

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

## Section 1: Overview

**Date: 1/17/2023**

### **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 Advice. Condition of Approval 8.5.1 Turbidity Bridge Avoidance is triggered and therefore OMRI is limited to -2,000 cfs.

### **Risk Assessment:**

*Delta Smelt:* Based on recent detection data, distribution patterns over the past decade, recent first flush conditions and widespread turbidity in the Delta, DS are likely migrating and distributing throughout the Delta. The last Delta Smelt observations were on 1/17/2023 by EDSM in the South Delta and on 1/7/2023 at the CVP salvage facility. Integrated Early Winter Pulse Protection (IEWPP) ended on 1/16/2023 and the Turbidity Bridge Avoidance Action is in effect starting 1/17/2023 due to continued elevated turbidity at OBI and is expected to continue through 1/21/2023 depending on turbidity. The implementation of the Turbidity Bridge Avoidance Action is expected to reduce the risk of entrainment to pre-spawning Delta Smelt in the OMR Corridor. Overall risk for entrainment is moderate for Delta Smelt outside of the OMR corridor; risk is high for fish within the South Delta.

*Longfin Smelt:* Two sub-adult LFS were detected at the federal fish salvage facility on 1/14-15/23 and one adult LFS was detected at the state fish salvage facility on 1/17/23: the cumulative salvage is now 16. One sub-adult LFS was detected in the Lower San Joaquin River by Enhanced Delta Smelt Monitoring Program (EDSM) on 1/5/23. Although one larval LFS was detected in the Lower San Joaquin River (station 812) by Smelt Larvae Survey (SLS) 13 on 12/19/22, and 2 larval LFS were detected in the Lower Sacramento River by SLS 1 on 1/6/23, no larvae were detected in the Central and South Delta in SLS 1. Many fish were detected by SLS 1 in Carquinez Strait and San Pablo Bay, suggesting that LFS are dispersing widely and distribution has shifted more downstream with the increased outflow. LFS adults are moving into spawning habitat, and spawning is on-going. Adult and sub-adult LFS were detected by EDSM in Suisun Marsh and Suisun Bay, and at the Confluence by Chipps Island Trawl. The increased flow from the recent storms has shifted X2 downstream to < 56 km. Fish are likely distributing widely, which will help decrease risk. Condition of Approval (COA) 8.5.1 Turbidity Bridge Avoidance has

been triggered and therefore OMRI is limited to -2,000 cfs. While risk remains low outside of the South Delta, risk is elevated to moderate within the South Delta.

**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:

<b>Species and life stage</b>	<b>Risk type</b>	<b>Risk level</b>	<b>Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)</b>
DS larvae and juveniles	Exposure Risk (Hydrology)	NA	Spawning hasn't started, no larvae present.
DS subadults and adults	Routing Risk (Behavior and life history)	Low	A turbidity bridge is present, which increases the possibility that DS could migrate into the central and south delta. However, Turbidity Bridge Avoidance has been triggered and OMRI is limited to -2,000 cfs for the next 5-days which will help off-set the risk that DS will migrate into the central and south delta. With first flush conditions being met, the migration in preparation for spawning is underway. Distribution is expected to shift upstream into fresh water.
<b>DS</b>	<b>Overall Entrainment Risk</b>	<b>Low</b>	Same as above.

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

<b>Species and life stage</b>	<b>Risk type</b>	<b>Risk level</b>	<b>Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)</b>
LFS larvae and juveniles	Exposure Risk (Hydrology)	Low	2 larvae were detected in the Lower Sacramento River by SLS on 1/6/23.
LFS sub-adults and adults	Routing Risk (Behavior and life history)	Low	Spawning is ongoing. Staging downstream of X2 is continuing and with the recent storms X2 has shifted downstream to <56 km and fish are likely distributing widely, which will help decrease risk.
<b>LFS</b>	<b>Overall Entrainment Risk</b>	<b>Low</b>	Turbidity Bridge Avoidance and therefore OMRI is limited to -2,000 cfs for 5-days, therefore risk remains low.

