

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

Section 1: Overview

Date: 2/14/2023

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 to WOMT.

Risk Assessment:

Delta Smelt: Based on recent detection data and distribution patterns over the past decade, Delta Smelt have likely completed migration, and fish are widely distributed throughout the Delta. Water temperatures are suitable for spawning (Damon et al. 2016) and two marked ripe Delta Smelt were detected. The response of cultured fish to environmental cues typically applied to wild Delta Smelt is highly uncertain. Unmarked Delta Smelt have been detected in Suisun Marsh and the Lower San Joaquin near Antioch between 1/31/2023 and 2/9/2023. Eight marked adult Delta Smelt were detected in Suisun Bay, the Lower Sacramento River, the Sacramento Deep Water Ship Channel and Liberty Island between 1/30/2023 and 2/9/2023. Two marked ripe Delta Smelt were detected by SKT in the Sacramento Deep Water Ship Channel and Lower Sacramento River. Marked Delta Smelt were detected at SWP on 2/8/2023 and CVP on 2/12/2023 and 2/13/2023. The Turbidity Bridge Avoidance Action off-ramped starting 2/9/2023 and turbidities continue to decrease. Overall risk for entrainment is low for Delta Smelt outside of the OMR corridor and risk is moderate for fish within the OMR corridor. However, the SMT remains concerned about salvage in the last week. In recent years, adult salvage of Delta Smelt reached the 50th percentile in late February or early March (see SacPas; [Adult Delta Smelt Salvage Timing : SacPAS Central Valley Prediction & Assessment of Salmon \(washington.edu\)](#)). Additional salvage is likely, particularly considering movement of X2 upstream in the coming week and OMRI at -5000 cfs.

Longfin Smelt: One sub-adult LFS was detected at the federal fish salvage facility on 1/25/23: the cumulative salvage is now 20. One adult LFS was detected in the Lower San Joaquin River by Enhanced Delta Smelt Monitoring Program (EDSM) on 1/26/23 and 1/19/23. Four larvae have been detected in the Lower San Joaquin River (Station 809, 812) by SLS 3, but no additional larvae were detected in the rest of the 12 Central and South Delta stations. Many fish were detected by SLS and EDSM in and westward of Suisun 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 San Pablo, Suisun Bay, Suisun Marsh, Lower Sacramento River, and Lower San Joaquin River, and at the Confluence by Chipps Island Trawl. X2 has shifted upstream to just above 65 km (Port Chicago). Fish are likely distributing widely, which will help decrease risk. Risk remains low outside of the South Delta, and risk remains 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:

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
DS larvae and juveniles	Exposure Risk (Hydrology)	NA	Spawning hasn't started, no larvae present. Water temperatures are now suitable for spawning (Damon et al. 2016).
DS subadults and adults	Routing Risk (Behavior and life history)	Low	While localized movement in preparation for spawning is underway, the extent of migration under the current flow and turbidity conditions is highly uncertain. Distribution has shifted upstream into fresh water. Two marked ripe female DS were detected by SKT 2 in the Lower Sacramento River (Station 704) and Sacramento Deepwater Shipping Channel (Station 719) on 2/8/23. One unmarked adult DS was detected by EDSM on 1/31/23 in the Lower San Joaquin River just north of Antioch and nine marked DS were detected in the Lower Sacramento River, Shipping Channel, and Cache Slough from 2/01/23 to 2/09/23. Chipps Island trawl had detected a marked DS on 1/19/23.
DS	Overall Entrainment Risk	Low	Same as above.

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

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
LFS larvae and juveniles	Exposure Risk (Hydrology)	Low	25 larvae were detected in the Confluence and the Lower Sacramento River by SLS 2 and SLS 3.

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	Spawning is ongoing. Staging downstream of X2 is continuing and with the recent dry weather, X2 has shifted upstream to just above 65 km (Port Chicago). Fish are likely distributing widely, which will help decrease risk. Five sub-adult and adult LFS have been detected in the Lower Sacramento River and the Confluence by EDSM this month.
LFS	Overall Entrainment Risk	Low	Same as above.

Section 1-B: Central Delta

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

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
DS subadults and adults	Exposure Risk (Hydrology)	Moderate	Four marked DS were salvaged from 2/8/23 to 2/13/23. One unmarked DS was detected in the South Delta in EDSM on 1/17/23, and one marked adult was detected in salvage on 1/7/23. Risk is moderate within the South Delta and low 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)	Moderate	Four larvae were detected in the Lower San Joaquin River (Stations 809, 812) by SLS 3.
LFS sub-adults and adults	Exposure Risk (Hydrology)	Moderate	One adult was detected in the Lower San Joaquin River by EDSM on 1/19/23 and 1/26/23, and one adult was detected in salvage on 1/25/23. Overall risk of entrainment remains low outside of the OMR corridor. However, within the OMR corridor the risk continues to be moderate.

