sutter	Sutter Community Service District GSA Butte Water District GSA - Sutter Sutter Extension Water District GSA City of Live Oak GSA County of Sutter GSA - Sutter Reclamation District No. 1500 GSA City of Yuba City GSA Reclamation District No. 70 GSA Reclamation District No. 1660 GSA	Medium
Sacramento Valley / Yolo	Yolo Subbasin GSA	High
Sacramento Valley / North American	Sacramento Groundwater Authority GSA West Placer GSA South Sutter Water District GSA Reclamation District No. 1001 GSA County of Sutter GSA - North American	High

Source: DWR 2021b, DWR 2021c.

3.4.2 Environmental Effects

3.4.2.1 No Action Alternative

Under the No Action Alternative, the Settlement Contractors would divert the 100 TAF in October 2022. Since this water would be diverted in October, the water would be expected to be used for irrigation of permanent crops, winter flooding for rice decomp or groundwater recharge through field flooding. Due to current dry conditions of the Settlement Contractor water conveyance systems (includes systemwide irrigation canal and ditches), a significant portion of the water diverted during the month of October would be accounted towards conveyance losses. Consequently, the No Action Alternative would have a beneficial impact on groundwater resources.

3.4.2.2 Proposed Action

Under the Proposed Action, the 100 TAF of water the Settlement Contractors could have otherwise diverted in October, consistent with Settlement Contracts would continue to be stored in Shasta Reservoir would not be diverted by the Settlement Contractors in October. Consequently, this water would not be used for irrigation of permanent crops, winter flooding for rice decomp or groundwater recharge through field flooding. In comparison to No Action Alternative, implementation of the Proposed Action would not result in beneficial impact on groundwater resources.

3.5 Hydrology and Water Quality

3.5.1 Affected Environment

3.5.1.1 Surface Water

The Sacramento River originates in the Klamath mountains and flows south for 447 miles through the northern Central Valley of California, between the Pacific Coast Range and Sierra Nevada Range, and enters the Sacramento-San Joaquin Delta (Delta) from the north. The Sacramento River and its tributaries, Pit and McCloud Rivers, fill Shasta Reservoir and are regulated by Shasta Dam for flood control, water supply, power production, fish and wildlife, and recreation. Other major tributaries, the Feather and American Rivers, are regulated by Oroville Dam and Folsom Dam, respectively (Water Education Foundation 2022).

Shasta Reservoir is an integral part of Reclamation's CVP. As the largest storage reservoir in California, Shasta Reservoir can hold approximately 4.552 MAF of water, creating a well-stratified cold-water pool behind Shasta Dam. Water releases from Shasta Dam are required to maintain suitable temperature conditions for the conservation of salmon in the Sacramento River downstream of Shasta Reservoir.

3.5.1.2 Surface Water Quality

While surface water quality in the Sacramento River system is generally good, several water bodies within the area of analysis have been identified as impaired by certain constituents of concern and appear on the most recent 303(d) list of impaired waterways under the Clean Water Act (State Board 2018).

3.5.2 Environmental Effects

3.5.2.1 No Action Alternative

Under the No Action Alternative, the Settlement Contractors would divert the 100 TAF of water in October. This operation would result in i water diverted by the Settlement Contractors. Flows in the Sacramento River are expected to increase at a rate of 300 cfs/day from October 1 until October 10, at which time the maximum flow rate of 6,300 cfs would be reached. Flow rates would decrease according to the ramping rates required by the 2019 BiOp (USFWS 2019 and NOAA Fisheries 2019) from October 15 until October 31, at which time flows would be 3,350 cfs. The action would not affect flows downstream of the point where water would have been diverted, therefore flows into the Delta would not be affected. Flows under the No Action Alternative would not violate existing water quality standards or worsen any water quality and flow standard violation.

3.5.2.2 Proposed Action

Under the Proposed Action, the purchased water would remain in Shasta Reservoir. Reclamation would continue to meet Sacramento River flow requirements as set forth by the TMP. This operation would not violate any existing water quality standards or worsen water quality and flow standard violation.

