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

Section 1: Overview

Date: 3/07/2023

Life Stages Present:

Delta Smelt (DS): Sub-adults and Adults
Longfin Smelt (LFS): Larvae, Sub-adults, and Adults

Advice to Water Operations Management Team (WOMT):

No recommendation to WOMT this week.

Turbidity has remained below 12 FNU and may be variable with forecasted precipitation and elevated San Joaquin River flows. If the daily turbidity at OBI exceeds 12 FNU, DWR will operate to the SWP share of an OMRI of -2,000 cfs for five days in accordance with ITP Condition of Approval (COA) 8.5.1.

Risk Assessment:

Delta Smelt: Based on recent detection data and distribution patterns over the past decade, the Delta Smelt population has completed migration and is widely distributed throughout the Delta. Water temperatures are suitable for spawning (Damon et al. 2016). The response of cultured fish to environmental cues typically applied to wild Delta Smelt is highly uncertain. Since 2/21/2023, three marked adult Delta Smelt, total, have been detected by surveys in the Lower Sacramento River, Suisun Marsh and the Sacramento Deep Water Ship Channel, and five marked Delta Smelt were detected at the CVP and SWP. Under the PA, the Turbidity Bridge Avoidance Action off-ramped starting 2/9/2023 due to detections of ripe Delta Smelt. While a turbidity bridge is not currently in place, precipitation is predicted later this week, likely leading to higher flows and widespread turbidity. If the daily turbidity at OBI exceeds 12 FNU, DWR will operate to the SWP share of an OMRI of -2,000 cfs for five days in accordance with ITP COA 8.5.1. Overall risk for entrainment is moderate for Delta Smelt within the lower San Joaquin River and high for fish within the OMR corridor; however, risk is low outside of these areas. Salvage of Delta Smelt is ongoing and in recent years, adult salvage of Delta Smelt reached the 50th percentile in late February or early March (see SacPas, https://www.cbr.washington.edu/sacramento/tmp/hrtsalvage_1676407207_694.html). Additional salvage is likely, considering OMRI at -3000 to -5000 cfs.

Longfin Smelt: COA 8.4.3 was triggered on 3/3/23 and remains triggered with San Joaquin River flow at Vernalis continuing to exceed 5,000 cfs, temporarily off-ramping COA 8.4.2 even though it remains triggered with the detection of 14 larvae in the Central and South Delta (Station 809, 812, 901, 902, and 915) by SLS 5. One adult LFS was detected at SWP on 3/2/23 and the cumulative seasonal salvage is 26. Four adults were detected in the Lower San Joaquin River near the Confluence by EDSM on 2/24/23. X2 has shifted downstream towards Port Chicago (~64 km) and may be pushed further downstream with expected rain. QWEST is around the same as last week and is expected to increase with forecasted weather (~20,000 cfs). Many fish were detected by SLS and EDSM in and westward of Suisun Bay, suggesting that LFS are dispersing widely. LFS adults are moving into spawning habitat, and spawning is on-going. Adult and sub-adult LFS were detected by EDSM in San Pablo, Suisun Bay, Suisun Marsh, Lower Sacramento River, Lower San Joaquin River, and at the Confluence by Chipps Island Trawl (2/19/23 – 3/6/23). Fish are likely distributing widely, which will help decrease risk. Risk remains moderate for LFS within the Lower San Joaquin River and high within the OMR corridor. However, risk is low outside of these areas.

Section 1-A: Sacramento River and Confluence

Table 1: Risk of entrainment into the Central Delta and export facilities for Delta Smelt in the Sacramento River and Confluence:

Species and life stage	**Risk type**	**Risk level**	**Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)**
DS larvae and juveniles	Exposure Risk (Hydrology)	NA	Spawning likely started, but no larvae have been detected. Water temperatures are suitable for spawning (Damon et al. 2016).
DS subadults and adults	Routing Risk (Behavior and life history)	Low	While localized movement in preparation for spawning is underway, the extent of migration under the current flow and turbidity conditions is highly uncertain. Distribution has shifted upstream into fresh water. Two marked DS were detected by Chipps Island Trawl and in the Lower Sacramento River by EDSM on 2/19/23 and 2/24/23, respectively. Three marked DS were detected in the Confluence and Lower Sacramento River by EDSM on 2/14/23 and 2/15/23, respectively. Two marked ripe female DS were detected by SKT 2 in the Lower Sacramento River (Station 704) and Sacramento Deepwater Shipping Channel (Station 719) on 2/8/23.
DS	**Overall Entrainment Risk**	**Low**	Same as above.

Table 2: Risk of entrainment into the Central Delta and export facilities for Longfin Smelt in the Sacramento River and Confluence:

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
LFS larvae and juveniles	Exposure Risk (Hydrology)	Low	44 larvae were detected in the Confluence and the Lower Sacramento River by SLS 5 (processing is on-going).
LFS sub-adults and adults	Routing Risk (Behavior and life history)	Low	Spawning is ongoing. Staging downstream of X2 is continuing, X2 is around 64 km and may move downstream with expected precipitation. Fish are likely distributing widely, which will help decrease risk. Nine sub-adult and adult LFS have been detected in the Lower Sacramento River and the Confluence by EDSM in the last month. 54 adult and sub-adult LFS were detected by Chipps Island Trawl from 2/26/2023 to 3/03/2023.
LFS	**Overall Entrainment Risk**	**Low**	Same as above.

