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

Section 1: Overview

Date: 12/06/2022

Life Stages Present:

Delta Smelt (DS): Sub-adults and Adults
Longfin Smelt (LFS): Sub-adults and Adults

Advice to Water Operations Management Team (WOMT):

No Advice.

Risk Assessment:

Delta Smelt: Based on distribution patterns over the past decade and low detections in this water year, Delta Smelt are unlikely to be prevalent in the Central and South Delta. Limited detection data from the past month and the position of X2 in the Sacramento River support Delta Smelt presence in the lower Sacramento River. The last Delta Smelt observations were on November 3 & 7, 2022, in the lower Sacramento River. These detections may be an indication that DS are starting to stage downstream of X2 in preparation for seasonal migration into freshwater. The likelihood of Delta Smelt entrainment is low due to seasonal timing. The Integrated Early Winter Pulse Protection (IEWPP) period began on December 1, 2022. The precipitation from last week and the predicted amount of precipitation for this week are unlikely to cause "First Flush" conditions and trigger IEWPP regulations.

Longfin Smelt: No adult LFS have been detected by Enhanced Delta Smelt Monitoring (EDSM) in the lower San Joaquin River or the Central or South Delta in recent sampling. LFS adults are expected to move into spawning habitat by November and December, and water temperatures are suitable for spawning. EDSM and Chipps Island Trawl LFS detections increased last week over previous weeks, which is an indication that spawning migration has started. Adult and sub-adult LFS were detected by EDSM in Suisun Marsh, Suisun Bay, and the Lower Sacramento River. Chipps Island Trawl detected 26 adult and 36 sub-adult LFS last week. Based on distribution data and life history, adults and sub-adults are not expected to be prevalent in the Central or South Delta and therefore are expected to be at low risk of entrainment. As of 12/1/2022, ITP Conditions of Approval 8.3.1 and 8.3.3 are active but not triggered. The September to November FMWT index is 321, which sets the current salvage threshold for COA 8.3.3 to 32 LFS. The final FMWT index will be available later in December.

Section 1-A: Sacramento River and Confluence

Table 1: Risk of entrainment into the central Delta and export facilities for Delta Smelt in the Sacramento River and confluence:

Species and life stage	**Risk type**	**Risk level**	**Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)**
DS larvae and juveniles	Exposure Risk (Hydrology)	NA	Spawning hasn't started, no larvae present.
DS subadults and adults	Routing Risk (Behavior and life history)	Low	Turbidity remains low, staging near X2 may be starting soon, water temperatures are decreasing.
DS	**Overall Entrainment Risk**	**Low**	Same as above.

Table 2: Risk of entrainment into the central Delta and export facilities for Longfin Smelt in the Sacramento River and confluence:

Species and life stage	**Risk type**	**Risk level**	**Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)**
LFS larvae and juveniles	Exposure Risk (Hydrology)	NA	Conditions are suitable for spawning, and spawning has likely started, however no larvae or ripe adults have been detected yet (sampling for larvae began 12/5).
LFS sub-adults and adults	Routing Risk (Behavior and life history)	Low	Conditions are suitable for spawning, and spawning has likely started. Staging downstream of X2 is continuing. Additionally, FCCL reported a mature male expressing milt was collected in the Lower Sacramento River near Sherman Island by the Broodstock Collection Effort. There were increased detections last week in Chipps Island especially of adult LFS.
LFS	**Overall Entrainment Risk**	**Low**	Same as above.

Section 1-B: Central Delta

Table 3: Risk of entrainment into the export facilities for Delta Smelt in the central Delta:

Species and life stage	**Risk type**	**Risk level**	**Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)**
DS subadults and adults	Exposure Risk (Hydrology)	Low	No subadults or adults have been detected in the Central Delta in field surveys.

Table 4: Risk of entrainment into the export facilities for Longfin Smelt in the central Delta:

Species and life stage	Risk type	Risk level	Rationale (turbidity, exports, OMR level, X2, Q west, temperature, distribution etc.)
LFS sub-adults and adults	Exposure Risk (Hydrology)	Low	No subadults or adults have been detected in the Central Delta in field surveys.

