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

Section 1: Overview

Date: 01/25/2022

Life Stages Present:

Delta Smelt (DS): Adults, sub-adults
Longfin Smelt (LFS): Adults, sub-adults, and larvae

Advice to Water Operations Management Team (WOMT):

No Advice.

Risk Assessment:

Delta Smelt: Based on distribution patterns over the past decade and rare detections, DS are unlikely to be prevalent in the south Delta, but a 54 mm, adipose clipped DS was salvaged at the Tracy Fish Collection Facility on 1/16/2022. Limited detection data support DS being present in the Sacramento Deep Water Ship Channel (SDWSC), lower San Joaquin River, south Delta, Suisun Marsh and the lower Sacramento River. One marked DS has been collected since 1/24/2022. High winds resulted in elevated turbidity at OBI on 1/22/2022 and 1/23/2022, but OBI turbidity did not reach 12 FNU and is currently decreasing. The likelihood of DS adult entrainment is elevated due to turbidity in the OMR corridor, but overall likelihood of entrainment remains low over the next seven days. Water temperatures are within the range for DS spawning.

Longfin Smelt: OMR is projected to be no more negative than -5,000 cfs due to initiation of OMR management. X2 is currently downstream of the confluence at 74 km. The SMT has determined that the overall risk of entrainment is low for larvae in the lower San Joaquin River and low for sub-adults, and adults based on PTM run and observed distribution. LFS adults are present in the Delta based on detections by Chipps Island Trawl and EDSM. There is evidence that spawning has occurred in the south Delta due to detections by Smelt Larva Survey (SLS) 1 and Larval Entrainment Pilot Study (LEPS). SLS 1 triggered 8.4.2 which required the SMT to meet on 1/21/2022 and conduct a Risk Assessment. SLS 1 detected an increase in larval density in the lower San Joaquin River and more widespread distribution in the south and central Delta which is expected due to increased emergence of larval LFS, however, this represents a seasonal norm and is consistent with the dryer hydrology observed this season. This may not represent an increase in risk for larvae in the lower San Joaquin River based on scenarios modeled in a PTM run. Risk of entrainment is high for larvae in the south Delta; however, an OMR recommendation would not affect the fate of simulated LFS larvae. This distribution is consistent with the expected upstream spawning distribution associated with drier hydrology.

LFS protections would be relaxed under wet conditions described in COA 8.4.3, however, the thresholds described within have not been met.

Barker Slough: The relevant COA (8.12) is not active based on the current Sacramento River Index Forecast as of January 1, 2022, being Below Normal. If subsequent water year forecasts reflect a drier hydrology of Dry or Critical, then 8.12 will become active.

Section 1-A: Sacramento River and Confluence

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

- Exposure Risk (Hydrology):
    - DS: Low. DS are expected to have made their migration in response to first flush and be holding in anticipation for temperatures conducive to spawning. Current water temperatures are within the range associated with spawning as reported in Damon et. al. (2016). Low turbidity persists in the OMR corridor, adult DS are associated with areas of higher turbidity.
    - LFS: Risk for larvae is low due to OMR management being initiated. See 'Routing Risk' for more information on adults and sub-adults.
- Routing Risk (Behavior and life history):
    - DS: Low to medium, however turbidity increased briefly due to high winds and created an area of elevated turbidity between the lower San Joaquin and Franks Tract. The daily average turbidity at OBI did not exceed 12 FNU.
    - LFS: Low risk of entrainment. Larvae do not exhibit swimming behaviors that would result in volitional movement into areas with a higher risk of entrainment. Spawning migration is underway. There is potential for adult and sub-adult movement into the central Delta. However, recent wet conditions, as indexed by X2, reduce the likelihood of adults and sub-adults moving into the south and central Delta. X2 has remained stable over the last week was insufficient to increase the likelihood of adult and sub-adult movement into the south and central Delta. X2 remains downstream of the confluence at 74 km.
- Overall Entrainment Risk:
    - DS: Low. Turbidity Bridge Avoidance is expected to maintain low turbidity conditions in the south Delta.
    - LFS: Low for adults, sub-adults and larvae, due to:
        - Exports targeting OMR no more negative than -5,000 cfs reduces risk of entrainment for larvae.
        - Lack of detections of adults and sub-adults in the Lower San Joaquin/South Delta.
        - Adult salvage has been rare following the Pelagic Organism Decline.