Section 1-B: Central Delta

Table 3: Risk of entrainment into the export facilities for Delta Smelt in the Central Delta:

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
DS subadults and adults	Exposure Risk (Hydrology)	Moderate	One marked adult DS was detected in salvage at SWP and CVP each on 3/2/23. Five DS were detected in salvage in the last two weeks (2/21/23 - 3/5/23). Risk is high within the OMR corridor and moderate in the Lower San Joaquin River.

Table 4: Risk of entrainment into the export facilities for Longfin Smelt in the Central Delta:

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
LFS larvae	Exposure Risk (Hydrology)	Moderate	Fourteen larvae were detected in the Lower San Joaquin River and the Central Delta (Stations 809, 812, 901, 902, 915) by SLS 5. Risk is high within the OMR corridor and moderate in the Lower San Joaquin River.

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
LFS sub-adults and adults	Exposure Risk (Hydrology)	Moderate	One adult LFS was detected in salvage at SWP on 3/2/23. Four adults were detected in the Lower San Joaquin River near the Confluence by EDSM on 2/24/23. Overall risk of entrainment remains low outside of the OMR corridor. However, within the OMR corridor the risk continues to be moderate.

- 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: Risk remains high for DS within the OMR corridor, moderate within the Lower San Joaquin River, and low outside of these areas. Two marked DS were detected by Chipps Island and Lower Sacramento River by Chipps Island Trawl and EDSM on 2/19/23 and 2/24/23, respectively. The SWP and CVP salvage facilities detected one marked DS each on 3/2/23, and the cumulative seasonal salvage for DS is currently 52. Turbidity has remained below 12 FNU and may be variable with forecasted precipitation and elevated San Joaquin River flows.
    - LFS: Risk remains high for LFS within the OMR corridor, moderate within the Lower San Joaquin River, and low outside of these areas. So far 2,121 larvae were detected this season by SLS, but some stations are still being processed. Fourteen larvae have been detected in the Central and South Delta (Station 809, 812, 901, 902, and 915) by SLS 5. EDSM detected four LFS in the Lower San Joaquin River near the Confluence on 2/24/23. One adult was detected at the SWP salvage facilities on 3/2/23, and cumulative seasonal salvage is currently 26. Spawning is on-going. Staging downstream of X2 is continuing and X2 is around 64 km and may move downstream with expected precipitation. Distribution of sub-adults and adults is expected to shift downstream with X2.
- Reporting Old and Middle River Index (OMRI) *(Number and range of OMRI bins will vary based on anticipated hydrology and operations)*
    - Expected daily OMRI range this week: -3,000 to -5,000 cfs
        - SWP may reach maximum capacity towards end of the week if flow levels continue to increase as predicted, and OMRI will become less negative.

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 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.

8.3.2 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 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 index[1] 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 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,

[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.

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 FNU. If the daily average turbidity at OBI is greater than 12 FNU, 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 FNU.

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 FNU 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.

When a larval or juvenile DS is detected in the SLS or 20 mm, or the 3-day average water temperature at Jersey Point is greater than or equal to 12°C, and Secchi depth from the most recent SLS or 20 mm survey is less than or equal to 1 meter, averaged across the 12 south Delta survey stations (809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918, and 919). Permittee shall restrict south Delta exports to maintain a seven-day average OMR index no more negative than -3,500 cfs until the average Secchi depth is greater than 1 meter in the south Delta stations in a subsequent SLS or 20mm survey. If average south Delta Secchi depth continues to be less than or equal to 1 meter in a subsequent SLS or 20mm survey 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 OMR management went into effect December 1st. The Smelt Monitoring Team (SMT) conducted a Risk Assessment based on COA 8.1.5.2.

8.3.1: This COA was triggered by conditions measured on 12/31/22 when the three-day average of daily flow and turbidity was 26,552 cfs and 77 FNU and respectively. Operations were reduced on 1/3/23 targeting a 14-day average OMRI no more negative than -2,000 cfs for 14 consecutive days through 1/16/23. After 1/16/23, the 14-day average OMRI shall be no more negative than -5,000 cfs, initiating the OMR Management Season until the OMR Management Season ends (COA 8.8). This condition has been off-ramped as of 1/16/23.

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

8.3.3: This COA is no longer active due to the initiation of an IEWPP (COA 8.3.1). One adult LFS was detected in salvage on 1/1/23, this was the first LFS salvage of WY 2023. The FMWT LFS index for September through December is 403, therefore the salvage threshold to trigger this COA is 40 LFS.

8.4.1: This COA is no longer active due to the detection of larval LFS by SLS.

8.4.2: This COA was triggered on 2/16/23 with the detection of LFS larvae at four (stations 809, 812, 901, and 902) of the 12 Central and South Delta stations by SLS 4. Exports will be managed for seven consecutive days to maintain a seven-day average OMR index no more negative than -5,000 cfs. SMT convened for an off-cycle meeting on 2/17/23 and discussed the risk of larval LFS entrainment in the Central and South Delta while looking at the PTM run provided by DWR. There was non-consensus between CDFW and DWR, and the decision was elevated to WOMT. WOMT convened for an off-cycle meeting on 2/17/23 and decided that OMRI would be limited to -3,500 cfs on a seven-day average. On 2/21/23 SMT agreed to continue to recommend OMRI be limited to -3,500 cfs, however there was non-consensus on the duration of this protection between CDFW and DWR in SMT and WOMT on 2/21/23 and 2/22/23 respectively. This was elevated to the Directors, and they decided that DWR would manage exports to -3,500 OMRI until SMT can reassess with further LFS data by SLS 5. Fourteen larvae were detected in the Central and South Delta (Station 809, 812, 901, 902, and 915) by SLS 5. SMT did not come to consensus on 2/28/23. CDFW recommended OMRI be limited to -2,000 cfs on a 7-day average for the protection of larval LFS based on the PTM results and recent detections by SLS 5. DWR recommended limiting OMRI to -5,000 cfs due to a positive QWEST and improvement in hydrodynamic conditions relative to last week. The decision has been elevated to WOMT. It was decided to keep the -3,500 cfs OMRI restrictions until COA 8.4.3 off-ramps COA 8.4.2 later in the week.

