

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

## Section 1: Overview

**Date: 12/19/2023**

### **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.

### **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. 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 population scale migration is on-going and spawning has started. Larval LFS have been detected in the Lower Sacramento River by Smelt Larva Survey (SLS) 12. Fall Midwater Trawl (FMWT) November survey, San Francisco Bay Study (SFBS) November survey, and Enhanced Delta Smelt Monitoring (EDSM) have detected a few sub-adult LFS in the Lower Sacramento River. The majority of adult and sub-adult LFS have been detected in and west of the Suisun region. X2 in the San Joaquin River is estimated to be around 96.1 km and QWEST is anticipated to remain between -2,000 and -3,000 cfs. Based on distribution data and life history, LFS are unlikely to be present in the Central or South Delta and therefore at low risk of entrainment.

## **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:

<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 subadults and adults	Exposure Risk (Hydrology)	Low	Water temperature is not conducive for spawning. Turbidity and flow are not conducive of population scale migration.

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
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 several sub-adults and adults have been detected near or east of Chipps Island. Spawning has started and X2 in the San Joaquin River is estimated to be around 96.1 km. Detection in this region remains relatively low, thus entrainment risk remains low.
LFS larvae	Exposure Risk (Hydrology)	Low	Two yolk-sac larvae were detected by SLS 12 in the Lower Sacramento River. QWEST is anticipated to be between -2,000 and -3,000 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 and unlikely to be present in this region.

- 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)*
  - Relevant Conditions of Approval (COAs) are not active.
  - Expected daily OMRI range this week: -4,000 to -8,000 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 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.

8.3.3 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 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.

## Discussion of Conditions of Approval

*Provide discussion addressing criteria for each Condition of Approval listed in “Basis for Advice”*

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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.

*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.

8.3.3: No adult LFS have been salvaged. The FMWT LFS index for September through November is 288, therefore the salvage threshold to trigger this COA is 8 LFS (assuming standard expansion factor) until it is updated to include the December index.

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

### 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 has not been initiated.
- Controlling Factors: Salinity management
- Water Temperature:
  - Clifton Court Forebay (CCF) Daily Average Water Temperature = NA
  - 3 Station Average = 10.48°C
- Tidal Cycle: Transitioning from Neap to Spring tide; full moon on 12/26/23.
- Turbidity:
  - 8.3.1 Freeport 3-day average = 6.81 formazin nephelometric units (FNU)
  - 8.5.1 Old River at Bacon Island (OBI) Turbidity = 2.99 FNU
- Salinity: X2 = ~96.1 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: 3,000 cfs. Anticipated range: 2,000 to 7,200 cfs
  - Jones: 3,600 cfs. Anticipated range: 3,600 to 4,200 cfs
- Meteorological Forecast: Moderate to heavy rain, high elevation snow and thunderstorm chances at the start of the week (Monday through Wednesday). Changing into quiet and seasonable weather from late week into the Christmas 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: 11,300 cfs as of 12/18/23.
  - Anticipated range: 10,000 to 20,000 cfs
- San Joaquin River flow at Vernalis: 1,300 cfs as of 12/18/23.
  - Anticipated range: 1,000 to 1,750 cfs
- Qwest: -3,300 cfs as of 12/17/23. Anticipated range: -2,000 to -3,000 cfs
- OBI Turbidity: No anticipated changes.
- NDOI: 4,060 cfs as of 12/17/23. Anticipated range: 5,000 to 15,000 cfs.
- Upstream releases:
  - Keswick = 5,000 cfs. No anticipated changes.
  - Nimbus = 2,000 cfs. No anticipated changes.
  - Goodwin = 200 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 19 December 2023.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
12/15/23	Daily	-4,830	-4,720
12/15/23	5-day	-5,120	-4,930
12/15/23	14-day	-4,720	-4,400

## 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 November 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 12 preliminarily detected no DS, but processing is ongoing. The 12 Central and South Delta station average Secchi depth is 166cm.
- 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.
- 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 November Index: 288
  - In November, two adult (FL: 92-100mm) and 79 sub-adult (FL: 48-75mm) LFS were detected, with the majority in the San Pablo Bay and fewer detected in Suisun Bay, Montezuma Slough, Confluence, and the Lower Sacramento River.
- Other Surveys:
  - EDSM: 14 adult (FL: > 84-100mm) and 106 sub-adult (FL: 53-84mm) LFS were detected in Suisun Bay and Suisun Marsh during the week of 12/12/23 (Table 1). The adult-sized LFS was not measured in order to reduce handling stress for the broodstock collection (indicated as FL: > 84mm). One sub-adult (FL: 60mm) LFS was detected in the Lower Sacramento River on 12/18/23.
  - Chipps Island Trawl: The last detections included two adult (FL: 97-107mm) LFS during the week of 12/04/23.
  - Bay Study: The last detections included three adult (FL: 97-103mm) and 86 sub-adult (FL: 44-75mm) LFS between the Lower Sacramento River and the South Bay in November.
  - SLS: Survey 12 detected two yolk-sac larvae (FL: 5-6mm) in the Lower Sacramento River (Table 2). Processing is on-going.
- 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. i**

##### **Notes:**

- Similar to last year, COA 8.4.1 was off-ramped before it was on-ramped this water year due to the detection of larval LFS by SLS 12.

Attachments: Table 1: EDSM Catch Table, Table 2: SLS 12 Catch Table, and Figure 1: Map of SLS stations.