Section 1-B: Central Delta

Risk of entrainment into the export facilities for DS and LFS in the central Delta (8.1.5.2 D iii, iv, v)

- Exposure Risk (Low, Medium, High):
    - DS: Low. DS are present in the south Delta based on the detection of a marked fish in salvage. However, the likelihood of adult and sub-adult DS entrainment remains low given persistent low turbidity in the OMR corridor and operations targeting an OMR Index no more negative than -5,000 cfs. There is a high degree of uncertainty regarding the response of cultured fish to environmental cues typically applied to wild DS.
    - LFS: Low risk for adult and sub-adult LFS entrainment if they are present in the Lower San Joaquin River and south Delta. No LFS have been detected by EDSM in the southern Delta and Lower San Joaquin strata.
        - Low risk for larvae observed in the lower San Joaquin River by SLS 1. The SMT reviewed a PTM run and determined that while risk of entrainment into the OMR corridor and export facilities is low, the PTM results indicated a high residence time in the lower San Joaquin River (PTM injection point 812) over the forecasted period.
        - High risk for larvae already present in the south and central Delta (PTM injection points 901 and 902). A recommendation to restrict OMR at the scenarios modeled would not result in a substantial change in particle fate based on the PTM results.
        - SLS 1 triggered COA 8.4.2 (See Discussion of Conditions of Approval) likely due to continued emergence in the South and Central Delta.
- Change in exposure from previous week: (Note: The change in risk compared to previous weeks is not required by the Incidental Take Permit [ITP]).
    - DS: No change from last week. The detection in salvage on 01/16/2022 may represent a short-term increase in risk, however the single fish does not provide sufficient information to inform longer term risk of entrainment in the next week.
    - LFS: No change from last week for LFS larvae outside of the zone of influence of the export facilities. However, the presence of LFS larvae in south and central Delta has been confirmed by recent sampling. The scenarios modeled in the PTM run show that a recommendation would not affect particle fate which represent larvae in the central and south Delta.
- Reporting Old and Middle River Index (OMRI) (Number and range of OMRI bins will vary based on anticipated hydrology and operations)
    - The SMT determined that risk of entrainment is low across the range of expected OMRI values for fish outside of the Old and Middle River corridor. The SMT reviewed a PTM run with insertion points at 812, 901, and 902. Three scenarios included the following:
        - A baseline scenario in which exports are maximized within the limits of current controlling factors.
        - OMR = -4,000 cfs
        - OMR = -2,500 cfs

Section 2: Basis for Advice

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

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

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 greater than, or equal to, 50 Nephelometric Turbidity Units (NTU), OR
- The Smelt Monitoring Team determines that real-time monitoring of abiotic and biotic factors indicates a high risk of DS migration and dispersal into areas at high risk of future entrainment.

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

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

8.3.3 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[1] divided by 10, OR

[1] 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.

- Real-time monitoring of abiotic and biotic factors indicates a high risk of LFS movement into areas at high risk of future entrainment, as determined by DWR and CDFW Smelt Monitoring Team staff.

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

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.

8.5.1 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 and 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 in 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.

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

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

From March 1 through June 30 of dry and critical water years, Permittee shall reduce the maximum seven-day average diversion rate at BSPP to less than 60 cfs when larval DS are detected at Station 716. In addition, in its weekly meetings from March 1 through June 30, the Smelt Monitoring Team shall review DS abundance and distribution survey data and other pertinent abiotic and biotic factors that influence the entrainment risk of larval DS at the BSPP (including temperature and turbidity). When recommended by the Smelt Monitoring Team, and as approved through the decision-making processes described in Conditions of Approval 8.1.3 and 8.1.4, Permittee shall reduce the maximum seven-day average diversion rate at BSPP to less than 60 cfs.