**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)	High	Turbidity Bridge Avoidance has been triggered and OMRI is limited to -2,000 cfs for the next 5-days which may help off-set the risk that DS will migrate into the Central and South Delta. One wild individual was detected in the South Delta in EDSM 1/17/23, and one cultured adult was detected in salvage on 1/7/23. A turbidity bridge is present, which increases the possibility that DS could migrate into the Central and South Delta. Risk is high within the South Delta and moderate in the Central Delta.

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)	Low	No larvae were detected in the Lower San Joaquin River by SLS 1. Turbidity Bridge Avoidance has been triggered and therefore OMRI is limited to -2,000 cfs for 5--days (through 1/21/23), therefore risk remains low.
LFS sub-adults and adults	Exposure Risk (Hydrology)	Moderate	One subadult has been detected in the Lower San Joaquin River by EDSM on 1/5/23, and two sub-adult LFS was detected in salvage on 1/14-15/23 and one adult on 1/17/23. Turbidity Bridge Avoidance has been triggered and therefore OMRI is limited to -2,000 cfs for 5-days (through 1/21/23), therefore overall risk of entrainment remains low outside of the OMR corridor. However, within the OMR corridor the risk is elevated to 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 in South Delta is increased to high. One unmarked individual was detected preliminarily by EDSM on 1/17/23 in the South Delta. One cultured adult DS was detected in salvage on 1/7/23, the cultured fish came from the DS Experimental Release that occurred on 11/30/22 which released a total of 13,140 DS in the Sacramento River near Rio Vista. Turbidity Bridge Avoidance has been triggered and OMRI is limited to -2,000 cfs for 5-days (through 1/21/23); however, turbidity is high across the system including the OMR corridor. Risk in the Central Delta remains moderate.
- LFS: Risk remains low for LFS outside of OMR corridor. 123 larvae were detected so far this season by SLS, but some stations are still being processed. Two sub-adult LFS were detected in salvage on 1/14-15/23 and one adult on 1/17/23. Spawning is on-going. Turbidity Bridge Avoidance has been triggered and therefore OMRI is limited to -2,000 cfs for 5-days (through 1/21/23) However, risk is elevated to moderate for LFS within the OMR corridor.
- Reporting Old and Middle River Index (OMRI) (*Number and range of OMRI bins will vary based on anticipated hydrology and operations*)
  - Relevant COA 8.5.1 was triggered.
  - Expected OMRI range this week: -2,000 cfs.

## Section 2: Basis for Advice

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

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

8.3.1 Integrated Early Winter Pulse Protection. Between December 1 and January 31 each year Permittee shall reduce south Delta exports for 14 consecutive days to maintain a 14-day average 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<sup>1</sup> 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  $\geq 60$  mm by the Chippis 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,

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<sup>1</sup> 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.

8.12 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 1<sup>st</sup>. 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 are being 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 expands to a salvage of four LFS. This is 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 became active on 1/1/23. Data for SLS 13 (12/19/22 through 12/22/22) did not trigger this COA.

8.4.3: Conditions currently exceed the thresholds described in this COA. If conditions still exceed these thresholds following the IEWPP period, it will temporarily off-ramp COA 8.4.2. 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, COA 8.4.2 shall come into effect.

8.5.1: This condition has been triggered on 1/17/23 by the conditions measured on 1/17/23 when the turbidity at OBI was 17 FNU. OMRI will be limited to no more negative than -2,000 cfs. After the first five days (1/17/23 through 1/21/23), if turbidity is still above 12 FNU at OBI, then SMT may reconvene to assess the risk for Delta Smelt.

8.12: This COA will not become active on Jan 15 due to water year type. The January water year type forecast is Below Normal. This COA may become active if the Water Year Type forecast is updated to dry or critical in February.

