BUREAU OF RECLAMATION

Guidance Document - Old and Middle River Management Implementation

LTO-017

U.S. Department of the Interior

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I. Purpose

This document provides implementation guidance on Old and Middle River (OMR) management pursuant to Section 4.10.5.10 of the U.S. Bureau of Reclamation's (Reclamation) and California Department of Water Resources' (DWR) Proposed Action (PA), and the U.S. Fish and Wildlife Service's (FWS) and the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service's (NMFS) Biological Opinions Incidental Take Statements (ITS), and the California Department of Fish and Wildlife's (CDFW) Incidental Take Permit (ITP). The scope of guidance includes the deliverables, schedule, and processes of different agency and stakeholder teams. The primary deliverables are transparent and reliable weekly assessments of potential actions during the OMR management season (generally, November through June) for consideration by the Water Operations Management Team (WOMT).

Reclamation, USFWS, NMFS, DWR, and CDFW have worked to develop this Guidance Document to aid technical and management staff in the near-term and in coordinated implementation of Central Valley Project (CVP) and State Water Project (SWP) operations pursuant to Reclamation's operations pursuant to the Federal Endangered Species Act (ESA) and DWR's obligations pursuant to the California Endangered Species Act (CESA). These authorizations have been challenged in various court proceedings. Neither participation in nor agreement to this Guidance Document shall be interpreted to limit or otherwise affect any agency's claims, defenses, arguments, and/or legal positions in those ongoing or future proceedings.

II. Background

This section provides the applicable verbatim language for OMR Management from Reclamation's and DWR's Proposed Action, USFWS' Incidental Take Statement (ITS), NMFS' ITS, and CDFW's ITP.

A. Reclamation and DWR Proposed Action (Pages 4-66 to 4-72)

4.10.5.10 OMR Management

Reclamation and DWR propose to operate the CVP and SWP in a manner that maximizes exports while minimizing entrainment of fish and protecting critical habitat. Net flow OMR provides a surrogate indicator for how export pumping at Banks and Jones Pumping Plants influence hydrodynamics in the south Delta. The management of OMR, in combination with other environmental variables, can minimize or avoid the entrainment of fish in the south Delta and at CVP and SWP salvage facilities. Reclamation and DWR propose to maximize exports by

incorporating real-time monitoring of fish distribution, turbidity, temperature, hydrodynamic models, and entrainment models into the decision support for the management of OMR to focus protections for fish when necessary and provide flexibility where possible, consistent with the WIIN Act Sections 4002 and 4003, as described below. Estimates of species distribution will be described by multi-agency Delta-focused technical teams.

From the onset of OMR management to the end, Reclamation and DWR will operate to an OMR index no more negative than a 14-day moving average of -5,000 cfs unless a storm event occurs (described below). Grimaldo et al. (2017) indicate that -5,000 cfs is an inflection point in OMR for fish entrainment. OMR could be more positive than -5,000 cfs if additional real-time OMR restrictions are triggered (described below) or constraints other than OMR control exports. Reclamation and DWR propose to operate to an OMR index computed using an equation. An OMR index allows for shorter-term operational planning and real-time adjustments. Reclamation and DWR will make a change to exports within 3 days of the trigger when monitoring, modeling, and criteria indicate protection for fish is necessary. The 3-day trigger allows for efficient power scheduling.

4.10.5.10.1 Onset of OMR Management

Reclamation and DWR shall start OMR management when one or more of the following conditions have occurred:

- Integrated Early Winter Pulse Protection ("First Flush" Turbidity Event): To minimize project influence on migration (or dispersal) of Delta Smelt, Reclamation and DWR proposes to reduce exports for 14 consecutive days so that the 14-day averaged OMR index for the period shall not be more negative than -2,000 cfs, in response to "First Flush" conditions in the Delta. The population-scale migration of Delta Smelt is believed to occur quickly in response to inflowing freshwater and turbidity (Grimaldo et al. 2009; Sommer et al. 2011). Thereafter, the best available scientific information suggests that fish make local movements, but there is no evidence for further population-scale migration (Polanksy et al. 2018). "First Flush" conditions may be triggered between December 1 and January 31 and include:
    - Running 3-day average of the daily flows at Freeport is greater than 25,000 cfs and
    - Running 3-day average of the daily turbidity at Freeport is 50 NTU or greater, or
    - Real-time monitoring (Appendix C) indicates a high risk of migration and dispersal into areas at high risk of future entrainment.
- This "First Flush" may only be initiated once during the December through January period and will not be required if:
    - Spent female Delta Smelt are collected in monitoring surveys.
- Salmonids Presence: After January 1, if more than 5 percent of any one or more salmonid species (wild young-of-year Winter-Run, wild young-of-year Spring-Run, or wild Central Valley Steelhead) are estimated to be present in the Delta as determined by their

appropriate monitoring working group based on available real-time data, historical information, and modeling.

4.10.5.10.2 Additional Real-Time OMR Restrictions and Performance Objectives

Reclamation and DWR shall manage to a more positive OMR than -5,000 cfs based on the following conditions:

- Turbidity Bridge Avoidance ("South Delta Turbidity"): After the Integrated Early Winter Pulse Protection (above) or February 1 (whichever comes first) and until a ripe or spent female is detected or April 1 (whichever is first), Reclamation and DWR propose to manage exports in order to maintain daily average turbidity in Old River at Bacon Island (OBI) at a level of less than 12 NTU. The purpose of this action is to minimize the risk to adult Delta smelt in the Old and Middle River Corridor, where they are subject to higher entrainment risks. This action seeks to avoid the formation of a turbidity bridge from the San Joaquin River shipping channel to the south Delta fish facilities, which historically has been associated with elevated salvage of pre-spawning adult Delta Smelt. If the daily average turbidity at Bacon Island cannot be maintained less than 12 NTU, Reclamation and DWR will manage exports to achieve an OMR no more negative than -2,000 cfs until the daily average turbidity at Bacon Island drops below 12 NTU. However, if 5 consecutive days of OMR less negative than -2,000 cfs do not reduce turbidity at Bacon Island below 12 NTU in a given month, Reclamation and DWR may determine that OMR restrictions to manage turbidity are infeasible, and will instead implement anOMR target that is deemed protective, based on turbidity, adult Delta smelt distribution and salvage, but not a more negative OMR than -5,000 cfs.

  Reclamation and DWR recognize that readings at individual sensors or localized groups of sensors can generate spurious results in real-time. To avoid triggering an OMR flow action during a sensor error or a localized turbidity spike that might be caused by local flows or a wind-driven event, Reclamation and DWR will consider and review data from other locations. In the event that the daily average turbidity at OBI is 12 NTU (or greater) and Reclamation and DWR believe that a Turbidity Bridge Avoidance action is not warranted based on additional data sources (isolated and/or wind-driven turbidity event at OBI), Reclamation and DWR will take no additional action and provide the supporting information to the Service within 24 hours.

  Larval and Juvenile Delta Smelt: Reclamation and DWR will use results produced by USFWS approved life cycle models to manage the annual entrainment levels of larval/juvenile Delta Smelt. The Service's models will be publicly vetted and peer reviewed prior to March 15, 2020. The USFWS will coordinate with the Delta Fish Monitoring Working Group to identify a Delta smelt recruitment level that Reclamation and DWR can use in OMR management. The life cycle models statistically link 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 delta smelt in June per number of spawning adults the prior February-March.

  Reclamation and DWR, in coordination with the Service will operationalize the life cycle model results through the use of real-time monitoring for the spatial distribution of Delta

Smelt. On or after March 15 of each year, if QWEST is negative, and larval or juvenile delta smelt are within the entrainment zone of the pumps based on real-time sampling of spawning adults or young of year life stages, Reclamation and/or DWR will run hydrodynamic models and forecasts of entrainment, informed by the EDSM or other relevant survey data to estimate the percentage of larval and juvenile delta smelt that could be entrained. If necessary, Reclamation will manage exports to limit entrainment to be protective based on the modeled recruitment levels. Reclamation and DWR will re-run hydrodynamic models when operational changes or new sampling data indicate a potential change in entrainment risk. This process will continue until the offramp criteria have been met as described in the "End of OMR Management" below. In the event the life cycle models cannot be operationalized in a manner that can be used to inform real-time operations then Reclamation, DWR and the Service will coordinate to develop an alternative plan to provide operational actions protective of this life stage.

- Cumulative Loss Threshold:
    - Reclamation and DWR propose to avoid exceeding cumulative loss thresholds over the duration of the Biological Opinions for:
        - Natural Winter-Run Chinook Salmon (cumulative loss= 8,738)
        - Hatchery Winter-Run Chinook Salmon (cumulative loss= 5,356)
        - Natural Central Valley Steelhead from December through March (cumulative loss= 6,038)
        - Natural Central Valley Steelhead from April 1 through June 15th (cumulative loss= 5,826).

    Natural Central Valley Steelhead are separated into two time periods to protect San Joaquin origin fish that historically appear in the Mossdale trawls later than Sacramento origin fish. The loss threshold and loss tracking for hatchery Winter-Run Chinook Salmon does not include releases into Battle Creek. Loss (for development of thresholds and ongoing tracking) for Chinook salmon are based on length-at-date criteria.

    - The cumulative loss thresholds shall be based on cumulative historical loss from 2010 through 2018. Reclamation's and DWR's performance objectives are intended to avoid loss such that this cumulative loss threshold (measured as the 2010-2018 average cumulative loss multiplied by 10 years) will not be exceeded by 2030.
    - If, at any time prior to 2024, Reclamation and DWR exceed 50% of the cumulative loss threshold, Reclamation and DWR 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, if any.
    - In the year 2024, Reclamation and DWR will convene an independent panel to review the first five years of actions and determine whether continuing these

actions are likely to reliably maintain the trajectory associated with this performance objective for the duration of the period.

