

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

Section 1: Overview

Date: 04/23/2024

Life Stages Present:

Delta Smelt (DS): Larvae, sub-adults, and adults

Longfin Smelt (LFS): Larvae, juveniles, sub-adults, and adults

Advice to Water Operations Management Team (WOMT):

No advice. However, Condition of Approval (COA) 8.17 Export Curtailments for Spring Outflow continues to be triggered and limit SWP exports to be within 4:1 I/E ratio with Vernalis flows or limit the State's share of combined exports of 1,500 cfs for health and safety minimum per the 2020 SWP ITP. The CVP will follow the 2024 Interim Operations Plan (IOP).

Conditions are good for DS and LFS. No DS have been detected in the Central or South Delta, the majority of LFS detections have been downstream of the Confluence, and turbidity is low in the Central and South Delta. Thus, we continue to expect low entrainment risk for both species between OMRI range of -800 and +700 cfs.

Risk Assessment:

Delta Smelt: Based on recent detection data and distribution patterns over the past decade, adult Delta Smelt spawning is ongoing. Forty-five confirmed and four preliminary larval Delta Smelt have been detected in Suisun Marsh, Suisun Bay, and the Sacramento River Deep Water Shipping Channel since 04/02/24. No Delta Smelt have been detected in salvage since 02/23/24. Risk of entrainment throughout the Delta remains low for all life stages based on low turbidity/ Secchi depth >1 m, positive QWEST, and lack of detections in salvage and the Central and South Delta. Implementation of salmonid protections and Export Curtailment for Spring Outflow (COA 8.17, IOP 2024) may reduce the chance of entraining Delta Smelt as less negative OMRI tends to entrain less fish. Entrainment risk is expected to remain low between OMRI range of -800 and +700 cfs.

The Sacramento Valley Water Year Type Index April forecast is Above Normal, and thus COA 8.12 is not in effect.

Longfin Smelt: LFS spawning is on-going. One juvenile LFS was detected in salvage on 04/10/24 and one larval LFS was detected in the Central and South Delta by 20-mm Survey 2. However, based on survey detections, the centroid of distribution for all life stages of LFS is likely downstream of the Confluence. X2 is estimated to be ~ 62 km. QWEST is anticipated to be

between +7,000 and +10,000 cfs this week. OMRI range this week is -800 to +700 cfs due to COA 8.17 and the 2024 IOP. Based on the detections and hydrology, the risk of entrainment of all life stages of LFS is low across all regions. COA 8.4.2 was not triggered by 20-mm Survey 3.

Section 1-A: Sacramento River and Confluence

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

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
DS sub-adults and adults	Exposure Risk (Hydrology)	Low	Spawning is ongoing.
DS sub-adults and adults	Routing Risk (Behavior and life history)	Low	EDSM detected one marked adult DS in the Lower Sacramento River on 03/25/24 and one in the Sacramento Deepwater Ship Channel (SDWSC) on 03/26/24.
DS larvae	Exposure Risk (Hydrology)	Low	43 larval DS were detected in the SDWSC on 04/05/24 by EDSM. Hydrological conditions are favorable.

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	Spawning is on-going. A few adult and sub-adult LFS have been detected near or east of Chipps Island in the past month. X2 is estimated to be ~62 km and OMRI range this week is -800 to +700 cfs this week.
LFS larvae and juveniles	Exposure Risk (Hydrology)	Low	EDSM detected three larvae in the Lower Sacramento River during the week of 04/01/24. 20-mm Survey 3 preliminarily detected ten larvae in this region. QWEST is anticipated to be between +7,000 and +10,000 cfs this week.

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 sub-adults and adults	Exposure Risk (Hydrology)	Low	No DS were detected in salvage in the past thirty days. Spawning is ongoing. Turbidity in the Central and South Delta is low.

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
DS larvae	Exposure Risk (Hydrology)	Low	The average Secchi depth in the Central and South Delta, as measured by 20-mm Survey 3, is greater than 1 m.

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

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
LFS sub-adults and adults	Exposure Risk (Hydrology)	Low	No survey detections in this region.
LFS larvae and juveniles	Exposure Risk (Hydrology)	Low	One juvenile LFS was detected in salvage (pre-expansion) on 04/10/24. One larva was detected in the Central and South Delta by 20-mm Survey 2. QWEST is anticipated to be between +7,000 and +10,000 cfs this week. OMRI range this week is -800 to +700 cfs this week.

- 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)*
 - OMRI range this week is -800 to +700 cfs this week due to COA 8.17 and the 2024 IOP.

Section 2: Basis for Advice

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

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

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

- Three-day running average daily flows at Freeport greater than, or equal to, 25,000 cfs, AND
- Three-day running average of daily turbidity at Freeport greater than, or equal to, 50

Formazin Nephelometric Unit (FNU), OR

- The SMT determines that real-time monitoring of abiotic and biotic factors indicates a high risk of DS migration and dispersal into areas at high risk of future entrainment.

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

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

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

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

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

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.

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.

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

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

Permittee shall restrict south Delta exports for seven consecutive days to maintain a seven-day average OMR index no more negative than -5,000 cfs. Permittee shall also immediately convene the SMT to conduct a risk assessment (see Condition of Approval 8.5.1.2) to assess the risk of larval and juvenile LFS entrainment into the South Delta Export Facilities, determine

if an OMR flow restriction is warranted, and recommend an OMR flow limit between -1,250 and -5,000 cfs. The SMT risk assessment and operational advice shall be reviewed by the WOMT (Condition of Approval 8.1.3) via the Collaborative Real-time Decision-making process (Condition of Approval 8.1.4). Permittee shall operate to the export restriction and OMR flow target approved through Conditions of Approval 8.1.3 and 8.1.4. Each week the SMT shall convene to conduct a new risk assessment and determine whether to maintain, or off ramp from, export restrictions based on the risk to LFS, or until the DS and LFS off-ramp has been met as described in Condition of Approval 8.8 (End of OMR Management).