8.13: The Sacramento Valley Water Year Type Index (SVI) January forecast corresponding to the 50% probability of exceedance is 6.6 which is in the range for a Below Normal water year classification. The forecast was reported on the California Data Exchange Center (CDEC) [Water Supply Index Webpage](#), accessed on 01/11/2023.

## 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.
  - COA 8.5.1 was triggered by conditions on 1/17/23.
- Controlling Factors: OMRI 5-day average no more negative than -2,000 cfs due to Turbidity Bridge Avoidance being triggered.
- Water Temperature:
  - Clifton Court Forebay (CCF) Daily Average Water Temperature = NA
  - 3 Station Average = 10.71°C
- Tidal Cycle: Spring tide, king tide on 1/21/23
- Turbidity:
  - 8.3.1 Freeport 3-day average = 94.24 formazin nephelometric units (FNU)
  - 8.5.1 Old River at Bacon Island (OBI) Turbidity = 17.83 FNU
- Salinity: X2 < 56 km
- Hydrologic Footprint: No Particle Tracking Models were requested.

### 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: 4,000 to 9,500 cfs
  - Jones: 3,500 to 4,200 cfs
  - Combined: 7,500 to 13,700 cfs
- Meteorological Forecast: Cool and showery conditions continue on Monday. Dry weather on Tuesday, before another quick shot of precipitation and wind Wednesday. On Thursday, prolonged dry conditions are expected to continue into next week.
- Storm Event Projection: Anticipating light rain in the north coast and northern Sierra.

### 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: 74,759 cfs as of 1/16/2023. Anticipated range: 60,000 to 80,000 cfs
- San Joaquin River flow at Vernalis: 18,222 cfs as of 1/16/2023. Anticipated range: 15,000 to 23,000 cfs

- Qwest: +36,587 cfs as of 1/16/2023. Anticipated range: continue to be significantly positive, but may drop to +20,000 throughout the week
- OBI Turbidity: 17.83 FNU
- NDOI: 172,524 cfs as of 1/16/2023. Anticipated range this week from outlook is 80,000-170,000 cfs.
- Upstream releases:
  - Keswick = 4,050 cfs. Anticipated range: 3,250 to 4,050 cfs due to flood control and side-flow management at Keswick.
  - Nimbus = 10,000 cfs. Anticipated range: 8,000 to 10,000 cfs due to flood control and side-flow management.
  - Goodwin = 1,950 cfs. Anticipated range: 200 to 3,150 cfs due to Tulloch side-flow management.
  - Oroville = 950 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 17 January 2023.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
1/14/2023	Daily	-2,626	-2,190
1/14/2023	5-day	-1,750	-2,090
1/14/2023	14-day	-2,410	-2,430

#### 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: One DS preliminarily detected in the South Delta near Franks Tract on January 17<sup>th</sup>. One subadult DS (Fork-length (FL): 55mm) and one adult DS (FL: 62mm) were detected in Lower Sacramento River on November 3<sup>rd</sup> and 7<sup>th</sup> respectively.
- Fall Mid-water Trawl (FMWT) Index for Delta Smelt: 0
- Delta Smelt life cycle model (LCM) discussion: NA
- Biological Conditions: Migration into freshwater is likely underway due to increased flows and turbidity. Increased flows have pushed X2 downstream to < 56 km and OMRI is limited to -2,000 cfs. A turbidity bridge formed on 1/1/2023 and extends from the Lower San Joaquin River into the South Delta and export facilities, increasing the risk of DS migration into the Central and South Delta.
- % 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 so far this season.
- Salvage: One cultured adult (FL: 74mm) DS was salvaged at the CVP on 1/7/2023. The expanded seasonal salvage is four. This is the first detection of WY 2023. This is the first adult salvage detected since February and March 2019. One cultured sub-adult (FL: 54mm) DS was salvaged at the CVP on 1/16/2022.
- 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: 13,140 fish were released in the Sacramento River near Rio Vista on 11/30/22. The next experimental release is planned for 1/18/23 and 1/19/23.