- If, during real-time operations, Reclamation and DWR exceed the cumulative loss threshold, Reclamation and DWR would immediately seek technical assistance from USFWS and NMFS, as appropriate, on the coordinated operation of the CVP and SWP for the remainder of the OMR management period. In addition, Reclamation and DWR shall, prior to the next OMR management season, charter an independent panel to review the OMR Management Action consistent with "Chartering of Independent Panels" under the "Governance" section of this Proposed Action. The purpose of the independent review shall be to evaluate the efficacy of actions to reduce the adverse effects on listed species under OMR management and the non-flow measures to improve survival in the south Delta and for San Joaquin origin fish.

- Single-Year Loss Threshold:
    - In each year, Reclamation and DWR propose to avoid exceeding an annual loss threshold equal to 90% of the greatest annual loss that occurred in the historical record from 2010 through 2018 for each of:
        - Natural Winter-Run Chinook Salmon (loss= 1.17% of JPE)
        - Hatchery Winter-Run Chinook Salmon (loss= 0.12% of JPE)
        - Natural Central Valley Steelhead from December through March (loss=1,414)
        - Natural Central Valley Steelhead from April through June 15 (loss = 1,552)

      Natural Central Valley Steelhead are separated into two time periods to protect San Joaquin Origin fish that historically appear in the Mossdale trawls later than Sacramento origin fish. The loss threshold and loss tracking for hatchery Winter-Run Chinook Salmon does not include releases into Battle Creek. Loss (for development of thresholds and ongoing tracking) for Chinook salmon are based on length-at-date criteria.

        - During the year, if Reclamation and DWR exceed the average annual loss from 2010 through 2018, Reclamation and DWR will review recent fish distribution information and operations with the fisheries agencies atWOMT and seek technical assistance on future planned operations. Any agency may elevate from WOMT to a Directors discussion, as appropriate.
        - During the year, if Reclamation and DWR exceed 50% of the annual loss threshold, Reclamation and DWR will restrict OMR to a 14-day moving average OMR index of no more negative than -3,500 cfs, unless Reclamation and DWR determine that further OMR restrictions are not required to benefit fish movement because a risk assessment shows that the risk is no longer present based on real-time information.

- The -3500 OMR operational criteria adjusted and informed by this risk assessment will remain in effect for the rest of the season. Reclamation and DWR will seek NMFS technical assistance on the risk assessment and real- time operations.
- During the year, if Reclamation and DWR exceed 75% of the annual loss threshold, Reclamation and DWR will restrict OMR to a 14-day moving average OMR index of no more negative than -2,500 cfs, unless Reclamation and DWR determine that further OMR restrictions are not required to benefit fish movement because a risk assessment shows that the risk is no longer present based on real-time information.
- The -2500 OMR operational criteria adjusted and informed by this risk assessment will remain in effect for the rest of the season. Reclamation and DWR will seek NMFS technical assistance on the risk assessment and real- time operations.
- Risk assessments (identified above): Reclamation and DWR will evaluate and adjust OMR restrictions under this section by preparing a risk assessment that considers several factors including, but not limited to, real-time monitoring, historical trends of salmonids exiting the delta, entering the south delta, fish detected in salvage, and relevant environmental conditions. Risks will be measured against the potential to exceed the next single year loss threshold. Reclamation and DWR will share its risk assessment and supporting documentation with USFWS and NMFS, seek their technical assistance, discuss the risk assessment and future operations with WOMT at its next meeting, and elevate to the Directors as appropriate.
- If, during real-time operations, Reclamation and DWR exceed the single-year loss threshold, Reclamation and DWR would immediately seek technical assistance from USFWS and NMFS, as appropriate, on the coordinated operation of the CVP and SWP for the remainder of the OMR management period. In addition, Reclamation and DWR shall, prior to the next OMR management season, charter an independent panel to review the OMR Management Action consistent with "Chartering of Independent Panels" under the "Governance" section of this Proposed Action. The purpose of the independent review shall be to evaluate the efficacy of actions to reduce the effects on listed species under OMR management and the non-flow measures to improve survival in the south Delta and for San Joaquin origin fish.

Reclamation and DWR propose to continue monitoring and reporting the salvage at the Tracy Fish Collection Facility and Skinner Delta Fish Protection Facility. Reclamation and DWR propose to continue the release and monitoring of yearling Coleman NFH late-fall run as yearling Spring-Run Chinook Salmon surrogates.

4.10.5.10.3 Storm-Related OMR Flexibility

Reclamation and DWR may operate to a more negative OMR up to a maximum (otherwise permitted) export rate at Banks and Jones Pumping Plants of 14,900 cfs (which could result in a range of OMR values) to capture peak flows during storm-related events. A storm related event occurs when precipitation falls in the Central Valley and Delta watersheds and Reclamation and DWR determine that the Delta outflow index indicates a higher level of flow available for diversion. Reclamation and DWR will define storm-related events in the first year of implementation of this proposed action. Reclamation and DWR will continue to monitor fish in real-time and will operate in accordance with "Additional Real- time OMR Restrictions," above. Under the following conditions, Reclamation and DWR shall not pursue storm-related OMR flexibility for capturing peak flows from storm-related events if:

- Integrated Early Winter Pulse Protection (above) or Additional real-time OMR restrictions (above) are triggered. Under such conditions, Reclamation and DWR have already determined that more restrictive OMR is required.
- An evaluation of environmental and biological conditions indicates more negative OMR would likely cause Reclamation and DWR to trigger an Additional real-time OMR restriction (above).
- Salvage of yearling Coleman NFH late-fall run as yearling Spring-Run Chinook Salmon surrogates exceeds 0.5% within any of the release groups.
- Reclamation and DWR identify changes in spawning, rearing, foraging, sheltering, or migration behavior beyond those anticipated to occur under OMR management.

Reclamation and DWR will continue to monitor conditions may resume management of OMR to no more negative than -5,000 cfs if conditions indicate the above offramps are necessary to avoid additional adverse effects. If storm-related flexibility causes the conditions in "Additional Real-Time OMR Restrictions", Reclamation and DWR will implement additional real-time OMR restrictions.

4.10.5.10.4. End of OMR Management

OMR criteria may control operations until June 30 (for Delta Smelt and Chinook salmon), until June 15 (for steelhead/rainbow trout), or when the following species-specific off ramps have occurred, whichever is earlier:

- Delta Smelt: when the daily mean water temperature at CCF reaches 77°F for3 consecutive days;
- Salmonids:
    - When more than 95 percent of salmonids have migrated past Chipps Island, as determined by their monitoring working group, or
    - After daily average water temperatures at Mossdale exceed 71.6°F for 7 days during June (the 7 days do not have to be consecutive).

4.10.5.10.5 Real-Time Decision Making and Salvage Thresholds

When real-time monitoring demonstrates that criteria in "Additional Real-Time OMR Restrictions and Performance Objectives" are not supported, then Reclamation and DWR may confer with the Directors of NMFS, USFWS, and CDFW if they desire to operate to a more negative OMR than what is specified in this section. Upon mutual agreement, the Directors of NMFS and USFWS may authorize Reclamation and DWR to operate to a more negative OMR than the "Additional Real-Time OMR Restrictions", but no more negative than -5000 cfs. This process would be separate from the risk analysis process referenced above.

B. USFWS ITS (Pages 393–401)

Amount or Extent of Anticipated Take

In the BiOp, the Service has determined that incidental take is reasonably certain to occur as follows:

The Service anticipates that the PA will result in the incidental take of individual delta smelt due to hydrodynamic effects caused by the operation of the CVP and SWP export facilities in the south Delta, the fish facilities in the south Delta, and other CVP or SWP water diversion and water distribution systems in other parts of the Delta and Suisun Marsh. Regarding the CVP and SWP export of water from the Delta, the Service anticipates take in the form of kill or harm of all delta smelt within the south Delta affected by water operations and other areas of the Delta affected by reduced habitat quality.

Incidental take associated with this action is expected in the following forms: mortality and harm of delta smelt adults, juveniles, and larvae. It is difficult to determine the number of individuals that could be injured or killed (including harm as a result of significant habitat modification) because free-swimming aquatic animals are difficult to observe in large water bodies and because delta smelt have become very rare in recent years. The Service anticipates injury and mortality of individual delta smelt will occur as a result of entrainment and whenever habitat conditions do not support the successful completion of the species' full life cycle.

Surrogate Approach

In accordance with 50 CFR 402.14(i)(1)(i), a surrogate may be used to express the amount or extent of anticipated incidental take if the BiOp or ITS describes the causal link between the surrogate and anticipated take, explains why it is not practical to express the amount or extent of anticipated take or to monitor take-related impacts in terms of individuals, and sets a clear standard for determining when the level of anticipated take has been exceeded.

Surrogates are used for this ITS because, as described throughout this BiOp, it is impossible to accurately quantify and monitor the amount or number of individuals that are expected to be incidentally taken as a result of the PA due to the variability associated with the effects of the PA, the declining population size of delta smelt, difficulty in detecting individuals entrained or impinged, annual variations in the timing of various parts of the species' life cycle, and variation in how individual fish use habitat within the Action Area.

The Service is using the ecological conditions described below as the incidental take surrogates for individual delta smelt.

Take from South Delta Entrainment

The Service has determined for the purposes of this BiOp that delta smelt that enter the Old and Middle river corridors are entrained whether or not they survive long enough to reach the CVP or SWP fish facilities. Adult delta smelt have substantial capacity to control their distribution in the Bay-Delta. Thus, some adult delta smelt may 'entrain' themselves during their winter dispersal, while others may cue on hydrodynamics resulting from the export of water while moving up the San Joaquin River and be entrained due to project operations. Delta smelt larvae have some ability to control their distribution but less than older, more competently swimming life stages, making them more vulnerable to tidal currents and the net displacement (or flow) of water over multiple tidal cycles. No delta smelt life stage is known to seek cover in beds of aquatic vegetation, such as those that have proliferated around much of the shallower waterways in Delta, and particularly in the south Delta and its associated flooded islands. Rather, delta smelt are attracted to turbidity in open-water habitats. The hydrodynamic conditions indexed by net negative flow in Old and Middle rivers can affect the dispersal of turbidity into and through the South Delta. During winter dispersal and spring spawning, when turbidity of more than 12 NTU is present in Old and Middle rivers, adult delta smelt may be more likely to move into these channels, become entrained, and become subject to the reduced quality habitat in the channels, adjoining canals, and associated flooded islands (e.g., Mildred Island) due to operations, or be injured or killed as a result of entering the export facilities. Additionally, entrained adult delta smelt may spawn in areas where their progeny will be lost to the population due to some unquantifiable combination of predation loss associated with submerged vegetation or eventual transport to the CVP and SWP facilities.

