



State of California –The Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Director's Office
P.O. Box 944209
Sacramento, CA 94244-9020
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director



March 31, 2020

Karla Nemeth, Director
California Department of Water Resources
1416 9th Street
Sacramento, CA 95814

Subject: Incidental Take Permit for Long-Term Operation of the State Water Project in the Sacramento-San Joaquin Delta (2081-2019-066-00)

Dear Ms. Nemeth:

Enclosed you will find two originals of the incidental take permit for the above referenced Project, which have been signed by the Department. Please read the permit carefully, sign the acknowledgement on both copies of the permit, and return one original **no later than 30 days from Department signature**, and prior to initiation of ground-disturbing activities, to:

Department of Fish and Wildlife
Habitat Conservation Planning Branch, CESA Permitting
Post Office Box 944209
Sacramento, CA 94244-2090

You are advised to keep the other original signature permit in a secure location and distribute copies to appropriate project staff responsible for ensuring compliance with the conditions of approval of the permit. Note that you are required to comply with certain conditions of approval prior to initiation of ground-disturbing activities. Additionally, a copy of the permit must be maintained at the project work site and made available for inspection by Department staff when requested.

The permit will not take effect until the signed acknowledgement is received by the Department. If you wish to discuss these instructions or have questions regarding the permit, please contact Joshua Grover, Water Branch Chief, at (916) 376-5460.

Sincerely,

Charlton Bonham, Director
California Department of Fish and Wildlife

Enclosures (2)

Conserving California's Wildlife Since 1870



California Department of Fish and Wildlife
Ecosystem Conservation Division
P.O. Box 944209
SACRAMENTO, CA, 94244-2090

California Endangered Species Act
Incidental Take Permit No. 2081-2019-066-00

**LONG-TERM OPERATION OF THE STATE WATER PROJECT IN THE SACRAMENTO SAN JOAQUIN
DELTA**

Authority: This California Endangered Species Act (CESA) incidental take permit (ITP) is issued by the California Department of Fish and Wildlife (CDFW) pursuant to Fish and Game Code section 2081, subdivisions (b) and (c), and California Code of Regulations, Title 14, section 783.0 et seq. CESA prohibits the take¹ of any species of wildlife designated by the California Fish and Game Commission as an endangered, threatened, or candidate species.² CDFW may authorize the take of any such species by permit if the conditions set forth in Fish and Game Code section 2081, subdivisions (b) and (c) are met. (See Cal. Code Regs., tit. 14, § 783.4).

Permittee:	California Department of Water Resources
Principal Officer:	Michelle Banonis, Assistant Chief Deputy Director
Contact Person:	Dean Messer, 916-376-9700
Mailing Address:	P.O. Box 942836 Sacramento, CA 94236-0001

Effective Date and Expiration Date of this ITP:

This ITP shall be executed in duplicate original form and shall become effective once a duplicate original is acknowledged by signature of the Permittee on the last page of this ITP and returned to CDFW's Habitat Conservation Planning Branch at the address listed in the Notices section of this ITP. Unless renewed by CDFW, this ITP's authorization to take the Covered Species shall expire on **March 31, 2030**.

¹Pursuant to Fish and Game Code section 86, "take' means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." (See also *Environmental Protection Information Center v. California Department of Forestry and Fire Protection* (2008) 44 Cal.4th 459, 507 [for purposes of incidental take permitting under Fish and Game Code section 2081, subdivision (b), "take' ... means to catch, capture or kill".])

²The definition of an endangered, threatened, and candidate species for purposes of CESA are found in Fish and Game Code sections 2062, 2067, and 2068, respectively.

Notwithstanding the expiration date on the take authorization provided by this ITP, Permittee's obligations pursuant to this ITP do not end until CDFW accepts as complete the Permittee's Final Mitigation Report required by Condition of Approval 7.3 of this ITP.

Project Location:

The Long-Term Operation of the State Water Project (Project) is located within the following geographic area (Project Area, See Figures 1A and B):

- Sacramento River from its confluence with the Feather River downstream to the legal Delta boundary at the I Street Bridge in the City of Sacramento;
- Sacramento-San Joaquin Delta (i.e., upstream to Vernalis and downstream to Chipps Island); and
- Suisun Marsh and Bay

Project operations will be in all fish-bearing waterways within the Project Area. The northern edge of the Project Area is located approximately 8.56 km northeast of Knights Landing in Yolo County at approximately 38.785281 latitude, -121.621825 longitude and extends downstream on the Sacramento River to the Sacramento-San Joaquin Delta (Delta). To the south and east the Project Area is bounded by the legal boundary of the Delta. To the west the Project Area is bounded by the legal Delta, Suisun Marsh, and Suisun Bay.

Project Description:

This Project Description is based on information CDFW obtained from Permittee's December 2019 ITP application and subsequent coordination with Permittee. The Conditions of Approval begin on page 49.

1. Introduction

The State Water Project (SWP) includes water, power, and conveyance systems, conveying an annual average of 2.9 million acre-feet (AF) of water. The principal facilities of the SWP are Oroville Reservoir and related facilities, and San Luis Dam and related

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facilities, facilities in the Delta, the Suisun Marsh Salinity Control Gates (SMSCG), the California Aqueduct including its terminal reservoirs and the Delta-Mendota Canal/California Aqueduct Intertie (DCI), and the North and South Bay Aqueducts. Permittee holds contracts with 29 public agencies in northern, central, and southern California for water supplies from the SWP. Water stored in the Oroville facilities, along with water available in the Delta (consistent with applicable regulations) is captured in the Delta and conveyed through several facilities to SWP contractors. The SWP is operated to provide flood control and water for agricultural, municipal, industrial, recreational, and environmental purposes.

1.1 Description of Existing SWP Facilities

The SWP facilities in the Delta provide for delivery of water supply to areas within and immediately adjacent to the Delta, and to regions south of the Delta. The SWP Delta facilities include the Suisun Marsh and Bay facilities, the Harvey O. Banks Pumping Plant (Banks Pumping Plant), the Clifton Court Forebay (CCF), the John E. Skinner Delta Fish Protective Facility, and the Barker Slough Pumping Plant (BSPP).

1.1.1 Harvey O. Banks Pumping Plant

The Harvey O. Banks Pumping Plant (Banks Pumping Plant), located about 12.87 km northwest of Tracy, marks the upstream end of the California Aqueduct. The plant discharges into five pipelines that convey water into a roughly 1.6 km- long canal, which in turn conveys water to Bethany Reservoir.³ The Banks Pumping Plant consists of 11 pumps—two rated at 375 cubic feet per second (cfs) capacity, five at 1,130 cfs capacity, and four at 1,067 cfs capacity—that provide the initial lift of water 74.37 m from the CCF into the California Aqueduct. The rated capacity of the Banks Pumping Plant is 10,300 cfs. The plant's maximum daily pumping rate is controlled by a combination of the State Water Resources Control Board's (SWRCB's) Water Rights Decision 1641 (D-1641) and permits

³ DWR and Reclamation (2015). Technical Information for Preparing Water Transfer Proposals. Information for Parties Preparing Proposals for Water Transfers Requiring Department of Water Resources or Bureau of Reclamation Approval.

issued by the United States Army Corps of Engineers (USACE) that regulate the rate of diversion of water into the CCF. The diversion rate is normally restricted to 6,680 cfs as a three-day average inflow and 6,993 cfs as a 1-day average inflow to the CCF in accordance with the existing USACE Section 10 permit issued pursuant to the Rivers and Harbors Act.⁴ The diversions may be greater in the winter and spring, depending on San Joaquin River flows at Vernalis.³ As part of the adaptive management process described in D-1641, the SWP is permitted to pump an additional 500 cfs between July 1 and September 30 to offset water costs associated with fisheries actions, making the summer limit effectively 7,180 cfs.⁵

The U.S. Bureau of Reclamation (Reclamation) operates the Central Valley Project (CVP). The CVP regularly uses the SWP facilities through 1) direct export at Banks Pumping Plant using Joint Point of Diversion (JPOD) provisions in D-1641, or 2) through the use of the DCI and pumping water directly into the California Aqueduct (CA) for conveyance to CVP storage and water users.

1.1.2 John E. Skinner Delta Fish Protective Facility

The John E. Skinner Delta Fish Facility (Skinner Fish Facility) is west of the CCF, about 3.22 km upstream from the Banks Pumping Plant. The Skinner Fish Facility guides fish away from entering the pumps that convey water into the CA. Large fish and debris are directed away from the facility by a 118-meter-long trash boom. Smaller fish are diverted from the intake channel into bypasses by a series of metal louvers. These smaller fish pass through a secondary system of screens, louvers, and pipes into seven holding tanks, where a subsample is counted and recorded. The salvaged fish are then returned to the Delta in oxygenated tank trucks.

⁴ State Water Resources Control Board. 2017. Scientific Basis Report in Support of New and Modified Requirements for Inflows from the Sacramento River and its Tributaries and Eastside Tributaries to the Delta, Delta Outflows, Cold Water Habitat, and Interior Delta Flows.

⁵ U.S. Bureau of Reclamation. 2008. Biological Assessment on the Continued Long-Term Operations of the Central Valley Project and the State Water Project. Mid-Pacific Region, Sacramento, CA. August 2008.

During normal operations, salvaged fish are transported approximately 30 km and released at one of six SWP and CVP release sites near the confluence of the Sacramento and San Joaquin Rivers. Up to present day, most fish hauls from the Skinner Fish Facility and the CVP Tracy Fish Facility have been released at either the SWP Horseshoe Bend Release Site or the SWP Curtis Landing Release Site on an alternating basis. In 2018, two new SWP release sites were constructed on Sherman Island (SWP Little Baja and SWP Manzo Ranch), and as a measure to reduce predation, Permittee plans to re-operate the release site rotation schedule to incorporate the two new release sites, the two CVP release sites at Emmaton and Antioch, and the SWP Curtis Landing Release Site. The SWP Horseshoe Bend Release Site is planned to be decommissioned from regular use due to age and lack of interagency operability.

1.1.2.1 SWP Horseshoe Bend Release Site

The SWP Horseshoe Bend release site is located within Horseshoe Bend on Sherman Island, approximately 11 km downstream of the city of Rio Vista along highway 160. The release facility consists of two 30.5-cm diameter steel pipes. One pipe is approximately 54.3 m long and is used for the release of fish and includes a short (~3 m) length of PVC pipe with a PIT tag detection array. The other pipe houses a submersible pump which feeds flushing water at 0.18 cfs into the release pipe through a four-inlet manifold. At the mean high-water level, the pipe is submerged 3.7 m (12 ft). The site is planned to be decommissioned upon operation of new SWP release sites at Little Baja and Manzo Ranch due to dated infrastructure and site constraints on refurbishment.

1.1.2.2 SWP Curtis Landing Release Site

The SWP Curtis Landing release site is on the San Joaquin River side of Sherman Island, immediately upstream of the Antioch Bridge. The release facility consists of two stainless steel pipes. One pipe is 30.5-cm in diameter, approximately 18.3 m long, and is used for the release of fish and includes a PVC section (~3 m) with a PIT tag detection array. The other pipe, a water intake pipe, is 40.6-cm in diameter and houses a submersible pump which feeds flushing water at 3.5 cfs into the release pipe through a dual-inlet manifold. The water intake pipe also includes a retrievable self-cleaning cylindrical fish screen. At the mean high-water level, the pipe is submerged approximately 5.5 m.

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1.1.2.3 SWP Little Baja and Manzo Ranch Release Sites

The SWP Little Baja and Manzo Ranch release sites are located on the Sacramento River side of Sherman Island, approximately 0.8 km and 1.6 km upstream of the Sherman Island County Park, respectively. At the mean high-water level, the end of the release pipe is submerged approximately 4.37 m and 3.96 m at Little Baja and Manzo Ranch, respectively. Both sites incorporate the same 3.5 cfs pipe flushing and overhead washdown system, fish screen, and other design elements utilized at Curtis Landing.

1.1.3 Clifton Court Forebay

The CCF is located near the city of Byron in the South Delta. The Banks Pumping Plant pumps water diverted from the CCF via the intake channel past Skinner Fish Facility. A set of five radial gates are located at the CCF inlet near the confluence of the Grant Line and West Canal. They are operated so that they can be closed during critical periods of the ebb/flood tidal cycle to protect water levels experienced by local agricultural water users in the South Delta. The gates are operated on the tidal cycle to reduce approach velocities, prevent scour in adjacent channels, and minimize fluctuations in water elevation in the South Delta by taking water in through the gates at times other than low tide.

Banks Pumping Plant pumping rates are constrained operationally by limits on CCF diversions from the Delta. The maximum daily diversion limit from the Delta into the CCF is 13,870 AF per day (6,990 cfs/day) and the maximum averaged diversion limit over any 3 days is 13,250 AF per day (6,680 cfs/day). In addition to these requirements, Permittee may increase diversions from the Delta into the CCF by one-third of the San Joaquin River flow at Vernalis from mid-December through mid-March when flows at Vernalis exceed 1,000 cfs. These limits are listed in USACE Public Notice 5820A Amended (Oct. 13, 1981).

From July through September, the maximum daily diversion limit from the Delta into the CCF may be increased from 13,870 AF per day (6,990 cfs/day) to 14,860 AF per day (7,490 cfs/day), and the maximum averaged diversion limit over any 3 days is increased from 13,250 AF per day (6,680 cfs/day) to 14,240 AF per day (7,180 cfs/day). These increases are for the purpose of recovering water supply losses incurred earlier in the same year to protect fish species listed under the Endangered Species Act.

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1.1.4 Barker Slough Pumping Plant

The BSPP diverts water from Barker Slough into the North Bay Aqueduct (NBA) for delivery to Napa and Solano counties. The NBA intake is located approximately 16 km from the mainstem Sacramento River at the end of Barker Slough. In accordance with salmon screening criteria, each of the aqueduct's 10 pump bays are individually screened with a positive barrier fish screen consisting of a series of flat, stainless-steel, wedge-wire panels with a slot width of 0.238 cm. This configuration is designed to exclude and prevent the entrainment of fish measuring approximately 2.54 cm or larger. The bays tied to the two smaller units have an approach velocity of about 0.2 foot per second (ft/sec). The larger units were designed for a 0.5 ft/sec approach velocity, but actual approach velocity is about 0.44 ft/sec. The screens are routinely cleaned to prevent excessive head loss, thereby minimizing increases in localized approach velocities.

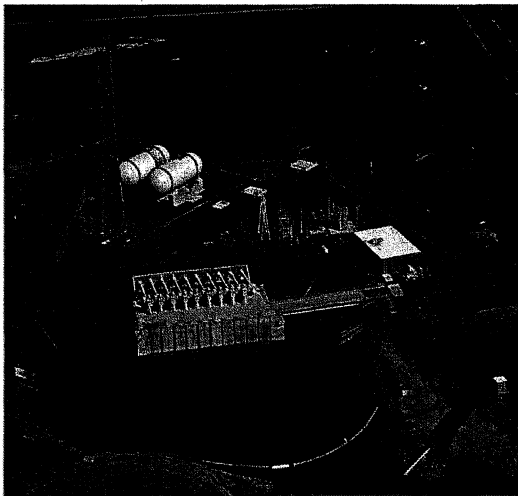


Figure 1. Aerial view of Barker Slough Pumping Plant.

The first two bays have smaller pump units (nominally 14 cfs), and seven bays have larger pump units (nominally 28 cfs). The last bay does not have a pump. The maximum pipeline capacity is 175 cfs, but currently the normal pumping rate is between 0 cfs and 130 cfs because the maximum pipeline capacity cannot be reached due to biofilm accumulation in the pipe. Under Project operations, Permittee will divert up to the maximum pipeline capacity

of 175 cfs year-round except when larval longfin smelt (LFS, *Spirinchus thaleichthys*) are present in the vicinity of the BSPP (see Condition of Approval 8.12 in this ITP).

1.1.4.1 Barker Slough Pumping Plant Fish Screen Cleaning

Permittee cleans the BSPP screens once a month using a truck mounted crane to lift the screens up and a high-pressure hose sprayed from the back side of the screens. The screens in front of each bay are entirely submerged and are more than 7.01 m below the top of the concrete platform. Each fish screen is 2.13 m wide by 3.05 m long and is lowered into position along vertical metal slots anchored to the façade of the intake structure.

1.1.4.2 Barker Slough Pumping Plant Sediment Removal

Sediment accumulated on the front apron in front of the fish screen and in the pump wells behind the fish screen will be removed by suction dredge. Sediment removal will be conducted from June 1 through October 15 when water temperatures are greater than 25°C and during the annual North Bay Aqueduct shutdown in March. The NBA is annually taken off-line for one to two weeks for routine maintenance and repairs, and the BSPP is non-operational during this period. If sediment removal is conducted when the water temperature is less than 25°C, a CDFW-approved Designated Biologist (see Conditions of Approval 6.2 and 7.7 in this ITP) will be present during the sediment removal. Removal of sediment from within the pump wells would occur as needed, year-round. Sediment will be tested and disposed at a suitable location or existing landfill.

1.1.4.3 Barker Slough Pumping Plant Aquatic Weed Removal

Aquatic weed removal system consists of grappling hooks attached by chains to an aluminum frame. A boom truck, staged on the platform in front of the BSPP pumps, will lower the grappling system into the water to retrieve the accumulated aquatic vegetation. The removed aquatic weeds will be transported to two aggregate base spoil sites located near the BSPP.

Removal of aquatic weeds from the BSPP fish screens will occur June 1 through October 15 when water temperatures are greater than 25°C and aquatic weed production is highest. Floating aquatic vegetation, i.e., water hyacinth, may need to be removed during spring months if vegetation becomes entrained into Barker Slough and accumulates in front of

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BSPP fish screens. If aquatic weed removal is necessary during other times of the year, or if the water temperature is less than 25°C, a CDFW-approved Designated Biologist (see Conditions of Approval 6.2 and 7.7 in this ITP) will be present during the activity.

1.1.5 Suisun Marsh Operations

The Suisun Marsh Preservation Agreement (SMPA) among Permittee, the U.S. Bureau of Reclamation (Reclamation), CDFW, and Suisun Resource Conservation District contains provisions for Permittee and Reclamation to mitigate the impacts on Suisun Marsh channel water salinity from SWP and CVP operations and other upstream diversions. The SMPA requires Permittee and Reclamation to meet salinity standards in accordance with D-1641, sets a timeline for implementing the Plan of Protection, and delineates monitoring and mitigation requirements.

There are two primary physical mechanisms for meeting salinity standards set forth in D-1641 and the SMPA: (1) the implementation and operation of physical facilities in the Marsh and (2) management of Delta outflow (i.e., facility operations are driven largely by salinity levels upstream of Montezuma Slough, and salinity levels are highly sensitive to Delta outflow). Physical facilities (described below) have been operating since the 1980s.

Physical facilities in the Suisun Marsh and Bay include SMSCG, the Roaring River Distribution System (RRDS), the Morrow Island Distribution System (MIDS) and the Goodyear Slough Outfall (GYSO). The location and operation of these facilities are described below and in Section 3 of the Project Description.

1.1.5.1 Suisun Marsh Salinity Control Gates

The SMSCG are located on Montezuma Slough about 3.22 km downstream from the confluence of the Sacramento and San Joaquin rivers, near Collinsville. The objective of SMSCG operation is to decrease the salinity of the water in Montezuma Slough. The gates control salinity by restricting the flow of higher salinity water from Grizzly Bay into Montezuma Slough during incoming tides and retaining lower salinity Sacramento River water from the previous ebb tide. Operation of the gates in this fashion lowers salinity in Suisun Marsh channels and results in a net movement of water from east to west through Suisun Marsh.

The SMSCG are operated during the salinity control season, which spans from October to May. Operational frequency is affected by salinity at D-1641 compliance stations, hydrologic conditions, weather, Delta outflow, tide, fishery considerations, and other factors. The boat lock portion of the gate is held partially open during SMSCG operation to allow an opportunity for continuous salmon passage. However, the boat lock gates may be closed temporarily to stabilize flows to facilitate safe passage of watercraft through the facility.

1.1.5.2 Roaring River Distribution System

The RRDS was constructed to provide lower salinity water to 5,000 acres of private and 3,000 acres of CDFW managed wetlands on Simmons, Hammond, Van Sickle, Wheeler, and Grizzly Islands. The RRDS includes a 40-acre intake pond that supplies water to Roaring River Slough. Water is diverted through a bank of eight 152.4 cm-diameter culverts equipped with fish screens into the Roaring River intake pond on high tides to raise the water surface elevation in the RRDS above the adjacent managed wetlands.

The intakes to the RRDS are screened to prevent entrainment of fish larger than approximately 25 mm. After the listing of Delta smelt (DS), RRDS diversion rates have been controlled to maintain a maximum average approach velocity of 0.2 ft/sec at the intake fish screens except during the period from September 14 through October 20, when RRDS diversion rates are controlled to maintain a maximum average approach velocity of 0.7 ft/sec for fall flood up operations.

1.1.5.3 Morrow Island Distribution System

The MIDS is three unscreened 122 cm intakes that allow Permittee and Reclamation to provide fresher water to the landowners for managed wetland activities approved in local management plans. The system was constructed primarily to channel drainage water from the adjacent managed wetlands for discharge into Suisun Slough and Grizzly Bay. This activity increases circulation and reduces salinity in Goodyear Slough. The MIDS is used year-round, but most intensively from September through June. When managed wetlands are filling and circulating, water is tidally diverted from Goodyear Slough just south of Pierce Harbor.

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1.1.5.4 Goodyear Slough Outfall

The GYSO connects the south end of Goodyear Slough to Suisun Bay. Prior to construction of the outfall, Goodyear Slough was a dead-end slough. The GYSO was designed to increase water circulation and reduce salinity in Goodyear Slough to provide higher water quality to the wetland managers who flood their ponds with Goodyear Slough water. GYSO has a series of four passive intakes that drain to Suisun Bay. The outfall is equipped with slide gates on the interior of the outfall structure to allow Permittee to close the system as needed for maintenance or repairs. The intakes and outfall of GYSO are unscreened but are equipped with trash racks. Any fish that enter the system are able to leave via the intake or the outfall, as GYSO is an open system.

1.1.6 South Delta Temporary Barrier Project

The South Delta Temporary Barrier Project (TBP) was initiated in 1991. The objectives of the TBP are to increase water levels, water circulation patterns, and water quality in the southern Delta area for local agricultural diversions. The Project includes operation of temporary rock barriers at the following locations:

- Middle River near the Victoria Canal, about 0.8 km south of the confluence of Middle River, Trapper Slough, and the North Canal
- Old River near Tracy, approximately 0.8 km east of the Delta-Mendota Canal intake; and
- Grant Line Canal, approximately 122 m east of the Tracy Boulevard Bridge

These rock barriers are designed to act as flow control structures, trapping tidal waters behind them after a high tide. These barriers improve water levels and circulation for local South Delta farmers and are collectively referred to as agricultural barriers.

Rock barriers at Old River near Tracy, Middle River, and the Grant Line Canal are in place no earlier than May 1 and operational no earlier than May 15, provided San Joaquin River flow at Vernalis is low enough to enable installation, typically less than 5,000 cfs, to September 30 each year. Flap gates will be tied open during operation of the temporary barriers. All three agricultural barriers operate until the fall and must be completely removed by November 30 of each year. Full closure of the Grant Line Canal

Barrier requires NMFS, USFWS, and CDFW approval and a demonstrated need for the full closure based on actual conditions and modeling. Barriers will include at least one open culvert, to allow fish passage when water temperatures are less than 22°C. The Old River barrier near Tracy has been installed since 1991 and the Middle River barrier has been installed since 1987. A rock barrier was first installed in the Grant Line Canal in spring 1996, and since then the barrier has been installed in every year except 1998.

This Project includes the operation of the barriers within the South Delta and does not address the construction or removal of the barriers, which is covered by ITP number 2081-2011-019-03-A3.

1.1.7 San Luis Reservoir

San Luis Reservoir is an off-stream storage facility located along the California Aqueduct downstream of the Jones and Banks pumping plants. The CVP and SWP share San Luis Reservoir storage roughly 50/50 (CVP has 966 thousand acre-feet [TAF] of storage, and SWP has 1062 TAF of storage). San Luis Reservoir is used by both the CVP and SWP to meet deliveries to their contractors during periods when Delta pumping is insufficient to meet demands. San Luis Reservoir is also operated to supply water to the CVP San Felipe Division in San Benito and Santa Clara counties.

San Luis Reservoir operates as a regulator on the CVP/SWP system, accepting any water pumped from the Jones and Banks pumping plants that exceeds contractor demands, then releasing that water back to the aqueduct system when the pumping at the Jones and Banks pumping plants is insufficient to meet demands. The reservoir allows the CVP/SWP to meet peak-season demands that are seldom balanced by Jones and Banks pumping.

As San Luis Reservoir is drawn down to meet contractor demands, it usually reaches its low point in late August or early September. From September through early October, demand for deliveries declines until it is less than the rate of diversions from the Delta at the Jones and Banks pumping plants. At this point, the additional diverted water is added to San Luis Reservoir, reversing its spring and summer decline and eventually filling the San Luis Reservoir—typically before April of the following year.

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Operations of the San Luis Reservoir are not discussed further in this document, as there will be no changes to the operations of this reservoir and it is an off-stream facility.

1.1.8 Delta-Mendota Canal/California Aqueduct Intertie

The Delta Mendota Canal/California Aqueduct Intertie (DCI) is a Reclamation facility that is co-operated by the CVP and SWP and provides the ability to move water from the Delta Mendota Canal (DMC) to the California Aqueduct (CA). The DCI provides up to 900 cfs gravity flow from the CA to the DMC and up to 467 cfs pumping capacity from the DMC to the CA. Though the DCI provides the capability to convey water in both directions, the primary use has been pumping water from the DMC to the CA. The DCI helps to offset loss of canal capacity due to subsidence on the upper DMC, which has impacted the CVP’s ability to utilize the full design capacity of the Jones Pumping Plant. The Jones Pumping Plant has for the most part been limited to about 3,600 cfs without the use of the DCI. Due to continued subsidence, the frequency of DCI use has increased. Figure 2 shows the average monthly volume that the CVP pumped using the DCI from 2012 to 2018.

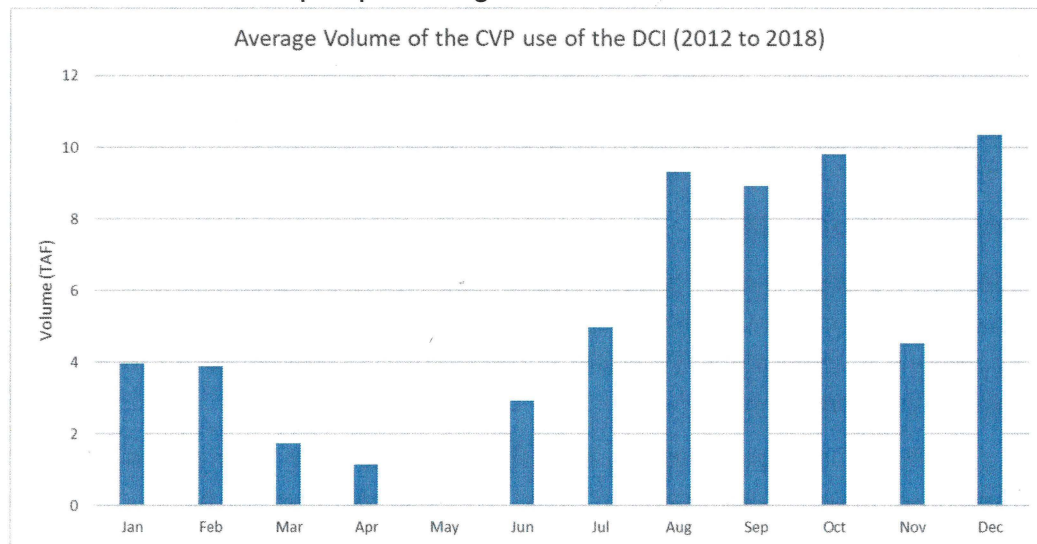


Figure 2. Average monthly volume CVP use of the DCI July 2012 - December 2018.

1.2 Description of Existing SWP Water Service Contracts

Permittee has signed long-term contracts with 29 water agencies statewide to deliver water supplies developed from the SWP system. These contracts are with both municipal and industrial (M&I) water users and agricultural water users. The contracts specify the charges that will be made by the water agency for both (1) water conservation and (2) conveyance of water. The foundation allocation of water to each contractor is based on their respective "Table A" entitlement, which is the maximum amount of water delivered to them by the SWP on an annual basis.

Under statewide contracts, Permittee allocates Table A water as an annual supply made available for scheduled delivery throughout the year. Table A contracts total 4,173 TAF, with more than 3 million acre-feet (MAF) for San Joaquin Valley and southern California water users.

Article 21 of the long-term SWP water supply contracts provides an interruptible water supply made available only when certain conditions exist: (1) The SWP share of San Luis Reservoir is physically full or is projected to be physically full; (2) other SWP reservoirs south of the Delta are at their storage targets or the conveyance capacity to fill these reservoirs is maximized; (3) the Delta is in excess conditions; (4) current Table A demand is being fully met; and (5) the Banks Pumping Plant has export capacity beyond that which is needed to meet current Table A and other SWP operational demands.

1.3 SWP Allocation and Forecasting

Permittee uses a forecasting water supply allocation process that is updated monthly, incorporates known conditions in the Central Valley watershed to date, and forecasts future hydrologic conditions to estimate SWP water supplies that can be delivered to SWP contractors as the water year progresses.

The Initial Allocation for SWP Deliveries is made by December 1 of each year with a conservative assumption of future precipitation to avoid over-allocating water before the hydrologic conditions are well defined for the year. As the water year unfolds, Central Valley hydrology and water supply delivery estimates are updated using measured and known information and conservative forecasts of future hydrology.

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Another water supply consideration is the contractual ability of SWP contractors to “carry over” allocated (but undelivered) Table A supplies from the previous year to the next if space is available in San Luis Reservoir. The carryover storage is often used to supplement an individual contractor’s current year Table A allocations if conditions are dry. Carryover supplies left in San Luis Reservoir by SWP contractors can result in higher storage levels in San Luis Reservoir. As SWP pumping fills San Luis Reservoir, the contractors are notified to take, or lose, their carryover supplies. Carryover water not taken, after notice is given to remove it, then becomes water available for reallocation to all contractors in a given year.

Article 21 (surplus to Table A) water, which is delivered early in the calendar year, may be reclassified as Table A water later in the year depending on final allocations, hydrology, and contractor requests. Reclassification does not affect the amount of water carried over in San Luis Reservoir, nor does it alter pumping volumes or schedules.

