

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

Section 1: Overview

Date: 6/28/2022

Life Stages Present:

Delta Smelt (DS): Juveniles

Longfin Smelt (LFS): Juveniles

Advice to Water Operations Management Team (WOMT):

OMR Management for DS and LFS has ended for Water Year 2022. Daily mean water temperature at Clifton Court Forebay has exceed 25°C for three consecutive days (6/25/2022 through 6/27/2022).

Risk Assessment:

Delta Smelt: The off-ramp criterion was met on 6/27/2022 and the SMT concluded meeting on 6/28/2022.

Barker Slough: COA 8.12 was not triggered by 20mm survey 7, as no DS were detected at station 716. This COA off-ramps June 30th.

Longfin Smelt: The Conditions of Approval relevant to LFS have ended for Water Year 2022.

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 OMRI no more negative than -2,000 cfs, and convene the SMT 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 SMT 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 OMRI no more negative than -2,000 cfs for 14 days, Permittee shall maintain a 14-day average OMRI 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 OMRI no more negative than -5,000 cfs and initiate OMR Management (Condition of Approval 8.3) if:

- Cumulative combined LFS 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 index¹ 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 SMT staff.

When evaluating the possibility of LFS movement into areas that may be subject to an elevated risk of entrainment, the SMT 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 SMT 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 SMT 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 SMT may provide advice to restrict south Delta exports for seven consecutive days to achieve a seven-day average OMRI 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 SMT determines that a more restrictive OMR flow requirement is needed to minimize take of adult LFS, the SMT 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 SMT, or, if there is disagreement and resolution is not reached within WOMT, as determined by CDFW. The SMT 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 SMT 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 SMT 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 SMT 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 SMT 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 SMT shall provide advice on the appropriate OMR flow targets to minimize LFS entrainment or entrainment risk, or both. The SMT 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 SMT 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 SMT may convene to assess the risk of entrainment of DS (Condition of Approval 8.1.5.2). The SMT may provide advice to WOMET regarding changes in operations that could be conducted to minimize the risk of entrainment of DS (Condition of Approval 8.1.3). The SMT 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 WOMET 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 SMT for consideration during the development of a risk assessment to be provided to the WOMET 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 SMT 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 SMT may provide advice to further restrict south Delta exports to maintain a more positive OMR than -5,000 cfs. The SMT 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 SMT 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 SMT 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 SMT 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 SMT 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 SMT, 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 SMT.

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 SMT 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 SMT, 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 (SVI) unless otherwise noted.

Additionally, ITP COA 3.8 Describes the 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.

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 SMT 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 OMRI no more negative than -2,000 cfs for 14 days, Permittee shall maintain a 14-day average OMRI 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 SLS.

8.4.2: This COA went into effect on 1/03/2022 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).