8.4.3: This COA was triggered by the conditions measured on 1/3/23 when the flow of the San Joaquin River at Vernalis exceeded 8,000 cfs, but no longer triggered as of 2/11/23 due to flow in the San Joaquin River at Vernalis decreasing to under 5,000 cfs.

This COA was triggered by the conditions measured on 3/2/23 when the flow of San Joaquin River at Vernalis exceeded 8,000 cfs, and temporarily off-ramped COA 8.4.2. It is expected for this condition to continue through the week of 3/6/23.

8.5.1: Previously, this condition was triggered on 1/17/23 by the conditions measured on 1/17/23 when the turbidity at OBI was 17 FNU. OMRI was limited to no more negative than -2,000 cfs. After the first five days (1/17/23 through 1/21/23), turbidity was still above 12 FNU at OBI, therefore the SMT reconvened to assess risk. The SMT reassessed risk for DS but was unable to reach consensus on a recommendation between -2,000 cfs and -5,000 cfs on 1/19/23. On 1/20/23 WOMT reached consensus to allow operational flexibility to maintain maximum exports until 1/24/23 when the SMT met again, which may have resulted in an OMRI as negative as -3,500 cfs. On 1/24/23 the OMRI had not reached -3,500 cfs (was -2,100 cfs as of 1/23/23) and proposed operations were to maintain maximum exports as long as possible and operate to an OMRI of -5,000 cfs for the week. The SMT reassessed risk for DS and determined that risk for DS in the South Delta was high and moderate outside the South Delta because of ongoing high turbidity. Additionally, the SMT agreed that risk of entrainment would increase if OMRI were to become more negative, however the SMT was unable to reach consensus on an OMRI recommendation. WOMT met on 1/25/23 and came to a consensus for -5,000 cfs OMRI for one week starting on 1/26/23. The SMT reassessed risk for DS on 1/31/23 and came to a consensus that no further restrictions were warranted at that time, because turbidity was decreasing. On 2/9/23 daily turbidity at Old River at Bacon Island decreased to less than 12 FNU, therefore this COA was no longer triggered.

This COA was triggered again by the conditions on 2/15/23. SMT agreed that a turbidity bridge had formed, and it was not a localized event nor a sensor error. Five-day average OMRI will be restricted to -2,000 cfs for five days starting on 2/18/23. If turbidity drops below 12 FNU on or before 2/18/23, then this condition will no longer be triggered and OMRI will not be restricted by this COA. If the turbidity increases to 12 FNU or greater thereafter, DWR will have three days to comply to the -2,000 cfs restriction once again. On 2/17/23, the daily turbidity at OBI decreased to less than 12 FNU, therefore this COA is no longer triggered.

SMT met on 2/21/23 and agreed that turbidity will likely spike again in the afternoon, and DWR will have three days to comply to -2,000 cfs OMRI restriction if the daily average turbidity at OBI exceeds 12 FNU. The daily average turbidity at OBI was above 12 FNU on 2/21/23. DWR restricted SWP share of -2,000 OMRI from 2/24/23 through 2/26/23. On 2/26/23, the daily turbidity at OBI decreased to less than 12 FNU, therefore this COA is no longer triggered.

8.5.2: This COA is not currently active due to Jersey Point not reaching 12°C and SLS not detecting any DS larvae yet this water year.

As of 2/21/23, the federal agencies are following this COA per order 6(i) of the Interim Operations Plan (IOP), which is in effect due to Condition 10 of the Temporary Urgency Change Order (TUCO).

8.12: This COA is not currently active due to water year type. The February water year type forecast is Above Normal. This COA may become active if the Water Year Type forecast is updated to dry or critical in March.

8.13: The Sacramento Valley Water Year Type Index (SVI) February forecast corresponding to the 50% probability of exceedance is 7.86 which is in the range for a Above Normal water year classification. The forecast was reported on the California Data Exchange Center (CDEC) Water Supply Index Webpage, accessed on 02/13/2023.

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.)*
    - DCC is closed as of 11/28/22.
- Controlling Factors: OMR, may be facility capacity during weekend depending on flows from incoming storm
- Water Temperature:
    - Clifton Court Forebay (CCF) Daily Average Water Temperature = NA
    - 3 Station Average = 9.5°C
- Tidal Cycle: Spring tide with full moon peaked on 3/7/23. Neap cycle will start soon.
- Turbidity:
    - 8.3.1 Freeport 3-day average = 25.21 formazin nephelometric units (FNU)
    - 8.5.1 Old River at Bacon Island (OBI) Turbidity = 7.85 FNU
- Salinity: X2 = ~64 km
- Hydrologic Footprint: Particle Tracking Model will be run when projections show San Joaquin River flow at Vernalis will drop below 5,000 cfs and off-ramp COA 8.4.3.