3.6 Cumulative Effects

This EA considers the overall cumulative impact of the Proposed Action and other actions that are related in terms of time or proximity, as required by NEPA implementing regulations. Per CEQ regulations for implementing the procedural provisions of NEPA, a cumulative impact is defined as *the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time* (40 CFR 1508.1(g)(3)). The cumulative analysis considers potential water transfers, non-CVP water transfers, additional water transfers, and voluntary agreements that could affect Shasta storage. However, due to current hydrologic conditions, no water transfers are occurring within the Settlement Contractor service area in the 2022 contract year.

3.6.1 Agricultural Resources

As discussed in Section 3.6, no water transfers related cropland idling are planned to occur within the Proposed Action area during water year 2022. Therefore, no cumulative impacts are expected to occur.

3.6.2 Biological Resources

As discussed in Section 3.6, no water transfers related reservoir storage action are planned to occur within the Proposed Action area during WY 2022. Therefore, no cumulative impacts are expected to occur.

3.6.3 Groundwater Resources

Due to the lack of water transfers in contract year 2022, there are no water transfers related groundwater substitution action planned to occur within the Proposed Action area. Therefore, no cumulative impacts are expected to occur. Impacts of the Proposed Action on Groundwater Resources is discussed in Section 3.4.2.2.

3.6.4 Hydrology and Water Quality

As discussed in Section 3.6, no water transfers related flow released are planned to occur within the Proposed Action area during water year 2022. Therefore, no cumulative impacts are expected to occur.

Section 4 Consultation & Coordination

4.1 Agencies and Persons Consulted

Reclamation consulted with the following agencies in preparing this EA.

- Individual Sacramento Settlement Contractors listed in Appendix A

4.2 Endangered Species Act

Reclamation will coordinate with the USFWS and NMFS as appropriate under Section 7 of ESA. Reclamation has previously consulted with the agencies under Section 7 of ESA for operation of the CVP.

- NMFS LTO Endangered Species Act (ESA) Section 7 Biological Opinion, October 21, 2019
- USFWS LTO Biological Opinion, October 21, 2019

In 2019, Reclamation consulted with USFWS on the potential impacts of crop idling on GGS under the Long-Term Water Transfer Program. In 2022, all crop idling transfers as a part of the long-term transfer program were paused due to a historically low availability of water to the Settlement Contractors. Decisions to idle fields were made based on the availability of water and needs of crop types. Priority of water supply was generally given to permanent crops with limited water going to rice fields nearest conveyance systems and drains to minimize losses of water in and out of the system. These decisions were not made by Reclamation, and any effects to GGS were not a result of a Reclamation Action. The Proposed Action would not change the decision to idle fields or create additional effects to GGS.

- USFWS Long-Term Water Transfers Project Biological Opinion, May 17, 2019

4.3 Section 106 of the National Historic Preservation Act (NHPA)

The Proposed Action would occur within existing facilities and there would be no ground disturbing activities, changes in land use, or construction proposed that could disturb existing or potential cultural resources or historic properties. 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 (NHPA) regulations codified at 36 CFR § 800.3(a)(1). Reclamation has no further obligations under NHPA Section 106, pursuant to 36 CFR § 800.3(a)(1). This action would not have significant impacts on properties listed, or eligible for 19 listing, on the National Register of Historic Places as determined by Reclamation (LND 02-01) (43 CFR 46.215 (g).

4.4 Public Involvement

Reclamation provides the public with an opportunity to comment on the Environmental Assessment during the public review period. The document is made available on Reclamation's website: https://www.usbr.gov/mp/nepa/.

