

Salmon Monitoring Team (SaMT) Weekly Meeting
Conference call: 4/14/20 at 9:00 a.m.

Executive Summary:

- No Delta Performance measures have been exceeded this week. SaMT does not anticipate any Delta Performance Thresholds to be exceeded during the next few weeks. However, there are two performance metrics that may be exceeded over the course of the Old and Middle River (OMR) management season:
 - The Delta Performance threshold with the highest likelihood of exceedance is the 50% threshold of single year loss for natural steelhead for the April 1 to June 15 period.
 - Preliminary estimate indicates that loss is at approximately 13% of that threshold.
 - It is unlikely, but possible that the hatchery winter-run Chinook salmon single year loss threshold could be exceeded during the remainder of the OMR management season.
 - There is no confirmed loss of hatchery winter-run Chinook salmon to date for this season.
 - Currently, most of the salvaged salmonids in the Central Valley Project (CVP) and State Water Project (SWP) fish collection facilities appear to be of San Joaquin River-origin, instead of Sacramento River-origin (i.e., where the winter-run Chinook salmon would be coming from).
 - Current exports are low and will remain so for the next month. SaMT expects loss rates to decrease over the next week in response to the lower export rates.
- SaMT reviews a lot of information, and would like longer meeting times to discuss the available information.
- A proposal to Water Operations Management Team (WOMT) was put forth by SaMT members to incorporate more of the DWR Incidental Take Permit (ITP) threshold information into SaMT Notes and Assessment document.

Objective: Provide information to the WOMT, Reclamation and California Department of Water Resources 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 SaMT webpage](#).

- **California Department of Fish and Wildlife (CDFW):** Geir Aasen, Kristal Davis-Fadtke, Kyle Griffiths, Kimberly Holley, Jason Julienne, Kenneth Kundargi, Duane Linander, Paige Uttley, Jonathan Williams
- **California Department of Water Resources (DWR):** Brittany Davis, Mike Ford, Bryant Giorgi, Farida Islam, Tracy Pettit, Kevin Reece, Ian Uecker
- **Kearns & West:** Matt Marvin
- **National Marine Fisheries Service (NMFS):** Kristin Begun, Jeff Stuart, Garwin Yip
- **U.S. Bureau of Reclamation (Reclamation):** Elissa Buttermore, Towns Burgess, Suzanne Manugian, Ben Nelson, Tom Patton
- **State Water Resources Control Board (SWRCB):** Chris Carr, Michael Macon, Craig Williams, Erin Foresman, Stanley Mubako, Alessia Siclari
- **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 State Water Resource Control Board'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 (2019 ROC Proposed Action). OMR flows are reported weekly with the OMR index and the tidally filtered US 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 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 ITL 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 weekly operations and fish outlook for more triggers relevant to the CDFW ITP (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 Operation of the State Water](#)

Agenda Item 3.

Weekly Fish and Water Operations Outlook 4/14/2020 – 4/20/2020

Dry and warmer with above-normal temperatures. D-1641 X2 compliance and ESA OMR \geq -5,000 cfs are still in effect. From April 10 through May 10, the D-641 San Joaquin River “pulse flow” period is occurring, with the combined exports of both projects at 100% of the Vernalis flow (3-day average) or 1,500 cfs, whichever is greater. In addition, SWP exports are limited by Spring Outflow requirements, as described in Section 8.17 of DFW’s Long Term ITP for the SWP. The applicable ratio of Vernalis flow to combined SWP/CVP exports (per the ITP) is 1:1 (for a critically dry year) and the proportionate share (per COA) of the SWP’s exports is 40% of the allowable combined export rate.

