

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

## Section 1: Overview

**Date: 01/09/2024**

### **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.

### **Risk Assessment:**

*Delta Smelt:* Based on distribution patterns over the past decade and low detections in this water year, Delta Smelt are unlikely to be prevalent in the Central and South Delta. Limited detection data from the past month supports Delta Smelt presence in the lower Sacramento River. The last Delta Smelt observation was on 12/07/23 in the lower Sacramento River. The likelihood of Delta Smelt entrainment is low due to seasonal timing. OMR Management based on Salmonid presence has begun as of 01/01/24. The Integrated Early Winter Pulse Protection (IEWPP) period began on 12/01/23. “First Flush” conditions that would trigger IEWPP regulations are not anticipated but will be monitored this week.

*Longfin Smelt:* LFS migration and spawning are on-going. Larval LFS have been detected in the Lower San Joaquin River, Lower Sacramento River, and the Confluence by Smelt Larva Survey (SLS) 13. Fall Midwater Trawl (FMWT) December survey, San Francisco Bay Study (SFBS) December survey, and Enhanced Delta Smelt Monitoring (EDSM) have detected several sub-adult and adult LFS in the Lower Sacramento River and the Confluence. The majority of adult and sub-adult detections are downstream of the Confluence. OMR management season initiated on 01/01/24 with COA 8.3.2, and will restrict OMRI to be no more negative than -5,000 cfs on a 14-day average. X2 is estimated to be around 79 km. QWEST is anticipated to be as negative as -1,000 cfs, and OMRI is expected to be as negative as -5,100 cfs this week. Based on the detections, the risk of entrainment of LFS larvae in the Central Delta region is moderate. Risk for all other life stages and in other regions is low. The December Water Year Type forecast is Below Normal, and thus COA 8.12 will not be in effect on 01/15/24. COA 8.12 for larval LFS may become active if the Water Year Type forecast is updated to Dry or Critical in January.

## Section 1-A: Sacramento River and Confluence

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 subadults and adults	Exposure Risk (Hydrology)	Low	Water temperature is not conducive for spawning. Turbidity and flow are not conducive of population scale migration.
DS subadults and adults	Routing Risk (Behavior and life history)	Low	One marked adult DS was detected in the Lower Sacramento River by EDSM on 12/07/23. One sub-adult DS was detected in the Lower Sacramento River by EDSM on 11/15/23.
<b>DS</b>	<b>Overall Entrainment Risk</b>	<b>Low</b>	As above

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 sub-adults and adults	Routing Risk (Behavior and life history)	Low	Migration is on-going and spawning has been detected in the Lower Sacramento River. Over 70 sub-adults and adults have been detected near or east of Chipps Island. X2 is estimated to be around 79 km and OMRI is expected to be as negative as -5,100 cfs this week.
LFS larvae	Exposure Risk (Hydrology)	Low	40 larvae (mostly yolk-sac) and two yolk-sac larvae were detected by SLS 13 and SLS 12 respectively in the Lower Sacramento River and the Confluence region. QWEST is anticipated to be as negative as -1,000 cfs.
<b>LFS</b>	<b>Overall Entrainment Risk</b>	<b>Low</b>	As above

## Section 1-B: Central Delta

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)	Low	No survey detections and unlikely to be present in this region.

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 sub-adults and adults	Exposure Risk (Hydrology)	Low	No survey detections in this region.
LFS larvae	Exposure Risk (Hydrology)	Moderate	Two yolk-sac larvae were detected at stations 809 and 812 by SLS 13. X2 is around the Confluence (~79 km).

- Change in exposure from previous week: *(Note: The change in risk compared to previous weeks is not required by the Incidental Take Permit [ITP]).*
  - DS: No changes
  - LFS: No changes
- Reporting Old and Middle River Index (OMRI) *(Number and range of OMRI bins will vary based on anticipated hydrology and operations)*
  - Condition of Approval (COA) 8.3.2 has initiated OMR management season on 01/01/24 and limit OMRI to no more negative than -5,000 cfs on a 14-day average.
  - Expected daily OMRI range this week: -4,800 to -5,100 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 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 Formazin Nephelometric Unit (FNU), 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 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

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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.

