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

Section 1: Overview

Date: 1/10/2023

Life Stages Present:

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

Advice to Water Operations Management Team (WOMT):

No Advice. Condition of Approval 8.3.1 Integrated Early Winter Pulse Protection is triggered and therefore OMRI is limited to -2,000 cfs for 14-days (1/3/23 through 1/16/23). If the turbidity at Old River at Bacon Island (OBI) continues to be greater than 12 NTU on 1/16/23, then COA 8.5.1 Turbidity Bridge Avoidance will limit OMRI to -2,000 cfs for five days (1/17/23 through 1/21/23).

Risk Assessment:

Delta Smelt: Based on recent detection data and distribution patterns over the past decade, Delta Smelt are likely distributed throughout the Delta. Limited detection data from the past month support Delta Smelt presence in the lower Sacramento River and the South Delta. The last Delta Smelt survey observations were on December 14, 2022, in the lower Sacramento River. A cultured adult Delta Smelt was salvaged at the CVP on 1/7/2023. Integrated Early Winter Pulse Protection (IEWPP) is active through 1/16/2023. Delta Smelt are likely migrating upstream in response to increased flow and turbidity conditions. The implementation of IEWPP is expected to reduce the chance that migrating Delta Smelt will move into areas with a high likelihood of entrainment in response to hydrology. However, the presence of a turbidity bridge and expectation of elevated turbidity continuing through this week increases the likelihood that they could move into the South Delta. Combined with the occurrence of salvage this week, overall risk for entrainment is moderate. The Turbidity Bridge Avoidance period begins 1/17/2023 after the IEWPP ends and will be triggered if turbidity remains elevated.

Longfin Smelt: One adult LFS was detected in salvage at the federal fish facility on 1/1/23, and this was the first salvage of the water year and cumulative salvage is now four One adult LFS was detected in the Lower San Joaquin River by Fall Midwater Trawl (FMWT) on 12/15/22. One sub-adult LFS was detected in the Lower San Joaquin River by Enhanced Delta Smelt Monitoring Program (EDSM) on 1/5/23. Although one larval LFS was detected in the Lower San Joaquin River (station 812) by Smelt Larvae Survey (SLS) 13 on 12/19/22, and 15 larval LFS were

detected in the Lower Sacramento River by SLS in December, no larvae were detected in the Central and South Delta in the recent SLS. Many fish detected by SLS were in Carquinez Strait and San Pablo Bay, suggesting that LFS is having high dispersal and more downstream distribution with the on-going storm. LFS adults are moving into spawning habitat, and spawning is on-going. Adult and sub-adult LFS were detected by EDSM in Suisun Marsh and Suisun Bay, and at the Confluence by Chipps Island Trawl. The final FMWT index was released and was 403, a 20% increase over last year's index. Condition of Approval (COA) 8.3.3 off-ramped with first flush. Based on distribution data and life history, adults and sub-adults are not expected to be prevalent in the Central or South Delta and therefore are expected to be at low risk of entrainment. The increased flow from the recent storms has triggered first flush and has shifted X2 downstream to < 56 km. Fish are likely distributing widely, which will help decrease risk. The increased flow has triggered first flush and therefore OMRI is limited to -2,000 cfs for 14-days (1/3/23 through 1/16/23), therefore risk remains low.

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.
DS subadults and adults	Routing Risk (Behavior and life history)	Low	A turbidity bridge is present, which increases the possibility that DS could migrate into the central and south delta. However, first flush has been triggered and OMRI is limited to -2,000 cfs for the next 14-days which will help off-set the risk that DS will migrate into the central and south delta. With first flush conditions being met, the migration in preparation for spawning is underway. Distribution is expected to shift upstream into fresh water.
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	15 larvae were detected in the Lower Sacramento River by SLS in December.

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 has started. Staging downstream of X2 is continuing and with the recent storms X2 has shifted downstream to <56 km and fish are likely distributing widely, which will help decrease risk.
LFS	**Overall Entrainment Risk**	**Low**	The increased flow has triggered first flush and therefore OMRI is limited to -2,000 cfs for 14-days, therefore risk remains low.

Section 1-B: Central Delta

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

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
DS subadults and adults	Exposure Risk (Hydrology)	Moderate	First flush has been triggered and OMRI is limited to -2,000 cfs for the next 7-days which may help off-set the risk that DS will migrate into the Central and South Delta. No subadults or adults have been detected in the Central Delta in field surveys; however, one cultured adult was detected in salvage on 1/7/23. A turbidity bridge is present, which increases the possibility that DS could migrate into the Central and South Delta.