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"> • Adult spring-run Chinook salmon immigration March – June. • Late-fall run Chinook salmon emergence from redds through May. • Steelhead emergence from redds through May. <p><i>(updated 04/13/20)</i></p>
Sacramento River	Shasta Storage: 3.72 MAF Shasta Release: 4,500 cfs, – 9,000 cfs (The CVP is expecting a large increase in diversions demands along the Sacramento River and Shasta’s releases will be increased consistent with the observed demands)	<ul style="list-style-type: none"> • End of winter-run Chinook salmon juvenile migration, adults migrating and holding. • Spring-run Chinook salmon juveniles rearing and emigrating. • Fall-run Chinook salmon fry in gravel with continued emergence, juveniles rearing and emigrating. • End of Late-fall Chinook salmon spawning, eggs and fry in gravel. • Steelhead spawning at peak. • Green sturgeon adults present. <p><i>(updated 4/6/20)</i></p>
Feather River	Oroville Storage: 2.38 MAF Oroville Release to Feather: 1,350 cfs to 1,750 cfs	<ul style="list-style-type: none"> • Fall-run Chinook salmon eggs still in gravel, hatching, and emergence is ongoing. Peak emergence of fall-run Chinook salmon to occur through mid-April. • Steelhead eggs are in gravel, hatching and emergence is ongoing. • Spring-run and fall-run juvenile Chinook salmon continue to emigrate out of the Lower Feather River. • Late-fall-run Chinook salmon eggs in gravel, hatching, and emergence is continuing. <p><i>(updated 4/13/20)</i></p>

American River	Folsom Storage: .58 MAF Nimbus Release to American: 1,500 cfs	<ul style="list-style-type: none"> • Fall-run Chinook salmon eggs still in gravel, hatching and emergence is ongoing. Peak emergence of fall-run Chinook salmon estimated to have occurred mid-March. Preliminary carcass survey results indicate the majority of fall-run Chinook salmon have emerged from the gravel and emergence will occur through mid-April. Fall-run Chinook salmon that have emerged are currently rearing and emigrating out of the lower American River. • Steelhead spawning continues, eggs are in the gravel, hatching and emergence is ongoing. • Spring-run and winter-run Chinook salmon juveniles present (non-natal rearing). • Steelhead redds at potential risk of dewatering due to reductions in releases. • Fall-run Chinook salmon and steelhead juveniles at risk of stranding due to reductions in releases. <p><i>(updated 4/13/20)</i></p>
Stanislaus River	New Melones Storage: 1.91 MAF Goodwin Release to Stanislaus: 400 cfs, with pulses to 1,500 cfs (Spring Pulse Flow)	<ul style="list-style-type: none"> • Preliminary carcass survey results indicate fall-run Chinook salmon peak emergence occurred mid- February, majority of fry rearing and emigrating. • Caswell RST Chinook salmon catch has increased and has been relatively high over the past week. • Steelhead are spawning based on historical timing and eggs are currently in the gravel. No empirical data on steelhead spawning is available. Historical data indicates steelhead may be emerging now. <p><i>(updated 4/13/20)</i></p>
Delta	Freeport: 10,000 to 13,000 cfs Vernalis: 1,700 to 3,500 cfs Delta Outflow index: 9,000 to 13,000 cfs Exports JPP: 800 to 3,000 cfs CC: 200 to 2,500 cfs Expected OMR Index: -1,000 to -2,000 cfs Maximum Allowable OMR: -5,000 cfs X2 position: 74 to 81 km QWEST: +1,000 cfs to +3,000 cfs DCC: Closed	<ul style="list-style-type: none"> • 19-20% winter-run Chinook salmon juveniles present and 80% past Chipps Island. • 48-68% spring-run Chinook salmon juveniles present and 17-22% past Chipps Island. • Fall-run Chinook salmon juveniles rearing. • Steelhead juvenile migration occurring. • Green sturgeon adult and juveniles present. • Adult Delta Smelt likely spawning and larval Delta Smelt present • Spawning adult and larval Longfin Smelt present. <p><i>(updated 4/14/2020)</i></p>