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

- Outages
    - State Water Project (SWP): None.
    - Central Valley Project (CVP): None.
- Exports:
    - CCF: 7,000 cfs. Anticipated range: 7,000 to 9,500 cfs
    - Jones: 4,200 cfs. No anticipated changes.
    - Combined: 11,200 to 13,700 cfs
- Meteorological Forecast: On and off showers into Wednesday. A short break from late Wednesday into Thursday night. A stronger storm moves in late Thursday night, associated with a moderately strong atmospheric river (AR) system. This storm is forecast as warmer than previous storms, so snow levels will be higher. Precipitation turns showery late Friday into Saturday. Potential for more precipitation early next week.
- Storm Event Projection: Increased likelihood of a storm towards the end of the week.

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

- DCC Gates position: Scheduled to remain closed for season.
- Sacramento River flow at Freeport: 25,813 cfs as of 3/6/23. Anticipated range: 25,000 to 50,000 cfs
- San Joaquin River flow at Vernalis: 11,786 cfs as of 3/6/23. Anticipated range: 10,000 to 20,000 cfs
- Qwest: +8,228 cfs as of 3/6/23. Anticipated range: ~+20,000 later in the week
- OBI Turbidity: 7.85 FNU
- NDOI: 31,756 cfs as of 3/6/23. Anticipated range: 30,000-75,000 cfs
- Upstream releases:
    - Keswick = 3,250 cfs. No anticipated changes.
    - Nimbus = 4,000 cfs. Anticipated range: 4,000 to 8,000 cfs
    - Goodwin = 500 cfs. Anticipated range: 200 to 2,000 cfs
    - Oroville = 1,050 cfs. No anticipated changes

Table 5: Comparison of OMR and OMR Index (5-day and 14-day averages for OMR Index and USGS gauge were reported on SacPAS website, accessed 07 March 2023.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
3/4/2023	Daily	-5,590	-4,850
3/4/2023	5-day	-4,000	-4,360
3/4/2023	14-day	-3,570	-3,720

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: Two marked adult (Fork Length (FL): 65-72mm) DS were detected in Suisun Marsh and Sacramento Deep Water Ship Channel on 3/6/23 and 3/7/23 respectively. One marked adult (FL: 70mm) DS was detected in the Lower Sacramento River on 2/24/23 (Table 1). Three marked adult (FL: 76-79mm) DS were detected in the Confluence, Lower Sacramento River, and the Sacramento Deep Water Ship Channel (SDWSC) on 2/14/23, 2/15/23, and 2/17/23 respectively. One unmarked (FL: not measured) DS was detected in Suisun Marsh on 2/9/23. One unmarked adult (FL: 73mm) DS was detected in the Lower San Joaquin River on 1/31/23. Sixteen marked (FL: 47-80mm) DS were detected in Suisun Bay, Cache Slough, SDWSC, and Lower Sacramento from 1/24/23 to 2/7/23. One unmarked adult (FL: 71mm) DS was detected in the South Delta near Franks Tract on 1/17/23. One subadult DS (FL: 55mm) and one adult DS (FL: 62mm) were detected in Lower Sacramento River on 11/3/22 and 11/7/22 respectively.
- Chipps Island Trawl: One marked adult (FL: 84mm) DS was detected on 2/19/23. One marked DS (FL: 68mm) was detected on 1/19/23.
- Fall Mid-water Trawl (FMWT) Index for Delta Smelt: 0
- Delta Smelt life cycle model (LCM) discussion: NA
- Biological Conditions: Turbidity has remained below 12 FNU and may be variable with forecasted precipitation and elevated San Joaquin River flows. X2 remains around Port Chicago (~64km) but may be pushed back westward with expected rain. While localized movements in preparation for spawning are still underway, the extent of migration both spatially and temporally under the current flow and turbidity conditions is highly uncertain. Temperatures are conducive to spawning (Damon et al. 2016). There is also a high degree of uncertainty regarding the response of cultured fish to environmental cues typically applied to wild DS. Distribution has shifted upstream into fresh water, though some fish are present downstream due to high outflow from the storms in January.
- % of population in Delta zones: NA
- Smelt Larva Survey (SLS) or 20mm Survey: Many stations are still being processed, but SLS has not detected any DS larvae so far this season.
- SKT: Survey 2 detected two marked, ripe DS in the Lower Sacramento River (station 704) and Sacramento Deep Water Ship Channel (station 719).
- Salvage: One marked adult (FL:64-67mm) was detected in salvage at SWP and CVP each on 3/2/23, two marked adult (FL: 70-72mm) DS were detected in salvage at SWP on 2/22/23, one marked adult (FL: 65mm) DS was detected in salvage at CVP on 2/22/23, one unmarked adult (FL: 76mm) DS was detected in salvage at CVP on 2/18/23, one marked adult (FL: 70mm) DS was detected in salvage at CVP on 2/17/23, one marked adult (FL: 63mm) DS was detected in salvage at CVP on 2/14/23, two marked adult (FL: 59-69mm) DS were detected in salvage at CVP on 2/13/23, one marked adult (FL: 63mm) was detected in salvage at CVP on 2/12/23, one marked adult (FL: 73mm) was detected in salvage at SWP on 2/8/23, and one marked adult (FL: 74mm) DS was detected in salvage at CVP on 1/7/2023.The cumulative seasonal salvage is 52.

- FCCL lampara net sampling detected two adult DS (FL: ~60mm [estimated since fish were not directly handled]) in the Lower Sacramento River on 12/14/22. One fish was untagged, and the other fish was tagged with red VIE tag (hard release) from the experimental release.
- Experimental release: Approximately 13,000 cultured DS were released in the Sacramento Deepwater Shipping Channel on 1/25/23 and 1/26/23, 17,570 cultured DS were released in the Sacramento River near Rio Vista on 1/18/23 and 1/19/23, and 13,140 fish were released in the Sacramento River near Rio Vista on 11/30/22. No further experimental releases are scheduled for this water year.