- 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: Risk remains low, though two fish were detected by EDSM in the lower Sacramento River in early November, indicating that staging may be starting soon. The DS Experimental Release occurred on 11/30/22 and released a total of 13,140 DS in the Sacramento River near Rio Vista.
    - LFS: Risk remains low, conditions are suitable for spawning. Presence of adults is increasing in Chipps Island Trawl.
- 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) 8.3.1 and 8.3.3 are active but not triggered.

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.

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 went into effect December 1st. The Smelt Monitoring Team (SMT) conducted a Risk Assessment based on COA 8.1.5.2.

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

8.3.3: No adult LFS have been salvaged. The FMWT LFS index for September through November is 321, therefore the salvage threshold to trigger this COA is 32 LFS until it is updated to include the December 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. Delta Cross Channel [DCC] gate closure and actions such as integrated early winter pulse protection, etc.)*
    - DCC is closed as of 11/28/22.
    - OMR management has not been initiated.
- Controlling Factors: Water Quality
- Water Temperature:
    - Clifton Court Forebay (CCF) Daily Average Water Temperature = NA
    - 3 Station Average = 10.51°C
- Tidal Cycle: Spring tide peaks 12/7/22.
- Turbidity:
    - 8.3.1 Freeport 3-day average = 4.27 formazin nephelometric units (FNU)
    - 8.5.1 Old River at Bacon Island (OBI) Turbidity = 2.51 FNU
- Salinity: X2 > 81 km, estimated at 96.1 km for Sacramento River as of 12/05/22, and 98.4 km for San Joaquin River as of 12/03/22.
- 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 to 2,000 cfs
    - Jones: 800 to 1,800 cfs
- Meteorological Forecast: Showers and a few thunderstorms on Monday, tapering off on Tuesday, and dry at mid-week. Precipitation returns at the end of the week.
- Storm Event Projection: NA

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

- DCC Gates position: Scheduled to remain closed for seasonal operation. Adjustments could be necessary to respond to real-time salinity conditions
- Sacramento River flow at Freeport: 10,417.42 cfs
- San Joaquin River flow at Vernalis: 799.88 cfs
- Qwest: 6,595 cfs
- OBI Turbidity: 2.51 FNU
- NDOI: 14,729 cfs
- Upstream releases:
    - Keswick = 3,250 cfs. No anticipated changes.
    - Nimbus = 1,300 cfs. No anticipated changes.

- Goodwin = 200 cfs. No anticipated changes.
- Oroville = 1,400 cfs. Anticipated Weekly Range of Releases: 1,400 cfs to 950 cfs

Table 5: Comparison of OMR and OMR Index (5-day and 14-day averages for OMR Index and USGS gauge were reported on SacPAS website, accessed 06 December 2022.

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
12/2/2022	Daily	-823	-1,120
12/2/2022	5-day	-1,040	-1,200
12/2/2022	14-day	-1,840	-1,650

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: One subadult DS (Fork-length (FL): 55mm) and one adult DS (FL: 62mm) were detected in lower Sacramento River on November 3rd and 7th respectively.
- Fall Mid-water Trawl (FMWT) Index for Delta Smelt: November Index: 0
- Delta Smelt life cycle model (LCM) discussion: NA
- Biological Conditions: NA
- % of population in Delta zones: NA
- Smelt Larva Survey (SLS) or 20mm Survey: SLS sampling began 12/5/2022.
- Salvage: No DS have been salvaged at either facility this water year.