Therefore, the level of turbidity present in the South Delta can be causally linked to the level of incidental take of adult delta smelt and some of their offspring due to entrainment caused by operations. The analysis of effects in this BiOp is based, in part, on the PA avoiding the formation of a continuous band of turbidity from the Sacramento River to the export facilities to minimize the number of adult delta smelt that disperse into unfavorable habitat conditions, thus minimizing entrainment of pre-spawning adult delta smelt and the subsequent loss of larval and juvenile delta smelt later in the spring. In addition to potential losses of larvae that may hatch from locations in the south Delta, current information indicates that the hydrodynamic conditions indexed by net negative flow in Old and Middle rivers are one factor that can affect the dispersal of delta smelt larvae spawned outside the south Delta into the channels, adjoining canals, and associated flooded islands of the south Delta (e.g., Mildred Island) where the Service has determined they are considered entrained for the purposes of this BiOp.

The following specific ecological conditions reflect the conditions commensurate with the level of incidental take through entrainment that is anticipated in this BiOp.

1. During the early winter, if and when the single annual, system-wide first flush has been identified pursuant to the criteria identified in the PA, net negative flow in Old and Middlerivers should be held to no greater than a 14-day averaged OMR of -2000 cfs for 14 days to prevent turbidity from being pulled into the south Delta and creating a continuous band of turbidity from the Sacramento River to the export facilities.

2. During the winter and early spring, net negative OMR flows should be held at levels no more negative than a 14-day averaged OMR of -2000 cfs, for at least 5 days, when turbidity at the Bacon Island monitoring station (OBI) is a daily average of 12 NTU or greater. To avoid triggering an OMR flow action during a sensor error or a localized turbidity spike that might be caused by local flows or a wind-driven event, Reclamation and DWR will consider and review data from other locations. In the event that the daily average turbidity at OBI is 12 NTU (or greater) and Reclamation and DWR believe that a Turbidity Bridge Avoidance action is not warranted based on additional data sources (isolated and/or wind-driven turbidity event at OBI), Reclamation and DWR will take no additional action and provide the supporting information to the Service within 24 hours.

3. During March-June, negative OMR flows should be managed at no more negative than -5000 cfs on a 14-day moving average or at the flow determined through use of Service-approved life cycle models to limit recruitment to stable levels.

Injury and mortality of adult, larval, and juvenile delta smelt are anticipated to be minimized due to active real-time management of OMR flow and turbidity in the south Delta as described in the PA. Incidental take resulting from operations of all south Delta CVP and SWP facilities is addressed in the ecological conditions described above consistent with the index equation approach to OMR Management described in the PA. If the conditions described above are not maintained, the amount or extent of the anticipated level of incidental take will be considered exceeded and reinitiation will be required pursuant to 50 CFR 402.16.

[…]

Effect of the Take

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to result in jeopardy to the delta smelt.

Reasonable and Prudent Measures

The Service has determined that the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of the delta smelt:

1. Minimize the adverse effects of the South Delta pumping facilities on delta smelt.
2. […]
3. […]
4. […].

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Reclamation and DWR shall comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

The following Terms and Conditions implement Reasonable and Prudent Measure Number 1:

1. Reclamation and DWR shall ensure the frequency of sampling for the south Delta export

facilities (Banks and Jones) will be at least 25% of the time the export facilities are in operation. If this cannot be achieved, the Service shall be notified on a real-time basis.

2. Reclamation and DWR shall update and provide fish salvage protocols for Skinner Fish Facility and the Tracy Fish Collection Facility to the Service within 1 year of the issuance of this biological opinion. Annual reports of salvage activities will be submitted to the Service documenting the operation and monitoring activities of the fish salvage facilities.
3. If it is determined that an independent panel is necessary to determine the efficacy of the proposed OMR Management actions, Reclamation shall seek technical assistance from the Service on development of the charter for that panel.
4. If Reclamation or DWR determine that a Turbidity Bridge Avoidance action is not necessary because the event is not believed to be related to an actual turbidity bridge, they will provide the supporting information, including the reason why the action is not warranted, within 24 hours, and the Service will respond within 24 hours. The action will be initiated until Reclamation, DWR, and the Service are in agreement that an action is not necessary.
5. Reclamation and DWR shall monitor OMR flow and turbidity levels (the surrogate parameter identified in the Amount or Extent of Anticipated Take section) at locations identified in the PA on a real-time basis. Reclamation and DWR shall ensure monitoring stations have appropriate redundancy to reduce the likelihood of data collection failure due to malfunction. This information shall be made available to the Service on a real-time basis to document the management of the system. This can be done through Bay Delta Live or a similar system. If the Service determines that conditions have led to the exceedance of anticipated take, reinitiation would be required.
6. Reclamation and DWR shall use Service life cycle models or other Service-approved models when available for the purposes of estimating proportion of the population affected by entrainment.
7. Reclamation shall seek technical assistance from the Service on the development of the charter for the independent panel for the proposed Four-Year Review of the "OMR management and measures to improve survival through the south Delta".
8. Reclamation and DWR will comply with all monitoring and reporting requirements as identified in the Reporting Requirements section, below.

[…]

Reporting Requirements

In order to monitor whether the amount or extent of incidental take anticipated from implementation of the PA is approached or exceeded, Reclamation shall adhere to the following reporting requirements. Should this anticipated amount or extent of incidental take be exceeded, Reclamation must reinitiate formal consultation as per 50 CFR 402.16.

1. Comply with reporting requirements included in the above Terms and Conditions.
2. […]
3. The Service must be notified within 24 hours of the finding of any injured or dead delta smelt or any unanticipated damage to its habitat associated with the PA. Notification will

be made to the contact below and must include the date, time, and precise location of the individual/incident clearly indicated on a U.S. Geological Survey 7.5 minute quadrangle or other maps at a finer scale, as requested by the Service, and any other pertinent information. When an injured or dead individual of the delta smelt is found, Reclamation and DWR shall follow the steps outlined in the Disposition of Individuals Taken section below.

C. NMFS ITS (Pages 809–821)

Section 13.3.5.3 CVP and SWP Pumping Facilities

[…]

At year five post-implementation of this Opinion, Reclamation and NMFS shall revisit the anticipated level of incidental take with new science and an expected new population-level index to determine the appropriate scalable take level.

Table 1. Maximum anticipated annual incidental take levels of listed species at the Bay-Delta pumping facilities.

Species	Measurement	Maximum Annual Quantity
Winter-run Chinook salmon	Loss of natural winter-run	1.3% of the juvenile production estimate (JPE) on a three-year rolling average or 2.0% of the JPE in any single year.
Winter-run Chinook salmon	Loss of hatchery winter-run - Sacramento River	0.8% of the estimated hatchery JPE (fish surviving to the Delta) from LNSFH released into the upper Sacramento River on a three-year rolling average or 1.0% of the JPE in any single year.
Winter-run Chinook salmon	Loss of hatchery winter-run - Battle Creek	0.8% of the estimated hatchery JPE (fish surviving to the Delta) from LNSFH released into Battle Creek on a three-year rolling average or 1.0% of the JPE in any single year.
CV Spring-run Chinook salmon – yearlings	Loss of late fall-run Chinook salmon from CNFH	1% of the estimated number of late fall-run Chinook salmon released from CNFH in each surrogate release group released into Battle Creek.
CCV Steelhead (naturally produced)	Loss of CCV steelhead December 1 - March 31	1,571 juveniles as a three-year rolling average or total loss of 2,760 in any single year
CCV Steelhead (naturally produced)	Loss of CCV steelhead April - June 15	1,725 juveniles as a three-year rolling average or total loss of 3,040 in any single year
Southern DPS Green Sturgeon	Salvage of sDPS Green Sturgeon	74 juveniles

[…]

RPM 5: Reclamation and DWR shall minimize the impact of the amount or extent of incidental take of listed species during operations of the Bay-Delta Division.

a. […]

b. Reclamation and DWR shall monitor the salvage and loss of winter-run Chinook salmon, CV spring-run Chinook salmon, fall-run Chinook salmon, late fall-run Chinook salmon, sDPS green sturgeon, and CCV steelhead, associated with the operation of the CVP's Jones and SWP's Harvey Banks pumping facilities.
    a. Reclamation and DWR shall monitor and calculate salvage and loss for winter-run Chinook salmon, CV spring-run Chinook salmon, CV fall-run Chinook salmon, CV late fall-run Chinook salmon, CCV steelhead, and salvage of sDPS green sturgeon at the Tracy Fish Collection Facility and Skinner Delta Fish Protective Facility.
        i. Reclamation and DWR shall prepare and submit to NMFS daily reports from October 1 through June 30 of each water year (or provide data online) regarding the observations of both salmonids and sDPS green sturgeon in the fish salvage facilities. Daily salvage sheets and the operational information needed to calculate salvage and loss shall be provided to NMFS (to a list of recipients updated each water year) or made available online. If, during the period from July 1 to September 30, salmonids and/or sDPS green sturgeon are observed in salvage, Reclamation and/or DWR shall notify NMFS through electronic mail and include the daily salvage sheets and operational information, or direct NMFS to where this information is available online.
        ii. During the October through June period of each water year, DWR and Reclamation shall prepare and submit to NMFS, Delta operations for salmonids and sturgeon and other relevant technical teams weekly reports summarizing salvage and loss over the previous week and for the water year to date (or provide data online).
        iii. No later than December 31, Reclamation and DWR shall submit to NMFS an annual report summarizing salvage and loss over the previous water year (October 1 to September 30).
    b. Reclamation and DWR shall undertake tissue sampling programs from natural origin salmonids, and coded wire tag samples from adipose fin-clipped juvenile winter-run Chinook salmon, CV spring-run Chinook salmon, and CCV steelhead and CV late- fall run Chinook salmon at the Tracy Fish Collection Facility and Skinner Delta Fish Protective Facility, for genetic analysis or tag removal/reading pursuant to appropriate sampling protocols and statistical power analyses.
        i. Reclamation and DWR shall submit incidental take reports from Tracy Fish Collection Facility and Skinner Delta Fish Protective Facility by December 31 of each year, to include the genetic results of the tissue samples.
        ii. Reclamation and DWR shall develop and submit for review and concurrence by NMFS a plan for tissue and whole fish or head processing and storage by December 31, 2020.
c. Reclamation and DWR shall minimize incidental take through the application of best management practices at the fish salvage facilities by developing coordinated protocols within 18 months of the effective date of this Opinion for the following three topics. Be the effective date of the Opinion, Reclamation and DWR shall provide the protocols currently being used.