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

- FMWT Index: 403
- Other Surveys:
  - EDSM: Three sub-adult (FL: 74-81mm) and three adult LFS (FL: 85-104mm) LFS were detected in Suisun Bay and Suisun Marsh during the week of February 27th – March 3rd (Table 1).
  - Chipps Island Trawl: 22 sub-adult (FL: 74-84mm) and 32 adult LFS (FL: 85-104mm) were detected during the week of February 26th – March 3rd (Table 2).
  - SLS: Fourteen larvae have been detected in the Central and South Delta (Station 809, 812, 901, 902, and 915) by SLS 5 (Table 6). Since the last meeting, SLS 2, SLS 3, SLS 4, and SLS 5 detected 14 (Table 3), 42 (Table 4), 613 (Table 5), and 547 (Table 6) more larval LFS respectively.
  - Bay Study: In January, Bay Study detected six adults (FL: 87-109mm) and 44 sub-adult (FL: 58-84mm) LFS in stations ranging from the Lower Sacramento River to the South Bay. Distribution was widespread but overall, more downstream than in December.
- Salvage: One adult (FL: 86mm) LFS was salvaged at SWP on 3/2/23. The cumulative seasonal salvage is 26.

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

Notes:

- CDFW clarified that the amendment to ITP COA 8.5.2 uses either the first detection of DS larvae at any SLS or 20mm station for the water year or the 3-day mean water temperature at Jersey Point being equal to or greater than 12°C as an on-ramp for the abiotic habitat trigger.
- Qualitative larval sampling started at SWP and CVP salvage facilities on 3/1/23. No LFS or DS larvae have been detected in processed samples.
- The Skinner Fish Collection facility at the SWP has been asked to identify all larval fish in qualitative larval sampling. Due to large numbers of other fish species besides smelt, like prickly sculpin and shad, this may cause significant delays in processing and reporting.
- SKT 3 is on water this week. The South Delta was sampled yesterday, Monday 3/6/23, and no smelt were detected.

- SLS 6 and 20mm Survey 1 are on the water next week.
- EDSM will start phase 2 sampling using a 20mm net at the beginning of April. Concurrent Kodiak trawling will continue.
- Future PTM runs will use Station 809 as one of the injection points instead of Station 902.

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: EDSM Catch Table, Table 2: Chipps Island Trawl Catch Table, Table 3: SLS 2 Catch Table, Table 4: SLS 3 Catch Table, Table 5: SLS 4 Catch Table, Table 6: SLS 5 Catch Table, and Figure 1: Map of SLS.

Table 1: DS and LFS catch for EDSM 2022 Phase 1 Kodiak trawls of February 27th – March 3rd. Only stations with catch of DS and LFS are reported here. These data are preliminary and subject to change. LFS that were mortalities upon capture were returned to the Lodi Fish and Wildlife Office (LFWO) to be frozen.

Date	Stratum	Subregion	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
02/28/2023	Suisun Bay	Confluence	23-31-SB01	LFS	None	86	1	Released
02/28/2023	Suisun Bay	Confluence	23-31-SB01	LFS	None	87	1	Released
03/01/2023	Suisun Bay	Mid Suisun Bay	23-31-SB03	LFS	None	74	1	Released
03/03/2023	Suisun Marsh	Grizzly Bay	23-31-SM02	LFS	None	76	1	Released
03/03/2023	Suisun Marsh	Suisun Marsh	23-31-SM03	LFS	None	81	1	Released
03/03/2023	Suisun Marsh	Suisun Marsh	23-31-SM03	LFS	None	85	1	Released

Table 2: DS and LFS catch for Chipps Island Trawls February 26th – March 3rd. These data are preliminary and subject to change.

Date	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
02/26/2023	SB018M	LFS	None	74	1	Released
02/26/2023	SB018M	LFS	None	91	1	Released
02/26/2023	SB018M	LFS	None	92	1	Released
02/26/2023	SB018M	LFS	None	94	1	Released
02/26/2023	SB018N	LFS	None	81	1	Released
02/26/2023	SB018N	LFS	None	86	1	Released
02/26/2023	SB018N	LFS	None	88	2	Released

Date	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
02/26/2023	SB018N	LFS	None	92	1	Released
02/26/2023	SB018N	LFS	None	98	1	Released
02/26/2023	SB018S	LFS	None	82	1	Released
02/27/2023	SB018M	LFS	None	78	1	Released
02/27/2023	SB018M	LFS	None	81	1	Released
02/27/2023	SB018M	LFS	None	84	1	Released
02/27/2023	SB018M	LFS	None	94	1	Released
02/27/2023	SB018N	LFS	None	78	1	Released
02/27/2023	SB018N	LFS	None	80	1	Released
02/27/2023	SB018N	LFS	None	84	1	Released
02/27/2023	SB018N	LFS	None	87	2	Released
02/27/2023	SB018N	LFS	None	90	2	Released
02/27/2023	SB018N	LFS	None	95	1	Released
02/27/2023	SB018S	LFS	None	80	1	Released
02/27/2023	SB018S	LFS	None	82	1	Released
02/27/2023	SB018S	LFS	None	85	1	Released
02/27/2023	SB018S	LFS	None	97	2	Released
02/28/2023	SB018M	LFS	None	76	1	Released
02/28/2023	SB018M	LFS	None	80	1	Released
02/28/2023	SB018N	LFS	None	78	1	Released
02/28/2023	SB018N	LFS	None	80	1	Released
02/28/2023	SB018N	LFS	None	84	1	Released
02/28/2023	SB018N	LFS	None	86	1	Released
02/28/2023	SB018N	LFS	None	90	1	Released
02/28/2023	SB018N	LFS	None	93	1	Released
02/28/2023	SB018N	LFS	None	94	1	Released
02/28/2023	SB018N	LFS	None	95	1	Released
02/28/2023	SB018N	LFS	None	96	1	Released
02/28/2023	SB018N	LFS	None	97	1	Released
02/28/2023	SB018N	LFS	None	100	1	Released
02/28/2023	SB018N	LFS	None	101	1	Released
02/28/2023	SB018N	LFS	None	102	1	Released
02/28/2023	SB018S	LFS	None	83	1	Released
02/28/2023	SB018S	LFS	None	84	1	Released
03/02/2023	SB018M	LFS	None	100	1	Released
03/02/2023	SB018S	LFS	None	77	1	Released
03/02/2023	SB018S	LFS	None	82	1	Released
03/02/2023	SB018S	LFS	None	85	1	Released