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 8.3.1) 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 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: Conditions are not likely to exceed the thresholds described in this COA in the next seven days.

8.3.2: This COA for salmonids initiated the OMR management season on 01/01/24.

8.3.3: No adult LFS have been salvaged this WY. The FMWT LFS index for September through December is 464, therefore the salvage (post-expansion) threshold to trigger this COA is 46 LFS. This COA has been off-ramped on 01/01/24 when COA 8.3.2 initiated OMR management season.

8.4.1: This COA has been off-ramped as of 12/18/23 due to detection of larval LFS by SLS 12.

8.4.2: This COA is in effect as of 01/01/24, but has not been triggered by SLS 13 which detected larval LFS in two of the 12 Central and South Delta stations, and two larvae total in that region.

8.4.3: Conditions are not likely to exceed the thresholds described in this COA in the next seven days.

8.5.1: This COA will be in effect after COA 8.3.1 is initiated or February 1, whichever comes first.

8.12: The December Water Year Type forecast is Below Normal, and thus COA 8.12 will not be in effect on 01/15/24. COA 8.12 for larval LFS may become active if the Water Year Type forecast is updated to Dry or Critical in January.

8.13: The Sacramento Valley Water Year Type Index (SVI) corresponding to the 50% probability of exceedance is 7.22, 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 01/09/24.

### 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: Closed on 11/27/23. Expected to remain closed for the season.
  - OMR management season initiated on 01/01/2024 based on COA 8.3.2.
- Controlling Factors: OMR (-5,000 cfs on a 14-day average)
- Water Temperature:
  - Clifton Court Forebay (CCF) Daily Average Water Temperature = NA
  - 3 Station Average = 9.95°C
- Tidal Cycle: Transitioning from Spring to Neap tide.
- Turbidity:
  - 8.3.1 Freeport 3-day average = 26.33 formazin nephelometric units (FNU)
  - 8.5.1 Old River at Bacon Island (OBI) Turbidity = 2.35 FNU
- Salinity: X2 = ~79 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: 2,300 cfs. Anticipated range: 2,000 to 3,500 cfs
  - Jones: 3,600 cfs. Anticipated range: 3,600 to 4,200 cfs
- Meteorological Forecast: Cold and dry Monday day; precipitation chances return Monday night and persist through this weekend.
- Six-day Storm Event Projection: NA

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

- DCC Gates position: Expected to remain closed for the season.
- Sacramento River flow at Freeport: 18,200 cfs as of 01/08/24.
  - Anticipated range: 14,000 to 20,000 cfs
- San Joaquin River flow at Vernalis: 1,807 cfs as of 01/08/24.
  - Anticipated range: 1,750 to 2,250 cfs
- Qwest: +810 cfs as of 01/07/24. Anticipated range: highly variable with expected precipitation but -200 to -1,000 cfs.
- OBI Turbidity: No anticipated changes.
- NDOI: 19,300 cfs as of 01/07/24. Anticipated range: 10,000 to 20,000 cfs.
- Upstream releases:
  - Keswick = 5,000 cfs. No anticipated changes.
  - Nimbus = 1,750 cfs. No anticipated changes.

- Goodwin = 1,000 cfs. No anticipated changes.
- Oroville = 1,750 cfs. No anticipated changes.

