

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

Section 1: Overview

Date: 03/19/2024

Life Stages Present:

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

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

Advice to Water Operations Management Team (WOMT):

No advice.

Risk Assessment:

Delta Smelt: Based on recent detection data and distribution patterns over the past decade, Delta Smelt have likely completed their population-level spawning migration and are distributed throughout the Delta, and temperatures are suitable for spawning. Three marked Delta Smelt have been detected by surveys in Suisun Marsh, the lower Sacramento River, and the Sacramento Deep Water Shipping Channel since 03/05/24. Risk of entrainment in the OMR corridor remains low for adults, based on low turbidity, and lack of detections in salvage and the Central and South Delta. Risk of entrainment of fish in the OMR corridor has decreased to low for larvae, based on Central and South Delta Secchi depth > 1m. COA 8.5.2 is no longer triggered as of 03/18/24. Implementation of steelhead protections may reduce the chance of entraining Delta Smelt as reduced OMRI tend to entrain less fish.

Longfin Smelt: LFS spawning is on-going. Larval LFS have been detected in the Confluence, Suisun region, Napa River, and San Pablo Bay by Smelt Larva Survey (SLS) Survey 5. Adult and sub-adult LFS have been detected in the Confluence, Suisun region, Napa River, and San Pablo Bay by Enhanced Delta Smelt Monitoring (EDSM) in the last month, while San Francisco Bay Study (SFBS) February survey only detected adult and sub-adult LFS west of Chipps Island. Based on these detections, the centroid of distribution for all life stages of LFS is likely downstream of the Confluence. X2 is estimated to be < 56 km. QWEST is anticipated to be between +8,000 and +12,000 cfs this week. OMRI is reduced for Steelhead Protections. 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 SLS 5 and continues to be temporarily off-ramped by COA 8.4.3. The March Water Year Type forecast is Above Normal, and thus COA 8.12 is not in effect.

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	DS population-level migration is likely completed and spawning is ongoing.
DS sub-adults and adults	Routing Risk (Behavior and life history)	Low	One marked adult DS was detected in the Lower Sacramento River on 03/13/24 and one in Sacramento Deepwater Ship Channel (SDWSC) on 03/11/24 by EDSM.
DS larvae	Exposure Risk (Hydrology)	Low	Hydrological conditions are favorable and there have been no detection of larvae.

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. Adult and sub-adult LFS have been detected near or east of Chipps Island. X2 is estimated to be < 56 km and OMRI is reduced for Steelhead Protections.
LFS larvae	Exposure Risk (Hydrology)	Low	SLS 5 and SLS 4 detected seven and 33 larvae respectively in the Lower Sacramento River and the Confluence region. QWEST is anticipated to be between +8,000 and +12,000 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	Three marked DS were detected in salvage (pre-expansion) in the past thirty days. Three marked DS were detected at Twitchell Island by EDSM during the week of 02/26/24. Water temperatures have exceeded 12°C at Jersey Point. Turbidity in the Central and South Delta is low.
DS larvae	Exposure Risk (Hydrology)	Low	The average Secchi depth in the Central and South Delta, as measured by SLS 6, 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	Exposure Risk (Hydrology)	Low	No larvae were detected in the Central and South Delta by SLS 5, and two larvae were detected in the Central and South Delta by SLS 4. QWEST is anticipated to be between +8,000 and +12,000 cfs this week. OMRI is reduced for Steelhead Protections.

- 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 larvae in the Central Delta: reduced to low, due to favorable OMRI and reduced turbidity.
 - 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 is reduced for Steelhead Protection.
 - Expected daily OMRI range this week: -400 to -1,600 cfs

Section 2: Basis for Advice

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

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

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

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

After maintaining a 14-day average OMRI no more negative than -2,000 cfs for 14 days,

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

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

8.3.2 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 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

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.

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.

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 has been temporarily off-ramped by COA 8.4.3 on 02/07/24, until flows at Rio Vista drop below 40,000 cfs and Vernalis flows drop below 5,000 cfs.