Table 4: Risk of entrainment into the export facilities for Longfin Smelt in the central Delta:

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
LFS larvae	Exposure Risk (Hydrology)	Low	No larvae were detected in the Lower San Joaquin River by SLS 1. The increased flow has triggered first flush and therefore OMRI is limited to -2,000 cfs for 14--days (through 1/16/23), therefore risk remains low.
LFS sub-adults and adults	Exposure Risk (Hydrology)	Low	One subadult has been detected in the Lower San Joaquin River by EDSM on 1/5/23, and one adult LFS was detected in salvage on 1/1/23. The increased flow has triggered first flush and therefore OMRI is limited to -2,000 cfs for 14-days (through 1/16/23), therefore risk remains low.

- 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 Central and South Delta is increased to moderate. One cultured adult DS was detected in salvage on 1/7/23, the cultured fish came from the DS Experimental Release that occurred on 11/30/22 which released a total of 13,140 DS in the Sacramento River near Rio Vista. The increased flow has triggered first flush and OMRI is limited to -2,000 cfs for 14-days (through 1/16/23); however, turbidity is high across the system including the OMR corridor. Therefore, the overall risk is moderate.
    - LFS: Risk remains low. 115 larvae were detected so far this season by SLS, but some stations are still being processed. One subadult has been detected in the Lower San Joaquin River by EDSM on 1/5/23, and one adult LFS was detected in salvage on 1/1/23. Spawning is on-going. The increased flow has triggered first flush and OMRI is limited to -2,000 cfs for 14-days (through 1/16/23), therefore risk remains low.

- Reporting Old and Middle River Index (OMRI) *(Number and range of OMRI bins will vary based on anticipated hydrology and operations)*
    - Relevant COA 8.3.1 was triggered.
    - Expected OMRI range this week: -2,000 cfs.

Section 2: Basis for Advice

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

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

8.3.1 Integrated Early Winter Pulse Protection. Between December 1 and January 31 each year Permittee shall reduce south Delta exports for 14 consecutive days to maintain a 14-day average OMRI no more negative than -2,000 cfs, and convene the SMT within one day of triggering the following criteria:

- Three-day running average daily flows at Freeport greater than, or equal to, 25,000 cfs, AND
- Three-day running average of daily turbidity at Freeport greater than, or equal to, 50 Nephelometric Turbidity Units (NTU), OR
- The SMT determines that real-time monitoring of abiotic and biotic factors indicates a high risk of DS migration and dispersal into areas at high risk of future entrainment.

After maintaining a 14-day average OMRI no more negative than -2,000 cfs for 14 days, Permittee shall maintain a 14-day average OMRI no more negative than -5,000 cfs, initiating the OMR Management season, until the OMR Management Season ends (Condition of Approval 8.8).

The Integrated Early Winter Pulse Protection Action may only be initiated once during the December 1 through January 31 time period each year.

8.3.2 Salmonid Presence. After January 1 each year, if Conditions of Approval 8.3.1 or 8.3.3 have not already been triggered, the OMR Management season shall begin when the Salmon Monitoring Team first estimates that 5% of the CHNWR or CHNSR population is in the Delta whichever is sooner. Upon initiation of the OMR Management season, Permittee shall reduce exports to achieve, and shall maintain a 14-day average OMR index no more negative than -5,000 cfs, until the OMR Management season ends (see Condition of Approval 8.8). In the event that a salmon daily or single-year loss threshold is exceeded (Conditions of Approval 8.6.1, 8.6.2, 8.6.3, or 8.6.4) prior to the start of OMR Management season the requirements in those Conditions shall control operations.

8.3.3 Adult Longfin Smelt Entrainment Protection. After December 1, if an Integrated Early Winter Pulse Protection (Condition of Approval 8.3.1) has not yet initiated, Permittee shall reduce south Delta exports to maintain a 14-day average OMRI no more negative than -5,000 cfs and initiate OMR Management (Condition of Approval 8.3) if:

- Cumulative combined LFS salvage (total estimated LFS counts at the CVP and SWP salvage facilities beginning December 1 through February 28 exceeds the most recent Fall Midwater Trawl (FMWT) LFS index[1] 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 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,

[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 NTU. If the daily average turbidity at OBI is greater than 12 NTU, 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 NTU.

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 NTU 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 12/31/2022 when the three-day average of daily flow and turbidity was 26,552 cfs and 77 FNU and respectively. Operations are being reduced on 1/3/22 targeting a 14-day average OMRI no more negative than -2,000 cfs for 14 consecutive days through 1/16/22. After 1/16/22, 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).

8.3.2: This COA is no longer active due to the initiation of an Integrated Early Winter Pulse Protection (IEWPP- COA 8.3.1).