a. Protocols for fish sampling and handling (from salvage through release), including a description of training procedures and the process for quality assurance and quality control of data.
b. Protocols for daily estimation of salvage or loss for each ESA-listed anadromous fish that include relevant calculations and identify the data and information sources necessary to perform the relevant calculations used to estimate fish salvage or loss.
c. Each facility shall include in their protocol a process to provide to NMFS, FWS, CDFW, DWR, and Reclamation staff the relevant data and information necessary to calculate fish salvage or loss. The protocol should specify whether and how pumping will be restricted during any salvage disruption, and whether and how salvage disruptions will be reflected in the estimation of salvage or loss. The protocol should include procedures used to implement the single year and cumulative loss thresholds for Delta operations.
d. Procedures for reporting salvage and loss for each ESA-listed anadromous fish (or relevant surrogate), including a description of the general content, frequency, and distribution of reports. Salvage and loss shall be reported daily (excepting weekends and holidays) from October 1 through June 30 and DWR and Reclamation shall submit to NMFS an annual report summarizing salvage and loss over the previous water year no later than December 31 of each year.

[…]

RPM 7: Reclamation and DWR shall monitor and report the amount and extent of incidental take described in Section 2.1 as necessary to implement this Opinion.

a. Reclamation and DWR shall monitor the amount and extent of incidental take through the continued use of programs and processes described in Appendix [C] (Should be C). Reclamation and DWR also shall annually maintain and update Appendix [C]G (should be C) as appropriate to describe the intended monitoring programs and how they will be used to monitor the amount and extent of take, how they will be applied to CVP and SWP water operation decision making and how they will be used for validation and effectiveness monitoring of Collaborative Planning actions.
b. […]

D. CDFW ITP (Pages 22–25; 66-94)

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.[1] 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.

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.

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

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. 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.

[…]

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

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.
- 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 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.

[…]

8.3.1 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).[2] 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 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,

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

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 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 index[3] 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

[3] 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.

described in Condition of Approval 8.1.4 (Collaborative Approach to Real-time Risk Assessment).

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 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 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 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 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 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 salmon[4] 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.

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

[4] 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.

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 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,[5] 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, 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

[5] 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.

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 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 25oC 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 22.2oC for 7 non-consecutive days in June, AND
    - Daily average water temperature at Prisoner's Point exceeds 22.2oC for 7 non-consecutive days in June.

III. Deliverables

Deliverables resulting from this effort generally follow the coordination described in Appendix C of the Proposed Action (PA) and Sections 3 and 8 of the ITP, and includes: (a) Fish and Water Operations Outlook, (b) Salmon Monitoring Team (SaMT) notes, (c) Smelt Monitoring Team

(SMT) notes, (d) PA Assessment, (e) ITP Risk Assessment, and, (f) Delta Monitoring Workgroup (DMW) notes. Section IV below details the processes to achieve these deliverables.

A. Fish and Water Operations Outlook

Information on current water and biological conditions, upcoming water operations, and relevant actions for protecting fish species (e.g., DCC Gate Operations). This information supports the Salmon and Smelt Monitoring Teams, DMW, Fish and Water Operation Stakeholder Coordination Call, WOMT, and Directors meeting.

B. Salmon Monitoring Team Notes

Captures the weekly discussion and other conversations not included in the Assessment on the status of species, the exposure to operations of the CVP and SWP, expected operations and controlling factors, and the potential sensitivity to changes in listed salmonid behaviors due to these elements.

DWR shall record and distribute regular meeting notes within two working days of each SaMT 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.

C. Smelt Monitoring Team Notes

Captures the weekly discussion and other conversations not included in the Assessment on the status of species, the exposure to operations of the CVP and SWP, and the potential sensitivity to changes in Delta Smelt and Longfin Smelt behaviors due to operations.

DWR shall record and distribute regular meeting notes within two working days of each SMT meeting to team members for review. DWR shall incorporate member comments and post final notes on a publicly available website.

D. Proposed Action Assessment – Old and Middle River Management

Technical analyses and input to support CVP and SWP operations for OMR management, including actions to meet performance measures for listed Chinook salmon and steelhead, actions to manage environmental surrogates for Delta Smelt; and actions for storm-related flexibility.

E. Incidental Take Permit Risk Assessment – Old and Middle River Management

Technical analyses and advice to support SWP operations for OMR management, including actions to meet performance measures for listed Chinook salmon, actions to manage environmental surrogates for Delta Smelt and Longfin Smelt, and actions for storm-related flexibility. The deliverable would be advice to WOMT, to be finalized by the end of the SMT and SaMT meeting. The Draft ITP Risk Assessment will include the advice to WOMT, but will not be finalized until after the SMT and SaMT have commented on it.

F. Delta Monitoring Workgroup Notes

Captures the weekly results of the DMW discussions for consideration by DWR and Reclamation.

IV. Process

Reclamation and/or DWR will convene and ensure facilitation is provided for the SMT, SaMT, and DMW (See Section X. for Weekly Schedule). This includes:

- Meeting scheduling and coordination
- Agenda development and distribution
- Coordinating preparation of presentation materials
- Taking notes
- Timely posting of notes and reports (including seasonal and annual reports) online

A. Salmon and Smelt Monitoring Teams

For the purpose of OMR Management, the SaMT and SMT (hereafter collectively Teams) will each have a kick-off meeting in October and meet as necessary until regular weekly meetings begin November 1 and run through June 30 of the water year, typically on Tuesdays. The Teams will include participants from federal and state agencies (Reclamation, USFWS, NMFS, DWR, CDFW, and State Water Resources Control Board [SWRCB]). The main focus of the Teams meetings are to: (1) review hydrologic, operational, fishery, and water quality data; (2) provide opportunities for engagement and discussion among biologists and operators on relevant information and issues; and, (3) provide input on the PA Assessment and advice on the ITP Risk Assessment (See Section V. and VI. for Teams Agendas) for WOMT. The results of the Teams discussions will be captured in the Assessments and meeting notes for consideration by WOMT.

The charge for these Teams is as follows:

- Assess listed species distributions, larval and juvenile smelt detection in salvage, biotic and abiotic conditions, model outputs, and other relevant information pertaining to the Assessments discussion;
- Assess potential weekly entrainment and loss of listed fish at the fish salvage facilities based on projected project operations, listed fish distribution, and forecasted conditions (e.g., flows, weather, tides);
- SaMT will follow the coordination process outlined in the DCC Guidance Document;
- Agency Teams leads are responsible to notify their agency's WOMT representative(s) if either a PA or ITP identified trigger and/or threshold is or will be met;
- Provide input on the PA Assessment and advice on the ITP Risk Assessment for WOMT/Directors; and
- Discuss and document differing perspectives (i.e., non-consensus) on the relevant assessments for WOMT/Directors.

The weekly Teams meetings will be divided into the following three parts:

- Part 1 – Updates on water operations and biological conditions
- Part 2 – Open discussion on species status (Structured-Unstructured Time)
- Part 3 – Live editing of the PA and ITP Risk Assessments

The Teams will be led by a facilitator or facilitators. The facilitator shall:

- Provide all meeting dates, agenda, and materials in advance, consistent with the schedule shown in Section IX;
- Ensure all Assessments, notes, and relevant materials are posted online;
- Ensure distribution of draft weekly notes to the Teams after each meeting, but never more than two working days later. Consolidate and incorporate Team edits to weekly notes and post final notes on Reclamation's website by the next meeting. Information from the monitoring team notes is expected to be reflected in other deliverables such as the Fish and Water Operations Outlook and Assessment;
- Ensure adherence by all participants to the Guidance Document, Agenda, and expectations below;
- Ensure everyone is provided an opportunity to share information during the Teams meetings, that members are not speaking over each other, and agencies are provided an opportunity at the end of the meeting to provide any final input/note any discrepancies.
- As needed, schedule follow-up meetings for critical issues requiring additional conversation time;

- Forward to WOMT for approval any recommendation by the Teams to invite a technical representative to participate in an upcoming meeting;
- At the end of the OMR season, in coordination with the Teams participants, complete an annual recap of accomplishments, lessons learned, and/or suggested updates to this Guidance Document;
- During the season/year, if a necessary and significant update is identified to the Guidance Document by the Teams, will provide any suggested updates to the Long-Term Operation Coordination Group for review and further consideration.