- 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.

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 3/15/24.

8.5.1: This COA came into effect on 02/01/24. Conditions may exceed the thresholds described in this COA in the next seven days.

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.

8.12: This COA is not in effect because the March 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.

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 is reduced for Steelhead Protection.
- Controlling Factors: OMRI (Steelhead Protection)
- Water Temperature:
 - Clifton Court Forebay (CCF) Daily Average Water Temperature = NA
 - 3 Station Average = 13.93°C
- Tidal Cycle: Transitioning from Neap to Spring; Full Moon on 03/25/24.

- Turbidity:
 - 8.3.1 Freeport 3-day average = 15.58 formazin nephelometric units (FNU)
 - 8.5.1 Old River at Bacon Island (OBI) Turbidity = 6.12 FNU
- Salinity: X2 < 56 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): None
- Exports:
 - CCF: 1,000 cfs. Anticipated range: 400 to 1,500 cfs
 - Jones: 1,800 cfs. Anticipated range: 1,800 to 3,600 cfs
- Meteorological Forecast: Warm and dry at start, and for most of this week. Cooler weather returns with rain and high-elevation snow by the end of the week.
- 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: 48,440 cfs as of 03/18/24.
 - Anticipated range: 33,000 to 50,000 cfs
- San Joaquin River flow at Vernalis: 5,350 cfs as of 03/18/24.
 - Anticipated range: 4,000 to 6,000 cfs
- Qwest: +11,000 cfs as of 03/18/24. Anticipated range: +8,000 to +12,000 cfs.
- OBI Turbidity: No anticipated changes.
- NDOI: 56,960 cfs as of 03/18/24. Anticipated range: 40,000 to 55,000 cfs.
- Upstream releases:
 - Keswick = 6,000 cfs. Anticipated range: 4,000 cfs to 6,000 cfs for ACID dam installation.
 - Nimbus = 5,000 cfs. Anticipated range: 4,500 cfs to 5,000 cfs.
 - Goodwin = 1,500 cfs. No anticipated changes.
 - Oroville = 10,000 cfs. Anticipated range: 8,000 cfs to 12,000 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 19 March 2024.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
03/15/24	Daily	-1,030	-450
03/15/24	5-day	-710	-400
03/15/24	14-day	-1,970	-1,740