1.4 Coordination of Daily Operations with Reclamation

After the allocations and forecasting process, Permittee and Reclamation coordinate their operations on a daily basis. Some factors Permittee and Reclamation consider when coordinating their joint operations include required in-Delta flows, Delta outflow, water quality, schedules for the joint use facilities, pumping and wheeling arrangements, and any facility limitations. Both the CVP and SWP must meet the flood obligations of individual reservoirs. CVP operations must also consider flows at Wilkins Slough and associated pump intake elevations.

The 2018 COA,⁶ included in Appendix B of the FEIR defines balanced and excess conditions as:

Balanced conditions: “The COA defines balanced water conditions as periods when it is mutually agreed that releases from upstream reservoirs plus unregulated flows

⁶ U.S. Bureau of Reclamation and California Department of Water Resources. 2018. Addendum to the Agreement Between the United States of America and the Department of Water Resources of the State of California for Coordinated Operation of the Central Valley Project and the State Water Project. December 2018.

approximately equal the water supply needed to meet Sacramento Valley in-basin uses plus Delta exports.”

Excess conditions: “Excess water conditions are periods when it is mutually agreed that releases from upstream reservoirs plus unregulated flows exceed Sacramento Valley in-basin uses plus Delta exports.”

Process to determine excess vs balanced conditions: “Reclamation’s Central Valley Operations Office and DWR’s SWP Operations Control Office jointly decide when balanced or excess water conditions exist. During excess water conditions, when sufficient water is available to meet all beneficial needs, the CVP and SWP are not required to supplement the supply with additional releases from storage.”

During balanced water conditions, Permittee and Reclamation maintain a daily water accounting of SWP and CVP obligations. This accounting allows for flexible operations and avoids the need to change reservoir releases made several days in advance (due to travel time from the Delta). Therefore, adjustments can be made “after the fact,” using actual observed data rather than by prediction for the variables of reservoir inflow, storage withdrawals, and in-basin uses. This iterative process of observation and adjustment results in a continuous trueing up of the running account under the Coordinated Operation Agreement between the Federal Government and the State of California (COA). If either the SWP or CVP is “owed” water (i.e., the project that provided more or exported less than its COA-defined share), each may request the other to adjust its operations to reduce or eliminate the accumulated account within a reasonable time.

The COA provides the mechanism for determining SWP and CVP responsibility for meeting in-basin use, but real-time conditions dictate real-time actions. Conditions in the Delta can change rapidly. For example, weather conditions combined with tidal action can quickly affect Delta salinity conditions and therefore the Delta outflow required to maintain joint salinity standards under D-1641.

Increasing or decreasing SWP or CVP exports can achieve changes to Delta outflow immediately. Imbalances in meeting each other’s initial shared obligations are captured by the COA accounting and balanced out later.

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When more reaction time is available, reservoir release changes are used to adjust to changing in-basin conditions and is coordinated with Reclamation. Permittee's Lake Oroville water releases require about three days to reach the Delta, while water released from Reclamation's Shasta Reservoir requires five days to travel from Keswick Reservoir to the Delta and Folsom Reservoir requires one day to travel to the Delta. Each occurrence is evaluated on an individual basis, and appropriate action is taken based on multiple factors.

The duration of balanced water conditions varies from year to year. Balanced conditions never occur in some very wet years, while very dry years may have long continuous periods of balanced conditions, and still other years may have had several periods of balanced conditions interspersed with excess water conditions. Account balances continue from one balanced water condition through the excess water condition and into the next balanced water condition. When either the SWP or CVP enters into flood control operations, the accounting is zeroed out for that project.

Permittee and Reclamation meet daily to discuss and coordinate CVP and SWP system operations. Several items are discussed at this daily meeting, including:

- Current reservoir conditions
- Pumping status and current outages (for both the CVP and the SWP and how they are affecting combined operations)
- Upcoming planned outages (CVP and SWP) and what that means for future operations
- Current reservoir releases and what changes may be planned
- Current regulatory requirements and compliance status
- Delta conditions to determine if CVP and SWP pumping make use of all available water

Permittee and Reclamation also coordinate with Hydrosystem Controllers and Area Offices to ensure that, if necessary, personnel are available to make the desired changes. Once Permittee and Reclamation each decide on a plan for that day and complete all coordination, the respective agencies issue change orders to implement the decisions, if necessary.

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Permittee and Reclamation are co-located in the Joint Operations Center. In addition, the California Data Exchange Center, California-Nevada River Forecast Center, and the Permittee's Flood Management Group are also co-located in the Joint Operations Center. This enables efficient and timely communication, particularly during flood events.

1.5 Relationship of Covered Activities to Voluntary Agreements

The Voluntary Agreements are a package of flow and non-flow measures proposed by a diverse range of interests for adoption by the SWRCB as an approach to implement the Bay-Delta Water Quality Control Plan (Bay-Delta Plan). The Voluntary Agreements would state commitments of water, funding, and other measures to implement Bay-Delta Plan water quality objectives related to protection of native fishes, including the Covered Species. The Voluntary Agreements offer a watershed-wide approach that includes new flows, habitat restoration, and a governance and science program that would be deployed adaptively.

CDFW, along with a wide variety of parties including water users, agencies, and non-governmental organizations, have been engaged in the process to develop the Voluntary Agreements. These parties include Permittee, as well as the public water agencies that hold long-term water service contracts with Permittee (SWP Contractors). The SWP Contractors have supported contributions to the Voluntary Agreements in the form of commitments to forgone exports and collection of fees to fund additional water acquisition, restoration, and research activities for the Voluntary Agreements' proposed fifteen-year term. In addition, parties to the Voluntary Agreements, including the SWP Contractors and entities holding water supply contracts with the CVP (CVP Contractors), have supported early implementation of Voluntary Agreement actions to expedite benefits to the extent allowed by law.

As described in Section 1.2 of this Project Description, individual SWP water agencies contract with Permittee to pay for the operation, maintenance, planning and capital costs of the SWP. As described in sections 1.2 and 1.3 of this Project Description, the SWP Contractors depend on Permittee for water deliveries for M&I and agricultural uses. The SWP Contractors are engaged in the Voluntary Agreements for the purpose of facilitating

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Permittee's compliance with the Bay-Delta Plan, which in turn facilitates SWP water deliveries to SWP Contractors.

The Voluntary Agreements are subject to ongoing discussion and have neither been finalized nor adopted by the SWRCB. Adoption and implementation of Voluntary Agreements are not Covered Activities; this ITP does not provide take authorization for the Voluntary Agreements, and this ITP does not rely on their implementation for its legal sufficiency.

However, as of issuance of this ITP, CDFW anticipates Voluntary Agreements may occur and if they do, would likely include elements Permittee could complete, or cause to be completed with the support of its SWP Contractors, to implement the Project. The Voluntary Agreements use flexible blocks of water to increase tributary flows for Delta outflow as well as for the restoration of habitat. Export curtailments that implement Permittee's plan for the long-term operations of the SWP could also be part of the Voluntary Agreements' proposals.

Export curtailments that, in part, implement the Covered Activities or Conditions of Approval may be provided through a commitment pursuant to Voluntary Agreements. In that circumstance, implementation of the Voluntary Agreements would provide an alternative approach to implementing operational conditions consistent with this ITP.

This alternative approach is not a reliance on future mitigation to support issuance of this ITP. Instead, this approach recognizes that as part of the Voluntary Agreements, the Permittee, in cooperation with the SWP and CVP contractors, has proposed to support certain Project operational changes, including a proposal involving export curtailments for spring outflow. Maintenance of spring outflow is a component of the Project, described in Section 3.17.1, and Condition of Approval 8.17. This condition of approval is included within the actions that will be reviewed pursuant to Four-Year Reviews described in the Adaptive Management Program.

If in any year during the term of this ITP, the SWP export reductions for spring outflow described in Section 3.17.1 are implemented pursuant to the Voluntary Agreements consistently with Condition of Approval 8.17, then those Voluntary Agreements may satisfy the operations required to meet Condition of Approval 8.17. If in any year during the term

of this ITP, the Voluntary Agreements are not planned to be implemented in such a manner, then Permittee will implement the relevant Condition of Approval independently.

The Voluntary Agreements also include commitments to complete significant habitat restoration in the Delta and its tributaries. These restoration actions would provide spawning and rearing habitat for winter-run and spring-run Chinook salmon and tidal habitat restoration to provide spawning, rearing and food web support for Delta and longfin smelt. These actions would be funded in large part by SWP Contractors and CVP contractors through annual assessments and implemented by the Permittee in coordination with Reclamation.

Voluntary Agreements also include commitments to fund and undertake new science (monitoring and research) to address hypotheses related to the efficacy of flow and habitat restoration actions which in some cases are similar or equivalent to the requirements in Conditions of Approval 7.5, 7.5.2, 7.5.3, and 7.6.

2 Existing Regulations Governing SWP Operations

2.1 U.S. Army Corps of Engineers Permits

In Public Notice 5820A (October 1981), USACE limited the volume of daily SWP diversions from the Delta into CCF, stating that such diversions may not exceed 13,870 AF and three-day average diversions into the CCF may not exceed 13,250 AF. In addition, the SWP can increase diversions into the CCF by one-third of the San Joaquin River flow at Vernalis from mid-December to mid-March when the river's flow at Vernalis exceeds 1,000 cfs.⁷

In 2017, USACE issued a revised Permit SPK-1999-0715 and raised the daily diversion from 13,870 AF to 14,860 AF and the three-day average diversion from 13,250 AF to 14,240 AF. The conditions in this permit apply to SWP operations from 2017 through

⁷ U.S. Army Corps of Engineers. 1981. Suspension of EIS preparation and permit processing for the application (NO. 5820A) to operate four additional pumps at the Delta Pumping Plant. Public Notice No. 5820A Amended. Sacramento, CA. October 13, 1981.

2020. The permit also required compliance with applicable terms and conditions in the existing BiOps for long-term operation of the SWP and CVP and installation of the South Delta temporary barriers.

2.2 State Water Resources Control Board Water Rights and D-1641

Permittee and Reclamation operate the SWP and CVP in accordance with the joint obligations under D-1641, which provides protection for fish and wildlife, M&I water quality, agricultural water quality, and Suisun Marsh salinity. D-1641 granted Permittee and Reclamation the ability to use or exchange either SWP or CVP diversion capacity capabilities to maximize the beneficial uses of the SWP and CVP. The SWRCB conditioned the use of Joint Point of Diversion capabilities based on staged implementation and conditional requirements for each stage of implementation.

2.3 Federal Endangered Species Act

The USFWS Biological Opinion for the Reinitiation of Consultation on Long-Term Operations of the Central Valley Project and State Water Project⁸ and the NMFS Biological Opinion on Long-Term Operations of the Central Valley Project and the State Water Project⁹ were issued on October 22, 2019, and they include incidental take statements (ITS) for DS, winter-run Chinook salmon (CHNWR), spring-run Chinook salmon (CHNSR), green sturgeon, and steelhead. These BiOps were formally adopted on February 19, 2020 when Reclamation signed the Record of Decision.¹⁰ Permittee will comply with the ITS in accordance with federal law, in addition to state requirements. As a result of the coordinated operation of the SWP and CVP, Permittee will operate the SWP for the protection of federally listed steelhead and green sturgeon in addition to operations for the protection of state-listed species. In some cases these operations and

⁸ U.S. Fish and Wildlife Service. 2019. Biological Opinion for the Reinitiation of Consultation on Coordinated Operations of the Central Valley Project and State Water Project. Service File No. 08FBTD00-2019-F-0164. United States Fish and Wildlife Service, Pacific Southwest Region, Sacramento, CA. October 21, 2019.

⁹ National Marine Fisheries Service. 2019. Biological Opinion on the Long-Term Operation of the Central Valley Project and the State Water Project. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, West Coast Region. October 21, 2019.

¹⁰ Note that both the NMFS and USFWS 2019 biological opinions have been challenged in federal court. *California Natural Resources Agency, et al. v. Ross, et al.*, Case No. 3:20-cv-01299-DMR, U.S. Dist. Court, Eastern District of California, case filed February 20, 2020, and *Pacific Coast Federation of Fishermen's Associations, et al. v. Ross, et al.*, Case No. 1:20-cv-00431-DAD-SAB, U.S. Dist. Court, Eastern District of California, case filed December 2, 2019.

the ITS for federally listed species may result in reductions in SWP pumping in addition to the reductions that would be necessary to comply with state law.

3 Description of SWP Facility Operations

3.1 OMR Management

Old and Middle River (OMR) flow is a surrogate indicator of the influence of export pumping at Banks and Jones Pumping Plants, as well as other south Delta diversions, on hydrodynamics in the South Delta. The management of OMR flow, in combination with other environmental variables, can minimize or avoid entrainment of fish into the South Delta, the Banks Pumping Plant and the Skinner Fish Facility. Permittee will manage OMR flow by changing exports at the Banks Pumping Plant in response to real time operating criteria described below. Some of these real-time operating criteria require Permittee, in collaboration with CDFW and multi-agency Delta-focused technical teams, to evaluate results from real-time fish distribution monitoring, turbidity, temperature, hydrodynamic models, and entrainment models and make informed recommendations regarding changes in OMR flow management.

From the onset of OMR management to the end, Permittee, in coordination with Reclamation, will operate to an OMR index that is no more negative than a 14-day moving average of -5,000 cfs unless Delta excess conditions occur (described below). OMR flow could be more positive than -5,000 cfs if additional real-time OMR restrictions are triggered (described below) or constraints other than OMR flow control exports. OMR flows will be estimated using an OMR flow index published by Hutton in 2008.¹¹ Permittee, in coordination with Reclamation, will make a change to exports to achieve the new OMR limit within three days of a trigger or decision to restrict Banks Pumping Plant operations to allow for efficient power scheduling.

¹¹ Hutton, P. 2008. A Model to Estimate Combined Old & Middle River Flows. Metropolitan Water District of Southern California. Final Version April 2008.

3.2 Collaborative Real-Time Risk Assessment

During the OMR Management period for Covered Species, Permittee and CDFW technical staff, as part of the Smelt Monitoring Team and Salmon Monitoring Team, will meet weekly to consider survey data, salvage data and other pertinent biological and abiotic factors as described in Section 3.14. The process to elevate operations recommendations and risk assessments from the Smelt Monitoring Team to Water Operations Management Team (WOMT), and the Directors (if necessary) is described in Condition of Approval 8.1.4 in this ITP.

3.3 Onset of OMR Management

Permittee, in coordination with Reclamation, will start OMR management when one or more of the following conditions have occurred:

- Integrated Early Winter Pulse Protection (Condition of Approval 8.3.1)
- Salmonids Presence (Condition of Approval 8.3.2)
- OMR Management for Adult Longfin Smelt (Condition of Approval 8.3.3)

3.4 Real-Time OMR Limits

Permittee, in coordination with Reclamation, will operate to an OMR flow requirement that is more positive than -5,000 cfs in response to operating criteria to minimize take of Covered Species as a result of entrainment into the CCF, Banks Pumping Plant and the South Delta. The OMR operating criteria are described in the Conditions of Approval to this ITP, specifically Conditions of Approval 8.3 – 8.8.

3.5 Salmonid Cumulative Entrainment Loss Thresholds

In addition to the OMR operating criteria, Permittee, in coordination with Reclamation, will manage SWP operations to avoid exceeding cumulative loss thresholds by 2030 as follows:

- Natural CHNWR (cumulative loss = 8,738)
- Hatchery CHNWR (cumulative loss = 5,356)

The loss threshold and loss tracking for hatchery CHNWR do not include releases into Battle Creek. Loss (for development of thresholds and ongoing tracking) for Chinook salmon is based on the Delta Model length-at-date criteria.

SWP operating criteria are intended to result in operations that minimize loss throughout the duration of this permit, such that the cumulative loss threshold will not be exceeded by 2030.

If at any time prior to 2024, Permittee, in coordination with Reclamation, were to exceed 50% of the cumulative loss threshold, Permittee, in coordination with Reclamation, will convene an independent panel to review the actions contributing to this loss trajectory and make recommendations on modifications or additional actions to stay within the cumulative loss threshold.

In the year 2024, Permittee, in coordination with Reclamation, will convene an independent panel to review the efficacy of the operating criteria in minimizing take of CHNWR after the effective date of this ITP.

If during real-time operations, Permittee, in coordination with Reclamation, were to exceed the cumulative loss threshold, Permittee, in coordination with Reclamation, would immediately seek technical assistance from CDFW and NMFS on the coordinated operation of the SWP and CVP, respectively for the remainder of the OMR management period. In addition, prior to the next OMR management season, Permittee in coordination with Reclamation would convene an independent review panel to review the actions contributing to the exceedance of this threshold and make recommendations for modifications or additional actions to minimize take of CHNWR.

3.6 OMR Flexibility During Delta Excess Flow Conditions

Permittee, in coordination with Reclamation, may operate to a more negative OMR flow but no more negative than -6,250 cfs on a 5-day average to capture excess flows in the Delta (OMR Flex). Excess flows are peak flows during storm-related events and are defined as flows in excess of that required to meet water quality control plan flow and salinity requirements and other applicable regulations. Excess Flow Conditions are defined in Section 1.4, consistent with the definition included in the 2018 COA Addendum.

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Permittee, in coordination with Reclamation, will continue to monitor fish in real time and will operate in accordance with the Real-time OMR Limits, previously described in Section 3.4. On-ramps and off-ramps for OMR Flex Operations are described in Conditions of Approval 8.7 to this ITP.

3.7 End of OMR Management

OMR flow criteria may control operations until June 30 each year. Criteria to determine when to end OMR Management each year are described in the Conditions of Approval to this ITP, specifically Condition of Approval 8.8.

3.8 Minimum Export Rate

As described in Permittee's December 2019 ITP application (page 3-56), in order to meet health and safety needs, critical refuge supplies, and obligations to senior water rights holders, the combined CVP and SWP export rates at Jones Pumping Plant and Banks Pumping Plant will not be required to drop below 1,500 cfs and SWP exports will not be required to drop below 600 cfs.

3.9 Delta smelt summer-fall habitat action

The Delta smelt summer-fall habitat action (Summer-Fall Action) is intended to improve DS food supply and habitat, thereby contributing to the recruitment, growth, and survival of DS. The operating criteria, links to adaptive management, and the annual planning process to implement the Summer-Fall Action are described in the Conditions of Approval to this ITP, specifically Conditions of Approval 9.1.3 and 9.1.3.1.

3.9.1 Delta Smelt Food Enhancement Summer-Fall Actions

Each year that Permittee and Reclamation develop a Summer-Fall Action Plan, Permittee will consider implementing actions to improve key aspects of DS habitat including turbidity and food availability, including facilitating downstream transport of phytoplankton and zooplankton in the North Delta and Suisun Marsh. This section describes examples of potential additional measures that may be incorporated into the Summer-Fall Action each year as a part of the annual planning process and the

Adaptive Management Program (Attachment 2). If implemented, subsequent environmental review and permitting would be conducted by Permittee as needed.

North Delta Food Subsidies and Colusa Basin Drain Project: While the Cache Slough Complex and the lower Yolo Bypass are known to have relatively high levels of food resources, local water diversions create net negative flows during summer and fall that may inhibit downstream food transport. By enhancing summer and fall flows through the Yolo Bypass, downstream transport of food could be improved.

Roaring River Distribution System Reoperations: Infrastructure in the RRDS may help drain food-rich water from the canal into Grizzly Bay to augment DS food supplies in that area.

3.9.2 Additional Summer – Fall Actions

To study the relationship between habitat effects and DS survival, Permittee will take additional summer-fall actions as described in the Conditions of Approval to this ITP, specifically Conditions of Approval 9.1.3, 9.1.3.1, and 9.1.3.2.

As described under Section 1.5, proposals under the Voluntary Agreements may be implemented in a way that complements the additional summer-fall actions by providing additional summer outflow in above normal, below normal, or dry years.

As part of the Voluntary Agreement Review (Section 3.13.9) and Four-Year Review (3.13.8), Permittee and CDFW will evaluate whether increased summer outflows provided through the Voluntary Agreements, without SMSCG operations, achieve an X2 of 80 km from June through August. Consistent with Condition of Approval 5 and CESA's implementing regulations, Permittee and CDFW will consider whether the Voluntary Agreements' implementation modifies the scope or nature of the Project, or the circumstances under which it is implemented, to an extent that warrants a permit amendment.

3.10 Dry Year Water Actions

In addition to all requirements listed in Conditions of the Approval pertaining to dry and critical water years Permittee will coordinate with Reclamation to develop a voluntary toolkit of drought actions that could be implemented at the discretion of Permittee, in coordination with Reclamation. On October 1, if the prior water year was dry or critical, Permittee, in

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coordination with Reclamation, will meet and confer with USFWS, NMFS, CDFW, SWRCB, and SWP and CVP Contractors on voluntary measures to be considered if dry conditions continue into the following year. If dry conditions continue, Permittee, in coordination with Reclamation, will regularly meet with this group (and potentially other agencies and organizations) to evaluate hydrologic conditions and the potential for continued dry conditions that may necessitate the need for development of a drought contingency plan (that may include actions from the toolkit) for the water year.

By February of each year following a critical year, Permittee, in coordination with Reclamation, will report on the measures employed and assess their effectiveness. The toolkit shall be revisited at a frequency of not more than 5-year intervals.

3.11 Clifton Court Forebay Operations

Clifton Court Forebay operations include predator management and aquatic weed removal and disposal. Each of these operations is described below.

3.11.1 Clifton Court Forebay Predator Management

Fish entering the CCF must travel approximately 3.38 km across the CCF to reach the Skinner Fish Facility. The loss of fish between the CCF Radial Gates and the Skinner Fish Facility is termed pre-screen loss (PSL). PSL includes, but is not limited to, predation by fish, birds, and other predatory species.

Permittee will continue the development of predator control methods within CCF including, but not limited to:

- Continued evaluation of the performance of various predator relocation methods
- The Enhanced Predatory Fish Removal and Relocation Study which includes the:
 - Clifton Court Forebay Predation Study,
 - Predator Reduction Electrofishing Study, and
 - Predator Fish Relocation Study.

The intent of this interim measure is to maximize the removal of predators from CCF and relocate them to Bethany Reservoir.

3.11.2 Clifton Court Forebay Aquatic Weed Removal and Disposal

Permittee will apply herbicides or will use mechanical harvesters on an as-needed basis to control aquatic weeds and algal blooms in the CCF. Herbicides may include Aquathol K or copper-based herbicides. Algaecides may include peroxygen-based algaecides (e.g., PAK 27), described further below.

3.11.3 Mechanical Removal

Permittee will also use mechanical methods to manually remove aquatic weeds. A debris boom and an automated weed rake system continuously remove weeds entrained on the trash racks. During high weed load periods such as late summer and fall when the plants senesce and fragment or during periods of hyacinth entrainment, boat-mounted harvesters are operated on an as-needed basis to remove aquatic weeds in CCF and the intake channel upstream of the trash racks and louvers.

3.11.4 Aquatic Herbicide Application

Aquatic weed and algae treatments would occur on an as-needed basis depending upon the level of vegetation biomass, the cyanotoxin concentration from the harmful algal blooms (HABs), or the concentration of taste and odor compounds. The frequency of aquatic herbicide applications to control aquatic weeds is not expected to occur more than twice per year, as demonstrated by the history of past applications. Aquatic herbicides are ideally applied early in the growing season when plants are susceptible to them during rapid growth and formation of plant tissues; or later in the season, when plants are mobilizing energy stores from their leaves towards their roots for overwintering senescence. The frequency of algaecide applications to control HABs is not expected to occur more than once every few years, as indicated by monitoring data and demonstrated by the history of past applications.

Treatment areas are typically about 900 acres, and no more than 50% of the 2,180 total surface acres in CCF.

Aquatic weed assemblages change from year to year in the CCF from predominantly *Egeria densa* to one dominated by curly-leaf pondweed, sago pondweed, and southern naiad. To effectively treat a dynamic aquatic weed assemblage and HABs, multiple

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aquatic pesticide compounds are required to control aquatic weeds and algal blooms in the CCF. The preferred products are the following:

- Aquathol K, an endothall-based aquatic herbicide that is effective on pondweeds
- Copper-based compounds that are effective on *E. densa*, cyanobacteria, and green algae; copper-based aquatic herbicides, including copper sulfate pentahydrate and chelated copper herbicides
- Peroxygen-based algaecides (e.g., PAK 27) that are effective on cyanobacteria

3.11.4.1 Aquathol K

The dipotassium salt of endothall is used for control of aquatic weeds and is the active ingredient in Aquathol K (liquid formulation). Aquathol K is a widely used herbicide to control submerged weeds in lakes and ponds, and the short residual contact time (12 to 48 hours) makes it effective in both still and slow-moving water. Aquathol K is effective on many weeds, including hydrilla, milfoil, and curly-leaf pondweed, and begins working on contact to break down cell structure and inhibit protein synthesis.

Without the ability to grow, the weed dies. Full kill takes place in one to two weeks. As weeds die, they sink to the bottom of the water column and decompose. Aquathol K is not effective at controlling *E. densa*.

When aquatic plant survey results indicate that pondweeds are the dominant species in the CCF, Aquathol K will be selected due to its effectiveness in controlling these species. Aquathol K will be applied according to the label instructions, with a target concentration dependent upon plant biomass, water volume, and forebay depth. The target concentration of treatments is 2 to 3 parts per million (ppm), which is well below the concentration of 9 to 12 ppm where sublethal effects have been observed.¹² Permittee monitors herbicide concentration levels during and after treatment to ensure levels do not exceed the Aquathol

¹² Courter, I. Courter, L. Garrison, T. Cramer, D. Duery, S. Child, D. Hanna, T. and Buckner, E. 2012. Effects of the Aquatic Herbicide Cascade on Survival of Salmon and Steelhead Smolts During Seawater Transition. Final report submitted to WSWRA January 2012

K application limit of 5 ppm. Additional water quality testing may occur following treatment for drinking water intake purposes. Samples are submitted to a laboratory for analysis.

There is no "real-time" field test for endothall. No more than 50% of the surface area of the CCF will be treated at one time. A minimum contact time of 12 hours is needed for biological uptake and treatment effectiveness, but the contact time may be extended up to 24 hours to reduce the residual endothall concentration for National Pollutant Discharge Elimination System (NPDES) compliance purposes.

3.11.4.2 Copper Based Aquatic Herbicides and Algaecides

Copper herbicides and algaecides include chelated copper products and copper sulfate pentahydrate crystals. When aquatic plant survey results indicate that *E. densa* is the dominant species, copper-based compounds will be selected due to their effectiveness in controlling this species. Copper-based algaecides are effective at controlling algal blooms (cyanobacteria) that produce cyanotoxins or taste and odor compounds.

Copper herbicides and algaecides will be applied in a manner consistent with the label instructions, with a target concentration dependent upon target species and biomass, water volume and the depth of the forebay. Applications of copper herbicides for aquatic weed control will be applied at a concentration of 1 ppm with an expected dilution to 0.75 ppm upon dispersal in the water column.

Applications for algal control will be applied at a concentration of 0.2 to 1 ppm with expected dilution within the water column. Permittee will monitor dissolved copper concentration levels during and after treatment to ensure levels do not exceed the application limit of 1 ppm, per National Pollutant Discharge Elimination System (NPDES) permit required procedures. Treatment contact time will be up to 24 hours. If the dissolved copper concentration falls below 0.25 ppm during an aquatic weed treatment, Permittee may opt to open the radial gates after 12 hours but before 24 hours to resume operations. Opening the radial gates prior to 24 hours would enable the rapid dilution of residual copper and thereby shorten the exposure duration of ESA- and CESA- listed fish to the treatment. No more than 50% of the surface area of the CCF will be treated at one time.

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3.11.4.3 Peroxygen Based Algaecides

The PAK 27 algaecide active ingredient is sodium carbonate peroxyhydrate.

PAK 27, or an equivalent product, will be applied in a manner consistent with the label instructions, with permissible concentrations in the range of 0.3 to 10.2 ppm hydrogen peroxide. No more than 50% of the surface area of the CCF will be treated at one time.

3.11.4.4 Herbicide Application Procedure

Permittee will implement operational procedures during aquatic herbicide treatment for application of Aquathol K, copper-based products or peroxide-based algaecides in the CCF. Operational procedures for aquatic weed control in CCF is described in Condition of Approval 8.14 in this ITP.

3.11.4.5 Herbicide Application Practices

Permittee implements the following best management practices during aquatic weed harvesting at the CCF to avoid and minimize potential impacts on sensitive resources:

- A pre-construction survey for nesting birds and burrowing owls is conducted by a qualified biologist within two weeks prior to the start of work. If burrowing owls are observed within 150 m of the Project, non-disturbance buffers are established, or a qualified biological monitor is present during disposal activities.
- On the first day of work, and as needed once work has begun, a qualified biologist surveys for floating grebe nests within the CCF and identifies avoidance areas to prevent take of nests.
- All on-site personnel participate in environmental awareness training for special-status species with the potential to occur in the project area.
- If any wildlife is observed within the aquatic weed removal and disposal areas, work is halted immediately, and the wildlife are allowed to move out of the area on their own.
- Work does not take place during rain events or within 24 hours of significant precipitation when special-status species could potentially travel to breeding ponds.

3.12 Skinner Fish Facility Improvements

The Skinner Fish Facility has behavioral barriers to keep fish away from the pumps that lift water into the California Aqueduct. Large fish and debris are directed away from the facility by a 118.26-meter-long trash rack. Smaller fish are diverted from the intake channel into bypasses by a series of behavioral barriers (metal louvers), while the main flow of water continues through the louvers and toward the pumps. These fish pass through a secondary system of louvers or screens and pipes into seven holding tanks, where a subsample is counted and recorded. The salvaged fish then are returned to the Delta in oxygenated tank trucks. The sampling frequency at Skinner Fish Facility is generally 30 minutes of every two hours, but may be reduced based upon the presence of excessive numbers of fish or debris based upon procedures developed by CDFW.

Permittee will continue to salvage fish with the Skinner Fish Facility which is located about 3.22 km upstream from the Banks Pumping Plant. In addition, Permittee will evaluate the following:

- Operational changes to salvage release scheduling and location to reduce post-salvage predation, and
- Continued refinement and improvement of the fish sampling and hauling procedures and infrastructure to improve the accuracy and reliability of data and fish survival.

Permittee will describe these changes in the CDFW-approved updated Skinner Fish Facility Operations Manual, as described in Condition of Approval 7.4.2 in this ITP.