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 = 5,001 . 50% of 1.17% of JPE = 5,001 WY2020 JPE: 854,941	Loss (LAD) = 175 (3.5% of 50% single-year loss threshold)	Decreasing	4/12/20
Hatchery Winter-run Chinook salmon loss	Single-year loss threshold = 55.4 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 3-10-2020 97,505 (~40% of production) released on 3-23-2020	Loss = 0	Potentially increasing	4/12/20
Natural steelhead loss	1) December 1 – March 31 (not active): 50% loss threshold = 707 50% of 1,414 from December 1 – March 31 = 707 2) April 1 – June 15 (active): 50% loss threshold = 776 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 = 87 (11% of 50% April 1 – June 15 loss threshold)	Decreasing	4/12/20
Hatchery Spring-run Chinook salmon surrogates	Loss > 0.5% of each release group: 1) 12-9-2019: 84,869 = 424.3 2) 12-18-2019: 77,672 = 388.4 3) 01-13-2020: 77,866 = 389.3	1) 20.2 2) 25.0 3) 0	No change expected	4/12/20
Green sturgeon	Cumulative salvage = 74	Salvage = 0	No change expected	4/12/20
Delta Smelt	1) Daily Avg. < 12 NTU at OBI 2) March-June: OMR ≥ -5000 cfs 3) 3 days exceeding Clifton Court Daily Aver. T ≥ 77°F	1) OBI Daily Avg Turbidity = 3.0 NTU (4/12/20) 2) QWEST: Positive 3) ≥ 77 °F Days = 0	Expected to remain stable	4/13/20

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 <i>(when ≥ 5% of SR or WR in Delta)</i>	In effect	≥ 5% of the WR or SR population in Delta	19-20% WR estimated in-Delta 48-68% SR estimated in Delta	Ongoing	4/14/20	80% WR estimated exited Delta 17-22% SR estimated exited Delta
	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	Current yearly loss = 175.02 (0.0175%) natural WR, 0 hatchery WR	Salvage likely to continue	4/13/20	Based on 4/12/20 Salvage data, Acoustic tagged hatchery WR have been detected in the Delta and past Chipps Island
	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	N/A			

<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>
	WR relative daily loss (8.6.3)	Jan. 1 - May 31	In effect	1/1 - 1/31: 0.00635% loss of the WR JPE = 54.29 fish 2/1 - 2/28: 0.00991% = 84.72 3/1 - 3/31: 0.0146% = 124.82 4/1 - 4/30: 0.00507% = 43.35 5/1 - 5/31: 0.0077% = 65.83	Max single daily loss from prev. week = 0.00 fish (WR last observed on 4/7/20)	No change – salvage below “trigger” levels	4/13/20	Based on 4/13/20 Salvage data
	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	Max. loss for any group = 0%	Large numbers of SR sized fish in salvage at the CVP, possibly part of FR hatchery releases from CNFH and Nimbus FH	4/13/20	Based on 4/12/20 Salvage data

<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>
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 ≥ 50 NTU OR Smelt Monitoring Team recommendation]	Avg. flow = -- cfs avg turbidity = -- NTU	N/A	N/A	
	Turbidity Bridge Avoidance (8.5.1)	Dec. 1 - Apr. 1	NA	- Avg. OBI turbidity > 12 NTU	OBI = 3.1 NTU	None expected	4/13/20	
	Larval and/Juvenile Delta Smelt Protection (8.5.2)	Ongoing	In effect	- 5-day cum. salvage of juv. DS \geq [average 3-yr FMWT index + 1] = 1.67	current 5-day salvage = 0 fish	None expected	4/13/20	
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	Cum. Salvage = 0 adults	None expected	N/A	
	OMR Mgt. for Adults (8.4.1)	Dec. 1 - Feb. 28	N/A	- Smelt Monitoring Team recommendation		None expected	N/A	

<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 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	LFS at 6 (SLS#6) & 4 (20mm#1) stations LFS catch/tow > 5 at 3 (SLS#6) & 2 (20mm#1) stations	Triggered - no OMR recommendation expected	4/13/20	40 juv LFS salvaged through 4/6/20
	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 $> 8,000$	Sac = 6,600 - 17,000 cfs SJ = 2,100 cfs	No change	4/13/20	Sac flow at Freeport (RVB not available)

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

- The winter-run Chinook salmon yearly loss differs in the above from what is captured in the ITP. This is a result of the differences in which the two sets of information were updated.