8.3.3: This COA is no longer active due to the initiation of an IEWPP (COA 8.3.1). One adult LFS was detected in salvage on 1/1/23, this expands to a salvage of four LFS. This is the first LFS salvage of WY 2023. The FMWT LFS index for September through December is 403, therefore the salvage threshold to trigger this COA is 40 LFS.

8.4.1: This COA is no longer active due to the detection of larval LFS by SLS.

8.4.2: This COA became active on 1/1/23. Data for SLS 13 (12/19/22 through 12/22/22) did not trigger this COA.

8.4.3: Conditions currently exceed the thresholds described in this COA. If conditions still exceed these thresholds following the IEWPP period, it will temporarily off-ramp COA 8.4.2. If flows subsequently drop below 40,000 cfs in the Sacramento River at Rio Vista or below 5,000 cfs in the San Joaquin River at Vernalis, COA 8.4.2 shall come into effect.

8.5.1: This condition may be triggered on 1/17/23 if the turbidity at OBI continues to be greater than 12 NTU. If triggered, OMRI will be limited to no more negative than -2,000 cfs for five consecutive days (1/17/23 through 1/21/23). After the five days, if turbidity is still above 12 NTU at OBI, then SMT may reconvene to assess the risk for Delta Smelt.

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

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

Section 3: Hydrology and Operations

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

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

- Antecedent Actions: *(e.g. Delta Cross Channel [DCC] gate closure and actions such as integrated early winter pulse protection, etc.)*
    - DCC is closed as of 11/28/22.
    - COA 8.3.1 was triggered by conditions on 12/31/22. Exports are being reduced to comply with this COA on 1/3/23 through 1/16/23.
- Controlling Factors: OMRI 14-day average no more negative than -2,000 cfs due to IEWPP being triggered.
- Water Temperature:
    - Clifton Court Forebay (CCF) Daily Average Water Temperature = NA
    - 3 Station Average = 10.35°C
- Tidal Cycle: Neap tide
- Turbidity:
    - 8.3.1 Freeport 3-day average = 178.79 formazin nephelometric units (FNU)
    - 8.5.1 Old River at Bacon Island (OBI) Turbidity = 19.12 FNU
- Salinity: X2 < 56 km
- Hydrologic Footprint: No Particle Tracking Models were requested.

Section 3-B: Water operations outlook. 8.1.5.2.A. ii

- Outages
    - State Water Project (SWP): The SWP facility reported a single reduced count on 12/30/22 due to an unexpected flow change.
    - Central Valley Project (CVP): None
- Exports:
    - CCF: 2,000 to 9,000 cfs
    - Jones: 3,500 to 4,200 cfs
    - Combined: 5,500 to 13,200 cfs
- Meteorological Forecast: Winter storms continue through Tuesday. Additional storms late this week and weekend.
- Storm Event Projection: Anticipating heavy rain in the northern Sierra and Shasta Basin of 10 inches, 5 inches in the Sacramento Valley, and 2.5 inches in the San Joaquin Valley.

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: 78,033 cfs as of 1/8/2023. Anticipated range: 60,000 to 100,000 cfs

- San Joaquin River flow at Vernalis: 6,454 cfs as of 1/8/2023. Anticipated range: 6,000 to 20,000 cfs
- Qwest: +19,767 cfs as of 1/8/2023. Anticipated range: remain above +10,000 for rest of the week
- OBI Turbidity: 19.12 FNU
- NDOI: 86,128 cfs as of 1/8/2023. Anticipated range this week from outlook is 80,000-150,000 cfs.
- Upstream releases:
    - Keswick = 3,250 to 4,250 cfs, with possibility of increases due to side-flow management.
    - Nimbus = 25,000 cfs. Anticipated range: 10,000 to 50,000 cfs due to flood control and side-flow management.
    - Goodwin = 2,500 cfs. Anticipated range: 200 to 3,000 cfs due to Tulloch side-flow management.
    - Oroville = 950 cfs. No anticipated changes.

