

# State Water Project Incidental Take Permit Risk Assessment for Delta Smelt and Longfin Smelt. Off-cycle meeting for Condition of Approval (COA) 8.4.2 Larval and Juvenile Longfin Smelt Protection

Section 1: Overview

**Date: 01/18/2024**

**Life Stages Present:**

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

**Advice to Water Operations Management Team (WOMT):**

SMT recommends the State's share of OMRI limited to -5,000 cfs on a 7-day average under COA 8.4.2, Larval and Juvenile Longfin Smelt Protection if the 3-day average QWEST remains above +3,000 cfs. If the 3-day average QWEST falls below +3,000 cfs, then SMT recommends the State's share of OMRI limited to -3,500 cfs on a 7-day average.

**Risk Assessment:**

*Longfin Smelt:* LFS migration and spawning are on-going. Larval LFS have been detected in the Central and South Delta, Lower Sacramento River, the Confluence, and Suisun region by Smelt Larva Survey (SLS) Survey 1 and Larval Entrainment Study (LES). Adult and sub-adult LFS have been detected in the Lower Sacramento River and the Confluence by Fall Midwater Trawl (FMWT) December survey, San Francisco Bay Study (SFBS) December survey, Chipps Island Trawl, and Enhanced Delta Smelt Monitoring (EDSM). Most adult and sub-adult detections have been downstream of the Confluence. X2 is estimated to be around 75 km. OMRI is anticipated to be between -5,100 cfs and -4,000 cfs this week. QWEST is anticipated to be between +1,400 cfs and +6,200, and has been positive since 01/14/24. It is forecasted to remain positive through this week and next week, which should help push the LFS larvae in the Lower San Joaquin River westwards and out of the zone of influence of the export facilities. The risk of entrainment of larval LFS in the Central and South Delta under the forecasted hydrology is now low. The risk for all other life stages and in other regions remain low. SMT recommends the State's share of OMRI limited to -5,000 cfs on a 7-day average under COA 8.4.2, Larval and Juvenile Longfin Smelt Protection if the 3-day average QWEST remains above +3,000 cfs. If the 3-day average QWEST falls below +3,000 cfs, then SMT recommends the State's share of OMRI limited to -3,500 cfs on a 7-day average.

**Discussion of larval LFS risk:**

- DWR's updated forecast shows higher precipitation over the weekend than originally discussed

by SMT on Tuesday 1/16/24. The new anticipated QWEST ranges from +1,400 cfs to +6,200 until the next SMT meeting.

- Conditions for COA 8.3.1 Integrated Early Winter Pulse Protection are forecasted to be met on 1/21/24 or 1/22/24. SWP and CVP will operate to the OMRI limit of -2,000 cfs on a 14-day average three days after the conditions are met, likely on 1/24/24 or 1/25/24.
- COA 8.6.3, a salmonid action, is controlling the State's share of -3,500 cfs OMRI through 1/21/24.
- Regardless of the magnitude of the recommendation, the recommendation set for COA 8.4.2 Larval and Juvenile LFS Protection will likely only be controlling between 1/22/24 and whenever COA 8.3.1 restrictions are enacted.
- X2 will continue to move westwards with the forecasted precipitation.
- Rio Vista flows may become as high as 40,000 cfs, but are unlikely to reach 55,000 cfs, which is the High Flow Off-ramp threshold under COA 8.4.3.
- The 3 -day average turbidity at Freeport reached > 50 FNU yesterday 1/17/24, but it is difficult to predict turbidity, especially how far south it will reach.
- Vernalis flows are also expected to increase on Sunday, but to a lesser extent than the Sacramento River.
- The positive QWEST should help push particles out from stations 815, 812, and 809, which is where most of the LFS larvae in this region were detected. The conceptual model also indicates that a positive QWEST will reduce the number of larvae that will be entrained into the OMR corridor.
- SMT clarified that although we believe distribution of larval LFS is continuous throughout the Central and South Delta, the minimization of entrainment through a positive QWEST is the most effective for those larvae in the Lower San Joaquin River.
- Under these hydrologic conditions where QWEST has been positive for the last five days and forecasted to remain positive in the upcoming week, DWR proposed to decrease the risk for larval LFS in the Central and South Delta to low and recommend an OMRI limit of -5,000 cfs on a seven-day average.
- CDFW agreed that based on forecasted hydrology, the risk for larval LFS is low and agreed to DWR's recommendation. However, should the three-day average QWEST be more negative than +3,000 cfs, then the recommendation of -3,500 cfs OMRI shall be reinstated.