3.13 Long-term Monitoring and Science Programs

Permittee will continue to fund and implement existing long-term monitoring programs (Sections 3.13.1 and 3.13.2) and ongoing science programs (Sections 3.13.3, 3.13.4, 3.13.5, and 3.13.7) to improve the scientific understanding of Covered Species ecology and the Bay-Delta ecosystem. Permittee will provide standard reporting on real-time operations, environmental conditions, and biological parameters (Section 3.14.6) on an annual basis and facilitate independent panel reviews of OMR Management, measures to

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improve Covered Species survival in the South Delta, and the Summer-Fall Action (Section 3.14.8). Although this ITP does not authorize take for these activities they are described below to provide context for the Conditions of Approval in this ITP.

3.13.1 Continuation of Existing Monitoring

Existing monitoring programs through the Interagency Ecological Program (IEP) and USFWS Enhanced Delta Smelt Monitoring Program (EDSM) program include monitoring to track the status of listed species of fish, and ascertain performance of minimization measures associated with operations of the South Delta export facilities and their fish salvage programs. Incidental take associated with the IEP monitoring programs is authorized via ESA Section 10(a)(1)(A) Research and Enhancement Permits and California Fish and Game Code section 2081(a) permits. Monitoring to track performance of the South Delta export facilities and their fish salvage programs is authorized through the 2019 BiOps and this ITP.

Monitoring for the Project will rely on a core set of long-term IEP monitoring elements and studies to assess minimization measures summarized below in Table 3.13-1, as described in a supplement to Permittee's December 2019 ITP application. As a part of the Project, Permittee will provide continued support for each of these elements at the current level of cost-share with Reclamation (50%). Note that the budgets and scope for IEP elements will change over time in response to management needs, input from periodic scientific reviews, innovation, and inflation. Some of the key expected changes to support management are summarized below in Section 3.13.2. These elements are in addition to the EDSM program, which is funded by Reclamation.

Table 3.13-1: IEP Core Long-Term Monitoring Elements

Title	Agency
Fall Midwater Trawl (FMWT)	CDFW
Summer Townet Survey (STN)	CDFW
Est and Marine Fish Survey (Bay Study)	CDFW
Bay Shrimp and Crab Surveys (Bay Study)	CDFW
Delta Flows Network	USGS
20mm Delta Smelt Survey (20mm)	CDFW
Juvenile Salmon Monitoring (DJFMP)	USFWS
Coleman Late Fall Run Tagging	USFWS
Mossdale Spring Trawl (Mossdale)	CDFW
Environmental Monitoring Program	DWR
Central Valley Juvenile Salmon and Steelhead Monitoring (Knights Landing)	CFDW
Upper Estuary Zooplankton Sampling	CDFW
Spring Kodiak Trawl (SKT)	CDFW
UCD Suisun Marsh Fish Monitoring	UCD
Smelt Larval Sampling (SLS)	CDFW
Operation of Thermograph Stations	USGS
Juvenile Salmon Emigration Real Time Monitoring (DJFMP)	USFWS
Tidal Wetland Monitoring	CDFW
Yolo Bypass Fish Monitoring Program (YBFMP)	DWR
Resident Fishes Survey (DJFMP)	USFWS

Note: List based on key monitoring programs in the draft 2020 IEP work plan.

3.13.2 Modifications to IEP Sampling Programs

Budgets for each IEP sampling program are provided in Table 3.13-1 above. As noted above, IEP's sampling program will continue to evolve to support specific management needs.

Through IEP's science management plan review process, Permittee will undertake a review of existing IEP fish monitoring programs to propose modifications to CDFW SLS and 20 mm programs given new information showing that LFS have a different distribution, both temporally (i.e., spawning window) and spatially (i.e., habitat and regions) than what is monitored by these programs. This review and associated monitoring changes, if approved by CDFW, will be completed within one year of the effective date of this ITP. Changes to monitoring required by D-1641 will also require approval from the SWRCB.

3.13.3 Longfin Smelt Science Program

Permittee will continue a Longfin Smelt Science Program, to be implemented with the involvement of Permittee, CDFW, and the SWP Contractors. An updated study plan will be developed jointly with guidance from IEP and will address issues that include external stressors influencing population abundance, such as distribution, catchability, vertical migration behavior, water transparency, and other factors that support growth and survival. A primary goal of this effort is to improve management of LFS, and to identify potential management actions that could improve its status.

As described previously, there are uncertainties about the biology and management of LFS. Efforts over the last several years under the Longfin Settlement Agreement have helped to address this gap. Permittee will continue applied research on LFS as part of this new Longfin Smelt Science Program for the duration of the ITP.

One of the key gaps for LFS management is the need for a life cycle model to help understand the effects of different management actions, and to evaluate potential impacts of different stressors including entrainment. Permittee will fund the development of a new LFS life cycle model to support management of that species.

Additional priorities and goals for the Longfin Smelt Science Program are further described in Condition of Approval 7.6.3 in this ITP.

The Longfin Smelt Science Program is included here for context but no take is authorized for the program through this ITP.

3.13.4 Conduct Further Studies to Prepare for Delta Smelt Reintroduction from Stock Raised at the UC Davis Fish Conservation and Culture Laboratory

Permittee has committed to continuing to support the operation and research being conducted by the University of California, Davis (UC Davis), Fish Conservation and Culture Laboratory (FCCL). Authorization for take of DS as a result of ongoing operations and research at the FCCL is provided through a separate permit.

The two main goals of the FCCL are to maintain a refuge DS population in captivity that is as genetically close as possible to the wild population and provide a safeguard against extinction. The culture technique has been improved continuously over the years and the survival rate of cultured DS at the FCCL is high.

The FCCL is undertaking multiple research projects that will continue to add to the understanding of DS and other species. The laboratory works collaboratively with other researchers from different agencies and institutions, assisting them with research projects and providing them with experimental fish populations of all life stages. The FCCL currently is expanding and renovating existing facilities, increasing the capacity for culture and research.

3.13.5 Continue Studies to Establish a Delta Fish Species Conservation Hatchery

In an effort to conserve DS, a refuge population has been maintained at the UC Davis FCCL in Byron, CA since 2006 (a smaller population exists as a backup to the FCCL at Livingston Stone Hatchery in Shasta Lake, CA). The refuge population provides fish for research purposes and is a reservoir of DS genetic diversity that has been specifically managed for potential wild population supplementation or reintroduction.

Since 2017 Permittee has facilitated studies with the overarching goal of determining the best methods to manage DS releases from the refuge population to benefit the wild with maximum survival, retention of genetic diversity, and minimal risk to the wild population. Take of Covered Species as a result of these studies is not authorized by this ITP.

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3.13.6 Annual Reporting Process

Permittee will provide standard reporting on real-time operations, environmental conditions, and biological parameters, such as species distribution, life stage, and dynamics. These data are available daily through Permittee and Reclamation websites and additional tools such as CDEC, NWIS, RWIS, SacPAS, Bay-Delta Live, and SHOWR.

Monitoring programs that will be used to inform real-time management include:

- Delta flow, temperature, and salinity stations
- Chinook salmon biological information:
 - Sacramento Trawl and Chipps Island Trawl: Informs juvenile abundance, timing of migration, and the implementation of OMR management
 - Beach seines, acoustic tagging, and EDSM: Provides information regarding Delta distribution and inform implementation of OMR actions
 - Salvage count: Informs the direct take of Covered Species
 - Genetic identification: Differentiates between salvage of listed Chinook salmon versus non-listed Chinook salmon runs.
- Delta biological information:
 - Turbidity stations: Informs the potential for a “turbidity bridge” or Integrated Early Winter Pulse (aka first flush event) that would initiate OMR actions.
 - Temperature stations: Informs the transition between life stages and the need for protective measures.
 - Water quality stations: Tracks the movement of the low salinity zone and parameters associated with the food web (e.g., chlorophyll).
 - EDSM: Informs the Delta distribution for DS and entrainment risk due to OMR actions.
 - Fish condition: Informs when adult DS have spawned and the need for larval protections.
- LFS biological information:
 - Water quality stations: Track the movement of the low salinity zone and parameters associated with the food web (e.g., chlorophyll)
 - Delta distribution: Informs the entrainment risk due to OMR actions.

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- Fish condition: Informs when adult LFS have spawned and the need for larval protections

3.13.7 Status and Trend Monitoring

Status and trend monitoring characterizes the population of Covered Species and their environments over time including the impacts of stressors from sources other than the CVP and SWP. Recovery plans characterize the status and trends differently depending upon the species in the general categories of abundance, production, life history diversity, and geographic diversity. A number of monitoring programs will continue and will be funded by Permittee as follows:

- Hatchery Proportion (Constant Fractional Marking),
- Genetic Analyses of California Salmonid Populations: Parentage Based Tagging (PBT) of salmonids in California Hatcheries,
- Fall Midwater Trawl,
- 20-mm Survey monitoring to determine distribution and relative abundance of DS and LFS,
- Spring Kodiak Trawl,
- Estuarine and Marine Fish Abundance and Distribution Survey,
- Smelt Larva Survey (SLS),
- Summer Townet Survey, and
- Environmental Monitoring Program (EMP).

The coordinated operation of the SWP requires Permittee to provide the following products to CDFW on the schedule identified below:

1. Monitoring Program for Core Water Operations, Ongoing;
2. December through June: Weekly real-time Covered Species distribution and life stage
3. Year-round: Monthly (and as needed) water operation status
4. Monthly (and more frequently as needed), specific operations for:
 - a. December through June: Old and Middle River reverse flow storm events (see Condition of Approval 8.7 in this ITP)
 - b. May: Summer Fall Action (see Section 3.9 and Conditions of Approval 9.1.3 and 9.1.3.2)

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5. Seasonal and Annual Compliance Reporting

a. September: Annual summary of water supply and fish salvage operations

In addition to those above, Reclamation will have additional deliverables that will be provided to USFWS and NMFS related to the operation of the CVP.

3.13.8 Four-year Reviews

In January of 2024 and January of 2028, Permittee, in coordination with Reclamation, will convene an independent panel to review OMR management and measures to improve survival through the South Delta and the Summer-Fall Action.

Establishment of independent review panels composed of subject matter experts is a key component of the Project and adaptive management of the SWP. CDFW, NMFS, and USFWS may provide technical assistance and input regarding the panel and its panel charge (see Condition of Approval 8.2 in this ITP). The panel will evaluate the efficacy of Project actions and make recommendations. As part of the review of OMR management and measures to improve survival through the South Delta and the Summer-Fall Action, the panel charge will incorporate consideration of export and flow modifications, habitat restoration or research activities that have been implemented under the Voluntary Agreements or their early implementation.

The independent panels will review actions for consistency with applicable guidance and will provide information and recommendations to Permittee. Permittee, in consultation with Reclamation, will provide the results of the independent review to CDFW, NMFS, and USFWS. Permittee will coordinate with Reclamation to document a response to the independent review.

3.13.9 Voluntary Agreement Review

Two years following the effective date of this ITP, or immediately following the SWRCB's approval of final Voluntary Agreements, whichever comes first, Permittee and CDFW will collaborate to review the Project in light of early implementation of the Voluntary Agreements or in light of the final form of the Voluntary Agreements. Consistent with Condition of Approval 5 and CESA's implementing regulations, Permittee and CDFW will utilize results from the review to consider whether the Voluntary Agreements'

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implementation modifies the scope or nature of the Project, or the circumstances under which it is implemented, to an extent that warrants a permit amendment.

3.14 Real-time Operations Workgroups

Permittee and Reclamation will convene Monitoring Workgroups as needed. Permittee, in coordination with Reclamation, will convene the Delta Monitoring Workgroup which will be responsible for integrating species information across watersheds, including DS, LFS, CHNWR, CHNSR, and other salmonids and acipenserids. The Delta Monitoring Workgroup will include technical representatives from federal and state agencies and stakeholders and will provide information to Permittee and Reclamation on species abundance, species distribution, life stage transitions, and relevant physical parameters. In addition to the Delta Monitoring Workgroup, Permittee will support the Smelt Monitoring Team and the Salmonid Monitoring Team (described in Conditions of Approval 8.1.1 and 8.1.2 in this ITP).

The WOMT will coordinate on overall water operations to oversee the implementation of various real-time provisions. The WOMT roles, responsibilities and membership is described in Condition of Approval 8.1.3 in this ITP.

Permittee will continue to coordinate with the IEP for permitting and coordination for physical and biological monitoring. It will also continue to coordinate with the Collaborative Science and Adaptive Management Program (CSAMP) for synthesis of monitoring and studies.

3.15 Water Transfers

Permittee will continue facilitating transfers of SWP water and other water supplies through its Delta facilities. North-to-south water transfers could occur from July 1 through November 30 in combined SWP/CVP annual volumes up to those described in Table 3.15-1.

Table 3.15-1. Annual north-to-south water transfer volume.

Water Year Type	Maximum Transfer Amount (TAF)
Critical	Up to 600
Dry (following Critical)	Up to 600
Dry (following Dry)	Up to 600
All other years	Up to 360

Real-time operations may restrict water transfers within the transfer window so that Permittee and Reclamation can meet other authorized project purposes, e.g., when pumping capacity is needed for SWP or CVP water.

3.16 Adaptive Management Plan

The Adaptive Management Plan (AMP) will be carried out to evaluate the efficacy of the operations and activities stated below. An Adaptive Management Team (AMT), composed of one designated representative and one designated alternate each from DWR, CDFW, and SWP Contractors will be established to carry out this AMP. The AMT will 1) oversee efforts to monitor and evaluate the operations and related activities, 2) use structured decision-making (SDM) to assess the relative costs and benefits of those operations and activities, and 3) identify proposed adaptive management changes to those operations and activities. Changes to the Covered Activities as described in this ITP and its Conditions of Approval may require an amendment, consistent with CESA's implementing regulations (See Conditions of Approval 5 and 8.16). The objectives, structure and goals of the AMP are described in Attachment 2 to this ITP.

The AMP currently pertains only to specified SWP operations and activities undertaken by Permittee concomitant to those operations and will support this ITP. Later, upon unanimous agreement among the members of the AMT it may be (1) expanded in the future to include other operations and activities, or (2) implemented in a coordinated manner with other adaptive management programs covering such operations and activities. These may include ongoing operations of the CVP and implementation of Voluntary Agreements or other activities associated with the SWP operations.

3.17 Flow Management Across Wetter and Drier Years

Permittee intends to improve knowledge of how the management of water influences Covered Species habitat across various hydrologic conditions. Testing the real-time operations of Banks Pumping Plant is one important component of this concept, allowing for exports when impacts to fish can be avoided, minimized or fully mitigated. The other important aspect of this concept is improving Covered Species habitat conditions during drier periods, and the SWP can contribute to that by shifting exports to wetter conditions. To that end, Permittee will maintain the recent historical SWP spring outflow contribution achieved in April and May across most water year types, allow for increased exports during some wet conditions per the real-time operations described in Conditions of Approval 8.17 and 8.18, and to provide additional water for outflow in some dry summer-fall periods.

3.17.1 Spring Outflow Action

Permittee will maintain its current SWP outflow contribution through SWP export curtailments as described in Condition of Approval 8.17 in this ITP.

As described under Section 1.5, proposals under the Voluntary Agreements may be implemented in a way that complements the spring outflow action.

Specifically, the Voluntary Agreements may include export reductions, to maintain the SWP and CVP's long-term average contribution toward Delta outflow during the spring time period.

If in any above normal, below normal, or dry year during the term of this ITP, SWP export reductions are not planned and implemented as a part of the Voluntary Agreements or early implementation, that will implement SWP export reductions equivalent to this ITP's criteria, then Condition of Approval 8.17 will control as to Permittee.

3.18 Components of the SWP Not Included in the Project

Take authorization for the following actions is not included in this ITP:

- Flood control
- Oroville Dam and Feather River operations

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- Any previously identified or potential future habitat restoration actions
- Suisun Marsh Habitat Management Preservation and Restoration
- CVP facilities, operations, and agreements
- North Delta Food Subsidies – Colusa Basin Drain Project (Section 3.9.1)
- Roaring River Distribution System Reoperations (Section 3.9.1)
- Maintenance and exterior levee repair at Suisun Marsh facilities
- Embankment repairs at Clifton Court Forebay
- Construction of a migratory fish barrier at Georgiana Slough
- Studies to prepare for DS reintroduction from stock raised at the UC Davis Fish Conservation and Culture Laboratory (Section 3.14.4)
- Studies to establish a Delta fish species conservation hatchery (Section 3.14.5)
- Longfin Smelt Science Plan described in Section 3.14.3 and Condition of Approval 7.6.3

Covered Species Subject to Take Authorization Provided by this ITP:

This ITP covers the following species:

Name	CESA Status
1. Longfin smelt (<i>Spirinchus thaleichthys</i>)	Threatened ¹³
2. Delta smelt (<i>Hypomesus transpacificus</i>)	Endangered ¹⁴
3. Spring-run Chinook salmon ESU (<i>Oncorhynchus tshawytscha</i>)	Threatened ¹⁵
4. Winter-run Chinook salmon ESU (<i>Oncorhynchus tshawytscha</i>)	Endangered ¹⁶

¹³See Cal. Code Regs. tit. 14 § 670.5, subd. (b)(2)(E).

¹⁴See Cal. Code Regs. tit. 14 § 670.5, subd. (a)(2)(O).

¹⁵See Cal. Code Regs. tit. 14 § 670.5, subd. (b)(2)(C).

¹⁶See Cal. Code Regs. tit. 14 § 670.5, subd. (a)(2)(M).

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These species and only these species are the “Covered Species” for the purposes of this ITP.

Impacts of the Taking on Covered Species:

Project activities and their resulting impacts are expected to result in the incidental take of individuals of the Covered Species. Project activities described above expected to result in incidental take of individuals of the Covered Species include operations of the: Banks Pumping Plant, Skinner Fish Facility, CCF (including predator control and aquatic weed control and removal), South Delta Temporary Barriers, Georgiana Slough Migratory Barrier, BSPP, and the SMSCG, RRDS and MIDS (Covered Activities).

Incidental take of individuals of the Covered Species in the form of mortality (“kill”) may occur as a result of Covered Activities. Impacts of the authorized taking also include adverse impacts to Covered Species related to temporal losses, increased habitat fragmentation, reduction in habitat extent and quality, and increased edge effects, and the Project’s incremental contribution to cumulative impacts (indirect effects). Anticipated incidental take and impacts of the taking are described in detail in the CDFW Effects Analysis, which is incorporated by reference, in its entirety, into this ITP. The areas where authorized take of the Covered Species is expected to occur include: the Sacramento River downstream of the Feather River confluence, the Delta, Suisun Marsh, and Suisun Bay (collectively, the Project Area, Figures 1A and 1B).

Delta smelt (*Hypomesus transpacificus*) and longfin smelt (*Spirinchus thaleichthys*)

The Project activities and their impacts are expected to result in the incidental take of DS and LFS. The Covered Activities that are expected to result in incidental take of DS and LFS include operations of the: South Delta Export Facilities, Skinner Fish Facility, CCF (including predator control and aquatic weed control and removal), South Delta Temporary Barriers, Georgiana Slough Migratory Barrier, BSPP, and Suisun Marsh Facilities that include the SMSCG, the RRDS, and the MIDS.

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South Delta Export Facilities, Skinner Fish Facility, and CCF - Incidental take of DS and LFS in the form of mortality ("kill") may occur as a result of operations of the South Delta Export Facilities and the CCF Aquatic Weed Control Program, and predator control in CCF.

Mechanical removal of aquatic weeds in CCF has the potential to result in take through direct physical injury. The CCF Aquatic Weed Control Program uses copper-based herbicides in CCF, which would result in injury and mortality of DS and LFS. Operations of the South Delta Export Facilities will result in take of all life stages of DS and LFS beyond the egg stage, but particularly adults, larvae, and early stage juveniles. After being entrained into the export facilities take may occur as a result of fish bypassing salvage operations through the louvered (behavioral) fish screens to the export pumps, and losses during the fish salvage process. South Delta export-related reverse flows in Old and Middle rivers can draw turbidity (associated with DS presence), and pre-spawn adult DS and LFS, into the interior Delta where they are subjected to higher exposure to entrainment risk at the South Delta Export Facilities. Incidental take of larval and juvenile DS and LFS is similar to adults, except that these smaller life stages are much less likely to be effectively screened by the louvered (behavioral) screens employed at the Skinner Fish Facility, and thus tend to be transported to the export pumps. Larval and juvenile DS and LFS produced by adults that spawn in the south Delta are particularly susceptible to take at the South Delta Export Facilities, even at low levels of operation. Incidental take of individuals of the DS and LFS may also occur from the Covered Activities in the form of pursue, catch, capture, or attempt to do so during the fish salvage process. The areas where authorized take of DS and LFS is expected to occur include: the South Delta Export Facilities, Skinner Fish Facility, and CCF located about 12.9 km northwest of Tracy.

Impacts of the authorized taking also include adverse impacts to DS and LFS individuals related to the Project's incremental contribution to cumulative impacts (indirect effects). These impacts include: vulnerability to predation within the CCF, entrainment of larval and juvenile DS and LFS into unfavorable southern Delta habitats through reverse flows in the Old and Middle rivers as a result of South Delta export operations, impaired feeding opportunities, and entrainment of food web resources. Project operations of the south Delta export facilities will cause hydrodynamic effects that will result in impacts to DS and LFS

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larvae, juveniles and adults occurring in the South Delta. Operations of south Delta facilities will also increase larval transport into the central Delta.

South Delta Temporary Barriers - Incidental take of DS and LFS in the form of mortality ("kill") may occur as a result of operations of the South Delta Temporary Barriers. South Delta Temporary Barrier installation will alter hydraulics in Old and Middle rivers, resulting in short term increases in OMR reverse flows. Increases in OMR reverse flows in turn may increase the entrainment of DS and LFS (larvae, early juvenile life stages, and migrating and spawning adults) into the South Delta Export Facilities. The area where authorized take of DS and LFS is expected to occur is upstream of the divergence at the Grant Line Canal Barrier and the Tracy Barrier on Old River and the Middle River Barrier on Middle River.

Impacts of the authorized taking also include adverse impacts to DS and LFS individuals related to the Project's incremental contribution to cumulative impacts (indirect effects). These impacts include increased vulnerability to predation through creation of enhanced predatory fish habitat adjacent to the South Delta Temporary Barriers.

Georgiana Slough Migratory Barrier – Impacts of the authorized taking related to the Project's incremental contribution to cumulative impacts (indirect impacts). Operation of the Georgiana Slough Migratory Barrier will result in increased vulnerability to predation through creation of enhanced predatory fish habitat adjacent to the barrier and increased migration timing for DS and LFS adults that enter Georgiana Slough from the south during upstream spawning migration.

Barker Slough Pumping Plant - Incidental take of DS and LFS in the form of mortality ("kill") may occur as a result of operations of the BSPP by means of entrainment, impingement and screen contact. The area where authorized take of DS and LFS is expected to occur is approximately 16 km from the mainstem Sacramento River at the end of Barker Slough.

Impacts of the authorized taking also include adverse impacts to DS and LFS related to the Project's incremental contribution to cumulative impacts (indirect impacts). These impacts include non-lethal impingement/screen contact, increased vulnerability to predation, and food web impacts.

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Suisun Marsh Facilities - Incidental take of DS and LFS in the form of mortality ("kill") may occur as a result of operations of RRDS, MIDS, and SMSCG by means of entrainment, impingement, and screen contact. The areas where authorized take of DS and LFS is expected to occur include: Montezuma Slough about three km downstream from the confluence of the Sacramento and San Joaquin rivers, the confluence of Roaring River and Montezuma Slough, and at Goodyear Slough south of Pierce Harbor.

Impacts of the authorized taking also include adverse impacts to DS and LFS related to the Project's incremental contribution to cumulative impacts (indirect impacts). These impacts include non-lethal impingement/screen contact and increased vulnerability to predation.

Winter-run Chinook salmon and spring-run Chinook salmon ESU (*Oncorhynchus tshawytscha*)

The Project activities and their impacts are expected to result in the incidental take of CHNWR and CHNSR. The Covered Activities that are expected to result in incidental take of CHNWR and CHNSR include operations of the: South Delta Export Facilities, Skinner Fish Facility, CCF (including predator control and aquatic weed control and removal), South Delta Temporary Barriers, Georgiana Slough Migratory Barrier, BSPP, and Suisun Marsh Facilities that include the SMSCG, the RRDS, and the MIDS.

South Delta Export Facilities, Skinner Fish Facility, and CCF - Incidental take of CHNWR and CHNSR in the form of mortality ("kill") may occur as a result of operations of the South Delta Export Facilities by means of entrainment into CCF, exposure to mechanical removal of aquatic vegetation, exposure to herbicides used to control aquatic vegetation, exposure to predator control activities, fish bypassing salvage operations through the louvered (behavioral) fish screens to the export pumps, and losses during the salvage process. Mechanical removal of aquatic weeds has the potential to result in take through direct physical injury. The CCF Aquatic Weed Control Program uses copper-based herbicides in CCF, which would result in injury and mortality of CHNWR and CHNSR. Incidental take of individuals of CHNWR and CHNSR may also occur from the Covered Activities in the form of pursue, catch, capture, or attempt to do so of individuals during salvage at the Skinner Fish Facility. The areas where authorized take of CHNWR and CHNSR is expected to occur

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include: the south Delta export facilities, Skinner Fish Facility, and CCF located about 12.9 km northwest of Tracy.

Impacts of the authorized taking associated with Project operations also include adverse impacts to CHNWR and CHNSR related to the Project's incremental contribution to cumulative impacts (indirect impacts). Project operations of the south Delta export facilities will cause hydrodynamic effects that will result in impacts to juvenile CHNWR and CHNSR emigrating from the Sacramento River basin and entering the interior Delta. These impacts include: increased migration time for actively migrating CHNWR and CHNSR, increased vulnerability to predation, reduction in habitat quantity and quality for rearing fish, greater risk of entry into migration routes with higher mortality such as Georgiana Slough, increased exposure to entrainment at the south Delta export facilities, and increased vulnerability to predation within CCF.

South Delta Temporary Barriers – Impacts of the authorized taking include adverse impacts to CHNWR and CHNSR related to the Project's incremental contribution to cumulative impacts (indirect impacts). Operation of the South Delta Temporary Barriers will result in increased juvenile vulnerability to predation through creation of enhanced predatory fish habitat adjacent to the barriers, increased entrainment of juvenile CHNWR and CHNSR into the Old River, Middle River and/or Grant Line Canal when flap gates operate tidally resulting in reduced survival and/or routing into the south Delta export facilities, and increased delays in emigration increasing vulnerability to predation and high water temperature throughout the season.

Georgiana Slough Migratory Barrier - Impacts of the authorized taking include adverse impacts to CHNWR and CHNSR related to the Project's incremental contribution to cumulative impacts (indirect impacts). Operation of the Georgiana Slough Migratory Barrier will result in increased vulnerability to predation through creation of enhanced predatory fish habitat adjacent to the barrier and increased migration timing for adults that enter Georgiana Slough from the south during upstream spawning migration increasing the risk of pre-spawn mortality.

Barker Slough Pumping Plant - Incidental take of juvenile CHNWR and CHNSR in the form of mortality ("kill") may occur as a result of operations of the BSPP by means of entrainment,

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impingement and screen contact. The area where authorized take of CHNWR and CHNSR is expected to occur is approximately 16 km from the mainstem Sacramento River at the end of Barker Slough.

Impacts of the authorized taking also include adverse impacts to CHNWR and CHNSR related to the Project's incremental contribution to cumulative impacts (indirect impacts). These impacts include non-lethal impingement/screen contact and increased vulnerability to predation.

Suisun Marsh Facilities - Incidental take of juvenile CHNWR and CHNSR in the form of mortality ("kill") may occur as a result of operations of RRDS, MIDS, and SMSCG by means of entrainment, impingement, and screen contact. The areas where authorized take of CHNWR and CHNSR is expected to occur include: Montezuma Slough about one km downstream from the confluence of the Sacramento and San Joaquin rivers, the confluence of Roaring River and Montezuma Slough, and at Goodyear Slough south of Pierce Harbor.

Impacts of the authorized taking also include adverse impacts to CHNWR and CHNSR related to the Project's incremental contribution to cumulative impacts (indirect impacts). These impacts include non-lethal impingement/screen contact, increased vulnerability to predation, and potential migration delays for adult CHNWR and CHNSR at the SMSCG.

Incidental Take Authorization of Covered Species:

This ITP authorizes incidental take of the Covered Species and only the Covered Species. With respect to incidental take of the Covered Species, CDFW authorizes the Permittee, its employees, contractors, and agents to take Covered Species incidentally in carrying out the Covered Activities, subject to the limitations described in this section and the Conditions of Approval identified below. This ITP does not authorize take of Covered Species from activities outside the scope of the Covered Activities, take of Covered Species outside of the Project Area, take of Covered Species resulting from violation of this ITP, or intentional take of Covered Species except for capture and relocation of Covered Species at the Skinner Fish Facility as authorized by this ITP.

Conditions of Approval:

Unless specified otherwise, the following measures apply to all Covered Activities within the Project Area, including waterways and channels within the Project Area, operation of pumps, barriers and gates, operation of the Skinner Fish Facility, pesticide application and mechanical aquatic weed removal in CCF, predator removal and relocation in CCF, and sediment removal and aquatic weed removal at the BSPP. CDFW's issuance of this ITP and Permittee's authorization to take the Covered Species are subject to Permittee's compliance with and implementation of the following Conditions of Approval:

1. **Legal Compliance:** Permittee shall comply with all applicable federal, state, and local laws in existence on the effective date of this ITP or adopted thereafter.
2. **CEQA Compliance:** Permittee shall implement and adhere to the measures related to the Covered Species in the Biological Resources section of the Environmental Impact Report (SCH No.: 2019049121) certified by California Department of Water Resources on March 27, 2020 as lead agency for the Project pursuant to the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). For purposes of this ITP, where the measures in the Environmental Impact Report are less protective of the Covered Species or otherwise conflict with this ITP, the conditions of approval set forth in this ITP shall control.
3. **ESA Compliance:** Permittee shall implement and adhere to the terms and conditions related to the Covered Species in the United States Fish and Wildlife Service Biological Opinion for the Reinitiation of Consultation on Long-Term Operations of the Central Valley Project and State Water Project (Biological Opinion No. 08FBTD00-2019-F-0164) (USFWS 2019 BiOp) and the National Marine Fisheries Service Biological Opinion on Long-Term Operation of the Central Valley Project and the State Water Project (Biological Opinion No. WCRO-2016-0069) (NMFS 2019 BiOp) for the Project pursuant to the Federal Endangered Species Act (ESA). For purposes of this ITP, where the terms and conditions in the federal authorization are less protective of the Covered Species or otherwise conflict with this ITP, the conditions of approval set forth in this ITP shall control.