- Change in exposure from previous week: *(Note: The change in risk compared to previous weeks is not required by the Incidental Take Permit [ITP]).*

- DS: Risk in South Delta remains moderate. Four marked adult DS were detected in salvage between 2/8/23 and 2/13/23. All four salvaged fish were from the Rio Vista release on 1/18-1/19/23, and expanded seasonal salvage for DS is currently 20. One marked adult DS was detected in salvage on 1/7/23, the marked fish came from the DS Experimental Release that occurred in the Sacramento River near Rio Vista on 11/30/22. One unmarked adult was detected by EDSM on 2/09/23 in Suisun Marsh, and on 1/17/23 in the South Delta. One marked DS was detected by Chippis Island Trawl on 1/19/23 from the Experimental Release that occurred in Rio Vista on 1/18/23. One unmarked adult DS and one marked DS were detected by EDSM in Lower San Joaquin River and Lower Sacramento River respectively on 1/31/23. Risk of entrainment for fish outside of the South Delta remains low.
- LFS: Risk remains low for LFS outside of OMR corridor. 678 larvae were detected so far this season by SLS, but some stations are still being processed. Four larvae have been detected in the Lower San Joaquin River (Station 809, 812) by SLS 3, and processing is ongoing, but no additional larvae were detected in the rest of the Central and South Delta stations. One adult was detected in salvage on 1/25/23, and cumulative expanded salvage is 20. Spawning is on-going. However, risk remains 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*)
 - Expected daily OMRI range this week: -5,000 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 index¹ divided by 10, OR
- Real-time monitoring of abiotic and biotic factors indicates a high risk of LFS movement into areas at high risk of future entrainment, as determined by DWR and CDFW SMT staff.

When evaluating the possibility of LFS movement into areas that may be subject to an elevated risk of entrainment, the SMT shall evaluate catch of LFS with fork length ≥ 60 mm by the 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,

¹ The Fall Midwater Trawl (FMWT) Survey annual abundance index for LFS is calculated as the sum of September through December monthly abundance indices and is typically reported at about the same date as adult salvage begins in December. The FMWT Index available beginning on December 1 each year shall be used to establish this threshold.

Permittee shall implement Condition of Approval 8.4.2 to minimize take of larval and juvenile LFS.

8.4.2 Larval and Juvenile Longfin Smelt Entrainment Protection. From January 1 through June 30, when a single Smelt Larva Survey (SLS) or 20 mm Survey (20 mm) sampling period exceeds one of the following thresholds:

- LFS larvae or juveniles found in four or more of the 12 SLS or 20 mm stations in the central Delta and south Delta (Stations 809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918, 919), or
- LFS catch per tow exceeds five LFS larvae or juveniles in two or more of the 12 stations in the central Delta and south Delta (Stations 809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918, 919).

Permittee shall restrict south Delta exports for seven consecutive days to maintain a seven-day average OMR index no more negative than -5,000 cfs. Permittee shall also immediately convene the SMT to conduct a risk assessment (see Condition of Approval 8.5.1.2) to assess the risk of larval and juvenile LFS entrainment into the South Delta Export Facilities, determine if an OMR flow restriction is warranted, and recommend an OMR flow limit between -1,250 and -5,000 cfs. The SMT risk assessment and operational advice shall be reviewed by the WOMT (Condition of Approval 8.1.3) via the Collaborative Real-time Decision-making process (Condition of Approval 8.1.4). Permittee shall operate to the export restriction and OMR flow target approved through Conditions of Approval 8.1.3 and 8.1.4. Each week the SMT shall convene to conduct a new risk assessment and determine whether to maintain, or off ramp from, export restrictions based on the risk to LFS, or until the DS and LFS off-ramp has been met as described in Condition of Approval 8.8 (End of OMR Management).

From January 1 through June 30, DWR and CDFW SMT staff shall conduct weekly, or more often as needed, risk assessments (see Condition of Approval 8.5.1.2) to assess the risk of larval and juvenile LFS entrainment into the South Delta Export Facilities. As a part of the risk assessment the SMT shall provide advice on the appropriate OMR flow targets to minimize LFS entrainment or entrainment risk, or both. The SMT shall provide its advice to WOMT (Condition of Approval 8.1.3) and use the Collaborative Approach to Real-time Risk Assessment process described in Condition of Approval 8.1.4 to determine if an OMR flow restriction is warranted and determine OMR flow limit between -1,250 and -5,000 cfs. The OMR flow limit shall be in place until the next risk assessment conducted by the SMT determines that it is no longer necessary to minimize take or related impacts to LFS, or until the DS and LFS off-ramp has been met as described in Condition of Approval 8.8 (End of OMR Management).

8.4.3 High Flow Off-Ramp from Longfin Smelt OMR Restrictions. OMR management for adult, juvenile, or larval LFS as described in Conditions of Approval 8.4.1 and 8.4.2 are not required, or would cease if previously required, when river flows are (a) greater than 55,000 cfs in the Sacramento River at Rio Vista or (b) greater than 8,000 cfs in the San Joaquin River at Vernalis. If flows subsequently drop below 40,000 cfs in the Sacramento River at Rio Vista or below 5,000

cfs in the San Joaquin River at Vernalis, the OMR limit previously required as a part of Conditions of Approval 8.4.1 and 8.4.2 shall resume.