Table 5: Comparison of OMR and OMR Index (5-day and 14-day averages for OMR Index and USGS gauge were reported on SacPAS website, accessed 10 January 2023.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
1/6/2023	Daily	-546	-2,030
1/6/2023	5-day	-2,710	-2,580
1/6/2023	14-day	-4,090	-4,020

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 subadult DS (Fork-length (FL): 55mm) and one adult DS (FL: 62mm) were detected in lower Sacramento River on November 3rd and 7th respectively.
- Fall Mid-water Trawl (FMWT) Index for Delta Smelt: 0
- Delta Smelt life cycle model (LCM) discussion: NA
- Biological Conditions: Migration into freshwater is likely underway due to increased flows and turbidity. Increased flows have pushed X2 downstream to < 56 km and OMRI is limited to -2,000 cfs. A turbidity bridge formed on 1/1/2023 and extends from the lower San Joaquin River into the South Delta and export facilities, increasing the risk of DS migration into the Central and South Delta.
- % of population in Delta zones: NA

- Smelt Larva Survey (SLS) or 20mm Survey: Many stations are still being processed, but SLS has not detected any DS so far this season.
- Salvage: One cultured adult (FL: 74mm) DS was salvaged at CVP on 1/7/2023. The expanded seasonal salvage is at n=4. This is the first detection of WY 2023. This is the first adult salvage detected since February and March 2019. One cultured sub-adult (FL: 54mm) DS was salvaged at CVP on 1/16/2022.
- FCCL lampara net sampling detected two adult DS (FL: ~60mm [estimated since fish were not directly handled]) in the Lower Sacramento River on 12/14/22. One fish was untagged, and the other fish was tagged with red VIE tag (hard release) from the experimental release.
- Experimental release: 13,140 fish were released in the Sacramento River near Rio Vista on 11/30/22.

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

- FMWT Index: December Index = 82
  - Final Index = 403
- Other Surveys:
  - EDSM: 21 sub-adult (FL: 60-84mm) and 12 adult LFS (FL: 85-104mm) were detected in Suisun Marsh, Suisun Bay, and the Lower San Joaquin River during the week of January 2nd-6th (Table 1). The one fish caught in the Lower San Joaquin River was a sub-adult (FL: 74mm).
  - Chipps Island Trawl: 4 sub-adult (FL: 73-84mm) and 29 adult LFS (85-116mm) were detected during the week of January 2nd-6th (Table 2).
  - SLS: 89 larval (6-8mm) LFS were detected in Carquinez Strait and San Pablo Bay by SLS 1 (Table 4). Yolk sac were present for more than half of these detections. Many stations for SLS 1 are still being processed, but the South and Central Delta stations were processed and detected no fish. SLS 13 has completed processing and no changes were made from previous week (Table 3).
  - Bay Study: In September, 36 sub-adult LFS (44-78mm) were detected from south of Bay Bridge (station 110) to San Pablo Bay (station 322). Distribution shifted further upstream in October with 47 sub-adult LFS (FL: 42-83mm) and five adult LFS (FL: 86-97mm) detected from near the San Mateo Bridge (station 101) to the Lower Sacramento River (station 750). In November, the center of distribution continued to move upstream from Central Bay to San Pablo and Suisun Bay with a total of 73 sub-adult LFS (FL: 47-76mm) and three adult LFS (FL: 87-89mm) detected. In December, 101 sub-adult LFS (FL: 48-80mm) and 14 adult LFS (84-109mm) were detected from south of Bay Bridge (station 140) to Lower Sacramento River (station 751).
  - LEPS: No LFS were detected last week.
- Salvage: One adult (FL: 110mm) LFS was salvaged at CVP on 1/1/2023. The expanded seasonal salvage is at n=4. This is the first detection of WY 2023. This is the first adult salvage observed since February 2019, and one of only 5 adult LFS salvaged since 2009.

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

Notes:

- SKT is out on water this week
- SLS 2 will survey next week.
- EDSM will be adding survey stations westwards of Suisun Bay.
- The third experimental release of the water year is postponed to the week of 1/23/23.

Attachments: Table 1: EDSM Catch Table, Table2: Chipps Island Trawl Catch Table, Table 3: SLS 13 Catch Table, Table 4: SLS 1 Catch Table, Figure 1: Map of SLS stations Table 5: December FMWT Catch Table, and Figure 2: Map of FMWT stations.

Table 1: DS and LFS catch for EDSM 2022 Phase 1 Kodiak trawls of January 2nd-6th. Only stations with catch of these species are reported here. These data are preliminary and subject to change.