Date	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
03/02/2023	SB018S	LFS	None	98	1	Released
03/02/2023	SB018S	LFS	None	104	1	Released
03/03/2023	SB018N	LFS	None	77	1	Released
03/03/2023	SB018N	LFS	None	85	1	Released
03/03/2023	SB018S	LFS	None	82	1	Released

Table 3: LFS catch for SLS 2 January 17th – 19th. Only stations with catch of DS and LFS are reported here. These data are QA/QC-ed and are completed.

Survey #	SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
2	306	1/18/2023	42.9	38	Processed	Longfin Smelt	2	Complete	7	8	7.5	1
2	311	1/18/2023	63.9	20	Processed	Longfin Smelt	2	Complete	7	8	7.5	0
2	315	1/18/2023	65.1	18	Processed	Longfin Smelt	6	Complete	7	9	7.8	3
2	322	1/18/2023	58.5	23	Processed	Longfin Smelt	3	Complete	7	9	8	2
2	323	1/18/2023	66.2	19	Processed	Longfin Smelt	33	Complete	6	10	8	22
2	327	1/18/2023	80.8	18	Processed	Longfin Smelt	46	Complete	7	9	7.2	37
2	328	1/18/2023	122	16	Processed	Longfin Smelt	8	Complete	7	9	8.3	5
2	329	1/18/2023	96	18	Processed	Longfin Smelt	6	Complete	6	8	7.2	6
2	330	1/18/2023	83.4	15	Processed	Longfin Smelt	11	Complete	8	9	8.2	6
2	335	1/18/2023	115	18	Processed	Longfin Smelt	6	Complete	6	8	7.5	5
2	336	1/18/2023	131	17	Processed	Longfin Smelt	3	Complete	8	8	8	3
2	338	1/18/2023	114	14	Processed	Longfin Smelt	30	Complete	7	9	7.8	18
2	340	1/17/2023	160	12	Processed	Longfin Smelt	5	Complete	8	8	8	3
2	401	1/18/2023	142	17	Processed	Longfin Smelt	11	Complete	7	8	7.4	6
2	404	1/18/2023	143	11	Processed	Longfin Smelt	43	Complete	6	9	7.8	7
2	405	1/19/2023	186	14	Processed	Longfin Smelt	2	Complete	6	7	6.5	2
2	411	1/19/2023	159	16	Processed	Longfin Smelt	2	Complete	6	6	6.0	1
2	418	1/19/2023	173	17	Processed	Longfin Smelt	1	Complete	6	6	6.0	1
2	501	1/19/2023	134	16	Processed	Longfin Smelt	4	Complete	5	6	5.8	4
2	504	1/19/2023	104	14	Processed	Longfin Smelt	5	Complete	6	8	6.8	4
2	508	1/19/2023	134	16	Processed	Longfin Smelt	2	Complete	6	6	6.0	0
2	519	1/19/2023	160	13	Processed	Longfin Smelt	1	Complete	5	5	5.0	0
2	520	1/19/2023	139	15	Processed	Longfin Smelt	2	Complete	6	7	6.5	1

Survey #	SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
2	606	1/19/2023	141	13	Processed	Longfin Smelt	2	Complete	6	6	6.0	1
2	609	1/19/2023	138	17	Processed	Longfin Smelt	2	Complete	6	7	6.5	2
2	801	1/18/2023	122	18	Processed	Longfin Smelt	1	Complete	7	7	7.0	1
2	804	1/18/2023	63.1	16	Processed	Longfin Smelt	2	Complete	6	6	6.0	1

Table 4: LFS catch for SLS 3 January 30th – February 1st. Only stations with catch of DS and LFS are reported here. These data are preliminary and subject to change.

