

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

Section 1: Overview

Date: 6 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). Projected operations will result in an OMRI that is less negative than the most protective level that the SMT can recommend under the relevant Conditions of Approval. 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 Suisun Marsh, west of the Sacramento-San Joaquin confluence, and within 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. No larval DS have been detected. 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.

Longfin Smelt: Projected operations are expected to result in an OMRI ranging from -600 to -1,500 cfs. 20mm Survey 2 began sampling on 4/5/2021. Data from five of the 12 stations listed on Condition of Approval 8.4.2 were available at the time of the call. Larval or juvenile LFS were detected at two of the stations listed in Condition of Approval 8.4.2 and catch per tow exceeded five at station 809. Persistent dry conditions are expected to continue and OMRI is not expected to become more negative than the most protective level that the SMT can recommend under Conditions of Approval 8.4.2, 8.5.1 or 8.5.2 (-1,250 cfs).

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.

To date, 60 juvenile LFS have been salvaged at the state Skinner Fish Facility and 90 juvenile LFS have been salvaged at the federal Tracy Fish Collections Facility. Salvage estimates are expanded based on sampling effort.

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: Moderate risk of LFS adults moving from the confluence into the Central Delta of their own volition. Chipps Island Trawl detected six LFS (FL = 70 - 85 mm) from 3/30/2021 through 4/6/2021.
- 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: Projected export levels are less negative than the most protective level that the SMT may recommend.
- Change in exposure from previous week:
 - Delta Smelt: Slightly elevated due to seasonal timing and previously elevated turbidity in the central Delta.
 - Longfin Smelt: Projected export levels are less negative than the most protective level that the SMT may recommend.
- Reporting OMRI (*Number and range of OMRI bins will vary based on anticipated hydrology and operations*)
 - OMRI is projected to range from -400 cfs to -1,000 cfs.
 - OMRI scenarios were not assessed. Export levels are projected to be less negative than the most protective level that the SMT may recommend.

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 20-mm Survey 2 sample collection and processing is ongoing. At the time of the SMT meeting, data was available for five of the 12 relevant stations. This Condition of Approval was previously triggered by 20-mm Survey 1. LFS catch per tow exceeded five at two of the relevant stations (809 and 812), which meets one of the criteria to trigger this Condition. However, OMRI is projected to be no more negative than -1,100 cfs and is not expected to exceed the most protective level that the SMT can recommend.

8.5.1 This Condition of Approval has not been triggered. Turbidity at OBI has been below 12 FNU since 2/1/2021. Projected operations are expected to remain less negative than the -2,000 cfs OMRI limit that would be required if this Condition of Approval were triggered.

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 No DS or LFS were detected at station 716 during 20mm Survey 1 or SLS 6. The relevant period for LFS ended on 3/31/2021.

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 remain closed for the remainder of the season (through May 20, 2021 per the PA description for DCC gate operations).
 - Grantline Canal agricultural barrier was breached on 11/11/2020. The OMRI equation was adjusted accordingly to accommodate the change in barrier status.
- Controlling Factors: Delta Water Quality
- 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 = 16.51 °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 = 2.60 FNU
- Salinity: X2 > 81 km. Estimated to be 85.9 km on the Sacramento River and 85.5 km 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: Banks pumping plant did not export on 3/29/2021, 4/1/2021 and 4/4/2021
 - CVP: Pumps are being cycled to reduce exports.
- Exports
 - CCF: 300 - 500cfs
 - Jones: 400 cfs
- Meteorological Forecast: No precipitation is in the forecast
- Storm Event Projection: No precipitation is in the forecast

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

- DCC Gates position: Closed for season (through May 20, 2021)
- Sacramento River flow at Freeport: 8,300 cfs and is expected to decrease
- San Joaquin River flow at Vernalis: 1,000 cfs
- Qwest: +1,200 cfs to 1,500 cfs
- Old River at Bacon Island Turbidity: 2.60 FNU.
- Expected changes in South Delta Exports: Exports are not expected to change substantially.
- NDOI: Operations are targeting a 3-day running average of 7,100 cfs