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

- FMWT Index: November Index = 53
  - September to November Index = 321
- Other Surveys:
  - EDSM: 20 sub-adult LFS (FL: 42-73mm) and four adult LFS (FL: 85-104mm) were detected in Suisun Marsh and Lower Sacramento River during the week of November 28th- December 2nd (Table 1).
  - Chipps Island Trawl: 36 sub-adult LFS (58-82mm) and 26 adult LFS (FL: 85-115mm) were detected during the week of November 28th- December 2nd (Table 2).
  - Bay Study: In September, 36 sub-adult LFS (20-84mm) were detected from south of Bay Bridge (station 110) to San Pablo Bay (station 322). Distribution shifted further upstream in October with 47 sub-adult LFS (FL: 20-84mm) and five adult LFS (FL: 86-97mm) detected from near the San Mateo Bridge (station 101) to the lower

Sacramento River (station 750). In November, the center of distribution continued to move upstream from Central Bay to San Pablo and Suisun Bay with a total of 73 sub-adult LFS (FL: 20-84mm) and three adult LFS (FL: 87-89mm) detected.

- Salvage: No LFS have been salvaged at either facility this water year.

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

Notes:

- LFS catch increased substantially at Chipps Island last week, especially adult catch. This is a good indication that the spawning migration has likely started.
- The rain event from last Thursday and the weekend did not trigger the First Flush.

Attachments: Table 1: EDSM Catch Table and Table2: Chipps Island Trawl Catch Table

Table 1: DS and LFS catch for EDSM 2022 Phase 3 Kodiak trawls November 28th- December 2nd. Only stations with catch of these species are reported here. FCCL = Fish Conservation and Culture Lab. These data are preliminary and subject to change.

Date	Stratum	Subregion	Station Code	Species	Mark Type	Fork Length	Total Catch	Disposition
11/28/2022	Suisun Marsh	Grizzly Bay	23-18-SM02	LFS	None	59	1	Released
11/28/2022	Suisun Marsh	Grizzly Bay	23-18-SM02	LFS	None	65	1	Released
11/28/2022	Suisun Marsh	Grizzly Bay	23-18-SM02	LFS	None	68	1	Released
11/28/2022	Suisun Marsh	Grizzly Bay	23-18-SM02	LFS	None	69	1	Released
11/28/2022	Suisun Marsh	Grizzly Bay	23-18-SM02	LFS	None	70	1	Released
11/28/2022	Suisun Marsh	Grizzly Bay	23-18-SM02	LFS	None	85	1	FCCL
11/28/2022	Suisun Marsh	Grizzly Bay	23-18-SM02	LFS	None	95	1	FCCL
11/28/2022	Suisun Marsh	Suisun Marsh	23-18-SM07	LFS	None	42	2	Released
11/28/2022	Suisun Marsh	Suisun Marsh	23-18-SM07	LFS	None	45	3	Released
11/28/2022	Suisun Marsh	Suisun Marsh	23-18-SM07	LFS	None	46	1	Released
11/29/2022	Lower Sacramento	Lower Sacramento	23-18-LSR01	LFS	None	104	1	FCCL
11/29/2022	Suisun Marsh	Grizzly Bay	23-18-SM05	LFS	None	61	1	Released
11/29/2022	Suisun Marsh	Grizzly Bay	23-18-SM05	LFS	None	66	1	Released
11/29/2022	Suisun Marsh	Grizzly Bay	23-18-SM06	LFS	None	68	1	Released
11/29/2022	Suisun Marsh	Grizzly Bay	23-18-SM06	LFS	None	73	1	Released
11/29/2022	Suisun Marsh	Suisun Marsh	23-18-SM04	LFS	None	65	1	Released
11/29/2022	Suisun Marsh	Suisun Marsh	23-18-SM04	LFS	None	67	1	Released
11/29/2022	Suisun Marsh	Suisun Marsh	23-18-SM04	LFS	None	70	1	Released
11/29/2022	Suisun Marsh	Suisun Marsh	23-18-SM04	LFS	None	71	1	Released
11/29/2022	Suisun Marsh	Suisun Marsh	23-18-SM04	LFS	None	72	1	Released
11/29/2022	Suisun Marsh	Suisun Marsh	23-18-SM04	LFS	None	92	1	FCCL

Table 2: LFS catch for Chipps Island Trawls November 28th- December 2nd. These data are preliminary and subject to change.

