

# Smelt Monitoring Team – Tuesday, May 4, 2021

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## PARTICIPANTS

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

## ACTION ITEMS

- CDFW will share an update on 20-mm Survey 4 catch data at the end of the week.
- CDFW will develop a visualization of historic salvage patterns to present at the next Smelt Monitoring Team (SMT) meeting.

## MEETING SUMMARY

### PART 1: Updates on Water Operations and Biological Updates

#### Relevant Actions & Triggers

USBR reported on the Old and Middle River (OMR) management measures currently in effect and whether they have been triggered; CDFW reported on the Incidental Take Permit (ITP) Conditions of Approval that are currently in effect and whether they have been triggered. The descriptions below are intended as summaries and do not provide all the details related to each action or trigger. For full descriptions, please see the OMR guidance document or ITP as relevant.

Starting today (May 4<sup>th</sup>), USBR will begin reporting water temperatures at Clifton Court Forebay to help the SMT determine if the “End of OMR management” action in USBR’s Proposed Action (PA) and ITP Condition of Approval 8.8 should be triggered. CDFW reported they will use data from CDEC Station CLC to evaluate this Condition of Approval.

#### Proposed Action

OMR Management Measures	Requirement	Time Frame	Trigger	Active? 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 three-day average of daily flows at Freeport >25,000 cfs; and (2) Running three-day average of daily turbidity at Freeport ≥50 Nephelometric Turbidity Units (NTU <sup>1</sup> ); or	Not active; Not triggered

<sup>1</sup> The current instrumentation measures turbidity in Formazin Nephelometric Units (FNU).

OMR Management Measures	Requirement	Time Frame	Trigger	Active? Triggered?
			(3) Real-time monitoring indicates a high risk of migration and dispersal into areas at high risk of future entrainment or a spent Delta Smelt (DS) has been collected in monitoring surveys.	
OMR Management	Manage to a more positive OMR than -5,000 cfs	From the onset of OMR management to the end		Yes (initiated on 1/1/2021 for salmon)
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.	Off-ramped; not triggered
Larval and Juvenile DS	Run hydrodynamic models and forecasts of entrainment, informed by the Enhanced Delta Smelt Monitoring (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	Active; not triggered
End of OMR Management	OMR criteria may control operations until June 30 (for Delta Smelt 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 Clifton Court Forebay reaches 77°F for 3 consecutive days	Not triggered

TTP Conditions of Approval

Condition of Approval	Requirement	Time Frame	Trigger	Active? Triggered?
8.1.5.2 (Smelt Monitoring Team Risk Assessment)	Outlines contents for weekly risk assessments of DS and Longfin Smelt (LFS) required under 8.1.5 and 8.1.1	Nov 1 <sup>st</sup> through June 30 <sup>th</sup> or until off-ramped by 8.8		Yes
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 Smelt Monitoring Team (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	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 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.	Not active
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 <sup>st</sup> through Feb 28 <sup>th</sup> , 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 <sup>th</sup>	Salvage threshold is three LFS for WY 2021.	Not active
8.4.1 (OMR Management for Adult Longfin Smelt)				Off-ramped due to detection of Longfin Smelt larvae on December 28 <sup>th</sup>

Condition of Approval	Requirement	Time Frame	Trigger	Active? Triggered?
8.4.2 <sup>2</sup> (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 1st through June 30th or until the temperature offramp occurs	(1) LFS larvae or juveniles are found in four or more of the 12 Smelt Larval Survey (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 on 1/26, 2/2, 2/23, 3/9, 3/16, 3/30
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.	No
8.5.1 (Turbidity Bridge Avoidance)	Maintain daily average turbidity in Old River at Bacon Island (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 April 1st	Turbidity at OBI > 12 FNU	Off-ramped; not 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	Nov 1 <sup>st</sup> through June 30 <sup>th</sup> 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 threshold for this year is one.	Active; Not Triggered

<sup>2</sup> CDFW confirmed that the "average catch per tow > 5 larvae or juveniles" referred to by Condition 8.4.2 should be calculated as the average of the three tows done at each station, i.e., the total LFS reported at each station in the 20-mm Survey is divided by three to calculate average catch per tow. Also, the SMT should always use the most recent survey data to determine whether the Condition is triggered; if only partial data is available, they refer to the previous survey available.

