

## Salmon Monitoring Team (SaMT) Weekly Meeting

Conference call: 4/21/20 at 9:00 a.m.

### Executive Summary:

- No Delta Performance measures have been exceeded. SaMT does not anticipate any Delta Performance Thresholds to be exceeded during the next week.
  - The Delta Performance threshold with the highest potential for exceedance is the 50% of single year natural steelhead loss threshold for the period of April 1 through June 15.
    - Preliminary estimate indicates that current (4/19/20) steelhead loss (140 fish) is approximately 18% of the threshold (776 fish) set between April 1 and June 15.
  - It is unlikely, but possible, that the winter-run hatchery Chinook salmon threshold could be exceeded during the remainder of the Old and Middle River (OMR) management season.
    - There are no losses of hatchery winter-run Chinook salmon to date for this season.
    - Currently, most of salvaged salmonids at the Central Valley Project (CVP) and State Water Project (SWP) fish collection facilities appear to be of San Joaquin River basin-origin, instead of Sacramento River basin-origin. Winter-run Chinook salmon originate in the Sacramento River basin.
    - However, it would only require the observation of 4 hatchery winter-run Chinook salmon in salvage at the SWP, or 21 fish at the CVP to exceed this threshold.
  - Current exports are low. SaMT expects loss rates to remain low over the next week in response to the low export levels.

**Objective:** Provide information to the Water Operations Management Team (WOMT), the U.S. Bureau of Reclamation (Reclamation) and California Department of Water Resources (DWR) on measures to reduce adverse effects from Delta operations of the CVP and the SWP on salmonids and green sturgeon. SaMT notes will be posted to Reclamation's web page <https://www.usbr.gov/mp/bdo/salmon-monitoring-team.html>.

- **California Department of Fish and Wildlife (CDFW):** Geir Aasen, Adam Chorazyczewski, Kristal Davis-Fadtke, Kyle Griffiths, Kimberly Holley, Andrew Huneycutt, Brian Jones, Morgan Kilgour, Kenneth Kundargi, Duane Linander, Jonathan Williams
- **DWR:** Brittany Davis, Chris Cook, Bryant Giorgi, Kevin Reece, Reza Shahcheraghi, Ian Uecker, Farida Islam, Mike Ford
- **Kearns & West:** Matt Marvin
- **National Marine Fisheries Service (NMFS):** Kristin Begun, Jeff Stuart, Garwin Yip
- **Reclamation:** Towns Burgess, Elissa Buttermore, Suzanne Manugian, Ben Nelson, Tom Patton
- **State Water Resources Control Board (SWRCB):** Chris Carr, Erin Foresman, Michael Macon, Stanley Mubako, Craig Williams
- **US Fish and Wildlife Service (USFWS):** Katherine Sun

### Agenda Items:

1. Introductions (9:00-9:03)  
Purpose: Provide an accurate record of who is attending these calls

2. Relevant Actions and Triggers (9:04-9:08)  
Purpose: Review of relevant actions and triggers status and discuss any changes
3. Outlook, Current Operations, and Weather Forecast (9:09 – 9:17)  
Purpose: Review operations and weather sections on Weekly Outlook. Discuss Delta operations to consider context for evaluating Assessment questions about Delta operation effects
4. Review of Environmental Data (9:18-9:20).  
Purpose: Review environmental data to consider context for evaluating Assessment questions about Delta operations effects
5. Fish Abundance and Distribution (9:21-9:40)  
Purpose: Review fish monitoring data to inform fish distribution estimates, fish exposure, and behaviour cues that is part of the next section
  - a. Hatchery Releases
  - b. Historical Fish Monitoring Data
  - c. Fish Monitoring: RSTs/trawls/seines
  - d. Fish Monitoring: Salvage
  - e. Migration Status: Estimates of Fish Distribution
6. Fish Exposure and Behavioural Cues (9:41-9:56)  
Purpose: Assist in assessing entrainment risk of Delta operations on salmonids and sturgeon. Complete Evaluation section questions of the Assessment. Review draft assessment.
  - a. Historical Patterns (Comparison of abundance, timing, and loss to prior years)
  - b. Current Conditions (DSM2, Entrainment Models)
  - c. Sensitivity to Operational Actions - review assessment document
7. Other Topics (9:57-9:58)  
Purpose: Identify additional topics that are not in the regular agenda
8. Additional Considerations for WOMT (9:58-10:00)  
Purpose: Highlight information that SaMT would like WOMT to consider related to changes to Delta water operations
9. Next SaMT Meeting (10:00)

## **Agenda Item 2.**

### **Relevant Actions and Triggers Review**

#### **Delta Cross Channel (DCC) Gate Operations**

- DCC gates are closed per operations described in the SWRCB's D-1641, and Reclamation's Proposed Action 4.10.5.3 and are expected to remain closed until 5/20/20.

### **Old and Middle River (OMR) Flow Management**

- Implementation of this action in water year (WY) 2020 began on 1/1/20 and requires that OMR flow be no more negative than -5,000 cfs. OMR flows are reported weekly with the OMR index and the tidally filtered U.S. Geological Survey (USGS) gauges at the daily, 5-day and 14-day running averages.
- On 3/27/20, NMFS provided a revised winter-run Chinook salmon juvenile production estimate (JPE) letter ([Revised JPE letter](#)) to Reclamation reflecting updated information. The revised JPE letter provides the Reclamation with the revised JPE and incidental take limit (ITL) for hatchery origin juvenile Sacramento River winter-run Chinook salmon for water year (WY) 2020 based on the estimated number of hatchery fish released.
  - The revised incidental take for juveniles released from Livingston Stone National Fish Hatchery into the Sacramento River is **923 hatchery-produced (adipose fin clipped)** winter-run Chinook salmon
  - The revised incidental take of juveniles released into Battle Creek is **622 hatchery produced (adipose fin clipped and left ventral fin clipped)** winter-run Chinook salmon.
- Refer to the weekly operations and fish outlook for more triggers relevant to the California Department of Fish and Wildlife Incidental Take Permit (CDFW ITP) and the 2019 ROC Proposed Action (see Agenda Item 3).

