

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

Section 1: Overview

Date: 15 June 2021

Life Stages Present:

Delta Smelt: Adult, Juvenile, Larvae

Longfin Smelt: 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). No diversion restrictions are in place for Barker Slough Pumping Plant (BSPP) operations under Condition of Approval 8.12. The SMT also agreed on 06-08-2021 that larval sampling could be discontinued at both facilities.

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 lower Sacramento River and in the Sacramento Deep Water Ship Channel (SDWSC). The likelihood of DS adult entrainment is low due to seasonal timing. The likelihood of larval entrainment is decreasing compared to the previous seven days due to warming water temperature and seasonal timing. The most recent detection of a Delta Smelt was on 5/6/2021. The less negative OMR Index (OMRI) values decrease the potential for entrainment of Delta Smelt into the South Delta.

Condition of Approval 8.12 is not controlling BSPP operations. No DS have been detected at station 716 in 20 mm Survey 6, which was in the field 6/1 – 6/4. The period in which DS protection could control BSPP operations extends through June 30th. The period in which LFS detections could control BSPP operations ended on 3/31/2021.

Longfin Smelt: The SMT does not expect LFS salvage to occur for the remainder of this season. No LFS were detected at any of the 12 south and central Delta stations listed in Condition of Approval 8.4.2 during 20-mm Survey 6. No LFS have been detected in salvage since 5/31/2021 and increasing water temperature reduces the likelihood of LFS remaining in the Delta.

Risk of entrainment into the export facilities is low for LFS. Juvenile LFS detections are rare above 22°C (72° F) ([Jeffries 2016](#)). Daily average water temperature at Clifton Court Forebay (CCF) was 22.61°C on 6/14/2021 and will increase with elevated ambient air temperature.

To date, 677 juvenile LFS have been salvaged at the state facility and 188 juvenile LFS have been salvaged at the federal 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: Low
- 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
- Change in exposure from previous week:
 - Delta Smelt: Decreasing compared to the previous seven days due to warming water temperature and seasonal timing
 - Longfin Smelt: Decreasing compared to the previous seven days due to increasing water temperature.
- Reporting OMRI (*Number and range of OMRI bins will vary based on anticipated hydrology and operations*)
 - OMRI is projected to range from -1,000 cfs to -1,600 cfs.
 - The SMT determined that a recommendation to restrict OMR was not warranted.

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 Smelt Larval 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 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.

8.8 End of OMR Management.

Permittee shall operate the Project to meet the requirements included in Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, and 8.6.4 to ensure that entrainment and take of Covered Species is minimized during the OMR Management season through June 30, or until the following species-specific off-ramps occur:

- LFS and DS: Daily mean water temperature at CCF is greater than 25°C (77° F) for three consecutive days.
- CHNWR and CHNSR:
 - More than 95% of CHNWR and CHNSR have migrated past Chipps Island as determined by the Salmon Monitoring Team, AND
 - Daily average water temperature at Mossdale exceeds 22.2°C (72° F) for 7 non-consecutive days in June, AND
 - Daily average water temperature at Prisoner's Point exceeds 22.2°C (72° F) for 7 non-consecutive days in June.

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. 20-mm Survey 6 did not report any LFS at the 12 stations listed in this Condition of Approval. Water temperature at CCF has fluctuated around the upper limit at which LFS have historically been detected by 20 mm Survey and is currently trending upward. Juvenile LFS detections are rare above 22°C (71.6° F) ([Jeffries 2016](#)). No LFS have been salvaged since 5/31/2021.

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 6.

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.)
 - OMR management for salmonids ended on 6/8/2021
 - DCC gates are currently closed and scheduled to open 6/16/2021

- Construction of the South Delta agricultural barriers is complete as of May 27th. Barrier culverts will be tidally operated as of June 1st. The OMRI equation was adjusted accordingly.
- A TUCP was submitted to the Water Board requesting that the NDOI outflow requirement be changed from 4,000 cfs to 3,000 cfs for June and July, and that the compliance point location for western Delta agricultural salinity be changed from Emmaton to Three Mile Slough from June 1st through August 15th. The TUCP was conditionally approved subject to conditions.
- Construction of the Drought Barrier at False River is underway and projected to be complete on 7/1/2021.
- Controlling Factors: Delta Outflow and X2 location.
- Water Temperature:
 - CCF Daily Average Water Temperature = 22.61°C
 - 3 Station Average = 21.14°C
- Tidal Cycle: Currently in a neap cycle. Anticipating a stronger spring tide at the end of the month.
- Turbidity:
 - 8.3.1 Freeport 3-day average = Not reported. 8.3.1 terminated without being triggered.
 - 8.5.1 OBI Turbidity = 3.13 FNU
- Salinity: X2 > 81 km. Average of estimates for Sacramento and San Joaquin Rivers is 94.95 km.
- 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: Jones pumping plant is offline
- Exports: Operations have transitioned to a single facility operation to further reduce combined exports.
 - CCF: 850 cfs. Will decrease as federal exports increase
 - Jones: 0 cfs. Will increase later this week.
 - See Expected Changes in Operations below for projected exports.
- Meteorological Forecast: No precipitation is in the forecast for the floor of the Central Valley.
- 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 are currently closed and scheduled to open 6/16/2021
- Sacramento River flow at Freeport: 6,200 cfs and will vary with upstream releases.
- San Joaquin River flow at Vernalis: 750 cfs
- Qwest: +1,400 cfs and is expected to fluctuate around zero.

