

PARTICIPANTS

- California Department of Fish and Wildlife (CDFW)
- California Department of Water Resources (DWR)
- State Water Resources Control Board (SWRCB)
- U.S. Bureau of Reclamation (USBR)
- U.S. Fish and Wildlife Service (USFWS)
- Kearns & West (KW)

ACTION ITEMS

- CDFW may develop a small series of pre-season workshops for Smelt Monitoring Team (SMT) members to support a shared understanding of topics related to the team. Suggested topics include Particle Tracking Models and interpretation of entrainment considering conflicting survey and salvage data. SMT members should send any topic requests to CDFW.

MEETING SUMMARY

Updates on Action Items

- USFWS initiated work on a regression analysis of state and federal facility Longfin Smelt (LFS) salvage data, but additional clarification is needed regarding hydrology.
- The SMT will address the continuation of qualitative larval sampling at an upcoming meeting given the next round of updates from fish surveys.

PART 1: Updates on Water Operations and Biological Updates

Relevant Actions & Triggers

USBR reported on Old and Middle River (OMR) management measures. Under Larval and Juvenile Delta Smelt (DS) action, if QWEST is negative and larval or juvenile DS are within the entrainment zone of the pumps based on real-time sampling run hydrodynamic models and forecasts of entrainment to estimate the percentage of larval and juvenile DS that could be entrained and if necessary, manage exports to limit entrainment to be protective based on the modeled recruitment levels. Under the end of OMR Management action, OMR criteria may control operations until June 30th or until the daily mean water temperature at Clifton Court Forebay (CCF) reaches 77° F for three consecutive days. CDFW reported on the Incidental Take Permit (ITP) Conditions of Approval (COA) that are in effect including 8.4.2 Larval and Juvenile LFS Entrainment Protection, 8.5.2 Larval and Juvenile DS Protection, and 8.12 Barker Slough Pumping Plant Longfin and Delta Smelt Protection.

Proposed Action

OMR Management Measures	Requirement	Time Frame	Trigger	Triggered?
Integrated Early Winter Pulse Protection (“First Flush” Turbidity Event)	Reduce exports for 14 consecutive days so that the 14-day averaged OMR index for the period shall not be more negative than -2,000 cfs	Dec 1 to Jan 31	(1) Running 3-day average of daily flows at Freeport >25,000 cfs; and (2) Running 3-day average of daily turbidity at Freeport ≥50 Nephelometric Turbidity Units (NTU ¹); or (3) Real-time monitoring indicates a high risk of migration and dispersal into areas at high risk of future entrainment or a spent DS has been collected in monitoring surveys.	Triggered 12/18/21; last day of action was 1/2/22
OMR Management	Manage to a more positive OMR than -5,000 cfs	From the onset of OMR management to the end		In effect
Turbidity Bridge Avoidance (“South Delta Turbidity”)	If the daily average turbidity at Bacon Island cannot be maintained less than 12 NTU, manage exports to achieve an OMR no more negative than -2,000 cfs until the daily average turbidity at Bacon Island drops below 12 NTU.	After the first flush or Feb 1 (whichever comes first) and until a ripe or spent female is detected or April 1 (whichever is first)	Average daily turbidity in Old River at Bacon Island (OBI) at a level of more than 12 NTU.	Triggered on 1/3/22; Off-ramped by SKT 3 on 3/17/22
Larval and Juvenile Delta Smelt	Run 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 necessary, manage exports to limit entrainment to be protective based on the modeled recruitment levels.	On or after March 15 of each year until off-ramp criteria are met	If QWEST is negative AND larval or juvenile DS are within the entrainment zone of the pumps based on real-time sampling of spawning adults or young of year life stages	In effect

¹ The current instrumentation measures turbidity in Formazin Nephelometric Units (FNU).