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: 48 DS; 43 of these have been experimentally released DS (Table 1).
- EDSM: During the week of 03/11/24, EDSM detected three marked DS in SDWSC, Suisun Marsh, and Lower Sacramento River (Table 1).
- 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): Survey 5 preliminarily detected no DS. The 11 Central and South Delta station average Secchi depth for SLS 6 is 111 cm.
- 20mm Survey: NA
- 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 03/11/24, 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 03/11/24, EDSM detected five sub-adult (FL: 73-84mm) LFS in Suisun Bay, Napa River, and San Pablo Bay (Table 2).
- Chipps Island Trawl: During the week of 03/11/24, Chipps Island Trawl detected one sub-adult (FL: 75mm) LFS (Table 3).
- Bay Study: The February survey detected two adult (FL: 87-90mm) and 29 sub-adult (FL: 61-83mm) LFS in the South Bay, 29 sub-adult (FL: 57-76mm) and one unknown length LFS in the Central Bay, two adult (FL: 90-93mm), 28 sub-adult (FL: 60-79mm), and one unknown length LFS in San Pablo Bay, and 15 sub-adult (FL: 62-81mm) LFS in Suisun Bay.
- SLS:
 - Survey 5 detected no larval LFS in the Central and South Delta, seven larval (FL: 6mm) LFS in the Confluence, 264 larval (FL: 5-12mm) LFS in the Suisun region, 607 larval (FL: 6-17mm) LFS in Napa River, and 394 larval (FL: 6-13mm) LFS in San Pablo Bay (Table 4). Processing is ongoing.
 - Survey 4 detected two larval (FL: 6-7mm) LFS in the Central and South Delta, 33 larval (FL: 5-8mm) LFS in the Lower Sacramento River and Confluence region, 128 larval (FL: 5-8mm) LFS in the Suisun Bay and West region, 340 larval (FL: 6-13mm) LFS in Napa River, and 405 larval (FL: 6-12mm) LFS in San Pablo Bay. Processing is complete.
 - Survey 3 detected one larval (FL: 6mm) LFS in the Central and South Delta, 38 larval (FL: 5-7mm) LFS in the Lower Sacramento and the Confluence region, 231 larval (FL: 5-10mm) LFS in the Suisun Bay and West region, 18 larval (FL: 6-9mm) LFS in San Pablo Bay, and 42 larval (FL: 7-10mm) LFS in Napa River. Processing is complete.
 - Survey 2 detected 24 larval (FL: 6-8mm) LFS in the Central and South Delta, 198 larval (FL: 6-12mm) LFS in the Lower Sacramento and the Confluence region, 194 larval (FL: 6-10mm) LFS in the Suisun Bay and West region, 6 larval (FL: 7mm) LFS in San Pablo Bay, and 33 larval (FL: 6-9mm) LFS in the Napa River. Processing is complete.
 - Survey 1 detected five larval (FL: 6-8mm) LFS in the Central and South Delta, 98 larval (FL: 6-11mm) LFS in the Lower Sacramento River and the Confluence region, 35 larval (FL: 6-10mm) LFS in the Suisun region, and one larval (FL: 8mm) LFS in the Napa River. Processing is complete.
 - Survey 13 detected two larval (FL: 7mm) LFS in the San Joaquin River, 40 larval (FL: 5-9mm) LFS in the Lower Sacramento River and the Confluence, and 11 larval (FL: 6-10mm) LFS in Suisun Marsh. Processing is complete.
 - Survey 12 detected two yolk-sac larvae (FL: 5-6mm) in the Lower Sacramento River. Processing is complete.
- Salvage: No LFS have been salvaged at either facility this water year.

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

Notes:

- Qualitative Larval Sampling began at CVP on 02/20/24 and SWP on 03/11/24.
- SLS 6 and 20mm Survey 1 are on the water this 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: Chipps Island Trawl catch table, Table 4: Smelt Larva Survey (SLS) 5 catch table, and Figure 1: Map of SLS sampling stations.

Table 1: Delta Smelt (DS) catch for water year 2024. These data are preliminary and subject to change.

Detection Date	Location	Tag	Release Date	Fork Length (mm)	Source
10/05/23	Lower Sacramento River	NA	NA	60	EDSM
10/24/23	Lower Sacramento River	NA	NA	53	EDSM
11/15/23	Lower Sacramento River	NA	NA	57	EDSM
12/07/23	Lower Sacramento River	VIE-LGA	11/15/23	63	EDSM
01/16/24	Lower Sacramento River	ad-clip	01/10/24	63	EDSM
01/22/24	Suisun Marsh	NA	NA	> 58	EDSM
01/22/24	Suisun Marsh	ad-clip	01/10/24	> 58	EDSM
01/24/24	Sacramento Deep Water Ship Channel	ad-clip	01/10/24	68	EDSM
01/24/24	Suisun Marsh	ad-clip	01/10/24	77	EDSM
01/25/24	Lower Sacramento River	VIE-LOP	01/24/24	67	EDSM
01/27/24	CVP	ad-clip	01/10/24	72	CVP
01/31/24	Lower San Joaquin River (Prisoners Point)	VIE-LOP	01/24/24	65	EDSM
02/01/24	Suisun Marsh	ad-clip	01/10/24	68	EDSM
02/05/24	Lower San Joaquin River (Confluence)	ad-clip	01/10/24	65	EDSM
02/05/24	Lower San Joaquin River (Confluence)	VIE-ROA	01/25/24	69	EDSM
02/05/24	Lower San Joaquin River (Confluence)	ad-clip	01/10/24	72	EDSM
02/05/24	Suisun Marsh	NA	NA	>58	EDSM
02/05/24	Suisun Marsh	VIE-LOP	01/24/24	56	EDSM
02/06/24	Suisun Marsh	ad-clip	01/10/24	69	EDSM
02/06/24	CVP	ad-clip	01/10/24	68	CVP
02/06/24	CVP	VIE-LOA	01/24/25	67	CVP