DWR's ITP was signed on 3/31/20 and can be found online here: [Incidental Take Permit for Long Term Operations of the State Water Project](#)

### Agenda Item 3.

#### Weekly Fish and Water Operations Outlook 4/21/20 – 4/27/20

Dry through the week with a chance of showers in the northern mountains on Wednesday. A warming trend begins Tuesday. A breezy, northerly wind is expected Thursday and Friday. Increases in diversions on Delta tributaries and in the Delta are expected as the weather warms. Delta Outflow is being maintained to meet D-1641 X2 requirements and Emmaton EC for agriculture. The D-1641 San Joaquin River “pulse flow” period is effective through May 10, with the combined exports of both projects at 100% of the Vernalis flow (3-day average) or 1,500 cfs, whichever is greater. SWP exports are also limited by Spring Outflow curtailments, as described in Section 8.17 of DFW’s Long Term ITP for the SWP.

Tributary/Division	Projected Intended Operations and Ranges for week	Related Environmental and Fish Conditions
Clear Creek	Whiskeytown Release: 200 cfs	<ul style="list-style-type: none"> <li>• Adult spring-run Chinook salmon immigration March – June.</li> <li>• Late-fall-run Chinook salmon emergence from redds through May.</li> <li>• Steelhead emergence from redds through May</li> </ul>
Sacramento River	Shasta Storage: 3.75 MAF Total Release to Sacramento: 7,000 cfs to 10,000 cfs (Releases are made to support observed legal diversion demands on the Sacramento River in addition to Delta demands)	<ul style="list-style-type: none"> <li>• End of winter-run Chinook salmon juvenile migration, adults migrating and holding.</li> <li>• Spring-run Chinook salmon juveniles rearing and emigrating.</li> <li>• Fall-run Chinook salmon fry in gravel with continued emergence, juveniles rearing and emigrating.</li> <li>• End of late-fall Chinook salmon spawning, eggs and fry in gravel.</li> <li>• Steelhead spawning at peak.</li> <li>• Green sturgeon adults present.</li> </ul>
Feather River	Oroville Storage: 2.44 MAF Total Release to Feather: 1,550 cfs to 2,000 cfs	<ul style="list-style-type: none"> <li>• Most of the fall-run Chinook salmon eggs have hatched and emerged from the gravel. Rearing and emigration continues for spring-run and fall-run juveniles.</li> <li>• Steelhead eggs are in gravel, hatching and emergence is ongoing.</li> <li>• Late-fall-run Chinook salmon eggs in gravel, hatching, and emergence is continuing.</li> </ul>
American River	Folsom Storage: .63 MAF Total Release to American: 1,000 to 1,500 cfs, pulse flow scheduled, change order planned for 04/21/20	<ul style="list-style-type: none"> <li>• Peak emergence of fall-run Chinook salmon estimated to have occurred mid-March. Fall-run Chinook salmon that have emerged are currently rearing and emigrating out of the lower American River.</li> <li>• Steelhead spawning has concluded. Steelhead eggs are in the gravel, hatching and emergence is ongoing. Preliminary steelhead spawning survey data indicate the majority of juvenile steelhead are estimated to emerge by the end of this week.</li> <li>• Spring-run Chinook salmon juveniles present (non-natal rearing).</li> </ul>

Stanislaus River	New Melones Storage: 1.91 MAF Total Release to Stanislaus: 400 cfs to 1,500 cfs (Spring Pulse Flow)	<ul style="list-style-type: none"> <li>• Majority of fry rearing and emigrating.</li> <li>• Historical timing indicates the majority of steelhead spawning has concluded. Eggs are currently in the gravel and emergence may continue through May. Historical data indicates steelhead are emerging and rearing now. One steelhead smolt was observed in the Caswell RST monitoring program last week.</li> </ul>
Delta	<p>Freeport: 9,000 to 11,000 cfs  Vernalis: 1,500 to 3,000 cfs  Delta Outflow index: 8,000 to 10,000 cfs  Combined Exports: 1,500 to 3,000 cfs  JPP: 800-2,700 cfs CC: 200-1,500 cfs  Expected OMR Index Values: -1,000 to -2,000 cfs (Max.: -5,000 cfs)  X2 position: 74 to 81 km  QWEST: +1,000 cfs to +2,000 cfs  DCC: Closed</p>	<ul style="list-style-type: none"> <li>• 14-15% winter-run Chinook salmon juveniles present and 85% past Chipps Island.</li> <li>• 48-58% spring-run Chinook salmon juveniles present and 27-32% past Chipps Island.</li> <li>• Fall-run Chinook salmon juveniles rearing.</li> <li>• Steelhead juvenile migration occurring.</li> <li>• Green sturgeon adult and juveniles present.</li> <li>• Delta Smelt spawning presently, Larval Delta smelt salvaged.</li> <li>• Longfin Smelt finishing spawning, Larval Longfin smelt salvaged.</li> </ul>

Table 2. Relevant Water Year 2020 Fish and Environmental Criteria and Status in 2019 Reclamation LTO Action and NMFS and USFWS Biological Opinions.

Species/run	Threshold	Current Status	Weekly Trend	Updated through
Natural winter- run Chinook salmon loss	50% Single-year loss threshold = <b>5,001</b> . 50% of 1.17% of JPE = 5,001 WY2020 JPE: 854,941	Loss (LAD) = <b>175</b> (3.5% of 50% single-year loss threshold)	Decreasing	4/19/20
Hatchery winter- run Chinook salmon loss	Single-year loss threshold = 110.8 50% of 0.12% of Sac. R releases JPE= 55.4 JPE of Sac. R releases: 92,291 152,000 (~60% of production) released on 3/10/20 97,505 (~40% of production) released on 3/23/20	Loss = <b>0</b>	Potentially increasing	4/19/20
Natural steelhead loss	1) December 1 – March 31 (not active):  50% loss threshold = <b>707</b> 50% of 1,414 from December 1 – March 31 = 707 2) April 1 – June 15 (active):  50% loss threshold = <b>776</b> 50% of 1,552 from April – June 15= 776	1) Loss = 402 (not active)  (56.9% of 50% December 1 – March 31 loss threshold) 2) Loss = <b>140</b>  (18% of 50% April 1 – June 15 loss threshold)	Decreasing	4/19/20
Hatchery spring- run Chinook salmon surrogates	Loss > 0.5% of each release group: 1) 12/9/19: 84,869 = <b>424.3</b> 2) 12/18/19: 77,672 = <b>388.4</b> 3) 01/13/20: 77,866 = <b>389.3</b>	1) <b>20.2</b> 2) <b>25.0</b> 3) <b>0</b>	No change expected	4/19/20
Green sturgeon	Cumulative salvage = <b>74</b>	Salvage = <b>0</b>	No change expected	4/19/20
Delta Smelt	1) Daily Avg. < 12 NTU at OBI 2) March-June: OMR $\geq$ -5000 cfs 3) 3 days exceeding Clifton Court Daily Aver. T $\geq$ 77°F	1) OBI Daily Avg Turbidity = 2.2 FNU (4/19/20) 2) QWEST: Positive 3) $\geq$ 77 °F Days = 0	Expected to remain stable	4/20/20