OMR Management Measures	Requirement	Time Frame	Trigger	Triggered?
End of OMR Management	OMR criteria may control operations until June 30 (for DS and Chinook salmon), until June 15 (for steelhead/rainbow trout), or when the species-specific off ramps have occurred, whichever is earlier.	During OMR management to June 30, or when the DS temperature off ramp has been reached.	DS: when the daily mean water temperature at CCF reaches 77°F for 3 consecutive days	In effect

IIP Conditions of Approval

Condition of Approval	Requirement	Time Frame	Trigger	Triggered?
8.1.5.2 (Smelt Monitoring Team Risk Assessment)	Outlines contents for weekly risk assessments of DS and LFS required under 8.1.5 and 8.1.1	Nov 1 st through June 30 th or until off-ramped by 8.8		Triggered
8.3.1 (Integrated Early Winter Pulse Protection)	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 SMT within one day of triggering. 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.	Dec 1 to Jan 31	3-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 FNU OR The SMT 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.	Triggered 12/18/21; last day of action was 1/2/22

Condition of Approval	Requirement	Time Frame	Trigger	Triggered?
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 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 if: Cumulative expanded salvage, Dec 1 st through Feb 28 th , exceeds most recent Fall Midwater Trawl (FMWT) Index divided by 10, or SMT determines that there is a high risk of entrainment.	Dec 1 through Feb 28 th	Salvage threshold for WY 2022 is one.	Off-ramped due to trigger of 8.3.1
8.4.1 (OMR Management for Adult Longfin Smelt)	The SMT shall conduct weekly risk assessments and decide whether to recommend an OMR flow requirement to minimize entrainment of adult LFS. The SMT may provide advice to restrict south Delta exports for seven consecutive days to achieve a seven-day average OMR index within three risk categories: Low risk: OMR between -4,000 cfs to -5,000 cfs Medium risk: OMR between -2,500 cfs to -4,000 cfs High risk: OMR between -1,250 cfs to -2,500 cfs	Onset of OMR management through Feb 28 th	SMT recommendation based on weekly risk assessment	Off-ramped by larval detections in Smelt Larval Survey (SLS) 12
8.4.2 (Larval and Juvenile Longfin Smelt Entrainment Protection)	If triggered, it will restrict south Delta exports for seven consecutive days in order to maintain a seven-day average OMR index no more negative than -5,000 cfs and convene the SMT to recommend an OMR flow limit between -1,250 and -5,000 cfs.	January 1 st through June 30 th or until the temperature offramp occurs	(1) LFS larvae or juveniles are found in four or more of the 12 SLS or 20 mm stations in the central or south Delta, Or (2) LFS catch per tow exceeds five larvae or juveniles in two or more of the 12 stations in the central or south Delta. The relevant stations are: 809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918 and 919	Triggered 1/20/22, 1/31/22, 2/28/22, 3/11/22, 3/29/22, 4/11/22, and 4/26/22

Condition of Approval	Requirement	Time Frame	Trigger	Triggered?
8.4.3 High flow offramp for Longfin Smelt	If triggered, Conditions of Approval 8.4.1 and 8.4.2 are not required or would cease if previously required.	Throughout OMR management	When river flows are (a) greater than 55,000 cfs in the Sacramento River at Rio Vista or (b) greater than 8,000 cfs in the San Joaquin River at Vernalis. If flows subsequently drop below 40,000 cfs in the Sacramento River at Rio Vista or below 5,000 cfs in the San Joaquin River at Vernalis, the OMR limit previously required as a part of Conditions of Approval 8.4.1 and 8.4.2 shall resume.	Active, Not Triggered
8.5.1 Turbidity Bridge Avoidance	Maintain daily average turbidity at OBI at a level of less than 12 NTU. If the daily average turbidity at OBI is greater than 12 NTU, Permittee shall restrict south Delta exports to achieve an OMR flow that is no more negative than -2,000 cfs until the daily average turbidity at OBI is less than 12 NTU.	After the first flush or Feb 1 until end of OMR management or until CDFW agrees that the action may be ended or modified.	Turbidity at OBI > 12 FNU	In effect as of 1/3/22; off-ramped April 1 st .