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

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

Discussion of Conditions of Approval

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

COAs relevant to initiating OMR management went into effect December 1st. The Smelt Monitoring Team conducted a Risk Assessment based on COA 8.1.5.2.

8.3.1: This COA was triggered by conditions measured on 12/17/2021 when the running three-day average of daily flow and turbidity reached 27,152 cfs and 66.79 FNU respectively. Operations were reduced on 12/20/2021 targeting a 14-day average OMR index no more negative than -2,000 cfs for 14 consecutive days. After maintaining a 14-day average OMR index no more negative than -2,000 cfs for 14 days, Permittee shall maintain a 14-day average OMR index no more negative than - 5,000 cfs, initiating the OMR Management season, until the OMR Management Season ends (Condition of Approval 8.8).

8.3.3: This COA is no longer active due to the initiation of an Integrated Early Winter Pulse Protection (COA 8.3.1).

8.4.1: This COA is no longer active due to the detection of larval LFS by Smelt larva Survey (SLS).

8.4.2: This COA went into effect on 01/03/2022 following the 14-day Integrated Early Winter Pulse Protection (COA 8.3.1). SLS 1 was initially canceled due to COVID mitigation, however, the 12 south and central Delta stations listed in this COA were sampled on 1/18/2022. The resulting data triggered this COA by detection of larval LFS at more than four stations (809, 812, 815, 901, 906, and 910) and larval catch exceeded 5 fish per tow at two stations (809 and 812). See table 3 below for details

8.5.1: This COA went into effect on 01/03/2022 following the 14-day Integrated Early Winter Pulse Protection (COA 8.3.1). Current OBI turbidity levels are below the threshold.

8.5.2: The 2021 FMWT Annual Index for DS is zero for the fourth consecutive year. The salvage threshold is one Juvenile DS. No juvenile DS have been salvaged this water year. One cultured subadult DS (FL = 54 mm, adipose fin clipped) was salvaged on 1/16/2022.

8.12: This COA is not active due to water year type. The current water year type forecast is Below Normal. This COA may become active as the Water Year Type forecast is updated.

8.13: The Sacramento Valley Water Year Type Index (SVI) January forecast corresponding to the 50% probability of exceedance is 7.5 which is in the range for a Below Normal water year classification. The forecast was reported on the California Data Exchange Center (CDEC) Water Supply Index Webpage, accessed on 01/11/2022.

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. Delta Cross Channel [DCC] gate closure and actions such as integrated early winter pulse protection, etc.)*
    - COA 8.4.2 was triggered by data reported to the SMT on 1/20/2021. The SMT met on 1/21/2021 and did not provide advice.
    - OMR Management was initiated on 01/03/2021 following the 14-day Integrated Early Warning Pulse Protection action (COA 8.3.1).
    - COA 8.3.1 was triggered by conditions measured on 12/17/2021. Exports were reduced to comply with this COA on 12/20/2021 through 01/02/2021.
    - DCC gates closed on 11/30/2021.
    - The Drought barrier at False River has been notched. The notch is quite large, such that hydrodynamically no barrier is present.
- Controlling Factors: OMRI 7-day average no more negative than -5,000 cfs for 7 consecutive days (COA 8.4.2).
- Water Temperature:
    - Clifton Court Forebay (CCF) Daily Average Water Temperature = NA
    - 3 Station Average = 10.24°C

- Tidal Cycle: At bottom of neap tide going into relatively high spring tide on 1/31/2022 and 2/01/2022.
- Turbidity:
    - 8.3.1 Freeport 3-day average = NA
    - 8.5.1 Old River at Bacon Island (OBI) Turbidity = 7.43 FNU
- Salinity: X2 = 74 km
- Hydrologic Footprint: Particle Tracking Models were run with insertion points at 812, 901, and 902. The simulated period began on 1/18/2022 and includes historical data for the first week and forecasted data through the first week of February. Three scenarios included the following:
    - A baseline scenario in which exports are maximized within the limits of current controlling factors.
    - OMRI = -4,000 cfs
    - OMRI = -2,500 cfs
    - The duration of the simulation includes a period in early February in which other controlling regulations limited the simulated OMRI to -3,000 cfs. Therefore, there is little difference in the base case and -4,000 cfs OMRI scenarios.