Table 3: Relevant Water Year 2020 Fish Criteria and Status for Listed Fish under the SWP Long-Term Incidental Take Permit. This table is draft and under revision by DWR

<u>Species</u>	<u>Action</u>	<u>Timeframe</u>	<u>Current Action Status</u>	<u>Threshold(s)</u>	<u>Current Relevant Data</u>	<u>Weekly Trend</u>	<u>Last Updated</u>	<u>Comments</u>
Salmonids	OMR Mgmt. triggered (8.3.2)	Jan. 1 - Jun. 30 (when $\geq 5\%$ of SR or WR in Delta)	In effect	$\geq 5\%$ of the WR or SR population in Delta	<b>14-15% WR estimated in-Delta, 48-58% SR estimated in-Delta</b>	<b>Ongoing</b>	<b>4/21/20</b>	<b>85% of WR estimated to have exited the Delta, 27-32% of SR estimated to have exited.</b>
	Winter-run yearly loss (8.6.1)	Nov. 1 - Jun. 30	In effect	- 1.17% loss of unclipped (natural) WR JPE = 10,002 fish - 0.12% loss of clipped (hatchery) WR = 110 fish	<b>current yearly loss = 175.06 (1.75%) natural, 0 hatchery</b>	<b>salvage likely to continue</b>	<b>4/20/20</b>	<b>Based on 4/19/20 Salvage data</b>
	WR discrete daily loss (8.6.2)	Nov. 1 - Dec. 31	N.A.	11/1-11/30: loss of 6/day unclipped older juv. WR 12/1-12/31: loss of 26/day clipped older juv. WR	<b>N.A.</b>		<b>N.A.</b>	
	WR relative daily loss (8.6.3)	Jan. 1 - May 31	In effect	1/1 - 1/31: 0.00635% loss of WR JPE = 54.29 fish 2/1 - 2/28: 0.00991% = 84.72 3/1 - 3/31: 0.0146% = 124.82 <b>4/1 - 4/30: 0.00507% = 43.35</b> 5/1 - 5/31: 0.0077% = 65.83	<b>max single daily loss from prev. week = 0.00 fish (WR last observed on 4/7/20)</b>	<b>No change – salvage below “trigger” levels</b>	<b>4/20/20</b>	<b>Based on 4/19/20 Salvage data</b>
	Spring-run surrogate protection (8.6.4)	Feb. 1 - Jun. 30	In effect	- Feather CWT SR surrogates cum. loss $>0.25\%$ for any release group <u>OR</u> - Coleman or Nimbus Fall Run $>0.25\%$ for any release group	<b>max. loss for any group = 0%</b>	<b>none expected</b>	<b>4/20/20</b>	<b>Based on 4/19/20 Salvage data</b>
Delta Smelt	Integrated Early Winter Pulse Protection ('First Flush') (8.3.1)	Dec. 1 - Jan. 31	N.A.	- Three-day Freeport daily flow running avg $\geq 25,000$ <u>AND</u> - [Three-day Freeport turbidity running avg $\geq 50$ NTU OR Smelt Monitoring Team recommendation]	<b>avg flow = -- cfs avg turbidity = - - NTU</b>	<b>N.A.</b>	<b>N.A.</b>	
	Turbidity Bridge Avoidance (8.5.1)	Dec. 15 - Apr. 1	N.A.	- avg. OBI turbidity $> 12$ NTU	<b>OBI = 2.25 NTU</b>	<b>none expected</b>	<b>4/20/20</b>	

<u>Species</u>	<u>Action</u>	<u>Timeframe</u>	<u>Current Action Status</u>	<u>Threshold(s)</u>	<u>Current Relevant Data</u>	<u>Weekly Trend</u>	<u>Last Updated</u>	<u>Comments</u>
	Larval and/Juvenile Delta Smelt Protection (8.5.2)	ongoing	In effect	- 5-day cum. salvage of juv. DS >= [average 3-yr FMWT index + 1] = 1.67	<b>current 5-day salvage = 0 fish</b>	<b>none expected</b>	4/20/20	<b>One 12mm DSM detected at CVP 4/13</b>
Longfin Smelt	Early Adult Protection (8.3.3)	Dec. 1 - Feb. 28	N.A.	- Cum. salvage > [most recent FMWT/10] = 1.2 fish <u>OR</u> - Smelt Monitoring Team determines high likelihood of LFS movement into high-risk areas	<b>Cum. Salvage = 0 adults</b>	<b>none expected</b>	N.A.	
	OMR Mgt. for Adults (8.4.1)	Dec. 1 - Feb. 28	N.A.	- Smelt Monitoring Team recommendation		<b>none expected</b>	N.A.	
	Larval and Juvenile Longfin Smelt Entrainment Protection (8.4.2)	Jan. 1 - Jun. 30	In effect	- LFS larvae or juveniles in >=4 SLS or 20 mm stations in central and south Delta, <u>OR</u> - LFS catch/tow >5 larvae or juveniles in >=2 stations	<b>LFS at 1 (20mm#3) stations LFS catch/tow &gt;5 at 0 (20mm#3) stations</b>	<b>Not triggered - no OMR recommendation expected</b>	4/20/20	<b>262 juv LFS salvaged through 4/16/20 (via SacPas)</b>
	High Flow OMR Off-Ramp for Longfin smelt (8.4.3)	ongoing	In effect	- Sac. R. at Rio Vista >55,000 <u>OR</u> - SJR at Vernalis >8,000	<b>Rio Vista = 7,500 - 8,500 cfs SJ = 1,500 - 3000 cfs</b>	<b>No change</b>	4/20/20	<b>Forecasted Values</b>

WR = winter-run Chinook salmon  
SR = spring-run Chinook salmon  
DS = Delta smelt  
LFS = long fin smelt