Condition of Approval	Requirement	Time Frame	Trigger	Active? Triggered?
	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.			
8.8 (End of OMR Management)	If triggered, OMR Management would be off-ramped for Longfin and Delta Smelt.	From the onset of OMR management through June 30 <sup>th</sup>	Daily mean water temperature at Clifton Court Forebay is >25° C for three consecutive days.	No
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 <sup>th</sup> through March 31 <sup>st</sup> in dry and critical water years for LFS, and from March 1 <sup>st</sup> through June 30 <sup>th</sup> of dry and critical water years for DS	Larval Smelt are detected at SLS Station 716 during the period identified for each species, and/or when recommended by the SMT	Off-ramped for LFS; Active but not triggered for DS

## Current Operations & Outlook

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

- USBR Central Valley Office (CVO) reported that forecasted conditions continue to be dry and warming, with high winds and red flag warnings diminishing this evening. No precipitation is anticipated in the next seven days.
- Releases from Whiskeytown Dam on Clear Creek are currently 200 cfs but will increase later this week for the scheduled spring pulse flows.
- Releases on the Sacramento River from Keswick Dam are currently at 8,000 cfs and will increase to 8,500 cfs on Thursday.
- American River releases from Nimbus Dam are currently holding at 1,000 cfs.

- Releases from Goodwin Dam on the Stanislaus River are currently 225 cfs, as the spring pulse flow comes to an end. Releases will increase to 500 cfs starting tomorrow (May 5<sup>th</sup>) to meet Vernalis flow requirements.
- Jones Pumping Plant exports will remain at 800 cfs this week.
- The Delta Cross-channel Gates are currently closed, but the gates will be briefly opened several times tomorrow (May 5<sup>th</sup>) for testing. Following testing, the gates will remain closed until there is an opportunity for normal operations per the PA and D-1641 requirements on or after May 21<sup>st</sup>.
- DWR reported that Feather River releases from Oroville are currently 800 cfs and may increase later this week but the details around any potential changes are still uncertain.
- Sacramento River flows at Freeport are 5,200 cfs. DWR hopes this value will remain steady; upstream releases should help support flows at Freeport. San Joaquin flows at Vernalis are 1,000 cfs and will decrease to around 700 cfs in coming days as the spring pulse flow period comes to an end.
- Clifton Court exports are currently 400 cfs. If demand decreases later in the week, exports will decrease to 300 cfs; if demand increases, exports will remain at 400 cfs. DWR is targeting Delta outflows of 4,000 cfs and outflows were near 4,000 cfs yesterday (May 2<sup>nd</sup>).
- The OMRI is around -1,100 to -1,000 cfs and may become more negative later in the week.
- QWEST was near 500 cfs yesterday; as San Joaquin River flows decrease, QWEST will be near zero or become slightly negative.
- X2 is currently upstream of Collinsville (81 km). (See Review of Environmental Conditions and Survey Updates section for more details.)
- Construction of the South Delta temporary agricultural barriers has begun on the Middle River and Grantline Canal barriers (May 1<sup>st</sup>). Construction will begin on the Old River near Tracy barrier on May 7<sup>th</sup>.

CDFW asked if the shift to more negative OMRI values will be due solely to reduced flows at Vernalis or if changes in operations are considered to be a factor. DWR confirmed that exports at Clifton Court Forebay may increase by 100 cfs late this week or early next week but most of the change in OMRI will be in response to changes in San Joaquin River flows. DWR added that the OMRI will become more negative by 100 to 200 cfs (around -1,400 instead of -1,300 cfs) when the Grantline Canal agricultural barrier is closed.

## Review of Environmental Conditions and Survey Updates

CDFW shared survey updates.

- 20-mm Survey 4 began yesterday, sampling in the south and central Delta. Catch data is not yet available; CDFW will share updates with the SMT via email later this week.
- CDFW shared updates on catch data from Spring Kodiak Trawl (SKT) 5 (April 26<sup>th</sup> to 29<sup>th</sup>) with SMT members via email yesterday.
  - No DS were detected.
  - One adult LFS was detected in the Carquinez Strait.
  - A few hundred small juvenile LFS were detected in the Lower Sacramento River and downstream of the confluence. These fish were taken to the lab for confirmation.
- The Bay Study detected 22 LFS during their April survey.
  - Fish (66 to 107 mm) were detected at Chipps Island and other downstream locations.
  - The May survey will sample May 5<sup>th</sup> to 17<sup>th</sup>.