Condition of Approval	Requirement	Time Frame	Trigger	Triggered?
8.5.2 (Larval and Juvenile Delta Smelt Protection)	If triggered, this Condition of Approval will restrict south Delta exports for seven consecutive days in order to maintain a seven-day average OMR index no more negative than -5,000 cfs and SMT members will meet to assess the risk of entrainment. The SMT may provide further advice to restrict exports in order to maintain an OMR index more positive than -5,000 cfs. In their assessment, SMT members will determine if risk of entrainment is low, medium, or high; subsequent OMR restrictions will be based on level of risk. Furthermore, if salvage of DS exceeds 11 in three days, this Condition of Approval will restrict south Delta exports for seven consecutive days in order to maintain a seven-day average OMR index no more negative than -3,500 cfs.	Nov 1 st through June 30 th or until off-ramped by 8.8	When the five-day salvage of juvenile DS is greater than or equal to one plus the average prior three years' FMWT index (rounded down). The 2021 FMWT index for DS was zero.	Active, not triggered
8.8 (End of OMR Management)	If triggered, OMR Management would be off-ramped for LFS and DS.	From the onset of OMR management through June 30 th	Daily mean water temperature at CCF is >25° C for three consecutive days.	Not active
8.12 (Barker Slough Pumping Plant Longfin and Delta Smelt Protection)	Barker Slough Pumping Plant will reduce exports so the maximum 7-day average is <60 cfs.	From January 15 through March 31 in dry and critical water years for LFS, and from March 1 st through June 30 th for DS	Larval Smelt are detected at SLS Station 716 during the period identified for each species, and/or when recommended by the SMT	Active, Triggered for LFS 2/14/22, 3/11/22, and DS on 3/23/22

Current Operations & Outlook

USBR and DWR shared operations updates from the Outlook. Their observations included:

- Releases from Whiskeytown Dam on Clear Creek are currently 200 cfs. No changes expected for the next seven-day period.

- Releases from Keswick Dam on the Sacramento River are currently 3,500 cfs. Flows may increase with higher temperatures.
- Releases from Nimbus Dam on American River flow are 1,500 cfs and holding.
- Releases from Goodwin Dam on the Stanislaus River are currently 500 cfs with no changes expected for the next seven-day period. The spring pulse flow has concluded.
- Federal facility exports are at 900 cfs with no changes expected for the week ahead.
- Delta Cross Channel gates are closed and will remain so through May 20th with the possibility of opening on the 27th.
- DWR reported that Feather River releases are 2,200 cfs.
- Freeport flows are around 8,100 cfs and will likely fluctuate just slightly over the next few days with pressure driven tidal effects.
- San Joaquin flows at Vernalis were 712 cfs on May 16th and will remain steady.
- State facility exports are 600 cfs as of May 17th. The outage at Banks Pumping Plant began as planned on Sunday the 15th. Over the week, flows will fill the storage space at CCF which should reach 0 feet of elevation by Thursday May 19th.
- Delta outflows were 4,800 cfs on May 17th and will increase to about 5,500 cfs later in the week depending on tidal effects.
- As of May 16th, QWEST was 100 cfs and will remain near 0 cfs plus or minus 500 cfs for the week ahead.
- The daily OMR Index is near -1,600 cfs and will remain variable with San Joaquin flows.
- X2 is upstream of Collinsville.
- Rio Vista flow will be in the 5,000 to 6,000 cfs range this week.
- DWR clarified that Banks Pumping Plant and the fish facility are offline so no water will be pumped out of CCF. Water will instead remain in CCF storage.
- CDFW inquired if the gates will be operated as normal during the Banks and fish facility shutdown to keep the water level up in CCF. DWR noted that the gates will be closed during daylight hours for the first few days as dives commence, otherwise they will generally be operated as normal.
- The SMT updated the survey table to reflect that Spring Kodiak Trawl (SKT) has concluded for the season.
 - CDFW added that this is the last week the Larval Entrainment Pilot Study (LEPS) will be on the water.

Review of Environmental Conditions and Survey Updates

CDFW delivered catch updates on relevant surveys to the SMT.