Date	Stratum	Subregion	Station Code	Species	Mark Type	Fork Length (mm)	Total Catch	Disposition
01/03/2023	Suisun Marsh	Suisun Marsh	23-23-SM01	LFS	None	75	2	Released
01/03/2023	Suisun Marsh	Suisun Marsh	23-23-SM01	LFS	None	78	1	Released
01/03/2023	Suisun Marsh	Suisun Marsh	23-23-SM01	LFS	None	79	1	Released
01/03/2023	Suisun Marsh	Suisun Marsh	23-23-SM01	LFS	None	80	3	Released
01/03/2023	Suisun Marsh	Suisun Marsh	23-23-SM01	LFS	None	82	1	Released
01/03/2023	Suisun Marsh	Suisun Marsh	23-23-SM01	LFS	None	87	1	Released
01/03/2023	Suisun Marsh	Suisun Marsh	23-23-SM06	LFS	None	60	1	Released
01/03/2023	Suisun Marsh	Suisun Marsh	23-23-SM06	LFS	None	75	1	Released
01/05/2023	Lower San Joaquin	San Joaquin River near Twitchell Island	23-23-LSJ04	LFS	None	70	1	Released
01/05/2023	Suisun Bay	Mid Suisun Bay	23-23-SB06	LFS	None	76	1	Released
01/05/2023	Suisun Bay	Mid Suisun Bay	23-23-SB06	LFS	None	100	2	Released
01/05/2023	Suisun Bay	Mid Suisun Bay	23-23-SB07	LFS	None	75	1	Released
01/05/2023	Suisun Bay	Mid Suisun Bay	23-23-SB07	LFS	None	78	1	Released
01/05/2023	Suisun Bay	Mid Suisun Bay	23-23-SB07	LFS	None	80	1	Released
01/05/2023	Suisun Bay	Mid Suisun Bay	23-23-SB07	LFS	None	95	1	Released
01/05/2023	Suisun Bay	Mid Suisun Bay	23-23-SB07	LFS	None	97	1	Released
01/05/2023	Suisun Bay	Mid Suisun Bay	23-23-SB07	LFS	None	100	1	Released
01/05/2023	Suisun Bay	Mid Suisun Bay	23-23-SB07	LFS	None	101	1	Released
01/05/2023	Suisun Bay	West Suisun Bay	23-23-SB03	LFS	None	60	1	Released
01/05/2023	Suisun Bay	West Suisun Bay	23-23-SB03	LFS	None	66	1	Released
01/05/2023	Suisun Bay	West Suisun Bay	23-23-SB03	LFS	None	71	1	Released
01/05/2023	Suisun Bay	West Suisun Bay	23-23-SB03	LFS	None	81	1	Released
01/05/2023	Suisun Bay	West Suisun Bay	23-23-SB03	LFS	None	83	1	Released
01/05/2023	Suisun Bay	West Suisun Bay	23-23-SB03	LFS	None	88	1	Released
01/05/2023	Suisun Bay	West Suisun Bay	23-23-SB03	LFS	None	98	1	Released
01/06/2023	Suisun Bay	Confluence	23-23-SB01	LFS	None	89	1	Released
01/06/2023	Suisun Bay	Confluence	23-23-SB02	LFS	None	104	1	Released
01/06/2023	Suisun Bay	Confluence	23-23-SB05	LFS	None	84	1	Released
01/06/2023	Suisun Bay	Confluence	23-23-SB05	LFS	None	85	1	Released

Table 2: LFS catch for Chipps Island Trawls January 2nd-6th. These data are preliminary and subject to change.

Date	Station Code	Species	Mark Type	Fork Length	Total Catch	Disposition
01/03/2023	SB018M	LFS	None	104	1	Released
01/03/2023	SB018M	LFS	None	105	1	Released
01/03/2023	SB018N	LFS	None	115	1	Released
01/03/2023	SB018N	LFS	None	116	1	Released
01/03/2023	SB018S	LFS	None	73	1	Released
01/03/2023	SB018S	LFS	None	98	1	Released
01/03/2023	SB018S	LFS	None	104	1	Released
01/03/2023	SB018S	LFS	None	105	1	Released
01/03/2023	SB018S	LFS	None	112	1	Released
01/05/2023	SB018M	LFS	None	92	1	Released
01/05/2023	SB018M	LFS	None	98	2	Released
01/05/2023	SB018M	LFS	None	100	3	Released
01/05/2023	SB018M	LFS	None	103	1	Released
01/05/2023	SB018M	LFS	None	104	1	Released
01/05/2023	SB018M	LFS	None	106	1	Released
01/05/2023	SB018M	LFS	None	112	1	Released
01/05/2023	SB018N	LFS	None	83	1	Released
01/05/2023	SB018N	LFS	None	97	1	Released
01/05/2023	SB018N	LFS	None	102	1	Released
01/05/2023	SB018S	LFS	None	108	1	Released
01/05/2023	SB018S	LFS	None	109	1	Released
01/05/2023	SB018S	LFS	None	110	1	Released
01/06/2023	SB018M	LFS	None	105	1	Released
01/06/2023	SB018N	LFS	None	84	1	Released
01/06/2023	SB018N	LFS	None	85	1	Released
01/06/2023	SB018N	LFS	None	90	1	Released
01/06/2023	SB018N	LFS	None	95	1	Released
01/06/2023	SB018N	LFS	None	100	1	Released
01/06/2023	SB018S	LFS	None	76	1	Released
01/06/2023	SB018S	LFS	None	85	1	Released

Table 3: LFS catch for SLS 13 December 19th- 23rd. These data are preliminary and subject to change. *Yolk-sac present.