Table 1: Comparison of OMR and OMR Index (5-day and 14-day averages for OMR Index and USGS gauge were reported on [SacPAS website](#), accessed 09 January 2024.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
01/05/24	Daily	-5,710	-4,870
01/05/24	5-day	-5,290	-4,910
01/05/24	14-day	-5,100	-6,270

#### 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 marked adult (Fork Length (FL): 63mm) DS was detected in the Lower Sacramento River on 12/07/23 (origin: 11/15/23 release). One subadult (FL: 57mm) DS was detected in the Lower Sacramento River on 11/15/23. One adult (FL: 60mm) and one sub-adult (FL: 53mm) DS were detected in Lower Sacramento River in October.
- FMWT September to December Index for Delta Smelt: 0
- Delta Smelt life cycle model (LCM) discussion: NA
- Biological Conditions: NA
- % of population in Delta zones: NA
- Smelt Larva Survey (SLS): Survey 13 detected no DS. The 12 Central and South Delta station average Secchi depth for SLS 1 is 158cm.
- 20mm Survey: NA
- Experimental release:
  - 14,104 cultured DS marked with green VIE on the left anterior dorsal side were released at Sacramento River near Rio Vista on 11/15/23.
  - 6,508 cultured DS marked with blue VIE on the left posterior dorsal side were released at Sacramento River near Rio Vista on 12/12/23.
  - 6,581 cultured DS marked with blue VIE on the right anterior dorsal side were released at Sacramento River near Rio Vista on 12/14/23.
  - 6,430 cultured DS marked with green VIE on the right anterior dorsal side were released at Sacramento River near Rio Vista on 12/19/23.

- 6,261 cultured DS marked with green VIE on the left posterior dorsal side were released at Sacramento River near Rio Vista on 12/20/23.
- Salvage: No DS have been salvaged at either facility this water year.

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

- FMWT September to December Index: 464
  - In December, two LFS were detected in the Lower Sacramento River, and 86 LFS were detected in San Pablo Bay, Carquinez Strait, Suisun Bay, and Montezuma Slough.
- Other Surveys:
  - EDSM: Three adult (FL: > 84mm) and 78 sub-adult (FL: 58-83mm) LFS were detected in the Confluence, Suisun Bay, and Suisun Marsh during the week of 01/01/24 (Table 1). Some of the adult-sized LFS were not measured in order to reduce handling stress for the broodstock collection (indicated as FL: > 84mm).
  - Chipps Island Trawl: Two adult (FL: >84mm) LFS were detected during the week of 01/01/24 (Table 2).
  - Bay Study: The December survey detected four adult (FL: 93-98mm) and 47 sub-adult (FL: 53-77mm) LFS in the Lower Sacramento River and the Confluence region, and ten adult (FL: 85-112mm) and 36 sub-adult (FL: 50-72mm) LFS in the South Bay, Central Bay, San Pablo Bay, and the Suisun region.
  - SLS: Survey 13 detected two larval (FL: 7mm) LFS in the San Joaquin River, 40 larval (FL: 5-9mm) LFS in the Lower Sacramento River and Confluence region, and 11 larval (FL: 6-10mm) LFS in Suisun Marsh (Table 3). Processing for Survey 13 is complete. Survey 12 detected two yolk-sac larvae (FL: 5-6mm) in the Lower Sacramento River.
- Salvage: No LFS have been salvaged at either facility this water year.

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

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#### **Notes:**

- SLS 1 is on the water this week
- In this document, salvage will be noted in three ways:
  - Salvage (pre-expansion) represents the number of fish detected in subsamples at the fish salvage facilities.
  - Salvage (post-expansion) represents the estimated total number of fish detected at the fish salvage facilities using appropriate expansion factors for the subsampled time. This may be reported as either daily or weekly value.
  - Cumulative seasonal salvage represents the year-to-date sum of salvage (post-expansion) for the current water year.

Attachments: Table 1: EDSM catch table, Table 2: Chipps Island Trawl catch table, Table 3: Smelt Larva Survey (SLS) 13 catch table, and Figure 1: Map of SLS sampling stations.

Table 1. Delta Smelt (DSM) and Longfin Smelt (LFS) catch for EDSM 2023 Phase 1 Kodiak trawls on the week of 01/01/24. Only stations with DSM or LFS catch are reported here. Some adult-sized LFS were not measured in order to reduce handling stress for the broodstock collection (indicated as FL: > 84mm). These data are preliminary and subject to change.