Section 3-B: Water operations outlook. 8.1.5.2.A. ii

- Outages:
    - State Water Project (SWP): None
    - Central Valley Project (CVP): None.
- Exports: Combined exports are targeting an OMRI no more negative than -5,000 cfs.
    - SWP: 1,300 cfs on 1/25/2022. 1,500 to 1,700 the rest of the week.
    - CVP: 4,200 cfs
- Meteorological Forecast: No significant precipitation is in the forecast.

Section 3-C: Projected conditions. 8.1.5.2.A. iii

- DCC Gates position: Closed 11/30/2021.
- Sacramento River flow at Freeport is 12,600 cfs and is expected to decrease
- San Joaquin River flow at Vernalis is 900 cfs
- Qwest: -2,300 cfs and will likely become more negative until 02/01/2022, then will turn positive with reduction in exports to meet Chipps Days in February.
- OBI Turbidity: 9.26 FNU
- Expected changes in South Delta Exports: Exports are not expected to change substantially in the next 7 days. Exports are expected to decrease on 02/01/2022
- NDOI: 7,900 cfs and is expected to decrease.
- Upstream releases: (Note: upstream releases may increase due to flood management)
    - Keswick = 3,250 cfs
    - Nimbus = 2,500 cfs. Decreasing to 2,000 cfs on 1/26/2022.

- Goodwin = 200 cfs. Variable flow expected due to winter instability pulse and D-1641 requirements beginning 2/1/22.
- Oroville = 950 cfs

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 01/25/2022.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
01/25/2022	Daily	Not Reported	-4,900 cfs
1/22/2022	5-day	-4,850 cfs	-4,930 cfs
1/22/2022	14-day	-4,880 cfs	-4,980 cfs

7-day average OMR Index = -4,900 cfs

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

- The last DS (adipose fin clipped) detection occurred on 1/24/2022 in the Lower Sacramento River.
- EDSM sampled 12 sites form 01/17/2022 through 01/19/2022 and collected 1 marked DS in Suisun Marsh on 1/18/2022. One DS was collected in the Lower Sacramento River on 1/24/2022 and is reported in Table 1 below.
- Chipps Island Trawl did not collect any DS during sampling conducted from 1/16/2022 through 1/21/2022.
- Salvage: One cultured sub-adult DS (adipose fin clipped, 54 mm) was salvaged on 01/16/2022 at the Tracy Fish Collection Facility at Jones Pumping Plant, representing an estimated salvage of 4 DS. No DS have been salvaged at the Skinner Fish Collection Facility.
- Fall Mid-water Trawl (FMWT) Index for DS = 0
- DS life cycle model (LCM) discussion: NA
- Biological Conditions: Water temperatures are within the range conducive to Delta Smelt Spawning as reported in Damon et al. (2016).
- % of population in Delta zones: NA

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

- FMWT Index for LFS = 323
- Other Surveys:

- EDSM sampled 12 sites form 01/17/2022 through 01/19/2022 LFS in Suisun Marsh and collected 21 LFS. One LFS was collected in the Lower Sacramento River on 1/24/2022 and is reported in Table 1 below.
- Chipps Island Trawl From 1/16/2022 through 1/21/2022 completed 27 of the 30 scheduled tows and collected 5 LFS and no DS. See table 2 below for details.
- SLS 1 sampled only the 12 Central and South Delta stations on 1/18/2022 and collected 53 LFS and no DS. See table 3 below for details.
- Salvage: No LFS have been salvaged at either facility.

Section 4-C: Additional data sources to assess sensitivity to entrainment Delta.8.1.5.2.C & D. i

The SMT discussed turbidity as visualized on Bay Delta Live and summarized in the DWR Turbidity Report for 1/23/2022.

The SMT reviewed Damon et al. (2016) to inform the onset of DS spawning. This publication identifies 9 – 18°C as the approximate temperature range in which DS spawn.