Year	Survey #	SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)
2022	13	508	12/22/22	11.1	80	Processed	Longfin Smelt	2*	Complete	7	8	8.5
2022	13	513	12/20/2022	15.7	65	Processed	Longfin Smelt	1*	Complete	8	8	8.0
2022	13	519	12/22/22	14.2	68	Processed	Longfin Smelt	2*	Complete	5	7	6.0
2022	13	610	12/21/22	16.1	60	Processed	Longfin Smelt	1*	Complete	9	9	9.0
2022	13	703	12/20/2022	16.5	59	Processed	Longfin Smelt	2*	Complete	8	8	8.0
2022	13	704	12/20/2022	25.7	44	Processed	Longfin Smelt	4*	Complete	6	8	7.0
2022	13	705	12/20/2022	14.6	72	Processed	Longfin Smelt	6*	Complete	6	7	6.8
2022	13	706	12/20/2022	17.0	68	Processed	Longfin Smelt	1*	Complete	7	7	7.0
2022	13	707	12/20/2022	14.1	75	Processed	Longfin Smelt	1	Complete	7	7	7.0
2022	13	716	12/20/2022	9.4	112	Processed	Longfin Smelt	1	Complete	9	9	9.0
2022	13	723	12/20/2022	9.0	103	Processed	Longfin Smelt	1*	Complete	6	6	6.0
2022	13	804	12/20/2022	12.9	92	Processed	Longfin Smelt	2*	Complete	6	8	7.0
2022	13	812	12/19/2022	5.2	152	Processed	Longfin Smelt	1*	Complete	7	7	7.0

Table 4: LFS catch for SLS 1 January 3rd-6th. These data are preliminary and subject to change.

Year	Survey #	SLS Station	Date	Turbidity (NTU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
2023	1	323	1/3/2023	7.7	58	Processed	LFS	2	Complete	7	8	7.5	2
2023	1	330	1/3/2023	6.7	46	Processed	LFS	3	Complete	7	7	7	3
2023	1	336	1/3/2023	12.3	44	Processed	LFS	1	Complete	8	8	8	1
2023	1	338	1/3/2023	12.0	40	Processed	LFS	79	Complete	6	8	7.5	41
2023	1	401	1/3/2023	14.4	40	Processed	LFS	1	Complete	7	7	7.0	1
2023	1	404	1/3/2023	14.6	37	Processed	LFS	3	Complete	7	7	7.0	3