USFWS reported on the EDSM Program.

- EDSM Phase 2 (20-mm) sampled in all six strata Monday through Thursday last week (April 26<sup>th</sup> to 29<sup>th</sup>). Processing is nearly complete.

- One DS (56.0 mm) was detected on April 27<sup>th</sup> in the Sacramento Deep Water Ship Channel; this fish was reported during last week's SMT meeting and was confirmed to be a DS by USFWS staff via field identification and picture verification along with DWR's photometric tool. The fish was released.
- Two additional DS (25.5 and 28.1 mm) were detected on April 27<sup>th</sup> in the Sacramento Deep Water Ship Channel. These fish were identified in the lab and will be sent to DOP (Directed Outflow Project) at the end of the season.
  - This brings total DS detections by EDSM in Water Year 2021 to eight.
- USFWS will generate a life stage-specific DS abundance estimate when sample processing and identification are complete.
- 277 LFS were detected last week, bringing the total number of LFS identified by EDSM Phase 2 sampling to 1,582.
  - 217 LFS (8.1 to 30 mm) on April 26<sup>th</sup> in Suisun Marsh.
  - One LFS (9.4 mm) on April 26<sup>th</sup> in the Sacramento Deep Water Ship Channel.
  - 21 LFS (16.5 to 28.0 mm) on April 27<sup>th</sup> in Suisun Bay.
  - 38 LFS (9.0 to 23.0 mm) on April 29<sup>th</sup> in the lower Sacramento River.
- EDSM Phase 2 (20-mm) will continue its sampling this week (May 3<sup>rd</sup> to 6<sup>th</sup>).
- The Chipps Island Trawl caught zero DS and three LFS in the last week. The LFS were caught on April 29<sup>th</sup> (95 mm, no expression) and April 30<sup>th</sup> (84 and 94 mm, no expression).
- The Chipps Island Trawl is scheduled to sample five days this week.

*After the meeting, USFWS shared that the 28.1 mm fish captured on April 27<sup>th</sup> was confirmed as a Wakasagi. The updated total DS detections by EDSM in Water Year 2021 is seven.*

CDFW provided a salvage update (April 27<sup>th</sup> to May 3<sup>rd</sup>).

- No adult or larval DS were salvaged at either facility.
- 98 LFS (20 to 34 mm) were salvaged at the SWP, bringing the expanded salvage season total to 451 LFS.
- Zero LFS were salvaged at the CVP; the expanded salvage season total remains 176 LFS.
- Larval LFS under 20 mm were detected at both projects:
  - Two at the CVP (April 29<sup>th</sup>, 19 mm; May 2<sup>nd</sup> 18.5 mm).
  - One at the SWP (April 30<sup>th</sup>, 19.9 mm).

USBR shared water quality data (three-station average daily water temperature as of May 3<sup>rd</sup> was 19.11° C; daily average turbidity at Old River at Bacon Island (OBI) was 2.07 FNU and is currently 3.70 FNU). The seven-day weather forecast for Antioch is sunny to clear with WNW/W winds from 5 to 20 mph and gusts up to 25 mph; the seven-day weather forecast for Stockton is sunny and clear with NW/W winds from 6 to 15 mph and gusts up to 21 mph. The estimated Sacramento River X2 is 89.3 km. The estimated San Joaquin River X2 for today was not available; the estimated San Joaquin River X2 on May 3<sup>rd</sup> was 89.9 km. The water temperature at Clifton Court Forebay on May 3<sup>rd</sup> was 19.95° C (67.91° F); there have been zero days with temperatures >77° F).

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

CDFW shared several observations to inform the risk assessment for LFS:

- Figure 2 in [Jeffries et al. \(2016\)](#) illustrates the temperature distribution of 20-mm survey detections of LFS and DS. Current temperatures (~20° C) are at the upper range of LFS detections in this dataset (1995 to 2015) and detections of LFS will likely become rarer throughout the rest of this season.
- LFS tend to move out of the Delta at cooler temperatures than DS.

