

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

## Section 1: Overview

**Date: 11/30/2021**

### **Life Stages Present:**

Delta Smelt (DS): Sub-Adult

Longfin Smelt (LFS): Adults and juveniles. Juveniles > 60 mm were detected at Chipps Island.

### **Advice to Water Operations Management Team (WOMT):**

No Advice.

### **Risk Assessment:**

*Delta Smelt:* Based on distribution patterns over the past decade and rare detections, DS are unlikely to be prevalent in the South Delta. Limited detection data support DS being present in the Sacramento Deep Water Ship Channel (SDWSC) and life history information support the centroid of distribution being close to the X2 position (Sommer et al. 2011). The last DS observed was in the SDWSC on 8/20/2021. The likelihood of DS subadult entrainment is low due to seasonal timing and spatial distribution. First flush conditions are not anticipated to occur within the next seven days. The regulations for Integrated Early Winter Pulse Protection does not go into effect until 12/1/2021.

*Longfin Smelt:* Juveniles > 60 mm have been detected in Chipps Island Trawl (11/15/2021 and 11/17/2021). Adult and juvenile LFS have been detected in Suisun Marsh (11/22/2021) and a juvenile was collected in Suisun Bay (11/26/2021). LFS adults are expected to move into the Delta beginning in December. The probability that LFS will initiate a spawning migration increases as the season progresses. However, risk of entrainment remains low. A recently released Fall Midwater Trawl (FMWT) memo showed that LFS have been collected in the Sacramento Deep Water Ship Channel (SDWSC) and the lower Sacramento River during October sampling. This indicates that LFS are present within the Delta, however, there have been no detections within the central and south Delta. Adult salvage is rare and the SMT determined that adults are at low risk of entrainment though detections in the SDWSC indicate that spawning may occur further upstream than in wetter years.

## **Section 1-A: Sacramento River and Confluence**

### **Risk of entrainment into the central Delta and export facilities for DS and LFS in Sacramento River (8.1.5.2 C ii, iii, iv)**

- Exposure Risk (Hydrology):

- DS: Low
  - LFS: Low
- Routing Risk (Behavior and life history):
  - DS: Low
  - LFS: Low
- Overall Entrainment Risk
  - DS: Low
  - LFS: Low

### **Section 1-B: Central Delta**

Risk of entrainment into the export facilities for DS and LFS in the central Delta (8.1.5.2 D iii, iv, v)

- Exposure Risk (Low, Medium, High):
  - DS: Low
  - LFS: Low
- Change in exposure from previous week: (Note: The change in risk compared to previous weeks is not required by the Incidental Take Permit [ITP]).
  - DS: No change
  - LFS: No change
- Reporting Old and Middle River Index (OMRI) (Number and range of OMRI bins will vary based on anticipated hydrology and operations)
  - Relevant Conditions of Approval (COAs) are not active.

## 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 OMR index no more negative than -2,000 cfs, and convene the Smelt Monitoring Team 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 is greater than, or equal to, 50 Nephelometric Turbidity Units (NTU), OR
- The Smelt Monitoring Team 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 OMR index no more negative than -2,000 cfs for 14 days, Permittee shall maintain a 14-day average OMR index no more negative than - 5,000 cfs, initiating the OMR Management season, until the OMR Management Season ends (Condition of Approval 8.8).

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

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

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

When evaluating the possibility of LFS movement into areas that may be subject to an elevated risk of entrainment, the Smelt Monitoring Team shall evaluate catch of LFS with fork length  $\geq 60$  mm by the Chipps Island Trawl (conducted by USFWS) as an early warning indicator for LFS migration movement into the Delta, in addition to other available survey and abiotic data. The Smelt Monitoring Team 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).

### **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 go into effect December 1<sup>st</sup>. The Smelt Monitoring Team (SMT) conducted a Risk Assessment based on COA 8.1.5.2 and noted that there is no regulatory mechanism in place to provide advice until December 1<sup>st</sup>.

3.3.1: Conditions are not likely to exceed thresholds described in this COA.

3.3.3: No adult LFS have been salvaged. The FMWT LFS indices for September and October are 1 and 12, respectively. The LFS index for November is not yet available.

### **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 gates were opened 11/26/2021 for Delta salinity.
  - OMR management has not been initiated.
  - Grantline barrier has been breached. This changes the OMRI calculation.
- Controlling Factors: Delta Outflow
- Water Temperature:
  - Clifton Court Forebay (CCF) Daily Average Water Temperature = NA
  - 3 Station Average = 13.17°C
- Tidal Cycle: Spring tide this week may depress value for Sacramento River flow at Freeport.
- Turbidity:
  - 8.3.1 Freeport 3-day average = 5.04 formazin nephelometric units (FNU)
  - 8.5.1 Old River at Bacon Island (OBI) Turbidity = NA
- Salinity: X2 = >82 km, estimated at 94.5 km for Sacramento River and 94.0 km for San Joaquin River.
- Hydrologic Footprint: No Particle Tracking Models were requested.