NTU = Nephelometric Turbidity unit  
OBI = Old River at Bacon Island



## Operations

Operations Category	Location	Operations on 4/14/20	Operations on 4/21/20
Clifton Court Inflow	Clifton Court Forebay	300 cfs, operating to I:E ratio of 1:1. May increase depending on state of Vernalis.	1,100 cfs
SWP Reservoir Releases	Feather – Oroville	1,550 cfs and holding	1,550 cfs
SWP Reservoir Storage	San Luis (SWP)	967 TAF	962 TAF
SWP Reservoir Storage	Oroville	2,390 TAF	2,441 TAF
Environmental Parameters	Sacramento River at Freeport	12,835 cfs	9,500 cfs
Environmental Parameters	San Joaquin River at Vernalis	2,036 cfs	2,700 cfs
Environmental Parameters	Delta Outflow Index	13,030 cfs	10,000 cfs
Environmental Parameters	E:I (14-day)	11.7% (14-day avg.)	10% (14-day avg.)
Environmental Parameters	X2	73.2 km	73 km
CVP Exports	Jones Pumping Plant	1,600 cfs, coordinating with SWP on meeting 1:1, may require adjustments at the end of this week to maintain I:E ratio of 1:1	1,600 cfs currently, scheduled decrease to 1,000 cfs on 4/23/20.
CVP Reservoir Releases	American – Nimbus	Holding at 1,500 cfs, discussions around potential reduction are ongoing	1,500 cfs currently. Ramping up and down between 1,000 cfs and 1,500 cfs starting later this week.

<b>Operations Category</b>	<b>Location</b>	<b>Operations on 4/14/20</b>	<b>Operations on 4/21/20</b>
CVP Reservoir Releases	Sacramento – Keswick	5,000 cfs, scheduled to increase tomorrow to 5,500 cfs	7,500 cfs currently. Increasing to 9,500 cfs by 4/24/20 as a result of increasing diversion demands on the river.
CVP Reservoir Releases	Stanislaus - Goodwin	900 cfs and is in the middle of pulse flow. Ramping down to 400 cfs and back up to 1,500 cfs,	400 cfs currently, scheduled increase to 1,200 cfs on 4/23/20, continuing spring pulse flows
CVP Reservoir Releases	Trinity - Lewiston	Started pulse flow, currently at 1,000 cfs, going up to 1,500 cfs on 4/14/20 before decreasing again	450 cfs currently, scheduled changes in releases for pulse flows
CVP Reservoir Storage	San Luis (CVP)	594 TAF	584 TAF
CVP Reservoir Storage	Shasta	3,729 TAF	3,750 TAF
CVP Reservoir Storage	Folsom	588 TAF	637 TAF
CVP Reservoir Storage	New Melones	1,909 TAF	1,909 TAF
CVP	DCC Gates	Closed	Closed

cfs = cubic feet per second

MAF = million acre feet

TAF = thousand acre feet

km = kilometer

Location of X2 measured from the Golden Gate

*Factors controlling Delta exports:* Controlling factor for 4/14/20 – 4/20/20 was 1:1 San Joaquin River inflow (as measured at Vernalis) to combined exports (I:E) ratio criteria from D-1641 that

will continue into next week. As SWP exports decrease, CVP's exports will increase (and vice versa) to maintain 1:1 I:E ratio.

#### Agenda Item 4.

##### Review of Environmental Data

OMR Demonstration Project: OMR Index and USGS Tidally Filtered Values are displayed on SacPAS. [http://www.cbr.washington.edu/sacramento/data/delta\\_loss.html](http://www.cbr.washington.edu/sacramento/data/delta_loss.html)

Approximate OMR gauge data as of 4/18/20

	<b>USGS gauges (cfs)</b>	<b>Index (cfs)</b>
Daily	-300 cfs	-1,000 cfs
5-day	-1,100 cfs	-1,200 cfs
14-day	-2,000 cfs	-2,000 cfs

Approximate OMRs as of 4/20/20:

	<b>Index (cfs)</b>
Daily	-1,400 cfs
5-day	-1,200 cfs
14-day	-1,700 cfs

## **Agenda Item 5.**

### **Fish Abundance and Distribution**

#### **Hatchery Releases**

On 4/20/20, the CDFW released approximately 450,000 brood year 2019 fall-run Chinook salmon from the Mokelumne River Hatchery into the San Joaquin River at the Sherman Island Net Pen site. This release will include 25% coded wire tagged (CWT) fish.

On 4/7/20, the CDFW released an estimated 10,509 brood year 2019 spring-run Chinook salmon from the San Joaquin River Restoration Program's (SJRRP) Interim Salmon Conservation and Research Facility (SCARF) into the San Joaquin River. This release consisted of 100% marked (adipose fin clip and CWT) juveniles.

Beginning 12/12/19 and planned to continue through 6/20, the SJRRP is conducting rotary screw trap (RST) efficiency releases using brood year 2019 spring-run Chinook salmon originating from the SCARF. Releases occur weekly, upstream of four RST locations (Owl Hollow, Scout Island, SR-99, and San Mateo Road), within Reaches 1 and 2 of the SJRRP Restoration Area. Releases consist of 100% marked (adipose fin clip, CWT, photonic tag) juveniles, and a planned season release total of over 30,000 juveniles.

On 4/16/20, the CDFW released approximately 1,001,830 brood year 2019 fall-run Chinook salmon from the Feather River Fish Hatchery into the Feather River at Boyd's Pump Boat Ramp. This release included 25% adipose fin clip and CWT marked fish.

On 4/21/20, the CDFW released approximately 585,000 brood year 2019 fall-run Chinook salmon from the Merced River Hatchery into the San Joaquin River at Sherman Island Net Pen site. This release group would normally include 25% adipose fin clip and CWT marked fish. Due to concerns with COVID-19, staff was unable to complete the 25% mark and CWT for release Group 2. Approximately 1.5% (8,279) of the fish were tagged due to Covid-19 complications.

On 4/22/20, the CDFW will release approximately 801,058 brood year 2019 fall-run Chinook salmon from the Nimbus Fish Hatchery into the Lower American River at Sunrise Boat Ramp. This release includes 25% adipose fin clip and CWT marked fish.

## Fish Monitoring

### Historical Fish Monitoring Data

Because of challenges with limited data and interpretation of real-time steelhead catch data, SaMT reviews historical catch data on SacPAS's Migration Timing and Conditions page and the Salvage Timing page.

*Migration Timing:* [SacPAS Migration Timing Website](#)

Average percent of annual emigrating population for each species of interest (based on LAD) captured at the following locations by 4/19 for the years 2005 to 2018.

Brood Years	Species, species run	Red Bluff Diversion Dam	Tisdale RST	Knights Landing RST	Beach Seines	Sac Trawl (Sherwood)	Chippis Island Trawl
2005 – 2018	Winter-run Chinook salmon	100%	99.8%	100%	100%	92.1%	95.5%
2005 – 2018	Spring-run Chinook salmon	88.8%	92.8%	94.9%	98.7%	77.3%	43.5%
2005 – 2018	Steelhead	5.9%	85.9%	76.4%	79.4%	95.6%	91.7%

*Salvage timing:* [SacPAS Salvage Timing Website](#)

Average percent for each species (based on LAD) of interest salvaged at the SWP and CVP Delta Fish Facilities by 4/19/ in previous years. Average sampled represents historic data spanning years 2005 – 2018.