Operations

Operations Category	Location	Operations on 4/7/20	Operations on 4/14/20
Clifton Court Inflow	Clifton Court Forebay	600 cfs, will increase by 100-200 cfs on 4/10/20 in response to anticipated increasing flows at Vernalis (VNS) due to spring pulse flows on the Stanislaus River. Operating to I:E ratio of 1:1	300 cfs, operating to I:E ratio of 1:1. May increase depending on state of Vernalis flows.
SWP Reservoir Releases	Feather – Oroville	1,750 cfs, potentially decreasing a couple of hundred cfs over the next week	1,550 cfs and holding
SWP Reservoir Storage	San Luis (SWP)	965 TAF	967 TAF
SWP Reservoir Storage	Oroville	2,329 TAF	2,390 TAF
Environmental Parameters	Sacramento River at Freeport	16,100 cfs	12,835 cfs
Environmental Parameters	San Joaquin River at Vernalis	1,730 cfs	2,036 cfs
Environmental Parameters	Delta Outflow Index	16,000 cfs, increasing to approximately 22,000 today (4/7)	13,030 cfs
Environmental Parameters	E:I (14-day)	26% (14-day avg.)	11.7% (14-day avg.)
Environmental Parameters	X2	79 Km	73.2 Km
CVP Exports	Jones Pumping Plant	3,500 cfs, anticipate increasing by approximately 2,000 cfs (2	1,600 cfs, coordinating with SWP on meeting 1:1, may require

Operations Category	Location	Operations on 4/7/20	Operations on 4/14/20
		units) due to higher than anticipated VNS flows.	adjustments at the end of this week to maintain I:E ratio of 1:1
CVP Reservoir Releases	American - Nimbus	1,500 cfs	Holding at 1,500 cfs, discussions around potential reduction are ongoing
CVP Reservoir Releases	Sacramento - Keswick	4,600 cfs today (4/7/20). In the process of ramping down from 5,000 cfs to 4,500 cfs (on 4/8/20) due to storm precipitation over the weekend. Potential to increase next week in order to offset expected warmer air temperatures and demand for increased agricultural diversions historically seen in mid-April from the Sacramento River.	5,000, scheduled to increase tomorrow to 5,500cfs. May increase further to meet in-river diversions for spring irrigation.
CVP Reservoir Releases	Stanislaus - Goodwin	200 cfs, change order for increases starting 4/8/20 for the next week. Increase releases to 1,250 cfs by 4/8/20, decrease to 400 cfs by 4/11/20, then increase releases to 1,350 cfs by 4/13/20.	900 cfs and is in the middle of pulse flow. Ramping down to 400 cfs and back up to 1,500 cfs (4/18/20). This is second of four pulses scheduled.
CVP Reservoir Releases	Trinity - Lewiston	300 cfs. Snow melt pulse flow to start on Trinity during the week of 4/12/20	Started pulse flow, currently at 1,000 cfs, going up to 1,500 on 4/14/20 before decreasing again
CVP Reservoir Storage	San Luis (CVP)	563 TAF	594 TAF

Operations Category	Location	Operations on 4/7/20	Operations on 4/14/20
CVP Reservoir Storage	Shasta	3,662 TAF	3,729 TAF
CVP Reservoir Storage	Folsom	526 TAF	588 TAF
CVP Reservoir Storage	New Melones	1,899 TAF	1,909 TAF
CVP	DCC Gates	Closed	Closed

cfs = cubic feet per second

MAF = million acre feet

TAF = thousand acre feet

Km = kilometer

X2 = 2 parts per thousand isohaline location; location measured from the Golden Gate Bridge

Factors controlling Delta exports: Controlling factor for 4/7/20 – 4/13/20 was 1:1 Vernalis inflow to exports criteria from D-1641.