- Data collected by SLS 2 triggered this action for the second time this season on 1/31/2022. Larval LFS were detected at four of the relevant stations (809, 812, 815 and 906) and catch per tow exceeded five LFS at two stations (809 and 812). The SMT did not advise a less negative OMR Index under this COA due to reduced exports.
- Data collected by SLS 3 did not trigger this COA.
- Data collected by SLS 4 triggered this action for the third time this season on 2/28/2022. Larval LFS were detected at five of the relevant stations (809, 812, 901, 902, and 915) and catch per tow exceeded five LFS at three stations (809, 812, and 901). However, the SMT did not advise a less negative OMRI under this COA due to low exports and positive Qwest. On March 8th the SMT requested a PTM run to help inform risk for larvae and determine if the fate of particles in the lower San Joaquin River and the central and south Delta would change if a recommendation to limit OMR was made. The injection points selected were at stations 812, 815, and 902. The scenarios modeled compared planned exports (-3000 cfs for a couple of days slowly ramping down to -1,400 cfs) with a recommendation to limit OMR to -1,250 cfs.
- Data collected by SLS 5 triggered this action for the fourth time this season on 3/11/2022. Larval LFS were detected at four of the relevant stations (809, 812, 815, and 901). Of the 21 larvae detected, 12 had yolk sacs indicating spawning is ongoing. On March 11th the SMT met to discuss the results of the PTM run and evaluate survey and salvage data. The PTM results show that with a more negative OMRI of -3,000 cfs as with the base case scenario 43% of particles are entrained into the facilities and into the OMR corridor after 3 weeks. Whereas the -1,250 cfs scenario showed 31% of particles are entrained into the facilities and into the OMR corridor after 3 weeks. This shows that at the more negative OMRI scenario (base case) there is an increased risk to larvae and juveniles in the OMR corridor, and this difference in particles entrained under different scenarios is consistent with prior years when recommendations to limit OMR were made. The SMT met on 3/15/2022 and continued the recommendation that was made on 3/11/2022 to limit OMRI to no more negative than -1,250 cfs for the protection of juvenile LFS. The SMT met on 3/22/2022 and discussed OMRI was expected to temporarily become as negative as -2,500 cfs on the 25th, however new PTM run results discussed showed very little to no difference in particles entrained into the OMR corridor and the projects between a -1,250 cfs recommendation and an OMRI temporarily as negative as -2,000 cfs. Therefore, the SMT decided not to continue the recommendation from 3/11/2022 and 3/15/2022.
- Data collected by SLS 6 and 20mm survey 1 triggered this action for the fifth time this season on 3/29/2022. SLS 6 detected 34 LFS larvae at 5 of the 11 stations processed so far in the central and south Delta (see table 1 in attachments), and densities were higher than those detected by SLS 5 earlier in March. Some of the

larvae detected by SLS 6 in the central and south Delta still had yolk-sacs. 20mm survey 1 detected 71 LFS larvae at 5 of the 6 stations processed so far in the central and south Delta (see table 2 in attachments). On March 29th the SMT met to discuss the results of the PTM run and evaluate survey and salvage data. After 3 weeks, the PTM run results show that 10% of the particles at 815 (lower San Joaquin River) were entrained into the OMR corridor and projects at the -5,000 cfs scenario, whereas 5% were entrained into the OMR corridor and projects at the -1,250 cfs scenario. PTM results also show that at station 902 with a more negative OMRI of -5,000 cfs as with the base case scenario, 63% of particles are entrained into the projects and into the OMR corridor after 3 weeks (27% to the projects, 36% into the OMR corridor). Whereas the -1,250 cfs scenario, showed 55% of particles entrained into the facilities and into the OMR corridor after 3 weeks (12% to the projects, 43% into the OMR corridor). This shows that a recommendation of -1,250 cfs on a 7-day average will help decrease risk of entrainment of LFS larvae and juveniles in the OMR corridor, particularly entrainment to the projects, under these two scenarios. Juvenile LFS salvage is increasing and expected to peak in April and May, this recommendation is made to help decrease the risk of higher salvage this year. The SMT continued this recommendation on 4/5/2022.

- Data collected by 20mm 2 triggered this COA for the 6th time this season on 4/11/2022. The SMT continued the -1,250 cfs recommendation on 4/12/2022 and on 4/19/2022. These recommendations were based on continued larval and juvenile LFS presence in the central and south Delta and continued LFS juvenile salvage.
- Data collected by 20mm survey 3 triggered this COA for the 7th time this season on 4/26/2022. The SMT continued the -1,250 cfs recommendation for the protection of larval and juvenile LFS. This recommendation was based on continued presence of larval and juvenile LFS in the central and south Delta and the sharp increase in LFS juvenile salvage over the previous week. On 5/3/2022 the SMT continued the -1,250 cfs recommendation for the protection of larval and juvenile LFS. This recommendation is based on continued presence of larval and juvenile LFS in the central and south Delta and continued elevated salvage of juvenile LFS over the past week.
- Data collected by 20mm survey 4 did not trigger this COA and on May 10th, the previous recommendation was lifted by the SMT.
- Data collected by 20mm surveys 5, 6, and 7 did not trigger this COA.

8.5.1: This COA went into effect on 1/3/2022 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 (fork length = 54 mm, adipose fin clipped) was salvaged on 1/16/2022.

8.8: Mean daily water temperature at Clifton Court Forebay has exceeded 25°C for three consecutive days (6/25/2022 through 6/27/2022).