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4. **ITP Time Frame Compliance:** Permittee shall fully implement and adhere to the conditions of this ITP within the time frames set forth below and as set forth in the Mitigation Monitoring and Reporting Program (MMRP), which is included as Attachment 1 to this ITP.
5. **Consultation Regarding Amendment:** This ITP may require an amendment if any one of the following conditions occur:
- Modification, reinitiation or replacement of the USFWS 2019 BiOp for DS or the NMFS 2019 BiOp for CHNWR AND CHNSR or any subsequent BiOp addressing the coordinated operations of the CVP and SWP.
 - Modification to the Bay-Delta Plan or water rights decisions by the SWRCB affecting operations of the Project, or execution of binding Voluntary Agreements adopted by the SWRCB as a means of implementing the Bay-Delta Plan that modify the context in which the Covered Activities are undertaken.
 - Modification to the project description, monitoring, studies, or Project operational criteria evaluated and requested through the AMP (Attachment 2) or independent panels convened pursuant to the USFWS 2019 BiOp or NMFS 2019 BiOp.
 - Modification to the project description, monitoring, studies, or Project operational criteria evaluated and recommended through an independent review panel convened in response to a Condition of Approval in this ITP or a requirement in the USFWS 2019 BiOp or the NMFS 2019 BiOp.
 - Modification to the Coordinated Operations Agreement including the 2018 Coordinated Operations Agreement Addendum.
 - An unanticipated emergency condition arises that imposes a serious threat to public health or safety.

Permittee shall notify CDFW if any of the conditions listed above occurs. Permittee shall consult with CDFW if any of the conditions listed above occur to determine whether an amendment is necessary for reasons including but not limited to an increase or decrease in the anticipated extent of the taking of Covered Species or the

impacts on the Covered Species that result from the Covered Activities, or modifications to the necessary and appropriate measures to minimize and fully mitigate the impacts of the taking. Permittee shall submit an application and supporting information to CDFW if it requests an amendment, in compliance with the California Code of Regulations, section 783.6, subdivision (c)(1). CDFW will follow the amendment process outlined in the California Code of Regulations, section 783.6, subdivision (c) to determine whether any proposed amendment is major or minor and whether additional or modified measures are necessary. This condition does not modify CDFW's authorities or obligations pursuant to CESA, including the obligation to amend this ITP as required by law.

6. General Provisions:

6.1. Designated Representative. Within one month of the effective date of this ITP, Permittee shall designate a representative (Designated Representative) responsible for communications with CDFW and overseeing compliance with this ITP. Permittee shall notify CDFW in writing within one month the effective date of this ITP of the Designated Representative's name, business address, and contact information, and shall notify CDFW in writing if a substitute Designated Representative is selected or identified at any time during the term of this ITP.

6.2. Designated Biologist. Permittee shall submit to CDFW in writing the name, qualifications, business address, and contact information of a biological monitor (Designated Biologist) within 30 days of the effective date of this ITP. Permittee shall ensure that the Designated Biologist is knowledgeable and experienced in the biology and the natural history of the Covered Species. The Designated Biologist shall be responsible for monitoring Covered Activities described in Condition of Approval 7.7 to help minimize or avoid the incidental take of individual Covered Species and to minimize disturbance of Covered Species' habitat. Permittee shall obtain CDFW approval of the Designated Biologist in writing, and shall also obtain approval in advance in writing if the Designated Biologist must be changed.

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6.3. Designated Biologist Authority. To ensure compliance with the Conditions of Approval of this ITP, the Designated Biologist shall have authority to immediately stop any activity that does not comply with this ITP, and to order any reasonable measure to avoid the unauthorized take of an individual of the Covered Species.

6.4. CDFW Access. Permittee shall provide CDFW staff with reasonable access to the Project facilities and mitigation lands under Permittee control, and shall otherwise fully cooperate with CDFW efforts to verify compliance with or effectiveness of mitigation measures set forth in this ITP.

7. Monitoring, Notification, Science and Reporting Provisions:

7.1. Notification of Non-Compliance. The Designated Representative shall immediately notify CDFW in writing if it determines that the Permittee is not in compliance with any Condition of Approval of this ITP, including but not limited to any actual or anticipated failure to implement measures within the time periods indicated in this ITP and the MMRP. The Designated Representative shall report any non-compliance with this ITP to CDFW within 24 hours.

7.2. Annual Status Report. Permittee shall provide CDFW with an Annual Status Report (ASR) no later than December 1 of every year beginning with issuance of this ITP and continuing until CDFW accepts the Final Mitigation Report identified below. The ASR shall summarize information from the prior water year October 1 through September 30. Each ASR shall include, at a minimum: (1) a copy of the table in the MMRP with notes showing the current implementation status of each Condition of Approval and mitigation measure; (2) a copy of all SWP and CVP salvage data collected from the prior water year; (3) reports of inspections and maintenance of fish protective equipment; and (4) an assessment of the effectiveness of each completed or partially completed Condition of Approval mitigation measure in avoiding, minimizing, and mitigating Project impacts.

7.3. Final Mitigation Report. No later than 45 days after completion of all mitigation measures or 90 days prior to the expiration of this ITP (whichever is sooner), Permittee

shall provide CDFW with a Final Mitigation Report. The Designated Biologist shall prepare the Final Mitigation Report which shall include, at a minimum: (1) a summary of all ASRs; (2) a copy of the table in the MMRP with notes showing when each of the mitigation measures was implemented; (3) all available information about Project-related incidental take of the Covered Species; (4) information about other Project impacts on the Covered Species; (5) an assessment of the effectiveness of this ITP's Conditions of Approval in minimizing and fully mitigating Project impacts of the taking on Covered Species; (6) recommendations on how mitigation measures might be changed to more effectively minimize take and mitigate the impacts of future projects on the Covered Species; and (7) any other pertinent information.

7.4. Skinner Fish Facility Operations. Permittee shall work in collaboration with CDFW to ensure essential information on salvage at the Skinner Fish Facility continues to be collected, verified for accuracy and quality, and reported to CDFW. CDFW will provide routine and regular oversight on operations as related to fish identification, handling, care, and transport to maintain appropriate compliance with ITP requirements (see Condition of Approval 8.15). This is both an essential data source for Conditions of Approval 8.1.5, 8.1.5.1, 8.5.1.2, 8.3.3, 8.4.1, 8.4.2, 8.5.2, 8.6.1, 8.6.2, 8.6.3, 8.6.4, and 8.7 as well as an important performance measure of their effectiveness. In addition, information on daily OMR flows and daily salvage are essential to ensure that the Conditions of Approval in this ITP are implemented effectively. Permittee shall continue to provide daily data sheets with preliminary salvage data from the SWP and CVP fish salvage facilities to CDFW no later than noon the following day, and final data shall be included in each ASR submitted to CDFW (Condition of Approval 7.2).

7.4.1. Maintenance and Inspection Reporting. Permittee shall submit annual reports that describe regular inspections and maintenance of fish protective equipment at the Skinner Fish Facility that may affect screening and salvage efficiencies to CDFW each year as a part of the ASR (see Condition of Approval 7.2). Additionally, each time Permittee inspects or conducts maintenance on fish protective equipment they shall report the activities to CDFW staff assigned to support salvage facility operations (see Condition of Approval 8.15) verbally or via email as soon as feasible, but no later than 24 hours after

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each instance.

7.4.2. Skinner Fish Facility Operations Manual. Permittee shall ensure the existing salvage monitoring and reporting program samples no less than 30 minutes every two hours from November 1 through June 30. If the presence of large number of fish or debris may result in the loss of Covered Species in the salvage monitoring process, Permittee may operate to the existing reduced sampling time protocols for such circumstances (see Skinner Fish Facility Operations Manual v 2.0 October 19, 2005) and consult with CDFW immediately, or no later than 12 hours after, to discuss options available in real-time to maintain adequate detection of Covered Species when reduced sampling time protocols are being implemented.

The salvage process at the Skinner Fish Facility generates one of the largest data sources characterizing entrainment and take of Covered Species with a high amount of sampling effort. Reducing count times greatly reduces the ability to detect fish in the salvage facility sampling process, and often these outages occur concurrent with conditions which may be conducive to entrainment events. The intent of this Condition is to ensure a clear understanding exists between Permittee and CDFW regarding the circumstances in which reduced sampling times are necessary and appropriate, as the data collected from the facilities informs real-time operations such as OMR Management (Conditions of Approval 8.3 through 8.8).

Permittee shall work with CDFW to update the Skinner Fish Facility Operations Manual and submit a draft updated manual to CDFW by June 30, 2021 for review. The updated draft operations manual shall include a new protocol for the Skinner Fish Facility which describes the decision-making process prior to reducing sampling times and the protocol used to determine whether Covered Species are present during debris removal efforts. Permittee shall work with CDFW to address comments on the draft manual and submit the final revised Skinner Fish Facility Operations Manual to CDFW for approval before September 30, 2021. Permittee shall operate the Skinner Fish Facility as described in the final CDFW-approved Skinner Fish Facility Operations Manual no more than 15 days after it is approved by CDFW.

7.4.3 Continue to Refine Loss Equation. Permittee shall continue to refine the loss equation through annual performance evaluation studies for each component of the loss equation, including but not limited to: salvage at the Skinner Fish Facility, pre-screen loss, louver (screen) efficiency, and handling and trucking loss. Performance evaluation studies shall also include post release survival studies on salvaged fish to evaluate loss associated with predation and reduced fitness as a result of the salvage and release process. Permittee shall work with Reclamation, CDFW, NMFS, and USFWS to develop refined protocols for daily estimation of salvage and loss for CHNWR and CHNSR, including relevant calculations, data, and information sources necessary to perform the relevant calculations used to estimate salvage and loss. Permittee shall update the loss equation with refinement to the loss equation components as approved by CDFW.

7.5. Winter- and Spring-run Chinook Salmon Monitoring and Science Requirements. To improve understanding of CHNWR and CHNSR population size, life history diversity, migration patterns, survival rates, habitat use, and impacts from water-operations related stressors, Permittee as a part of the AMP shall initiate, fund, and implement new monitoring and science. This new monitoring and science shall include the elements identified in Conditions of Approval 7.5.1, 7.5.2, and 7.5.3, and shall be combined with existing surveys and data to: 1) continue to build knowledge regarding the biology and life history of CHNSR and CHNWR; 2) better understand potential impacts of Project operations on CHNWR and CHNSR; 3) continue to refine the CHNWR juvenile production estimate (JPE); and 4) develop a CHNSR JPE and associated operational criteria that may be proposed to replace Condition of Approval 8.6.4 as a part of the AMP (described in Attachment 2) and a subsequent amendment to this ITP.

7.5.1 Upstream Monitoring During Water Transfer Window. CHNSR are vulnerable to redd dewatering and juvenile stranding when flows in tributaries are increased rapidly to initiate a water transfer, then decreased rapidly following the end of a water transfer. Permittee as part of the AMP shall develop a plan to monitor relevant flow rates prior to, during, and after all water transfers and redd distribution, redd dewatering, and juvenile stranding during the Project water transfer window and submit the draft Water Transfer Monitoring Plan to CDFW for approval within six months of the effective date of this ITP.

Permittee shall work collaboratively with CDFW to address comments on the draft plan before it is finalized and submitted to CDFW for approval. Permittee shall implement the final Water Transfer Monitoring Plan no more than 30 days after CDFW approval and provide data to CDFW annually thereafter within 30 days of the end of the water transfer window. Additionally, Permittee shall notify the Designated Representative as soon as possible, and no more than 24 hours, after each redd dewatering or juvenile stranding event observed as a part of this monitoring program.

7.5.2 New and Ongoing Monitoring Required to Develop and Establish a Spring-run Chinook Salmon JPE. Within 30 days of the effective date of this ITP, Permittee as part of the AMP shall convene a Spring-run JPE Team including experts from CDFW, DWR, NMFS, USFWS, and Reclamation. To further advance collaboration, upon convening, the Spring-run JPE team may invite other experts in fish biology, hydrology, or operations of the SWP and CVP to meetings of the Spring-run JPE Team to assist with discussion and analyses. Permittee shall prepare a draft Spring-run JPE Monitoring Plan in collaboration with the Spring-run JPE Team that describes monitoring required to inform the development of the JPE prior to December 1, 2020. The plan shall include, but not be limited to:

- *Feather River adult passage monitoring and escapement surveys:* Monitoring needed to develop adult spawner abundance estimates from which to derive production estimates. Monitoring includes continuing redd surveys and carcass surveys for CHNSR and collecting genetic samples from all carcasses.
- *Lower Yuba River adult passage monitoring and escapement surveys:* Monitoring needed to develop adult spawner abundance estimates from which to derive production estimates. Monitoring includes continuing adult salmonid passage surveys via the Vaki Riverwatcher at Daguerre Point Dam, redd surveys for CHNSR, upstream of Daguerre Point Dam, and carcass surveys for CHNSR upstream of Daguerre Point Dam. Collect genetic samples from all carcasses.
- *Deer, Mill, and Butte Creek adult passage monitoring and escapement surveys:* Monitoring needed to develop adult spawner abundance estimates from which to derive production estimates. Monitoring includes passage surveys via video

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monitoring stations on Deer, Mill and Butte creeks, carcass surveys, and redd surveys.

- *Feather River rotary screw trap monitoring at RM 61 and 45.8:* Monitoring to provide estimates of the number of CHNSR emigrating through the upper limits of the Feather River via two existing rotary screw traps located at RM 45.8 (High Flow Channel RST) and RM 61 (Low Flow Channel RST).
- *Feather River rotary screw trap monitoring near Beer Can Beach:* New monitoring near Beer Can Beach (river mile seven) to provide estimates of the number of CHNSR entering the Delta from the Feather River Basin. Data obtained would be used to integrate all Feather River Basin-origin fish into the JPE. The data obtained can also be used as a point of comparison for reach-specific loss estimates from upstream sites when used in conjunction with acoustic telemetry data.
- *Lower Yuba River rotary screw trap monitoring:* Monitoring to provide estimates of the number of CHNSR emigrating through the lower Yuba River via two rotary screw traps located near Hallwood Boulevard. Collect genetic samples on all length-at-date CHNSR. These data can also provide an upstream measurement to assess reach-specific loss estimates in coordination with acoustic telemetry data.
- *Deer, Mill, and Butte Creek rotary screw trap monitoring:* Monitoring needed to develop in-season production estimates and provide data on the egg-to-fry survival and emigration timing of yearling and young-of-year CHNSR. Collect genetic samples on all length-at-date CHNSR. These data can also provide an upstream measurement to assess reach-specific loss estimates in coordination with acoustic telemetry data.
- *Tisdale Weir and Knights Landing rotary screw trap monitoring:* Monitoring is needed to provide estimates of the number of CHNSR entering the Delta from the Sacramento River Basin. Collect genetic samples on all length-at-date CHNSR. The data obtained can be used as a point of comparison for reach-specific loss estimates from upstream sites. Weir overtopping and Sutter Bypass activation can influence the detectability of Chinook salmon at the Knights Landing monitoring station. Water entering the Sutter Bypass provides an alternative route in which juvenile salmon are routed around the Knights Landing monitoring station.

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Monitoring upstream of Tisdale Weir will provide an additional measure of abundance prior to weir influence.

- *Rotary screw trap acoustic tagging monitoring:* Monitoring using acoustic tagged fish to provide estimates of loss and timing of yearling CHNSR emigrants in the fall and emigrating young-of-year CHNSR in the spring at all new and ongoing rotary screw traps.
- *Genetic identification of CHNSR to support ongoing and new monitoring and development of a CHNSR JPE:* Genetic samples shall be collected from all fish (or a subsample of fish where appropriate) and analyzed to race to improve identification of CHNSR-sized fish observed during monitoring and better inform migration and production estimates. Permittee shall coordinate with the CDFW Genetics Lab and NMFS Southwest Fisheries Science Center regarding the methodology for collecting and analyzing all genetic samples.
- *Trap capture efficiency studies:* Research to guide annual CHNSR JPE calculations using current methods of visibly marking trap captured and hatchery sourced fish including late fall-run and fall-run Chinook salmon. Studies should also include developing trap efficiency models using the paired acoustic tagged (AT)-coded-wire tagged (CWT) releases from Livingston Stone National Fish Hatchery (NFH), Colman NFH, and Feather River Hatchery.
- A list of the entities that shall receive funding from Permittee to implement required monitoring programs.

This list of required monitoring may be modified in the final monitoring plan if approved by CDFW. Permittee shall work collaboratively with the Spring-run JPE Team members to incorporate edits and comments on the draft Spring-run JPE Monitoring Plan while preparing the final plan. After the final Spring-run JPE Monitoring Plan is approved in writing by CDFW, Permittee shall fund and implement required monitoring beginning the calendar year after the effective date of this ITP, according to the timelines specified in the CDFW-approved plan. At a minimum, Permittee shall convene the Spring-run JPE Team quarterly every year following initiation of the final monitoring plan to:

- Review data obtained from new and ongoing monitoring programs,

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- Review methods used to implement monitoring and recommend adjustments as they deem appropriate,
- Formulate an approach to calculating a CHNSR JPE, including the following elements:
 - Total in-river escapement,
 - Adult female estimate,
 - Adult female estimate minus pre-spawn mortality,
 - Average fecundity,
 - Total viable eggs,
 - Estimated egg-to-fry survival based on Juvenile Production Index (JPI) at ongoing and new monitoring stations/total viable eggs,
 - Fry equivalents of juvenile production,
 - Fry-to-smolt survival estimates,
 - Number of smolts, and
 - Upper river to Delta survival.
- Request additional monitoring if it is deemed necessary to complete a CHNSR JPE within five years of the effective date of this ITP,
- Recommend approaches to using the CHNSR JPE and monitoring results as operational criteria to minimize take of CHNSR as a result of Project operations, including operations at the south Delta export facilities, and
- Evaluate the need to revise and update the plan to incorporate genetic testing of CHNSR when it becomes available.

Permittee shall make all raw data acquired as a part of the monitoring program available to members of the Spring-run JPE Team within ten days of a request.

Within four years of the effective date of this ITP, and in collaboration with the Spring-run JPE Team, Permittee shall review data collected over the past four years and prepare a draft plan that describes the approach to calculating a CHNSR JPE and long-term monitoring needed to collect the data to calculate a CHNSR JPE annually. Permittee shall submit the draft plan to the Spring-Run JPE Team for review and work collaboratively with team members to incorporate their comments into the final draft. Permittee shall submit

the final plan to CDFW for approval no more than four years and six months after the effective date of this ITP to ensure that annual calculation of a CHNSR JPE is initiated within five years of the effective date of this ITP. After the final draft Spring-run JPE Plan is approved by CDFW, Permittee shall convene the Spring-run JPE Team annually to provide an annual JPE estimate for CDFW, Reclamation, USFWS, and NMFS and share all data obtained through long-term monitoring programs.

7.5.3 Winter- and Spring-run Chinook Salmon Science Requirements. Permittee as part of the AMP shall initiate, fund, and implement new science to continue to build knowledge of CHNWR and CHNSR ecology and the status of the ESUs. Permittee shall fund and implement the following scientific studies:

- *Pathology Monitoring:* Within two years of the effective date of this ITP Permittee shall fund and initiate monitoring to provide information on the source and magnitude of CHNSR loss prior to Delta entry including in-season studies in the Sacramento and Feather Rivers and Delta. Disease has been well documented to be present in the Central Valley and to dramatically reduce production via reduction in adult spawners and egg and juvenile mortality.
- *Salmon Rearing Habitat in the Bay-Delta:* To inform salmonid impact assessments and restoration activities, the Permittee shall fund research activities to investigate juvenile salmonid habitat use in the Delta, Cache Slough, and Suisun Marsh, and subsequently conduct habitat occupancy modeling beginning no later than three years after the effective date of this ITP. This work shall build upon ongoing work funded by the Delta Conservancy (*Identifying Suitable Rearing Habitat for Chinook Salmon in the Sacramento-San Joaquin Delta*) and Permittee (*Juvenile salmon distribution, abundance, and growth in restored and relict Delta marsh habitats*). Data collected through this research will also inform ongoing CHNWR lifecycle modeling and the development of a new CHNSR lifecycle model.
- *Spring-run Chinook Life Cycle Model:* Beginning five years after the effective date of this ITP Permittee shall fully fund and support the development of a life cycle model for CHNSR. This life cycle model shall be developed and informed by

ongoing and new monitoring described in this ITP, along with other available science.

- *Winter-run Chinook entrainment prediction tool:* Within thirty days of the effective date of this ITP Permittee and CDFW will convene a technical team to develop a model focused on predicting Chinook salmon entrainment events at the SWP and CVP salvage facilities. Within one year of the effective date of this ITP a CDFW-approved model developed as a part of this technical team shall be provided to Salmon Monitoring Team staff to use as a part of real-time risk assessments alongside other tools described in Condition of Approval 8.1.5.1.

Permittee shall work collaboratively with members of the Spring-run JPE Team to review study plans, data, and reports associated with both studies. All final reports documenting the results of these studies shall be subject to CDFW approval.

7.6 Delta Smelt and Longfin Smelt Monitoring and Science Requirements.

7.6.1 Longfin Smelt December Larval Surveys. Permittee shall fully fund at least one additional SLS survey and associated sampling and processing costs to be implemented by CDFW staff between December 1 and January 31, annually. The timing of additional SLS surveys shall be determined each year by CDFW Smelt Monitoring Team staff based on observations of LFS in the Chipps Island Trawl beginning on November 1. The additional surveys requested by CDFW Smelt Monitoring Team staff shall use the same sampling methodology as the SLS, however they shall be restricted in spatial extent to the following central and south Delta stations: 809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918, 919.

7.6.2 Larval Smelt Entrainment Monitoring. Permittee shall fund and implement a new Smelt Larval Entrainment Program to quantify larval DS and LFS entrainment into CCF. Within ninety days of the effective date of this ITP Permittee shall convene a meeting of CDFW, DWR, USFWS, and Reclamation Smelt Monitoring Team staff to begin planning larval smelt monitoring protocol to fulfill this Condition of Approval. Smelt Monitoring Team staff shall evaluate options to conduct additional larval surveys within CCF and immediately outside CCF to better quantify larval entrainment into CCF. Permittee shall

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prepare and submit a draft monitoring plan to support a test pilot of the Smelt Larval Entrainment Program to participating Smelt Monitoring Team members for review and comment. Permittee shall work collaboratively with Smelt Monitoring Team members to incorporate their edits and feedback into the monitoring plan and pilot program.

Permittee shall implement the pilot program within two years of the effective date of this ITP. Permittee shall provide raw data from the pilot program to CDFW and work collaboratively with the Smelt Monitoring Team members to use new information from the pilot program to develop a final monitoring plan within three years of the effective date of this ITP. Permittee shall fund and implement the final CDFW-approved monitoring plan and provide data to the Smelt Monitoring Team after each survey.

7.6.3 Longfin Smelt Science Program Priorities. Permittee as part of the AMP shall convene a meeting of the Longfin Smelt Science Program within 120 days of the effective date of this ITP. The Longfin Smelt Science Program shall include experts from CDFW, DWR, USFWS, and SWP Contractors. Permittee shall prepare a draft Longfin Smelt Science Program research plan in collaboration with the science program members that describes new LFS science needed to improve the understanding of LFS ecology and impacts as a result of SWP and CVP operations prior to December 1, 2020. The plan shall include, but not be limited to, the following science priorities:

- A schedule for implementation including deadlines for draft and final reports for each study required.
- Develop a mathematical life cycle model for LFS, verified with field data collection, as a quantitative tool to characterize the effects of abiotic and biotic factors on LFS populations.
- New and ongoing monitoring that:
 - Applies equal effort throughout the known spawning and rearing distribution spanning the Delta, Suisun Marsh, Suisun Bay, Napa-Sonoma Marsh and Alviso Marsh in South Bay.
 - Characterizes the distribution and abundance of adult, larvae and juvenile life stages.
 - Facilitates estimates of survival probabilities among life stages.

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- Characterizes changes in abundance and distribution of life stages across a range of hydrologic conditions, including different water year types.
- Considers revisions to existing IEP monitoring programs to expand the spatial distribution of LFS sampling.
- Addresses factors that influence LFS population abundance, distribution, and catchability, including vertical migration behavior, water transparency, and other factors that support growth and survival.
- Complete LFS lifecycle in captivity at the FCCL.
- Characterize LFS spawning substrate and spawning microhabitat requirements.
- Improve understanding of LFS spawning substrate distribution in the Delta, Cache Slough, and Suisun Marsh.
- Improve understanding of adult migration behavior and review the current conceptual model that assumes adult staging is followed by rapid migration into lower salinity water and spawning soon thereafter.
- Improve the understanding of juvenile LFS outmigration behavior and transport mechanisms for out-migrating fish, as it related to the potential for miscuing resulting in increased entrainment at the south Delta facilities.

Permittee shall work collaboratively with the science program members to incorporate edits and comments on the draft Longfin Smelt Science Plan while preparing the final plan. After the final Longfin Smelt Science Plan is approved in writing by CDFW, Permittee shall fund and implement required monitoring and science according to the timelines specified in the final plan. At a minimum, Permittee shall convene the Longfin Smelt Science Program quarterly every year following initiation of the final Longfin Smelt Science Plan to:

- Review data obtained from new and ongoing monitoring programs.
- Review methods used to implement monitoring and recommend adjustments as they deem appropriate.
- Review draft results from new and ongoing science.

Permittee shall make all raw data and modeling acquired as a part of the Longfin Smelt Science Plan available to members of the Longfin Smelt Science Plan within ten days of a

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request.

7.6.4 Science to Improve Understanding of Delta Smelt Habitat in the Summer and Fall. There is a need for additional science to further investigate the spatial and temporal distribution of abiotic and biotic factors influencing DS habitat and survival during the summer-fall time period. To study habitat effects on DS survival as part of the AMP, Permittee shall work collaboratively with CDFW and the Delta Coordination Group (Condition of Approval 9.1.3.1) to develop and conduct studies during implementation of the Summer-Fall Action Plan, including deployment of the Additional 100 TAF block of water (Condition of Approval 8.19) when it is available as described in the Delta Outflow Operations Plan (Condition of Approval 8.20). The Additional 100 TAF could be deferred in above normal or wet years and redeployed to operate the SMSCG in the summers of dry years, or supplement spring-summer outflow in below-normal years to provide DS habitat and improve DS survival during this critical portion of their life history (Condition of Approval 8.19). The benefits associated with the Additional 100 TAF block of water shall be evaluated in conjunction with new monitoring in Grizzly Bay (Condition of Approval 9.1.3.3) to better quantify changes in salinity associated with SMSCG operations. This new science shall also facilitate testing and evaluating components of the Delta Smelt Resiliency Strategy by studying outflow effects on DS habitat.

7.7. Barker Slough Pumping Plant Sediment and Aquatic Weed Removal. If Permittee seeks to conduct aquatic weed or sediment removal in the vicinity of the BSPP when water temperatures are likely to be less than 25°C, Permittee shall coordinate with CDFW at least seven days prior to initiating the aquatic weed or sediment removal. Permittee shall provide a written description of the planned aquatic weed or sediment removal activities to CDFW including a description of whether activities are planned outside the embayment and the floating booms as shown in Figure 1 in the Project Description. Permittee shall ensure that a Designated Biologist is onsite before, during, and after the planned activities to assess the potential for take of DS or LFS that would not otherwise occur as a result of Project operations and permitted diversions at the BSPP.

7.8 Data Accessibility. Permittee shall provide CDFW with access to all raw data and associated analyses and reports for all monitoring required in Condition of Approval 7 of this ITP and described in the Project Description within 60 days of collection of data or completion of analyses and reports, and otherwise upon request.

8. Minimization Measures:

The following requirements are intended to ensure the minimization of incidental take of Covered Species in the Project Area during Covered Activities. Permittee shall implement and adhere to the following conditions to minimize take of Covered Species:

8.1. Real-time Operations, Monitoring, and Technical Teams. Permittee shall monitor and manage Project operations in response to risk assessments conducted by collaborative real-time operations monitoring teams that include representatives from CDFW, DWR, USFWS, NMFS, SWRCB and Reclamation.

8.1.1 Smelt Monitoring Team. The purpose of the Smelt Monitoring Team is to meet weekly beginning November 1 and throughout the OMR management season and implementation of the Summer-Fall Action, or more often as needed, to consider and discuss:

- The status of DS and LFS;
- DS and LFS survey and salvage data at the SWP and CVP facilities;
- Delta hydrology;
- Other pertinent biotic or abiotic factors;
- Exposure of DS and LFS to impacts associated with the operation of the CVP and SWP;
- DS and LFS sensitivity to changes in behaviors of sheltering, foraging, and migration;
- Results from the CDFW-approved DS life cycle model; and
- The need to implement changes in operations as described in Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.17, 8.18, 8.19, 8.20, 9.1.3.1 and 9.1.3.2

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The Smelt Monitoring Team shall include representatives from CDFW, USFWS, NMFS, DWR, SWRCB, and Reclamation. To further advance collaboration, upon convening, the Smelt Monitoring Team may invite, one other expert in fish biology, hydrology, or operations of the SWP and CVP each from the SWP Contractors and a non-governmental organization (NGO) to participate in specific meetings of the Smelt Monitoring Team and assist with their discussion and analyses.

Permittee shall:

- Convene the first meeting of the Smelt Monitoring Team within three days of the effective date of this ITP and weekly thereafter. In each year, Permittee shall convene the Smelt Monitoring Team meeting weekly, beginning no later than October 1 each year, throughout the time frame when Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.7, 8.8, 8.17, 8.18, 8.19, 8.20, and 9.1.3.1 may be initiated, control operations, or off-ramp.
- Distribute a meeting agenda, with relevant documents and analyses to be discussed (as applicable), to team members at least two working days prior to each Smelt Monitoring Team meeting.
- Record and distribute regular meeting notes within two working days of each Smelt Monitoring Team meeting to team members for review. Incorporate member comments and post final notes on a publicly available website.
- Provide an annual written report to CDFW no later than October 1 following the salvage season of approximately October through June. This report shall include a summary of major actions taken during the year to implement Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.7 and 8.8, an evaluation of their effectiveness, and recommendations for future actions.
- Call for a special meeting of the Smelt Monitoring Team outside the regular weekly schedule, upon request from CDFW or any other Smelt Monitoring Team member. Such meetings shall be scheduled within one working day of receiving a request, and shall be held in a timeframe responsive to the issue(s) warranting the meeting.

The Smelt Monitoring Team shall:

- Provide advice for real-time management of operations to Permittee, CDFW, and

WOMT consistent with the Project Description, Conditions of Approval in this ITP, and the applicable ESA authorizations, within one working day of each Smelt Monitoring Team meeting.

- Meet weekly, or more often as needed, to consider and discuss survey data, salvage data, and other pertinent biotic and abiotic factors and conduct risk assessments (Condition of Approval 8.5.1.2).