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

- Outages
  - State Water Project (SWP): None
  - Central Valley Project (CVP): None.
- Exports:
  - CCF: 300 cfs
  - Jones: 1,700 cfs to 900 cfs
- Meteorological Forecast: Slight chance of precipitation in the Shasta region on Monday.
- Storm Event Projection: NA

**Section 3-C: Projected conditions. 8.1.5.2.A. iii**

- DCC Gates position: Closed 11/30/2021.
- Sacramento River flow at Freeport: 6,000 cfs
- San Joaquin River flow at Vernalis: 500 cfs – 700 cfs
- Qwest: + 1,400 cfs to 0 cfs after DCC closes
- OBI Turbidity: NA
- Expected changes in South Delta Exports: CVP exports are projected to decrease to 900 cfs on 12/3/2021. SWP exports are not expected to change.
- NDOI: 3,000 cfs
- Upstream releases:
  - Keswick = 3,250 cfs
  - Nimbus = 550 cfs
  - Goodwin = 200 cfs
  - Oroville = 1,150 cfs increasing to 1,300 cfs on 11/30/2021

**Table 1:** Comparison of OMR and OMR Index (5-day and 14-day averages for OMR Index and USGS gauge were reported on [SacPAS website](#), accessed 30 November 2021.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
11/30/21	Daily	Not Reported	-2,000 cfs
11/27/21	5-day	-2,150 cfs	Not Reported
11/27/21	14-day	-3,390 cfs	Not Reported

**Section 4: Distribution and Biology.**

**8.1.5.2.B. Assessment of biological information for Delta Smelt and Longfin Smelt**

#### **Section 4-A: Delta Smelt population status 8.1.5.2.B. i**

- EDSM: No Delta Smelt have been collected during recent sampling
- Fall Mid-water Trawl (FMWT) Index for Delta Smelt: September and October Indices = 0.
- Delta Smelt life cycle model (LCM) discussion: NA
- Biological Conditions: NA
- % of population in Delta zones: NA
- Smelt Larva Survey (SLS) will begin on 12/13/2021.
  
- Salvage: No DS have been salvaged at either facility.

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

- FMWT Index: September Index = 1, October Index = 12
  - October FMWT collected 2 LFS in Suisun Bay, 2 in the Lower Sacramento River, 2 in San Pablo Bay, 2 in Suisun Marsh, and 6 in the SDWSC. See memorandum “2021 Fall Midwater Trawl September-October fish abundance and distribution” for more details. The memorandum can be accessed via the [FMWT webpage](#).
- Other Surveys:
  - EDSM: One juvenile LFS (FL = 66 mm) was collected on 11/22/2021 in Suisun Slough in the Suisun Marsh Stratum and one adult LFS (FL = 104 mm) was collected in Suisun Slough in the Suisun Marsh Stratum. **NOTE:** LFS collected on 11/22/2021 were discussed during last week’s call. One juvenile LFS (FL = 72 mm) was collected in Suisun Bay on 11/26/2021.
- Chipps Island Trawl: No LFS were collected last week (11/22 - 11/26/2021). Four juvenile LFS were collected the week before last. Three juvenile LFS (FL = 64, 64 and 68) were collected on 11/15/2021 and one (FL = 64 mm) was collected on 11/17/2021.
- Bay Study: November Bay Study collected 142 juvenile and 7 adult Longfin Smelt throughout the estuary. Five juveniles and 3 adults were collected in Suisun Bay. The remainder were collected downstream of Carquinez Strait. See attached prior week’s Risk Assessment for catch table and further details.
- Salvage: No LFS have been salvaged at either facility.

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

##### Notes:

SMT discussed LFS catch and salvage trends observed in 2020. In 2020 SLS did not collect larval LFS in it’s first December survey, but did collect LFS larvae later in December. No adult LFS were salvaged last year. Adult LFS salvage has been rare since 2009.

SLS will sample all stations, including in the Napa River, during December. This is an expansion from 2020 in which December SLS sampled only the 12 south and central Delta stations.

EDSM transitioned to Phase 1 sampling on 11/29/2021. Phase 1 uses a Kodiak net to target adult DS.

USFWS will distribute preliminary analysis examining changes in the monthly proportion of catch contributing the FMWT LFS index. Results suggest that November and December contribute a greater proportion of LFS catch in recent years. The SMT will discuss this during a future meeting.

During the call, the FMWT mid-season memorandum was released. This provided new FMWT data that was discussed. The SMT noted that the LFS collected in the SDWSC was unusual and warranted further discussion.