8.12: This COA became active on 2/8/2022 when the Sacramento Valley Water Year Type Index (SVI) February Forecast was released. The forecasted value of 6.2 (50% exceedance) is within the range for a dry water year. SLS 2 detected larvae at station 716, however, this COA was not active at the time based on the January SVI. SLS 3 collected 3 LFS larvae at station 716. This data was reported to the SMT via email on 2/14/2022, triggering this COA for the first time this season thereby limiting BSPP maximum diversion rate to no more than 60 cfs on a 7-day average. SLS 4 did not detect LFS or DS larvae at station 716, therefore this COA was not triggered thereby removing the limitation on BSPP of no more than 60 cfs exports on a 7-day average that was previously triggered by SLS 3. SLS 5 collected 3 LFS larvae at station 716. This data was reported to the SMT via email on 3/11/2022, triggering this COA for the second time this season. 20-mm survey 1 detected 5 larval DS on 3/21/2022, triggering this COA for the third time this season. BSPP LFS protections off-ramped March 31st. An amendment to this COA was approved on April 1st that allows the permittee to meet and confer with CDFW in the event this COA is triggered to determine if a higher maximum export rate than 60 cfs is needed for health and safety. 20-mm 2 did not detect DS at 716, so this COA was not triggered thereby removing the limitation on BSPP of no more than 60 cfs exports on a 7-day average on April 11th that was previously triggered by 20mm 1. 20mm surveys 3, 4, 5, and 6 did not detect DS at station 716, so this COA was not triggered.

8.13: The SVI February forecast corresponding to the 50% probability of exceedance is 6.2 which is in the range for a Dry water year classification. The forecast was reported on the California Data Exchange Center (CDEC) [Water Supply Index Webpage](#), accessed on 2/8/2022. The updated March SVI forecast was released on 3/8/2022 is 4.8 (50% exceedance) within the range for a critically dry water year. The updated April SVI forecast was 4.2 (50% exceedance) within the range for a critically dry water year.

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.)*
 - OMR Management was initiated on 1/3/2022 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 1/2/2022.
 - DCC gates closed on 11/30/2021. Opened on May 27th and closed again on May 31st.
 - The Emergency Drought barrier at False River reconstruction was completed on 4/13/2022.

- The Old River, Middle River, and Grant Line Canal Agricultural Barriers installations are now complete.
- OMR Management for DS and LFS was off-ramped on 6/28/2022 after the mean daily water temperature at Clifton Court Forebay exceeded 25°C for three consecutive days (6/25/2022 through 6/27/2022).
- Controlling Factors: Combined exports are targeting a Net Delta Outflow Index (NDOI) of 4,000 cfs, combined exports are limited to 1,500 cfs when NDOI is below 7,100 cfs for April through June per the TUCO ([link to TUCO](#)). Starting July 1st, the regular D-1641 water quality requirements will be in effect, with the most restrictive requirement through August 15th being the 14-day average salinity requirement at Emmaton.
- Water Temperature:
 - Clifton Court Forebay (CCF) Daily Average Water Temperature = 25.8°C, 3 days > 25°C
 - 3 Station Average = 23.5°C
- Tidal Cycle: Peak of moderate neap tide, anticipating stronger spring tide that will peak mid-month and cause challenges with meeting Delta salinity requirements. Releases increased to proactively help address salinity challenges.
- Turbidity:
 - 8.3.1 Freeport 3-day average = NA
 - 8.5.1 OBI Turbidity Daily Average = 2.36 FNU.
- Salinity: X2 is > 81 km. Estimated at 95.8 km.
- Hydrologic Footprint: not discussed

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

- Outages:
 - State Water Project (SWP): Banks shut down on 6/28 – 7/2 for herbicide application
 - Central Valley Project (CVP): None
- Exports: Combined exports limited to 1,500 cfs when NDOI is below 7,100 cfs for April through June per the TUCO.
 - SWP: 0 to 600 cfs, radial gates closed yesterday at 0700 and an herbicide treatment was conducted in Clifton Court, radial gates will remain closed until Thursday. Banks will resume pumping on July 2nd.
 - CVP: 900 to 1,800 cfs

Meteorological Forecast: No significant precipitation is in the forecast.