The San Joaquin River water year index is at the border between “critical” and “dry”. Going into “dry” would result in impacts to the ratio between river inflows and exports. There is also the possibility of some Chipps Islands day in May requiring X2 to be downstream of Chipps Island, which would potentially impact operations.

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

Approximate OMR gage data as of 4/11/20

	USGS gauges (cfs)	Index (cfs)
Daily	-1,400 cfs	-1,300 cfs
5-day	-2,800 cfs	-2,500 cfs
14-day	-3,200 cfs	-3,200 cfs

Approximate OMRs as of 4/13/20:

	Index (cfs)
Daily	-1,400 cfs
5-day	-1,800 cfs
14-day	-2,800 cfs

Agenda Item 5.

Fish Abundance and Distribution

Hatchery Releases

On 4/13/20 and 4/14/20 the CDFW released approximately 900,000 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 includes 25% CWT 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: http://www.cbr.washington.edu/sacramento/data/query_hrt.html

Average percent of annual emigrating population for each species of interest (based on LAD) captured at the following locations by 4/12/20 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	99.9%	99.8%	99.9%	100%	90.3%	84.9%
2005 – 2018	Spring-run Chinook salmon	78.0%	78.0%	81.3%	95.5%	48.2%	22.3%
2005 – 2018	Steelhead	4.2%	77.1%	72.4%	79.4%	93.5%	88.1%

Salvage timing: http://www.cbr.washington.edu/sacramento/data/query_salvage_hrt.html

Average percent for each species (based on LAD) of interest salvaged at the SWP and CVP Delta Fish Facilities by 4/12/20 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)	98.2%
Average 2005 – 2018	Spring-run Chinook salmon (unclipped)	31.2%
Average 2005 – 2018	Steelhead (unclipped)	73.6%

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 ^A	Feather River RST Herringer ^B	GCID RST ^C	Tisdale RST ^D	Knights Landing RST ^E	LAR RST ^G	Sacramento Trawls ^F	Chippis Island Midwater Trawl ^F	Caswell RST ^H
Sample Dates	4/6/20-4/12/20	4/6/20-4/12/20	4/11/20-4/13/20	4/6/20-4/12/20	4/6/20-4/12/20	4/9/20-4/10/20	4/5/20-4/6/20, 4/8/20-4/10/20	4/5/20, 4/9/20-4/10/20	4/7/20-4/10/20
Chinook									148 juv.
FR Chinook	5,264	2,601	183 juv.		24	302	58	2	
SR Chinook	30	14	83 juv.	3	44	47	411	379	
WR Chinook								46	
LFR Chinook	72	17		1		12			
Chinook (ad-clip)		1,669 SR	6 juv. FR 1 smolt WR 3 juv. WR	1 FR 1 SR	6 FR 16 SR	6	192	137	
Steelhead (natural)	7						2	1	
Steelhead (ad-clip)					1				
Green Sturgeon									
Flows (avg. cfs)	1,300	1,683	1,172 *	7,789	8,055				
W. Temp. (avg. °F)	53.3	55.2	58.8 *	57.6	57.4				
Turbidity (avg. NTU)	1.9	1.9	23.1 *	11.7	12.7				

^A Feather River RST data from Eye Channel sampling period was from 4/6/20 at 13:20 to 4/12/20 at 12:44.

^B Feather River RST data at Herringer sampling period was from 4/6/20 at 11:46 to 4/12/20 at 9:30.

^C GCID RST cone was raised 4/4/20 in the morning due to high waters and Coleman Hatchery released Chinook. Sampling resumed 4/10/20 in the morning. GCID RST sampling period was from 4/11/20 at 9:00 to 4/13/20 at 9:00. RST operating at full cone. * Environmental conditions sampling period was from 4/7/20 at 9:00 to 4/13/20 at 9:00.