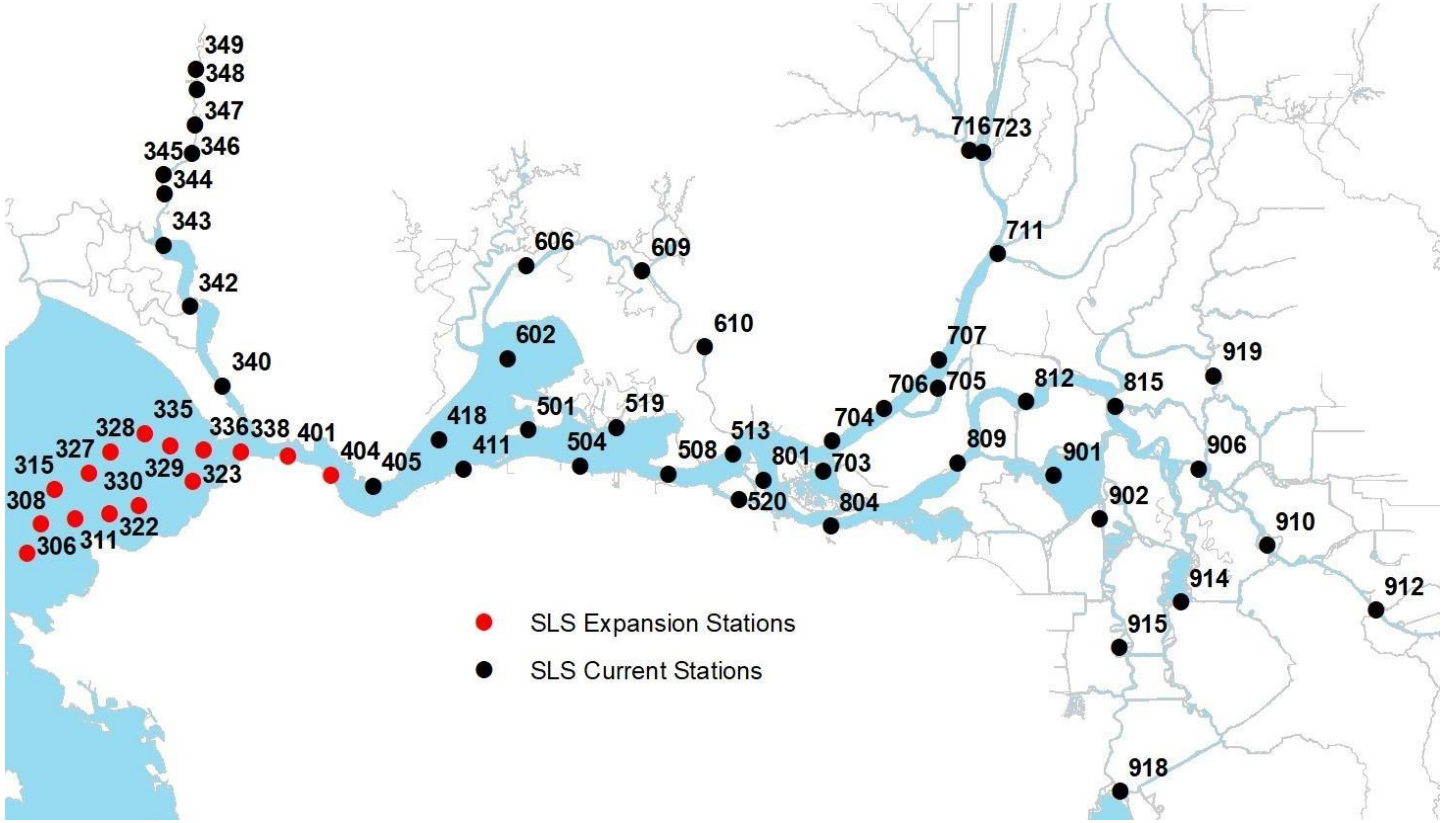

Figure 1: Map of SLS stations

Table 5: LFS catch for December FMWT. These data are preliminary and subject to change.

Sample Date	Station Code	Species	Catch	Fork Length (mm)	Length Frequency
12/5/2022	314	Longfin Smelt	2	60	1
12/5/2022	314	Longfin Smelt	2	64	1
12/5/2022	315	Longfin Smelt	1	60	1

Sample Date	Station Code	Species	Catch	Fork Length (mm)	Length Frequency
12/5/2022	321	Longfin Smelt	1	80	1
12/5/2022	327	Longfin Smelt	1	67	1
12/6/2022	329	Longfin Smelt	4	57	1
12/6/2022	329	Longfin Smelt	4	63	2
12/6/2022	329	Longfin Smelt	4	67	1
12/6/2022	336	Longfin Smelt	2	62	1
12/6/2022	336	Longfin Smelt	2	70	1
12/6/2022	337	Longfin Smelt	1	94	1
12/6/2022	404	Longfin Smelt	1	99	1
12/7/2022	416	Longfin Smelt	3	67	1
12/7/2022	416	Longfin Smelt	3	71	1
12/7/2022	416	Longfin Smelt	3	73	1
12/7/2022	417	Longfin Smelt	6	60	1
12/7/2022	417	Longfin Smelt	6	63	1
12/7/2022	417	Longfin Smelt	6	69	1
12/7/2022	417	Longfin Smelt	6	87	1
12/7/2022	417	Longfin Smelt	6	97	1
12/7/2022	417	Longfin Smelt	6	101	1
12/7/2022	418	Longfin Smelt	6	61	1
12/7/2022	418	Longfin Smelt	6	63	2
12/7/2022	418	Longfin Smelt	6	69	1
12/7/2022	418	Longfin Smelt	6	71	1
12/7/2022	418	Longfin Smelt	6	84	1
12/9/2022	502	Longfin Smelt	1	71	1
12/9/2022	504	Longfin Smelt	1	74	1
12/9/2022	508	Longfin Smelt	3	65	1
12/9/2022	508	Longfin Smelt	3	77	1
12/9/2022	508	Longfin Smelt	3	94	1