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

- Warm and dry conditions continue
- DCC Gates position: Opened May 27th and closed again on May 31st. Plan to open on July 1st for the holiday weekend and may keep open depending on salinity.
- Sacramento River flow at Freeport 9,700 cfs.

- San Joaquin River flow at Vernalis 850 cfs yesterday.
- Qwest: -800 cfs
- Expected changes in South Delta Exports: Exports will increase after June 30th when the TUCO is no longer in effect.
- NDOI: 5,000 cfs yesterday.
- Upstream releases:
 - Keswick = 4,500 cfs
 - Nimbus = 5,000 cfs
 - Goodwin = 900 cfs to meet D-1641 Vernalis flow requirements, will decrease to 300 cfs Friday.
 - Oroville = 4,000 cfs, evaluating if need to go up to 4,500 cfs later this week.

Table 1: Comparison of OMR and OMR Index (all values from [SacPAS website](#), accessed 6/28/2022).

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
6/23/2022	Daily	-3,280 cfs	-1,820 cfs
6/23/2022	5-day	-2,490 cfs	-1,780 cfs
6/23/2022	14-day	-2,400 cfs	-1,760 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 marked adult DS detection occurred on 4/14/2022 in Suisun Marsh (n=1), another was caught on 4/13/2022 in the SDWSC, both were pre-spawn males. The last wild adult DS detection occurred on 1/5/2022 in the lower Sacramento River stratum. Larval fish haven't been detected in surveys since April 7th but may still be present at low densities. Water temperatures are increasing and approaching the thermal maximum at which spawning is expected, so spawning is likely winding down for the season. Several juveniles were detected and confirmed by EDSM in the last few weeks in the SDWSC, with the last detection on June 6th (FL=22.5mm).
- Spring Kodiak Trawl: SKT 5 was on the water from 5/9/2022 through 5/12/2022, this was the final survey for this season. No DS were detected.
- 20mm: Survey 7 was on the water from 6/13/2022 through 6/16/2022, processing is ongoing and so far, no DS have been detected. Preliminary data is in table 1 of the attachments. The 20mm season total for DS is now 9. Survey 8 is on the water this week, no data is yet available.

- EDSM: From 6/19/2022 through 6/25/2022 EDSM completed sampling at 40 sites. Currently there is no catch data to report for last week, but it is included along with effort and sample processing status in table 2 in attachments. Processing is ongoing and data is preliminary. The total EDSM DS count for the Phase 2 season is now 18 confirmed. Preliminary data for each week of phase 2 is summarized in table 2 in attachments. So far, the postlarval/juvenile abundance estimate for the week of June 6th-June 10th was 1,633, processing is ongoing.
- Chipps: From 6/19/2022 through 6/25/2022 Chipps Island Trawl completed all of the 30 scheduled tows and collected no DS.
- Bay Study: Survey 6 sampling is complete, and no DS were detected.
- Salvage: No DS have been salvaged at either facility in the past seven days. Qualitative larval sampling ended on June 7th at both facilities.
- FMWT Index for DS = 0
- DS life cycle model (LCM) discussion: NA
- Biological Conditions: Water temperatures are above the upper thermal range limit that is conducive to spawning as reported in Damon et al. (2016), larval fish have not been detected since April 7th, but may still be present at low densities. Spawning is likely to be winding down for the season.
- % of population in Delta zones: NA