Brood Year	Species, species run	Average Percent Salvaged at SWP and CVP Delta Facilities
Average 2005 - 2018	Winter-run Chinook salmon (unclipped)	99%
Average 2005 – 2018	Spring-run Chinook salmon (unclipped)	44.5%
Average 2005 – 2018	Steelhead (unclipped)	78.3%

## Current Fish Monitoring Data

Fish monitoring data summarized over the past week are found on Bay Delta Live. Unless otherwise noted, reported races are based on fork length (LAD).

Location	Feather River RST Eye Channel <sup>A</sup>	Feather River RST Herringer <sup>B</sup>	GCID RST <sup>C</sup>	Tisdale RST <sup>D</sup>	Knights Landing RST <sup>E</sup>	LAR RST <sup>G</sup>	Sacramento Trawls <sup>F</sup>	Chippis Island Midwater Trawl <sup>F</sup>	Caswell RST <sup>H</sup>	Butte Creek Okie Diversion Trap <sup>I</sup>	Butte Creek Okie Screw Trap <sup>J</sup>
Sample Dates	4/13/20-4/19/20	4/13/20-4/19/20	4/14/20 – 4/20/20	4/13/20 - 4/19/20	4/1320-4/20/20	4/14/20 - 4/16/20	4/12/20 -4/14/20, 4/16/20 - 4/17/20	4/12/20-4/14/20, 4/16/20-4/17/20	4/14/20-4/16/20	4/13/20-4/19/20	4/17/20-4/19/20
Chinook						18 VIE CS			22		
FR Chinook	2,166	813	673 juv.		8	670	55	17			
SR Chinook	59	6	316 juv.		9	62	58	502		1,212	282
WR Chinook			3 smolt					6			
LFR Chinook	75	17				14					
Chinook (ad-clip)		15 SR	36 juv FR 7 smolt WR		2 FR 2 SR	14	72	190			
Steelhead (natural)	23	1	3			7 fry		1	2 smolt		1
Steelhead (ad-clip)			1		1	4		3			
Green Sturgeon											
Flows (avg. cfs)	1,233	1,550	1,329	5,695	5,712					246	257
W. Temp. (avg. °F)	54.2	57.8	59.6	62.8	63.9					52.9	53.2
Turbidity (avg. NTU)	1.6	1.6	7.6	7.2	8.4						

<sup>A</sup> Feather River RST data from Eye Channel sampling period was from 4/13/20 at 13:50 to 4/19/20 at 12:07.

<sup>B</sup> Feather River RST data at Herringer sampling period was from 4/13/20 at 11:11 to 4/19/20 at 9:42.

<sup>C</sup> GCID RST sampling period was from 4/14/20 at 9:00 to 4/20/20 9:00. RST operating at full cone.

<sup>D</sup> Tisdale RST sampling period was from 4/13/20 at 10:30 to 4/19/20 at 9:45. RST operating at half cone the full duration.

<sup>E</sup> Knights Landing RST sampling period was from 4/13/20 at 9:45 to 4/20/20 at 9:45. RST operating at half cone the full duration.

<sup>F</sup> DatCall sampling data period was from 4/12/20 to 4/14/20 and 4/16/20 to 4/17/20.

<sup>G</sup> Lower American River RST sampling period was 4/14/20 to 4/16/20.

<sup>H</sup> Caswell RST sampling period was from 4/14/20 to 4/16/20.

<sup>I</sup> Butte Creek Okie Diversion Trap sampling period was from 4/13/20 at 8:15 to 4/19/20 at 8:15.

<sup>J</sup> Butte Creek Okie Screw Trap set 4/17/20 at 9:30. Sampling period was from 4/17/20 at 9:30 to 4/19/20 at 9:15.



**Fish Monitoring Gear Efficiency/Disruptions: COVID-19 impacts.**

<b>Monitoring Survey</b>	<b>Status (as of 4/13/20) Most Recent Change in Green</b>
Delta	
SWP regular counts, CWT reading, and larval sampling	Ongoing through modified staffing
CVP regular counts, CWT reading, and larval sampling	Ongoing through modified staffing
Smelt Larval Survey	On hold until further notice
20mm Survey	Starting 4/13, modified survey (South and Central Delta priority stations)
Bay Study	On hold until further notice
DJFMP- Chipps and Sacramento Trawls	Ongoing
DJFMP- Seines	Suspended
EDSM	Ongoing
EMP	Discrete sampling will not occur in April, Continuous sampling continues
Mosssdale	On hold until further notice
USGS Flow monitoring	Continuous monitoring continues
Sacramento River	
Acoustic tagging- Battle Creek hatchery	Tagged ~250 fish
Acoustic tagging- Fall run Chinook	Will not occur this March and April
Acoustic tagging-Spring run Chinook	Unlikely to occur
Acoustic tagging-Pulse Flow experiment	Under review
Red Bluff Diversion Dam screw trap	Suspended on March 26 until further notice
Knights Landing screw trap	Ongoing through modified staffing
Tisdale screw trap	Ongoing through modified staffing
Redd dewatering and stranding surveys	Suspended
Sacramento Carcass and Redd Surveys	Continuing
San Joaquin River	
SJRRP CDFW Field Monitoring	On hold until further notice
SJRRP USFWS and USBR Field Monitoring	Ongoing with modified staffing

**Green Sturgeon**

One green sturgeon was tagged on 4/16/20 at the North of Sherman Lake location. Three juvenile green sturgeon have been detected in the Sacramento River, North of Sherman Lake on 4/14/20 and 4/16/20.

**Red Bluff Diversion Dam Biweekly Report**

There was no USFWS biweekly report for this week. Sampling did not occur this week due to COVID-19.