Notes:

- FWS notified the SMT that the Lodi FWS webpage is being redesigned and will be down in the near future. They updated the distribution list for the Daily EDSM catch report and Weekly Abundance Estimate report and advised SMT members to contact them for data or to be added to a distribution list.
- Experimental release originally scheduled for last week has been rescheduled to occur on 2/2/2022 and 2/3/2022. At least 16,000 cultured Delta Smelt will be released in several hard releases over 2 days. Release locations are likely to be in the SDWSC or in Montezuma Slough.
- The SMT requested the initiation of qualitative larval sampling at both facilities. This effort is expected to begin in approximately 2 weeks.
- The SMT continued to work towards standardizing PTM runs and agreed that stations 812, 815 and 902 would be most informative. These stations may be adjusted based on hydrology and fish distribution.
- The SMT discussed the 2 unmarked DS collected by EDSM in December. Initial observation by FCCL staff indicate that they may be cultured fish in which the adipose fin was clipped in a manner that made it difficult to identify as originating from the experimental releases. Results from genetic analysis are not yet available.

Attachments: Table 1: EDSM Catch Table, Figure 1: EDSM Sample Locations, Table 2: Chipps Island Catch Table, Table 3: SLS 1 Catch Table

Table 1. Delta Smelt (DSM) and Longfin Smelt (LFS) catch per station for EDSM 2022 Phase 1 Kodiak trawls, from 1/18/2022–1/24/2022. These data are preliminary and subject to change.

Water Year	Phase	Station Code	Date	# Tows	Species	Mark Type	Fork Length	Total Catch	Stratum
2022	1	22-26-SBW03	1/24/2022	1	NA	NA	NA	NA	Suisun Bay
2022	1	22-25-GB01	1/18/2022	4	LFS	None	60	2	Suisun Marsh
2022	1	22-25-GB01	1/18/2022	4	LFS	None	63	1	Suisun Marsh
2022	1	22-25-GB01	1/18/2022	4	LFS	None	65	1	Suisun Marsh
2022	1	22-25-GB01	1/18/2022	4	LFS	None	67	2	Suisun Marsh
2022	1	22-25-GB01	1/18/2022	4	LFS	None	73	2	Suisun Marsh
2022	1	22-25-GB01	1/18/2022	4	LFS	None	74	1	Suisun Marsh
2022	1	22-25-GB01	1/18/2022	4	LFS	None	75	2	Suisun Marsh
2022	1	22-25-GB01	1/18/2022	4	LFS	None	78	4	Suisun Marsh
2022	1	22-25-GB01	1/18/2022	4	LFS	None	80	1	Suisun Marsh
2022	1	22-25-GB01	1/18/2022	4	LFS	None	81	1	Suisun Marsh

Water Year	Phase	Station Code	Date	# Tows	Species	Mark Type	Fork Length	Total Catch	Stratum
2022	1	22-25-GB01	1/18/2022	4	LFS	None	83	1	Suisun Marsh
2022	1	22-25-GB01	1/18/2022	4	LFS	None	86	1	Suisun Marsh
2022	1	22-25-SM01	1/18/2022	4	LFS	None	85	2	Suisun Marsh
2022	1	22-25-SM02	1/18/2022	3	DSM	AdClipped	85	1	Suisun Marsh
2022	1	22-25-RV01	1/19/2022	4	NA	NA	NA	NA	Lower Sac River
2022	1	22-25-RV04	1/19/2022	4	NA	NA	NA	NA	Lower Sac River
2022	1	22-25-RV05	1/19/2022	4	NA	NA	NA	NA	Lower Sac River
2022	1	22-26-LSR01	1/24/2022	4	DSM	AdClipped	65	1	Lower Sac River
2022	1	22-26-LSR01	1/24/2022	4	LFS	None	75	1	Lower Sac River
2022	1	22-25-LSSC01	1/18/2022	4	NA	NA	NA	NA	Sac DW Ship Channel