Detection Date	Location	Tag	Release Date	Fork Length (mm)	Source
02/07/24	Lower Sacramento River	VIE-ROA	01/25/24	58	EDSM
02/07/24	Lower Sacramento River	ad-clip	01/10/24	65	EDSM
02/08/24	Lower Sacramento River	VIE-LRP	01/31/24	69	EDSM
02/08/24	Lower San Joaquin River (Prisoners Point)	VIE-ROA	01/25/24	68	EDSM
02/09/24	CVP	VIE-RRA	01/30/24	81	CVP
02/10/24	CVP	ad-clip	01/10/24	65	CVP
02/12/24	CVP	VIE-LRP	01/31/24	68	CVP
02/12/24	Carquinez Strait	VIE-LOP	01/24/24	70	EDSM
02/13/24	Lower San Joaquin River (Prisoners Point)	VIE-ROA	01/25/24	78	EDSM
02/13/24	CVP	VIE-LRP	01/31/24	77	CVP
02/13/24	CVP	ad-clip	01/10/24	84	CVP
02/14/24	Suisun Marsh	VIE-LRP	01/31/24	61	EDSM
02/14/24	Suisun Marsh	VIE-RRA	01/30/24	63	EDSM
02/14/24	Liberty Island	VIE-LRP	01/31/24	63	DJFMP
02/17/24	CVP	VIE-RRA	01/31/24	58	CVP
02/18/24	CVP	ad-clip	01/10/24	85	CVP
02/18/24	CVP	VIE-RRA	01/31/24	68	CVP
02/22/24	CVP	ad-clip	01/10/24	69	CVP
02/23/24	CVP	ad-clip	01/10/24	66	CVP
02/23/24	CVP	VIE-LOP	01/24/24	70	CVP
02/26/24	Lower San Joaquin River (Twitchell Island)	VIE-RBA	12/14/23	66	EDSM
02/27/24	Suisun Marsh	VIE-LOP	01/24/24	66	EDSM
02/28/24	Lower San Joaquin River (Twitchell Island)	VIE-LRP	01/31/24	61	EDSM
02/28/24	Lower San Joaquin River (Twitchell Island)	VIE-ROA	01/25/24	77	EDSM
03/11/24	Sacramento Deepwater Ship Channel	VIE-RBA	12/14/23	66	EDSM
03/11/24	Suisun Marsh	VIE-LOP	01/24/24	72	EDSM
03/13/24	Lower Sacramento River (Confluence)	VIE-ROA	01/25/24	79	EDSM

Table 2: Longfin Smelt (LFS) catch for EDSM 2023 Phase 1 Kodiak trawls on the week of 03/11/24. Only stations with LFS catch are reported here. These data are preliminary and subject to change.

Date	Stratum	Subregion	Station Code	Species	Fork Length (mm)	Total Catch	Disposition
3/12/2024	Suisun Bay	Mid Suisun Bay	24-33-SB02	LFS	73	1	UC Davis/DOP
3/13/2024	Western Delta	East San Pablo Bay	24-33-WD02	LFS	82	1	UC Davis/DOP
3/13/2024	Western Delta	Lower Napa River	24-33-WD03	LFS	75	1	UC Davis/DOP
3/13/2024	Western Delta	East San Pablo Bay	24-33-WD04	LFS	77	1	UC Davis/DOP
3/13/2024	Western Delta	East San Pablo Bay	24-33-WD04	LFS	84	1	UC Davis/DOP

Table 3: Longfin Smelt (LFS) catch for Chipps Island Trawl on the week of 03/11/24. Only stations with LFS catch are reported here. These data are preliminary and subject to change.