- 20 mm Survey 5 is on the water this week.
- 20 mm survey 4 was on water May 2nd to the 5th.
 - Additional LFS detections were found in Suisun Marsh, the lower Sacramento River, and the confluence.
- Updated 20 mm Survey 2 detections are updated below:
 - There are now only two DS detections after QC, down from 24 preliminarily reported previously:
 - Station 726: One
 - Station 902: One
 - Additional LFS were detected in Suisun Bay, Suisun Marsh, the confluence, and Sacramento River system.
- SKT results for the week of May 9th are as follows:
 - Young of year LFS:

- Station 405: 1
 - Station 602: 30
 - Station 606: 20
 - Station 609: 6
 - Station 610: 31
 - Station 704: 2
 - Station 706: 2
- Wakasagi:
 - Station 706: 1
 - Station 920: 1
- No DS were detected.
- CDFW clarified for DWR that the DS detections for the season have shifted dramatically for four primary reasons:
 1. Most of the data are shared when they are still preliminary and have not been quality controlled yet. Except for the 12 central and south delta stations and 716, which are usually quality controlled before data is shared.
 2. CDFW is currently training new staff on proper identification methods.
 3. There are simply more DS in the system given the experimental release which has resulted in identification challenges.
 4. Most of the DS detected so far are small and difficult to identify.
- DWR shared that genetic identification results confirmed that the three Fish Restoration Program (FRP) larvae are Wakasagi, not DS.
- USBR shared that the ICF DS detection from a few weeks ago is formalin fixed and has not been genetically tested yet.

USFWS provided catch updates on the Enhanced Delta Smelt Monitoring (EDSM) Program and Chipps Island Trawl.

- EDSM sampled all planned sites.
 - There were six new detections since last week with four of the six confirmed and two pending. Fish lengths ranged from 23.7 to 31.6 mm.
 - Over 70 LFS were detected in the Suisun Bay, Suisun Marsh, and Lower Sacramento stratum.
- The weekly abundance estimate for the week of May 2nd to the 5th is 9,493 based on the detection of three DS in the Sacramento Deep Water Shipping Channel.
- Last week concluded the run of five-day long Chipps Island Trawl surveys. The team was not able to sample on Sunday the 8th due to high winds so a make-up tow was completed the following Wednesday.
 - One LFS was detected.
 - This week marks the start of three-day long surveys.

CDFW provided a salvage and qualitative larval sampling update (May 10th to the 16th).

- No LFS larvae or DS detected at either facility.
- Weekly salvage of LFS ≥20 mm:
 - Federal Facility: 20
 - Salvage occurred May 10th, 13th, and 14th.
 - State Facility: 471
 - Salvage occurred every day of the week.
 - Weekly total for both facilities: 491

- The seasonal total LFS juvenile salvage is 7,218 for both state and federal facilities.
- CDFW highlighted that last week's salvage represents 6.8% of the annual salvage to date.
- The salvage over the Fall Mid Water Trawl Index is now 22.3 which is approaching 2021 levels.

USBR shared environmental data updates as of May 16th.

- Three-station daily average water temperature: 19.80° C.
- CCF daily average temperature: 20.25° C.
- Current daily average turbidity at OBI: 5.29 FNU
- Current turbidity at OBI: 2.49 FNU.
- X2 is at 82 km.
- The weather forecast out of Antioch is hot and dry with temperatures reaching 96° F and no precipitation expected. Light winds will approach from the west.
- The weather forecast out of Stockton is hot and dry with temperatures reaching 100° F and no precipitation expected. Light winds from the west to northwest.

PART 2: Open Discussion on Species Status (Structured-Unstructured Time)

The SMT discussed the implications of the current three-station average temperature of 19.80° C on DS spawning. USBR noted this temperature falls outside of the 9 to 18° C range set by [Damon et al., 2016](#) on wild DS fecundity (n=129). CDFW noted that the three-station daily average temperature includes Mossdale, which tends to be warmer than many other parts of the system, and while it may be too warm for spawning in one region of the delta that does not mean spawning has ceased for all parts of the system. The most recent detection of a DS larvae (12 mm) was April 7th. The SMT concluded that at this point it is best to avoid speaking in absolutes and instead acknowledge that spawning is winding down for the water year.