Water Year	Phase	Station Code	Date	# Tows	Species	Mark Type	Fork Length	Total Catch	Stratum
2022	1	22-25-LSSC02	1/18/2022	4	NA	NA	NA	NA	Sac DW Ship Channel
2022	1	22-25-USSC01	1/18/2022	4	NA	NA	NA	NA	Sac DW Ship Channel
2022	1	22-25-MIW01	1/18/2022	4	NA	NA	NA	NA	Southern Delta
2022	1	22-25-MIW02	1/18/2022	4	NA	NA	NA	NA	Southern Delta
2022	1	22-25-VC01	1/18/2022	4	NA	NA	NA	NA	Southern Delta

Unmarked DSM collected during Phase 1 are transferred alive to FCCL to contribute to DSM broodstock if tow temperatures are below 17°C. If tow temperatures are above 17°C, unmarked DSM are flash frozen in liquid nitrogen and transferred to the UC Davis Aquatic Health Program for processing. All marked DSM are flash frozen in liquid nitrogen and transferred to UC Davis for processing.

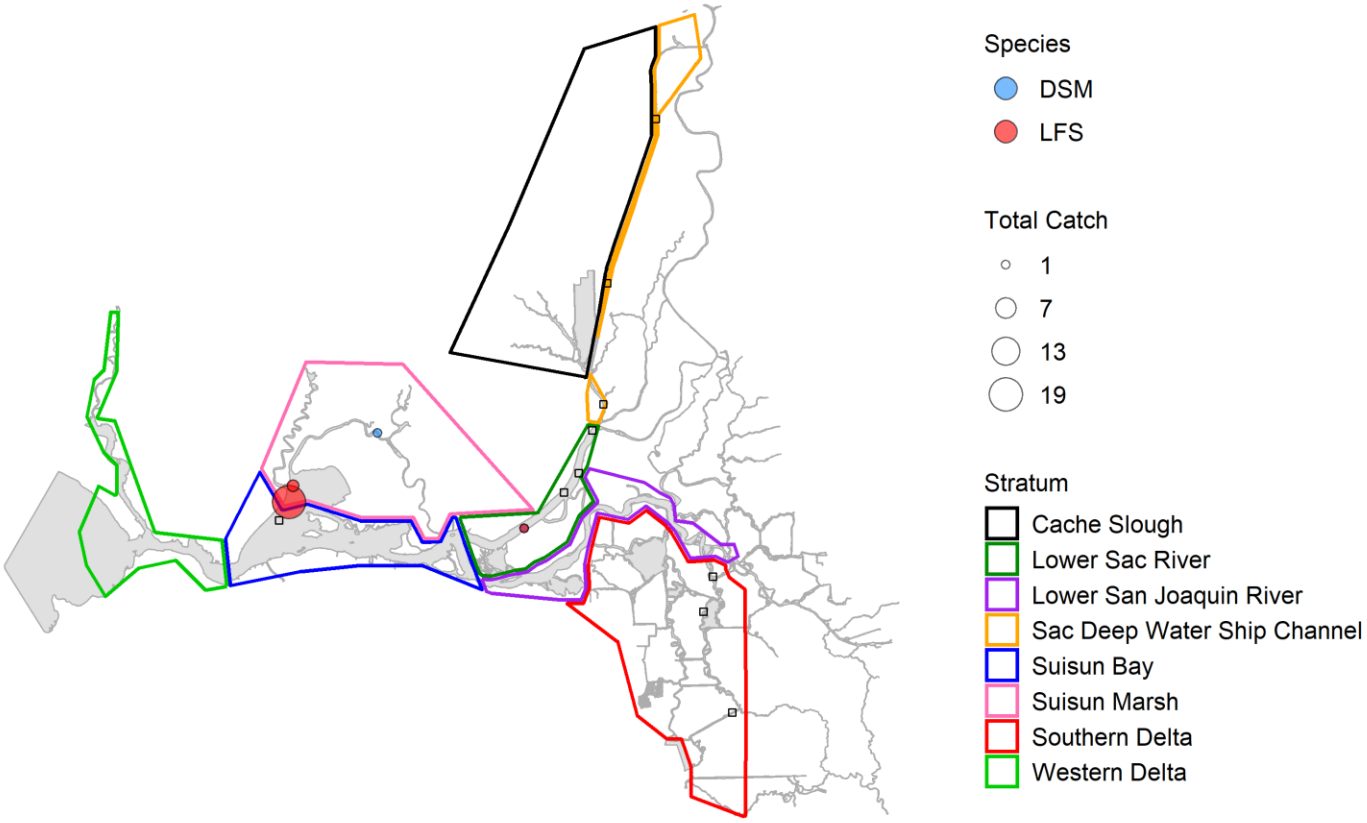

Figure 1. Delta Smelt (DSM) and Longfin Smelt (LFS) catch per station for EDSM 2022 Phase 1 Kodiak trawls, from 1/18/2022–1/24/2022. Sites with no DSM or LFS catch are indicated with squares.