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

- FMWT Index: 403
- Other Surveys:
  - EDSM: 17 sub-adult (FL: 60-84mm) and three adult LFS (FL: 85-92mm) were detected in Suisun Marsh and Suisun Bay during the week of January 9<sup>th</sup> – 13<sup>th</sup> (Table 1).
  - Chipps Island Trawl: Four sub-adult (FL: 75-79mm) and four adult LFS (91-112mm) were detected during the week of January 9<sup>th</sup>-13<sup>th</sup> (Table 2).
  - SLS: Eight larval (6-7mm) LFS were detected in the Confluence, Lower Sacramento River, Suisun Bay, and Suisun Marsh, by SLS 1 (Table 3). Many stations for SLS 1 are still being processed, but the South and Central Delta stations were processed and detected no fish.
  - Bay Study: In September, 36 sub-adult LFS (44-78mm) were detected from south of Bay Bridge (station 110) to San Pablo Bay (station 322). Distribution shifted further upstream in October with 47 sub-adult LFS (FL: 42-83mm) and five adult LFS (FL: 86-97mm) detected from near the San Mateo Bridge (station 101) to the Lower Sacramento River (station 750). In November, the center of distribution continued to move upstream from Central Bay to San Pablo and Suisun Bay with a total of 73 sub-adult LFS (FL: 47-76mm) and three adult LFS (FL: 87-89mm) detected. In December, 101 sub-adult LFS (FL: 48-80mm) and 14 adult LFS (84-109mm) were detected from south of Bay Bridge (station 140) to Lower Sacramento River (station 751).
  - LEPS: Processing is on-going, but no LFS detections were reported last week.
  - Spring Kodiak Trawl (SKT): Eight sub-adult (FL: 68-80mm) and four adult (86-109mm) LFS were detected in the Confluence, Suisun Bay, and the West regions on the week of January 9<sup>th</sup>-13<sup>th</sup> (Table 4).
- Salvage: One adult (FL: 101mm) LFS was salvaged at SWP on 1/17/2023. Two sub-adult (FL: 70-81mm) LFS were salvaged at CVP on 1/14/2023 and 1/15/2023. The expanded seasonal salvage is 16.

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

**Notes:**

- SLS 2 is out on water this week
- SKT detected many wakasagis especially in Sacramento Deepwater Shipping Channel, so all osmerids will be sent to the lab for QC and verification.
- The second experimental release of the water year is scheduled this week, and the third release is scheduled for the week of January 23<sup>rd</sup>.
- SMT will hold an off-cycle meeting on 1/19/2023 for further discussion on operational plans and potentially if an OMRI recommendation is warranted after the first five days of Turbidity Bridge Avoidance.

**Attachments:** Table 1: EDSM Catch Table, Table2: Chipps Island Trawl Catch Table, Table 3: SLS 1 Catch Table, Figure 1: Map of SLS stations Table 4: SKT Catch Table, and Figure 2: Map of SKT stations.

Table 1: DS and LFS catch for EDSM 2022 Phase 1 Kodiak trawls of January 9<sup>th</sup>-13<sup>th</sup>. Only stations with catch of these species are reported here. These data are preliminary and subject to change.

