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

Section 1: Overview

Date: December 15, 2020

Life Stages Present:

Delta Smelt: Adult

Longfin Smelt: Adult

Advice to WOMT:

No advice is warranted for south Delta or Barker Slough operations.

Risk Assessment:

Risk of entrainment into the central and south Delta or into the export facilities in the south Delta is low across the range of expected OMR Index levels.

Delta Smelt: Based on distribution patterns over the past decade and limited recent detection data, Delta Smelt are unlikely to be prevalent in the South Delta. Limited detection data support Delta Smelt being present in Suisun Marsh and west of the Sacramento-San Joaquin confluence. High X2 position could mean the distribution of Delta Smelt extends further upstream of the confluence. However, the projected less negative OMR Index limits and low turbidity create a low risk of entrainment based on the lack of detections in the South Delta. Precipitation occurred over the weekend and is anticipated again mid-week, however, changes to Freeport flows and turbidity are not expected to reach “First Flush” conditions within the next seven days. Risk is slightly elevated due to the range of potential OMR values being more negative during the next seven days, but overall risk of Delta Smelt moving into the south Delta is low.

Longfin Smelt: Evaluation of recent catch data does not indicate that Longfin Smelt (LFS) have entered the central or south Delta, however there is evidence that they have begun migrating upstream. At this time of year, the SMT looks to the Chipps Island survey to predict Longfin Smelt migration upstream into the Delta. Chipps Island Survey collected three age-2 LFS (FL = 105 – 114 mm) and three age-1 LFS (FL = 68 – 74 mm) on 12/08/2020 and 12/09/2020. December FMWT reported four LFS with one collected in San Pablo Bay, one in Suisun Bay, one near Chipps Island and one in the lower Sacramento River. Other surveys (FMWT, Bay Study, and EDSM) collected LFS of smaller fork lengths in Suisun Bay, Suisun Marsh and farther downstream during November. UC Davis Otolith and Geochemistry Laboratory collected ripe and post spawn LFS while sampling in south San Francisco Bay. See section 4-B below for catch details.

Section 1-A: Sacramento River and Confluence

Risk of entrainment into central Delta and export facilities for Delta Smelt and Longfin Smelt in Sacramento River (8.1.5.2 C ii, iii, iv)

- Exposure Risk:
  - Delta Smelt: Low
  - Longfin Smelt: Low
- Routing Risk:
  - 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 Delta Smelt and Longfin Smelt in the central Delta

- Exposure Risk:
    - Delta Smelt: Low
    - Longfin Smelt: Low
- Change in exposure from previous week:
    - Delta Smelt: No change
    - Longfin Smelt: Slight increase in exposure associated with onset of upstream migration, however, there have been no detections in areas associated with elevated risk of entrainment into the export facilities.
- Reporting Old and Middle River Index (OMRI) *(Number and range of OMRI bins will vary based on anticipated hydrology and operations)*
    - OMRI is approximately -1,500 cfs and projected to remain between -1,000 cfs and -5,000 cfs. An increase in exports is unlikely without precipitation and an improvement in Delta water quality conditions.
    - OMRI *(*Export Scenario OMRI = -1,500 cfs)
        - Delta Smelt: Low Risk
        - Longfin Smelt: Low Risk
    - OMRI *(*Export Scenario OMRI = -5,000 cfs)
        - Delta Smelt: Low Risk
        - Longfin Smelt: Moderate for fish in OMR corridor (for fish in proximity to Bacon Island, the risk is moderate, for fish in the main-stem San Joaquin River, an OMRI of -5,000 cfs is considered protective)
        - Sustained precipitation and a "freshening" of the Delta is needed for OMRI to reach and remain at -5,000 cfs through increased export 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 Water Operations Management Team (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

8.3.1 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 been 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[1] 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 ≥ 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).

[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.

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 have not exceeded the thresholds identified in this condition. The SMT examined abiotic conditions and determined that risk is low for Delta Smelt.

8.3.3 No LFS have been salvaged this water year. The cumulative expanded salvage threshold is 2 based on the most recently available FMWT Index. The November Index, which was reported to the SMT via email on 11/25/2020, will be used until the annual index is finalized in late December or early January. The SMT examined abiotic conditions and determined that risk is low for Longfin Smelt. See section 4-B for the discussion of the FMWT Index.

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.)*
    - DCC gates will remain closed for the remainder of the season (through May 20, 2021 per the PA description for DCC gate operations) but may be opened to maintain water quality during drought conditions for up to 5 days and for up to 2 events as per the PA in December and January.
    - 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 outflow and 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 = 10.49°C
- Tidal Cycle: Entering a period of reduced tidal magnitude which may reduce salinity within the western Delta.
- Turbidity:
    - 8.3.1 Freeport 3-day average = 3.46 FNU
    - *8.5.1 Turbidity at OBI Feb 1 to April 1*
- Salinity: X2 is upstream of Collinsville and is likely higher than 95 km on the Sacramento River.
- Hydrologic Footprint:
    - No PTM models were run this week. CDFW will request PTM runs if any LFS are collected in the San Joaquin River or central/south Delta.

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

- Outages
    - SWP: No export or salvage outages reported for the period of 12/07/2020 to 12/14/20.
- CVP: No export or salvage outages reported for the period of 12/07/2020 to 12/14/20.Exports
    - CCF: 800 cfs (May increase if water quality permits)
    - CVP: 800 cfs. (May increase if water quality permits)
    - Barker Slough: Not reported. Will begin reporting when Barker Slough Condition of Approval go into effect January 15th.
- Meteorological Forecast: 90% chance of rain Wednesday with projected totals of 0.1 to 0.25 inches.
- Storm Event Projection: 90% chance of rain Wednesday with projected totals of 0.1 to 0.25 inches.