### Literature Cited

Davis, Brittany E., Dennis E Cocherell, Ted Sommer, Randall D Baxter, Tien-Chieh Hung, Anne E Todgham, Nann A Fangue, Sensitivities of an endemic, endangered California smelt and two non-native fishes to serial increases in temperature and salinity: implications for shifting community structure with climate change, Conservation Physiology, Volume 7, Issue 1, 2019, coy076, <https://doi.org/10.1093/conphys/coy076>

Jassby, Alan D., William J. Kimmerer, Stephen G. Monismith, Charles Armor, James E. Cloern, Thomas M. Powell, Jerry R. Schubel, Timothy J. Venlinski (1995) Isohaline Position as a Habitat Indicator for Estuarine Populations. Ecological Applications, 5:1, 272-289, DOI: <https://doi.org/10.2307/1942069>

Sommer, T., F. Mejia, M. Nobriga, and L. Grimaldo. 2011. The Spawning Migration of Delta Smelt in the Upper San Francisco Estuary. San Francisco Estuary and Watershed Science 9(2), DOI: <https://doi.org/10.15447/sfew.2014v9iss2art2>

Attachments: Table 1: EDSM Catch Table

Table 1: Delta Smelt (DSM) and Longfin Smelt (LFS) catch per station for EDSM 2021 Phase 3 Kodiak trawls, from 11/22/2021 – 11/26/2021. These data are preliminary and subject to change.

Year	Phase	Station Code	Date	# Tows	Species	Fork Length	Total Catch	Stratum
2021	3	22-17-CF01	11/24/2021	4	NA	NA	NA	Suisun Bay
2021	3	22-17-CF02	11/24/2021	4	NA	NA	NA	Suisun Bay
2021	3	22-17-SBM01	11/24/2021	4	NA	NA	NA	Suisun Bay
2021	3	22-17-CF03	11/26/2021	4	NA	NA	NA	Suisun Bay
2021	3	22-17-SBM02	11/26/2021	4	LFS	72	1	Suisun Bay
2021	3	22-17-SBW01	11/26/2021	4	NA	NA	NA	Suisun Bay
2021	3	22-17-SM01	11/22/2021	4	NA	NA	NA	Suisun Marsh
2021	3	22-17-SM02	11/22/2021	4	LFS	104	1	Suisun Marsh
2021	3	22-17-SM03	11/22/2021	4	LFS	66	1	Suisun Marsh
2021	3	22-17-SM04	11/23/2021	4	NA	NA	NA	Suisun Marsh
2021	3	22-17-SM05	11/23/2021	4	NA	NA	NA	Suisun Marsh
2021	3	22-17-SM06	11/23/2021	4	NA	NA	NA	Suisun Marsh
2021	3	22-17-LSR01	11/23/2021	4	NA	NA	NA	Lower Sac River
2021	3	22-17-RV01	11/23/2021	4	NA	NA	NA	Lower Sac River
2021	3	22-17-RV02	11/23/2021	4	NA	NA	NA	Lower Sac River
2021	3	22-17-LSJ01	11/24/2021	4	NA	NA	NA	Lower San Joaquin River

Year	Phase	Station Code	Date	# Tows	Species	Fork Length	Total Catch	Stratum
2021	3	22-17-SJT01	11/24/2021	4	NA	NA	NA	Lower San Joaquin River
2021	3	22-17-SJT02	11/24/2021	4	NA	NA	NA	Lower San Joaquin River
2021	3	22-17-PP01	11/26/2021	4	NA	NA	NA	Lower San Joaquin River
2021	3	22-17-PP02	11/26/2021	4	NA	NA	NA	Lower San Joaquin River
2021	3	22-17-SJT03	11/26/2021	4	NA	NA	NA	Lower San Joaquin River
2021	3	22-17-LSSC01	11/24/2021	4	NA	NA	NA	Sac Deep Water Ship Channel
2021	3	22-17-LSSC02	11/24/2021	4	NA	NA	NA	Sac Deep Water Ship Channel
2021	3	22-17-USSC01	11/24/2021	4	NA	NA	NA	Sac Deep Water Ship Channel
2021	3	22-17-LSSC03	11/26/2021	2	NA	NA	NA	Sac Deep Water Ship Channel
2021	3	22-17-LSSC04	11/26/2021	4	NA	NA	NA	Sac Deep Water Ship Channel

Year	Phase	Station Code	Date	# Tows	Species	Fork Length	Total Catch	Stratum
2021	3	22-17-USSC02	11/26/2021	4	NA	NA	NA	Sac Deep Water Ship Channel

DSM collected during Phase 3 are transferred alive to FCCL to contribute to DSM brood stock if tow temperatures are below 17°C. If tow temperatures are above 17°C, DSM are flash frozen in liquid nitrogen and transferred to UC Davis. Processing is complete through 11/26/2021.