Date	Stratum	Subregion	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
01/09/2023	Suisun Marsh	Suisun Marsh	23-24-SM03	LFS	None	85	1	LFWO
01/09/2023	Suisun Marsh	Suisun Marsh	23-24-SM03	LFS	None	74	2	Released
01/09/2023	Suisun Marsh	Suisun Marsh	23-24-SM04	LFS	None	76	2	Released
01/09/2023	Suisun Marsh	Suisun Marsh	23-24-SM04	LFS	None	77	1	Released
01/09/2023	Suisun Marsh	Suisun Marsh	23-24-SM04	LFS	None	78	2	Released
01/09/2023	Suisun Marsh	Suisun Marsh	23-24-SM04	LFS	None	84	1	Released
01/09/2023	Suisun Marsh	Suisun Marsh	23-24-SM04	LFS	None	86	1	Released
01/09/2023	Suisun Marsh	Suisun Marsh	23-24-SM06	LFS	None	64	2	Released
01/09/2023	Suisun Marsh	Suisun Marsh	23-24-SM06	LFS	None	73	1	Released
01/09/2023	Suisun Marsh	Suisun Marsh	23-24-SM06	LFS	None	78	1	Released
01/11/2023	Suisun Marsh	Grizzly Bay	23-24-SM05	LFS	None	80	1	Released
01/11/2023	Suisun Marsh	Grizzly Bay	23-24-SM05	LFS	None	92	1	Released
01/11/2023	Suisun Marsh	Suisun Marsh	23-24-SM02	LFS	None	73	1	Released
01/11/2023	Suisun Marsh	Suisun Marsh	23-24-SM07	LFS	None	60	1	Released
01/11/2023	Suisun Marsh	Suisun Marsh	23-24-SM07	LFS	None	81	1	Released
01/13/2023	Suisun Bay	Mid Suisun Bay	23-24-SB06	LFS	None	80	1	Released

Table 2: LFS catch for Chipps Island Trawls January 9<sup>th</sup>-13<sup>th</sup>. These data are preliminary and subject to change.

Date	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
01/09/2023	SB018N	LFS	None	77	1	Released
01/09/2023	SB018N	LFS	None	112	1	Released
01/09/2023	SB018S	LFS	None	75	1	Released
01/09/2023	SB018S	LFS	None	91	1	Released
01/09/2023	SB018S	LFS	None	110	1	Released
01/11/2023	SB018M	LFS	None	75	1	Released
01/11/2023	SB018M	LFS	None	104	1	Released
01/11/2023	SB018N	LFS	None	79	1	Released

Table 3: LFS catch for SLS 1 January 3<sup>rd</sup>-6<sup>th</sup>. 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)
1	323	1/3/2023	7.7	58	Processed	LFS	2	Complete	7	8	7.5	2
1	330	1/3/2023	6.7	46	Processed	LFS	3	Complete	7	7	7	3
1	336	1/3/2023	12.3	44	Processed	LFS	1	Complete	8	8	8	1
1	338	1/3/2023	12.0	40	Processed	LFS	79	Complete	6	8	7.5	41
1	401	1/3/2023	14.4	40	Processed	LFS	1	Complete	7	7	7.0	1
1	404	1/3/2023	14.6	37	Processed	LFS	3	Complete	7	7	7.0	3
1	520	1/6/2023	117	18	Processed	LFS	1	Preliminary	7	7	7	0
1	602	1/6/2023	90.9	26	Processed	LFS	2	Complete	7	8	7.5	2
1	606	1/6/2023	n/a	25	Processed	LFS	2	Complete	6	7	6.5	2
1	703	1/6/2023	114	17	Processed	LFS	1	Complete	7	7	7	1
1	704	1/6/2023	108	18	Processed	LFS	1	Complete	7	7	7	1
1	801	1/6/2023	112	19	Processed	LFS	1	Complete	6	6	6	1

