

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

Section 1: Overview

Date: 27 April 2021

Life Stages Present:

Delta Smelt: Adult, Larvae

Longfin Smelt: Adult, Juvenile, Larvae

Advice to Water Operations Management Team (WOMT):

The Smelt Monitoring Team (SMT) does not recommend any OMR Index (OMRI) limits for the protection of Longfin Smelt (LFS) or Delta Smelt (DS). The SMT determined that a recommendation would not change the salvage trajectory of LFS in the south Delta. No diversion restrictions are in place for Barker Slough Pumping Plant (BSPP) operations under Condition of Approval 8.12.

Risk Assessment:

Delta Smelt: Based on distribution patterns over the past decade and rare detections in this water year, DS are unlikely to be prevalent in the South Delta. Limited detection data supports DS being present in the Sacramento Deep Water Ship Channel. The distribution of adult DS is expected to extend upstream of the confluence which is supported by historical Spring Kodiak Trawl (SKT) data analysis. The likelihood of DS adult entrainment is slightly lower relative to the previous seven days due to seasonal timing. The likelihood of larval entrainment is slightly higher than the previous seven days due to seasonal timing. The most recent detections of a Delta Smelt were a 13.3 mm (4/12/2021) and 12.7 mm (4/13/2021) larvae collected in the Sacramento Deep Water Ship Channel by Enhanced Delta Smelt Monitoring (EDSM). On 4/27/2021 a 56 mm DS was detected in the Sacramento Deep Water Ship Channel by EDSM. The less negative levels of OMRI decrease the potential for entrainment of DS in the central Delta, which includes fish in the lower San Joaquin River, into the south Delta.

Condition of Approval 8.12 is not controlling BSPP operations. No DS have been detected at station 716 during recent sampling. The period in which LFS protection could control BSPP operations ended on 3/31/2021.

Longfin Smelt: Projected operations are expected to result in an OMRI ranging from -500 to -1,500 cfs. 20mm Survey 3 sampled from 4/19/2021 through 4/22/2021. Data for all 12 of the stations listed in Condition of Approval 8.4.2 were reported. LFS larvae were present at one of the relevant stations, 809. Sample Processing is 49% complete. See attached catch table for details. Condition of Approval 8.4.2 has not been triggered by recent sampling. Persistent dry

conditions are expected to continue and OMRI is not expected to become more negative than -1,500 cfs. The most protective level that the SMT can recommend under Condition of Approval 8.4.2 is -1,250 cfs. However, the SMT lacks the information necessary to distinguish between a -1,250 OMRI scenario and a -1,500 cfs OMRI scenario. Detections of juvenile LFS at the salvage facilities indicate that they are present within, or immediately outside of, Clifton Court Forebay (CCF) and within the vicinity of the federal Tracy Pumping Plant. LFS present in the Old and Middle River corridor and within CCF will continue to be entrained and a recommendation for a more conservative OMRI level would not prevent further loss to entrainment.

To date, 361 juvenile LFS have been salvaged at the state Skinner Fish Facility and 176 juvenile LFS have been salvaged at the federal Tracy Fish Collections Facility. Salvage estimates are expanded based on sampling effort. The difference in salvage trends at the facilities was attributed to differing operations and the presence of Clifton Court Forebay.

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):
 - Delta Smelt: Low
 - Longfin Smelt: Low
- Routing Risk (Behavior and life history):
 - Delta Smelt: Low
 - Longfin Smelt: Low risk of LFS adults moving from the confluence into the Central Delta of their own volition. Water temperature has exceeded that typically associated with LFS spawning.
- Overall Entrainment Risk
 - Delta Smelt: Low
 - Longfin Smelt: Low

Section 1-B: Central Delta

Risk of entrainment into the export facilities for DS and LFS in the central Delta

- Exposure Risk:
 - Delta Smelt: Low
 - Longfin Smelt: Low risk for LFS in Franks Tract and further downstream, moderate risk for LFS in the OMR corridor.
- Change in exposure from previous week:
 - Delta Smelt: Slightly elevated due to seasonal timing
 - Longfin Smelt: Similar to last week.
- Reporting OMRI (*Number and range of OMRI bins will vary based on anticipated hydrology and operations*)
 - OMRI is projected to range from -500 cfs to -1,500 cfs.

- OMRI = -1,250 to -1,500 cfs. A recommendation to limit OMRI to -1,250 is not expected to change the salvage trend when compared to the most negative OMRI based on projected operations.

Section 2: Basis for Advice

The 2020 [Incidental Take Permit for Long-Term Operation of the State Water Project in the Sacramento-San Joaquin Delta 2081-2019-066-00](#) (ITP) 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.

8.1.5.2 Smelt Monitoring Team Risk Assessment

8.4.2 Larval and Juvenile Longfin Smelt Entrainment Protection.

From January 1 through June 30, when a single 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 OMRI 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 OMRI flow restriction is warranted, and recommend an OMRI flow limit between -1,250 cfs 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 OMRI 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 OMRI 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 OMRI flow restriction is warranted and determine an OMRI flow limit between -1,250 cfs and -5,000 cfs. The OMRI 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).