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

- FMWT Index for LFS = 323
- Spring Kodiak Trawl: SKT 5 was on the water from 5/9/2022 through 5/12/2022, this was the final survey for this season. 92 LFS were detected; four were caught in the lower Sacramento River, 31 were caught in Suisun Bay, and 57 were caught in Suisun Marsh.
- 20mm: Survey 7 was on the water from 6/13/2022 through 6/16/2022, processing is ongoing and so far LFS have been detected in the confluence and Suisun Bay. Preliminary data is in table 1 of the attachments. Survey 8 is on the water this week, no data is yet available.
- EDSM: From 6/19/2022 through 6/25/2022 EDSM completed sampling at 40 sites. Currently there is no catch data to report for last week, but it is included along with effort and sample processing status in table 2 in attachments. Processing is ongoing and data is preliminary. So far larval and juvenile LFS were detected in Suisun Bay, Suisun Marsh, and the lower Sacramento River in recent weeks.
- Chipps: From 6/19/2022 through 6/25/2022 Chipps Island Trawl completed all of the 30 scheduled tows and collected no LFS.
- Bay Study: The June Bay Study survey is now complete. They caught 928 LFS, including 927 juveniles and 1 adult. Most fish were caught in Suisun and San Pablo Bay, but LFS were caught from the lower Sacramento River down to Central and South Bay.
- LEPS sampling with the 20mm net ended May 12th and sample processing is ongoing, however final data will not be available until later this. Larval LFS were detected at low densities as of sampling conducted on 2/25/2022. No yolk sac larvae were present as of

February 25th. An additional larva (FL=10mm) was reported from the March 18th LEPS samples from the SLS gear.

- Salvage: From 6/19/22 through 6/26/22, no LFS were salvaged. Seasonal salvage remains at 7,448 juvenile LFS this season. This is much higher than total salvage was in WY2020 or WY2021 and the highest salvage observed since 2002.
- Qualitative larval sampling began at both facilities on February 7th and ended on June 7th.

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

Notes:

- The SMT discussed pre-season meeting topics. With SMT meetings starting again on November 1st, there will be five meetings in November before any of the permit conditions come into effect December 1st, so there should be plenty of time to cover each of these topics at the beginning of the season.
- A Doodle Poll has been sent out to schedule a post-season meeting. the SMT tentatively plans to meet the week of July 12th with the time to be determined.

Literature cited:

Damon, L. J., S. B. Slater, R. D. Baxter, and R. W. Fujimura. 2016. Fecundity and reproductive potential of wild female Delta smelt in the upper San Francisco Estuary, California. California Fish and Game 102(4):188–210.

Attachments: Table 1: 20mm survey 7 Catch Table, Figure 1. 20mm Sampling Locations, Table 2: EDSM Catch Table,

Table 1. Delta Smelt and Longfin Smelt catch per station from 2022 20-mm Survey 7, which was in the field 6/13/2022 – 6/16/2022. These data are preliminary and subject to change. Reduced tow times of 5 minutes indicated with *. Reduced tow times of 2.5 minutes indicated with **. Stations with dropped tows indicated with ***. Processing complete through 6/27/2022.