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 4/6/2021.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
4/6/2021	Daily	Not Reported	-700 cfs
4/3/2021	5-day	-1,120 cfs	-510 cfs
4/3/2021	14-day	-1,110 cfs	-770 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 did not collect any DS during sampling conducted from 3/29/2021 through 4/2/2021. No abundance estimate was calculated.
- 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: The last DS detection was on 1/26/2021 by EDSM.
- 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:
 - Chipps Island Trawl collected 6 LFS (FL = 70 – 87 mm)
 - EDSM began Phase 2 sampling on 3/29/2021. They reported 137 LFS collected from 3/29/2021 through 3/30/2021. Eight were collected in the Lower Sacramento River, two were collected in the lower San Joaquin River and 127 were collected in Suisun Marsh.

- 20mm Survey 1 sample processing is >90% complete. See the attached catch table for details.

Salvage:

To date, 60 juvenile LFS have been salvaged at the state Skinner Fish Facility and 90 juvenile LFS have been salvaged at the federal Tracy Fish Collections Facility. Salvage estimates are expanded based on sampling effort.

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 SMT discussed a discrepancy between the OMR value measured by the USGS gauges and the OMR Index. The values differed substantially on April 1st and 2nd. The ITP requires ongoing comparison of the USGS OMR gauge data and OMR Index.

The size range of young LFS present at this time of year will be examined at a future meeting. CDFW staff will summarize length frequency data to facilitate discussion.

Attachments:

Table 1: Delta Smelt and Longfin Smelt catch per station from 2021 20-mm Survey 1, which was in the field 3/22/2021 – 3/25/2021. These data are preliminary and subject to change.

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length
2021	1	323	22-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	340	22-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	342	22-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	343	22-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	344	NA	0	Not Yet Processed	0	NA	NA	NA
2021	1	345**	22-Mar-21	1	No Smelt Catch	0	NA	NA	NA
2021	1	346	22-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	405	23-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	411	23-Mar-21	1	No Smelt Catch	0	NA	NA	NA
2021	1	418	23-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	501	24-Mar-21	3	Longfin Smelt	4	9	15	11.5
2021	1	504	24-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	519	24-Mar-21	3	Longfin Smelt	34	7	14	10.44
2021	1	602	24-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	606	23-Mar-21	3	Longfin Smelt	79	7	29	14.38
2021	1	609	23-Mar-21	3	Longfin Smelt	27	10	20	13.15
2021	1	610	23-Mar-21	3	Longfin Smelt	36	8	24	15.58
2021	1	508	24-Mar-21	3	Longfin Smelt	3	10	12	10.67
2021	1	513	24-Mar-21	3	Longfin Smelt	14	10	19	13.5
2021	1	520	24-Mar-21	3	Longfin Smelt	22	9	18	12.55
2021	1	801	24-Mar-21	3	Longfin Smelt	13	8	15	11.77
2021	1	804	24-Mar-21	3	Longfin Smelt	9	8	16	11.67
2021	1	703	25-Mar-21	3	Longfin Smelt	21	9	21	13.81

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length
2021	1	704	25-Mar-21	3	Longfin Smelt	75	8	22	14.43
2021	1	705	25-Mar-21	3	Longfin Smelt	14	10	18	12.57
2021	1	706	NA	0	Not Yet Processed	0	NA	NA	NA
2021	1	707	25-Mar-21	3	Longfin Smelt	72	9	21	13.24
2021	1	711	25-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	716	25-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	718	25-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	719	25-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	720	25-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	723	25-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	724	25-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	726	25-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	809	24-Mar-21	3	Longfin Smelt	19	10	18	13.32
2021	1	812	24-Mar-21	3	Longfin Smelt	35	10	19	12.51
2021	1	815	24-Mar-21	3	Longfin Smelt	2	11	13	12
2021	1	901*	22-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	902	22-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	906	24-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	910	22-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	912	22-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	914	22-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	915	22-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	918	22-Mar-21	3	No Smelt Catch	0	NA	NA	NA
2021	1	919	23-Mar-21	3	No Smelt Catch	0	NA	NA	NA

*Reduced tow time

**Only 1 tow conducted

Processing is complete through 4/5/2021