8.1.2 Salmon Monitoring Team. The purpose of the Salmon Monitoring Team is to meet weekly to consider and discuss survey data, salvage data, and other pertinent biotic and abiotic factors as described in Conditions of Approval 8.6.1, 8.6.2, 8.6.3, 8.6.4, and 8.7. The Salmon Monitoring Team shall include representatives from CDFW, USFWS, NMFS, DWR, SWRCB, and Reclamation. To further advance collaboration, upon convening, the Salmon Monitoring Team may invite one other expert in fish biology, hydrology, or operations of the SWP and CVP each from the SWP Contractors and an NGO to participate in specific meetings of the Salmon Monitoring Team and assist with their discussion and analyses.

Permittee shall:

- Convene the first meeting of the Salmon Monitoring Team within three days of the effective date of this ITP and weekly thereafter. In each year, Permittee shall convene the Smelt Monitoring Team meeting weekly, beginning no later than October 1 each year, throughout the time frame when Conditions of Approval 8.3.1, 8.3.2, 8.3.3, 8.6.1, 8.6.2, 8.6.3, 8.6.4, 8.7, and 8.8 may be initiated, control operations, or off-ramp.
- Distribute a meeting agenda, with relevant documents and analyses to be discussed (as applicable), to team members at least two working days prior to each Salmon Monitoring Team meeting.
- Record and distribute regular meeting notes within two working days of each Salmon Monitoring Team meeting to team members for review. Meeting notes shall include issues considered, recommendations made, key information on which recommendations were based, and incorporate member comments. Final notes shall be posted on a publicly available website.

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- Provide an annual written report to CDFW no later than October 1 following the salvage season of approximately October through June. This report shall include a summary of major actions taken during the year to implement Conditions of Approval 8.3.1, 8.3.2, 8.3.3, 8.6.1, 8.6.2, 8.6.3, 8.6.4, 8.7, and 8.8, an evaluation of their effectiveness, and recommendations for future actions.
- Call for a special meeting of the Salmon Monitoring Team outside the regular weekly schedule, upon request from CDFW or any other Salmon Monitoring Team member. Such meetings shall be scheduled within one working day of receiving a request, and shall be held in a timeframe responsive to the issue(s) warranting the meeting.

The Salmon Monitoring Team shall:

- Provide advice for real-time management of operations to Permittee, CDFW, and WOMT consistent with the Project Description, Conditions of Approval in this ITP, and the applicable ESA authorizations, within one working day of each Salmon Monitoring Team meeting.
- Review Project operations in the Delta and the data collected from ongoing monitoring programs annually.
- Meet weekly, or more often as needed, to conduct a risk assessment (Condition of Approval 8.1.5.1) and consider and discuss survey data, salvage data, and other pertinent biotic and abiotic factors.
- Estimate the percentage of CHNWR and young-of-year CHNSR that are currently 1) upstream of the Delta, 2) in the Delta, or 3) exited the Delta past Chipps Island.
- Estimate the risk of entrainment in to the central Delta and the SWP and CVP export facilities and identify factors that influence the entrainment risks such as percent of the population in the Delta, Delta Cross Channel (DCC) gate operations, Sacramento River and San Joaquin River flows and a range of possible OMR flows.
- As required by Condition of Approval 8.1.4 conduct a collaborative risk assessment and recommend OMR targets to minimize the risk of exceeding 50% or 75% of the single year loss threshold (Condition of Approval 8.6.1) to the WOMT (Condition of

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Approval 8.1.3) within one working day of each Salmon Monitoring Team meeting and follow the process outlined in Condition of Approval 8.1.4.

8.1.3 Water Operations Management Team. Beginning no later than October 1 each year Permittee shall convene the WOMT on a weekly basis until the end of OMR management (Condition of Approval 8.8), or the end of implementation of the Summer-Fall Action (Condition of Approval 9.1.3.2), whichever is later.

The WOMT shall be composed of manager-level representatives from Reclamation, DWR, USFWS, NMFS, SWRCB, and CDFW with decision-making authority. This management-level team shall facilitate timely decision-support and decision-making at the appropriate level.

The Smelt and Salmon Monitoring Teams shall report weekly updates, operations advice, and risk analyses to the WOMT. Each week the WOMT shall review and evaluate these risk assessments and operational advice, discuss potential changes to Project operations, and make final determinations for Covered Species minimization needs and water operations. If WOMT representatives do not achieve a consensus regarding final determinations for Covered Species minimization and Project operations, Permittee and CDFW shall prepare written summaries of their operational recommendations to the Directors for discussion and final decision per Condition of Approval 8.1.4 (Collaborative Approach to Real-time Risk Assessment).

8.1.4 Collaborative Approach to Real-time Risk Assessment. Beginning no later than October 1 through the end of OMR Management (see Condition of Approval 8.8) the Smelt and Salmon Monitoring Teams shall meet weekly, or more often as required, to consider survey data, salvage data, and other pertinent biotic and abiotic factors and prepare risk assessments as described in Conditions of Approval 8.1.1, 8.1.2, 8.1.5.1 and 8.1.5.2.

The Smelt and Salmon Monitoring Teams shall prepare operations advice for the WOMT as required by Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, 8.6.4, 8.7, and 8.8, including advice on operations. The Smelt and

Salmon Monitoring Teams shall each prepare risk assessments and operations advice. Within each team, staff jointly develop the risk assessment and supporting documentation to accompany operations advice (see Conditions of Approval 8.1.5.1 and 8.1.5.2). DWR and CDFW Smelt and Salmon Monitoring Team staff may conclude different operations advice is warranted, in which case the difference shall be noted and elevated as described in this Condition of Approval.

The Smelt and Salmon Monitoring Teams shall communicate their advice to WOMT. The WOMT shall then confer and attempt to reach a resolution and agreed-upon Project operations. If a resolution is reached, Permittee shall operate consistent with the decision regarding Project operations from WOMT. If the WOMT does not reach a resolution, the CDFW Director may require Permittee to implement an operational recommendation provided by CDFW. CDFW will provide its operational decision to Permittee in writing. Permittee shall implement the operational decision required by CDFW. Permittee shall ensure that its proportional share (see Condition of Approval 8.10) of the OMR flow requirement as a part of the operational decision is satisfied.

8.1.5 Real-time Risk Assessments. The Smelt and Salmon Monitoring Teams (Conditions of Approval 8.1.1 and 8.1.2) shall prepare weekly risk assessments, or more often as required, and operations advice (as required by Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, 8.6.4, and 8.7) during their discussions and analyses. The Smelt and Salmon Monitoring Teams shall provide the risk assessments and pertinent supporting information to the WOMT (Condition of Approval 8.1.3) within one business day of each meeting.

8.1.5.1 Salmon Monitoring Team Risk Assessments. Salmon Monitoring Team risk assessments shall include, but not be limited to, Components A – F and associated data sources listed below:

- A. Assessment of hydrologic, operational and meteorological information
 - i. Water operations conditions data:
 - Antecedent actions (e.g. DCC gate closure and required actions such as first flush, etc.)

- Current controlling factor(s)
 - Water temperatures
 - Tidal cycle
 - Turbidity
 - Salinity
- ii. Water operations outlook data:
- Meteorological forecast
 - Outages
 - Diversions
 - Storm event projection
- iii. Projection data:
- DCC gate status
 - Freeport flows
 - Vernalis flows
 - Old River at Bacon Island (OBI) and Freeport turbidities
 - South Delta Exports
 - OMR

B. Assessment of biological information for CHNWR and CHNSR

- i. CHNWR population status data:
- Adult escapement
 - Redd distribution and fry emergence timing
 - JPE and hatchery releases
 - Distribution of natural CHNWR, Livingston Stone NFH CHNWR releases, and CHNWR in Battle Creek:
 - % of juveniles upstream of the Delta
 - % of juveniles in Delta
 - % of juveniles past Chipps Island
- ii. CHNSR population data
- Adult escapement
 - Redd distribution and fry emergence timing

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- Hatchery release (in-river vs. downstream)
 - Distribution of natural and hatchery fish:
 - % of juveniles upstream of the Delta
 - % of juvenile in the Delta
 - % of juveniles past Chipps Island
 - iii. Change in risk of entrainment into the central Delta
 - Change in routing risk of entrainment into the central Delta
 - Comparison to the previous week
- C. Assessment of risk of entrainment into the central Delta and CVP/SWP facilities for CHNWR and CHNSR in the Sacramento River:
- i. Data sources to assess sensitivity to entrainment into the central Delta from the Sacramento River and western Delta:
 - In-Delta distribution of fish
 - Acoustic telemetry, trawls (e.g. Spring Kodiak), EDSM catch, rotary screw traps, seines, and hatchery release notifications
 - Hydraulic footprint
 - STARS model
 - Enhanced Particle Tracking Model (EPTM) (e.g. transitions between regions)
 - Data from new monitoring required in Conditions of Approval 7.5 in this ITP
 - ii. Exposure risk (low, medium, high):
 - Distribution of juvenile CHNWR estimated to be in the lower Sacramento and northern Delta
 - Distribution of juvenile CHNSR estimated to be in the lower Sacramento and northern Delta
 - Distribution of hatchery produced salmonids
 - Incorporation of real-time acoustic tracking of AT/CWT fish
 - Anticipated emigration to continue into the Delta
 - iii. Routing risk (low, medium, high):
 - Flows in the Sacramento River predicted with upcoming storm events
 - DCC gate position

- Prediction of tidal interaction at Georgiana Slough
 - Inflow to Delta from Sacramento River and the interaction of the muting of tidal effects around Georgiana Slough
 - Precipitation in the forecast for the weekend and increasing river flows effects of routing into central and interior delta
- iv. Overall entrainment risk: Combination of the above two risk assessments in ii and iii.
- D. CVP/SWP facilities entrainment risk for CHNWR and CHNSR in the central Delta over the next week:
- i. Data sources to assess sensitivity to entrainment into the south Delta from the San Joaquin River and central Delta
 - In-Delta distribution of fish
 - Acoustic telemetry, trawls (e.g. Spring Kodiak), EDSM catch, rotary screw traps, seines, and hatchery release notifications
 - Hydraulic footprint
 - EPTM (e.g. transitions between regions)
 - ii. Data sources to assess sensitivity to entrainment in salvage in the south Delta
 - In-Delta distribution of fish
 - Acoustic telemetry, trawls (e.g. Spring Kodiak), EDSM catch, rotary screw traps, seines, and hatchery release notifications, and salvage monitoring data at the SWP and CVP facilities
 - Trend analysis (historical timing)
 - Survival analysis (e.g. Zeug and Cavallo CWT Model)
 - Tillotson entrainment model, or other entrainment models as they are available
 - EPTM (e.g. transitions between regions)
 - New monitoring required by Condition of Approval 7.5 in this ITP
 - iii. Exposure risk assessments (low, medium, high):

- Listed Chinook salmon from the Sacramento River basin observed in monitoring sites in the lower Sacramento River and northern Delta (fish at the junction of Georgiana Slough, Mokelumne River, and San Joaquin River confluence).
 - Prediction of flows expected to change due to precipitation events.
 - Salvage trends in relation to OMR
 - Future export modifications
- iv. Reporting OMR/export risk:¹⁷
- OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: LOW
 - OMR -5,000 cfs: MEDIUM
 - OMR -6,250 cfs: MEDIUM-HIGH
 - OMR -7,500 cfs: HIGH
 - OMR -9,000 cfs: HIGH
- v. Overall entrainment risk: Combination of the above two risk assessments in iii and iv

E. Annual loss threshold risk

- i. Salvage loss at the SWP and CVP facilities compared to estimated remaining population in Delta and upstream of the Delta
- ii. Define risk of hitting a threshold, 50%, or 75%, or 100%, and actions to minimize that happening
- iii. Daily loss thresholds hit and subsequent loss and associated operations

F. Alternative actions, if any

- i. Operations scenario
- ii. Alternative exposure analysis

8.1.5.2 Smelt Monitoring Team Risk Assessments. Smelt Monitoring Team risk

¹⁷ Categories provided as examples and the associated OMR flows are subject to change based on applicable Conditions of Approval, risk assessments and real-time conditions.

assessments shall include, but not be limited to, Components A – F and associated data sources listed below:

A. Assessment of hydrologic, operational and meteorological information

i. Water operations conditions:

- Antecedent actions (e.g. DCC gate closure and actions such as integrated early winter pulse protection, etc.)
- Current controlling factor(s)
- Water temperatures
- Tidal cycle
- Turbidity
- Salinity

ii. Water Operations Outlook:

- Meteorological forecast
- Outages
- Diversions
- Storm event projection

iii. Projections:

- Date
- DCC status
- Freeport flows
- Vernalis flows
- OBI and Freeport turbidities
- South Delta exports
- OMR

B. Assessment of biological information for DS and LFS

i. DS population status

- EDSM
- LCM
- Biological conditions (spawned/unspawned)
- % in Delta zones

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- ii. LFS population status
 - FMWT and Bay Study
 - iii. Change in exposure
 - Comparison to the previous week
- C. Assessment of risk of entrainment into the central Delta and CVP/SWP facilities for DS and LFS in the Sacramento River:
- i. Data sources to assess sensitivity to entrainment into the central Delta from the Sacramento River and western Delta:
 - In-Delta distribution of fish
 - Trawls (e.g. Spring Kodiak, FMWT, SFBS, and EDSM) catch
 - Hydraulic footprint
 - EPTM (e.g. transitions between regions)
 - New monitoring required by Conditions of Approval 7.6.1 and 7.6.2 in this ITP
 - ii. Exposure risk (low, medium, high):
 - Distribution of DS estimated to be downstream of the lower Sacramento and northern Delta
 - Distribution of all life stages of larval and juvenile DS and LFS estimated to be in the lower Sacramento and northern Delta
 - Anticipated onset of spawning movement into upstream Delta habitats.
 - iii. Routing risk (low, medium, high):
 - Flows in the Sacramento River predicted with upcoming storm events
 - Precipitation in the forecast for the weekend and increasing river flows effects of routing into central and interior delta
 - iv. Overall entrainment risk: Combination of the above two risk assessments in ii and iii.
- D. CVP/SWP facilities entrainment risk for DS and LFS in the central Delta over the next week:
- i. Data sources to assess sensitivity to entrainment into the south Delta from the San Joaquin River and central Delta

- In-Delta distribution of fish
 - Trawls (e.g. Spring Kodiak, FMWT, SFBS, and EDSM) catch
 - Hydraulic footprint
 - EPTM (e.g. transitions between regions)
 - New monitoring required by Conditions of Approval 7.6.1 and 7.6.2 in this ITP
- ii. Data sources to assess sensitivity to entrainment in salvage in the south Delta
- In-Delta distribution of fish
 - Trend analysis (e.g., historical timing)
 - Temperature conditions
 - New monitoring required by Conditions of Approval 7.6.1 and 7.6.2 in this ITP
- iii. Exposure risk assessments (low, medium, high):
- DS or LFS observed in monitoring sites in the lower Sacramento River, northern Delta, lower San Joaquin River and Sacramento-San Joaquin confluence
 - Daily salvage thresholds exceeded, subsequent loss, and associated operations
 - Recruitment informed by available life cycle model
 - Prediction of flows expected to change due to precipitation events.
 - Salvage trends in relation to OMR
 - Future export modifications
 - Environmental surrogates
- iv. Reporting OMR/export risk:¹⁸
- OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: LOW
 - OMR -5,000 cfs: MEDIUM

¹⁸ Categories provided as examples and the associated OMR flows are subject to change based on applicable Conditions of Approval, risk assessments and real-time conditions.

- OMR -6,250 cfs: MEDIUM-HIGH
 - OMR -7,500 cfs: HIGH
 - OMR -9,000 cfs: HIGH
- v. Overall entrainment risk: Combination of the above two risk assessments in iii and iv.

E. Alternative actions, if any

- Operations scenario
- Alternative exposure analysis

8.2. Independent Review Panels. In the event that an independent review panel is convened to review aspects of the Project or AMP, Permittee shall provide drafts of 1) the list of potential panel participants, 2) the panel charges and associated review questions, and 3) the panel report and findings to CDFW for review at least 20 days before they are scheduled to be finalized. Permittee shall incorporate CDFW comments into the final panel selection and panel charge before they are finalized. Permittee shall facilitate CDFW communication with panelists, as requested, to help address CDFW questions on the draft panel report before a final report is completed. Permittee shall work collaboratively with CDFW to address CDFW comments in the final panel report.

8.3. Onset of OMR Management. From the onset of OMR Management (initiated as described in Conditions of Approval 8.3.1, 8.3.2, or 8.3.3) to the end (Condition of Approval 8.8) Permittee shall maintain a 14-day average OMR index that is no more negative than -5,000 cfs, except during OMR Flex operations (see Condition of Approval 8.7) or if a more positive OMR index is required. The OMR index shall be calculated using the equation provided in Hutton (2008).¹⁹ When a more positive OMR index is required by any Condition of Approval of this ITP, except when ending OMR Flex During Excess Conditions (Condition of Approval 8.7), Permittee shall reduce south Delta exports to achieve the new required OMR index within three days of exceeding a threshold or

¹⁹ Hutton, P. 2008. A Model to Estimate Combined Old & Middle River Flows. Metropolitan Water District of Southern California. Final Version April 2008.

acceptance of flow advice (see Conditions of Approval 8.3.1, 8.3.2, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, 8.6.4, 8.7, and 8.8). The new moving average will be calculated beginning no later than the third day moving forward.

8.3.1 Integrated Early Winter Pulse Protection. Between December 1 and January 31 each year Permittee shall reduce south Delta exports for 14 consecutive days to maintain a 14-day average OMR index no more negative than -2,000 cfs, and convene the Smelt Monitoring Team within one day of triggering the following criteria:

- Three day running average daily flows at Freeport greater than, or equal to, 25,000 cfs, AND
- Three day running average of daily turbidity at Freeport is greater than, or equal to, 50 Nephelometric Turbidity Units (NTU), OR
- The Smelt Monitoring Team determines that real-time monitoring of abiotic and biotic factors indicates a high risk of DS migration and dispersal into areas at high risk of future entrainment.

After maintaining a 14-day average OMR index no more negative than -2,000 cfs for 14 days, Permittee shall maintain a 14-day average OMR index no more negative than -5,000 cfs, initiating the OMR Management season, until the OMR Management Season ends (Condition of Approval 8.8).

The Integrated Early Winter Pulse Protection Action may only be initiated once during the December 1 through January 31 time period each year.

8.3.2 Salmonid Presence. After January 1 each year, if Conditions of Approval 8.3.1 or 8.3.3 have not already been triggered, the OMR Management season shall begin when the Salmon Monitoring Team first estimates that 5% of the CHNWR or CHNSR population is in the Delta whichever is sooner. Upon initiation of the OMR Management season, Permittee shall reduce exports to achieve, and shall maintain a 14-day average OMR index no more negative than -5,000 cfs, until the OMR Management season ends (see Condition of Approval 8.8). In the event that a salmon daily or single-year loss threshold is

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exceeded (Conditions of Approval 8.6.1, 8.6.2, 8.6.3, or 8.6.4) prior to the start of OMR Management season the requirements in those Conditions shall control operations.

8.3.3 Adult Longfin Smelt Entrainment Protection. After December 1, if an Integrated Early Winter Pulse Protection (Condition of Approval 8.3.1) has not yet initiated, Permittee shall reduce south Delta exports to maintain a 14-day average OMR index no more negative than -5,000 cfs and initiate OMR Management (Condition of Approval 8.3) if:

- Cumulative combined LFS expanded salvage (total estimated LFS counts at the CVP and SWP salvage facilities beginning December 1 through February 28 exceeds the most recent Fall Midwater Trawl (FMWT) LFS index²⁰ divided by 10, OR
- Real-time monitoring of abiotic and biotic factors indicates a high risk of LFS movement into areas at high risk of future entrainment, as determined by DWR and CDFW Smelt Monitoring Team staff.

When evaluating the possibility of LFS movement into areas that may be subject to an elevated risk of entrainment, the Smelt Monitoring Team shall evaluate catch of LFS with fork length ≥ 60 mm by the Chipps Island Trawl (conducted by USFWS) as an early warning indicator for LFS migration movement into the Delta, in addition to other available survey and abiotic data. The Smelt Monitoring Team shall communicate the results of these risk assessments and advice to the WOMT (Condition of Approval 8.1.3), and operational decisions shall be made as described in Condition of Approval 8.1.4 (Collaborative Approach to Real-time Risk Assessment).

²⁰ The Fall Midwater Trawl (FMWT) Survey annual abundance index for LFS is calculated as the sum of September through December monthly abundance indices and is typically reported at about the same date as adult salvage begins in December. The FMWT Index available beginning on December 1 each year shall be used to establish this threshold.

8.4 Longfin Smelt Entrainment Protections.

8.4.1 OMR Management for Adult Longfin Smelt. From the onset of OMR Management (Condition of Approval 8.3) through February 28, the Smelt Monitoring Team shall conduct weekly, or more often as needed, risk assessments (see Condition of Approval 8.1.5.2) and decide whether to recommend an OMR flow requirement between -5,000 cfs and -1,250 cfs to minimize entrainment and take of adult LFS. The Smelt Monitoring Team may provide advice to restrict south Delta exports for seven consecutive days to achieve a seven-day average OMR index within three risk categories:

- Low risk: OMR between -4,000 cfs to -5,000 cfs
- Medium risk: OMR between -2,500 cfs to -4,000 cfs
- High risk: OMR between -1,250 cfs to -2,500 cfs

If a risk assessment conducted by the Smelt Monitoring Team determines that a more restrictive OMR flow requirement is needed to minimize take of adult LFS, the Smelt Monitoring Team shall provide its advice to WOMT (Condition of Approval 8.1.3) and operational decisions shall be made following the process described in Condition of Approval 8.1.4 (Collaborative Approach to Real-time Risk Assessment).

This Condition will terminate when a high-flow off-ramp occurs (Condition of Approval 8.4.3), or when LFS spawning has been detected in the system, as determined by the Smelt Monitoring Team, or, if there is disagreement and resolution is not reached within WOMT, as determined by CDFW. The Smelt Monitoring Team shall consider results from Additional LFS Larval Sampling (Condition of Approval 7.6.1) to inform its assessment of the start of LFS spawning. After LFS spawning has been observed, Permittee shall implement Condition of Approval 8.4.2 to minimize take of larval and juvenile LFS.

8.4.2 Larval and Juvenile Longfin Smelt Entrainment Protection. From January 1 through June 30, when a single Smelt Larva Survey (SLS) or 20 mm Survey (20 mm) sampling period exceeds one of the following thresholds:

- LFS larvae or juveniles found in four or more of the 12 SLS or 20 mm stations in the

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central Delta and south Delta (Stations 809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918, 919), or

- LFS catch per tow exceeds five LFS larvae or juveniles in two or more of the 12 stations in the central Delta and south Delta (Stations 809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918, 919).

Permittee shall restrict south Delta exports for seven consecutive days to maintain a seven-day average OMR index no more negative than -5,000 cfs. Permittee shall also immediately convene the Smelt Monitoring Team to conduct a risk assessment (see Condition of Approval 8.5.1.2) to assess the risk of larval and juvenile LFS entrainment into the South Delta Export Facilities, determine if an OMR flow restriction is warranted, and recommend an OMR flow limit between -1,250 and -5,000 cfs. The Smelt Monitoring Team risk assessment and operational advice shall be reviewed by the WOMT (Condition of Approval 8.1.3) via the Collaborative Real-time Decision-making process (Condition of Approval 8.1.4). Permittee shall operate to the export restriction and OMR flow target approved through Conditions of Approval 8.1.3 and 8.1.4. Each week the Smelt Monitoring Team shall convene to conduct a new risk assessment and determine whether to maintain, or off ramp from, export restrictions based on the risk to LFS, or until the DS and LFS off-ramp has been met as described in Condition of Approval 8.8 (End of OMR Management).

From January 1 through June 30, DWR and CDFW Smelt Monitoring Team staff shall conduct weekly, or more often as needed, risk assessments (see Condition of Approval 8.5.1.2) to assess the risk of larval and juvenile LFS entrainment into the South Delta Export Facilities. As a part of the risk assessment the Smelt Monitoring Team shall provide advice on the appropriate OMR flow targets to minimize LFS entrainment or entrainment risk, or both. The Smelt Monitoring Team shall provide its advice to WOMT (Condition of Approval 8.1.3) and use the Collaborative Approach to Real-time Risk Assessment process described in Condition of Approval 8.1.4 to determine if an OMR flow restriction is warranted and determine OMR flow limit between -1,250 and -5,000 cfs. The OMR flow limit shall be in place until the next risk assessment conducted by the Smelt Monitoring Team determines that it is no longer necessary to minimize take or

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related impacts to LFS, or until the DS and LFS off-ramp has been met as described in Condition of Approval 8.8 (End of OMR Management).

8.4.3 High Flow Off-Ramp from Longfin Smelt OMR Restrictions. OMR management for adult, juvenile, or larval LFS as described in Conditions of Approval 8.4.1 and 8.4.2 are not required, or would cease if previously required, when river flows are (a) greater than 55,000 cfs in the Sacramento River at Rio Vista or (b) greater than 8,000 cfs in the San Joaquin River at Vernalis. If flows subsequently drop below 40,000 cfs in the Sacramento River at Rio Vista or below 5,000 cfs in the San Joaquin River at Vernalis, the OMR limit previously required as a part of Conditions of Approval 8.4.1 and 8.4.2 shall resume.

8.5 Delta Smelt Entrainment Protections.

8.5.1 Turbidity Bridge Avoidance. The purpose of this Condition is to minimize the risk of entrainment of adult DS in the corridors of the Old and Middle rivers into the south Delta export facilities. This Condition is intended to avoid the formation of a turbidity bridge from the San Joaquin River shipping channel to the south Delta export facilities, which historically has been associated with elevated salvage of pre-spawning adult DS.

After the Integrated Early Winter Pulse Protection (Condition of Approval 8.1.3) or February 1 (whichever comes first), until April 1, Permittee shall manage exports to maintain daily average turbidity in Old River at Bacon Island (OBI) at a level of less than 12 NTU. If the daily average turbidity at OBI is greater than 12 NTU, Permittee shall restrict south Delta exports to achieve an OMR flow that is no more negative than -2,000 cfs until the daily average turbidity at OBI is less than 12 NTU.

If, after five consecutive days of OMR flow that is less negative than -2,000 cfs, the daily average turbidity at OBI is not less than 12 NTU the Smelt Monitoring Team may convene to assess the risk of entrainment of DS (Condition of Approval 8.1.5.2). The Smelt Monitoring Team may provide advice to WOMT regarding changes in operations that could be conducted to minimize the risk of entrainment of DS (Condition of Approval 8.1.3). The Smelt Monitoring Team may also determine that OMR restrictions

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to manage turbidity are infeasible and may instead provide advice for a different OMR flow target that is between -2,000 and -5,000 cfs and is protective based on turbidity and adult DS distribution and salvage to the WOMT for consideration (Condition of Approval 8.1.3). Operational decisions shall be made following the process described in Condition of Approval 8.1.4 (Collaborative Real Time Risk Assessment).

Turbidity readings at individual sensors can generate spurious results in real time. Spurious results could be incorrectly interpreted as a turbidity bridge, when in fact the cause is a result of local conditions or sensor error. To assess whether turbidity readings at OBI are attributable to a sensor error or a localized turbidity spike, Permittee, in coordination with Reclamation, may consider and review data from other nearby locations and sources. Additional information that will be reviewed include regional visualizations of turbidity, alternative sensors, and boat-based turbidity mapping, particularly if there was evidence of a local sensor error. Permittee may bring data from these additional sources to the Smelt Monitoring Team for consideration during the development of a risk assessment to be provided to the WOMT for evaluation (Condition of Approval 8.1.3).

Permittee shall use the decision-making process described Condition of Approval 8.1.4 (Collaborative Real-time Risk Assessment) to determine if south Delta exports may increase after five-days of OMR no more negative than -2,000 cfs, or to determine that this action is not warranted due to a sensor error or localized turbidity event. Permittee shall implement this action until CDFW is in agreement that the action may be ended or modified.

8.5.2 Larval and Juvenile Delta Smelt Protection. If the five-day cumulative salvage of juvenile DS at the CVP and SWP facilities is greater than or equal to one plus the average prior three years' FMWT index (rounded down), Permittee shall restrict south Delta exports for seven consecutive days to maintain a seven-day average OMR index no more negative than -5,000 cfs. Additionally, if the five-day cumulative salvage threshold is met or exceeded, Permittee shall immediately convene the Smelt Monitoring Team to conduct a risk assessment (Condition of Approval 8.1.5.2) and determine the future risk of entrainment and take of larval and juvenile DS. The Smelt Monitoring Team may provide

advice to further restrict south Delta exports to maintain a more positive OMR than -5,000 cfs. The Smelt Monitoring Team may provide advice for further restrictions within three risk categories:

- Low risk: Limit OMR between -4,000 cfs to -5,000 cfs
- Medium risk: Limit OMR between -2,500 cfs to -4,000 cfs
- High risk: Limit OMR between -1,250 cfs to -2,500 cfs

The duration and magnitude of operational advice shall be provided to the WOMT (Condition of Approval 8.1.3) and decisions shall be made following the process described in Condition of Approval 8.1.4 (Collaborative Real Time Risk Assessment). When conducting risk assessments to evaluate the risk of entrainment and take of juvenile DS the Smelt Monitoring Team shall evaluate the following information sources, in addition to any other models or surveys they deem appropriate and those listed in Condition of Approval 8.1.5.2:

- Results from a CDFW approved DS life cycle model.
- DS recruitment levels identified by the Smelt Monitoring Team using the CDFW-approved life cycle model that links environmental conditions to recruitment, including factors related to loss as a result of entrainment such as OMR flows. In this context, recruitment is defined as the estimated number of post-larval DS in June per number of spawning adults in the prior February-March period.
- Hydrodynamic models and forecasts of entrainment informed by the EDSM or other relevant survey data to estimate the percentage of larval and juvenile DS that could be entrained.

If expanded salvage at the CVP and SWP facilities of juvenile DS exceeds 11 within a three-day period under this condition, Permittee shall restrict south Delta exports for seven consecutive days to maintain a seven-day average OMR index no more negative than -3,500 cfs. If juvenile DS continue to be salvaged at the CVP and SWP facilities during the seven days of OMR restrictions, then Permittee shall continue restrictions and request a risk assessment by the Smelt Monitoring Team to determine if additional advice and subsequent restrictions are warranted and provide advice to WOMT (see Condition of

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Approval 8.1.3) and follow the decision-making process described in Condition of Approval 8.1.4.

8.6 Salmonid Entrainment Loss Protections.

8.6.1 Winter-run Single-year Loss Threshold. In each year, Permittee shall, in coordination with Reclamation, operate the Project to avoid exceeding the following single-year loss thresholds:

- Natural CHNWR (loss = 1.17% of JPE)
- Hatchery CHNWR (loss = 0.12% of JPE)

The loss threshold and loss tracking for hatchery CHNWR does not include releases into Battle Creek.