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

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

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

After the Integrated Early Winter Pulse Protection (Condition of Approval 8.3.1) or February 1 (whichever comes first), until April 1, Permittee shall manage exports to maintain daily average turbidity in Old River at Bacon Island (OBI) at a level of less than 12 FNU. If the daily average turbidity at OBI is greater than 12 FNU, Permittee shall restrict south Delta exports to achieve an OMR flow that is no more negative than -2,000 cfs until the daily average turbidity OBI is less than 12 FNU.

If, after five consecutive days of OMR flow that is less negative than -2,000 cfs, the daily average turbidity at OBI is not less than 12 FNU the Smelt Monitoring Team may convene to

assess the risk of entrainment of DS (Condition of Approval 8.1.5.2). The Smelt Monitoring Team may provide advice to WOMT regarding changes in operations that could be conducted to minimize the risk of entrainment of DS (Condition of Approval 8.1.3). The Smelt Monitoring Team may also determine that OMR restrictions to manage turbidity are infeasible and may instead provide advice for a different OMR flow target that is between -2,000 and -5,000 cfs and is protective based on turbidity and adult DS distribution and salvage to the WOMT for consideration (Condition of Approval 8.1.3). Operational decisions shall be made following the process described in Condition of Approval 8.1.4 (Collaborative Real Time Risk Assessment).

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

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

8.5.2 Larval and Juvenile Delta Smelt Protection. If the five-day cumulative salvage of juvenile DS at the CVP and SWP facilities is greater than or equal to one plus the average prior three years' FMWT index (rounded down), 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.

Additionally, if the five-day cumulative salvage threshold is met or exceeded, Permittee shall immediately convene the Smelt Monitoring Team to conduct a risk assessment (Condition of Approval 8.1.5.2) and determine the future risk of entrainment and take of larval and juvenile DS. The Smelt Monitoring Team may provide advice to further restrict south Delta exports to maintain a more positive OMR than -5,000 cfs. The Smelt Monitoring Team may provide advice for further restrictions within three risk categories:

- Low risk: Limit OMR between -4,000 cfs to -5,000 cfs
- Medium risk: Limit OMR between -2,500 cfs to -4,000 cfs
- High risk: Limit OMR between -1,250 cfs to -2,500 cfs

The duration and magnitude of operational advice shall be provided to the WOMT (Condition of Approval 8.1.3) and decisions shall be made following the process described in Condition of

Approval 8.1.4 (Collaborative Real Time Risk Assessment). When conducting risk assessments to evaluate the risk of entrainment and take of juvenile DS the Smelt Monitoring Team shall evaluate the following information sources, in addition to any other models or surveys they deem appropriate and those listed in Condition of Approval 8.1.5.2:

- Results from a CDFW approved DS life cycle model.
- DS recruitment levels identified by the Smelt Monitoring Team using the CDFW approved life cycle model that links environmental conditions to recruitment, including factors related to loss as a result of entrainment such as OMR flows. In this context, recruitment is defined as the estimated number of post-larval DS in June per number of spawning adults in the prior February-March period.
- Hydrodynamic models and forecasts of entrainment informed by the EDSM or other relevant survey data to estimate the percentage of larval and juvenile DS that could be entrained.

When a larval or juvenile DS is detected in the SLS or 20 mm, or the 3-day average water temperature at Jersey Point is greater than or equal to 12°C, and Secchi depth from the most recent SLS or 20 mm survey is less than or equal to 1 meter, averaged across the 12 south Delta survey stations (809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918, and 919). Permittee shall restrict south Delta exports to maintain a seven-day average OMR index no more negative than -3,500 cfs until the average Secchi depth is greater than 1 meter in the south Delta stations in a subsequent SLS or 20mm survey. If average south Delta Secchi depth continues to be less than or equal to 1 meter in a subsequent SLS or 20mm survey then Permittee shall continue restrictions and request a risk assessment by the Smelt Monitoring Team to determine if additional advice and subsequent restrictions are warranted and provide advice to WOMT (see Condition of Approval 8.1.3) and follow the decision-making process described in Condition of Approval 8.1.4.

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.

8.17 Export Curtailments for Spring Outflow. As described in Sections 1.5 and 3.17 of the Project description, as part of the Voluntary Agreement process, Permittee and its SWP Contractors have proposed a reduction in SWP exports to protect outflows in the spring time period. Each year, following the finalization of the March forecast, Permittee will confer with CDFW regarding export reductions from April 1 to May 31. If in any year during the term of this ITP, Permittee and its SWP Contractors identify in a written operations plan, submitted to CDFW following the March forecast, and throughout April and May conduct SWP export reductions pursuant to the Voluntary Agreements that are consistent with the SWP export reductions required by this Condition, then the Voluntary Agreement implementation may satisfy the reductions required to meet this Condition.

The following shall be implemented by Permittee during any year in which SWP export reductions pursuant to the Voluntary Agreements are not identified and conducted as described in the preceding paragraph. Permittee shall operate the Project during the spring each year to restrict exports and enhance Delta outflow.

Permittee shall reduce exports from April 1 to May 31 each year to achieve the SWP proportional share (Condition of Approval 8.10) of export reductions established by the ratio of Vernalis flow (cfs) to combined CVP and SWP exports, scaled by water year type, to provide incidental spring outflow. In a critically dry year, the ratio of Vernalis flow to CVP and SWP combined exports shall be 1 to 1. In a dry year, the ratio of Vernalis flow to CVP and SWP combined exports shall be 2 to 1. In a below normal year, the ratio of Vernalis flow to CVP and SWP combined exports shall be 3 to 1. In an above normal or wet year, the ratio of Vernalis flow to CVP and SWP combined exports shall be 4 to 1. In wet years SWP export curtailments required by this Condition of Approval for spring outflow in April and May is limited to 150 TAF. The ratio of Vernalis flows to export reductions is intended to serve as an operational mechanism to achieve the Delta outflow required by this Condition of Approval for minimization of the Covered Activities' impacts

to Covered Species.