Survey #	SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
3	322	1/31/2023	10.5	62	Processed	Longfin Smelt	1	Complete	8	8	8	1
3	328	1/31/2023	17.1	45	Processed	Longfin Smelt	6	Complete	7	9	8.5	3
3	329	1/31/2023	21.0	43	Processed	Longfin Smelt	3	Complete	9	10	9.3	0
3	336	1/31/2023	29.5	31	Processed	Longfin Smelt	6	Preliminary	8	10	6.8	2
3	340	1/30/2023	33.2	33	Processed	Longfin Smelt	5	Complete	7	9	8.2	4
3	342	1/30/2023	29.0	32	Processed	Longfin Smelt	5	Complete	7	9	8.2	4
3	343	1/30/2023	50.5	28	Processed	Longfin Smelt	14	Complete	7	10	8.1	9
3	344	1/30/2023	56.3	23	Processed	Longfin Smelt	38	Complete	7	11	8.8	21
3	345	1/30/2023	67.8	21	Processed	Longfin Smelt	26	Complete	7	14	8.5	11
3	404	1/31/2023	37.4	34	Processed	Longfin Smelt	2	Complete	8	8	8.0	0
3	405	2/1/2023	22.9	33	Processed	Longfin Smelt	21	Complete	7	10	8.8	10
3	411	2/1/2023	29.8	45	Processed	Longfin Smelt	49	Complete	7	11	8.3	24
3	418	2/1/2023	32.3	39	Processed	Longfin Smelt	5	Complete	7	10	8.6	2
3	501	2/1/2023	49.5	26	Processed	Longfin Smelt	21	Complete	6	9	7.4	20
3	504	2/1/2023	39.6	28	Processed	Longfin Smelt	53	Complete	7	9	8.0	34
3	508	2/1/2023	47.9	24	Processed	Longfin Smelt	12	Complete	6	7	6.4	11
3	513	1/31/2023	46.0	30	Processed	Longfin Smelt	7	Complete	6	7	6.6	5
3	519	2/1/2023	61.5	22	Processed	Longfin Smelt	16	Complete	6	9	7.1	14

Survey #	SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
3	520	1/31/2023	36.9	28	Processed	Longfin Smelt	9	Complete	6	7	6.1	8
3	602	2/1/2023	55.1	36	Processed	Longfin Smelt	34	Complete	7	11	8.3	25
3	606	2/1/2023	80.5	25	Processed	Longfin Smelt	8	Complete	6	9	7.3	7
3	610	2/1/2023	48.2	31	Processed	Longfin Smelt	6	Complete	6	7	6.8	6
3	704	1/31/2023	43.1	25	Processed	Longfin Smelt	11	Complete	6	8	6.5	9
3	706	1/31/2023	47.6	26	Processed	Longfin Smelt	4	Complete	6	7	6.5	4
3	707	1/31/2023	39.7	34	Processed	Longfin Smelt	4	Complete	6	6	6.0	4
3	801	2/1/2023	36.4	29	Processed	Longfin Smelt	1	Complete	7	7	7.0	0
3	804	1/31/2023	30.1	31	Processed	Longfin Smelt	2	Complete	6	6	6.0	2
3	809	1/30/2023	26.0	35	Processed	Longfin Smelt	2	Complete	7	7	7.0	2
3	812	1/30/2023	23.0	38	Processed	Longfin Smelt	2	Complete	6	7	6.5	2

Table 5: LFS catch for SLS 4 February 13th – 15th. Only stations with catch of DS and LFS are reported here. These data are preliminary and subject to change.

Survey #	SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
4	329	2/13/2023	9.3	67	Processed	Longfin Smelt	1	Preliminary	65	65	65	0
4	346	2/14/2023	16.0	51	Processed	Longfin Smelt	221	Preliminary	8	15	n/a	0
4	401	2/13/2023	13.5	64	Processed	Longfin Smelt	2	Preliminary	7	24	15.5	0
4	405	2/15/2023	10.1	52	Processed	Longfin Smelt	3	Complete	8	9	8.3	1
4	504	2/15/2023	25.2	34	Processed	Longfin Smelt	359	Complete	6	12	n/a	127
4	508	2/15/2023	36.4	27	Processed	Longfin Smelt	64	Complete	6	15	8.8	26
4	513	2/15/2023	29.3	26	Processed	Longfin Smelt	25	Complete	6	8	6.8	21
4	519	2/15/2023	74.4	21	Processed	Longfin Smelt	5	Preliminary	6	11	8.6	2
4	520	2/14/2023	28.5	35	Processed	Longfin Smelt	18	Complete	6	12	8.5	5
4	602	2/15/2023	23.1	34	Processed	Longfin Smelt	11	Complete	7	8	7.7	8

Survey #	SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
4	606	2/15/2023	39.9	22	Processed	Longfin Smelt	20	Complete	6	14	9.9	6
4	609	2/15/2023	57.1	38	Processed	Longfin Smelt	10	Complete	9	13	10.3	1
4	703	2/14/2023	20.5	52	Processed	Longfin Smelt	5	Complete	7	8	7.2	5
4	704	2/14/2023	21.9	39	Processed	Longfin Smelt	3	Complete	6	7	6.7	3
4	706	2/14/2023	22.8	39	Processed	Longfin Smelt	11	Complete	6	7	6.8	7
4	707	2/14/2023	18.1	48	Processed	Longfin Smelt	7	Complete	6	7	6.4	4
4	801	2/14/2023	23.3	48	Processed	Longfin Smelt	6	Complete	6	7	6.7	4
4	804	2/14/2023	21.9	51	Processed	Longfin Smelt	11	Complete	7	14	9.5	6
4	809	2/13/2023	18.6	44	Processed	Longfin Smelt	6	Complete	6	7	6.3	5
4	812	2/13/2023	15.0	52	Processed	Longfin Smelt	2	Complete	7	7	7.0	1
4	901	2/13/2023	12.3	64	Processed	Longfin Smelt	1	Complete	6	6	6.0	1
4	902	2/13/2023	12.5	64	Processed	Longfin Smelt	1	Complete	8	8	8.0	0

Table 6: LFS catch for SLS 5 February 27th – March 1st. Only stations with catch of DS and LFS are reported here. These data are preliminary and subject to change.