## 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.

8.4.2 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.

### **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 likely to exceed the thresholds described in this COA in the next seven days.

8.4.2: This COA is in effect as of 01/01/24.

- SLS 13 detected larval LFS in two of the 12 Central and South Delta stations, and two larvae total in that region, which did not trigger this COA.
- SLS 1 detected five larval LFS across four of the 12 Central and South Delta stations, and triggered this COA on 01/10/23 and restricted SWP share of OMRI to no more negative than -5,000 cfs on a 7-day average for seven consecutive days. SMT held an off-cycle meeting on 01/11/24 and recommended the State's share of OMRI no more negative than -3,500 cfs on a 7-day average. This was implemented on 01/14/24. SMT agreed to continue the same level of protection on 01/16/24. SMT held an off-cycle meeting on 01/18/24 and recommended the State's share of OMRI limited to -5,000 cfs on a 7-day average if the 3-day average QWEST remains above +3,000 cfs. If the 3-day

average QWEST falls below +3,000 cfs, then the SMT recommends the State's share of OMRI limited to -3,500 cfs on a 7-day average.

### 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:
  - CVP: OMR (-5,000 cfs on a 14-day average)
  - SWP: OMR (-3,500 cfs on a 7-day average due to COA 8.4.2)
- Water Temperature:
  - Clifton Court Forebay (CCF) Daily Average Water Temperature = NA
  - 3 Station Average = 10.15°C
- Tidal Cycle: Transitioning from Neap to Spring tide.
- Turbidity:
  - 8.3.1 Freeport 3-day average = 66.49 formazin nephelometric units (FNU)
  - 8.5.1 Old River at Bacon Island (OBI) Turbidity = 3.2 FNU
- Salinity: X2 = ~75 km
- Hydrologic Footprint: Particle Tracking Model was requested to DWR to discuss on 01/23/24.

#### **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: 1,800 cfs. Anticipated range: 1,800 to 3,500 cfs
  - Jones: 3,600 cfs. Anticipated range: 3,600 to 4,200 cfs
- Meteorological Forecast: Rain and mountain snow returns Tuesday and Wednesday. Active weather picks up by 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: 25,520 cfs as of 01/17/24.
  - Anticipated range: 14,000 to 30,000 cfs

- San Joaquin River flow at Vernalis: 1,920 cfs as of 01/17/24.
  - Anticipated range: 1,750 to 2,250 cfs
- Qwest: +1,560 cfs as of 01/16/24. Anticipated range: -600 to +5,000 cfs but highly variable with expected precipitation.
- OBI Turbidity: No anticipated changes.
- NDOI: 13,100 cfs as of 01/11/24. Anticipated range: 10,000 to 30,000 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 18 January 2024.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
01/14/24	Daily	-4,440	-4,230
01/14/24	5-day	-4,860	-4,820
01/14/24	14-day	-5,100	-4,900

#### Section 4: Distribution and Biology

##### 8.1.5.2.B. Assessment of biological information for Delta Smelt and Longfin Smelt

##### **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.
- EDSM: Six adult (FL: 85-104mm) and 217 sub-adult (FL: 54-83mm) LFS were detected in Suisun Bay and Suisun Marsh during the week of 01/08/24 (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: No LFS were detected during the week of 01/08/24.
- 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 1 detected five larval (FL: 6-8mm) LFS in the Central and South Delta, 36 larval (FL: 6-8mm) LFS in the Lower Sacramento River and the Confluence, and 21 larval (FL: 6-9mm) LFS in the Suisun region (Table 2).
  - 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 the Confluence, and 11 larval (FL: 6-10mm) LFS in Suisun Marsh.
  - 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 2 will be on the water next 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: Smelt Larva Survey (SLS) 1 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 01/08/24. 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 (mm)	Disposition
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	57	1	UC Davis/DOP
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	59	1	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	61	2	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	62	1	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	63	1	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	64	2	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	65	1	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	66	2	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	67	1	UC Davis/DOP