Table 1. Delta Smelt (DSM) and Longfin Smelt (LFS) catch for EDSM 2023 Phase 1 Kodiak trawls on the week of 12/11/23. Only stations with DSM or LFS catch 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
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	>84	5	Broodstock
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	55	1	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	57	1	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	59	1	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	60	1	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	61	1	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	62	1	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	63	6	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	64	5	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	65	7	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	66	1	UC Davis/DOP
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	66	2	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	67	2	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	68	2	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	68	1	UC Davis/DOP
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	69	3	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	70	6	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	70	1	UC Davis/DOP
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	71	1	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	72	3	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	73	5	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	74	3	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	75	1	UC Davis/DOP
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	75	4	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	76	1	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	77	1	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	78	1	UC Davis/DOP
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	78	2	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	79	2	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	80	2	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	82	2	Released
12/12/2023	Suisun Marsh	Suisun Marsh	24-20-SM05	LFS	None	84	1	Released
12/12/2023	Suisun Marsh	Grizzly Bay	24-20-SM06	LFS	None	>84	2	Broodstock
12/12/2023	Suisun Marsh	Grizzly Bay	24-20-SM06	LFS	None	55	1	UC Davis/DOP
12/12/2023	Suisun Marsh	Grizzly Bay	24-20-SM06	LFS	None	59	1	UC Davis/DOP
12/12/2023	Suisun Marsh	Grizzly Bay	24-20-SM06	LFS	None	65	1	UC Davis/DOP
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	>84	6	Broodstock
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	53	1	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	54	2	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	57	2	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	58	1	UC Davis/DOP
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	59	1	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	60	1	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	63	5	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	65	1	UC Davis/DOP
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	65	1	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	66	1	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	67	1	Released



Date	Stratum	Subregion	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	68	1	UC Davis/DOP
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	68	2	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	69	1	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	70	1	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	71	3	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	73	2	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	74	1	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	75	1	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	76	1	Released
12/13/2023	Suisun Marsh	Grizzly Bay	24-20-SM02	LFS	None	78	1	UC Davis/DOP
12/13/2023	Suisun Marsh	Suisun Marsh	24-20-SM03	LFS	None	73	1	USFWS Lab
12/14/2023	Suisun Bay	Mid Suisun Bay	24-20-SB06	LFS	None	100	1	USFWS Lab

Table 2: SLS 12 catch table.

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	12	704	12/12/2023	9.0	77	Processed	Longfin Smelt	2	Complete	5	6	5.5	2

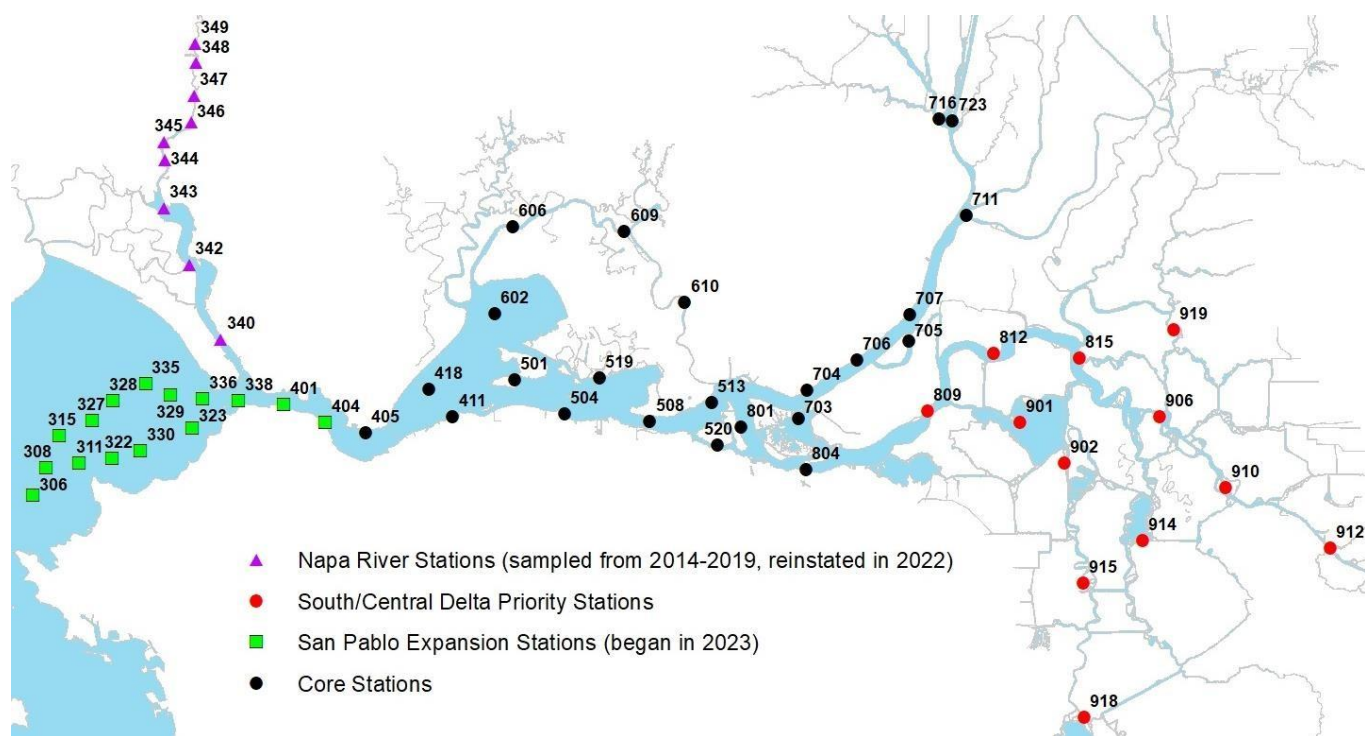


Figure 1: Map of SLS stations.