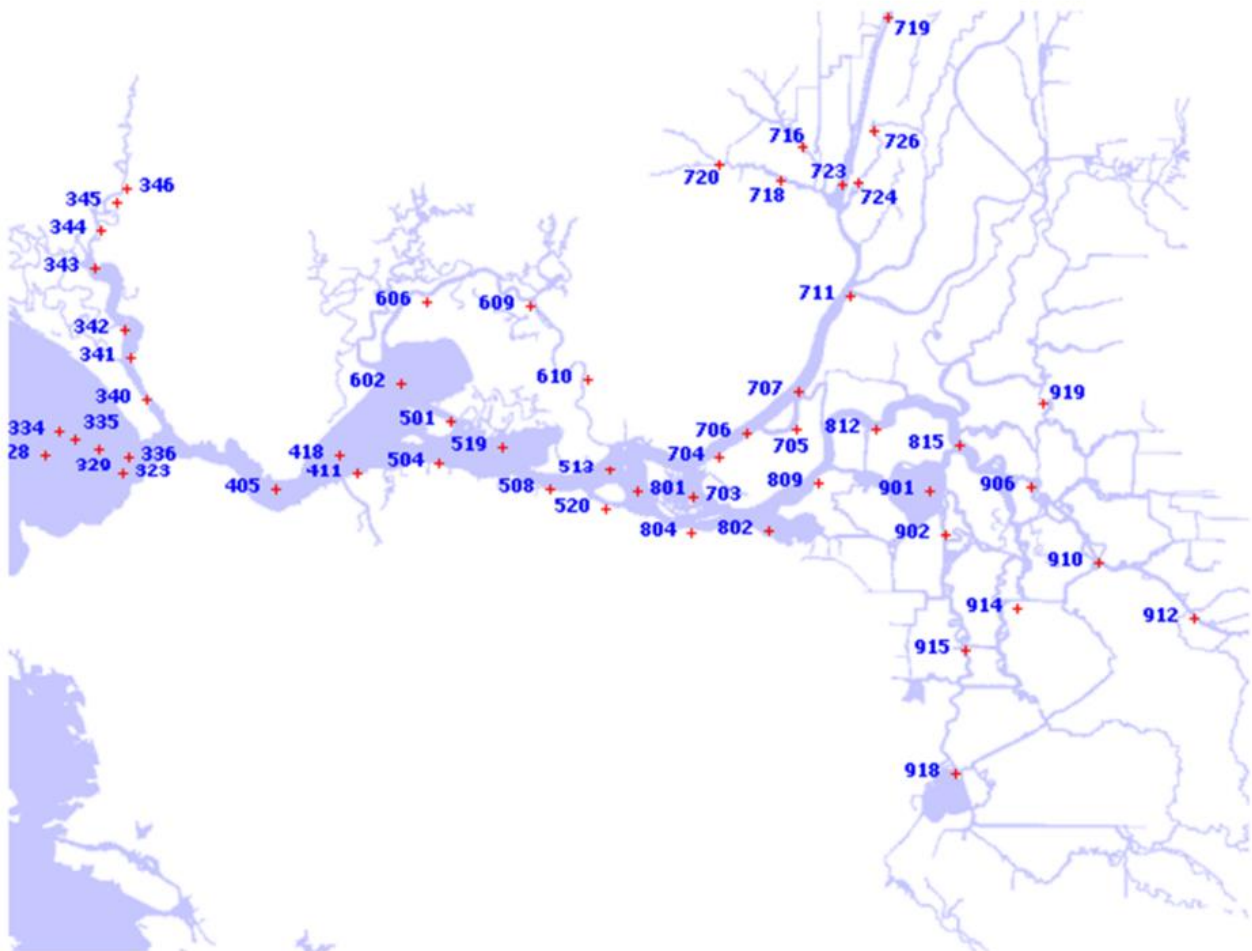
Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length	Region
2022	7	323	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	340	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	342	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	343	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length	Region
2022	7	344	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	345	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	346	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	405	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	411	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	418	14-Jun-22	3	Longfin Smelt	11	28	37	33.3	Suisun Bay & West
2022	7	501	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	504	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	519	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	602	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	606	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	609	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	610	NA	0	Not Yet Processed	NA	NA	NA	NA	Suisun Bay & West
2022	7	508	NA	0	Not Yet Processed	NA	NA	NA	NA	Confluence
2022	7	513	16-Jun-22	3	Longfin Smelt	7	31	36	34.1	Confluence
2022	7	520	NA	0	Not Yet Processed	NA	NA	NA	NA	Confluence
2022	7	801*	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Confluence
2022	7	804	14-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Confluence
2022	7	703	15-Jun-22	2	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	704	13-Jun-22	1	No Smelt Catch	0	NA	NA	NA	Sac. River System

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length	Region
2022	7	705	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	706*	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	707*	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	711	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	712	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	716	15-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	718	15-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	719	15-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	720	15-Jun-22	2	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	723	15-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	724	15-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	726	15-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Sac. River System
2022	7	809	14-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Central & South Delta
2022	7	812	14-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Central & South Delta
2022	7	815	14-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Central & South Delta
2022	7	901**	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Central & South Delta
2022	7	902	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Central & South Delta
2022	7	906	14-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Central & South Delta
2022	7	910	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Central & South Delta

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length	Region
2022	7	912	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Central & South Delta
2022	7	914	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Central & South Delta
2022	7	915	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Central & South Delta
2022	7	918	13-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Central & South Delta
2022	7	919	14-Jun-22	3	No Smelt Catch	0	NA	NA	NA	Central & South Delta

Figure 1. 20mm sampling locations.



[illegible]

[illegible]

[illegible]

[illegible]