8.5.1 Turbidity Bridge Avoidance. The purpose of this Condition is to minimize the risk of entrainment of adult DS in the corridors of the Old and Middle rivers into the south Delta export facilities. This Condition is intended to avoid the formation of a turbidity bridge from the San Joaquin River shipping channel to the south Delta export facilities, which historically has been associated with elevated salvage of pre-spawning adult DS.

After the Integrated Early Winter Pulse Protection (Condition of Approval 8.1.3) or February 1 (whichever comes first), until April 1, Permittee shall manage exports to maintain daily average turbidity in Old River at Bacon Island (OBI) at a level of less than 12 FNU. If the daily average turbidity at OBI is greater than 12 FNU, Permittee shall restrict south Delta exports to achieve an OMR flow that is no more negative than -2,000 cfs until the daily average turbidity at OBI is less than 12 FNU.

If, after five consecutive days of OMR flow that is less negative than -2,000 cfs, the daily average turbidity at OBI is not less than 12 FNU the Smelt Monitoring Team may convene to assess the risk of entrainment of DS (Condition of Approval 8.1.5.2). The Smelt Monitoring Team may provide advice to WOMT regarding changes in operations that could be conducted to minimize the risk of entrainment of DS (Condition of Approval 8.1.3). The Smelt Monitoring Team may also determine that OMR restrictions to manage turbidity are infeasible and may instead provide advice for a different OMR flow target that is between -2,000 and -5,000 cfs and is protective based on turbidity and adult DS distribution and salvage to the WOMT for consideration (Condition of Approval 8.1.3). Operational decisions shall be made following the process described in Condition of Approval 8.1.4 (Collaborative Real Time Risk Assessment).

Turbidity readings at individual sensors can generate spurious results in real time. Spurious results could be incorrectly interpreted as a turbidity bridge, when in fact the cause is a result of local conditions or sensor error. To assess whether turbidity readings at OBI are attributable to a sensor error or a localized turbidity spike, Permittee, in coordination with Reclamation, may consider and review data from other nearby locations and sources. Additional information that will be reviewed include regional visualizations of turbidity, alternative sensors, and boat-based turbidity mapping, particularly if there was evidence of a local sensor error. Permittee may bring data from these additional sources to the Smelt Monitoring Team for consideration during the development of a risk assessment to be provided to the WOMT for evaluation (Condition of Approval 8.1.3).

Permittee shall use the decision-making process described Condition of Approval 8.1.4 (Collaborative Real-time Risk Assessment) to determine if south Delta exports may increase after five-days of OMR no more negative than -2,000 cfs, or to determine that this action is not warranted due to a sensor error or localized turbidity

event. Permittee shall implement this action until CDFW is in agreement that the action may be ended or modified.

8.12 Barker Slough Pumping Plant Longfin and Delta Smelt Protection. Permittee shall operate the BSPP to protect larval LFS from January 15 through March 31 of dry and critical water years. Permittee shall operate to protect larval DS from March 1 through June 30 of dry and critical years. If the water year type changes after January 1 to below normal, above normal or wet, this action will be suspended. If the water year type changes after January to dry or critical, Permittee shall operate according to this Condition of Approval.

From January 15 through March 31 of dry and critical water years, Permittee shall reduce the maximum seven-day average diversion rate at BSPP to less than 60 cfs when larval LFS are detected at Station 716. In addition, in its weekly meetings from January 15 through March 31, the Smelt Monitoring Team shall review LFS abundance and distribution survey data and other pertinent abiotic and biotic factors that influence the entrainment risk of larval LFS at the BSPP. When recommended by the Smelt Monitoring Team, and as approved through the decision making processes described in Conditions of Approval 8.1.3 and 8.1.4, Permittee shall reduce the maximum seven-day average diversion rate at BSPP according to the advice provided by the Smelt Monitoring Team.

From March 1 through June 30 of dry and critical water years, Permittee shall reduce the maximum seven-day average diversion rate at BSPP to less than 60 cfs when larval DS are detected at Station 716. In addition, in its weekly meetings from March 1 through June 30, the Smelt Monitoring Team shall review DS abundance and distribution survey data and other pertinent abiotic and biotic factors that influence the entrainment risk of larval DS at the BSPP (including temperature and turbidity). When recommended by the Smelt Monitoring Team, and as approved through the decision-making processes described in Conditions of Approval 8.1.3 and 8.1.4, Permittee shall reduce the maximum seven-day average diversion rate at BSPP to less than 60 cfs.

The DS requirements described in this condition may be adjusted to align with USFWS requirements to minimize take of DS through an amendment to this ITP.

8.13 Water Year Type Definition. All references to water year type in this ITP shall be defined based on the Sacramento Valley Index unless otherwise noted.

Discussion of Conditions of Approval

Provide discussion addressing criteria for each Condition of Approval listed in "Basis for Advice" section. Refer to data below where appropriate.