8.5.2 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 OMRI no more negative than -5,000 cfs. Additionally, if the five-day cumulative salvage threshold is met or exceeded, Permittee shall immediately convene the SMT 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 SMT may provide advice to further restrict south Delta exports to maintain a more positive OMRI than -5,000 cfs. The SMT may provide advice for further restrictions within three risk categories:

- Low risk: Limit OMRI between -4,000 cfs to -5,000 cfs
- Medium risk: Limit OMRI between -2,500 cfs to -4,000 cfs
- High risk: Limit OMRI 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 SMT 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 SMT 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 OMRI 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.

If expanded salvage at the CVP and SWP facilities of juvenile DS exceeds 11 within a three-day period under this condition, Permittee shall restrict south Delta exports for seven consecutive days to maintain a seven-day average OMRI no more negative than -3,500 cfs. If juvenile DS continue to be salvaged at the CVP and SWP facilities during the seven days of OMRI restrictions, then Permittee shall continue restrictions and request a risk assessment by the SMT 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 SMT, 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 SMT.

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 SMT 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 SMT, 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 sentence or two addressing criteria for each Condition of Approval listed in “Basis for Advice” section. Refer to data below where appropriate.

SMT will conduct weekly risk assessments as described in Condition of Approval 8.1.5.2.

8.3.1 Environmental conditions did not exceed the thresholds identified in this condition during Water Year 2021. This Condition of Approval ended on 1/31/2021.

8.3.3 This Condition of Approval ended on 2/28/2021.

8.4.1 This Condition of Approval ended on 12/28/2021 when SLS detected a larval LFS in the lower San Joaquin River.

8.4.2 This Condition of Approval was not triggered by the most recently available data and the SMT determined that a recommendation was not warranted. 20mm Survey 3 sampled from 4/19/2021 through 4/22/2021. At the time of the call, data from 20mm Survey 3 was available for all of the 12 stations listed in Condition of Approval 8.4.2. LFS larvae were detected at station 809 in the lower San Joaquin River. None were detected at the rest of the stations listed in this Condition of Approval.

8.5.1 This Condition of Approval ended on 4/1/2021.

8.5.2 This Condition of Approval has not been triggered. The three-year average FMWT Index for DS is zero, resulting in a salvage threshold of one for juvenile DS. No DS have been salvaged this water year.

8.12 This Condition of Approval has not been triggered. No DS were detected at station 716 during 20mm Survey 3.

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. DCC gate closure and actions such as integrated early winter pulse protection, etc.)*
 - ITP Conditions of Approval 8.3.2 Salmonid Presence limits exports to maintain a 14-day running OMRI average no more negative than -5,000 cfs. as of 1/1/2021.
 - DCC gates will be tested the first week of May and are expected to begin routine operations towards the end of May.
 - Agricultural barriers are scheduled to be installed in May.
 - D-1641 NDOI requirement will change to 4,000 cfs 5/01/2021.

- Controlling Factors: Delta Outflow and X2 location.
- Water Temperature:
 - CCF = Not discussed (*Condition of Approval 8.8: Daily average temperature at CCF exceeds 25°C for 3 consecutive days*)
 - 3 Station Average = 16.87°C
- Tidal Cycle: Not discussed
- Turbidity:
 - 8.3.1 Freeport 3-day average = Not reported. 8.3.1 terminated without being triggered.
 - 8.5.1 OBI Turbidity = 2.95 FNU
- Salinity: X2 > 81 km. Estimated to be 87.6 km on the Sacramento River and 86.8 on the San Joaquin River.
- Hydrologic Footprint: The SMT did not request any new PTM runs.

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

- Outages
 - SWP: None reported.
 - CVP: None reported.
- Exports
 - CCF: 400 cfs
 - Jones: 800 cfs
- Meteorological Forecast: No precipitation is in the forecast.
- Storm Event Projection: No major storm events are expected.

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

- DCC Gates position: DCC gates will be tested the first week of May and are expected to begin routine operations towards the end of May.
- Sacramento River flow at Freeport: < 6,000 cfs
- San Joaquin River flow at Vernalis: 1,300 cfs and is expected to decrease to 600 to 700 cfs by 05/01/2021.
- Qwest: Approximately 1,000 cfs but will decrease as San Joaquin River flow decreases. It is expected to approach zero and may become slightly negative.
- Old River at Bacon Island Turbidity: 2.95 FNU.
- Expected changes in South Delta Exports: No changes are expected.
- NDOI: 5,800 cfs and is expected to decrease.