Loss of CHNWR at the at the CVP and SWP salvage facilities shall be calculated based on length-at-date criteria.

Annual loss of natural and hatchery CHNWR at the CVP and SWP salvage facilities shall be counted cumulatively beginning November 1 each calendar year through June 30 the following calendar year.

CHNWR shall be identified based on the Delta Model length-at-date criteria. Loss shall be calculated for the South Delta Export Facilities using the 2018 CDFW loss equation (Attachment 6).

During the water year, if cumulative loss of natural or hatchery CHNWR exceeds 50% of the annual loss threshold, Permittee shall restrict south Delta exports to maintain a 14-day average OMR index no more negative than -3,500 cfs through the end of OMR Management (see Condition of Approval 8.8). After 14 days of operations to maintain an OMR index no more negative than -3,500 cfs Permittee may convene the Salmon Monitoring Team to conduct a risk assessment (Condition of Approval 8.1.5.1) and determine whether the risk of entrainment and loss of natural and hatchery CHNWR is no longer present. Risks shall be measured against the potential to exceed the next single-year loss threshold. The results of this risk assessment and associated OMR

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advice shall be provided to WOMT according to Condition of Approval 8.1.3 and the decision-making process shall follow the process described in Condition of Approval 8.1.4.

The -3,500 cfs OMR flow operational criteria, adjusted and informed by this risk assessment, shall remain in effect until the end of OMR Management (Condition of Approval 8.8).

During the water year, if cumulative loss of natural or hatchery CHNWR at the at the CVP and SWP salvage facilities exceeds 75% of the single-year loss threshold, Permittee shall restrict OMR to a 14-day moving average OMR flow index that is no more negative than -2,500 cfs through the end of OMR Management (Condition of Approval 8.7). After 14 days Permittee may convene the Salmon Monitoring Team to conduct a risk assessment (Condition of Approval 8.1.5.1) and determine whether the risk of entrainment and take of natural and hatchery CHNWR is no longer present. The results of this risk assessment and associated OMR advice shall be provided to WOMT according to Condition of Approval 8.1.3 and the decision-making process shall follow the process described in Condition of Approval 8.1.4.

The -2,500 cfs OMR flow operational criteria adjusted and informed by this risk assessment shall remain in effect until the end of OMR Management (Condition of Approval 8.8).

During the water year, if natural or hatchery CHNWR cumulative loss at the at the CVP and SWP salvage facilities exceeds the single-year loss threshold, Permittee shall immediately convene the Salmon Monitoring Team to review recent fish distribution information and operations and provide advice regarding future planned Project operations to minimize subsequent loss during that year. The Salmon Monitoring Team shall report the results of this review and advice to the WOMT (see Condition of Approval 8.1.3). Operational decisions shall be made following the process described in Condition of Approval 8.1.4 (Collaborative Real Time Risk Assessment).

If the single-year loss threshold is exceeded, Permittee and Reclamation shall also convene an independent panel to review Project operations and the single-year loss threshold prior to November 1, as described in Condition of Approval 8.2. The purpose

of the independent panel is to review the actions and decisions contributing to the loss trajectory that lead to an exceedance of the single-year loss threshold, and make recommendations on modifications to Project implementation, or additional actions to be conducted to stay within the single-year loss threshold in subsequent years.

Permittee shall, in coordination with Reclamation, continue monitoring and reporting salvage at the at the CVP and SWP salvage facilities. Permittee and Reclamation shall continue the release and monitoring of yearling Coleman National Fish Hatchery (NFH) late fall-run and yearling CHNSR surrogates. The Salmon Monitoring Team shall use reported real-time salvage counts along with qualitative and quantitative tools to inform risk assessments (see Condition of Approval 8.1.5.1).

8.6.2 Early-season Natural Winter-run Chinook Salmon Discrete Daily Loss Threshold. To minimize entrainment, salvage, and take of early-migrating natural CHNWR Permittee shall restrict south Delta exports for five consecutive days to achieve a five-day average OMR index no more negative than -5,000 cfs when daily loss of older juveniles (natural older juvenile Chinook salmon²¹ and yearling CHNSR used as a surrogate for CHNWR) at the SWP and CVP salvage facilities exceeds the following thresholds:

- From November 1 – November 30: 6 older juvenile Chinook salmon
- From December 1 – December 31: 26 older juvenile Chinook salmon

All natural older juvenile Chinook salmon juveniles shall be identified based on the Delta Model length-at-date criteria. Loss shall be calculated for the South Delta Export Facilities using the equation provided in CDFW 2018 (Attachment 6). This Condition of Approval may be modified through the process described in Condition of Approval 8.6.6 and an amendment to this ITP.

²¹ Older juvenile Chinook salmon is defined as any Chinook salmon that is above the minimum length for CHNWR, according to the Delta Model length-at-date criteria used to assign individuals to race.

8.6.3 Mid- and Late-season Natural Winter-run Chinook Salmon Daily Loss Threshold. To minimize entrainment, salvage, and take of natural CHNWR during the peak and end of their migration through the Delta. Permittee shall restrict south Delta exports for five days to achieve a five-day average OMR index no more negative than -3,500 cfs when daily loss of natural older juveniles at the SWP and CVP salvage facilities exceeds the following thresholds based on the JPE reported in January of the same calendar year:

- January 1 – January 31: 0.00635 % of the CHNWR JPE
- February 1 – February 28: 0.00991 % of the CHNWR JPE
- March 1 – March 31: 0.0146 % of the CHNWR JPE
- April 1 – April 30: 0.00507 % of the CHNWR JPE
- May 1 – May 31: 0.0077 % of the CHNWR JPE

All natural older juvenile Chinook salmon juveniles shall be identified based on the Delta Model length-at-date criteria. Loss shall be calculated for the South Delta Export Facilities using the equation provided in CDFW 2018 (Attachment 6). This Condition of Approval may be modified through the process described in Condition of Approval 8.6.6 and an amendment to this ITP.

8.6.4 Daily Spring-run Chinook Salmon Hatchery Surrogate Loss Threshold. To minimize entrainment of emigrating natural juvenile CHNSR from the Sacramento River and tributaries, including the Feather and Yuba rivers into the channels of the central Delta, south Delta, CCF, and the Banks Pumping Plant, Permittee shall restrict exports based on the presence of hatchery produced CHNSR surrogate groups at the CVP and SWP salvage facilities. CHNSR surrogate groups shall consist of all in-river fall- and spring-run surrogate release groups of Chinook salmon from the Coleman National Fish Hatchery, Feather River Hatchery, and the Nimbus Fish Hatchery.

Each water year between February 1 and June 30 Permittee shall reduce south Delta exports for five consecutive days to achieve a five-day average OMR index no more negative than -3,500 cfs when:

- Feather River Hatchery coded wire tagged (CWT) CHNSR surrogates (includes both spring- and fall-run hatchery release groups) cumulative loss at the at the CVP and SWP salvage facilities is greater than 0.25% for each release group; OR
- Coleman National Fish Hatchery and Nimbus Fish Hatchery CWT fall-run release groups cumulative loss at the at the CVP and SWP salvage facilities is greater than 0.25% of the total in-river releases for each release group.

This Condition of Approval may be modified through the process described in Condition of Approval 8.6.6 and an amendment to this ITP.

8.6.5 Funding for Spring-run Hatchery Surrogates. Permittee shall provide at least \$72,000 one-time start-up costs per hatchery and \$150,000 of additional funding each year for each hatchery to CDFW to support the following hatchery surrogate release group protocol to enable implementation of Condition of Approval 8.6.4:

- 100% CWT for each hatchery in-river surrogate release group
- Unique CWT for each hatchery in-river surrogate release group to allow differentiation among groups at the salvage facilities
- At least two hatchery in-river surrogate release groups per hatchery, per year

Permittee shall provide sufficient funding to ensure that all hatchery surrogate release groups can be produced in addition to annual production releases.

Locations and times of year for in-river surrogate releases shall be developed to best represent natural juvenile CHNSR migration into the Sacramento River and Delta. Permittee shall provide technical support and guidance to CDFW, as needed, to inform CDFW's development of its annual plan for in-river surrogate releases. CDFW's annual planning includes specifying the number of fish included in each release group, and the timing and the locations of in-river releases.

8.6.6 Evaluate Proactive Salmon Entrainment Minimization During Real-time Operations. When a new Chinook salmon entrainment model is developed and approved by CDFW as required by Condition of Approval 7.5.3, it shall be evaluated during real-time operations for two water years by the Salmon Monitoring Team (Condition of Approval 8.1.2) as a part of their weekly risk assessments (Condition of Approval 8.5.1.1).

If Permittee and CDFW agree that the new entrainment model provides a more proactive approach to minimizing CHNWR entrainment and loss, while providing the same level of protection as Conditions of Approval 8.6.2 and 8.6.3, Permittee may request an amendment to the ITP to modify or replace Conditions of Approval 8.6.2 and 8.6.3 with salmon entrainment thresholds based on the entrainment model.

When a CHNSR JPE is approved by CDFW and implemented (see Condition of Approval 7.5.2), Permittee and CDFW staff shall work with the Spring-run JPE Team to evaluate minimization provided by Condition of Approval 8.6.4. Permittee may request an amendment to the ITP to modify or replace Conditions of Approval 8.6.4 and 8.6.5 with CHNSR entrainment minimization measures that incorporate new information gleaned from the new monitoring and CHNSR JPE.

8.7 OMR Flexibility During Delta Excess Conditions. Permittee may increase exports to capture peak flows in the Delta during storm-related events (hereafter OMR flex) when:

- The Delta is in excess conditions,²² AND
- QWEST is greater than 0, AND
- A measurable precipitation event has occurred in the Central Valley, AND
- Permittee, in coordination with Reclamation, determines that the Delta outflow index indicates a higher level of outflow available for diversion due to peak storm flows, AND
- None of the following Conditions of Approval are controlling Project operations: 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, and 8.6.4, AND
- Risk assessments conducted by the Salmon and Smelt Monitoring Teams (Conditions of Approval 8.1.5.1 and 8.1.5.2) indicate that an OMR more negative than -5,000 cfs is not likely to trigger an additional real-time OMR restriction (Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3,

²² Water is available for export in excess of the flow required to meet D-1641 flow and salinity requirements as well as other applicable regulations.

and 8.6.4), AND

- Cumulative salvage at the CVP and SWP facilities of yearling Coleman NFH late fall-run Chinook salmon (as yearling CHNSR surrogates) is less than 0.5% within any of the release groups, AND
- Risk assessments conducted by the Salmon and Smelt Monitoring Teams determines that no changes in spawning, rearing, foraging, sheltering, or migration behavior as a result of OMR Flex operations beyond those anticipated to occur through operations described in Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, and 8.6.4 are likely to occur.

If none of the restrictions listed above apply, Permittee may increase south Delta exports but shall manage Project operations to achieve a five-day average OMR index no more negative than -6,250 cfs. The decision to operate under this Condition of Approval shall be made following the process described in Condition of Approval 8.1.4 (Collaborative Real Time Risk Assessment), and SWP OMR flex is subject to approval by CDFW.

If, during OMR flex operations, any of the following conditions occurs, Permittee shall reduce south Delta exports to achieve a 14-day average OMR index no more negative than -5,000 cfs, unless a further reduction in exports is required by another Condition of Approval. The more positive OMR index shall be achieved within 48 hours of the occurrence of the condition, and the 14-day moving average shall apply from that point forward.

- Risk assessments conducted by the Salmon and Smelt Monitoring Teams (Conditions of Approval 8.1.5.1 and 8.5.1.2) indicate that an OMR more negative than -5,000 cfs is likely to trigger an additional real-time OMR restriction (Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, and 8.6.4), OR
- Cumulative salvage at the CVP and SWP facilities of yearling Coleman NFH late fall-run Chinook salmon (as yearling CHNSR surrogates) exceeds 0.5% within any of the release groups, OR
- A risk assessment conducted by the Salmon or Smelt Monitoring Teams identifies

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changes in spawning, rearing, foraging, sheltering, or migration behavior as a result of OMR Flex operations beyond those anticipated to occur through operations described in Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, and 8.6.4, OR

- Operational restrictions described in Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, 8.6.4, and 8.17 are required.

8.8 End of OMR Management. Permittee shall operate the Project to meet the requirements included in Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, and 8.6.4 to ensure that entrainment and take of Covered Species is minimized during the OMR Management season through June 30, or until the following species-specific off-ramps occur:

- LFS and DS: Daily mean water temperature at CCF is greater than 25°C for three consecutive days.
- CHNWR and CHNSR:
 - More than 95% of CHNWR and CHNSR have migrated past Chipps Island as determined by the Salmon Monitoring Team, AND
 - Daily average water temperature at Mossdale exceeds 22.2°C for 7 non-consecutive days in June, AND
 - Daily average water temperature at Prisoner's Point exceeds 22.2°C for 7 non-consecutive days in June.

8.9 Minimization of CHNWR and CHNSR Migration into the Central and South Delta.

8.9.1 Construct and Operate a Salmonid Migratory Barrier at Georgiana Slough. A salmonid migratory barrier at Georgiana Slough is expected to provide a higher probability of survival for emigrating juvenile CHNWR and CHNSR that encounter the Sacramento River-Georgiana Slough junction and reduce entrainment of emigrating CHNWR and CHNSR into the central and south Delta. Permittee shall construct and operate a salmonid migratory barrier at Georgiana Slough within three years of the effective date of this ITP. This timeline shall be subject to Permittee attaining required state and federal

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permits. If permits are not obtained within 2.5 years after the effective date of this ITP, Permittee shall confer with CDFW to determine a timeline for permit acquisition and construction of the migratory barrier.

Permittee shall develop a Georgiana Slough Migratory Barrier Operations Plan and associated operating criteria in collaboration with CDFW, USFWS and NMFS to maximize benefits to migrating CHNWR and CHNSR. Permittee shall prepare a draft Georgiana Slough Migratory Barrier Operations Plan and submit it to CDFW, USFWS, and NMFS at least 120 days before beginning construction and deployment of the barrier. Operation of the Georgiana Slough Migratory Barrier shall not commence until the final Georgiana Slough Migratory Barrier Operations Plan and associated criteria are approved in writing by CDFW.

Permittee as part of the AMP shall continue pilot investigations to refine the understanding of barrier efficiency and benefits to Covered Species in coordination with CDFW, NMFS and USFWS. This ITP does not provide take authorization for construction of the migratory barrier at Georgiana Slough. Permittee shall submit a separate 2081(b) application for incidental take authorization associated with construction of the barrier.

8.9.2 Evaluate Benefits of Salmonid Guidance Structures at Sutter and Steamboat Sloughs. Fish guidance structures near the junction between the Sacramento River and Sutter and Steamboat sloughs are expected to provide a higher probability of survival for emigrating juvenile CHNWR and CHNSR by increasing the proportion of juveniles that enter Sutter and Steamboat sloughs and minimizing the proportion of juveniles that migrate into the central and south Delta.

Within two years of the effective date of this ITP, Permittee as part of the AMP shall use SDM, in collaboration with CDFW, NMFS, and USFWS, to evaluate a range of potential approaches to designing and operating fish guidance structures near Sutter and Steamboat sloughs. Permittee shall submit a draft report documenting the results of the SDM process and associated implementation recommendations to CDFW, NMFS, and USFWS within three years of the effective date of this ITP.

8.10 SWP Proportional Share. Due to the historically coordinated operations of the SWP and CVP, joint operational criteria related to OMR flows and export restrictions have been developed for SWP and CVP that assume coordinated implementation by Permittee and Reclamation. Conditions of Approval 8.3.1, 8.3.2, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, 8.6.4, 8.7, 8.8, and 8.17 set out such operational criteria that assume coordination by Permittee and Reclamation to meet the criteria and that are subject to the process set out in this condition.

During the term of this ITP there may be instances when operational requirements stated in or determined by these Conditions of Approval are different from operational requirements of the applicable ESA authorizations, which govern operations at the CVP as well as the SWP. If an operational restriction required by this ITP, pursuant to one or more of the Conditions of Approval listed above, is more restrictive than the then-controlling operations required by the applicable ESA authorizations, Permittee shall take the following steps to meet its proportional share of the operational criteria stated or determined by the Condition of Approval(s) at issue:

- 1) Permittee is legally bound, both statutorily and through agreements with the Bureau of Reclamation, not to utilize State facilities (including the CCF, Banks Pumping Plant, the California Aqueduct, and the SWP share of San Luis Reservoir) or allow third parties (including the CVP) to use State facilities in a manner that would result in a violation of law, including the operational criteria stated in or determined by Conditions of Approval 8.3.1, 8.3.2, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, 8.6.4, 8.7, 8.8, and 8.17 of this ITP.
- 2) If prohibiting the use of state facilities for CVP purposes will not result in conditions that meet the operational criteria stated in or determined by the Condition of Approval at issue, Permittee shall provide CDFW with a written estimate of the total allowed exports at both the SWP and CVP facilities that would be required to meet the operational criteria stated in or determined by the Condition of Approval at issue.

- 3) Under Excess Conditions: Based on the written estimate prepared under paragraph 2 of this condition, Permittee shall reduce exports at the Banks Pumping Plant to 40% of the estimated total allowed exports that would be allowed if both the SWP and CVP were operating to meet the requirement stated in or determined by the Condition of Approval at issue.

Under Balanced Conditions: Based on the written estimate prepared under paragraph 2 of this condition, Permittee shall reduce exports at the Banks Pumping Plant to 35% of the estimated total allowed exports that would be allowed if both the SWP and CVP were operating to meet the requirement stated in or determined by the Condition of Approval at issue.

Excess and Balanced Conditions are defined in Section 1.4 of the Project Description. The SWP shares of allowable exports in Step 3 above are defined based on the SWP share of exports during excess and balanced conditions described in the 2018 COA Addendum.²³ This condition in combination with other Conditions of Approval required by this ITP are intended to further satisfy Permittee's obligations pursuant to CESA. If the COA is revised after the effective date of this ITP, Permittee shall notify CDFW per Condition of Approval 5.

Permittee shall not be required to reduce exports below 600 cfs, the minimum required to health and safety standards.

8.11 Ongoing comparison of OMR Index to Tidally Filtered OMR. The United States Geological Survey (USGS) Tidally Filtered Method to calculate OMR flow is defined in the NMFS 2009 BiOp and uses values reported by the USGS for the Old River at Bacon Island and Middle River at Middle River monitoring stations. Permittee shall continue to calculate and report OMR as estimated using the USGS Tidally Filtered Method in all risk

²³ Addendum to the Agreement Between the United States of America and the Department of Water Resources of the State of California for Coordinated Operation of the Central Valley Project and the State Water Project. Signed December 13, 2018.

analyses conducted as a part of the Smelt and Salmon Monitoring Teams and reported to the WOMT, in addition to OMR flows as calculated using the OMR Index. Permittee shall provide raw data for the daily OMR Index and USGS Tidally Filtered OMR and a report comparing the estimates over the prior water year annually as a part of the ASR (Condition of Approval 7.2).

8.12 Barker Slough Pumping Plant Longfin and Delta Smelt Protection. Permittee shall operate the BSPP to protect larval LFS from January 15 through March 31 of dry and critical water years. Permittee shall operate to protect larval DS from March 1 through June 30 of dry and critical years. If the water year type changes after January 1 to below normal, above normal or wet, this action will be suspended. If the water year type changes after January to dry or critical, Permittee shall operate according to this Condition of Approval.

From January 15 through March 31 of dry and critical water years, Permittee shall reduce the maximum seven-day average diversion rate at BSPP to less than 60 cfs when larval LFS are detected at Station 716. In addition, in its weekly meetings from January 15 through March 31, the Smelt Monitoring Team shall review LFS abundance and distribution survey data and other pertinent abiotic and biotic factors that influence the entrainment risk of larval LFS at the BSPP. When recommended by the Smelt Monitoring Team, and as approved through the decision-making processes described in Conditions of Approval 8.1.3 and 8.1.4, Permittee shall reduce the maximum seven-day average diversion rate at BSPP according to the advice provided by the Smelt Monitoring Team.

From March 1 through June 30 of dry and critical water years, Permittee shall reduce the maximum seven-day average diversion rate at BSPP to less than 60 cfs when larval DS are detected at Station 716. In addition, in its weekly meetings from March 1 through June 30, the Smelt Monitoring Team shall review DS abundance and distribution survey data and other pertinent abiotic and biotic factors that influence the entrainment risk of larval DS at the BSPP (including temperature and turbidity). When recommended by the Smelt Monitoring Team, and as approved through the decision-making processes

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described in Conditions of Approval 8.1.3 and 8.1.4, Permittee shall reduce the maximum seven-day average diversion rate at BSPP to less than 60 cfs.

The DS requirements described in this condition may be adjusted to align with USFWS requirements to minimize take of DS through an amendment to this ITP.

8.13 Water Year Type Definition. All references to water year type in this ITP shall be defined based on the Sacramento Valley Index unless otherwise noted.

8.14 Clifton Court Forebay Aquatic Weed Control Practices. Permittee may apply Aquathol K and copper-based aquatic pesticides, as needed, from June 28 to August 31.

Permittee may apply Aquathol K and copper-based aquatic pesticides, if necessary, prior to June 28 or after August 31 if the average daily water temperature within the CCF is greater than or equal to 25°C, and if DS, LFS, CHNWR and CHNSR are not at additional risk from the treatment, as confirmed by CDFW, NMFS and USFWS. Before applying aquatic pesticides outside of the June 28 to August 31 time frame, Permittee shall notify and confer with CDFW, NMFS and USFWS to determine whether ESA- or CESA-listed fish species are present and at risk from the proposed treatment.

Permittee may apply Aquathol K and copper-based aquatic pesticides, outside of the June 28 to August 31 timeframe and when the average daily water temperature in the CCF is below 25°C only as approved by CDFW and subject to the following conditions. Permittee shall:

- Close the CCF radial gates for 24 hours after Aquathol K application is completed, unless CDFW determines that rapid dilution of the herbicide would be beneficial to reduce the exposure duration to Covered Species present within the CCF.
- Monitor the salvage of Covered Species at the Skinner Fish Facility prior to the application of the aquatic herbicides and algaecides in the CCF. If salvage of Covered Species occurs Permittee shall confer with CDFW prior to initiating aquatic weed control.
- Close the radial intake gates at the entrance to the CCF for at least 24 hours prior to the application of Aquathol K and copper compounds pesticides to allow fish to move

out of the targeted treatment areas and toward the salvage facility and to minimize the possibility of aquatic pesticide diffusing into the Delta.

- Close the radial gates for a minimum of 12 and up to 24 hours after treatment with Aquathol K and copper compounds to allow for the recommended duration of contact time between the aquatic pesticide and the treated vegetation or cyanobacteria in CCF, and to reduce residual endothall concentration for drinking water compliance purposes. Permittee shall not open radial gates until a minimum of 36 hours (24 hours pre-treatment closure plus 12 hours post-treatment closure).
- Close the radial gates prior to the application of peroxide-based algaecides to minimize the possibility of the algaecide diffusing into the Delta. Permittee may reopen the radial gates immediately after treatment with peroxide-based algaecides.
- Ensure that aquatic herbicides are applied by a licensed applicator under the supervision of a California Certified Pest Control Advisor.
- Apply aquatic herbicides and algaecides by boat or by aircraft.
- Apply aquatic herbicides by boat using a subsurface injection system for liquid formulations and a boat-mounted hopper dispensing system for granular formulations. Applications shall start at the shoreline and move systematically farther offshore, enabling fish to move out of the treatment area.
- Use helicopter or aircraft for aerial application of aquatic herbicides during times when wind speeds are less than 15 mph to prevent spray drift.
- Restrict application to the smallest area possible (no more than 50% of the CCF at one time) that provides relief to SWP operations or water quality.
- Collect water quality samples to monitor copper and endothall concentrations within or adjacent to the treatment area, per NPDES permit requirements, before, during and after application. Additional water quality samples may be collected during the following treatment for drinking water compliance purposes.
- Measure dissolved oxygen concentration prior to and immediately following application within and adjacent to the treatment zone.

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8.15 Skinner Fish Salvage Facility CDFW Staff. To support implementation of Conditions of Approval 7.4, 7.4.1, 7.4.2 and 7.4.3 Permittee shall fully fund two existing Environmental Scientist and one new Senior Environmental Scientist Specialist CDFW staff positions to work collaboratively with DWR Skinner Fish Salvage Facility staff starting on July 1 in the same year this ITP becomes effective. Permittee shall work collaboratively with these CDFW staff to ensure that they have the access and information needed to perform their duties and discuss roles and responsibilities relative to existing DWR facility staff. CDFW staff duties will include, but not be limited to, the following:

- Receive daily salvage data from the SWP and CVP fish salvage facilities,
- Conduct salvage data QA/QC,
- Train salvage facility staff,
- Monitor salvage facility operations,
- Work collaboratively with DWR staff to develop a revised Skinner Fish Facility Operations Manual v 2.0 October 19, 2005 (see Condition of Approval 7.4.2),
- Review annual salvage reports,
- Receive notifications regarding inspections or maintenance of fish protective equipment,
- Work collaboratively with Permittee to develop a new protocol which describes the decision-making process prior to reducing sampling times,
- Engage in real-time decision making to determine whether reduce count times are needed and measures to ensure adequate detection of Covered Species during reducing count times, and
- Conduct special studies to refine estimates of entrainment, expanded salvage, and loss (see Condition of Approval 7.4.3)

Permittee shall provide reasonable access to the Skinner Fish Salvage Facility for the three CDFW staff identified in this Condition of Approval.

8.16 Relationship Between the Adaptive Management Program and This ITP. The Adaptive Management Program (Attachment 2, AMP) shall be used to consider and address scientific uncertainty regarding the Bay-Delta ecosystem, Covered Species ecology, and to inform the understanding of minimization of take and impacts of the taking

associated with the operational criteria in this ITP. The AMP may result in recommendations regarding operational components described in Conditions of Approval in this ITP, and consequently Permittee may request amendment of this ITP based on new information developed through new science and monitoring (Condition of Approval 5) and according to the amendment standards and processes identified in CESA's implementing regulations. The AMP shall be used to build scientific understanding of Covered Species and evaluate potential changes in the operational criteria in this ITP. The AMP (Attachment 2) describes this structure and steps associated with adaptive management in more detail.

The AMP does not govern real-time operations. Recommendations of the AMP shall not commit Permittee or CDFW to a definite course of action related to ITP amendments. The AMP shall not modify CDFW's discretionary decision-making as set out in the Conditions of Approval, CESA, or CESA's implementing regulations.

Condition of Approval 5 describes circumstances when CDFW anticipates that Permittee may request an amendment to this ITP in the future, including amendments that may be requested in response to recommendations from the AMP.

8.17 Export Curtailments for Spring Outflow. As described in Sections 1.5 and 3.17 of the Project description, as part of the Voluntary Agreement process, Permittee and its SWP Contractors have proposed a reduction in SWP exports to protect outflows in the spring time period. Each year, following the finalization of the March forecast, Permittee will confer with CDFW regarding export reductions from April 1 to May 31. If in any year during the term of this ITP, Permittee and its SWP Contractors identify in a written operations plan, submitted to CDFW following the March forecast, and throughout April and May conduct SWP export reductions pursuant to the Voluntary Agreements that are consistent with the SWP export reductions required by this Condition, then the Voluntary Agreement implementation may satisfy the reductions required to meet this Condition.

The following shall be implemented by Permittee during any year in which SWP export reductions pursuant to the Voluntary Agreements are not identified and conducted as

described in the preceding paragraph. Permittee shall operate the Project during the spring each year to restrict exports and enhance Delta outflow.

Permittee shall reduce exports from April 1 to May 31 each year to achieve the SWP proportional share (Condition of Approval 8.10) of export reductions established by the ratio of Vernalis flow (cfs) to combined CVP and SWP exports, scaled by water year type, to provide incidental spring outflow. In a critically dry year, the ratio of Vernalis flow to CVP and SWP combined exports shall be 1 to 1. In a dry year, the ratio of Vernalis flow to CVP and SWP combined exports shall be 2 to 1. In a below normal year, the ratio of Vernalis flow to CVP and SWP combined exports shall be 3 to 1. In an above normal or wet year, the ratio of Vernalis flow to CVP and SWP combined exports shall be 4 to 1²⁴. In wet years SWP export curtailments required by this Condition of Approval for spring outflow in April and May is limited to 150 TAF. The ratio of Vernalis flows to export reductions is intended to serve as an operational mechanism to achieve the Delta outflow required by this Condition of Approval for minimization of the Covered Activities' impacts to Covered Species.

For purposes of this Condition of Approval only, the Joaquin Valley "60-20-20" Water Year Hydrologic Classification and Indicator as defined in the Bay-Delta Plan (SWRCB 2006) is used.

Permittee shall not be required to restrict operations as described above under either of the following circumstances:

- If the three-day average Delta outflow is greater than 44,500 cfs, then Project operations shall not be controlled by this Condition until the flows drop below 44,500 cfs on a three-day average.

²⁴ Ratio adjustments for multi-year droughts as outlined in the 2009 NMFS Central Valley Operations Biological Opinion would apply.

- Permittee shall not be required by this Condition of Approval to restrict exports at the Banks Pumping Plant below its minimum health and safety exports of 600 cfs.

The ratios used to establish export restrictions by water year type are a tool that incorporates San Joaquin River inflows while also allowing for a high outflow off-ramp of 44,500 cfs, which is expected to be driven by inflow from the Sacramento River. Spring export curtailments are intended to augment Delta outflow during a critical time in the life history of all four Covered Species. When April and May Delta outflow is augmented salinity in Suisun Bay is reduced and central Delta productivity is dispersed westward, improving habitat for both Delta and longfin smelt. At the upper end of managed flows when X2 is in San Pablo Bay, export curtailments help maintain this favorable location and sustain food web productivity and other conditions for improved longfin smelt recruitment in San Pablo Bay. Reductions in outflow during such conditions could restrict longfin smelt nursery habitat upstream to less favorable habitat in Carquinez Strait. Augmenting spring outflow through export curtailments improves migratory conditions for CHNWR and CHNSR by reducing Covered Activities' impacts on routing and through-Delta survival. Maintaining a higher Delta outflow during this time period will also provide a proactive approach to entrainment minimization that is expected to reduce CHNWR and CHNSR routing into the central and south Delta and minimize loss of all Covered Species at the SWP export facility. Additionally, increases in Delta outflow are associated with increased food web transport to, and productivity in, Suisun Bay.