Table 2. Delta Smelt (DSM) and Longfin Smelt (LFS) catch in Chipps Island mid-water trawls from 1/16/2022–1/19/2022. These data are preliminary and subject to change.

Year	Station Code	Date	Species	Fork Length	Total Catch	Mark Type	Maturation	Special Study	Location
2022	SB018S	1/16/2022	LFS	80	1	None	n/p	n/a	Chipps Island
2022	SB018N	1/16/2022	LFS	78	1	None	n/p	n/a	Chipps Island
2022	SB018N	1/16/2022	LFS	82	1	None	n/p	n/a	Chipps Island
2022	SB018N	1/16/2022	LFS	101	1	None	n/p	n/a	Chipps Island
2022	SB018S	1/18/2022	LFS	105	1	None	n/p	n/a	Chipps Island

As requested, LFS > 80 mm fork length collected in Chipps Island trawls during Dec-Apr are transferred alive to FCCL to contribute to LFS broodstock if tow temperatures are below 14.5°C. Generally, LFS collected >65 mm are checked for expression (M=milt, E=eggs, X=no expression). Fish transferred to FCCL are NOT expressed. All DSM are flash frozen in liquid nitrogen and transferred to the UC Davis Aquatic Health Program for processing. L*: Fish dead, taken back to LFWO lab for preservation.

Table 3 Longfin Smelt catch per station from 2022 Smelt Larva Survey, Survey 1. Longfin Smelt incidental take permit criteria stations are highlighted in blue (Barker Slough Pumping Plant) and yellow (South Delta exports). Survey 1 was delayed due to health concerns. A makeup day was conducted on 1/18/2022 to sample the priority south/central delta stations.

Year	Survey #	SLS Station	Turbidity (NTU)	Sample Status	Species	Smelt Catch	Min Length	Max Length	Mean Length
2022	1	340	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	342	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	343	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	344	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	345	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	346	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	347	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	348	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	349	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	405	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	411	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	418	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	501	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	504	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	508	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	513	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	519	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	520	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	602	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	606	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	609	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	610	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	703	NA	Not Sampled	NA	NA	NA	NA	NA

Year	Survey #	SLS Station	Turbidity (NTU)	Sample Status	Species	Smelt Catch	Min Length	Max Length	Mean Length
2022	1	704	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	705	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	706	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	707	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	711	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	716	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	723	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	801	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	804	NA	Not Sampled	NA	NA	NA	NA	NA
2022	1	809	n/a	Processed	Longfin Smelt	22	6	8	6.6
2022	1	812	13.1	Processed	Longfin Smelt	25	5	8	6.5
2022	1	815	9.2	Processed	Longfin Smelt	2	7	8	7.5
2022	1	901	n/a	Processed	Longfin Smelt	1	4	4	4.0
2022	1	902	6.8	Processed	NA	No Smelt Catch	NA	NA	NA
2022	1	906	6.2	Processed	Longfin Smelt	2	7	7	7.0
2022	1	910	9.1	Processed	Longfin Smelt	1	8	8	8.0
2022	1	912	7.7	Processed	NA	No Smelt Catch	NA	NA	NA
2022	1	914	6.8	Processed	NA	No Smelt Catch	NA	NA	NA
2022	1	915	6.4	Processed	NA	No Smelt Catch	NA	NA	NA
2022	1	918	5.9	Processed	NA	No Smelt Catch	NA	NA	NA
2022	1	919	6.1	Processed	NA	No Smelt Catch	NA	NA	NA

Processing is complete and all data quality control checked.