The Teams may recommend, for approval by the WOMT, to invite technical experts to participate in specific meetings of the Teams to assist with their discussion and analyses. Participants are expected to:

- Be knowledgeable and familiar with this Guidance Document. New participants shall review this Guidance Document prior to their first meeting;
- Review preliminary documents, evaluate available data, prepare additional materials for meeting, and review deliverables;
- Provide expert input on the PA Assessment and expert advice on the ITP Risk Assessment. Comments and discussion are succinct and focused on agenda items, allowing for and facilitating input by all participants;
- Discuss uncertainties, ambiguities, and issues ahead of meeting to the extent practical. Any critical issue should be brought up as soon as practical;
- Note any differing perspectives from team members and ensure the issue is properly documented in the Assessment, with any additional supporting information in the notes. If the issue rises to the level of elevation to WOMT, work through individual agency elevation process to present the issue to WOMT;
- Provide edits to the draft weekly Teams notes in a cumulative manner to other editors (one document per agency), for easy conforming by the facilitator;
- As appropriate, identify additional opportunities for engagement among biologists and operators on issues, recommend topics for further discussion and collaboration among monitoring team members, and discuss incorporating new information; and
- Document and suggest updates to the Facilitator, at any time, on this Guidance Document.

B. Assessments for Old and Middle River Management

Proposed Action Assessment

As Part 3 of the SaMT and SMT meetings, the Teams will provide input on the weekly assessments for Reclamation and DWR (See BOX 3) at the anticipated weekly operational range to reduce the future likelihood of exceeding the PA's single-year loss thresholds for listed

salmon and steelhead that trigger actions to manage OMR flows and manage environmental surrogates for Delta Smelt. Also, if a single-year loss threshold that would cause an OMR management action to be taken is exceeded, Reclamation and DWR will evaluate and adjust OMR restrictions by preparing an assessment measured against the potential to exceed the next single-year loss threshold using the same template (See BOX 3).

The assessments will include:

- current and projected operational actions and environmental conditions population status
- exposure to real-time operations and potential sensitivity to anticipated weekly operational range
- measures to ensure the PA and ITS requirements are met evaluation of alternative operations, if any

Reclamation and DWR will use information from the Teams, apply models, and provide the assessment to the DMW and WOMT by Tuesday afternoon for discussion at the Tuesday afternoon DMW and Wednesday afternoon WOMT meetings.

Incidental Take Permit Risk Assessment

The ITP requires that the Teams collaboratively develop weekly risk assessments that evaluate entrainment and routing risk into the central Delta and the exposure and OMR reporting risk for entrainment into the CVP/SWP fish collection facilities. Under the California Environmental Quality Act, CDFW is tasked with evaluating direct and indirect effects of the SWP as a whole and DWR is required to comply to a full mitigation standard. The ITP requires that the risk of entrainment into the interior Delta from the Sacramento River be characterized along with the risk of exceeding single year and daily loss thresholds for natural winter-run Chinook salmon, hatchery winter-run Chinook salmon, spring-run Chinook salmon, and spring-run Chinook salmon hatchery surrogates be evaluated weekly. While the ITP utilizes many of the same informational sources to develop risk assessments as does the PA Assessment, there are differences. These differences in the risk assessment requirements for the ITP are outlined in Box 3.

C. Delta Monitoring Workgroup

The DMW will include technical representatives from federal and state agencies and stakeholders. and will provide information to DWR and Reclamation on species abundance, species distribution, life stage transitions, and relevant physical parameters. The federal and state participants will be the agency leads and/or alternates from the SaMT and SMT. Similar to the federal and state agencies, the SWP and CVP contractors shall identify a lead and alternate participant who are knowledgeable and have expertise in water operations, monitoring, and fish biology. The main focus of the DMW meetings (typically Tuesday afternoon occurring after the Teams meetings) are to: 1) review hydrologic, operational, fishery, and water quality data; 2) provide opportunities for engagement and discussion among biologists and operators on relevant information and issues; and, 3) review the PA Assessment and ITP Risk Assessment (See

Section IX. Box 5 Agenda). The results of the DMW discussions will be captured in meeting notes for consideration by DWR and Reclamation.

D. Water Operations Management Team

The Teams will provide a weekly (typically on Tuesday afternoon) PA Assessment, ITP Risk Assessment, draft notes, Fish and Water Operations Outlook, and any other relevant materials to WOMT. For the ITP, the 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 DWR to implement an operational recommendation provided by CDFW. CDFW will provide its operational decision to DWR in writing. DWR shall implement the operational decision required by CDFW. DWR 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.

E. Updates to Guidance Document

It is expected that as this Guidance Document is being implemented there will be necessary revisions to provide further clarification and refinement. Reclamation and DWR, with technical assistance from the SWRCB, USFWS, NMFS, and CDFW, commit to reviewing this Guidance Document following each OMR management season, at a minimum, to identify and incorporate any necessary revisions.

V. Box 1: Salmon Monitoring Team Agenda

Date:

Salmon Monitoring Team Agenda

Roster: Bureau of Reclamation, Department of Water Resources, Department of Fish and Wildlife, U.S. Fish and Wildlife, National Marine Fisheries Service, State Water Resources Control Board.

- Roll-Call
- (Part 1) Update Water Operations and Biological Conditions. Review the Operations Outlook Document
    - Relevant Actions (e.g., DCC Gate Operations, Storm Flex)
    - Operations – Previous and Outlook
    - Review any updates in environmental data
    - Review of Status Relevant triggers.
- (Part 2) Potential open discussion on species status (Structured-Unstructured Time)
- (Part 3) Live edit Assessments
    - PA Assessment
        - Finalize input to Reclamation/DWR (describe any non-consensus)
    - ITP Risk Assessment
        - Finalize advice to WOMT (or describe lack of consensus)
- Additional Considerations/Next Meeting

Potential SaMT Questions for Discussion (Part 2 of Meeting)

For each species can discuss concurrently or separately:

- What life stages are present in the Delta region?
- What distribution data is available?
    - If no data is available, what abiotic factors can predict distribution?
    - Are conditions in the Central/South Delta conducive to length-at-date (LAD) natural winter-run Chinook salmon (WR), hatchery winter-run Chinook salmon (WRH), or natural Steelhead (SH) presence? (We could also point to past data indicating that fish may have moved into the area earlier in the season.)
- What abiotic factors are relevant?
    - Current and projected water operations, hydrology, and meteorology
- What modeling results are available to inform risk relative to thresholds?
- Have changes in abiotic factors and/or listed fish distribution, life stage, or behavior increased or decreased the risk of entrainment?
- Consolidation – how do the above factors combine to inform levels of risk and changes in risk?
    - Risk defined "high, medium/moderate, and low" means relative to potential of reaching cumulative thresholds, daily thresholds, and/or hatchery surrogate thresholds.
        - What lines of evidence support the ITP Risk Assessment?
        - What is the relative confidence or uncertainty of the conclusions?
        - What does WOMT need to know or be aware of for the coming week?
- Modeling versus Professional Opinion challenge:
    - Weekly Salvage prediction - Number of LAD
    - WR Weekly Salvage prediction - Number of WRH
    - Weekly Salvage prediction - Number of SH

VI. Box 2: Smelt Monitoring Team Agenda

Date:

Smelt Monitoring Team Agenda

Roster: Bureau of Reclamation, Department of Water Resources, Department of Fish and Wildlife, U.S. Fish and Wildlife, National Marine Fisheries Service, State Water Resources Control Board.

- Roll-Call
- (Part 1) Update Water Operations and Biological Conditions.
    - Relevant Actions (e.g., DCC operations, Storm Flex).
    - Operations – Previous and Outlook
    - Review any updates in environmental data
- (Part 2) Open discussion on species status (Structured-Unstructured Time)
    - Two species
        - Delta Smelt
        - Longfin Smelt
    - Life stages present
        - Review survey and environmental data to inform start and end of larval sampling.
    - Two regions
        - Outside Central/South Delta (Sac River & Confluence)
        - Inside Central/South Delta
    - Levels of risk and change in risk
        - Need to define what “high, medium/moderate, and low” risk mean when communicating to WOMT.
- (Part 3) Live edit Assessments
    - PA Assessment (Delta Smelt)
        - Finalize input on Reclamation/DWR (describe any non-consensus)
    - ITP Risk Assessment (Delta Smelt and Longfin Smelt)

        - Finalize advice to WOMT (or describe lack of consensus)
        - Finalize Executive Summary
        - Barker Slough
- Additional Considerations/Next Meeting

SMT Questions for Discussion (Part 2 of Meeting)

For each species:

- What life stages are present?
- What distribution data is available?
    - If no species data is available, what abiotic factors can predict fish distribution based on their historical distribution?
    - Are conditions in the Central/South Delta conducive to Delta Smelt or Longfin Smelt presence? (We could also point to past data indicating that fish may have moved into the area earlier in the season.)
- What abiotic factors are relevant?
    - E.g. temperature for spawning, migration cues, turbidity
- Have changes in abiotic factors increased or decreased risk of entrainment?

SMT Recommended Reading

- ITP Smelt Effects Analysis (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=178921&inline).
- Bennett (2005) Critical Assessment of the Delta Smelt Population in the San Francisco Estuary, California. San Francisco Estuary and Watershed Science 3(2). http://dx.doi.org/10.15447/sfews.2005v3iss2art1 Retrieved from https://escholarship.org/uc/item/0725n5vk.
- Castillo et al. (2018) Community Patterns and Environmental Associations for Pelagic Fishes in a Highly Modified Estuary. Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science 10:508-524. DOI: 10.1002/mcf2.10047 (https://afspubs.onlinelibrary.wiley.com/doi/pdfdirect/10.1002/mcf2.10047)
- Damon, L. J., Slater, S. B., Baxter, R. D., & Fujimura, R. W. (2016). Fecundity and reproductive potential of wild female Delta Smelt in the upper San Francisco Estuary, California. Calif Fish Game, 102, 188-210.