Date	Stratum	Subregion	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM05	LFS	None	71	1	UC Davis/DOP
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	58	1	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	61	1	UC Davis/DOP
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	61	1	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	62	2	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	64	2	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	65	3	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	66	3	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	67	5	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	68	1	UC Davis/DOP
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	68	5	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	69	2	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	70	1	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	71	2	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	72	3	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	73	7	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	74	1	UC Davis/DOP
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	74	2	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	75	3	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	76	2	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	77	1	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	77	1	UC Davis/DOP
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	78	4	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	79	1	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	80	3	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	81	1	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	82	1	Released
1/2/2024	Suisun Marsh	Suisun Marsh	24-23-SM06	LFS	None	83	2	Released
1/3/2024	Suisun Marsh	Grizzly Bay	24-23-SM04	LFS	None	66	1	UC Davis/DOP
1/3/2024	Suisun Marsh	Grizzly Bay	24-23-SM04	LFS	None	72	1	UC Davis/DOP
1/3/2024	Suisun Marsh	Grizzly Bay	24-23-SM04	LFS	None	75	2	UC Davis/DOP
1/3/2024	Suisun Marsh	Grizzly Bay	24-23-SM04	LFS	None	80	1	Released
1/5/2024	Suisun Bay	Confluence	24-23-SB06	LFS	None	74	1	Released
1/5/2024	Suisun Bay	Honker Bay	24-23-SB07	LFS	None	>84	3	Released
1/5/2024	Suisun Bay	Honker Bay	24-23-SB07	LFS	None	60	1	Released
1/5/2024	Suisun Bay	Honker Bay	24-23-SB07	LFS	None	68	1	UC Davis/DOP
1/5/2024	Suisun Bay	Honker Bay	24-23-SB07	LFS	None	68	2	Released
1/5/2024	Suisun Bay	Honker Bay	24-23-SB07	LFS	None	70	1	Released
1/5/2024	Suisun Bay	Honker Bay	24-23-SB07	LFS	None	71	1	Released

Date	Stratum	Subregion	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
1/5/2024	Suisun Bay	Honker Bay	24-23-SB07	LFS	None	73	1	Released
1/5/2024	Suisun Bay	Honker Bay	24-23-SB07	LFS	None	78	1	UC Davis/DOP
1/5/2024	Suisun Bay	Honker Bay	24-23-SB07	LFS	None	80	1	UC Davis/DOP
1/5/2024	Suisun Bay	Honker Bay	24-23-SB07	LFS	None	82	1	UC Davis/DOP

Table 2: Delta Smelt (DSM) and Longfin Smelt (LFS) catch for Chipps Island Trawl on the week of 01/01/24. Only stations with DSM or LFS catch are reported here. Some adult-sized LFS were not measured in order to reduce handling stress for the broodstock collection (indicated as FL: > 84mm). These data are preliminary and subject to change.

Date	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
1/4/2024	SB018N	LFS	None	>84	2	Broodstock

Table 3: SLS 13 catch table. Processing is on-going. These data are preliminary and subject to change.

Year	Survey #	SLS Station	Date	Turbidity (FNU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
2023	13	508	12/28/2023	7.3	78	Processed	Longfin Smelt	11	Complete	6	9	7.1	11
2023	13	513	12/28/2023	8.3	68	Processed	Longfin Smelt	8	Complete	5	8	6.8	8
2023	13	520	12/27/2023	8.2	72	Processed	Longfin Smelt	4	Complete	6	8	6.8	2
2023	13	609	12/28/2023	14.2	48	Processed	Longfin Smelt	4	Complete	8	10	8.5	0
2023	13	610	12/28/2023	11.1	53	Processed	Longfin Smelt	7	Complete	6	7	6.9	7
2023	13	703	12/27/2023	9.4	79	Processed	Longfin Smelt	1	Complete	8	8	8.0	1
2023	13	704	12/27/2023	7.3	86	Processed	Longfin Smelt	1	Complete	7	7	7.0	1
2023	13	705	12/27/2023	7.9	87	Processed	Longfin Smelt	2	Complete	6	7	6.5	1
2023	13	707	12/27/2023	9.7	71	Processed	Longfin Smelt	1	Complete	7	7	7.0	1
2023	13	801	12/27/2023	7.9	71	Processed	Longfin Smelt	7	Complete	6	7	6.3	7
2023	13	804	12/27/2023	13.2	64	Processed	Longfin Smelt	5	Complete	5	7	6.2	5
2023	13	809	12/26/2023	4.5	127	Processed	Longfin Smelt	1	Complete	7	7	7.0	1
2023	13	812	12/26/2023	3.6	140	Processed	Longfin Smelt	1	Complete	7	7	7.0	1