Section 5 References

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Appendix A

List of Sacramento Settlement Contractors

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List of Sacramento River Settlement Contractors

Service Area	Contractor Type	Contract Name	Contract Number
Sacramento River	Short Form	Alexander, Thomas, et ux	14-06-200-7754A
Sacramento River	Short Form	Anderson Properties L.P., R and J	14-06-200-1726A
Sacramento River	Short Form	Anderson, Art, et al	14-06-200-3591A
Sacramento River	District	Anderson-Cottonwood Irrigation District	14-06-200-3346A
Sacramento River	Standard Form	Andreotti Associates	14-06-200-1898A
Sacramento River	Short Form	B & D Family Partnership	14-06-200-4178A
Sacramento River	Standard Form	Baber, Jack, et al	14-06-200-1604A
Sacramento River	Short Form	Butler, Dianne E., Revocable Intervivos Trust	14-06-200-2365A
Sacramento River	Short Form	Butte Creek Farms (A)	14-06-200-5206A
Sacramento River	Short Form	Butte Creek Farms (M)	14-06-200-1976A
Sacramento River	Short Form	Butte Creek Farms (P)	14-06-200-7744X
Sacramento River	Short Form	Butte Creek Farms (Y)	14-06-200-2851A
Sacramento River	Standard Form	Byrd, Anna C. and Jane Osborne	14-06-200-1595A
Sacramento River	Short Form	Cachil Dehe Band of Wintun Indians of the Colusa Indian Community	14-06-200-7206A
Sacramento River	District	Carter Mutual Water Company	14-06-200-2401A
Sacramento River	Short Form	Charter, Mary K.	14-06-200-8118A
Sacramento River	Short Form	Chesney, Adona, Bypass Trust et al	14-06-200-930A
Sacramento River	Short Form	Churkin, Michael, et al	14-06-200-7227A
Sacramento River	Standard Form	Conaway Preservation Group, LLC	14-06-200-7422A
Sacramento River	Short Form	Cummings, William C.	7-07-20-W0054
Sacramento River	Short Form	Daniell, Harry	14-06-200-4348A
Sacramento River	Short Form	Davis, Grover L., et ux	14-06-200-1851A
Sacramento River	Standard Form	Dennis, L.C. (Canal Farms)	14-06-200-2896A
Sacramento River	Short Form	Driscoll Strawberry Associates, Incorporated	14-06-200-4736A
Sacramento River	Short Form	Driver Family Trust	14-06-200-2398A
Sacramento River	Short Form	Driver Family Trust	14-06-200-1314A
Sacramento River	Short Form	Driver, Gary, et al	14-06-200-8585A
Sacramento River	Short Form	Driver, Gregory E.	14-06-200-939A-2
Sacramento River	Short Form	Driver, William Trust, et al	14-06-200-939A-1
Sacramento River	Short Form	Dyer, Jeffrey E. and Jan Wing	14-06-200-2486A
Sacramento River	District	Eastside Mutual Water Company	14-06-200-1053A
Sacramento River	Short Form	Eggleston, Ronald H., et ux	14-06-200-7339A
Sacramento River	Short Form	Ehrke, Allen A., et ux	14-06-200-8330A
Sacramento River	Short Form	Empire Group, LLC	14-06-200-2145A
Sacramento River	Short Form	Exchange Bank (TNC)	14-06-200-3774A
Sacramento River	Short Form	Fedora, Sib, et al	14-06-200-2916A
Sacramento River	Standard Form	Forry, Laurie	14-06-200-7691A
Sacramento River	Short Form	Gillaspy, William	14-06-200-8117A
Sacramento River	Short Form	Four Corners Farmland Yolo, LLC (formerly Emil Giovannetti)	14-06-200-991A
Sacramento River	Short Form	Giusti, Richard, et al	14-06-200-4076A
Sacramento River	Short Form	Gjermann, Hal	14-06-200-4010A
Sacramento River	District	Glenn-Colusa Irrigation District	14-06-200-855A
Sacramento River	Short Form	Gomes, Frank & Judy - Trust	14-06-200-1827X
Sacramento River	Standard Form	Green Valley Corporation (Swenson Farms, LLC)	14-06-200-5210A
Sacramento River	Standard Form	Griffin & Prater Tenancy-in-Common	14-06-200-2895A
Sacramento River	Short Form	Hale & Marks	14-06-200-1638A
Sacramento River	Short Form	Hale & Marks	14-06-200-7572A
Sacramento River	Short Form	Hatfield, Robert and Bonnie	14-06-200-2365X
Sacramento River	Short Form	Heidrick & McGinnis Properties, L.P.	14-06-200-1176A
Sacramento River	Short Form	Heidrick Family Trust, James & Terry	14-06-200-8322A
Sacramento River	Short Form	Heidrick Family Trust, James & Terry	14-06-200-1616A
Sacramento River	Standard Form	Henle Family Limited Partnership	14-06-200-932A
Sacramento River	Standard Form	Howald Farms, Inc.	14-06-200-1042A
Sacramento River	Short Form	Howard, Theodore	14-06-200-1976X
Sacramento River	Short Form	J.B. Unlimited, Inc.(Flynn Farmlands, LLC)	14-06-200-2519A
Sacramento River	Short Form	Jaeger, William, et al	7-07-20-W0002
Sacramento River	Short Form	Jansen, Peter & Sandy	14-06-200-1426A
Sacramento River	Short Form	Kary, Carol	14-06-200-2520A
Sacramento River	Short Form	King, Ben	14-06-200-1086Y
Sacramento River	Short Form	King, Laura	14-06-200-1086Z
Sacramento River	Short Form	KLSY, LLC	14-06-200-7556A
Sacramento River	Standard Form	Knights Landing Investors, LLC	14-06-200-4604A