^D Tisdale RST sampling period was from 4/6/20 at 10:00 to 4/12/20 at 9:30. RST operating at half cone the full duration (4/6/20 at 10:00 to 4/12/20 at 9:30). Debris was present this past week.

^E Knights Landing RST sampling period was from 4/6/20 at 9:45 to 4/12/20 at 11:00. RST operating at half cone the full duration (4/6/20 at 9:45 to 4/12/20 at 11:00). Debris was present this past week.

^E DatCall sampling data period was from 4/5/20 to 4/10/20. Beach Seines, EDSM, and Mossdale Trawl not sampled the past week.

^G Lower American River RST sampling period was 4/9/2020 to 4/10/2020, no additional data before or after that date.

^H Caswell RST sampling period was from 4/7/20 to 4/10/20.

- The large releases of hatchery fall-run Chinook salmon (> 6.5 million fish) from different hatcheries with body lengths overlapping those of natural LAD spring-run Chinook salmon confounds identification of natural spring-run Chinook salmon by LAD. The similarity of the ratio of clipped to unclipped fish in monitoring, compared to the ratio of clipped to non-clipped fish from the hatcheries (25%:75%) indicate that most LAD spring-run Chinook salmon observed are likely to be larger unclipped fall-run Chinook salmon from the multiple hatchery releases.

Fish Monitoring Gear Efficiency/Disruptions:

Monitoring Survey	Status (as of 4/13/20) Most Recent Change in Green
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 Ck 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 (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

No new tags deployed. A green sturgeon adult was detected at the Sacramento River at Rio Vista on 4/7/20 and 4/9/20. Four juvenile green sturgeon were detected north of Sherman Lake on 4/7/20 and 4/9/20.

One green sturgeon adult was detected at the 3-meter steel fyke trap on the San Joaquin River at Hills Ferr on 4/11/20. No PIT or acoustic tag was detected, all scutes were present, and neither of the pectoral fins were noticeably notched. It was released upstream of the trap location and appeared healthy.

Red Bluff Diversion Dam Biweekly Report

There was no USFWS biweekly report for this week (3/30/20 – 4/6/20) prior to the call. Sampling is not currently occurring due to COVID-19.

DOSS Weekly Salvage Update

Reporting Period: April 6-April 12, 2020
 Prepared by Kyle Griffiths on April 13, 2020 14:57
 Preliminary Results -Subject to Revision

Criteria	6-Apr	7-Apr	8-Apr	9-Apr	10-Apr	11-Apr	12-Apr	Trend	
Loss Densities									
Wild older juvenile CS	0	0.35	0	0	0	0	0	↘	0.05
Wild steelhead	0.78	0	4.89	0	0.51	0	5.34	↗	1.65
Exports									
SWP daily export	0	1,339	1,255	1,906	2,124	1,610	1,668	↘	1,415
CVP daily export	6,954	6,937	6,933	6,928	3,242	3,196	3,195	↘	5,341
SWP reduced counts	0	0	0	0	0	0	0		
CVP reduced counts	0	0	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
Wild							
Winter Run	4	3	↘	67	132	102	175
Spring Run	713	576	↗	813	756	817	759
Late Fall Run	0	0	↗	12	8	12	8
Fall Run	40	30	↗	111	97	72	51
Unclassified	0	0	↗	0	0	0	0
Total	757	609		1,003	994	1,003	994
Hatchery							
Winter Run	0	0	↘	17	12	77	81
Spring Run	339	284	↘	1,068	1,364	937	1,249
Late Fall Run	0	0	↗	195	153	186	144
Fall Run	4	3	↗	25	17	105	72
Unclassified	0	0	↗	0	0	0	0
Total	343	287		1,305	1,546	1,305	1,546

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	34	74	↘	198	489
Hatchery	109	92	↘	367	512
Total	143	167		565	1,001

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

- The CVP reported that salvage pumping was reduced for a few minutes during a few counts the previous week due to maintenance on the salvage pump system. However, the 30 minute salvage count times were not reduced. SaMT members will follow up offline on how to account for this for this week's reports.
- Two clipped Chinook salmon with CWT code 068020 were indicated on the CVP salvage sheets last week, however this code does not match any from the hatchery release notifications or on SacPAS. SaMT members to follow up with Reclamation and SacPAS website administrators on this discrepancy.