Survey #	SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
5	328	3/1/2023	27.5	38	Processed	Longfin Smelt	1	Preliminary	8	8	8	0
5	405	3/2/2023	20.4	40	Processed	Longfin Smelt	93	Preliminary	7	10	n/a	73
5	411	3/2/2023	25.5	35	Processed	Longfin Smelt	192	Preliminary	7	11	n/a	67
5	501	3/2/2023	25.8	26	Processed	Longfin Smelt	91	Preliminary	6	20	n/a	51
5	504	3/2/2023	28.5	32	Processed	Longfin Smelt	61	Preliminary	6	19	10.8	14
5	508	3/2/2023	23.4	40	Processed	Longfin Smelt	26	Preliminary	6	15	6.8	6
5	519	3/2/2023	32.4	27	Processed	Longfin Smelt	57	Preliminary	6	14	n/a	14
5	520	3/2/2023	17.6	42	Processed	Longfin Smelt	18	Preliminary	6	7	6.0	14

Survey #	SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
5	606	3/2/2023	56.4	20	Processed	Longfin Smelt	7	Preliminary	7	14	9.3	4
5	610	3/2/2023	29.5	27	Processed	Longfin Smelt	2	Preliminary	7	8	7.5	1
5	809	2/27/2023	22.1	55	Processed	Longfin Smelt	7	Complete	6	8	6.8	0
5	812	2/27/2023	16.4	61	Processed	Longfin Smelt	1	Complete	7	7	7.0	1
5	901	2/27/2023	24.6	40	Processed	Longfin Smelt	2	Complete	7	7	7.0	2
5	902	2/27/2023	13.7	58	Processed	Longfin Smelt	3	Complete	7	7	7.0	3
5	915	2/27/2023	9.8	91	Processed	Longfin Smelt	1	Complete	8	8	8	1

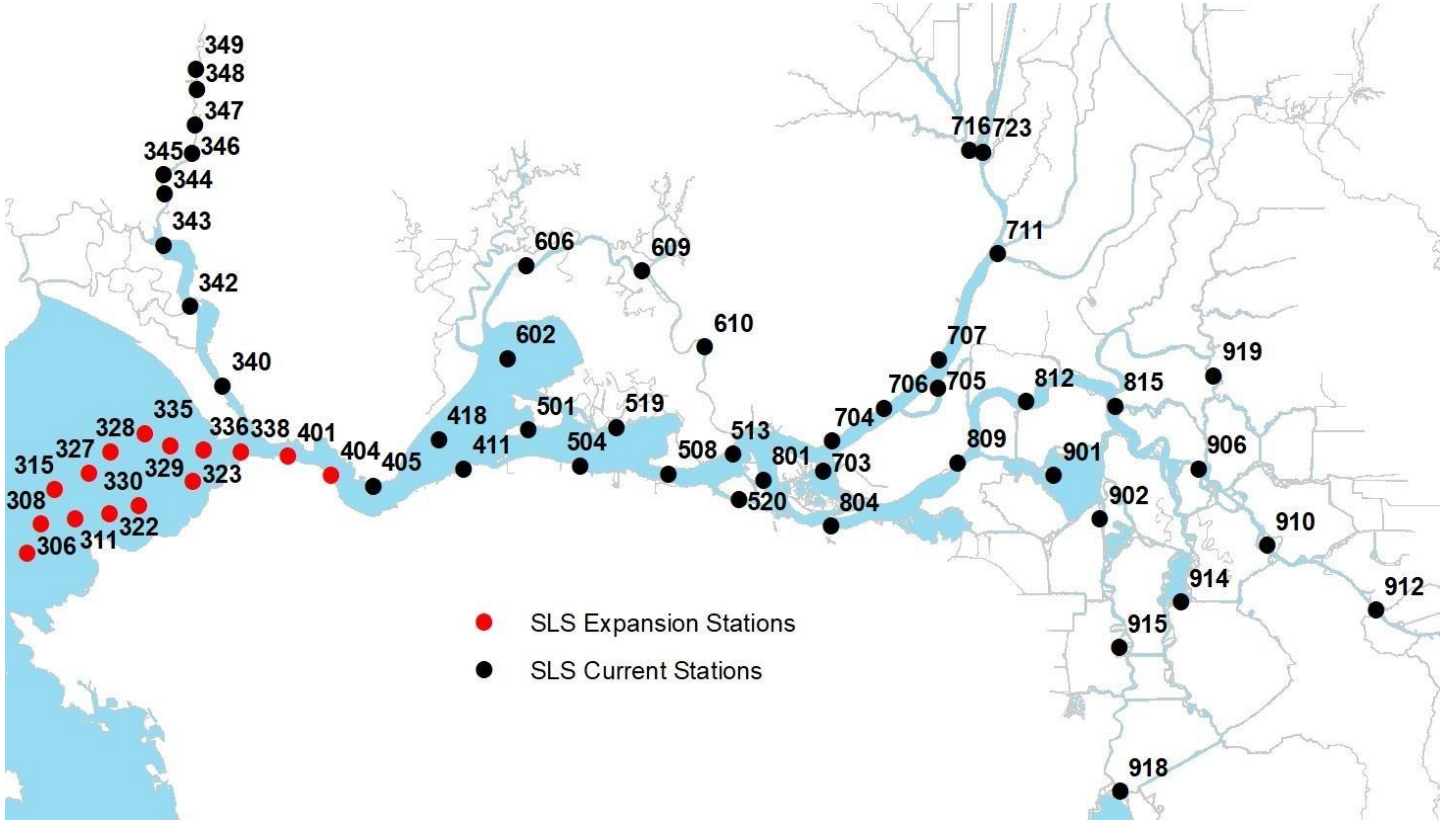

Figure 1: Map of SLS stations