USBR shared a link to [historical DS sampling](#) data on SacPAS for members to look at as a proxy for when DS spawning concludes.

DWR shared a resource on [spawning temperatures](#). USFWS referenced work by [Bennett \(2005\)](#) and [Brown et al. \(2016\)](#), commenting that it is also important to consider the spawning window, especially this year when spawning may be delayed by relatively cool temperatures, unlike some previous drought years.

CDFW noted that LFS are in the same situation as last week given no new distribution data and no significant change in conditions. SKT results suggest that adult/sub-adult fish are further downstream, and 20 mm Survey 4 indicates low detections at the two most downstream stations in the central and south Delta. Unfortunately, salvage was still significant last week, accounting for about 7% of the annual total.

USFWS and CDFW agreed that the elevated salvage last week highlights the need to consider triggers beyond those based on surveys for LFS in future permits. Current conditions with CCF filled this week but not being pumped out, will result in increased residence time resulting in increased pre-screen loss which may complicate and underrepresent the use of salvage totals as an index of entrainment for the year.

CDFW shared updated graphs of salvage data with exports and OMRI, during 2020 to 2022. DWR noted the weekly salvage totals appear to be declining for the last four weeks.

The SMT did not make a recommendation for LFS this week as COA 8.4.2 was not triggered.

PART 3: Live-edit Assessments

Proposed Action Weekly Evaluation of Delta Smelt, including Distribution, Abiotic Conditions, Risk Assessment Questions, and Executive Summary

USBR reviewed proposed changes to the PA Assessment, which include the latest dates, detections, and data as well as:

- Language for the abundance estimate was updated from larval to juvenile DS.
- Evaluation question three was updated to note that SKT surveys for WY 2022 have concluded.
- Evaluation question eight was revised to clarify that if there are DS in the OMR corridor they are at an increased likelihood of entrainment and text referencing a detection from early April was removed.
- Language was added throughout the document to note that spawning is likely winding down due to increased water temperatures in certain regions of the system.

ITP Longfin Smelt Risk Assessment

The SMT reviewed and discussed updates to the ITP Risk Assessment for LFS, which include the latest dates, detections, and data as well as:

Advice to WOMT:

Text was added to explain that the SWP outage may increase pre-screen loss resulting in unaccounted losses.

Section 1-A: Risk of entrainment into the central Delta and export facilities for DS and LFS in the Sacramento River and Confluence

- Exposure Risk (hydrology)
 - DS: No changes in risk since last week. Language was added to note elevated water temperatures are approaching the upper thermal limit for spawning which likely indicates spawning starting to wind down for the season.
 - LFS: No changes in risk since last week.
- Routing Risk (behavior and life history)
 - DS: No changes in risk since last week. Updated to acknowledge elevated water temperatures.
 - LFS: No changes in risk since last week. Removed language on larvae not exhibiting swimming behaviors that would result in volitional movement as the most recently detected fish are large enough to swim.
- Overall entrainment risk for DS or LFS.
 - DS: No changes since last week.
 - LFS: No changes since last week.

Section 1-B: Risk of entrainment into the export facilities for DS and LFS in the central Delta

- Exposure Risk
 - DS:
 - Adults and sub-adults: No changes in risk since last week.
 - Juveniles: No changes in risk since last week.
 - Larvae: No changes to risk since last week.
 - LFS:
 - No changes to adult risk since last week. Language added to clarify declining detections.
 - No changes since last week for larvae and juveniles in the lower San Joaquin River.

- No changes in risk since last week for larvae and juveniles in the OMR corridor. Updated language specifying that larvae were not detected in the qualitative larval sampling at either facility last week and salvage is slowly starting to decrease.
- Change in exposure from last week
 - DS: No changes since last week.
 - LFS: No changes since last week.
- The executive summary for LFS notes increasing water temperatures and decreasing likelihood of spawning.

Part 4: Additional Considerations/Discussion

Agencies reported no items for elevation to WOMT.