### DOSS Weekly Salvage Update

Reporting Period: April 13-April 19, 2020

Prepared by Kyle Griffiths on April 20, 2020 15:15

Preliminary Results -Subject to Revision

Criteria	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	Trend	
<b>Loss Densities</b>									
Wild older juvenile CS	0	0	0	0	0	0	0	↘	0.00
Wild steelhead	2.80	0.85	0.64	0	10.10	1.45	0	↘	2.26
<b>Exports</b>									
SWP daily export	1,440	0	984	788	1,037	1,023	780	↘	865
CVP daily export	3,199	3,191	3,253	3,188	1,963	1,958	1,956	↘	2,673
SWP reduced counts	0	NA	0	0	0	0	0		
CVP reduced counts	25%	16%	0	0	0	0	0		

Loss Density = fish lost/TAF; water export = AF; Trend = compared to previous week; wild = adipose fin present

Loss = estimated number of fish lost at the CVP and SWP Delta export facilities based on estimated salvage (see below)

Reduced counts = percentage of time that routine salvage sample time were less than 30 min per 2 hours of salvage and export operations

Yellow highlighted dates indicate TFCF salvage outage occurred

### Chinook Salmon Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities

Race determined by size at date of capture; hatchery = adipose fin missing;

Category	Weekly Total			Season Total		Season Total LAD	
	Salvage	Loss	Trend	Salvage	Loss	Salvage	Loss
<b>Wild</b>							
Winter Run	0	0	↘	67	132	102	175
Spring Run	556	751	↘	1,369	1,508	1373	1511
Late Fall Run	0	0	↘	12	8	12	8
Fall Run	70	73	↘	181	170	142	124
Unclassified	0	0	↘	0	0	0	0
<b>Total</b>	<b>626</b>	<b>824</b>		<b>1,629</b>	<b>1,818</b>	<b>1,629</b>	<b>1,819</b>
<b>Hatchery</b>							
Winter Run	0	0	↘	17	12	77	81
Spring Run	64	79	↘	1,132	1,443	1001	1328
Late Fall Run	0	0	↘	195	153	186	144
Fall Run	0	0	↘	25	17	105	72
Unclassified	0	0	↘	0	0	0	0
<b>Total</b>	<b>64</b>	<b>79</b>		<b>1,369</b>	<b>1,625</b>	<b>1,369</b>	<b>1,625</b>

Trend = weekly loss per race; Salvage = estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time

NC = cannot be calculated; hatchery salmon salvage and loss estimates have been corrected using CWT readings when available

### Steelhead Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities

Category	Weekly Total			Season Total	
	Salvage	Loss	Trend	Salvage	Loss
Wild	19	53	↘	217	542
Hatchery	20	28	↘	387	540
<b>Total</b>	<b>39</b>	<b>81</b>		<b>604</b>	<b>1,082</b>

State Water Project loss = salvage x 4.33; Central Valley Project loss = salvage x 0.68

**SaMT Estimates of Fish Distribution**

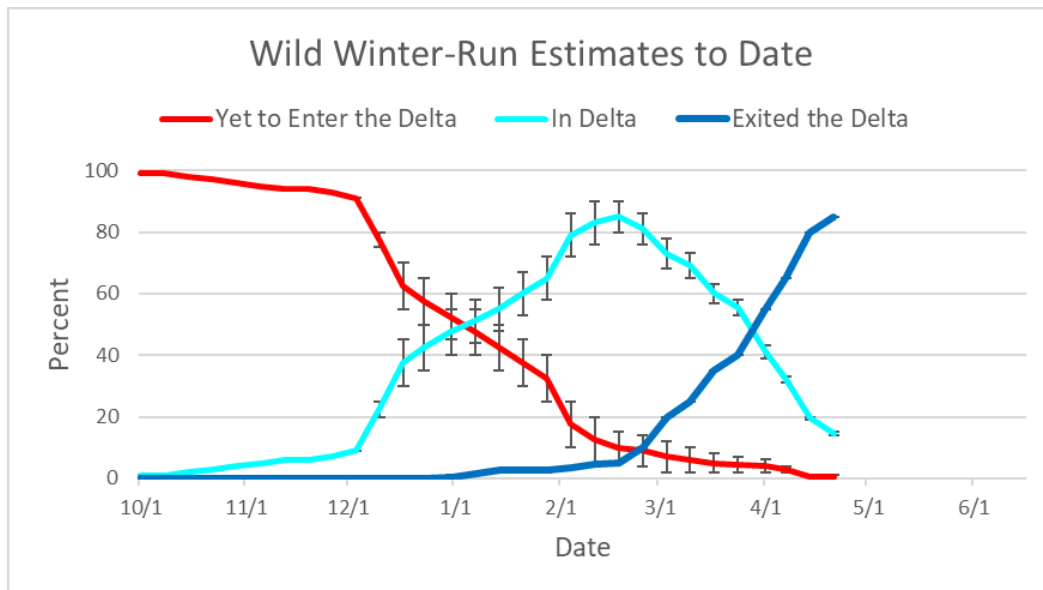
SaMT estimates of the current distribution of listed Chinook salmon, as a percentage of the population, are based on recent monitoring data and historical migration timing patterns.

Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chipps Island)
<i>Young-of-year (YOY) winter-run Chinook salmon</i>	0-1% Last week: 0-1%	14-15% Last week: 19-20%	85% Last week: 80%
<i>YOY spring-run Chinook salmon</i>	15-20% Last week: 15-30%	48-58% Last week: 48-68%	27-32% Last week: 17-22%
<i>YOY hatchery winter-run Chinook salmon</i>	5-15% Last week: 20-30%	40-45% Last week: 40-45%	45-50% Last week: 30-35%
<i>Natural origin steelhead</i>	20-35% Last week: 30-45%	35-55% Last week: 30-50%	25-30% Last week: 20-25%

**Rationale for changes in distribution**

*Natural winter-run Chinook salmon:*

Over 3.8 million BY 2019 winter-run Chinook salmon have passed RBDD so far in WY 2020. In the last week, 6 winter-run were captured in Chipps Island Trawl. SaMT estimates that the percentage of winter-run Chinook salmon population within the Delta changed from 19-20% to 14-15%. SaMT also estimates an additional 5% exited past Chipps Island equating to an estimated sum total of 85% exiting the Delta. Based on the time of year, the majority of winter-run Chinook salmon juveniles are migrating out of the Delta.