- Davis BE, Cocherell DE, Sommer T, Baxter RD, Hung TC, Todgham AE, Fangue NA. Sensitivities of an endemic, endangered California smelt and two non-native fishes to serial increases in temperature and salinity: implications for shifting community structure with climate change. Conservation physiology. 2019;7(1):coy076.
- Dege M, LR Brown. 2004. Effect of outflow on spring and summertime distribution and abundance of larval and juvenile fishes in the Upper San Francisco Estuary. Am Fish Soc Symp 39:49–65
- Hobbs, J. A., Lewis, L. S., Willmes, M., Denney, C., & Bush, E. (2019). Complex life histories discovered in a critically endangered fish. Scientific Reports, 9(1). https://doi.org/10.1038/s41598-019-52273-8
- Jassby A.D., W.J. Kimmerer, S.G. Monismith, C. Armor, J.E. Cloern, T.M. Powell, J.R. Schubel, and T.J. Vendlinski. 1995. Isohaline position as a habitat indicator for estuarine applications. Ecological Applications 5: 272-289. https://doi.org/10.2307/1942069
- Jeffries et al. (2016) Effects of high temperatures on threatened estuarine fishes during periods of extreme drought. Journal of Experimental Biology 219(11): 1705-1716. https://doi.org/10.1242/jeb.134528 (https://journals.biologists.com/jeb/article/219/11/1705/15168/Effects-of-high-temperatures-on-threatened)
- Kimmerer, W. J. (2008). Losses of Sacramento River Chinook salmon and delta smelt to entrainment in water diversions in the Sacramento–San Joaquin Delta. San Francisco Estuary and Watershed Science, 6(2).
- Komoroske LM, Connon RE, Lindberg J, Cheng BS, Castillo G, Hasenbein M, Fangue NA. Ontogeny influences sensitivity to climate change stressors in an endangered fish. Conservation physiology. 2014 Jan 1;2(1).
- Lenny F. Grimaldo, Ted Sommer, Nick Van Ark, Gardner Jones, Erika Holland, Peter B. Moyle, Bruce Herbold & Pete Smith (2009) Factors Affecting Fish Entrainment into Massive Water Diversions in a Tidal Freshwater Estuary: Can Fish Losses be Managed?, North American Journal of Fisheries Management, 29:5, 1253-1270, DOI: 10.1577/M08-062.1
- Moyle, P. B., Brown, L. R., Durand, J. R., & Hobbs, J. A. (2016). Delta smelt: life history and decline of a once-abundant species in the San Francisco Estuary. San Francisco Estuary and Watershed Science, 14(2).
- Nobriga ML, Sommer TR, Feyrer F, Fleming K. Long-term trends in summertime habitat suitability for delta smelt, Hypomesus transpacificus. San Francisco Estuary and Watershed Science. 2008;6(1).
- Polansky, L., Newman, K.B., Nobriga, M.L. et al. Spatiotemporal Models of an Estuarine Fish Species to Identify Patterns and Factors Impacting Their Distribution and Abundance. Estuaries and Coasts 41, 572–581 (2018). https://doi.org/10.1007/s12237-017-0277-3

- Sommer, T., Mejia, F. H, Nobriga, M. L, Feyrer, F., & Grimaldo, L. (2011). The Spawning Migration of Delta Smelt in the Upper San Francisco Estuary. *San Francisco Estuary and Watershed Science*, 9(2). doi:https://doi.org/10.15447/sfews.2014v9iss2art2 Retrieved from https://escholarship.org/uc/item/86m0g5sz
- Sommer, T. (2020). How to Respond? An Introduction to Current Bay-Delta Natural Resources Management Options. San Francisco Estuary and Watershed Science, 18(3).
- Swanson C, Reid T, Young PS, Cech Jr JJ. Comparative environmental tolerances of threatened delta smelt (Hypomesus transpacificus) and introduced wakasagi (H. nipponensis) in an altered California estuary. Oecologia. 2000 May 1;123(3):384-90.
- Tobias V, Baxter R. Fewer and Farther between: Changes in the Timing of Longfin Smelt (Spirinchus thaleichthys) Movements in the San Francisco Estuary. Preprint. https://doi.org/10.20944/preprints202101.0512.v1
- Wang 2007, "Spawning, Early Life Stages, and Early Life Histories of the Osmerids Found in the Sacramento-San Joaquin Delta of California," https://www.usbr.gov/mp/TFFIP/docs/tracy-reports/tracy-rpt-vol-38-spawning-early-life-stages.pdf.

VII. Box 3: Weekly Assessments for Old and Middle River Management

This Section VII, Box 3, provides an example outline for the PA Assessment and ITP Risk Assessment. The information and modeling tools identified below are not intended to be exhaustive, nor do they preclude any agency from utilizing other information and modeling tools to inform the Assessments.

A. Proposed Action Assessment

Section 1. Executive Summary

- Operations anticipated during the week
- Winter-run Chinook salmon summary
- Spring-run Chinook Salmon summary
- Central Valley Steelhead summary
- Green Sturgeon summary
- Delta Smelt summary
- Monitoring Teams summary – includes additional information supporting differing perspectives or non-consensus

Section 2. Operational and Regulatory Conditions

- Fish and Water Operations Outlook
    - Antecedent operational and regulatory actions, e.g., DCC Gate Closure, triggers such as First Flush, D-1641, fish and environmental triggers.
    - Current Controlling Factor(s) for exports
    - Tributary and Delta operational conditions
    - Related environmental and fish conditions
    - Relevant fish salvage/loss and environment conditions

Section 3. Biology, Distribution, and Evaluation

- Winter-run and Spring-run Chinook Salmon, Central Valley Steelhead
    - Population Status
    - Distribution

        - Current, historical trend, and forecasted distribution within the Central Valley and Delta regions.
    - Evaluation. Answer appropriate questions based on date and potential conditions and determine consistency with the PA:
        - After January 1, are more than 5% of juveniles from one or more salmonid species present in the Delta?
        - Do the operational outlook's ranges impact fish movement and change the potential distribution of fish?
            - Connect to potential effects within the 7 days (near term) in the operations outlook.
        - What is the likelihood of increased loss exceeding the next annual PA loss threshold (50%, 75%, or 90% of threshold) resulting in OMR management actions based on population distribution, abundance, and behavior of fish in Delta?
        - If an annual PA loss threshold has been exceeded, do continued OMR restrictions benefit fish movement and survival based on real-time information?
        - If OMR is more negative than -5,000 cfs, are there changes in spawning, rearing, foraging, sheltering, or migration behavior beyond those anticipated to occur under OMR management at -5,000 cfs?
- Green Sturgeon
    - Population Status
    - Distribution
        - Current, historical and forecasted distribution within the Central Valley and Delta regions
    - Evaluation. Answer appropriate questions based on date and potential conditions and determine consistency with the PA.
        - Is there likely to be salvage that may exceed the annual loss limit?
- Delta Smelt
    - Population Status
    - Distribution
        - Current, historical trend, and forecasted distribution within the Central Valley and Delta regions
    - Abiotic Conditions (Provide sentence or two addressing environmental surrogate used for Delta Smelt)

- Evaluation. Answer appropriate questions based on date and potential conditions and determine consistency with the PA.
    - Between December 1 and January 31, has any First Flush condition been exceeded?
    - Do Delta Smelt (DSM) have a high risk of migration and dispersal into areas at high risk of future entrainment? (December 1- January 31)
    - Has a spent female been collected?
    - If OMR of -2000 cfs does not reduce OBI turbidity below 12 Nephelometric Turbidity Unit (NTU)/Formazin Nephelometric Unit (FNU), what OMR target is deemed protective between -2000 cfs and -5000 cfs?
    - If OBI is 12 NTU, what do other station locations show?
    - If OBI is 12 NTU, is a turbidity bridge avoidance action not warranted? What is the supporting information?
    - After March 15 and if QWEST is negative, are larval or juvenile DSM within the entrainment zone of the CVP and SWP pumps based on surveys or other relevant data?
    - Based on real-time spatial distribution of Delta Smelt and currently available turbidity information, should OMR be managed to no more negative than -3,500 cfs?
    - What do hydrodynamic models, informed by Enhanced Delta Smelt Monitoring (EDSM) or other relevant data, suggest the estimated percentage of larval and juvenile DSM that could be entrained may be?

Attachments (as necessary)

B. State Water Project Incidental Take Permit Risk Assessment for Winter-run and Spring-run Chinook Salmon

Section 1: Overview

- Advice to WOMT (Portions of the ITP Risk Assessment that are live edited during the SaMT Team Meeting)
- Risk Assessment (Portions of the ITP Risk Assessment that are live edited during the SaMT Team Meeting)
    - Section 1-A: Sacramento River and Confluence
    - Section 1-B: Facilities Risk
    - Section 1-C: Annual Loss Threshold Risk
    - Section 1-D: Daily Loss Threshold Risk

Section 2: Basis for Advice

- List relevant Condition of Approval number and title based on species/life stage, time of year, etc.
- Discussion of Conditions of Approval (Provide sentence or two addressing criteria for each Condition of Approval listed in "Basis for Advice" section. Refer to data below where appropriate.)

Section 3: Hydrology and Operations

- Assessment of hydrologic, operational, and meteorological information. 8.1.5.1 A
    - Section 3-A: Water operations conditions 8.1.5.1 A. i:
    - Section 3-B: Water Operations Outlook 8.1.5.1 A. ii:
    - Section 3-C: Projected Conditions 8.1.5.1 A. iii:

Section 4: Distribution and Biology

- 8.1.5.1.B Assessment of biological information for CHNWR and CHNSR
    - Section 4-A: CHNWR population status 8.1.5.1.B i
    - Section 4-B: CHNSR population status 8.1.5.1.B ii
    - Section 4-C: Additional data sources to assess sensitivity to entrainment into the central and south Delta 8.1.5.1.C & D

Notes:

Attachments (as necessary)

State Water Project Incidental Take Permit Risk Assessment for Winter-run and Spring-run Chinook Salmon (Template)

Section 1: Overview

Date:

Life Stages Present:

Winter-run Chinook Salmon (juvenile)

Spring-run Chinook Salmon (juvenile)

Advice to WOMT:

Brief summary of advice to WOMT

ITP Risk Assessment:

Brief synopsis of overall risk for relevant species and life stages.