Date	Stratum	Subregion	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch (mm)	Disposition
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	67	1	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	68	3	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	69	2	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	70	1	UC Davis/DOP
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	71	1	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	73	1	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	74	2	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	76	1	UC Davis/DOP
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM02	LFS	None	85	1	Released
1/9/2024	Suisun Marsh	Grizzly Bay	24-24-SM05	LFS	None	75	1	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	>84	1	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	54	1	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	56	2	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	58	1	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	60	3	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	62	4	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	64	3	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	65	2	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	66	1	UC Davis/DOP
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	66	2	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	67	3	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	68	5	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	69	3	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	70	6	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	71	3	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	72	6	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	73	1	UC Davis/DOP
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	73	4	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	74	6	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	74	1	UC Davis/DOP
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	75	7	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	76	5	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	77	4	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	78	4	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	79	1	UC Davis/DOP
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	79	2	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	81	2	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	82	2	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	83	1	Released
1/9/2024	Suisun Marsh	Suisun Marsh	24-24-SM08	LFS	None	85	1	Released
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB02	LFS	None	72	1	UC Davis/DOP
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	>84	1	Released
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	58	1	Released
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	63	1	UC Davis/DOP
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	65	1	UC Davis/DOP
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	65	1	Released
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	68	1	Released
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	69	1	Released

Date	Stratum	Subregion	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch (mm)	Disposition
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	70	1	UC Davis/DOP
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	71	1	Released
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	73	1	Released
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	74	1	Released
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	75	1	UC Davis/DOP
1/10/2024	Suisun Bay	West Suisun Bay	24-24-SB03	LFS	None	79	1	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM01	LFS	None	80	1	UC Davis/DOP
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM03	LFS	None	68	1	UC Davis/DOP
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM03	LFS	None	69	1	UC Davis/DOP
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM03	LFS	None	71	1	UC Davis/DOP
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM03	LFS	None	79	1	USFWS Lab
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	59	1	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	60	2	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	61	1	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	62	1	USFWS Lab
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	62	1	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	63	2	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	64	1	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	65	1	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	66	6	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	67	1	UC Davis/DOP
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	67	2	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	68	1	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	69	3	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	70	10	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	71	5	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	72	2	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	73	8	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	73	1	UC Davis/DOP
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	74	7	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	75	9	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	76	8	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	77	2	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	78	3	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	79	1	UC Davis/DOP
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	79	4	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	81	1	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	82	3	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	83	1	UC Davis/DOP
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	83	1	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	87	1	Released
1/11/2024	Suisun Marsh	Suisun Marsh	24-24-SM07	LFS	None	104	1	Released

Table 2: SLS 1 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)
2024	1	602	1/10/2024	19.0	45	Processed	LFS	16	Preliminary	6	9	7.7	14
2024	1	606	1/10/2024	25.5	45	Processed	LFS	3	Preliminary	6	7	6.3	3
2024	1	610	1/10/2024	20.4	43	Processed	LFS	2	Preliminary	6	9	7.5	1
2024	1	703	1/9/2024	63.5	87	Processed	LFS	10	Complete	6	8	7.1	10
2024	1	704	1/9/2024	12.6	65	Processed	LFS	5	Complete	6	6	6.0	5
2024	1	705	1/9/2024	6.9	94	Processed	LFS	2	Complete	6	7	6.5	2
2024	1	711	1/9/2024	14.8	70	Processed	LFS	1	Complete	7	7	7.0	0
2024	1	716	1/9/2024	9.3	77	Processed	LFS	1	Complete	7	7	7.0	1.0
2024	1	723	1/9/2024	11.3	70	Processed	LFS	1	Complete	6	6	6.0	1.0
2024	1	801	1/10/2024	9.8	71	Processed	LFS	16	Preliminary	6	8	7.1	16
2024	1	809	1/8/2024	5.1	91	Processed	LFS	2	Complete	7	8	7.5	2
2024	1	812	1/8/2024	5.8	95	Processed	LFS	1	Complete	8	8	8.0	0
2024	1	815	1/8/2024	3.8	99	Processed	LFS	1	Complete	8	8	8.0	1
2024	1	901	1/8/2024	2.9	151	Processed	LFS	1	Complete	6	6	6.0	1



Figure 1: Map of SLS sampling stations.