Date	Station Code	Species	Fork Length (mm)	Total Catch	Disposition
3/12/2024	SB018N	LFS	75	1	USFWS Lab

Table 4: SLS 5 catch table. Processing is on-going. Only stations with LFS catch are reported here. These data are preliminary and subject to change.

Year	Survey #	SLS Station	Date	Turbidity (FNU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
2024	5	306	3/6/2024	7.4	72	Processed	Longfin Smelt	1	Complete	8	8	8.0	0
2024	5	315	3/6/2024	10.2	50	Processed	Longfin Smelt	7	Complete	6	10	7.7	4
2024	5	322	3/6/2024	10.6	58	Processed	Longfin Smelt	5	Complete	7	11	8.6	1
2024	5	323	3/6/2024	40.9	30	Processed	Longfin Smelt	17	Complete	7	12	8.5	8
2024	5	327	3/6/2024	15.0	53	Processed	Longfin Smelt	40	Complete	6	13	8.2	7
2024	5	328	3/6/2024	14.9	47	Processed	Longfin Smelt	26	Complete	7	11	8.7	9
2024	5	329	3/6/2024	14.0	54	Processed	Longfin Smelt	16	Complete	6	11	8.6	3
2024	5	330	3/6/2024	20.4	44	Processed	Longfin Smelt	9	Complete	7	11	8.2	4
2024	5	335	3/6/2024	15.4	37	Processed	Longfin Smelt	10	Complete	7	9	8.2	6
2024	5	336	3/6/2024	20.1	40	Processed	Longfin Smelt	15	Complete	6	11	8.5	7
2024	5	338	3/6/2024	13.0	44	Processed	Longfin Smelt	34	Complete	6	11	8.3	5
2024	5	340	3/7/2024	28.1	39	Processed	Longfin Smelt	192	Preliminary	7	12	NA	43
2024	5	342	3/7/2024	42.6	28	Processed	Longfin Smelt	88	Complete	6	12	9.0	26
2024	5	343	3/7/2024	43.7	21	Processed	Longfin Smelt	51	Complete	6	12	7.4	41
2024	5	344	3/7/2024	44.6	17	Processed	Longfin Smelt	172	Complete	6	16	9.0	44

Year	Survey #	SLS Station	Date	Turbidity (FNU)	Secchi (cm)	Sample Status	Species	Smelt Catch	ID Status	Min Length (mm)	Max Length (mm)	Mean Length (mm)	Yolk Sac (# of Individuals)
2024	5	345	3/7/2024	33.8	20	Processed	Longfin Smelt	38	Complete	7	13	8.9	22
2024	5	346	3/7/2024	27.7	28	Processed	Longfin Smelt	66	Complete	8	17	9.9	7
2024	5	401	3/6/2024	22.0	36	Processed	Longfin Smelt	159	Complete	5	12	7.8	71
2024	5	404	3/6/2024	21.4	40	Processed	Longfin Smelt	55	Complete	6	13	8.2	21
2024	5	405	3/7/2024	30.3	30	Processed	Longfin Smelt	124	Complete	6	12	8.0	51
2024	5	411	3/6/2024	21.9	48	Processed	Longfin Smelt	53	Complete	6	12	NA	43
2024	5	418	3/6/2024	22.9	38	Processed	Longfin Smelt	32	Complete	6	11	NA	25
2024	5	501	3/6/2024	16.8	48	Processed	Longfin Smelt	2	Complete	7	7	7.0	1
2024	5	504	3/6/2024	13.5	40	Processed	Longfin Smelt	35	Complete	5	7	6.0	30
2024	5	513	3/5/2024	13.4	49	Processed	Longfin Smelt	3	Complete	6	6	6.0	2
2024	5	520	3/5/2024	13.6	54	Processed	Longfin Smelt	2	Complete	6	6	6.0	0
2024	5	602	3/6/2024	32.4	24	Processed	Longfin Smelt	3	Complete	6	7	6.7	0
2024	5	606	3/6/2024	35.1	25	Processed	Longfin Smelt	14	Complete	6	7	6.4	14
2024	5	609	3/6/2024	30.8	30	Processed	Longfin Smelt	1	Complete	6	6	6.0	1
2024	5	801	3/6/2024	11.9	50	Processed	Longfin Smelt	2	Complete	6	6	6.0	0