**WY 2020 natural winter-run Chinook salmon distribution**

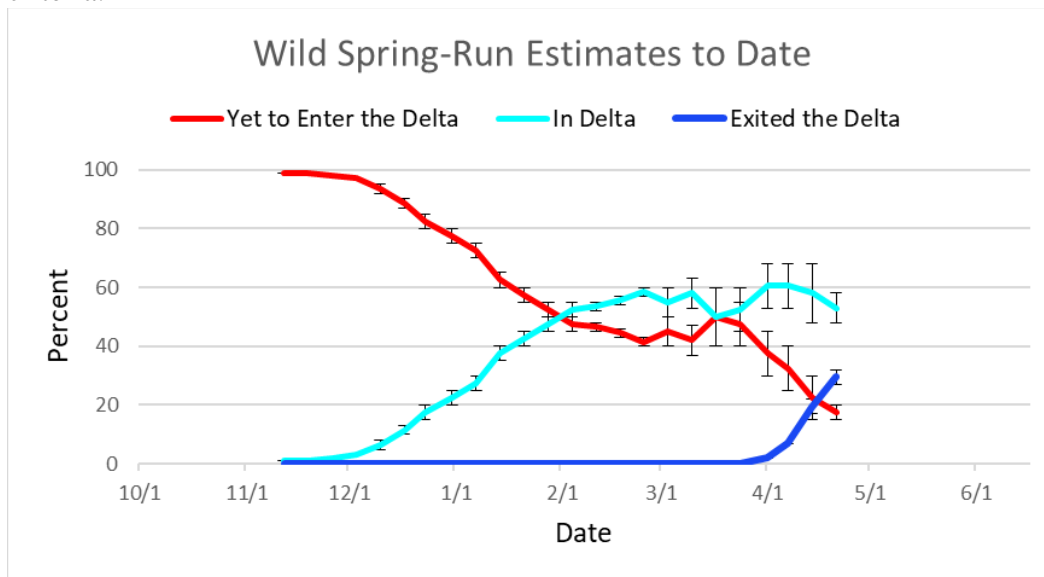
*Hatchery winter-run Chinook salmon:* Hatchery winter-run Chinook salmon were released into Sacramento River and Battle Creek (3/10/20 and 3/23/20, respectively). Acoustic tagged fish have been detected at several locations including: Butte City, Wilkins Slough, I-80/I-50, Tower Bridge, Georgiana Slough, and Benicia (western Suisun Bay), indicating that at least some of these fish have moved into the Delta and beyond. One acoustic tagged winter-run was detected at Butte City over the past week (4/14/20-4/20/20) indicating that a proportion of the release still remains upstream of the Delta.

[CalFish Acoustic Tag Tracking website - winter-run Chinook salmon](#)

*Natural spring-run Chinook salmon:*

In the last week, 58 juvenile spring-run Chinook salmon were observed at Sacramento Trawl, 9 at Knights Landing, and 502 at Chipps Island. Beach seine sites were not sampled. Historical timing based on passage at Knights Landing indicate that 94.9% of the natural young-of-year spring-run Chinook salmon are considered to be in the Delta by this time of year, but excludes Butte Creek and Feather River spring-run Chinook salmon that typically emigrate into the Delta later in the season and are not captured at the Knights Landing monitoring station. Historical timing indicates that young-of-year spring-run Chinook salmon from Mill, Deer, and Butte creeks are entering the mainstem Sacramento River and emigrating through the Delta. SaMT estimates 15-20% of the spring-run Chinook salmon population are upstream of the Delta and 48-58% are in the Delta. SaMT also estimates an additional 27-32% have exited past Chipps Island.

It is important to note that this week’s large numbers of spring-run Chinook salmon were observed at downstream monitoring sites following the fall-run Chinook salmon production releases from Coleman NFH which include 75% unmarked fish. Natural spring-run Chinook salmon are indistinguishable from larger, unmarked hatchery origin fall-run Chinook salmon and the average FL of this year’s releases suggest a large portion of the fall-run Chinook salmon would be counted as spring-run Chinook salmon where monitoring sites assign run using LAD criteria.



**WY 2020 natural spring-run Chinook salmon distribution estimates to date**

### *Natural Steelhead:*

Several factors increase uncertainty of measuring downstream movements of steelhead including varying life history and residency times, as well as monitoring gear avoidance. To provide an estimate of steelhead presence in the Delta, the SaMT discussed historical catch and emigration timing data. Natural-origin steelhead were observed in salvage (weekly loss = 53) and at Chipps Island (n = 1) during this past week. Historically, 78.3% of steelhead are salvaged by this time of the year. SaMT estimates that 35-55% of steelhead are in the Delta this week and that 25-30% have exited past Chipps Island. These estimates are based on historical rather than upper river monitoring data.

## **Agenda Item 6. Fish Exposure and Behavioral Cues**

### **Historical Patterns**

This section is a placeholder to discuss plots of historical loss to current loss and loss tool predictions in future meetings. These figures were included in the Assessment document for this week. Additional figures, tables, and online tools are being developed to inform this discussion. SaMT reviewed the Assessment document.

### **Current Conditions**

#### *Entrainment into the Interior Delta:*

The Delta STARS Model ([Delta STARS web site](#)) is an individual-based simulation model that estimates survival, travel time, and routing of juvenile salmon migrating through the Delta. Routing probabilities at Three Mile Slough and Broad Slough (junction of the Sacramento and San Joaquin rivers) are not estimated by the STARS model.

Routing probabilities into the interior Delta from the Sacramento River appeared to be similar to last week based on minute changes in Sacramento River flows. The STARS model estimates the following proportion of route entrainment: 0% DCC, 27% Georgiana Slough, 46% Sacramento River, and 26% Sutter and Steamboat sloughs (Last updated on 4/20/20).

#### *DSM2*

DSM2 – Results are provided in the Assessment documents weekly on Mondays and Fridays. SaMT reviewed the latest DSM2 modeling results.

- SaMT members noted that, the SWP is generally exporting more than the CVP during this week. More positive flows were observed and that more water is being pulled into Clifton Court Forebay.
- SaMT members noted that agricultural barriers will be installed in the south Delta starting on 5/1/20 and will subsequently impact hydrodynamics and water elevation levels in the South Delta, while adversely affecting travel times and survival of fish routed through those channels with barriers.

## Sensitivity to Operational Actions - SaMT Feedback on Entrainment Risk

The questions from OMR Flow Management Guidance Document (page 20) are provide below.