COAs relevant to OMR management went into effect December 1st. The Smelt Monitoring Team (SMT) conducted a Risk Assessment based on COA 8.1.5.2.

8.3.1: This COA was triggered by conditions measured on 12/31/22 when the three-day average of daily flow and turbidity was 26,552 cfs and 77 FNU and respectively. Operations 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.

8.4.3: This COA is no longer active as of 2/11/23 due to flow in the San Joaquin River at Vernalis decreasing to under 5,000 cfs.

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

consensus that no further restrictions are warranted at this time, because turbidity was decreasing. On 2/9/23 daily turbidity at Old River at Bacon Island decreased to less than 12 FNU, therefore this COA is no longer triggered.

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

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

Section 3: Hydrology and Operations

Assessment of hydrologic, operational, and meteorological information. 8.1.5.2 A.

Section 3-A: Water operations conditions. 8.1.5.2.A. i

- Antecedent Actions: *(e.g. Delta Cross Channel [DCC] gate closure and actions such as integrated early winter pulse protection, etc.)*
 - DCC is closed as of 11/28/22.
- Controlling Factors: OMR
- Water Temperature:
 - Clifton Court Forebay (CCF) Daily Average Water Temperature = NA
 - 3 Station Average = 10.6°C
- Tidal Cycle: Neap tide. Spring tide with new moon will peak on the 19th.
- Turbidity:
 - 8.3.1 Freeport 3-day average = 20.67 formazin nephelometric units (FNU)
 - 8.5.1 Old River at Bacon Island (OBI) Turbidity = 8.88 FNU
- Salinity: X2 > 65 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): Reduced count from 1600-1800 on 2/8/23 for vegetation management, and no counts occurred at 0800, 1000, 1200, or 1400 due to staffing issues
- Exports:
 - CCF: 2,800 to 3,500 cfs
 - Jones: 3,500 to 4,200 cfs
 - Combined: 6,300 to 7,700 cfs

- Meteorological Forecast: A very weak system at start of week brings breezy northern winds and very light mountain precipitation through Tuesday. Dry and cooler weather from mid to late week, with a slow warming trend.
- Storm Event Projection: n/a

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: 19,417 cfs as of 2/13/2023. Anticipated range: 15,000 to 22,000 cfs
- San Joaquin River flow at Vernalis: 4,195 cfs as of 2/13/2023. Anticipated range: 3,500 to 4,500 cfs
- Qwest: +2,658 cfs as of 2/12/2023. Anticipated range: continue to be significantly positive, but may drop to +1,500 by next week.
- OBI Turbidity: 8.88 FNU
- NDOI: 19,674 cfs as of 2/12/2023. Anticipated range: 15,000-20,000 cfs
- Upstream releases:
 - Keswick = 3,250 cfs. No anticipated changes.
 - Nimbus = 4,000 cfs. Anticipated range: 3,000 to 4,000 cfs
 - Goodwin = 200 cfs. No anticipated changes.
 - 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 14 February 2023.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
2/11/2023	Daily	-5,840	-4,980
2/11/2023	5-day	-5,330	-4,710
2/11/2023	14-day	-5,450	-4,800

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 unmarked individual was detected in Suisun Marsh on 2/9/23 (Table 1). One unmarked adult (Fork Length (FL): 73mm) DS was detected in the Lower San Joaquin River on 1/31/23. Sixteen marked DS were detected in Suisun Bay, Cache Slough, Sacramento Deepwater Shipping Channel, and Lower Sacramento from 1/24/23 to 2/7/23. One unmarked adult (FL: 71mm) DS was detected in the South Delta near Franks Tract on 1/17. One subadult DS (FL: 55mm) and one adult DS (FL: 62mm) were detected in Lower Sacramento River on 11/3/22 and 11/7/22 respectively.
- Chipps Island Trawl: One marked DS (FL: 68mm) detected on 1/19/23. This fish was from the experimental release at Rio Vista on 1/18/23.
- Fall Mid-water Trawl (FMWT) Index for Delta Smelt: 0
- Delta Smelt life cycle model (LCM) discussion: NA
- Biological Conditions: X2 has shifted upstream to just above 65 km (Port Chicago) and will continue to increase in the coming week. While localized movements in preparation for spawning are still underway, the extent of migration both spatially and temporally is highly uncertain. There is also a high degree of uncertainty regarding the response of cultured fish to environmental cues typically applied to wild DS. Distribution has shifted upstream into fresh water, though some fish are present downstream due to high outflow.
- % 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.
- SKT: Survey 2 detected two marked, ripe DS in the Lower Sacramento River (station 704) and Sacramento Deep Water Ship Channel (station 719) (Table 5).
- Salvage: Two marked adult (FL: 59-69mm) DS were salvaged at CVP on 2/13/23, one marked adult (FL: 63mm) was salvaged at CVP on 2/12/23, one marked adult (FL: 73mm) was salvaged at SWP on 2/8/23, and one marked adult (FL: 74mm) DS was salvaged at CVP on 1/7/2023. All four DS salvaged in the last week were from the Rio Vista release on 1/18-1/19/23 The expanded seasonal salvage is 20.
- FCCL lampara net sampling detected two adult DS (FL: ~60mm [estimated since fish were not directly handled]) in the Lower Sacramento River on 12/14/22. One fish was untagged, and the other fish was tagged with red VIE tag (hard release) from the experimental release.
- Experimental release: Approximately 13,000 cultured DS were released in the Sacramento Deepwater Shipping Channel on 1/25/23 and 1/26/23, 17,570 cultured DS were released in the Sacramento River near Rio Vista on 1/18/23 and 1/19/23, and 13,140 fish were released in the Sacramento River near Rio Vista on 11/30/22. No further experimental releases are scheduled for this water year.