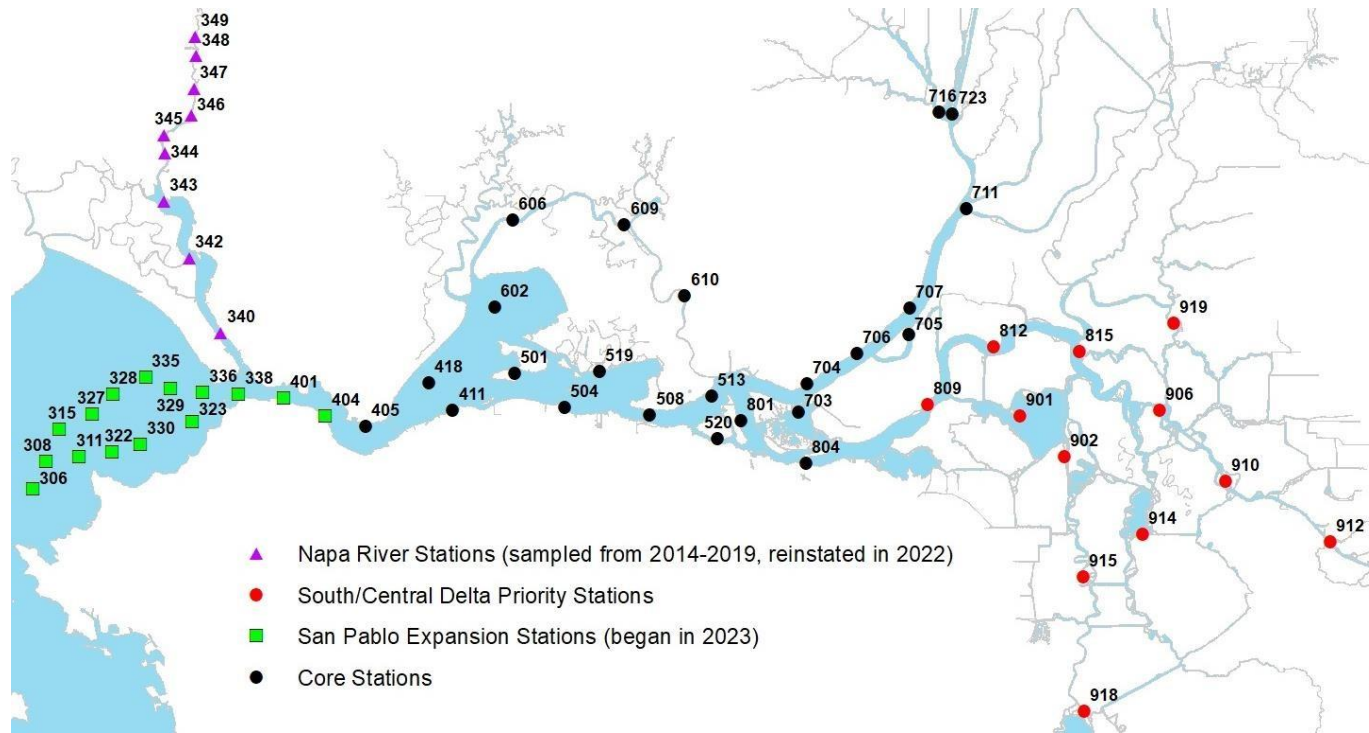


Figure 1: Map of SLS sampling stations.