For purposes of this Condition of Approval only, the Joaquin Valley “60-20-20” Water Year Hydrologic Classification and Indicator as defined in the Bay-Delta Plan (SWRCB 2006) is used.

Permittee shall not be required to restrict operations as described above under either of the following circumstances:

- If the three-day average Delta outflow is greater than 44,500 cfs, then Project operations shall not be controlled by this Condition until the flows drop below 44,500 cfs on a three-day average.
- Permittee shall not be required by this Condition of Approval to restrict exports at the Banks Pumping Plant below its minimum health and safety exports of 600 cfs.

The ratios used to establish export restrictions by water year type are a tool that incorporates San Joaquin River inflows while also allowing for a high outflow offramp of 44,500 cfs, which is expected to be driven by inflow from the Sacramento River. Spring export curtailments are intended to augment Delta outflow during a critical time in the life history of all four Covered Species. When April and May Delta outflow is augmented salinity in Suisun Bay is reduced and central Delta productivity is dispersed westward, improving habitat for both Delta and longfin smelt. At the upper end of managed flows when X2 is in San Pablo Bay, export curtailments help maintain this favorable location and sustain food web productivity and other conditions for improved longfin smelt recruitment in San Pablo Bay. Reductions in outflow during such conditions could restrict longfin smelt nursery habitat upstream to less favorable habitat in Carquinez Strait. Augmenting spring outflow through export curtailments improves migratory conditions for CHNWR and CHNSR by reducing Covered Activities’ impacts on routing and through Delta survival. Maintaining a higher Delta outflow during this time period will also provide a proactive approach to entrainment minimization that is expected to reduce CHNWR and CHNSR routing into the central and south Delta and minimize loss of all Covered Species at the SWP export facility. Additionally, increases in Delta outflow are associated with increased food web transport to, and productivity in, Suisun Bay.

Immediately following the SWRCB’s adoption of final Voluntary Agreements Permittee, SWC and CDFW will meet and confer to review the Project in light of the final form of the Voluntary Agreements. Consistent with Condition of Approval 5, CESA, and CESA’s implementing regulations, the Permittee and CDFW, in consultation with SWC and as appropriate depending on the results of that review, may replace the ratio of Vernalis flows to exports used as an operational mechanism to determine spring outflow volumes in this condition of approval, based on the final Voluntary Agreements and as part of such amendment process.

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: Flow and turbidity threshold for this condition was met on 01/21/24 and OMRI was limited to -2,000 cfs on a 14-day average from 01/23/24 through 02/05/24.

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

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

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

8.4.2: This COA is in effect as of 01/01/24. This COA was temporarily off-ramped by COA 8.4.3 on 02/07/24, but has been back in effect as of 03/21/24.

- SLS 13 detected larval LFS in two of the 12 Central and South Delta stations, and two larvae total in that region, which did not trigger this COA.
- SLS 1 detected five larval LFS across four of the 12 Central and South Delta stations and triggered this COA on 01/10/24.
 - SMT held an off-cycle meeting on 01/11/24 and recommended the State’s share of OMRI no more negative than -3,500 cfs on a 7-day average. The operational change was implemented on 01/14/24.
 - SMT agreed to continue the same level of protection on 01/16/24.
 - SMT held an off-cycle meeting on 01/18/24 and recommended the State’s share of OMRI limited to -5,000 cfs on a 7-day average if the 3-day average QWEST remains above +3,000 cfs. If the 3-day average QWEST falls below +3,000 cfs, then SMT recommends the State’s share of OMRI limited to -3,500 cfs on a 7-day average. The 3-day average QWEST exceeded +3,000 cfs on 01/19/24 but not on 01/20/24 or 01/21/24. COA 8.6.3 limited exports to -3,500 cfs between 01/18/24 and 01/22/24 regardless of recommendation for COA 8.4.2.
 - Although not controlling, on 01/23/24, the SMT continued the same recommendation from 01/18/24.
- SLS 2 detected 24 larval LFS across five of the 12 Central and South Delta stations and retriggered this COA on 01/25/24.
 - CDFW and DWR agreed via email communication that while COA 8.3.1 is controlling OMRI at -2,000 cfs, LFS is at low risk and thus recommending -5,000 cfs OMRI on a

7-day average. This recommendation was continued during the SMT meeting on 01/30/24.

- Due to the favorable hydrology, the SMT continued recommending -5,000 cfs OMRI on a 7-day average on 02/06/24.
- SLS 3 detected one larval LFS at station 901 and none at the other 12 Central and South Delta stations, thus this COA is no longer triggered as of 02/13/24.
- SLS 4 detected two larval LFS at station 809 and none at the other 12 Central and South Delta stations, thus this COA continued to not be triggered as of 02/26/24.
- SLS 5 detected no larval LFS at the 11 Central and South Delta stations, thus this COA continued to not be triggered as of 03/12/24.
- SLS 6 and 20-mm Survey 1 detected no larval LFS at the 11 Central and South Delta stations, thus this COA continued to not be triggered as of 03/26/24.
- 20-mm Survey 2 detected one larval LFS at the 12 Central and South Delta stations, thus this COA continued to not be triggered as of 04/09/24.
- 20-mm Survey 3 detected no larval LFS at the 11 Central and South Delta stations, thus this COA continued to not be triggered as of 04/23/24.

8.4.3: This COA was triggered on 02/07/24 by the Rio Vista daily average flow exceeding 55,000 cfs on 02/06/24, and temporarily off-ramped COA 8.4.2. Vernalis daily average flow exceeded 8,000 cfs on 02/20/24 and fell below 5,000 cfs on 03/15/24. Rio Vista daily average flow fell below 40,000 cfs on 03/20/24, and thus this COA is no longer triggered as of 03/21/24.

8.5.1: This COA came into effect on 02/01/24, and was off-ramped on 04/01/24.

8.5.2: The federal agencies are following COA 8.5.2 per order 6(i) of the 2023 Interim Operations Plan (IOP). The 3-day average water temperature at Jersey Point exceeded 12°C on 01/31/24.