- 1) After January 1, are more than 5% of the juveniles from one or more salmonid species present in the Delta?
  - o Yes.
    - Currently 14-15% natural winter-run Chinook salmon, 48-58% spring-run Chinook salmon, 45-55% of hatchery winter-run Chinook salmon, and 35-55% of steelhead are estimated to be in the Delta.
- 2) Does the action (Delta exports, OMR flows, DCC gate operations) impact fish movement and change the potential distribution of fish?
  - o Yes.
    - Winter-run Chinook salmon, spring-run Chinook salmon, and steelhead are shifting from a rearing phase (where they are closer to river banks) to migration phase (where they are moving in the river channel). This behavior makes them more vulnerable to exports.
    - Considering historical timing of outmigration for winter-run Chinook salmon, spring-run Chinook salmon, and steelhead, as well as monitoring data (in salvage and Chipps Island Trawl), we believe that the distribution of Sacramento-origin fish are likely to be affected by Delta exports as they are migrating through the Delta to be observed at these locations.
    - In past years, under conditions similar to those being experienced currently, fish have been routed through the Head of Old River from the San Joaquin River. The Mossdale trawl is not sampling currently due to COVID-19 restrictions, but we have observed San Joaquin River Restoration Project (SJRRP) spring-run Chinook salmon in salvage at the Delta Fish Collection Facilities during the past week (total estimated loss > 1,263 fish).
    - The SaMT expects to see more San Joaquin River origin fish salvaged at the CVP and SWP.
    - Spring-run Chinook salmon-sized fish seen in salvage are of unknown origin given the Mossdale Trawl is not monitoring currently and detection of fish leaving the San Joaquin River basin at Mossdale is not possible.
    - Assessment of risk of entrainment into the Central Delta and CVP/SWP facilities was conducted for winter-run Chinook salmon, spring-run Chinook salmon, and steelhead in the Sacramento River and steelhead in the San Joaquin River for the next week. The intent is to qualify and characterize risks that may indicate the potential to exceed daily early-, mid-, and late-season daily loss thresholds. Evaluation of risk is informed by STARS model results, acoustic tag detections on CVEAT, real-time monitoring data, current estimated fish distribution, and hydrology discussed in the previous section.
      - Exposure risk (low, medium, high) of fish anticipated to be in the vicinity of an entrainment risk:
        - Sacramento River Basin Origin:
          - Spring-run Chinook salmon: High
          - Winter-run Chinook salmon: Low
        - San Joaquin Basin Origin:

- Steelhead: High
    - Routing risk (low, medium, high) that flow split conditions could result in fish being diverted from the main channel:
      - Sacramento River Basin Origin: Medium
      - San Joaquin River Basin Origin: High
    - Overall entrainment risk (low, medium, high):
      - Sacramento River Basin Origin:
        - Winter-run Chinook salmon: Low-Medium
        - Spring-run Chinook salmon: Medium-High
        - Steelhead: Medium-High
      - San Joaquin River Basin Origin:
        - Steelhead: High
- 3) How much loss has occurred in the past week (4/13/20 - 4/20/20)?
- Losses of salmonids in both clipped and natural fish have been observed at the SWP and CVP facilities. Fish salvage began to increase slightly on the State side, due to increased exports (shift of more exports to the SWP) and decreasing slightly at the CVP, due to the reduced share of exports. An increase in salvage at the CVP of San Joaquin-origin salmonids is expected over the upcoming weeks.
  - In the past week, no natural-origin winter-run sized Chinook salmon were salvaged at the Delta fish collection facilities (weekly loss = 0 fish).
  - Natural-origin spring-run sized Chinook salmon (LAD) were salvaged last week at the Delta fish collection facilities (weekly loss = 751 fish). Weekly loss total likely includes larger natural and hatchery origin fall-run which are misidentified as spring-run Chinook salmon using LAD methodology
  - Hatchery-origin spring-run Chinook salmon were salvaged at both facilities (weekly loss = 79 fish). All fish were San Joaquin River Restoration Program fish, none from Feather River. To date, only one fish from the Feather River Fish Hatchery spring-run Chinook salmon release has been detected in salvage on 4/10/20.
  - Hatchery-origin steelhead were observed in salvage at both facilities (weekly loss = 28 fish).
  - Natural-origin steelhead were observed in salvage at both facilities (weekly loss = 53).
  - CVP/SWP facilities entrainment risk was conducted for winter-run Chinook salmon and spring-run Chinook salmon in the Central Delta over the next week. The intent is to qualify and characterize risks that may indicate the potential to exceed daily early-, mid-, and late-season daily loss thresholds.
    - Evaluation of risk is informed by DSM2 model results, acoustic tag detections on CVEAT, real-time monitoring data, current estimated fish distribution, and hydrology discussed in the previous section.
    - Exposure risk assessment (low, medium, high) of fish anticipated to be in the vicinity of an entrainment risk:
      - Sacramento River Basin Origin: Low
      - San Joaquin River Basin Origin: High

- Reporting OMR/export risk (low, medium, high) for fish in the interior Delta that OMR and/or export levels could result in entrainment into the CVP/SWP facilities:
    - OMR -1,000 cfs:
      - Sacramento River Basin Origin: Low
      - San Joaquin River Basin Origin: Medium
    - OMR -2,000 cfs:
      - Sacramento River Basin Origin: Low
      - San Joaquin River Basin Origin: High
        - Head of Old River Barrier (HORB) not installed.
  - Overall entrainment risk (low, medium, high)
    - OMR -1,000 cfs:
      - Sacramento River Basin Origin: Low
      - San Joaquin River Basin Origin: Medium-High
    - OMR -2,000 cfs:
      - Sacramento River Basin Origin: Low
      - San Joaquin River Basin Origin: High
- 4) What is the likelihood of increased loss exceeding the next single-year loss threshold based on the population distribution, abundance, and behavior of fish in Delta?
    - Unlikely. Annual cumulative loss is not approaching any of the Delta Performance Thresholds. Please refer to operations outlook for details.
    - It is unlikely that that any Delta performance thresholds for natural winter-run Chinook salmon will be exceeded. Hatchery winter-run Chinook salmon and steelhead might eventually exceed the single-year thresholds by the end of the OMR management season, but low exports reduce the likelihood of exceeding the threshold in the next week or two.
    - It is unlikely that older juvenile Chinook salmon daily loss thresholds would be exceeded (DWR ITP requirement).
  - 5) If a single-year loss threshold has been exceeded, do continued OMR restrictions benefit fish movement based on real-time information?
    - Not applicable. No thresholds have been exceeded during this water year.
  - 6) If OMR is more negative than -5,000 cfs, are there changes in spawning, rearing, foraging, sheltering, or migration behavior beyond those anticipated to occur under OMR management at -5,000 cfs?
    - Not applicable. Current OMR flows more positive than -5,000 cfs.

**Agenda Item 7.**

**Other Topics**

- ITP integration and other SaMT meeting improvements to data management and communication sub-team meeting on Friday.

**Agenda Item 8.**

**Additional Considerations for WOMT**

- NONE

**Agenda Item 9.**



**Next SaMT Meeting is scheduled for Tuesday, 4/28/20 at 9:00 a.m.**