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

- FMWT Index: 403
- Other Surveys:
 - EDSM: 15 sub-adult (FL: 67-83mm) and six adult LFS (FL: 85-96mm) were detected in Suisun Bay, Suisun Marsh, Western Delta, and the Confluence during the week of February 3rd – 10th (Table 1).
 - Chipps Island Trawl: 20 sub-adult (FL: 75-84mm) and 15 adult LFS (FL: 85-114mm) were detected during the week of February 3rd – 10th (Table 2).
 - SLS: Since the last meeting, SLS 2 detected six additional LFS larvae (Table 3), and SLS 3 detected 153 additional LFS larvae (Table 4). Many stations are still being processed for SLS 2 and 3, but no additional larvae were detected in the 12 Central and South Delta stations.
 - SKT: Survey 2 detected ten sub-adult (FL: 65-77mm) and eight adult (FL: 85-104mm) LFS in Lower Sacramento River, Confluence, and Suisun region (Table 5).
 - Bay Study: In January, Bay Study detected six adults (FL: 87-109mm) and 44 sub-adult (FL: 58-84mm) LFS in stations ranging from the Lower Sacramento River to the South Bay. Distribution was widespread but overall, more downstream than in December.
- Salvage: One sub-adult (FL: 75mm) LFS was salvaged at CVP on 1/25/2023. The expanded seasonal salvage is 20.

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

Notes:

- SLS 4 is on the water this week.
- CVP and SWP confirmed that they will begin qualitative larval sampling on March 1st.
- During the 0600-1600 reduced count at CVP on 2/12/23, there were five largemouth bass in the holding tank found at the 1600 count. Any DS or LFS that may have been in the holding tank during this ten hour period with largemouth bass would have likely been predated on, thus the reliability of salvage data for that time is compromised.
- USFWS and USBR will elevate their rationale of whether the two ripe females detected by SKT will off-ramp PA Turbidity Bridge Avoidance Action to WOMT.

Literature Cited:

Damon, L. J., S. B. Slater, R. D. Baxter, and R. W. Fujimura. 2016. Fecundity and reproductive potential of wild female Delta smelt in the upper San Francisco Estuary, California. *California Fish and Game* 102(4):188–210.

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

Table 1: DS and LFS catch for EDSM 2022 Phase 1 Kodiak trawls of February 6th – 10th. Only stations with catch of these species are reported here. These data are preliminary and subject to change. LFS that were mortalities upon capture were returned to the Lodi Fish and Wildlife Office (LFWO) to be frozen.

Date	Stratum	Subregion	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
02/06/2023	Suisun Bay	Mid Suisun Bay	23-28-SB05	LFS	None	85	1	Released
02/06/2023	Suisun Bay	West Suisun Bay	23-28-SB02	LFS	None	67	1	Released
02/06/2023	Suisun Bay	West Suisun Bay	23-28-SB02	LFS	None	76	2	Released
02/06/2023	Suisun Bay	West Suisun Bay	23-28-SB02	LFS	None	77	1	Released
02/06/2023	Suisun Bay	West Suisun Bay	23-28-SB02	LFS	None	80	1	Released
02/06/2023	Suisun Bay	West Suisun Bay	23-28-SB02	LFS	None	82	1	Released
02/06/2023	Suisun Bay	West Suisun Bay	23-28-SB02	LFS	None	86	1	Released
02/06/2023	Suisun Bay	West Suisun Bay	23-28-SB02	LFS	None	95	1	Released
02/06/2023	Suisun Bay	West Suisun Bay	23-28-SB03	LFS	None	72	1	Released
02/06/2023	Suisun Bay	West Suisun Bay	23-28-SB03	LFS	None	83	1	Released
02/07/2023	Cache Slough LI	Cache Slough and Liberty Island	23-28-CS06	DSM	VIE-LOA	69	1	UC Davis
02/07/2023	Suisun Bay	Confluence	23-28-SB01	LFS	None	86	1	Released
02/07/2023	Suisun Bay	Mid Suisun Bay	23-28-SB06	LFS	None	77	1	Released
02/07/2023	Suisun Bay	Mid Suisun Bay	23-28-SB06	LFS	None	83	1	Released
02/07/2023	Suisun Bay	Mid Suisun Bay	23-28-SB06	LFS	None	85	1	Released
02/08/2023	Western Delta	Carquinez Strait	23-28-WD01	LFS	None	85	1	Released
02/08/2023	Western Delta	Lower Napa River	23-28-WD02	LFS	None	75	1	Released
02/09/2023	Suisun Marsh	Suisun Marsh	23-28-SM01	DSM	None	None	1	FCCL
02/09/2023	Suisun Marsh	Suisun Marsh	23-28-SM02	LFS	None	70	1	Released
02/09/2023	Suisun Marsh	Suisun Marsh	23-28-SM02	LFS	None	76	1	Released
02/09/2023	Suisun Marsh	Suisun Marsh	23-28-SM02	LFS	None	80	1	Released
02/09/2023	Suisun Marsh	Suisun Marsh	23-28-SM02	LFS	None	82	1	Released