- This COA was triggered by SLS 3 on 02/05/24 due to the average Secchi depth across the 11 Central and South Delta being 70cm. SWP and CVP will operate to OMRI no more negative than -3,500 cfs on a 7-day average starting on 02/07/24 until the subsequent SLS average Secchi depth in the Central and South Delta is greater than 1m. SLS 3 measured Secchi depth at the previously inaccessible station on 02/07/24 and updated the average Secchi depth to 72cm.
- This COA was retriggered by SLS 4 on 02/21/24 due to the average Secchi depth across the 12 Central and South Delta being 83cm.
- This COA was retriggered by SLS 5 on 03/04/24 due to the average Secchi depth across the 11 Central and South Delta being 95cm. Station 918 was inaccessible due to the water level under Old River Bridge. The crew was unable to resample station 918 later in the week due to boat issues.
- This COA was not triggered by SLS 6 on 03/18/24 due to the average Secchi depth across the 11 Central and South Delta being 111cm. Station 918 was inaccessible due to the water level under Old River Bridge.

- This COA was not triggered by 20-mm Survey 1 on 03/19/24 due to the average Secchi depth across the 11 Central and South Delta being 124cm. Station 918 was inaccessible due to the water level under Old River Bridge.
- This COA was not triggered by 20-mm Survey 2 on 04/04/24 due to the average Secchi depth across the 12 Central and South Delta being 141cm.
- This COA was not triggered by 20-mm Survey 3 on 04/17/24 due to the average Secchi depth across the 11 Central and South Delta being 153cm. Station 918 was inaccessible due to the water level under Old River Bridge.

8.12: This COA is not in effect because the April Water Year Type forecast is Above Normal. This COA for larval DS would become active if future Water Year Type forecasts are updated to Dry or Critical.

8.13: The January Sacramento Valley Water Year Type Index (SVI) corresponding to the 50% probability of exceedance is 6.91, 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 01/12/24.

The February Sacramento Valley Water Year Type Index (SVI) corresponding to the 50% probability of exceedance is 7.36, 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 02/13/24.

The March Sacramento Valley Water Year Type Index (SVI) corresponding to the 50% probability of exceedance is 8.23, 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 03/11/24.

The April Sacramento Valley Water Year Type Index (SVI) corresponding to the 50% probability of exceedance is 8.42, 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 04/15/24.

8.17: This COA became active on 04/01/24, but was temporarily off-ramped between 04/01/24 to 04/09/24 due to the three-day average Delta outflow exceeding 44,500 cfs. The April San Joaquin Valley Water Year Type Index (SJI) corresponding to the 75% probability of exceedance is 3.24, which is in the range for an Above Normal water year classification. The forecast was reported on the California Data Exchange Center (CDEC) [Water Supply Index Webpage](#), accessed on 04/15/24. This COA went into effect on 04/10/24, and limit the State's share of combined exports of 1,500 cfs for health and safety minimum. The CVP is following the 2024 IOP.

Section 3: Hydrology and Operations

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

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

- Antecedent Actions: (*e.g. Delta Cross Channel [DCC] gate closure and actions such as integrated early winter pulse protection, etc.*)
 - DCC: Closed on 11/27/23. Expected to remain closed for the season.
 - OMR management season initiated on 01/01/2024 based on COA 8.3.2.
 - OMRI range this week is -800 to +700 cfs due to COA 8.17.
- Controlling Factors: SJR I/E (COA 8.17)
- Water Temperature:
 - Clifton Court Forebay (CCF) Daily Average Water Temperature = 19.43°C
 - 3 Station Average = 17.64°C
- Tidal Cycle: Transitioning from Spring to Neap; Last Quarter Moon on 05/01/24.
- Turbidity:
 - 8.3.1 Freeport 3-day average = 12.75 formazin nephelometric units (FNU)
 - 8.5.1 Old River at Bacon Island (OBI) Turbidity = 3.26 FNU
- Salinity: X2 = ~62 km
- Hydrologic Footprint: NA

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

- Outages
 - State Water Project (SWP): None
 - Central Valley Project (CVP): No outage, but CVP reduced pumping to 0 for several hours each day on 04/16/24-04/18/24 due to scheduled maintenance.
- Exports:
 - CCF: 600 cfs. No anticipated changes.
 - Jones: 900 cfs. Anticipated range: 900 to 1,800 cfs.
- Meteorological Forecast: Dry and warm on Monday. Cooler conditions return on Tuesday with chances of a few mountain showers and thunderstorms. Best chances for rain are Friday as a weather system moves in.
- 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: 28,400 cfs as of 04/22/24.
 - Anticipated range: 23,000 to 38,000 cfs
- San Joaquin River flow at Vernalis: 5,500 cfs as of 04/22/24.
 - Anticipated range: 4,500 to 6,000 cfs
- Qwest: +9,400 cfs as of 04/22/24. Anticipated range: +7,000 to +10,000 cfs.
- OBI Turbidity: No anticipated changes.
- NDOI: 34,000 cfs as of 04/22/24. Anticipated range: 25,000 to 40,000 cfs.

- Upstream releases:
 - Keswick = 11,000 cfs. Anticipated range: 6,000 cfs to 11,000 cfs for spring pulse flow.
 - Nimbus = 5,000 cfs. Anticipated range: 4,000 cfs to 5,000 cfs.
 - Goodwin = 400 cfs. Anticipated range: 300 cfs to 2,500 cfs for spring pulse flow.
 - Oroville = 3,500 cfs. Anticipated range: 2,500 cfs to 7,000 cfs.
- Comparison of OMR and OMR Index (5-day and 14-day averages for OMR Index and USGS gauge were reported on [SacPAS website](#), accessed 23 April 2024.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
04/15/24	Daily	+700	+820
04/15/24	5-day	-20	+500
04/15/24	14-day	-1,500	-780