- Old River at Bacon Island Turbidity: 3.01 FNU.
- Expected changes in South Delta Exports: Exports will transition from Banks (SWP) to Jones (CVP) this week.
 - SWP will reduce exports to 300 cfs, then decrease to minimal CCF intake on 6/19.
- NDOI: 3,600 cfs and may increase with increased upstream releases.
- Upstream releases have increased to improve Delta outflow
 - Keswick = 7,500 cfs, increasing to 8,000 cfs on 6/16/21
 - Nimbus = 1,850 cfs
 - Goodwin = 1,500 cfs
 - Oroville = 2,550 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 6/15/2021.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
6/15/2021	Daily	Not Reported	-1,200 cfs
6/12/2021	5-day	-1,590 cfs	-1,260 cfs
6/12/2021	14-day	-1,950 cfs	-1,170 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 sampling was reduced due to boat issues. They sampled eight sites in two strata on 6/10 and 6/11 No DS were collected.
- 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.
- 20 mm Survey 6 sample processing is 55% complete. No DS have been in the stations processed to date including station 716 in Barker Slough.
- 20 mm Survey 4 collected 1 DS (FL = 25 mm) at station 719 in the SDWSC on 5/6/2021.
- Salvage: No DS have been detected at either salvage facility this season.

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.
- 20 mm Survey 6 sampled from 6/1/2021 through 6/4/2021. Sample processing is 55% complete. Eight LFS were collected downstream of the confluence of the Sacramento and San Joaquin Rivers. None were collected at the 12 stations listed in Condition of Approval 8.4.2. See attached catch table for more details.
- Other Surveys:
 - Chipps Island Trawl did not collect any LFS over the last seven days.
 - EDSM sampling was reduced due to boat issues. They sampled eight sites in two strata on 6/1 and 6/2. No LFS were collected.
 - Salvage: No LFS were salvaged at either facility from 6/8/2021 through 6/14/2021. To date, 677 juvenile LFS have been salvaged at the state facility and 188 juvenile LFS have been salvaged at the federal 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 continued discussion of the purpose and possible topics for post-season workshop(s), this discussion will be ongoing. A framework for the discussion has been circulated to SMT members who are requested to make red-line edits or additions to items listed under weeks one and two.

Attachments:

Table 1. Delta Smelt and Longfin Smelt catch per station from 2021 20-mm Survey 6, which was in the field 6/1/2021 – 6/4/2021. These data are preliminary and subject to change.

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length
2021	6	323	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	340	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	342	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	343	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	344	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	345	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	346	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	405	2-Jun-21	3	No Smelt Catch	0	NA	NA	NA

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length
2021	6	411	2-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	418	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	501	4-Jun-21	3	Longfin Smelt	2	30	36	33
2021	6	504	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	519**	4-Jun-21	1	No Smelt Catch	0	NA	NA	NA
2021	6	602	4-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	606	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	609	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	610	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	508	2-Jun-21	3	Longfin Smelt	6	26	34	29.17
2021	6	513	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	520	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	801	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	804	2-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	703	3-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	704	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	705	3-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	706	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	707	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	711	3-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	716*	4-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	718	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	719	NA	0	Not Yet Processed	0	NA	NA	NA
2021	6	720	NA	NA	Not Sampled	NA	NA	NA	NA
2021	6	723	4-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	724	4-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	726	4-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	809	2-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	812	2-Jun-21	3	No Smelt Catch	0	NA	NA	NA

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length
2021	6	815	2-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	901*	1-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	902*	1-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	906	2-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	910	2-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	912	1-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	914	1-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	915	1-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	918	1-Jun-21	3	No Smelt Catch	0	NA	NA	NA
2021	6	919	2-Jun-21	3	No Smelt Catch	0	NA	NA	NA

*Reduced tow time

**Only 1 tow conducted

Processing is complete through 6/14/2021