Section 1-A: Sacramento River and Confluence

Assessment of risk of entrainment into the central Delta and CVP/SWP facilities for CHNWR and CHNSR in the Sacramento River: (8.1.5.1 C ii, iii, iv and 8.1.5.1 B iii)

- Exposure Risk:
    - Winter-run Chinook Salmon
    - Spring-run Chinook Salmon
- Routing Risk:
    - Winter-run Chinook Salmon
    - Spring-run Chinook Salmon
- Overall Entrainment Risk:
    - Winter-run Chinook Salmon
    - Spring-run Chinook Salmon
- Change in risk of entrainment into the Central Delta:
    - Winter-run Chinook Salmon (Increased/decreased risk compared to last week)
    - Spring-run Chinook Salmon (Increased/decreased risk compared to last week)

Section 1-B: Central Delta

CVP/SWP facilities entrainment risk for CHNWR and CHNSR in the central Delta over the next week (8.1.5.1 D iii, iv, v)

- Exposure Risk:
    - Winter-run Chinook Salmon
    - Spring-run Chinook Salmon
- Reporting OMR/Export Risk: (Number and range of OMR bins will vary based on anticipated hydrology and operations)
    - OMR (Low export risk scenario)
        - Winter-run Chinook Salmon
        - Spring-run Chinook Salmon
    - OMR (Medium export risk scenario)
        - Winter-run Chinook Salmon
        - Spring-run Chinook Salmon
    - OMR (High export risk scenario)
        - Winter-run Chinook Salmon
        - Spring-run Chinook Salmon

Section 1-C: Annual Loss Threshold Risk

- Daily loss threshold risk and Alternative Actions
    - Salvage loss at the SWP and CVP facilities compared to estimated remaining population in Delta and upstream of the Delta:
        - Daily loss thresholds hit and subsequent loss and associated operations:
            - Natural origin winter-run Chinook salmon:
                - Monthly daily loss threshold:
                - Highest daily loss:
            - Hatchery origin spring-run Chinook salmon:
                - Highest daily loss:
            - Hatchery origin spring-run Chinook salmon surrogates:
                - Highest daily loss:

Section 2: Basis for Advice:

The 2020 Incidental Take Permit for Long-Term Operation of the State Water Project in the Sacramento-San Joaquin Delta 2081-2019-066-00 (ITP) states that advice to WOMT shall be consistent with the Project Description, Conditions of Approval in the ITP, and the applicable ESA authorizations. This week's advice is based on the following Conditions of Approval which are currently applicable:

List relevant Condition of Approval number and title based on species/life stage, time of year, etc.

8.6.1 Winter-run single-year loss threshold

8.6.2 Early-season natural winter-run Chinook salmon discrete daily loss

8.6.3 Mid- and Late-season natural winter-run Chinook salmon daily loss

8.6.4 Daily spring-run Chinook salmon hatchery surrogate loss threshold

8.7 OMR Flexibility During Delta Excess Conditions

8.8 End of OMR Management

Discussion of Conditions of Approval

Provide sentence or two addressing criteria for each Condition of Approval listed in "Basis for Advice" section. Refer to data below where appropriate.

Section 3: Hydrology and Operations

Assessment of hydrologic, operational, and meteorological information. 8.1.5.1 A

Section 3-A: Water operations conditions 8.1.5.1 A. i, iii:

- Antecedent Actions: (e.g. DCC Gate closure and actions such as integrated early winter pulse protection)
- Current Controlling Factor(s):
    - SWP
    - CVP
- Water Temperature:
    - Mossdale:
        - Number of days threshold exceeded:
    - Prisoners Point:
        - Number of days threshold exceeded:

- Tidal Cycle: (Spring/Neap. Note if tidal cycle has potential to affect south Delta hydrology or X2)
- Turbidity:
    - 8.3.1 Turbidity at Freeport (FPT) Dec 1 to Jan 31
- Salinity: X2
- Hydrologic Footprint:
    - Provide brief description of hydrologic footprint and summary of relevant DSM2 results.

Section 3-B: Water Operations Outlook 8.1.5.1 A, ii:

- Outages:
    - SWP
    - CVP
- Exports
    - SWP
    - CVP
- Meteorological Forecast: Precipitation, wind, air temperature. Are conditions (e.g., flow, turbidity, water temp) expected to change?
- Storm Event Projection:

Section 3-C: Projected Conditions 8.1.5.1 A, iii:

- DCC Gates position
- Sacramento River flow at Freeport: California Daily Exchange Center (CDEC) FPT daily average for day prior to call and expected changes
- San Joaquin River flow at Vernalis (VNS): CDEC VNS daily average for day prior to call and expected changes
- Qwest:
- OBI Turbidity: Is turbidity at OBI expected to change due to precipitation, wind, operations, or other factors?
- FPT: Is turbidity at FPT expected to change due to precipitation, wind, operations or other factors?
- Expected changes in South Delta Exports:
    - Corralitos Creek at Freeport (CCF):

- Tracy:

Table 1. Comparison of OMR and OMR Index

Date	Averaging Period	USGS gauges (cfs)	Index
Insert Date	Daily	Insert USGS gauges in cfs	Insert Index
Insert Date	5-day 14-day	Insert USGS gauges in cfs	Insert Index
Insert Date	Daily	Insert USGS gauges in cfs	Insert Index
Insert Date	5-day	Insert USGS gauges in cfs	Insert Index
Insert Date	14-day	Insert USGS gauges in cfs	Insert Index

Section 4: Distribution and Biology

8.1.5.1.B Assessment of biological information for winter-run Chinook salmon and spring-run Chinook salmon.

Section 4-A: Winter-run Chinook salmon population status 8.1.5.1.B i

- Adult escapement estimate:
- Redd distribution and fry emergence timing: JPE:
- Livingston Stone National Fish Hatchery release:
- Distribution of natural winter-run Chinook salmon
    - % of juveniles upstream of the Delta:
    - % of juveniles in Delta:
    - % of juveniles past Chipps Island:
- Distribution of Livingston Stone National Fish Hatchery winter-run Chinook salmon:
    - % of juveniles upstream of the Delta:
    - % of juveniles in Delta:
    - % of juveniles past Chipps Island:
- Distribution of Battle Creek winter-run Chinook salmon:
    - % of juveniles upstream of the Delta:
    - % of juveniles in Delta:
    - % of juveniles past Chipps Island:
- Change in risk of entrainment into the central Delta:
    - Change in routing risk of entrainment into the central Delta (comparison to previous week)

Section 4-B: Spring-run Chinook salmon population status 8.1.5.1.B ii

- Adult escapement estimate:
- Redd distribution and fry emergence timing:
- Hatchery release (in-river and downstream):
- Distribution of natural spring-run Chinook salmon:
    - % of juveniles upstream of the Delta:
    - % of juveniles in Delta:
    - % of juveniles past Chipps Island:
- Distribution of Feather River Fish Hatchery spring-run Chinook salmon:
    - % of juveniles upstream of the Delta:
    - % of juveniles in Delta:
    - % of juveniles past Chipps Island:
- Change in risk of entrainment into the central Delta:
    - Change in routing risk of entrainment into the central Delta (comparison to previous week)

Section 4-C: Additional data sources to assess sensitivity to entrainment into the central and south Delta 8.1.5.1C& D

- In-Delta distribution of winter-run and spring-run Chinook salmon
- Acoustic telemetry: Summary of acoustic telemetry tracking
- Trawls: List all relevant trawl surveys and brief overview of data. Insert tables, PDFs or other information as attachment at end of document. Include interruptions to sampling or other relevant information (e.g. canceled surveys, dropped stations)
- Rotary Screw Traps: List all relevant rotary screw trap surveys and brief overview of data. Insert tables, PDFs or other information as attachment at end of document. Include interruptions to sampling or other relevant information (e.g. canceled surveys, dropped stations)
- Seines: List all relevant seine surveys and brief overview of data. Insert tables, PDFs or other information as attachment at end of document. Include interruptions to sampling or other relevant information (e.g. canceled surveys, dropped stations)
- Hatchery release notifications: List all relevant hatchery release notifications
- New monitoring (as required by Condition of Approval 7.5.1, 7.5.2, and 7.5.3): Upstream monitoring results during transfer window, additional rotary screw trap monitoring

updates, additional acoustic tag study results, genetic identification results, trap capture efficiency trial results, and pathology results if available and relevant

- Distribution of juvenile winter-run and spring-run Chinook salmon estimated to be in the lower Sacramento and northern Delta
- Distribution of hatchery produced salmon indicated by real-time acoustic tracking of AT/CWT paired releases
- Anticipated emigration to continue into the Delta
- 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 week and river flows affecting routing into central and interior Delta
- Trend analysis: Provide brief description of historic trends if relevant (e.g. salvage patterns, onset of spawning). Refer to data or publications as needed
- Survival analysis: (e.g. Zeug and Cavallo CWT model)
- Tillotson entrainment model or other entrainment models as they become available Salvage trends in relation to OMR index: Provide overview of salvage data and insert salvage table as attachment at end of document
- Future export modifications: Describe anticipated or potential changes to exports

Attachments: Insert catch reports, DSM2 results, salvage tables, etc.

C. State Water Project Incidental Take Permit Risk Assessment for Delta Smelt and Longfin Smelt

Section 1: Overview

- Advice to WOMT (Portions of the ITP Risk Assessment that are live edited during the SMT Team Meeting)
- Risk Assessment (Portions of the ITP Risk Assessment that are live edited during the SMT Team Meeting)
    - Section 1-A: Sacramento River and Confluence
        - Risk of entrainment into central Delta and export facilities for Delta Smelt and Longfin Smelt in Sacramento River (8.1.5.2 C ii, iii, iv)
    - Section 1-B: Central Delta
        - Risk of entrainment for Delta Smelt and Longfin Smelt in the central Delta

Section 2: Basis for Advice

- List relevant Condition of Approval number and title based on species/life stage, time of year, etc.
- Discussion of Conditions of Approval (Provide sentence or two addressing criteria for each Condition of Approval listed in "Basis for Advice" section. Refer to data below where appropriate.)