Date	Station Code	Species	Mark Type	Fork Length	Total Catch	Disposition
11/28/2022	SB018M	LFS	None	65	1	Released
11/30/2022	SB018M	LFS	None	100	1	Released
11/30/2022	SB018M	LFS	None	98	1	Released
11/30/2022	SB018M	LFS	None	103	1	Released
11/30/2022	SB018N	LFS	None	64	1	Released
11/30/2022	SB018N	LFS	None	74	1	Released
11/30/2022	SB018N	LFS	None	98	1	Released
11/30/2022	SB018N	LFS	None	65	1	Released
11/30/2022	SB018N	LFS	None	72	1	Released
11/30/2022	SB018N	LFS	None	74	1	Released
11/30/2022	SB018N	LFS	None	102	1	Released
11/30/2022	SB018N	LFS	None	102	1	Released
11/30/2022	SB018N	LFS	None	110	1	Released
11/30/2022	SB018S	LFS	None	101	1	Released
11/30/2022	SB018S	LFS	None	112	1	Released
12/2/2022	SB018N	LFS	None	59	1	Released
12/2/2022	SB018N	LFS	None	66	1	Released
12/2/2022	SB018N	LFS	None	68	2	Released
12/2/2022	SB018N	LFS	None	71	1	Released
12/2/2022	SB018N	LFS	None	72	1	Released
12/2/2022	SB018N	LFS	None	73	2	Released
12/2/2022	SB018N	LFS	None	81	1	FCCL
12/2/2022	SB018N	LFS	None	95	1	FCCL
12/2/2022	SB018N	LFS	None	104	1	FCCL
12/2/2022	SB018N	LFS	None	105	1	FCCL
12/2/2022	SB018N	LFS	None	110	1	FCCL
12/2/2022	SB018N	LFS	None	111	1	FCCL
12/2/2022	SB018N	LFS	None	58	1	Released
12/2/2022	SB018N	LFS	None	70	1	Released
12/2/2022	SB018N	LFS	None	75	1	Released
12/2/2022	SB018N	LFS	None	98	1	FCCL
12/2/2022	SB018N	LFS	None	99	1	FCCL
12/2/2022	SB018N	LFS	None	100	1	FCCL
12/2/2022	SB018N	LFS	None	62	1	Released
12/2/2022	SB018N	LFS	None	63	1	Released
12/2/2022	SB018N	LFS	None	65	2	Released
12/2/2022	SB018N	LFS	None	68	1	Released
12/2/2022	SB018N	LFS	None	69	1	Released
12/2/2022	SB018N	LFS	None	71	1	Released
12/2/2022	SB018N	LFS	None	72	2	Released
12/2/2022	SB018N	LFS	None	73	2	Released
12/2/2022	SB018N	LFS	None	74	1	Released
12/2/2022	SB018N	LFS	None	75	1	Released
12/2/2022	SB018N	LFS	None	76	1	Released
12/2/2022	SB018N	LFS	None	85	1	FCCL

Date	Station Code	Species	Mark Type	Fork Length	Total Catch	Disposition
12/2/2022	SB018N	LFS	None	86	1	FCCL
12/2/2022	SB018N	LFS	None	92	1	FCCL
12/2/2022	SB018N	LFS	None	113	1	FCCL
12/2/2022	SB018N	LFS	None	115	1	FCCL
12/2/2022	SB018M	LFS	None	66	1	Released
12/2/2022	SB018M	LFS	None	68	1	Released
12/2/2022	SB018M	LFS	None	71	1	Released
12/2/2022	SB018M	LFS	None	82	1	FCCL
12/2/2022	SB018M	LFS	None	98	2	FCCL
12/2/2022	SB018M	LFS	None	103	1	FCCL
12/2/2022	SB018M	LFS	None	105	1	FCCL