Immediately following the SWRCB's adoption of final Voluntary Agreements Permittee, SWC and CDFW will meet and confer to review the Project in light of the final form of the Voluntary Agreements. Consistent with Condition of Approval 5, CESA, and CESA's implementing regulations, the Permittee and CDFW, in consultation with SWC and as appropriate depending on the results of that review, may replace the ratio of Vernalis flows to exports used as an operational mechanism to determine spring outflow volumes in this condition of approval, based on the final Voluntary Agreements and as part of such amendment process.

8.18 Potential to Redeploy up to 150 TAF for Delta Outflow. Permittee shall curtail exports at the Banks Pumping Plant to maintain the SWP contribution to spring Delta outflow as required by Condition of Approval 8.17 from April 1 to May 31.

If approved in writing by CDFW, Permittee may increase exports at the Banks Pumping Plant between April 1 and May 31 above what would otherwise be allowed by operating to Condition of Approval 8.17. When making the determination about whether to approve an increase in exports CDFW will weigh the benefits of increasing exports to bank water for other purposes against the risk of entrainment of Covered Species or impacting Covered Species habitat during that water year.

If an increase in Project exports is approved by CDFW in April and May, the increase in the volume of water exported during this time period, up to 150 TAF (hereafter Spring Outflow Block), shall be accounted for by Permittee and available for use by CDFW after March 1 of the next water year, except if the following year is critical. The Spring Outflow Block is in addition to the water required to achieve criteria in Table 9-A in Condition of Approval 9.1.3.1 and the Additional 100 TAF Block (Condition of Approval 8.19).

Condition of Approval 8.19, Delta Outflow Operations Plan and Report, describes the required planning, accounting, and reporting process that shall be used by Permittee, in collaboration with CDFW, each year following a water year in which CDFW approves an increase in exports during April and May. CDFW is most likely to approve an increase in exports for the purpose of building a Spring Outflow Block in wetter water years.

In wet water years Permittee may export no more than 30 TAF above what would be allowed by operating to Condition of Approval 8.17. This 30 TAF is intended to offset the water required to operate SMSCG for 30 days during summers of dry years that follow a below normal water year as described in Condition of Approval 9.1.3.1, Table 9-A. The timing and magnitude of exports to capture 30 TAF in a wet year shall be described in the Delta Outflow Operations Plan (Condition of Approval 8.20) to avoid sharp reductions in Delta outflow during April and May that may increase take of Covered Species as a result of entrainment into the central and south Delta.

In addition, Permittee shall provide a Spring Outflow Block Report to CDFW by August 1 of the same water year in which the increased exports are approved by CDFW. The

Spring Outflow Block Report shall quantify the increase in Project exports, account for the water available in the Spring Outflow Block, and include the following daily information from April 1 through May 31:

- Delta outflow
- Delta conditions (excess vs. balanced)
- Total exports at Banks Pumping Plant
- Jones Pumping Plants
- OMR index
- San Joaquin inflow
- Flow at Freeport
- Controlling factor each day and associated SWP allowable exports
- Estimated daily exports at Banks Pumping Plant from April 1 – May 31 of that year that would have occurred if all SWP operations remained the same except exports were restricted by operating to Condition of Approval 8.17

Permittee shall address comments and questions from CDFW on the draft Spring Outflow Block Report before it is finalized and submitted to CDFW for approval, no later than October 31.

The following water year, Permittee shall adjust operations of the Project to provide the Spring Outflow Block (as specified in the CDFW-approved Delta Outflow Operations Plan, Condition of Approval 8.20), unless that water year is critical. The Spring Outflow Block shall be stored in Oroville Reservoir and will be subject to spill if redeployed to the following year.

Permittee shall ensure that the water provided by the SWP achieves the defined purpose in the CDFW-approved Delta Outflow Operations Plan by dedicating the Spring Outflow Block of water to outflow for the duration of this ITP through agreements with downstream water users, a term-limited Section 1707 dedication as provided under the California Water Code, reliance on Term 91 conditions as enforceable by the SWRCB, or other means to ensure the water is not diverted for any intended use other than Delta outflow.

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8.19 Additional 100 TAF for Delta Outflow. To provide benefits to DS or LFS during a critical part of their life histories Permittee shall operate the project to provide a flexible block of water to enhance Delta outflow during the spring, summer, or fall months. Permittee shall provide 100 TAF of water to supplement Delta outflow (Additional 100 TAF) as approved by CDFW. Permittee shall provide the Additional 100 TAF of water subject to the following conditions:

- This water may be used in June through September of wet and above normal water years, and the October immediately following, to supplement Delta outflow in addition to flow required to meet the criteria in Condition of Approval 9.1.3.1, Table 9-A, and improve DS habitat.
- As approved by CDFW, the Additional 100 TAF of water available in a wet or above normal water year may instead be deferred and redeployed in the following water year to supplement Delta outflow during the March through September time period, or the October immediately following the end of that water year. The Additional 100 TAF shall be provided in addition to outflow required to meet the criteria in Table 9-A of Condition of Approval 9.1.3.1 in that following year, except if the following year is dry. The Additional 100 TAF is not required to be provided if the following water year is critical as determined by the May forecast with planning beginning in February each year as described in Condition of Approval 8.20, Delta Outflow Operations Plan and Report.
- The Additional 100 TAF shall be stored in Oroville Reservoir and will be subject to spill from Oroville Reservoir if redeployed to the following year.
- The Additional 100 TAF from a wet or above normal water year may be deferred only to the following water year, or the October immediately following the end of that water year.

Permittee shall provide the Additional 100 TAF as described in the CDFW-approved Delta Outflow Plan (Condition of Approval 8.20). In determining the use of the Additional 100 TAF, CDFW and Permittee will plan for the possibility that the following year is dry and this water would be needed to operate the SMSCG for 60 days during the June –

October time period. Sixty days of SMSCG operations in the summer of a dry year is anticipated to require an additional 60-70 TAF of Delta outflow to ensure that other Project operating requirements (including Delta salinity standards) are met. CDFW anticipates that another high-priority use of the Additional 100 TAF, if deferred and redeployed to the following year, would be to supplement outflow in the spring of below normal water years.

Permittee shall ensure that the water provided by the SWP achieves the defined purpose in the CDFW-approved Delta Outflow Operations Plan by dedicating the 100 TAF to outflow for the duration of this ITP through agreements with downstream water users, a term-limited Section 1707 dedication as provided under the California Water Code, reliance on Term 91 conditions as enforceable by the SWRCB, or other means to ensure the water is not diverted for any intended use other than Delta outflow.

8.20 Delta Outflow Operations Plan and Report. Conditions of Approval 8.18 and 8.19 describe blocks of water that shall be made available to supplement spring, summer or fall Delta outflow at the discretion of CDFW. Additionally, Condition of Approval 9.1.3.1 describes a requirement to operate the SMSCG during above normal, below normal, and dry water years and operate to an X2 standard in September and October of wet and above normal water years. Each year, to facilitate the planning, accounting, and reporting of these Conditions of Approval, Permittee shall:

- 1) Develop and operate to a Delta Outflow Operations Plan:
 - Beginning no later than February 1, work collaboratively with CDFW to develop a draft Delta Outflow Operations Plan that describes:
 - The amount of water available to supplement Delta outflow associated with the Additional 100 TAF (Condition of Approval 8.19) and Spring Outflow Block (Condition of Approval 8.18).
 - The timing and volume of water to be made available on a daily basis between March 1 and October 31 associated with the available blocks of water.

- Anticipated Project operational actions (e.g. export restrictions or storage releases) that would be taken to ensure the available blocks of water supplement Delta outflow.
- An accounting of how and when each available block of water would be used to supplement Delta outflow in addition to water required to operate to X2, SMSG operational criteria, or other controlling operational criteria as required in Table 9-A and Condition of Approval 9.1.3.2.
- Ongoing coordination with CDFW throughout deployment of the available blocks of water to evaluate operations relative to the requirements described in the Final Delta Operations Plan.
- Permittee shall work collaboratively with CDFW on an ongoing basis after February 1 to update the draft Delta Outflow Operations Plan based on refinements in understanding of Covered Species status and distribution, Project operations, and hydrologic and temperature forecasts.
- Submit the draft Delta Outflow Operations Plan to CDFW no less than 15 days prior to the start date of operational requirements described in the plan and incorporate CDFW comments and edits into the final plan no less than five days prior to the start of operational requirements described in the plan.
- Operate the Project consistent with the final CDFW-approved Delta Outflow Operations Plan.

2) By October 31, submit to CDFW a draft Delta Outflow Operations Report that includes the following daily information throughout the duration of the implementation of the Delta Outflow Operations Plan that year:

- Delta outflow
- Total exports at Banks Pumping Plant
- Total exports at Jones Pumping Plant
- OMR index
- USGS Tidally Filtered OMR flow
- San Joaquin inflow
- Flow at Freeport

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- Flow on the Feather River immediately below Thermalito
- State and federal share stored in San Luis Reservoir
- Releases from the following reservoirs:
 - Nimbus
 - Keswick
 - Oroville
 - Whiskeytown
- Jersey Point salinity
- Salinity at Belden's Landing
- Flow as measured at Lisbon Weir
- Delta outflow controlling factor each day and associated allowable SWP exports
- Minimum required Delta outflow that would be required to meet applicable controlling standards
- Documentation of the volume and timing of the Additional 100 TAF and Spring Outflow Block planned to be used in that year according to the CDFW-approved Delta Outflow Operations Plan
- Depiction of operations that would have occurred during the timeframe outlined in the Delta Outflow Operations Plan for that water year if the available blocks of water and the Summer-Fall Action had not been implemented. This depiction shall include estimates of all required hydrologic data points used to quantify actual operations during the same time period.

3) Incorporate CDFW comments and edits into the draft Delta Outflow Operations Report and submit it to CDFW for approval before December 1.

8.21 Drought Contingency Planning. On October 1, if the prior water year was dry or critical, Permittee, in coordination with Reclamation, shall meet and confer with USFWS, NMFS, SWRCB, and CDFW to develop a drought contingency plan to be implemented if dry conditions continue into the following year. On February 1 if dry conditions continue, Permittee shall submit the drought contingency plan to CDFW and shall update the plan monthly based on current and forecasted hydrologic conditions. If dry conditions continue, Permittee shall regularly convene this group to evaluate hydrologic conditions and the

potential for continued dry conditions that necessitate implementation of measures identified in the drought contingency plan for the current water year. By February 1 of each year following the development of a drought contingency plan, Permittee shall submit a report to CDFW on the measures employed during the previous year, including an assessment of their effectiveness.

9 Compensatory mitigation:

CDFW has determined that permanent protection and perpetual management of compensatory habitat is necessary and required pursuant to CESA to fully mitigate Project-related impacts of the taking on the Covered Species that will result with implementation of the Covered Activities (see CDFW Effects Analysis). This determination is based on factors including an assessment of the importance of the habitat in the Project Area, the extent to which the Covered Activities will impact the habitat, and CDFW's estimate of the acreage required to provide for adequate compensation.

To meet this requirement, Permittee shall either purchase Covered Species credits from a CDFW-approved mitigation or conservation bank to achieve the acreage requirements described in Condition of Approval 9.1, or shall provide for the permanent protection, restoration and initial and long-term management and monitoring of Habitat Management (HM) lands described in Condition of Approval 9.1 and consistent with Covered Species habitat criteria described in Attachment 4. HM land protection, restoration, monitoring, and management shall be pursuant to Condition of Approval 10.6 below and the calculation of the management funds pursuant to Condition of Approval 10.5 below.

Permittee shall include in its ASR, pursuant to Condition of Approval 7.2, documentation demonstrating cumulative HM lands permanently protected (and restored where required) for each Covered Species to date.

Permanent protection, restoration and funding for perpetual monitoring and management of compensatory habitat must be complete before starting Covered Activities, or, if Security is provided pursuant to Condition of Approval 10 below for all uncompleted obligations, after the effective date of this ITP.

Permittee's implementation of the protection, restoration or perpetual management of HM

lands may require separate CEQA evaluation. Because no take authorization is provided through this permit for the HM lands activities, Permittee shall obtain CESA authorization as necessary to implement HM land requirements. All individual protection and restoration projects proposed to achieve the compensatory mitigation required in this Condition of Approval shall be subject to CDFW approval in writing.

9.1 Compensatory Mitigation for Delta Smelt and Longfin Smelt.

9.1.1 Tidal Wetland Habitat Restoration for Delta Smelt. Within 6 years of the effective date of this ITP, Permittee shall complete siting, design, restoration, and conservation of 8,000 acres of DS tidal wetland habitat as compensatory mitigation to expand the diversity, quantity, and quality of DS rearing and refuge habitat in the tidal portions of the Delta and Suisun Marsh. This requirement is carried forward from the compensatory mitigation obligation originally established in the 2008 BiOp and associated CDFW consistency determination.

Permittee shall site, design, restore, and conserve an additional 396.3 acres of DS tidal wetland habitat as compensatory mitigation for increased diversions at the BSPP.

Permittee shall coordinate with USFWS and CDFW during the process of site selection and restoration design for HM lands intended to serve as compensatory mitigation for impacts to DS habitat. HM lands and restoration designs shall be informed by the specifications and habitat crediting process described in the 2012 *Fish Restoration Program Agreement Implementation Strategy*, the *Draft 2008 FWS BiOp Delta Smelt Crediting Decision Model Guidelines*, and the *Draft 2008 FWS BiOp Delta Smelt Crediting Decision Model* (Guidance for Smelt HM Lands Suitable for Compensatory Mitigation, Attachment 4). All DS tidal wetland habitat restoration shall be subject to approval by CDFW.

9.1.2 Habitat Restoration for Longfin Smelt. Within 6 years of the effective date of this ITP, Permittee shall complete siting, design, restoration, and conservation of 800 acres of LFS mesohaline habitat and 396.3 acres of LFS tidal wetland habitat as compensatory mitigation to expand the diversity, quantity, and quality of LFS rearing and refuge habitat

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in the tidal portions of the Delta and Suisun Marsh. The requirement to restore and conserve 800 acres of mesohaline habitat is carried forward from the compensatory mitigation obligation originally established in the 2009 ITP issued by CDFW for take of LFS.

Permittee shall coordinate with CDFW during the process of site selection and restoration design for HM lands intended to serve as compensatory mitigation for impacts to LFS habitat. HM lands and restoration designs shall be informed by the specifications and habitat crediting process described in the 2012 *Fish Restoration Program Agreement Implementation Strategy*, the *Draft 2008 FWS BiOp Delta Smelt Crediting Decision Model Guidelines*, and the *Draft 2008 FWS BiOp Delta Smelt Crediting Decision Model* (Guidance for Smelt HM Lands Suitable for Compensatory Mitigation, Attachment 4) and adapted for the specific habitat requirements of LFS, as approved by CDFW. All LFS mesohaline habitat restoration shall be subject to approval by CDFW.

9.1.3 Delta Smelt Summer-Fall Habitat Action. The DS summer-fall habitat action (Summer-Fall Action) is intended to benefit DS food supply and habitat, thereby contributing to the recruitment, growth, and survival of DS. The FLASH conceptual model²⁵ states that DS habitat should include low-salinity conditions of 0 to 6 parts per thousand (ppt), turbidity of approximately 12 NTU, temperatures below 25°C, food availability, and littoral or open water physical habitats. The highest-quality habitat in Suisun Marsh and Grizzly Bay includes areas with complex bathymetry, in deep channels close to shoals and shallows, and in proximity to extensive tidal or freshwater marshlands and other wetlands. The Summer-Fall Action will provide the aforementioned habitat components in the Suisun Marsh and Grizzly Bay through a range of actions by water year type to improve water quality and food supplies.

²⁵ Brown, L.R., R. Baxter, G. Castillo, L. Conrad, S. Culberson, G. Erickson, F. Feyrer, S. Fong, K. Gehrts, L. Grimaldo, B. Herbold, J. Kirsch, A. Mueller-Solger, S. Slater, K. Souza, and E. Van Nieuwenhuysse. 2014. Synthesis of Studies in the Fall Low-Salinity Zone of the San Francisco Estuary, September–December 2011: U.S. Geological Survey Scientific Investigations Report 2014–5041. U.S. Geological Survey, Reston, VA.

As described in Sections 1.5 and 3.9.2 of the Project Description, proposals under the Voluntary Agreements may be implemented in a way that complements the Delta Smelt Summer-Fall Habitat Action by providing summer outflow during above normal, below normal, and dry water year types, in a manner that is equivalent to or greater than the flow needed to achieve the standards described in Conditions of Approval 9.1.3.1 and 9.1.3.2 for Permittee.

Permittee shall implement SMSCG operations as described in Conditions of Approval 9.1.3.1 and 9.1.3.2 through its operations, including through reducing its exports at Banks Pumping Plant.

9.1.3.1 Summer-Fall Action Plan. Each year Permittee shall initiate the process to develop a plan to operate the Project, achieve criteria described in Table 9-A and requirements in Conditions of Approval 8.19, 9.1.3, and 9.1.3.2, and implement additional actions, as available, including monitoring, science, and food enhancement actions to enhance DS habitat (Summer-Fall Action Plan). As a part of this annual planning and implementation process, reports documenting summer-fall operations and results from monitoring (including Condition of Approval 9.1.3.3) and scientific investigations (including Condition of Approval 7.6.4) shall be used to better understand DS habitat during the summer-fall time period and investigate the way in which SWP-CVP operations interact with the full range of components of DS habitat. The planning process will investigate the extent to which providing flow and low salinity conditions of various volumes and locations improves the quality and quantity of DS habitat and food in the summer and fall, and whether DS survival, viability, and abundance improves in response to the Summer-Fall Action. The planning process shall also consider tradeoffs between actions to benefit DS and effects on other Covered Species. For example, the planning process shall include consideration of the potential for CHNSR juvenile stranding in upstream tributaries associated with reservoir releases.

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Table 9-A. Criteria required to be met through implementation of the Summer-Fall Action to benefit DS habitat by water year.

Month	Water Year Type (SVI)				
	Wet	Above-normal	Below-normal	Dry	Critical
June	Additional 100 TAF Delta outflow, June through October**	Criteria: Operate SMSCG for 60 days*	Criteria: Operate SMSCG for 60 days*	Criteria: In dry years following below-normal years operate SMSCG for 30 days*	No action
July		Additional 100 TAF Delta outflow, June through October**		Criteria: In dry years following wet or above-normal water years operate SMSCG for 60 days* ***	
August		Criteria: 30-day average X2 ≤ 80km		Criteria: 30-day average X2 ≤ 80km	
September					
October					
* Water necessary to implement SMSCG operations may be provided through export curtailments supported by the SWP Contractors through a commitment pursuant to Voluntary Agreements or as early implementation of such agreements.					
** If approved by CDFW the Additional 100 TAF may be deferred and redeployed to supplement Delta outflow the following water year during the March – October timeframe, unless the following water year is critical (see Condition of Approval 8.19). This use of the redeployed water is not intended to serve as a criteria.					
*** CDFW anticipates deferring a portion of the 100 TAF received from an above normal or wet year when the following year is dry to facilitate SMSCG operation for 60 days in the absence of other available water.					

The Summer-Fall Action Plan shall be developed based on hydrologic, operational, and temperature forecasts using the best available modeling to plan SMSCG operations (Table 9-A) to maximize the number of days that Belden’s Landing three-day average salinity is equal to, or less than, 4 ppt in all but dry years following below normal years. In a dry year following a below normal year the Summer-Fall Action Plan shall be developed to maximize the number of days that Belden’s Landing three-day average

salinity is equal to, or less than, 6 ppt. CDFW anticipates that a three-day average salinity of 4 ppt at Belden's Landing (or 6 ppt in dry years following below normal years) may be met by operating the SMSCG intermittently throughout the summer-fall. The required days of SMSCG operations (Table 9-A) need not be on consecutive days. As a result, this action is likely to extend beyond the required number of days of SMSCG operations to maximize benefits to DS. Project operations shall be consistent with the operations described in the Summer-Fall Action Plan from June – October each year. Permittee shall meet and confer with CDFW within thirty days of the effective date of this ITP to determine actions to implement June – August to improve Delta smelt habitat to the maximum extent feasible, including the possibility of operating the SMSCG. The requirements described in this Condition shall begin with the 2021 water year.

Permittee shall:

- Within 30 days of the effective date of this ITP, convene a Delta Coordination Group (two representatives each from DWR, Reclamation, USFWS, NMFS and CDFW and one representative each from the CVP water contractors and SWP water contractors) to select a SDM model and complete initial model runs (and annual model runs thereafter) testing various approaches to satisfying environmental and biological goals, based on the criteria described in Table 9-A, monitoring and science, and additional actions, if available, such as DS food enhancement actions (see Section 3.9.1 in the Project Description and Section 5.3.3 in the FEIR).
- Distribute a meeting agenda to group members at least four working days prior to each Delta Coordination Group meeting.
- Record and distribute regular meeting notes within two working days of each Delta Coordination Group meeting to group members for review. Incorporate member comments and post final notes on a publicly available website.
- Before April 15, develop a draft Summer-Fall Action Plan in collaboration with the Delta Coordination Group accounting for forecasted hydrology and temperatures over the summer and fall that describes:
 - How planned operations are expected to meet the criteria in Table 9-A based

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- on the anticipated water year type;
- Planned operations of the SMSCG if the group anticipates an above normal, below normal, or dry water year, including whether the SMSCG operations are anticipated to be conducted pursuant to the Voluntary Agreements or by Permittee independently;
 - A schedule for applying the Additional 100 TAF as described in the CDFW-approved Delta Outflow Operations Plan, if applicable;
 - Planned studies and monitoring during the planned Summer-Fall Action Plan to improve understanding of DS summer-fall habitat and survival during this time period (see Conditions of Approval 7.6.4 and 9.1.3.3);
 - A schedule for regular meetings and coordination between CDFW and Permittee throughout the implementation of the Summer-Fall Action Plan each year;
 - Habitat conditions expected to be achieved through use of the Additional 100 TAF (Condition of Approval 8.19) as described in the CDFW-approved Delta Outflow Operations Plan to supplement Delta outflow during the spring, summer, or fall and further improve DS habitat conditions beyond those required through operations criteria governing X2 and SMSCG operations included in Table 9-A;
 - Hypotheses to be tested through ongoing monitoring and scientific investigations, the suite of actions and operations conducted to test the hypotheses, and the expected outcomes; and
 - Information learned from data and prior year Summer-Fall Action Reports.
 - Submit the draft Summer-Fall Action Plan to the Delta Coordination Group and work collaboratively to address comments and prepare a final report no later than May 15.
 - No later than December 31 annually, Permittee shall submit a draft Summer-Fall Action Report to the Delta Coordination Group that:
 - Synthesizes results from abiotic and biotic monitoring conducted during the prior summer-fall season;

- Synthesizes results from actions conducted as a part of the Summer-Fall Action Plan including scientific research and additional summer-fall food actions;
- Describes Project operations (including south Delta exports and dates of SMSCG operations) implemented to comply with the final Summer-Fall Action Plan for the prior water year;
- Includes all raw data from monitoring efforts conducted as a part of the Summer-Fall Action;
- Includes the criteria required in Table 9-A and summaries of monitoring data demonstrating whether criteria were met through planned operations.
- Submit a final Summer-Fall Action Report to the Delta Coordination Group that incorporates comments and edits from CDFW prior to February 28 each year.

Each year, the Delta Coordination Group shall:

- Collaboratively assess forecasted hydrologic conditions, precipitation and temperature forecasts, and review available information regarding the distribution and abundance of DS and LFS prior to March 15.
- Use a SDM model to analyze the environmental and biological goals based on the criteria described in Table 9-A, proposed DS food enhancement summer-fall actions (see Section 3.9.1 in the Project Description and Section 5.3.3 of the FEIR), and make predictions regarding the potential outcomes for various implementation scenarios. This structured decision-making process shall be used to inform the Summer-Fall Action Plan prepared each year.
- Review draft Summer-Fall Action Plan prior to May 1.
- Collaboratively review available monitoring data and results from scientific studies following the completion of a Summer-Fall Action.
- Review the draft Summer-Fall Action Report and provide comments to Permittee to assist in developing a final report prior to February 28.
- Use the results from prior year reports to inform the subsequent SDM modeling exercise and develop future Summer-Fall Action Plans.

The Summer-Fall Action shall be included in the Four-Year Reviews under the Adaptive

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Management Program (Attachment 2), including the SDM model used to develop the annual Summer-Fall Action Plan.

If, in a given year, CDFW does not approve the Summer-Fall Action Plan developed by the Delta Coordination Group, CDFW may develop a new Summer-Fall Action Plan, consistent with the parameters of Conditions of Approval 8.19, 8.20, 9.1.3, 9.1.3.1, and 9.1.3.2 and Table 9-A, and submit it to Permittee prior to June 1. Permittee shall operate the Project consistent with the CDFW-developed Summer-Fall Action Plan beginning June 1.

9.1.3.2 Summer-fall Delta Smelt Habitat During Successive Dry Years. Permittee shall operate the Project to enhance DS summer-fall habitat as described in Conditions of Approval 9.1.3.1, except if the current water year is dry and was preceded by a dry or critical water year. If a dry water year was preceded by a dry or critical water year, Permittee shall confer with CDFW prior to April 1 to collaboratively develop a plan for June through October to enhance DS habitat to the maximum extent practicable. Permittee shall evaluate their ability to operate the SMSCG during the June – September time period and implement other appropriate actions to enhance DS habitat.

9.1.3.3 Improved Monitoring in Grizzly Bay. Permittee shall convene the Smelt Monitoring Team within 60 days of the effective date of this ITP to collaboratively develop a draft Grizzly Bay Monitoring Plan to identify and implement three additional monitoring stations and improve measurement of temperature, salinity, turbidity, and other relevant abiotic factors in areas expected to be influenced by planned operations of the SMSCG in the summer and fall. At least one of these new stations shall be sited in the western margin of Grizzly Bay near the mouth of Montezuma Slough. Permittee shall submit the draft Grizzly Bay Monitoring Plan to CDFW and the IEP Science Management Team (SMT) for review and comments. After CDFW and IEP SMT review, Permittee shall prepare a final Grizzly Bay Monitoring Plan to deploy, maintain, and fund these additional monitoring stations within nine months of the effective date of this ITP and submit the final Grizzly Bay Monitoring Plan to CDFW for review. If approved by CDFW, Permittee shall implement the final Grizzly Bay Monitoring Plan and incorporate data from new monitoring stations into annual Summer-Fall Action data collection, planning and

reporting processes within one year of the effective date of this ITP.

9.1.4 Rio Vista Estuarine Research Station. Permittee shall provide 66% of the total funding required during the term of this ITP to construct the Rio Vista Estuarine Research Station (RVERS) to provide long-term support for Bay-Delta science and research to enhance the understanding of Covered Species ecology. RVERS shall be constructed in conjunction with the USFWS Fish Technology Center, a research facility for cultured fish and a potential future home for Delta smelt refuge populations.

9.2 Compensatory Mitigation for Winter- and Spring-run Chinook salmon.

9.2.1 Mitigation for Impacts Associated with Project Operations. Within six months of the effective date of this ITP, Permittee shall fund at least one restoration project annually identified in coordination with CDFW, NMFS, USFWS, Reclamation and other entities undertaking restoration and enhancement in the Sacramento River watershed. Permittee shall fund a total of \$20,000,000 for restoration projects over the term of the ITP as approved by CDFW. The selected restoration projects shall provide one or more of the biological benefits described below to CHNWR and CHNSR in the Sacramento River watershed upstream of the Delta, as compensatory mitigation for impacts associated with Project operations. Larger restoration projects may be carried over multiple years. Restoration projects shall align with CHNWR and CHNSR recovery needs and be guided by information in the Salmon Resiliency Strategy.

Biological Benefits of Improved Juvenile Upstream Rearing Habitat:

Channelization of rivers to manage flood risk and convert wildlife habitat to agricultural use has eliminated 95% of riparian and floodplain wetland habitat in the Central Valley.²⁶ Historically, these habitats benefited rearing CHNWR and CHNSR by providing increased primary productivity and prey availability, refuge from predators, respite from high flows, and efficient locations to feed. These benefits allow for increased growth of juvenile CHNWR and CHNSR, which may be reflected in higher

²⁶ Lund, J.R., E. Hanak, W.E. Fleener, J.F. Mount, R. Howitt, B. Bennett, and P.B. Moyle. 2010. *Comparing futures for the Sacramento-San Joaquin Delta*. First edition. Berkeley: University of California Press and Public Policy Institute of California.

adult return rates.²⁷ Remaining riparian and floodplain wetland habitat in the Sacramento and San Joaquin river basins is largely unavailable for rearing juvenile CHNWR and CHNSR due to the reduced frequency and duration of seasonal over-bank flooding.

Restoring connectivity of floodplains with adjacent streams increases the available habitat that is inundated with the frequency and duration of suitable floodplain rearing habitat. This connectivity with adjacent streams is critical to provide volitional entry and exit for rearing juveniles that cue migration based on the hydrograph of the river. Projects to improve rearing habitat for juvenile salmonids are limited in scope by engineered leveed waterways, but primarily include breaching or setbacks of levees to create bench habitat. These habitats provide shallow water foraging and refuge habitat for rearing juveniles. Other projects include channel margin enhancement that focuses on improving channel geometry and restoring riparian, marsh, and mudflat habitats on the water side of levees. Similar to breaching and setbacks of levees, channel margin enhancement is expected to increase rearing habitat through enhancement and creation of additional shallow water habitat that will provide foraging opportunities and refuge from unfavorable hydraulic conditions and predation.

Restoring juvenile rearing habitat is intended to increase habitat diversity and complexity, which can lead to population resiliency during times of increased temperatures and water demands.

Biological Benefits of Improved Adult Passage: Passage barriers exist in many forms, including low-flow road crossings, bridges, flow control structures, and dams. Many of these structures require minimum flows to allow passage; however, flows are often limited due to high water demands. Each in-water structure within the Sacramento and San Joaquin river basins can cause delays in upstream passage for CHNWR and CHNSR. CHNWR and CHNSR may sustain injuries or experience pre-spawn mortality

²⁷ Sommer, T.R., M.L. Nobriga, W.C. Harrell, W. Batham, and W.J. Kimmerer. 2001. Floodplain rearing of juvenile chinook salmon: evidence of enhanced growth and survival. *Canadian Journal of Fisheries and Aquatic Sciences* 58:325–333.
Sommer, T.R., W.C. Harrell, and M.L. Nobriga. 2005. Habitat use and stranding risk of juvenile Chinook salmon on a seasonal floodplain. *North American Journal of Fisheries Management* 25:1493–1504.
Jeffres, C., J.J. Opperman, and P.B. Moyle. 2008. Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. *Environmental Biology of Fishes* 83(4):449–458.

due to stress as they attempt to navigate barriers. Loss of upstream spawners can lead to a reduction in genetic diversity as well as a decrease in juvenile production.