Section 3: Hydrology and Operations

- Assessment of hydrologic, operational, and meteorological information. 8.1.5.2 A
    - Section 3-A: Water operations conditions 8.1.5.2 A. i:
    - Section 3-B: Water Operations Outlook 8.1.5.2 A. ii:
    - Section 3-C: Projected Conditions 8.1.5.2 A. iii:

Section 4: Distribution and Biology

- 8.1.5.2.B Assessment of biological information for Delta Smelt and Longfin Smelt
    - Section 4-A: Delta Smelt population status 8.1.5.2.B. i
    - Section 4-B: Longfin Smelt population status 8.1.5.2.B. ii.
    - Section 4-C: Additional data sources to assess sensitivity to entrainment Delta.
    - 8.1.5.2.C & D. i

Notes:

Attachments (as necessary)

State Water Project Incidental Take Permit Risk Assessment for Winter-run and Spring-run Chinook Salmon (Template)

Section 1: Overview

Date:

Life Stages Present:

Delta Smelt: Adult, Larvae, Juvenile

Longfin Smelt: Adult, Larvae, Juvenile

Advice to Water Operations Management Team (WOMT):

Brief statement describing outcome of SMT meeting

ITP Risk Assessment:

Delta Smelt: Summary of information supporting SMT decisions regarding Delta Smelt. Note if any Conditions of Approval (COAs) were triggered. Include discussion of Barker Slough operations (COA 8.12) if relevant.

Longfin Smelt: Summary of information supporting SMT decisions regarding Longfin Smelt. Note if any COAs were triggered. Include discussion of Barker Slough operations (COA 8.12) if relevant.

Section 1-A: Sacramento River and Confluence

Risk of entrainment into the central Delta and export facilities for Delta Smelt and Longfin Smelt in Sacramento River (8.1.5.2 C ii, iii, iv)

- Exposure Risk (Hydrology):
    - Delta Smelt:
    - Longfin Smelt:
- Routing Risk (Behavior and life history):
    - Delta Smelt:
    - Longfin Smelt:
- Overall Entrainment Risk
    - Delta Smelt:
    - Longfin Smelt:

Section 1-B: Central Delta

Risk of entrainment into the export facilities for Delta Smelt and Longfin Smelt in the central Delta

- Exposure Risk (Low, Medium, High):
    - Delta Smelt:
    - Longfin Smelt:
- Change in exposure from previous week: (Note: The change in risk compared to previous weeks is not required by the ITP).
    - Delta Smelt:
    - Longfin Smelt:
- Reporting OMR index (Number and range of OMR index bins will vary based on anticipated hydrology and operations)
    - OMR index Bin: Risk Level
    - OMR index Bin: Risk Level

Section 2: Basis for Advice:

The 2020 Incidental Take Permit for Long-Term Operation of the State Water Project in the Sacramento-San Joaquin Delta 2081-2019-066-00 (ITP) states that advice to WOMT shall be based the following COA:

List relevant Condition of Approval number and title based on species/life stage, time of year, etc.

Discussion of Conditions of Approval

Provide discussion addressing criteria for each COA listed in "Basis for Advice" section. Refer to data below where appropriate.

Section 3: Hydrology and Operations

Assessment of hydrologic, operational, and meteorological information. 8.1.5.2 A

Section 3-A: Water operations conditions 8.1.5.2 A. i:

- Antecedent Actions: (e.g. DCC Gate closure and actions such as integrated early winter pulse protection)
- Controlling Factor(s):
- Water Temperature:
    - CCF Daily Average Water Temperature =

    - Three Station Average =
- Tidal Cycle: Currently in a neap cycle. Anticipating a stronger spring tide at the end of the month.
- Turbidity:
    - 8.3.1 Turbidity Freeport 3-day average =
    - 8.5.1 OBI Turbidity =
- Salinity: X2
- Hydrologic Footprint: Provide brief description of hydrologic footprint and summary of relevant DSM2 results.

Section 3-B: Water Operations Outlook 8.1.5.2 A, ii:

- Outages:
    - SWP
    - CVP
- Exports
    - SWP
    - CVP
- Meteorological Forecast:
- Storm Event Projection:

Section 3-C: Projected Conditions 8.1.5.2 A, iii:

- DCC Gates position
- Sacramento River flow at Freeport:
- San Joaquin River flow at Vernalis
- Qwest:
- OBI Turbidity:
- Expected changes in South Delta Exports:
- Net Delta Outflow Index (NDOI):
- Upstream releases:
    - Keswick =
    - Nimbus =

- Goodwin =
- Oroville =

Table 1. Comparison of OMR and OMR Index (5-day and 14-day averages for OMR index and USGS gauge were reported on SacPAS website, accessed *Date.)*

Date	Averaging Period	USGS gauges (cfs)	Index
Insert Date	Daily	Insert USGS gauges in cfs	Insert Index
Insert Date	5-day	Insert USGS gauges in cfs	Insert Index
Insert Date	14-day	Insert USGS gauges in cfs	Insert Index

Section 4: Distribution and Biology

8.1.5.2.B Assessment of biological information for Delta Smelt and Longfin Smelt.

Section 4-A: Delta Smelt population status 8.1.5.2.B i

- EDSM:
- Fall Midwater Trawl (FMWT) Index for Delta Smelt
- Delta Smelt Life Cycle Model (LCM) discussion:
- Biological Conditions:
- % of population in Delta zones:
- SLS or 20mm Survey: Provide brief overview of Delta Smelt catch. Refer to attached catch table if available.
- Salvage:

Section 4-B: Longfin Smelt population status 8.1.5.2.B ii

- FMWT Index: Provide monthly indices if annual index is not available.
- 20 mm Survey 6 sampled from 6/1/2021 through 6/4/2021. Sample processing is 55% complete. Eight Longfin Smelt were collected downstream of the confluence of the Sacramento and San Joaquin Rivers. None were collected at the 12 stations listed in Condition of Approval 8.4.2. See attached catch table for more details.
- Other Surveys:
    - EDSM:
    - Chipps Island Trawl:
- Salvage

Section 4-C: Additional data sources to assess sensitivity to entrainment into Delta 8.1.5.1C& D i

List additional data sources. For example, X2 estimation tool.

Notes:

Attachments: PTM results, Catch Tables, etc.

VIII: Box 4: Weekly Water and Fishery Operational Outlook

DRAFT For Discussion 1/24/20

Weekly Operational Outlook

This Week's (1/21/19-1/27/19) Weather:

Light to Moderate Precipitation Today 1/21 into Tonight. Dry conditions return for most of week. Chance of wet weather pattern developing late next weekend.

Tributary/Divisions	Proposed Operational (Ranges)	Environmental and Fish Conditions Outlook (January 13-20, 2020)
Clear Creek	Whiskeytown Release: 275 cfs Temperature at Igo: N.A.	SCS eggs in gravel, hatching has begun FCS eggs in gravel, no hatching yet STH spawning to start soon.
Sacramento River	Shasta Storage: 3.35 MAF Shasta Release: 5000 cfs Temperature at Control Point (Currently Ball's Ferry): N.A.	N.AWCS outmigrating GST adults outmigrating SCS eggs in gravel, hatching has begun FCS eggs in gravel, no hatching yet STH spawning to start soon
Feather River	Oroville Storage: 2.13 MAF Oroville Release to Feather: 1,750-2,000 cfs	SCS eggs in gravel, hatching has begun FCS eggs in gravel, no hatching yet STH spawning to start soon
American River	Folsom Storage: 0.48 MAF Nimbus Release to American: 2,000 cfs Temperature at Watt Avenue: N.A.	SCS eggs in gravel, hatching has begun FCS eggs in gravel, no hatching yet STH spawning to start soon.
Stanislaus River	New Melones Storage: 1.98 MAF Goodwin Release to Stanislaus: 800 cfs OBB Temperature: N.A.	FCS eggs in gravel, no hatching yet STH spawning to start soon.
Delta	Freeport: 15,000-16,000 cfs Vernalis: 2,000-2,200 cfs Delta Outflow Index: 10,000-14,000 cfs JPP Export: 4,200 cfs CC Export: 2,100 cfs OMR Index Daily Value: -4,800 to -5,100 cfs X2 positions: 80 km QWEST: 0 to -2,000 cfs DCC: Closed	53-67% WCS present 40-45% SCS present STH outmigrating DSM: Not in high entrainment zone LFS: Not in high entrainment zone GST: Uncertain

IX. Box 5: Delta Monitoring Workgroup Agenda

Date:

Delta Monitoring Workgroup Agenda

Roster: Bureau of Reclamation, Department of Water Resources, Department of Fish and Wildlife, U.S. Fish and Wildlife, National Marine Fisheries Service, State Water Resources Control Board, CVP Stakeholder, SWP Stakeholder.

- Roll-Call
- Update Water Operations and Biological Conditions.
    - Relevant Actions (e.g. DCC operations, Storm Flex)
    - Operations - Previous and Outlook
    - Review any updates in Environmental Data
- Relevant Assessments
- Discussion Items
- Next Meeting

X. Weekly Schedule

Role or Group	Friday	Monday	Tuesday	Wednesday	Thursday
Facilitator	Operations Outlook Coordination Final Notes from Prior Week (confirming edits from reviewers	Review Modeling, Draft Water Ops Outlook, other relevant information not on SacPAS/electronically available and automated (DSM2, other) data sent out	Weekly Assessments and Outlook to SMT/SaMT/WOMT/DMW Draft Notes	N/A	Edits on notes
SaMT & SMT	Review prior week assessment Review available information (e.g., SacPAS)	Review Draft Water Ops Outlook, Other Information, SacPAS	Participate in SaMT, SMT, and DMW meetings	N/A	Revisions to notes due to facilitator Comments on ITP Risk Assessment
DMW	Review prior week assessment Review available information (e.g., SacPAS)	Review Draft Water Ops Outlook, Other Information, SacPAS	Review Final Assessment from SMT/SaMT and provide information to DWR and Reclamation	N/A	N/A
WOMT	N/A	N/A	N/A	Review Final Assessment from SaMT/SMT	N/A
Directors	N/A	N/A	N/A	N/A	TBD