SaMT Estimates of Fish Distribution

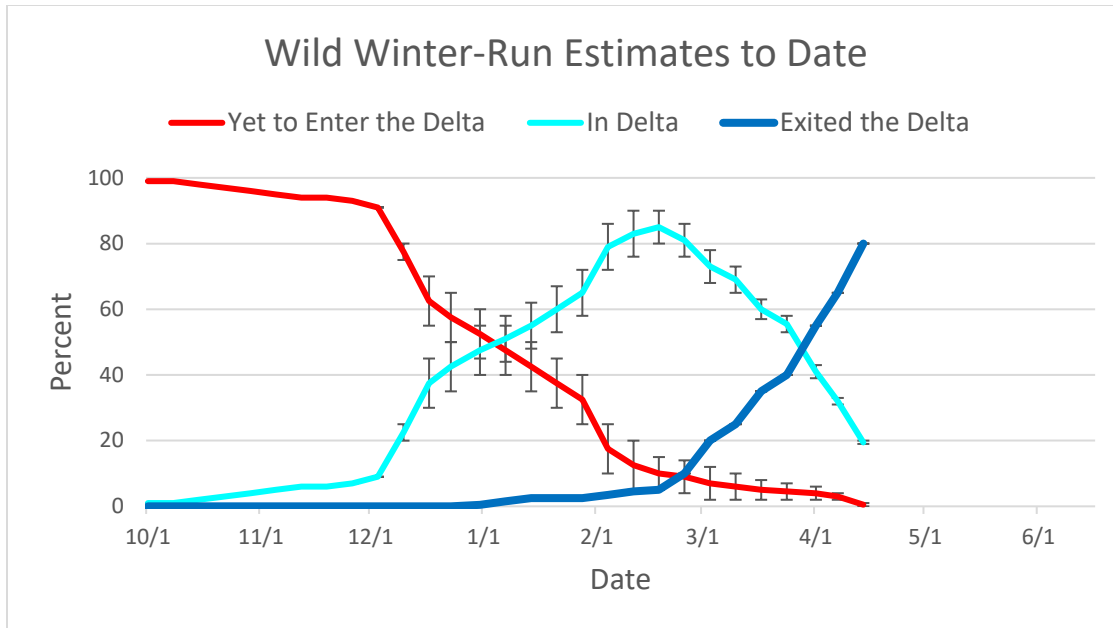
SaMT estimates of the current distribution of listed Chinook salmon, as a percentage of the population, are based on recent monitoring data and historical migration timing patterns.

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: 2-4%	19-20% Last week: 31-33%	80% Last week: 65%
<i>YOY spring-run Chinook salmon</i>	15-30% Last week: 25-40%	48-68% Last week: 53-68%	17-22% Last week: 7%
<i>YOY hatchery winter-run Chinook salmon</i>	20-30% Last week: 35-45%	40-45% Last week: 40-45%	30-35% Last week: 15-20%
<i>Natural Origin Steelhead</i>	30-45% Last week: 30-45%	30-50% Last week: 40-60%	20-25% Last week: 10-15%

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, 46 winter-run were captured in Chipps Island Trawl. SaMT estimates that the percentage of winter-run Chinook salmon population within the Delta changed from 31-33% to 19-20%. SaMT also estimates an additional 15% exited past Chipps Island equating to an estimated sum total of 80% 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 recently into Sacramento River and Battle Creek (3/10/20, 3/23/20). Acoustic tagged fish have been detected at several locations including: Butte City, Wilkens 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.