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

- Total detection for the WY: 105 DS; 48 of these have been experimentally released DS (Table 1).
- EDSM: For their phase 2 larval surface trawl, EDSM has confirmed detections of 43 larval DS in SDWSC and two larval DS in Suisun Marsh. They have preliminary detections of one larval DS in Suisun Marsh and three larval DS in Suisun Bay (Table 1). Processing is ongoing.
- FMWT September to December Index for Delta Smelt: 0
- Delta Smelt life cycle model (LCM) discussion: NA
- Biological Conditions: NA
- % of population in Delta zones: NA
- Smelt Larva Survey (SLS): NA
- 20-mm Survey:
 - Survey 1 detected two larval (FL: 10-11mm) DS, one in the North Delta (Miner Slough) and one in Lower Sacramento River (Table 1). Processing is ongoing.
 - Survey 3 average Secchi depth for the 12 Central and South Delta station is 153 cm. Processing is ongoing.
- Experimental release:
 - 14,104 cultured DS marked with green VIE on the left anterior dorsal side (VIE- LGA) 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 (VIE-LBP)

- 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 (VIE-RBA) were released at Sacramento River near Rio Vista on 12/14/23.
- 6,430 cultured DS marked with green VIE on the right anterior dorsal side (VIE-RGA) were released at Sacramento River near Rio Vista on 12/19/23.
- 6,261 cultured DS marked with green VIE on the left posterior dorsal side (VIE-LGP) were released at Sacramento River near Rio Vista on 12/20/23.
- 25,649 cultured DS with clipped adipose fin were released at Sacramento River near Rio Vista on 01/10/24.
- 6,382 cultured DS marked with orange VIE on the left posterior dorsal side (VIE-LOP) were released at Sacramento River near Rio Vista on 01/24/24.
- 6,396 cultured DS marked with orange VIE on the right anterior dorsal side (VIE-ROA) were released at Sacramento River near Rio Vista on 01/25/24.
- 6,576 cultured DS marked with red VIE on the left posterior dorsal side (VIE-LRP) were released at Sacramento River near Rio Vista on 01/31/24.
- 6,581 cultured DS marked with red VIE on the right anterior dorsal side (VIE-RRA) were released at Sacramento River near Rio Vista on 01/30/24.
- Salvage: During the week of 04/15/24, no DS were detected in salvage. The cumulative seasonal salvage of DS is 56.

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

- FMWT September to December Index: 464
- EDSM: During the week of 04/08/24, EDSM preliminarily detected 43 larval LFS (Table 2). Processing is ongoing.
- Chipps Island Trawl: During the week of 04/15/24, Chipps Island Trawl detected no LFS.
- Bay Study: The March survey detected three sub-adult (FL: 70-75mm) LFS in the South Bay, two adult (FL: 86mm) and 30 sub-adult (FL: 61-83mm) LFS in the Central Bay, five adult (FL: 86-110mm) and 35 sub-adult (FL: 63-82mm) LFS in San Pablo Bay, and one adult (FL: 96mm) and ten sub-adult (FL: 68-84mm) LFS in Suisun Bay.
- 20-mm Survey:
 - Survey 1 (Table 3; processing is ongoing)
 - Lower Sacramento River/Confluence: three larval (FL: 6-11mm) LFS
 - Suisun region: 1,898 larval and juvenile (FL: 5-21mm), one sub-adult (FL: 80mm), and one adult (FL: 95mm) LFS
 - Carquinez Strait: 53 larval (FL: 7-16mm) LFS
 - Napa River: 1,378 larval and juvenile (FL: 6-23mm) and one adult (FL: 91mm) LFS
 - San Pablo Bay: 99 larval (FL: 7-16mm) and three adult (FL: 87-88mm) LFS

- Survey 2 (Table 4; processing is ongoing)
 - Central and South Delta: one larval (FL: 14mm) LFS
 - Confluence: ten larval (FL: 9-17mm) LFS
 - Suisun region: 1,402 larval and juvenile (FL: 6-23mm) and two sub-adult (FL: 77-79mm) LFS
 - Carquinez Strait: three larval (FL: 8-15mm) LFS
 - Napa River: 8,184 larval (FL: 8-29mm) LFS
 - San Pablo Bay: 20 larval (FL: 9-19mm) LFS
- Survey 3 (Table 5, processing is ongoing)
 - Lower Sacramento River/Confluence: ten larval (FL: 6-15mm) LFS
 - Suisun region: 870 larval and juvenile (FL: 7-27mm) LFS
 - Carquinez Strait: one larval (FL: 16mm) LFS
 - Napa River: 76 larval and juvenile (FL: 13-30mm), one sub-adult (FL: 80mm), and one adult (FL: 85mm) LFS.
- SLS: NA
- Salvage: During the week of 04/15/24, no LFS were detected in salvage. The cumulative seasonal salvage of LFS is 4.

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

Notes:

- Qualitative Larval Sampling began at CVP on 02/20/24 and SWP on 03/11/24. No LFS or DS larvae have been detected at either facility thus far.
- 20-mm Survey 4 is on the water next week.
- In this document, salvage will be noted in three ways:
 - Salvage (pre-expansion) represents the number of fish detected in subsamples at the fish salvage facilities.
 - Salvage (post-expansion) represents the estimated total number of fish detected at the fish salvage facilities using appropriate expansion factors for the subsampled time. This may be reported as either daily or weekly value.
 - Cumulative seasonal salvage represents the year-to-date sum of salvage (post-expansion) for the current water year.

Attachments: Table 1: Seasonal catch table for DS, Table 2: EDSM catch table, Table 3: 20-mm Survey 1 catch table, Table 4: 20-mm Survey 2 catch table, Table 5: 20-mm Survey 3 catch table, and Figure 1: Map of 20-mm Survey sampling stations.

Table 1: Delta Smelt catch for water year 2024. These data are preliminary and subject to change. * indicate fish data that have not gone under quality control process.