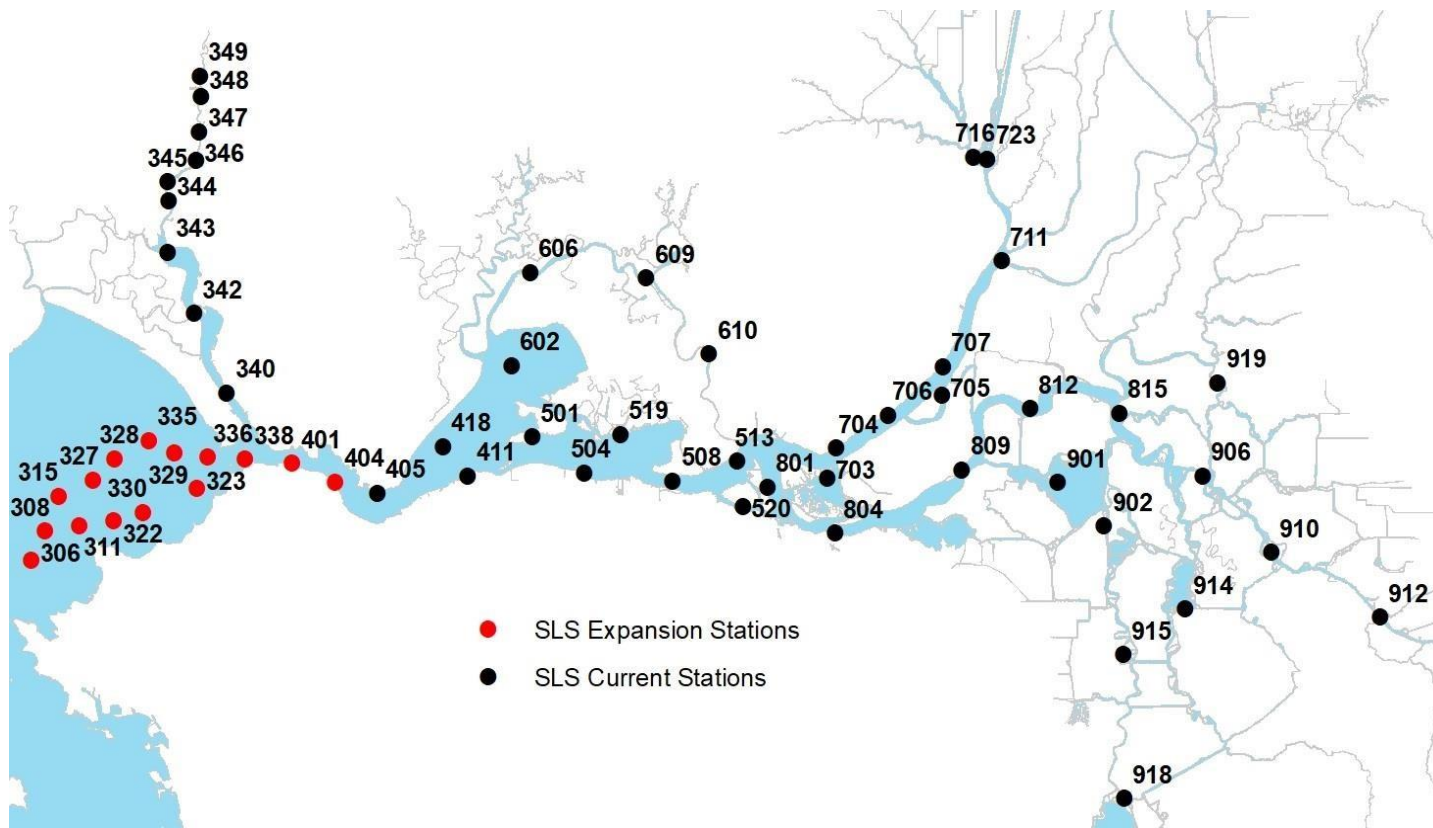


Figure 1: Map of SLS stations



Table 4: LFS catch data for SKT 1 on January 9<sup>th</sup> – 13<sup>th</sup>. These data are preliminary and subject to change.