Table 2: LFS catch for Chipps Island Trawls February 6th – 10th. These data are preliminary and subject to change.

Date	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
02/06/2023	SB018M	LFS	None	86	4	Released
02/06/2023	SB018M	LFS	None	79	1	LFWO
02/06/2023	SB018M	LFS	None	95	1	Released
02/06/2023	SB018N	LFS	None	77	1	LFWO
02/06/2023	SB018N	LFS	None	80	1	Released
02/06/2023	SB018N	LFS	None	85	1	Released

Date	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
02/06/2023	SB018N	LFS	None	87	1	Released
02/06/2023	SB018N	LFS	None	99	1	Released
02/06/2023	SB018N	LFS	None	114	1	Released
02/06/2023	SB018S	LFS	None	82	2	Released
02/06/2023	SB018S	LFS	None	84	1	Released
02/08/2023	SB018M	LFS	None	77	1	Released
02/08/2023	SB018M	LFS	None	78	1	LFWO
02/08/2023	SB018M	LFS	None	79	1	Released
02/08/2023	SB018M	LFS	None	80	1	Released
02/08/2023	SB018M	LFS	None	89	2	Released
02/08/2023	SB018S	LFS	None	92	1	Released
02/10/2023	SB018M	LFS	None	80	1	Released
02/10/2023	SB018M	LFS	None	83	1	Released
02/10/2023	SB018N	LFS	None	75	2	Released
02/10/2023	SB018N	LFS	None	80	1	Released
02/10/2023	SB018N	LFS	None	83	2	Released
02/10/2023	SB018N	LFS	None	84	1	Released
02/10/2023	SB018N	LFS	None	85	1	Released
02/10/2023	SB018N	LFS	None	91	1	Released
02/10/2023	SB018N	LFS	None	92	1	Released
02/10/2023	SB018S	LFS	None	75	1	Released
02/10/2023	SB018S	LFS	None	82	1	Released

Table 3: LFS catch for SLS 2 January 17th-19th. These data are preliminary and subject to change.

SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Species	Smelt Catch	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
306	1/18/2023	42.9	38	Longfin Smelt	2	7	8	7.5	1
311	1/18/2023	63.9	20	Longfin Smelt	2	7	8	7.5	0
322	1/18/2023	58.5	23	Longfin Smelt	3	7	9	8	2
323	1/18/2023	66.2	19	Longfin Smelt	33	7	10	8	22
327	1/18/2023	80.8	18	Longfin Smelt	46	7	9	7.7	37
329	1/18/2023	96	18	Longfin Smelt	6	6	8	7.2	6
330	1/18/2023	83.4	15	Longfin Smelt	11	8	9	8.2	6
335	1/18/2023	115	18	Longfin Smelt	6	6	8	7.5	5
336	1/18/2023	131	17	Longfin Smelt	3	8	8	8	3
338	1/18/2023	114	14	Longfin Smelt	30	7	9	7.8	18
340	1/17/2023	160	12	Longfin Smelt	5	8	8	8	3
401	1/18/2023	142	17	Longfin Smelt	11	7	8	7.4	6
404	1/18/2023	143	11	Longfin Smelt	43	7	9	7.8	7
405	1/19/2023	186	14	Longfin Smelt	2	6	7	6.5	2
411	1/19/2023	159	16	Longfin Smelt	2	6	6	6.0	1
418	1/19/2023	173	17	Longfin Smelt	1	6	6	6.0	1

SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Species	Smelt Catch	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
501	1/19/2023	134	16	Longfin Smelt	4	5	6	5.8	4
504	1/19/2023	104	14	Longfin Smelt	5	6	8	6.8	4
508	1/19/2023	134	16	Longfin Smelt	2	6	6	6.0	0
519	1/19/2023	160	13	Longfin Smelt	1	5	5	5.0	0
520	1/19/2023	139	15	Longfin Smelt	2	6	7	6.5	1
606	1/19/2023	141	13	Longfin Smelt	2	6	6	6.0	1
609	1/19/2023	138	17	Longfin Smelt	2	6	7	6.5	2
801	1/18/2023	122	18	Longfin Smelt	1	7	7	7.0	1
804	1/18/2023	63.1	16	Longfin Smelt	2	6	6	6.0	1

Table 4: LFS catch for SLS 3 January 30th – February 1st. These data are preliminary and subject to change.

SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Species	Smelt Catch	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
343	1/30/2023	50.5	28	Longfin Smelt	14	7	10	8.1	9
344	1/30/2023	56.3	23	Longfin Smelt	38	7	11	8.8	21
411	2/1/2023	29.8	45	Longfin Smelt	49	7	11	8.3	24
418	2/1/2023	32.3	39	Longfin Smelt	5	7	10	8.6	2

SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Species	Smelt Catch	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
501	2/1/2023	49.5	26	Longfin Smelt	21	6	9	7.4	20
504	2/1/2023	39.6	28	Longfin Smelt	53	7	9	8.0	34
508	2/1/2023	47.9	24	Longfin Smelt	12	6	7	6.4	11
513	1/31/2023	46.0	30	Longfin Smelt	7	6	7	6.6	5
519	2/1/2023	61.5	22	Longfin Smelt	16	6	9	7.1	14
520	1/31/2023	36.9	28	Longfin Smelt	9	6	7	6.1	8
602	2/1/2023	41.5	36	Longfin Smelt	34	7	11	8.3	25
606	2/1/2023	80.5	25	Longfin Smelt	8	6	9	7.3	7
610	2/1/2023	48.2	31	Longfin Smelt	6	6	7	6.8	6
704	1/31/2023	43.1	25	Longfin Smelt	11	6	8	6.5	9
706	1/31/2023	47.6	26	Longfin Smelt	4	6	7	6.5	4
707	1/31/2023	39.7	34	Longfin Smelt	4	6	6	6.0	4
801	2/1/2023	36.4	29	Longfin Smelt	1	7	7	7.0	0
804	1/31/2023	30.1	31	Longfin Smelt	2	6	6	6.0	2
809	1/30/2023	26.0	35	Longfin Smelt	2	7	7	7.0	2
812	1/30/2023	23.0	38	Longfin Smelt	2	6	7	6.5	2