Detection Date	Location	Tag	Release Date	Count	Fork Length (mm)	Source
10/05/23	Lower Sacramento River	NA	NA	1	60	EDSM

Detection Date	Location	Tag	Release Date	Count	Fork Length (mm)	Source
10/24/23	Lower Sacramento River	NA	NA	1	53	EDSM
11/15/23	Lower Sacramento River	NA	NA	1	57	EDSM
12/07/23	Lower Sacramento River	VIE-LGA	11/15/23	1	63	EDSM
01/16/24	Lower Sacramento River	ad-clip	01/10/24	1	63	EDSM
01/16/24	Lower Sacramento River	NA	NA	1	65	EDSM
01/22/24	Suisun Marsh	NA	NA	1	> 58	EDSM
01/22/24	Suisun Marsh	ad-clip	01/10/24	1	> 58	EDSM
01/24/24	Sacramento Deep Water Ship Channel	ad-clip	01/10/24	1	68	EDSM
01/24/24	Suisun Marsh	ad-clip	01/10/24	1	77	EDSM
01/25/24	Lower Sacramento River	VIE-LOP	01/24/24	1	67	EDSM
01/27/24	CVP	ad-clip	01/10/24	1	72	CVP
01/31/24	Lower San Joaquin River (Prisoners Point)	VIE-LOP	01/24/24	1	65	EDSM
02/01/24	Suisun Marsh	ad-clip	01/10/24	1	68	EDSM
02/05/24	Lower San Joaquin River (Confluence)	ad-clip	01/10/24	2	65-72	EDSM
02/05/24	Lower San Joaquin River (Confluence)	VIE-ROA	01/25/24	1	69	EDSM
02/05/24	Suisun Marsh	NA	NA	1	>58	EDSM
02/05/24	Suisun Marsh	VIE-LOP	01/24/24	1	56	EDSM
02/06/24	Suisun Marsh	ad-clip	01/10/24	1	69	EDSM
02/06/24	CVP	ad-clip	01/10/24	1	68	CVP
02/06/24	CVP	VIE-LOA	01/24/25	1	67	CVP
02/07/24	Lower Sacramento River	VIE-ROA	01/25/24	1	58	EDSM
02/07/24	Lower Sacramento River	ad-clip	01/10/24	1	65	EDSM
02/07/24	Suisun Bay	VIE-LOP	01/24/24	1	71	EDSM
02/08/24	Lower Sacramento River	VIE-LRP	01/31/24	1	69	EDSM
02/08/24	Lower San Joaquin River (Prisoners Point)	VIE-ROA	01/25/24	1	68	EDSM
02/09/24	CVP	VIE-RRA	01/30/24	1	81	CVP
02/10/24	CVP	ad-clip	01/10/24	1	65	CVP
02/12/24	CVP	VIE-LRP	01/31/24	1	68	CVP
02/12/24	Carquinez Strait	VIE-LOP	01/24/24	1	70	EDSM
02/13/24	Lower San Joaquin River (Prisoners Point)	VIE-ROA	01/25/24	1	78	EDSM
02/13/24	CVP	VIE-LRP	01/31/24	1	77	CVP
02/13/24	CVP	ad-clip	01/10/24	1	84	CVP
02/14/24	Suisun Marsh	VIE-LRP	01/31/24	1	61	EDSM
02/14/24	Suisun Marsh	VIE-RRA	01/30/24	1	63	EDSM
02/14/24	Liberty Island	VIE-LRP	01/31/24	1	63	DJFMP
02/17/24	CVP	VIE-RRA	01/31/24	1	58	CVP
02/18/24	CVP	ad-clip	01/10/24	1	85	CVP
02/18/24	CVP	VIE-RRA	01/31/24	1	68	CVP
02/22/24	CVP	ad-clip	01/10/24	1	69	CVP
02/23/24	CVP	ad-clip	01/10/24	1	66	CVP
02/23/24	CVP	VIE-LOP	01/24/24	1	70	CVP

Detection Date	Location	Tag	Release Date	Count	Fork Length (mm)	Source
02/26/24	Lower San Joaquin River (Twitchell Island)	VIE-RBA	12/14/23	1	66	EDSM
02/27/24	Suisun Marsh	VIE-LOP	01/24/24	1	66	EDSM
02/28/24	Lower San Joaquin River (Twitchell Island)	VIE-LRP	01/31/24	1	61	EDSM
02/28/24	Lower San Joaquin River (Twitchell Island)	VIE-ROA	01/25/24	1	77	EDSM
03/11/24	Sacramento Deepwater Ship Channel	VIE-RBA	12/14/23	1	66	EDSM
03/11/24	Suisun Marsh	VIE-LOP	01/24/24	1	72	EDSM
03/13/24	Lower Sacramento River (Confluence)	VIE-ROA	01/25/24	1	79	EDSM
03/22/24	Lower Sacramento River	NA	NA	1	11	20-mm
03/22/24	Lower Sacramento River (Miner Slough)	NA	NA	1	10	20-mm
03/25/24	Lower Sacramento River (Confluence)	VIE-LOP	01/24/24	1	76	EDSM
03/25/24	Suisun Marsh	VIE-LOP	01/24/24	2	81-85	EDSM
03/26/24	Sacramento Deepwater Ship Channel	VIE-RBA	12/14/23	1	61	EDSM
04/03/24	Suisun Marsh	NA	NA	1	7.2	EDSM
04/05/24	Sacramento Deepwater Ship Channel	NA	NA	43	8.2-18.5	EDSM
04/08/24	Suisun Marsh	NA	NA	1	11.5	EDSM
04/09/24	Suisun Bay	NA	NA	3*	6-10	EDSM
04/09/24	Suisun Marsh	NA	NA	1*	11.5	EDSM

Table 2: Longfin Smelt (LFS) catch for EDSM 2024 Phase 2 20mm larval sampling between the week of 04/01/24 (Survey Week 36) and 04/15/24 (Survey Week 38). Only stations with LFS catch are reported here. Processing is ongoing. These data are preliminary and subject to change.