Sample Date	Survey Number	Station Code	Species	Fork Length (mm)
1/10/2023	1	804	LFS	73
1/12/2023	1	609	LFS	109
1/12/2023	1	606	LFS	68
1/12/2023	1	504	LFS	75
1/12/2023	1	501	LFS	78
1/12/2023	1	340	LFS	80
1/12/2023	1	340	LFS	89
1/12/2023	1	340	LFS	75
1/12/2023	1	340	LFS	86
1/12/2023	1	340	LFS	87
1/12/2023	1	340	LFS	80

## Spring Kodiak Trawl Sampling Stations

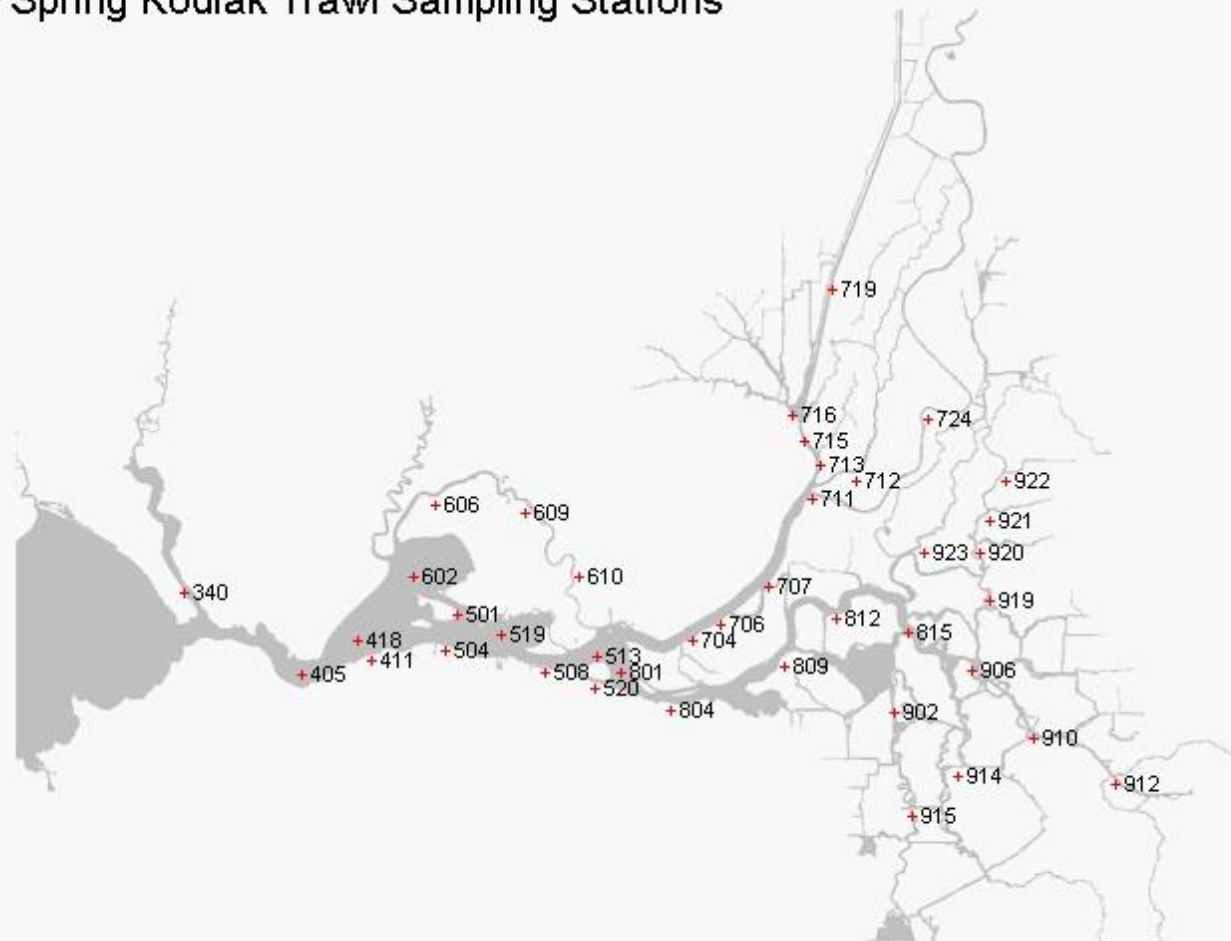


Figure 2: Map of SKT stations