Sample Date	Station Code	Species	Catch	Fork Length (mm)	Length Frequency
12/14/2022	510	Longfin Smelt	5	63	1
12/14/2022	510	Longfin Smelt	5	97	1
12/14/2022	510	Longfin Smelt	5	104	1
12/14/2022	510	Longfin Smelt	5	110	1
12/14/2022	510	Longfin Smelt	5	125	1
12/14/2022	511	Longfin Smelt	2	98	1
12/14/2022	511	Longfin Smelt	2	107	1
12/8/2022	515	Longfin Smelt	1	70	1
12/8/2022	517	Longfin Smelt	2	72	1
12/8/2022	517	Longfin Smelt	2	74	1
12/8/2022	604	Longfin Smelt	4	65	2
12/8/2022	604	Longfin Smelt	4	78	1
12/8/2022	604	Longfin Smelt	4	95	1
12/8/2022	605	Longfin Smelt	1	70	1
12/8/2022	606	Longfin Smelt	5	59	1
12/8/2022	606	Longfin Smelt	5	65	1
12/8/2022	606	Longfin Smelt	5	67	1
12/8/2022	606	Longfin Smelt	5	73	1
12/8/2022	606	Longfin Smelt	5	80	1
12/15/2022	811	Longfin Smelt	1	108	1

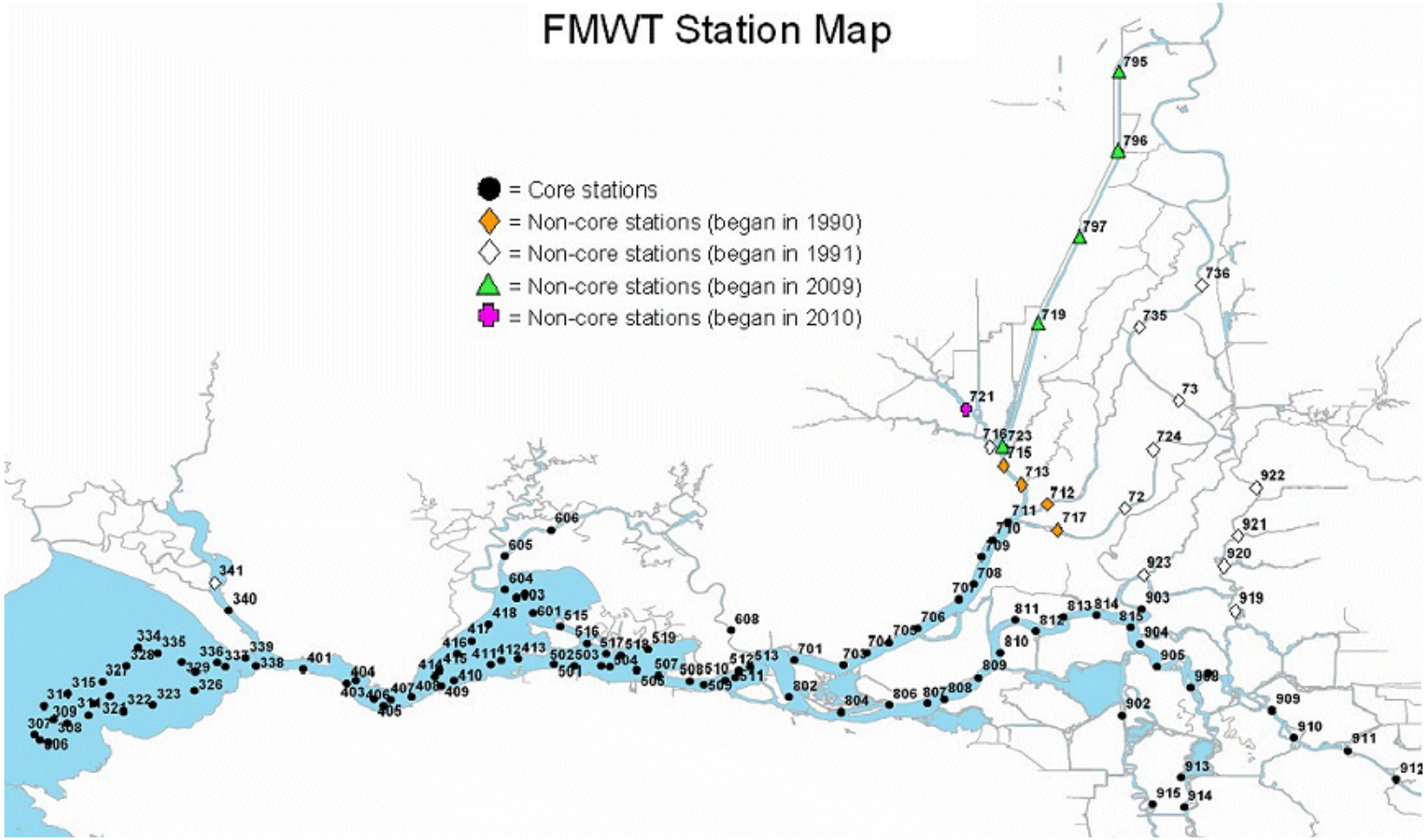

Figure 2: Map of FMWT Stations.