Survey Week	Stratum	# Sites	Larvae	Juvenile	Adult	Min Length (mm)	Max Length (mm)	Avg Length (mm)
36	Suisun Bay	5	28	0	0	8.2	18.5	10.6
36	Suisun Marsh	5	75	1	0	6.8	21.5	12
36	Lower Sacramento	5	3	0	0	12	12.5	12.3
36	Cache Slough LI	5	0	0	0	n/a	n/a	n/a
36	Sac DW Ship Chan	5	0	0	0	n/a	n/a	n/a
36	Lower San Joaquin	10	0	0	0	n/a	n/a	n/a
37	Suisun Bay	10	0	0	0	n/a	n/a	n/a
37	Suisun Marsh	5	43	0	0	n/a	n/a	n/a
37	Lower Sacramento	10	0	0	0	n/a	n/a	n/a

Survey Week	Stratum	# Sites	Larvae	Juvenile	Adult	Min Length (mm)	Max Length (mm)	Avg Length (mm)
37	Cache Slough LI	5	0	0	0	n/a	n/a	n/a
37	Sac DW Ship Chan	5	0	0	0	n/a	n/a	n/a
37	Lower San Joaquin	5	0	0	0	n/a	n/a	n/a
38	Suisun Bay	5	0	0	0	n/a	n/a	n/a
38	Suisun Marsh	10	0	0	0	n/a	n/a	n/a
38	Lower Sacramento	5	0	0	0	n/a	n/a	n/a
38	Cache Slough LI	10	0	0	0	n/a	n/a	n/a
38	Sac DW Ship Chan	4	0	0	0	n/a	n/a	n/a
38	Lower San Joaquin	5	0	0	0	n/a	n/a	n/a

Table 3: 20-mm Survey 1 catch table. Processing is on-going. Only stations with LFS catch are reported here. These data are preliminary and subject to change.

Year	Survey	Station	Date	Secchi (cm)	# Tows Processed	Species	Total Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)
2024	1	308	3/18/2024	40	3	LFS	4	Preliminary	7	88	NA
2024	1	311	3/18/2024	53	3	LFS	4	Preliminary	10	88	NA
2024	1	315	3/18/2024	61	3	LFS	2	Preliminary	10	10	10
2024	1	322	3/18/2024	38	3	LFS	11	Preliminary	8	87	NA
2024	1	323	3/19/2024	59	3	LFS	3	Preliminary	8	11	9.3
2024	1	327	3/18/2024	54	3	LFS	25	Preliminary	8	14	10.1
2024	1	328	3/18/2024	57	3	LFS	2	Preliminary	10	11	10.5
2024	1	329	3/18/2024	41	3	LFS	4	Preliminary	8	14	10.3
2024	1	330	3/18/2024	52	3	LFS	16	Preliminary	6	12	9
2024	1	336	3/19/2024	57	3	LFS	28	Preliminary	7	14	10.3
2024	1	338	3/19/2024	59	3	LFS	3	Preliminary	7	12	9.3
2024	1	340	3/20/2024	21	3	LFS	31	Preliminary	6	91	NA
2024	1	342	3/20/2024	38	3	LFS	143	Preliminary	7	17	NA
2024	1	343	3/20/2024	38	3	LFS	39	Preliminary	6	17	NA
2024	1	344	3/20/2024	25	2	LFS	315	Preliminary	8	21	NA
2024	1	345	3/20/2024	29	3	LFS	536	Preliminary	7	23	NA
2024	1	346	3/20/2024	39	3	LFS	315	Preliminary	8	23	NA
2024	1	401	3/20/2024	40	3	LFS	26	Complete	10	16	12.4
2024	1	404	3/19/2024	48	3	LFS	19	Complete	7	14	10.1
2024	1	405	3/19/2024	45	3	LFS	8	Complete	7	13	9.4
2024	1	411	3/19/2024	39	3	LFS	1750	Preliminary	7	14	NA
2024	1	418	3/19/2024	44	3	LFS	27	Complete	5	95	12.7
2024	1	501	3/19/2024	40	3	LFS	32	Complete	6	80	11.8
2024	1	504	3/19/2024	41	3	LFS	20	Complete	6	7	6.4
2024	1	519	3/21/2024	43	3	LFS	15	Complete	6	14	8.7
2024	1	602	3/21/2024	45	3	LFS	47	Complete	6	18	12.4
2024	1	606	3/21/2024	24	3	LFS	8	Complete	7	21	12.4
2024	1	609	3/21/2024	26	3	LFS	1	Complete	8	8	8
2024	1	508	3/20/2024	48	3	LFS	1	Complete	6	6	6

Table 4: 20-mm Survey 2 catch table. Processing is on-going. Only stations with LFS catch are reported here. These data are preliminary and subject to change.

Year	Survey	Station	Date	Secchi (cm)	# Tows Processed	Species	Total Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)
2024	2	327	4/2/2024	88	3	LFS	1	Preliminary	9	9	9
2024	2	335	4/4/2024	64	3	LFS	10	Preliminary	11	19	NA
2024	2	336	4/4/2024	39	3	LFS	9	Preliminary	9	14	NA
2024	2	340	4/3/2024	76	3	LFS	1	Preliminary	12	12	12
2024	2	342	4/4/2024	22	3	LFS	464	Preliminary	8	28	NA
2024	2	343	4/4/2024	29	3	LFS	1173	Preliminary	11	25	NA
2024	2	344	4/4/2024	28	3	LFS	2453	Preliminary	11	29	NA
2024	2	345	4/4/2024	33	3	LFS	2931	Preliminary	10	26	NA
2024	2	346	4/3/2024	50	3	LFS	1162	Preliminary	10	25	NA
2024	2	404	4/4/2024	61	3	LFS	3	Complete	8	15	12.3
2024	2	411	4/4/2024	52	3	LFS	5	Preliminary	6	8	NA
2024	2	418	4/4/2024	53	3	LFS	4	Complete	10	79	NA
2024	2	501	4/5/2024	40	3	LFS	319	Preliminary	7	23	NA
2024	2	504	4/5/2024	45	3	LFS	787	Preliminary	7	19	NA
2024	2	519	4/5/2024	40	3	LFS	29	Complete	8	15	NA
2024	2	602	4/4/2024	37	3	LFS	56	Complete	7	15	NA
2024	2	606	4/4/2024	39	3	LFS	196	Complete	7	23	NA
2024	2	609	4/4/2024	31	3	LFS	8	Complete	8	14	12
2024	2	508	4/5/2024	44	3	LFS	4	Complete	9	13	NA
2024	2	513	4/5/2024	48	3	LFS	4	Complete	13	17	NA
2024	2	520	4/5/2024	45	3	LFS	1	Complete	15	15	15
2024	2	801	4/5/2024	51	3	LFS	1	Complete	13	13	13
2024	2	809	4/3/2024	87	3	LFS	1	Complete	14	14	14

Table 5: 20-mm Survey 3 catch table. Processing is on-going. Only stations with LFS catch are reported here. These data are preliminary and subject to change.