- Last year there were three peaks in LFS salvage; the final peak occurred around this time last year when water temperatures exceeded 20° C in Clifton Court Forebay.
- As temperatures increase, fish in locations such as Suisun Marsh are able to move out of the system, but the only likely exit route for fish in the south Delta within the OMR corridor and the only exit route for fish within Clifton Court Forebay is through the pumps. Therefore, CDFW hypothesizes that there will be a final pulse of LFS salvage this season as the water temperature in Clifton Court Forebay exceeds 20° C.
- Although the projected OMRI values for the upcoming week are within the range of potential SMT recommendations, no LFS have been detected near Clifton Court Forebay in the most recent distribution data (20-mm Survey 3). The only detections in the central and south Delta in 20-mm Survey 3 were at Station 809 (near Jersey Point).
- 20-mm Survey 3 will be used for this week's ITP Risk Assessment since 20-mm Survey 4 data is not yet available. Condition 8.4.2 for LFS has not been triggered by 20-mm Survey 3.

DWR noted that recent survey data (including SKT 5) indicates young-of-year LFS other than those in the south Delta are moving out of the system.

CDFW recommended the following:

- Retain language from the previous week's ITP Risk Assessment noting that a recommended OMRI limit from the SMT would not change the salvage trajectory.
- Provide a reference to the Jeffries et al. (2016) paper in the notes that indicates that temperatures are approaching a level at which LFS detections would be rare.
- Explain that preliminary SKT 5 catch data indicate young-of-year LFS have shifted downstream, and based on life history LFS are expected to move downstream to more brackish water at this time of year.

USFWS and DWR agreed.

CDFW also noted that no DS were observed in monitoring at Station 716, so no advice for Barker Slough is warranted.

USFWS noted that [Grimaldo et al. \(2009\)](#) reports total salvage of LFS, which peaks in May. Therefore, USFWS would not rule out additional salvage taking place in the coming weeks. CDFW agreed that additional salvage is to be expected as temperatures approach 20° C and clarified that the Jeffries et al. (2016) paper looks at the temperature distribution of LFS detections not salvage. CDFW offered to develop a visualization of historic salvage patterns for the next SMT meeting.

USBR noted that although there were two additional DS reported this week, conditions have not changed since last week.

*As noted above, USFWS confirmed after the meeting that only one additional DS was detected.*

## PART 3: Live-edit Assessments

### ITP Longfin Smelt Risk Assessment

CDFW updated the ITP assessment based on the discussion documented in Part 2 above.



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

USBR reviewed updates to the assessment, which were limited to minor changes in anticipated conditions in the Delta (including OMR Index, turbidity, X2, and QWEST values) as well as adding information on the two new DS detections from April 27<sup>th</sup>.

The group reviewed the relevant assessment questions: (1) Between December 1 and January 31, has any first flush condition been exceeded? (2) Do DS have a high risk of migration and dispersal into areas at high risk of future entrainment? (3) Has a spent female DS been collected? (4) If OMR of -2,000 cfs does not reduce daily average OBI turbidity below 12 NTU/FNU, what OMR target is deemed protective between -2,000 and -5,000 cfs? (5) If daily average OBI turbidity is greater than 12 NTU/FNU, what do other station locations show? (6) If daily average OBI is greater than 12 NTU/FNU, is a turbidity bridge avoidance action not warranted? What is the supporting information? (7) After March 15 and if QWEST is negative, are larval or juvenile DS within the entrainment zone of the CVP and SWP pumps based on surveys? (8) Based on real-time spatial distribution of DS and currently available turbidity information, should OMR be managed to no more negative than -3,500? (9) What do hydrodynamic models, informed by EDSM or other relevant data, suggest the estimated percentage of larval and juvenile DS that could be entrained may be?

- The responses to questions one through nine either did not change at all or were updated to reflect the latest dates, abiotic data, and survey detections.

USBR reviewed the Executive Summary:

- The SMT added language referencing the two new DS detections from April 27<sup>th</sup> and removed language referencing the DS detections on April 12<sup>th</sup> and 13<sup>th</sup>.

*Next week's PA assessment will be updated to reflect the post-meeting update from USFWS that confirmed one of the fish detected on April 27<sup>th</sup> as a Wakasagi.*

No non-consensus issues were identified.

### Additional Considerations/Discussion

Agencies reported no items for elevation to WOMT.