The decline in CHNWR and CHNSR populations increased following the construction of major water project facilities and development projects in the mid-1900s.²⁸ Many of these projects impede or completely block upstream migration of CHNWR and CHNSR to historic cold-water spawning and rearing habitats. This has led to a reduction in available spawning habitat (e.g., suitable spawning and egg incubation temperatures and flow) and has increased competition and hybridization between CHNSR and CHNFR. As a result of reduced spawning habitat CHNWR and CHNSR are more vulnerable to serious effects of elevated, and potentially lethal, temperatures during egg incubation that can occur in most years. The frequency of increased temperatures is expected to increase with increased water demands and climate change, necessitating the evaluation of passage above known barriers.

Improving fish passage throughout the Sacramento and San Joaquin river basins will reduce migratory delays and loss of adult CHNWR and CHNSR at barriers and can enhance ecosystem function through improved habitat connectivity.

After consulting with Reclamation, USFWS, and NMFS, Permittee and CDFW shall work each year to collaboratively select the restoration projects to be funded to restore and enhance CHNWR and CHNSR spawning and rearing habitat on the Sacramento River and its tributaries. CDFW acknowledges that planning, environmental review, and permitting may be necessary for restoration project implementation and funding under this Condition of Approval may be used for these project development activities. In some cases, implementation may be in the form of funding a restoration project in whole or in part to supplement restoration projects being implemented by others, when appropriate and approved by CDFW and when CDFW determines that funding under this Condition of

²⁸ USFWS, 2001. Final Restoration Plan for the Anadromous Fish Restoration Program: A plan to increase natural production of anadromous fish in the Central Valley of California. Prepared for the Secretary of the Interior by the U.S. Fish and Wildlife Service.

Approval will ensure additive benefits to CHNSR and CHNWR that would not occur in the absence of Permittee's contribution. However, under no circumstances shall any funds under this Condition of Approval be used to fund any other regulatory permitting requirement other than those established in this ITP. Final allocation of this funding shall be subject to CDFW approval each year.

If, as described in Section 1.6 of the Project description and as part of the Voluntary Agreement Review (Section 3.13.9), the Voluntary Agreements are approved and Permittee, or its SWP Contractors acting on Permittee's behalf, conduct habitat restoration for CHNWR and CHNSR, Permittee and CDFW shall collaborate to review the Project in light of the final form of the Voluntary Agreements. Consistent with Condition of Approval 5, CESA, and CESA's implementing regulations, Permittee and CDFW will utilize results from the review to consider whether the Voluntary Agreements' implementation modifies the scope or nature of the Project, or the circumstances under which it is implemented, to an extent that warrants a permit amendment.

9.2.2 Implement the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project. Within 6 years of the effective date of this ITP Permittee shall implement the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (Salmonid Habitat and Fish Passage Project). The objective of the Salmonid Habitat and Fish Passage Project is to enhance floodplain rearing habitat and fish passage in the Yolo Bypass by implementing the Project as described in in Alternative 1 of the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Final EIR/EIS.²⁹ This project will benefit CHNWR, CHNSR, Central Valley steelhead, and the Southern DPS of North American green sturgeon to benefit CHNWR, CHNSR, Central Valley steelhead, and the Southern DPS of North American green sturgeon.

²⁹ California Department of Water Resources and U.S. Bureau of Reclamation. 2019. Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project. Final Environmental Impact Statement/Environmental Impact Report. State Clearinghouse No. 2013032004. May 2019.

The first objective of the Salmonid Habitat and Fish Passage Project is to increase the availability of floodplain rearing habitat for juvenile CHNWR, CHNSR, and Central Valley steelhead. This action can also improve conditions for Sacramento splittail and Central Valley fall-run Chinook salmon. Specific biological goals include:

- Improve access to seasonal habitat through volitional entry
- Increase access to and acreage of seasonal floodplain fisheries rearing habitat
- Reduce stranding and presence of migration barriers
- Increase aquatic primary and secondary biotic production to provide food through an ecosystem approach

The second objective of the Salmonid Habitat and Fish Passage Project is to reduce migratory delays and loss of fish at Fremont Weir and other structures in the Yolo Bypass. Specific biological goals include:

- Improve connectivity within the Yolo Bypass for passage of salmonids and green sturgeon
- Improve connectivity between the Sacramento River and the Yolo Bypass to provide safe and timely passage for:
 - Adult CHNWR between mid-November and May when water surface elevations in the Sacramento River are amenable to fish passage
 - Adult CHNSR between January and May when elevations in the Sacramento River are amenable to fish passage
 - Adult California Central Valley steelhead in the event their presence overlaps with the defined seasonal window for other target species when elevations in the Sacramento River are amenable to fish passage
 - Adult Southern DPS green sturgeon between February and May when elevations in the Sacramento River are amenable to fish passage.

Primary Project activities include the construction of a notch in Fremont Weir located in the Northern Yolo Bypass, including the construction of the following features:

- *Intake channel:* The intake channel shall connect the Sacramento River to the proposed headworks structure at the appropriate elevation to facilitate an upstream

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fish passage facility for adult fish and for passing rearing habitat flows and juvenile salmonids

- *Headworks structure:* The headworks structure shall bisect the existing Fremont Weir on the east side and would control the diversion of Project flow from the Sacramento River into the Yolo Bypass. It would also serve as the primary upstream fish passage facility for adult fish and the primary facility for passing rearing habitat flows and juvenile salmonids into the Yolo Bypass. The components of the headworks shall include a concrete control structure, an upstream vehicular bridge crossing, and a concrete channel transition, which transitions the rectangular sides of the control structure to the side channel slopes of the transport channel.
- *Transport channel:* The transport channel shall serve as the primary facility for upstream adult fish passage between the existing Tule Pond and the headworks structure. It would also serve as the primary channel for conveying juvenile salmonids and rearing habitat flows from the headworks structure to the existing Tule Pond.
- *Downstream channel improvements:* Improvements shall be made to the existing channel that extends from the Tule Pond outlet to the beginning of Tule Canal. The improvements would be made to facilitate upstream adult fish passage between the existing Tule Canal and Tule Pond

The location of each of these facilities is described in Alternative 1 of the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Final EIR/EIS. The project also includes a supplementary fish passage structure located on the west side of Fremont Weir

9.3 Cost Estimates. Permittee has estimated the cost of acquisition, protection, restoration, and perpetual management of the HM lands required by Conditions of Approval 9.1.1 and 9.1.2, as shown in Tables 9-B and 9-C. The methods used to determine these costs are described in Section 8.1 of the ITP application.

9.3.1 Acquisition Costs, Start-up Costs and Transaction Fees. Land acquisition costs for HM lands identified in Condition of Approval 9.1.1 and 9.1.2 are based on local fair

market current value for lands with habitat values meeting mitigation requirements plus a ten percent contingency. Start-up costs for HM lands include initial site protection, enhancement, and restoration costs as described in Conditions of Approval 9.4.1 and 9.4.5 below. Transaction fees include but are not limited to account set-up fees, administrative fees, title and documentation review and related title transactions, expenses incurred from other state agency reviews, and overhead related to transfer of HM lands to CDFW as described in Condition of Approval 9.4. Total acquisition costs, start-up costs, and transaction fees are estimated to be \$33,150/creditable acre and are included in the total cost estimates shown in Tables 9-B and 9-C. This includes costs of restoration and enhancement.

9.3.2 Interim Management Period. Interim management period funding as described in Condition of Approval 9.4.6 below, is estimated to be \$402,655/year and is included in the total cost estimates shown in Tables 9-B and 9-C by habitat type. This cost includes post-restoration or enhancement monitoring and management actions.

9.3.3 Long-term Management. Long-term management funding as described in Condition of Approval 9.4.7 below, was estimated at \$284,299/year to ensure implementation of HM lands management.

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Table 9-B. Estimated habitat mitigation lands costs for existing obligations from 2008/2009 BiOps and 2009 LFS ITP

Species	Cost item	Habitat	Land (acres)	Total cost over 10 years	Average annual cost
DS	Habitat restoration required by 2008 USFWS BiOp ³⁰	Tidal perennial aquatic habitat	8,000	\$248,000,000	\$24,800,000
LFS	Habitat restoration required by 2009 LFS ITP ³⁰	Mesohaline habitat	800	\$24,800,000	\$2,480,000
CHNWR and CHNSR	Yolo Bypass Restoration	Juvenile rearing habitat		\$62,500,000	

Table 9-C. Estimated habitat mitigation lands costs for new obligations from this ITP

Species	Cost item	Habitat	Land (acres)	Total cost over 10 years	Average annual cost
LFS and DS	New habitat restoration	Tidal wetland habitat	396.3	\$12,285,300	\$1,228,530

9.4 Habitat Acquisition and Protection. Permittee shall either purchase Covered Species credits from a CDFW-approved mitigation or conservation bank prior to initiating Covered Activities impacting Covered Species habitat, or provide for the acquisition and perpetual protection and management of the HM lands consistent with Condition of Approval 9 above, and pursuant to Conditions of Approval 9.4.1 to 9.4.10. To provide for

³⁰ Permittee has completed 1,571 acres of habitat restoration at Decker Island (114 acres), Tule Red (610 acres), Yolo Flyways Farms (294 acres), and Winter Island (553 acres). The total expended costs for these four projects are \$24,427,000 but costs listed in this Table include the entirety of the restoration acreages required by the 2008 USFWS BiOp and 2009 LFS ITP.

the acquisition and perpetual protection of the HM lands, Permittee shall adhere to requirements in Conditions of Approval 9.4.1 to 9.4.10.

9.4.1 Fee Title/Conservation Easement. Transfer fee title to the HM lands to CDFW pursuant to terms approved in writing by CDFW. Alternatively, CDFW, in its sole discretion, may authorize a governmental entity, special district, non-profit organization, for-profit entity, person, or another entity to hold title to and manage the property provided that the district, organization, entity, or person meets the requirements of Government Code sections 65965-65968, as amended. If CDFW does not hold fee title to the HM lands, CDFW shall act as grantee for a conservation easement over the HM lands or shall, in its sole discretion, approve a non-profit entity, public agency, or Native American tribe to act as grantee for a conservation easement over the HM lands provided that the entity, agency, or tribe meets the requirements of Civil Code section 815.3. If CDFW does not hold the conservation easement, CDFW shall be expressly named in the conservation easement as a third-party beneficiary. The Permittee shall obtain CDFW written approval of any conservation easement before its execution or recordation. No conservation easement shall be approved by CDFW unless it complies with Government Code sections 65965-65968, as amended and includes provisions expressly addressing Government Code sections 65966(j) and 65967(e).

9.4.2 HM Lands Approval. Obtain CDFW written approval of the HM lands before acquisition and/or transfer of the land by submitting, at least three months before acquisition and/or transfer of the HM lands, a formal Proposed Lands for Acquisition Form (see Attachment 3B) identifying the land to be purchased or property interest conveyed to an approved entity as mitigation for the Project's impacts on Covered Species. HM lands may be proposed and approved in segments or subsets.

9.4.3 HM Lands Documentation. Provide a recent preliminary title report, initial hazardous materials survey report, and other necessary documents (see Attachment 3A). All documents conveying the HM lands and all conditions of title are subject to the approval of CDFW, and if applicable, the Wildlife Conservation Board and the Department of General Services.

9.4.4 Land Manager. Designate both an interim and long-term land manager approved by CDFW. The interim and long-term land managers may, but need not, be the same. The interim and/or long-term land managers may be the landowner or another party. Documents related to land management shall identify both the interim and long-term land managers. Permittee shall notify CDFW of any subsequent changes in the land manager within 30 days of the change. If CDFW will hold fee title to the mitigation land, CDFW will also act as both the interim and long-term land manager unless otherwise specified.

9.4.5 Start-up Activities. Provide for the implementation of start-up activities, including the initial site protection and enhancement of HM lands, once the HM lands have been approved by CDFW. Start-up activities include, at a minimum: (1) Preparation of restoration or enhancement plan as necessary; (2) preparing necessary CEQA documents and obtaining necessary permits, including take authorization under CESA (3) preparing a final management plan for CDFW approval; (4) implementing habitat restoration or enhancement, if applicable; (5) conducting a baseline biological assessment and land survey report within four months of recording or transfer; (6) developing and transferring Geographic Information Systems (GIS) data if applicable; (7) initial site management including installing fencing and site improvements as necessary; (8) site maintenance; and (9), installing signage. Permittee shall provide for these start-up activities until the final management plan is approved and all restoration or enhancement actions are completed.

9.4.6 Interim Management (Initial and Capital). Provide for the interim management of the HM lands. Permittee shall ensure that the interim land manager implements the interim management of the HM lands as described in the final management plan and conservation easement approved by CDFW. The interim management period shall be a minimum of three years from the date of HM land acquisition and protection and includes expected management following start-up activities. Interim management period activities described in the final management plan shall include site maintenance, site monitoring, and vegetation and invasive species management. Permittee shall provide funding for interim management of the HM lands by using revenues derived from the SWP charges to

the SWP Contractors under long-term water supply contracts, and any subsequent agreements.

9.4.7 In-Perpetuity Management Funding. Permittee shall ensure that the HM lands are perpetually managed, maintained, and monitored by the long-term land manager as described in this ITP, the conservation easement, and the final management plan approved by CDFW. After obtaining CDFW approval of the HM lands, Permittee shall provide long-term management funding for the perpetual management of the HM lands. As shall be specified in written terms acceptable to CDFW for individual HM lands projects, Permittee shall provide long-term funding for the perpetual management of the HM lands by using revenues derived from the SWP charges to the SWP Contractors under long-term water supply contracts, and any subsequent agreements, to fund long-term management activities in perpetuity annually in the amount identified initially in a CDFW approved Property Analysis Record (PAR) or PAR-equivalent analysis (hereinafter "PAR") addressing the specific long-term management costs for individual HM lands sites. Actual annual funding shall be adjusted for inflation and may be adjusted to address actual costs of management over time, as approved by CDFW.

After the interim management period, Permittee shall ensure that the designated long-term land manager implements the management and monitoring of the HM lands according to the final management plan. The long-term land manager shall be obligated to manage and monitor the HM lands in perpetuity to preserve their conservation values in accordance with this ITP, the conservation easement, and the final management plan. Such activities shall be funded as described above or in the event a conservation or mitigation bank is used to meet HM land requirements the long-term manager will be responsible for funding in perpetuity management through the endowment for the bank.

If funding is no longer available from SWP charges to the SWP Contractors, Permittee shall annually fund in-perpetuity management activities through another funding source until Permittee has established and fully funded an endowment. If another funding source is required, it shall be established within six months of identifying that the previous funding source will no longer be available. If SWP charges to the SWP Contractors are no longer available as funding, Permittee shall establish a long-term management fund

(Endowment). The Endowment is a sum of money, held in a CDFW-approved fund, that provides funds for the perpetual management, maintenance, monitoring, and other activities on the HM lands consistent with the management plan(s) required by Condition of Approval 9.4.5, and based on funding requirements established through the PAR(s) prepared for the HM lands pursuant to Condition of Approval 9.4.9. If the HM lands have been managed pursuant to a final management plan approved by CDFW for at least five years, the PAR and Endowment shall be based on the actual costs of managing the HM lands. Permittee shall fund the Endowment by contributing a minimum of ten percent of the amount required by the PAR (adjusted for present value) annually, commencing the fiscal year that SWP charges to the SWP Contractors are no longer an available funding source, to a mutually agreed upon account, until the Endowment is fully funded, after which time the activities under the management plan(s) will be funded from interest generated from the Endowment principal. Endowment as referred to in this ITP shall refer to the endowment deposit and all interest, dividends, other earnings, additions and appreciation thereon. The Endowment shall be governed by this ITP, Government Code sections 65965-65968, as amended, and Probate Code sections 18501-18510, as amended.

9.4.8 Identify an Endowment Manager. In the event an Endowment is required (Condition of Approval 9.4.7), the Endowment shall be held by the Endowment Manager, which shall be either CDFW or another entity qualified pursuant to Government Code sections 65965-65968, as amended. Permittee shall submit to CDFW a written proposal that includes: (i) the name of the proposed Endowment Manager; (ii) whether the proposed Endowment Manager is a governmental entity, special district, nonprofit organization, community foundation, or congressionally chartered foundation; (iii) whether the proposed Endowment Manager holds the property or an interest in the property for conservation purposes as required by Government Code section 65968(b)(1) or, in the alternative, the basis for finding that the Project qualifies for an exception pursuant to Government Code section 65968(b)(2); and (iv) a copy of the proposed Endowment Manager's certification pursuant to Government Code section 65968(e). Within thirty days of CDFW's receipt of Permittee's written proposal, CDFW shall inform Permittee in writing if it determines the proposal does not satisfy the requirements of Fish and Game Code

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section 2081(b)(4) and, if so, shall provide Permittee with a written explanation of the reasons for its determination. If CDFW does not provide Permittee with a written determination within the thirty-day period, the proposal shall be deemed consistent with Section 2081(b)(4).

9.4.9 Calculate the Endowment Funds Deposit. In the event that an Endowment is required (Condition of Approval 9.4.7), after obtaining CDFW written approval of the HM lands, or a subset of them, and long-term management plan, Permittee shall prepare a PAR to calculate the amount of funding necessary to ensure the long-term management of the HM lands or identified subset (Endowment Deposit Amount). If at the time an Endowment becomes necessary, the HM lands have been managed pursuant to an approved final management plan for at least five years, Permittee shall use the actual costs of managing the HM lands to prepare the PAR. The Permittee shall submit to CDFW for review and approval the results of the PAR(s) before transferring funds to the Endowment Manager.

9.4.9.1 Capitalization Rate and Fees. Permittee shall obtain the capitalization rate from the selected Endowment Manager for use in calculating the PAR and adjust for any additional administrative, periodic, or annual fees.

9.4.9.2 Endowment Buffers/Assumptions. Permittee shall include in PAR assumptions the following buffers for endowment establishment and use that will substantially ensure long-term viability and security of the Endowment.

9.4.9.2.1 Ten Percent Contingency. A ten percent contingency shall be added to each endowment calculation to hedge against underestimation of the fund, unanticipated expenditures, inflation, or catastrophic events.

9.4.9.2.2 Three Years Delayed Spending. The endowment shall be established assuming spending will not occur for the first three years after full funding.

9.4.9.2.3 Non-annualized Expenses. For all large capital expenses to occur periodically but not annually such as fence replacement or well replacement, payments shall be

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withheld from the annual disbursement until the year of anticipated need or upon request to Endowment Manager and CDFW.

9.4.10 Transfer Long-term Endowment Funds. In the event that an Endowment is required (Condition of Approval 9.4.7), Permittee shall fund the Endowment Deposit Amount over a ten-year period, in annual amounts of ten percent of the total Endowment Deposit Amount, adjusted for inflation, as approved by CDFW in writing. The approved Endowment Manager may pool the Endowment with other endowments for the operation, management, and protection of HM lands for local populations of the Covered Species, but shall maintain separate accounting for each Endowment. The Endowment Manager shall, at all times, hold and manage the Endowment in compliance with this ITP, Government Code sections 65965-65968, as amended, and Probate Code sections 18501-18510, as amended.

9.5 Reimburse CDFW. Permittee shall reimburse CDFW for all reasonable expenses incurred by CDFW such as transaction fees, account set-up fees, administrative fees, title and documentation review and related title transactions, expenses incurred from other state agency reviews, and overhead related to transfer of HM lands to CDFW.

10 Performance Security:

The Permittee may proceed with Covered Activities based on the Security as described below. Permittee is a party to a long-term water supply contract with each of its 29 water supply customers, who are generally referred to as "SWP Contractors." SWP Contractors contract with Permittee to pay for the operation, maintenance, planning and capital costs of the SWP. Under Water Code section 11651, "any agency which contracts to purchase from the department any water, use of water, water storage, electric power, or other service shall provide for the punctual payment to the department of all amounts which become due under the contract." In accordance with a statutory requirement, each water supply contract between Permittee and an SWP Contractor requires that if that SWP Contractor fails or is unable to raise sufficient funds by other means, the SWP Contractor must levy upon all taxable property in the SWP Contractor's service area a tax or

assessment sufficient (with other available moneys) to provide for all payments under the water supply contract. If the SWP Contractor defaults in payment, Permittee may, and under certain conditions is required to, upon six months' notice, suspend water deliveries during the period of default.

Permittee will treat the costs of ITP implementation as components of the Project and address such costs to fulfill those requirements as part of overall Project costs. Costs, such as routine operation, maintenance, and power (e.g., monitoring of mitigation sites) are not financed, but are instead paid in monthly installments in the calendar year, incurred based upon estimates developed by Permittee and delivered to the SWP Contractors in July of the preceding year.

Permittee shall assure performance as follows:

10.1 Security Amount. Estimated costs to implement acquisition, protection, restoration and perpetual management of the HM lands as shown in Tables 9-B and 9-C of this ITP and Condition of Approval 9.1.1, 9.1.2, 9.1.4, 9.2.1, and 9.2.2 total \$367,585,300.

Total costs to maintain the required long-term monitoring described in Section 3.13.1 of the Project Description are \$78,650,000. Estimated costs throughout the term of this ITP to implement studies and monitoring required in Conditions of Approval 6 through 9 and to support the Adaptive Management Program required by this ITP (Attachment 2) are estimated to total \$21,618,503 per year in addition to \$54,099,010 total per year carried forward from existing commitments into this ITP.

10.2 Security Form.

10.2.1 Mitigation implementation and monitoring. Payment of the costs of mitigation projects, is assured by Permittee's long-term water supply contracts and applicable state law. All costs of the Project, including the costs of mitigation and monitoring activities required by this ITP shall be paid by Permittee and charged to SWP Contractors.

Permittee shall prepare and submit to CDFW within one year of the effective date of this ITP an initial CESA mitigation funding strategy for review and approval. The strategy shall

include detailed cost estimates regarding, as applicable: 1) purchase of mitigation or conservation bank credits; 2) HM lands acquisition and start-up costs and interim management period costs; 3) restoration costs including design, environmental review, permitting, construction and interim management period costs 4) and long-term management costs for all HM lands. The strategy shall include detailed funding and commitments for the duration of the ITP (2020 – 2030).

Permittee shall submit annual updates to the strategy to CDFW for review and approval. These updates shall include extension of the detailed funding strategy for five years post submission date, and shall include a description of expenditures to date for compliance with Conditions of Approval 9.1.1, 9.1.2, 9.1.4, 9.2.1, and 9.2.2. To the degree that annual charges to SWP Contractors are relied upon, the funding strategy shall demonstrate that those funds have been or will be charged to SWP Contractors and received by Permittee consistent with SWP Contractor billing practices.

10.2.2 Monitoring, Science, and Adaptive Management Program. Permittee shall prepare and submit to CDFW within one year of the effective date of this ITP an initial Monitoring, Science, and Adaptive Management Program funding strategy for review and approval. Permittee shall develop a funding strategy that clearly identifies responsible parties and levels of annual and total program funding consistent with the funding amounts identified in Condition of Approval 10.1 for implementation of the Monitoring, Science, and Adaptive Management Program starting in 2020, and shall identify the anticipated costs associated with funding all additional monitoring and science requirements for the Conditions of Approval of this ITP, and funding sources that will be relied upon. The strategy shall include detailed funding and commitments for the duration of the ITP (2020 – 2030).

Permittee shall submit annual updates to the strategy to CDFW for review and approval. To the degree that annual charges to SWP Contractors are relied upon, the funding strategy shall demonstrate that those funds have been or will be charged to the SWP Contractors and received by Permittee consistent with SWP Contractor billing practices.

10.3 Demonstration of Performance. Permittee shall demonstrate to CDFW that Covered Species' requirements have been satisfied, as evidenced by:

- Within one year of the effective date of this ITP, submission of an initial CESA mitigation funding strategy for concurrence by CDFW; and
- Within one year the effective date of this ITP submission of an initial Monitoring, Science, and Adaptive Management Program funding strategy for concurrence by CDFW.
- Receipt by CDFW of documentation, acceptable to CDFW, demonstrating that Permittee will treat the mitigation obligations of this ITP as components of the Project and will fulfill those requirements as a part of the overall Project costs.

During the ITP term, Permittee shall demonstrate to CDFW that Covered Species' requirements have been satisfied on an ongoing basis, as evidenced by:

- Written documentation of the acquisition of HM lands as required in Condition 9;
- Copies of all executed and recorded conservation easements for HM lands acquired;
- Final CDFW approved management plans for all HM lands;
- Documentation of completion of habitat restoration or enhancement to mitigate adverse effects to Covered Species from Covered Activities;
- Written confirmation from the approved Endowment Manager of its receipt of the full Endowment if required; and
- Timely submission of all required reports.

CDFW may require the Permittee to provide additional HM lands and/or additional funding to ensure the impacts of the taking are minimized and fully mitigated, as required by law, if the Permittee does not complete these requirements within the specified timeframe.

Amendment:

This ITP may be amended as provided by California Code of Regulations, Title 14, section 783.6, subdivision (c), and other applicable law. This ITP may be amended without the concurrence of the Permittee as required by law, including if CDFW determines that continued implementation of the Project as authorized under this ITP would jeopardize the

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continued existence of the Covered Species or where Project changes or changed biological conditions necessitate an ITP amendment to ensure that all Project-related impacts of the taking to the Covered Species are minimized and fully mitigated.

Stop-Work Order:

CDFW may issue Permittee a written stop-work order requiring Permittee to suspend any Covered Activity for an initial period of up to 25 days to prevent or remedy a violation of this ITP, including but not limited to the failure to comply with reporting or monitoring obligations, or to prevent the unauthorized take of any CESA endangered, threatened, or candidate species. Permittee shall stop work immediately as directed by CDFW upon receipt of any such stop-work order. Upon written notice to Permittee, CDFW may extend any stop-work order issued to Permittee for a period not to exceed 25 additional days. Suspension and revocation of this ITP shall be governed by California Code of Regulations, Title 14, section 783.7, and any other applicable law. Neither the Designated Biologist nor CDFW shall be liable for any costs incurred in complying with stop-work orders.

Compliance with Other Laws:

This ITP sets forth CDFW's requirements for the Permittee to implement the Project pursuant to CESA. This ITP does not necessarily create an entitlement to proceed with the Project. Permittee is responsible for complying with all other applicable federal, state, and local law.

Notices:

The Permittee shall deliver a fully executed duplicate original ITP by registered first class mail or overnight delivery to the following address:

Habitat Conservation Planning Branch
California Department of Fish and Wildlife
Attention: CESA Permitting Program
Post Office Box 944209
Sacramento, CA 94244-2090

Written notices, reports and other communications relating to this ITP shall be delivered to

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CDFW by registered first class mail at the following address, or at addresses CDFW may subsequently provide the Permittee. Notices, reports, and other communications shall reference the Project name, Permittee, and ITP Number (2081-2019-066-00) in a cover letter and on any other associated documents.

Original cover with attachment(s) to:

Joshua Grover, Water Branch Chief
California Department of Fish and Wildlife
Post Office Box 944209
Sacramento, CA 944209
Telephone (916) 376-3961

and a copy to:

Habitat Conservation Planning Branch
California Department of Fish and Wildlife
Attention: CESA Permitting Program
Post Office Box 944209
Sacramento, CA 94244-2090

Unless Permittee is notified otherwise, CDFW's Department Representative for purposes of addressing issues that arise during implementation of this ITP is:

Joshua Grover
Post Office Box 944209
Sacramento, CA 944209
Telephone (916) 376-3961

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Compliance with CEQA:

In general, the issuance of an ITP under CESA constitutes the approval of a project by CDFW subject to CEQA. CDFW's issuance of this ITP is subject to CEQA. CDFW is a responsible agency pursuant to CEQA with respect to this ITP because of prior environmental review of the Project by the lead agency, DWR. (See generally Pub. Resources Code, §§ 21000 et seq., 21067, 21069.) The lead agency's prior environmental review of the Project is set forth in the *Long-Term Operation of the California State Water Project Final Environmental Impact Report (EIR)* (State Clearinghouse No. 2019049121), dated March 2020 that DWR certified for the Project on March 27, 2020.

This ITP, along with CDFW's related CEQA findings, which are set forth in a separate document, and the CDFW Effects Analyses, which are attached to this ITP and incorporated by reference, provide evidence of CDFW's consideration of the lead agency's EIR for the Project and the environmental effects related to issuance of this ITP (CEQA Guidelines, § 15096, subd. (f)). CDFW finds that issuance of this ITP will not result in any previously undisclosed potentially significant effects on the environment or a substantial increase in the severity of any potentially significant environmental effects previously disclosed by the lead agency. Furthermore, to the extent the potential for such effects exists, CDFW finds adherence to and implementation of the conditions of Project approval adopted by the lead agency, and that adherence to and implementation of the Conditions of Approval imposed by CDFW through the issuance of this ITP, will avoid or reduce to below a level of significance any such potential effects. CDFW consequently finds that issuance of this ITP will not result in any significant, adverse impacts on the environment.

Findings Pursuant to CESA:

CESA and CDFW's related implementing regulations require CDFW to prepare and adopt specific findings under CESA prior to and in connection with the issuance of this ITP. (See, e.g. Fish & G. Code § 2081, subds. (b)-(c); Cal. Code Regs., tit. 14, §§ 783.4, subds. (a)-(b), 783.5, subd. (c)(2).) CDFW's CESA findings for this ITP and the related CDW Effects Analysis are set forth in separate documents as adopted by CDFW and specifically

incorporated by reference into this ITP.

Attachments:

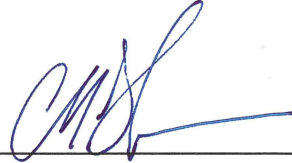
FIGURES 1A, 1B	Map of Project
ATTACHMENT 1	Mitigation Monitoring and Reporting Program
ATTACHMENT 2	Adaptive Management Program
ATTACHMENTS 3A, 3B	Habitat Management Lands Checklist; Proposed Lands for Acquisition Form
ATTACHMENT 4	Guidance for Smelt HM Lands Suitable for Compensatory Mitigation
ATTACHMENT 5	List of Acronyms and Terms
ATTACHMENT 6	Definition of Loss Equation
ATTACHMENT 7	CDFW Smelt Effects Analysis
ATTACHMENT 8	CDFW Salmon Effects Analysis

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ISSUED BY THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

on March 31, 2020



Charlton Bonham, Director
California Department of Fish and
Wildlife

ACKNOWLEDGMENT

The undersigned: (1) warrants that he or she is acting as a duly authorized representative of the Permittee, (2) acknowledges receipt of this ITP, and (3) agrees on behalf of the Permittee to comply with all terms and conditions

By: Karla A Nemeth Date: 3-31-20

Printed Name: Karla A. Nemeth Title: Director

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