Service Area	Contractor Type	Contract Name	Contract Number
Sacramento River	Short Form	Knights Landing Properties, LLC (Sioux Creek)	14-06-200-889A
Sacramento River	Short Form	Lake California Property Owners Association	14-06-200-4961A
Sacramento River	Short Form	Lauppe, Alan, et al (ELH)	14-06-200-1364Y
Sacramento River	Short Form	Lauppe, B & K	14-06-200-1364X
Sacramento River	Short Form	Lauppe, Burton	14-06-200-1289A
Sacramento River	Short Form	Leonard, James C.	14-06-200-1175A
Sacramento River	Short Form	Leviathan, Inc.	14-06-200-7308A
Sacramento River	Short Form	Lockett, William P. & Jean B.	14-06-200-4105A
Sacramento River	Standard Form	Lomo Cold Storage	14-06-200-931A
Sacramento River	Short Form	Lonon, Michael, et al	14-06-200-8658A
Sacramento River	Standard Form	M&T Chico Ranch	02-WC-20-2082
Sacramento River	District	Maxwell Irrigation District	14-06-200-6078A
Sacramento River	Standard Form	MCM Properties, Inc.	14-06-200-7827A
Sacramento River	District	Meridian Farms Water Company	14-06-200-838A
Sacramento River	Short Form	Micke, Daniel	14-06-200-7995A
Sacramento River	Short Form	Morehead, Joseph A., et ux	14-06-200-5789A
Sacramento River	Short Form	Natomas Basin Conservancy	14-06-200-1364A
Sacramento River	District	Natomas Central Mutual Water Company	14-06-200-885A
Sacramento River	Short Form	Nelson Family Trust	14-06-200-1954A
Sacramento River	Standard Form	O'Brien, Frank J., Family Trust	14-06-200-4105X
Sacramento River	Short Form	Odysseus Farms Partnership	14-06-200-8574A
Sacramento River	Standard Form	Oji Brothers Farm, Inc.	14-06-200-3753A
Sacramento River	Standard Form	Oji, Mitsue, Family Partnership	14-06-200-2427A
Sacramento River	Standard Form	Pacific Realty Associates (dba M&T, Inc.)	14-06-200-940A
Sacramento River	District	Pelger Mutual Water Company	14-06-200-2073A
Sacramento River	Standard Form	Pelger Road 1700, LLC	14-06-200-1286A
Sacramento River	Short Form	Penner, Roger & Leona	14-06-200-960A
Sacramento River	District	Pleasant Grove-Verona Mutual Water Co.	14-06-200-5520A
Sacramento River	District	Princeton-Codora-Glenn Irrigation District	14-06-200-849A
Sacramento River	District	Provident Irrigation District	14-06-200-856A
Sacramento River	Short Form	Quad H Ranches	14-06-200-2153A
Sacramento River	Short Form	Reclamation District #1000	14-06-200-1779A
Sacramento River	District	Reclamation District #1004	14-06-200-890A
Sacramento River	District	Reclamation District #108	14-06-200-876A
Sacramento River	Short Form	Redding Rancheria Tribe	7-07-20-W0006