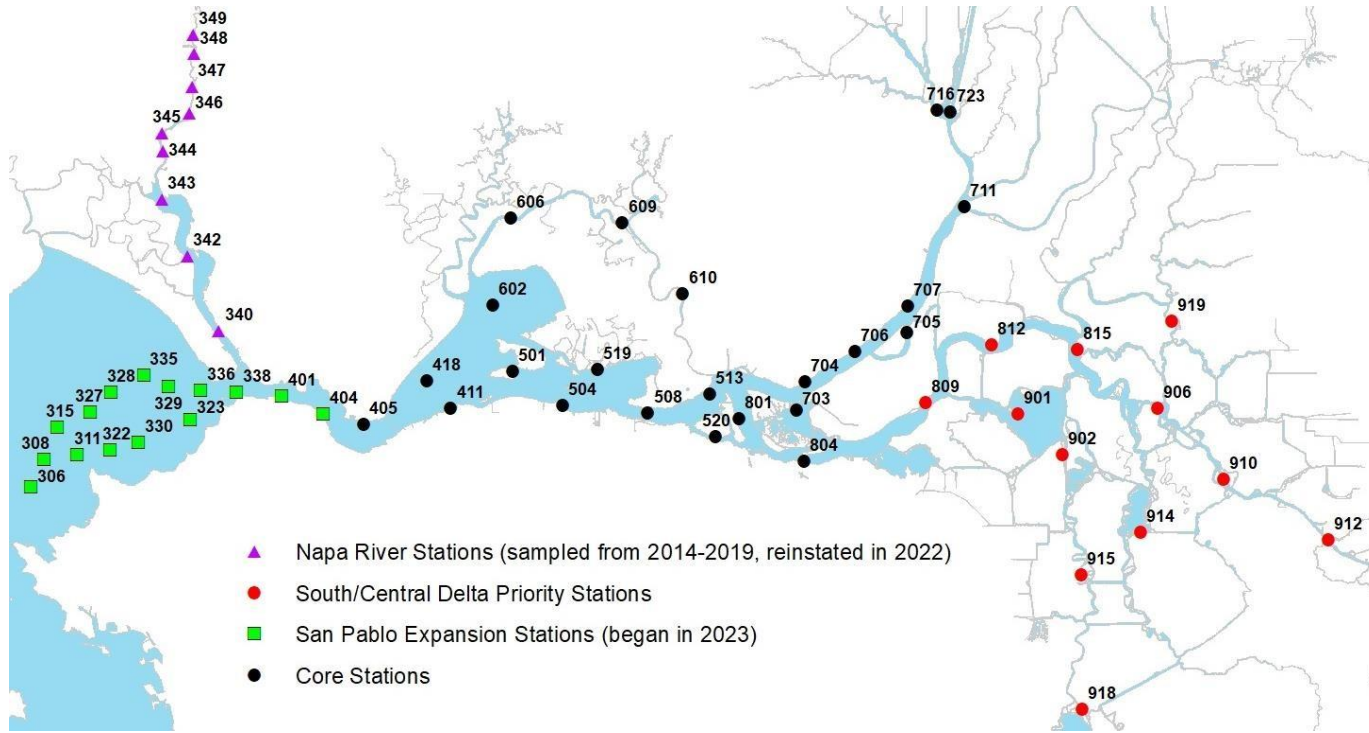


Figure 1: Map of SLS sampling stations.