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: Approximately 8,900cfs. Flow is expected to increase by several hundred cfs then return to approximately 8,000 cfs as runoff from the recent storm event moves through the system.
- San Joaquin River flow at Vernalis: 1000 cfs
- Qwest: + 4800 cfs as of 12/14/2020. Qwest is projected to decrease and become slightly negative as runoff from the recent storm moves through the system.
- Old River at Bacon Island Turbidity: Not reported
- Freeport Turbidity (3-day average): 3.46 FNU. Turbidity is not expected to increase in the next seven days
- Expected changes in South Delta Exports: Exports may increase if water quality permits.
- NDOI: 12,700 cfs as of 12/14/2020.

Table 1: Comparison of OMR and OMR Index (5-day and 14-day averages reported on SacPAS website, accessed Dec 15, 2020)

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
12/14/2020	Daily	Not Reported	-1,500 cfs
12/13/2020	5-day	Not Reported	-1,580 cfs
12/13/2020	14-day	Not Reported	-2,200 cfs
NA	Daily	Not Reported	Not Reported
12/12/2020	5-day	-1,760cfs	-1,590 cfs
12/12/2020	14-day	-2,360 cfs	-2,340 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 Delta Smelt last week (12/07/2020 – 12/11/2020).
- Delta Smelt LCM discussion. Not Discussed.
- Biological Conditions: None reported.
- % in Delta zones: SMT did not discuss distribution in terms of percentage in Delta zones.
- Other Surveys: No Delta Smelt detections were reported in recent sampling including Bay Study and FMWT. FCCL brood stock collection has not detected any Delta Smelt in the lower Sacramento River after 5 days of sampling. December SLS began on 12/14/2020 and sampled 6 south Delta stations. No Delta Smelt were detected. There will be a second December SLS survey beginning on 12/28/2020. Both December SLS surveys will only be conducted in the south and central Delta. January SLS is scheduled to begin 2 weeks after the second December SLS survey.
- The last Delta Smelt detection occurred on 11/09/2020 in Suisun Marsh.
- Salvage: No Delta Smelt 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 November FMWT Index is 21.7. Indices for September and October were zero. Preliminary December FMWT catch reported 4 Longfin Smelt, with one collected in San Pablo Bay, Suisun Bay, the lower Sacramento River and one near Chipps Island. Fork lengths and station numbers were not available at the time of the call. The annual index is typically distributed in late December or early January.
- Bay Study: During November sampling, 42 Longfin Smelt were collected. One was collected in Carquinez Strait. The rest were collected in San Pablo and San Francisco Bays. December Bay Study began 12/01/2020 but was interrupted after two days of sampling. No Longfin Smelt were detected.
- Other Surveys: EDSM did not collect any Longfin Smelt last week (12/07/2020 – 12/11/2020). Chipps Island reported six Longfin Smelt (FL = 68, 69, 74, 105, 107, 114 mm) collected on 12/08/2020 and 12/09/2020.
- December SLS began on 12/14/2020 and sampled 6 south Delta stations. No Longfin Smelt were detected. There will be a second December SLS survey beginning on 12/28/2020. Both December SLS surveys will only be conducted in the south and central Delta. January SLS is scheduled to begin 2 weeks after the second December SLS survey.
- UC Davis Otolith Lab collected Longfin Smelt in south San Francisco Bay including spent and ripe adults.
- Salvage: No Longfin Smelt have been detected at either salvage facility.

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. There is interest in validating the results of this tool.

Notes: The SMT ITP Risk Assessments can be accessed on the CDFW Water Branch website.

The Onset of OMR management has not been triggered.

This is typically a highly variable time of year for water operations. Hydrologic measures such as Qwest, NDOI, and river flows at Freeport and Vernalis are expected to increase then decrease as runoff from recent and forecasted storm systems move through the system. Exports may increase if water quality allows. Two OMR scenarios were assessed to capture the range of potential OMR Index values that could occur in the next seven days. It was noted that Electrical Conductivity along the Old and Middle River corridor would need to decrease for exports to increase. However, increased outflow from storm runoff and reduced tidal magnitude may result in a change in water quality sufficient to increase exports.

Some sampling has been disrupted due to COVID-19. Chipps Island survey will not sample this week (12/14/2020 to 12/18/2020), December Bay Study was only able to complete 2 days of sampling, EDSM was unable to complete sampling in the south Delta stratum last week. The USBR Assessment includes a table of interruptions. It was suggested that each agency communicate these disruptions to their WOMT representatives.

The SMT continued discussion regarding how to assess Delta Smelt distribution in the absence of detections in the wild. During discussion of X2, it was noted that Jassby et al 1995 included X2 estimates > 82 km, which indicates that it can be defined when upstream of Collinsville. It was also noted that the last Delta Smelt detection occurred more than a month ago. First flush conditions have not occurred and some SMT members indicated that it was early in the season for Delta Smelt to begin moving. Others noted that Delta Smelt will move in the absence of a first flush. The SMT also noted that water temperature may be an important factor in predicting Delta Smelt movement and that water temperatures are relatively low. Turbidity also remains low throughout the south Delta.

Longfin Smelt appear to be migrating as evidenced by increased detections at Chipps Island and the detection of ripe and post spawn Longfin Smelt in south San Francisco Bay by UC Davis Otolith and Geochemistry Laboratory. These detections occurred outside of the region typically assessed by the SMT but my indicate that spawning has also begun in the upper estuary. The SMT also discussed the need to clarify geographic nuances in the ITP Risk Assessment when describing the risk of entrainment.

Attachments:

Insert catch reports, PTM results, Salvage tables, etc.