Sacramento River	District	Redding, City of	14-06-200-2871A
Sacramento River	Short Form	Reische, Eric	14-06-200-1150X
Sacramento River	Short Form	Reische, Laverne C., et ux	14-06-200-1150A
Sacramento River	Standard Form	Richter Brothers, et al	14-06-200-4362A
Sacramento River	Standard Form	River Garden Farms	14-06-200-878A
Sacramento River	Short Form	Riverby Ranches, LLC	14-06-200-934A
Sacramento River	Short Form	Riverview Golf & Country Club	14-06-200-8286A
Sacramento River	District	Robert's Ditch Irrigation Company	14-06-200-935A
Sacramento River	Short Form	Rubio, Exequiel & Elsa	14-06-200-2368A
Sacramento River	Short Form	Sacramento, County of	14-06-200-2404A
Sacramento River	Standard Form	Saeed, Faraz A.	8-07-20-W0117
Sacramento River	Short Form	Seaver, Charles	14-06-200-3296A
Sacramento River	Short Form	Sooch, Jagtar, et al (Munson)	14-06-200-7049A
Sacramento River	District	Sutter Mutual Water Company	14-06-200-815A
Sacramento River	Short Form	Swenson Farms, LLC (Green Valley)	14-06-200-5211A
Sacramento River	Standard Form	Sycamore Mutual Water Company	14-06-200-2146A
Sacramento River	Short Form	T&P Farms	14-06-200-2993A
Sacramento River	Standard Form	Tarke, Stephen	14-06-200-1949A
Sacramento River	Standard Form	TeVelde Family Revocable Trust	14-06-200-2149A
Sacramento River	District	Tisdale Irrigation and Drainage Company	14-06-200-2781A
Sacramento River	Short Form	Tuttle, Charles W. - Trust	14-06-200-7296A
Sacramento River	Standard Form	Van Ruiten Bros.	14-06-200-880A
Sacramento River	Short Form	Van Ruiten Bros.	14-06-200-5200X
Sacramento River	Short Form	Van Ruiten Bros.	14-06-200-1415A
Sacramento River	Standard Form	Van Ruiten Bros. (formerly Van Ruiten Bros. and Gail Owens)	14-06-200-880X
Sacramento River	Short Form	Wallace, Joseph and Janine	14-06-200-5200A
Sacramento River	Short Form	Wallace, Kenneth L. Living Trust	14-06-200-1175A-X

Service Area	Contractor Type	Contract Name	Contract Number
Sacramento River	Short Form	Willey, Edwin & Marjorie, Revocable Trust	14-06-200-3556A
Sacramento River	Standard Form	Wilson Ranch Partnership	14-06-200-4520A
Sacramento River	Standard Form	Windswept Land & Livestock	14-06-200-2045A
Sacramento River	Short Form	Wisler, John Jr.	14-06-200-5215A
Sacramento River	District	Woodland-Davis Clean Water Agency	14-06-200-7422X
Sacramento River	Standard Form	Yolo Land Trust	14-06-200-2148A
Sacramento River	Short Form	Young, Russell L., et al	14-06-200-2552A
Sacramento River	Short Form	ZelMar Ranches	14-06-200-1827A