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 4/27/2021.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
4/27/2021	Daily	Not Reported	Not Reported
4/24/2021	5-day	-460 cfs	-800 cfs
4/16/2021	14-day	-510 cfs	-920 cfs

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 – Three DS have been collected by EDSM during recent sampling. A 13.3 mm (4/12/2021) and a 12.7 mm (4/13/2021) larvae were collected in the Sacramento Deep Water Ship Channel by Enhanced Delta Smelt Monitoring (EDSM). On 4/27/2021 a 56 mm DS was detected in the Sacramento Deep Water Ship Channel.
- The abundance estimate resulting from the detection of 2 DS in the Sacramento Deep Water Ship Channel is 49,733.
- The 2020 Annual FMWT Index for DS is zero for the third consecutive year.
- Delta Smelt LCM discussion. Not Discussed.
- Biological Conditions: Not Discussed
- % of population in Delta zones: SMT did not discuss distribution in terms of percentage in Delta zones.
- Other Surveys: No other surveys reported Delta Smelt Catch.
- Salvage: No DS have been detected at either salvage facility this season. No DS have been detected in larval sampling at the Tracy Fish Collection Facility (CVP) or Skinner Fish Facility (SWP). Larval sampling began at the Tracy Fish Collection Facility on 2/15/2021 and at the Skinner Fish Facility on 2/22/2021.

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

- FMWT Index: The FMWT Annual Index for LFS is 28. Monthly indices for September and October are zero, the index for November is 22 and index for December is 6.
- Bay Study: In March, Bay Study detected 1 LFS in the lower Sacramento River, six LFS in Suisun Bay and four LFS downstream of Carquinez Strait.
- Other Surveys:
 - Chippis Island Trawl collected 4 LFS (FL = 33 - 93 mm)

- EDSM began Phase 2 sampling on 3/29/2021. They have collected 1,290 LFS during Phase II sampling. A total of 815 LFS (FL = 11.4 – 28.3 mm) were collected during sampling conducted from 4/19/2021 through 4/23/2021. Most were in the Suisun Marsh Stratum; one was collected in the Lower San Joaquin Stratum.
- 20mm Survey 3 collected 10 LFS at station 809 (FL = 11 – 20 mm). No LFS were collected at other stations in the south or central Delta (i.e., those listed in Condition of Approval 8.4.2). Sample processing is 49% complete. See attached catch table for further details.
- Salvage: To date, 361 juvenile LFS have been salvaged at the state Skinner Fish Facility and 176 juvenile LFS have been salvaged at the federal Tracy Fish Collections Facility. Salvage estimates are expanded based on sampling effort. The difference in salvage trends at the facilities was attributed to differing operations and the presence of Clifton Court Forebay.

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

- SMT estimated X2 using a tool developed by DWR staff that applies the same methodology used to calculate X2 reported on CDEC.

Notes:

The SMT ITP Risk Assessments can be accessed on the CDFW [Water Branch website](#).

The agricultural barrier at Middle River is scheduled to start installation on 5/01/2021 and may be completed as early as 5/15/2021. This will alter hydrology in the Delta. The remaining two agricultural barriers will be completed and become operational at a later date.

Delta Juvenile Beach Seine Surveys in the San Joaquin River region are scheduled to resume on 5/01/2021 after a 2-week hiatus.

The SMT discussed the size of the most recent DS detection by EDSM. It is unlikely that this is a young of year fish. Its identity will be confirmed based on photographs taken in the field. The fish recovered and was released after being measured and photographed. The two DS detected in January, by EDSM, were also considered small for that time of year.

Table 1. Delta Smelt and Longfin Smelt catch per station from 2021 20-mm Survey 3, which was in the field 4/19/2021 – 4/22/2021. These data are preliminary and subject to change.

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length
2021	3	323	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	340	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	342	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	343	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	344	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	345	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	346	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	405	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	411	4/20/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	418	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	501	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	504	4/20/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	519	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	602	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	606	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	609	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	610	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	508	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	513	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	520	4/20/2021	3	Longfin Smelt	29	15	29	22.1
2021	3	801	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	804	4/20/2021	3	Longfin Smelt	5	14	25	20.8
2021	3	703	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	704	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	705	4/21/2021	3	Longfin Smelt	7	15	21	18.29
2021	3	706	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	707	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	711	4/21/2021	3	Longfin Smelt	1	12	12	12
2021	3	716	4/22/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	718	4/22/2021	3	No Smelt Catch	0	NA	NA	NA

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length
2021	3	719	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	720	NA	0	Not Yet Processed	0	NA	NA	NA
2021	3	723	4/22/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	724	4/22/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	726	4/22/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	809	4/20/2021	3	Longfin Smelt	10	11	20	15.2
2021	3	812*	4/20/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	815	4/20/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	901*	4/19/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	902	4/19/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	906	4/20/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	910	4/19/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	912	4/19/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	914	4/19/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	915	4/19/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	918	4/19/2021	3	No Smelt Catch	0	NA	NA	NA
2021	3	919	4/20/2021	3	No Smelt Catch	0	NA	NA	NA

*Reduced tow time

Processing is complete through 4/26/2021