Year	Survey	Station	Date	Secchi (cm)	# Tows Processed	Species	Total Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)
2024	3	340	4/15/2024	NA	2	LFS	11	Preliminary	NA	NA	NA
2024	3	342	4/15/2024	28	1	LFS	25	Preliminary	14	80	NA
2024	3	343	4/15/2024	27	1	LFS	40	Preliminary	13	30	NA
2024	3	405	4/18/2024	61	3	LFS	1	Preliminary	16	16	16
2024	3	418	4/17/2024	49	3	LFS	4	Preliminary	12	22	15
2024	3	501	4/17/2024	48	3	LFS	713	Preliminary	8	27	NA
2024	3	504	4/18/2024	82	2	LFS	37	Preliminary	8	23	NA
2024	3	519	4/18/2024	76	3	LFS	5	Preliminary	7	19	13.4
2024	3	602	4/17/2024	49	2	LFS	105	Preliminary	7	26	NA
2024	3	609	4/17/2024	38	3	LFS	6	Preliminary	17	21	18.5
2024	3	508	4/18/2024	86	3	LFS	6	Preliminary	7	12	10.3
2024	3	804	4/15/2024	90	3	LFS	1	Complete	14	14	14
2024	3	703	4/15/2024	88	3	LFS	2	Preliminary	13	15	14
2024	3	704	4/15/2024	87	3	LFS	1	Complete	6	6	6

20-mm Survey

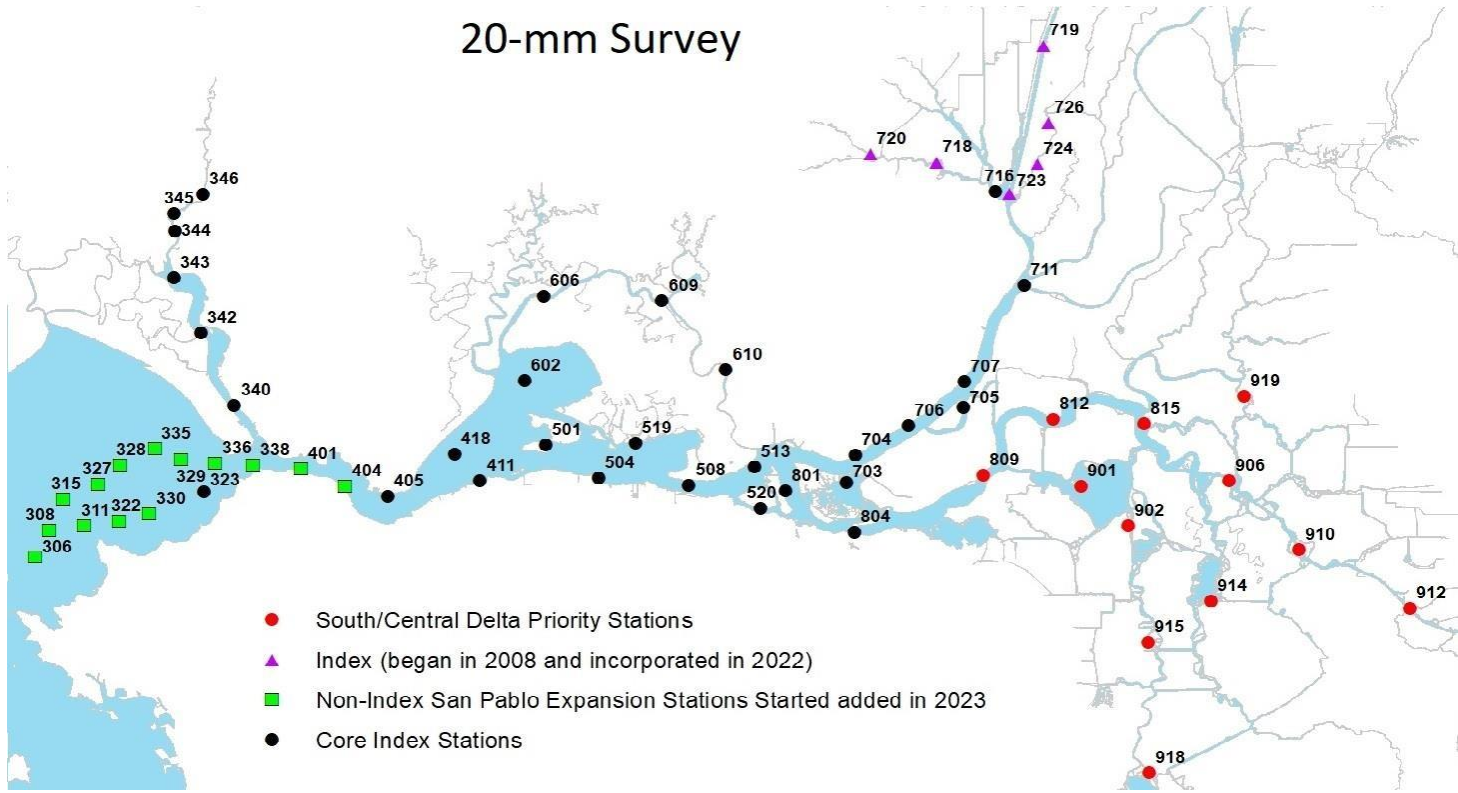


Figure 1: Map of 20-mm Survey sampling stations.