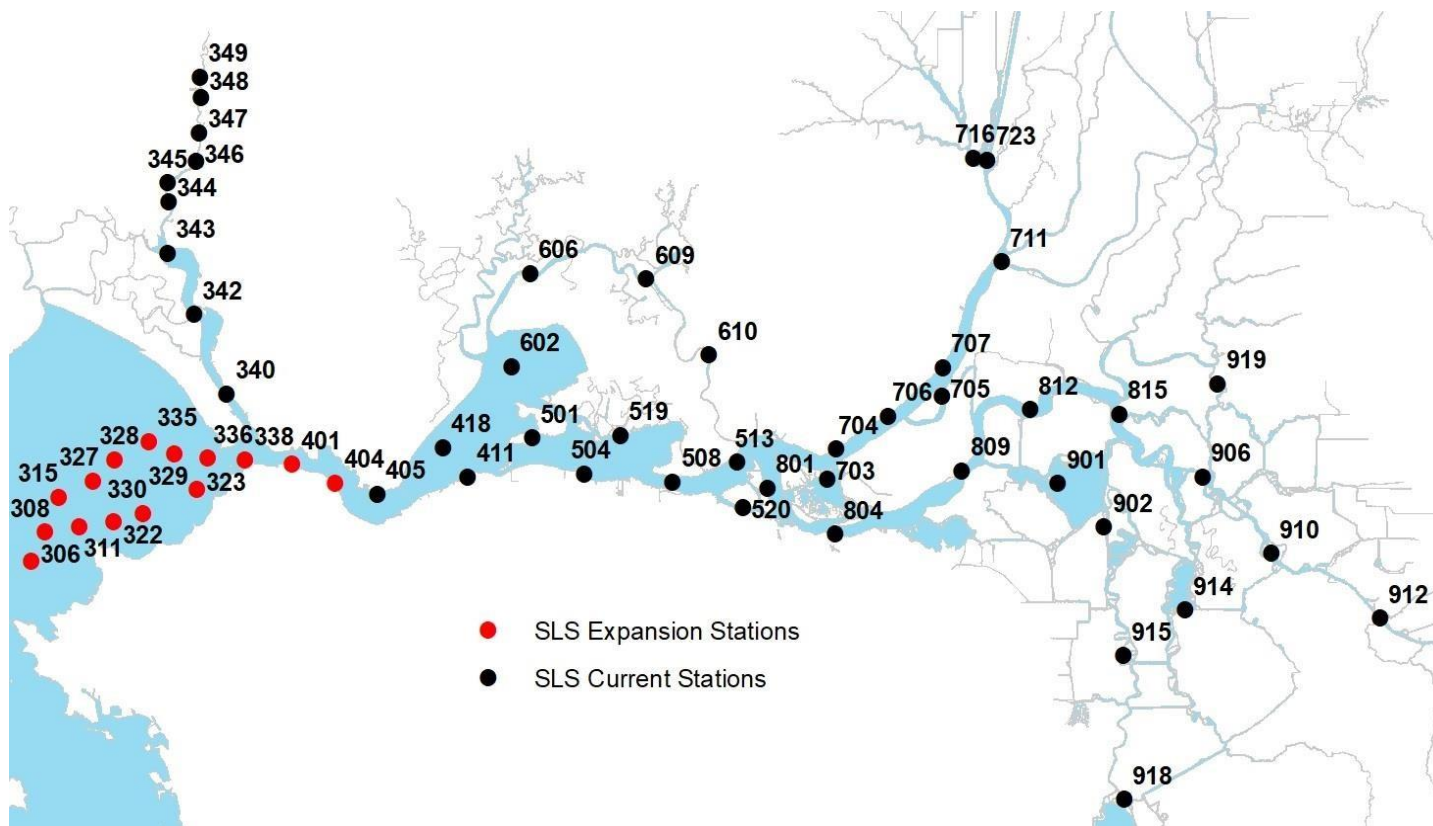


Figure 1: Map of SLS stations

Table 5: Catch for SKT 2 February 6th – 9th. These data are preliminary and subject to change. The two DS were both marked, ripe females.

Sample Date	Station Code	Species	Fork Length (mm)
2/9/2023	501	LFS	65
2/9/2023	418	LFS	71
2/9/2023	418	LFS	72
2/9/2023	418	LFS	72
2/9/2023	418	LFS	73
2/9/2023	418	LFS	73
2/9/2023	418	LFS	74
2/9/2023	418	LFS	75
2/9/2023	418	LFS	77
2/7/2023	801	LFS	77
2/8/2023	707	LFS	85
2/7/2023	513	LFS	85
2/9/2023	606	LFS	87
2/9/2023	418	LFS	87
2/9/2023	418	LFS	90
2/9/2023	411	LFS	93
2/9/2023	418	LFS	94
2/7/2023	801	LFS	104
2/8/2023	704	DS	54
2/8/2023	719	DS	72

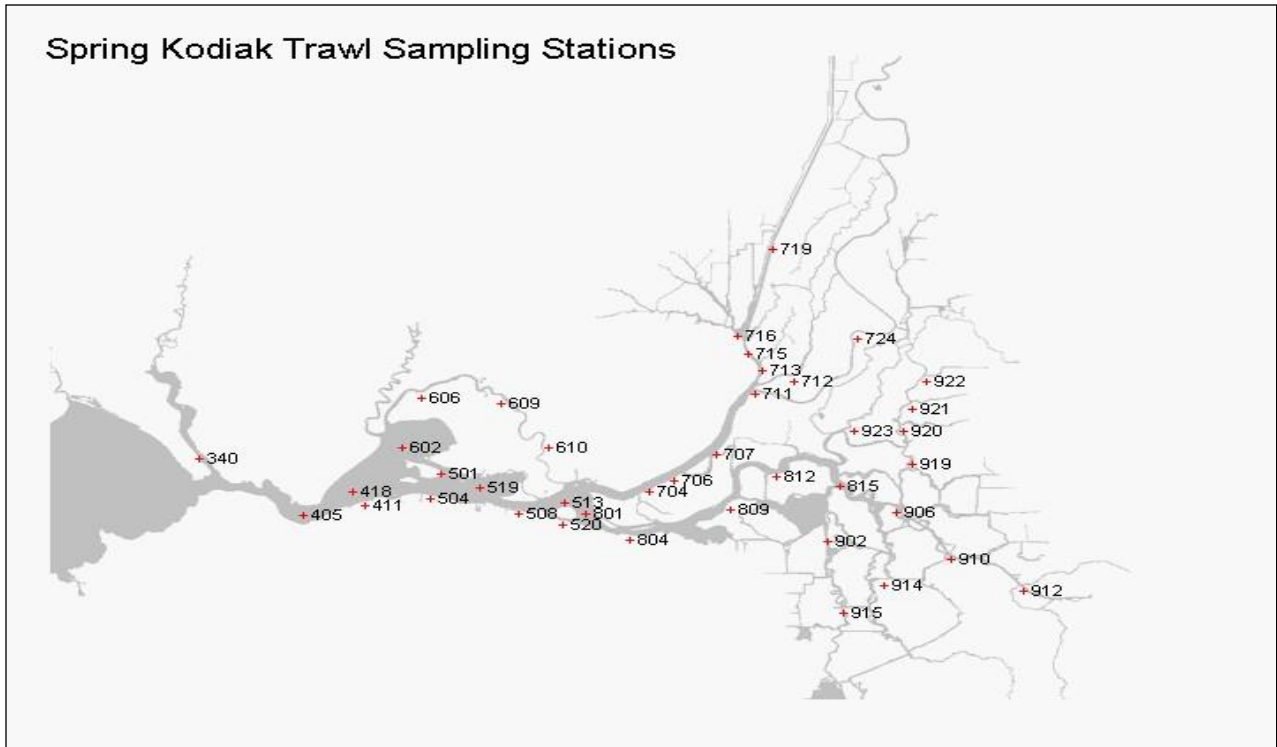


Figure 2: Map of SKT 2