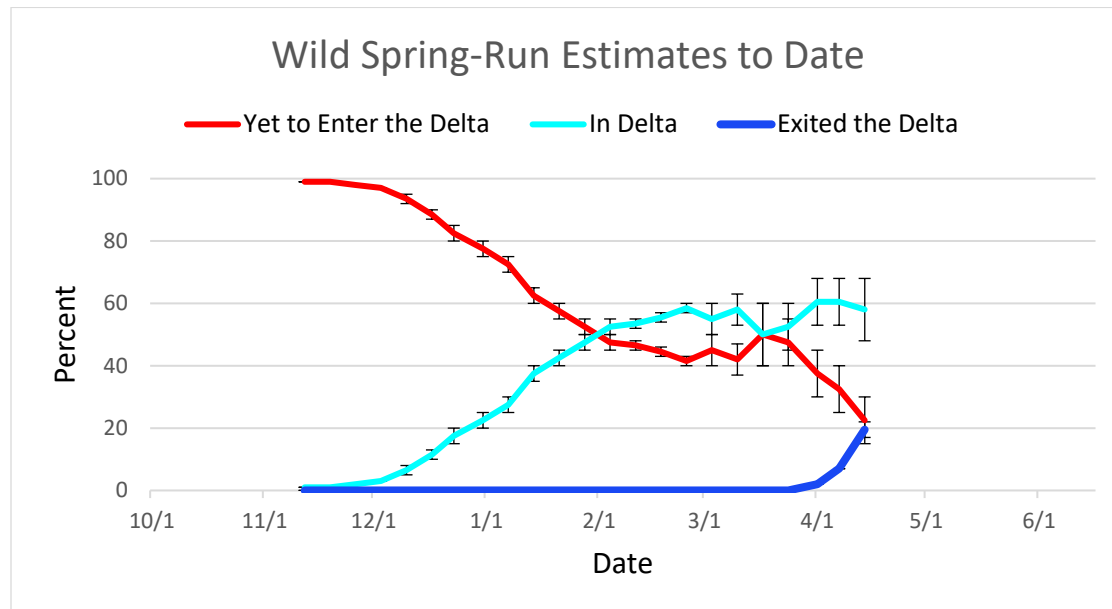
https://calfishtrack.github.io/real-time/pageLSWR_2020.html

Natural spring-run Chinook salmon:

In the last week 411 juvenile spring-run Chinook salmon were observed at Sacramento Trawl, 44 at Knights Landing, 3 at Tisdale, and 379 at Chipps Island. Beach seine sites were not sampled last week. Historical timing based on passage at Knights Landing indicate that 81.3% 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 Creek are entering the mainstem Sacramento River and emigrating through the Delta.. SaMT estimates 15-30% of the spring-run Chinook salmon population are upstream of the Delta and 48-68% are in the Delta. SaMT also estimates an additional 10-15% 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 (loss = 74), at Chipps Island (n = 1), and at Sacramento Trawls (n = 2) during this past week. Historically, 73.6% of steelhead are salvaged by this time of the year. SaMT estimates that 30-50% of steelhead are in the Delta this week and that 20-25% 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.

Current Conditions

Entrainment into the Interior Delta:

<https://oceanview.pfeg.noaa.gov/shiny/FED/CalFishTrack/>

The Delta STARS Model is an individual-based simulation model that estimates survival, travel time, and routing of juvenile salmon migrating through the Delta. The model's structure and parameters are based on a recent analysis (Perry et al. in press) that relates individual survival, travel time, and routing of late-fall-run Chinook salmon to daily Sacramento River flows at

Freeport and Delta Cross Channel operations. SaMT reviewed the STARS model for route-specific survival and routing probabilities.

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 entrainment: 0% DCC, 24% Georgiana Slough, 47% Sacramento River, and 29% Sutter and Steamboat Slough (Last updated on 4/9/20).

Routing probabilities at Three Mile Slough and Broad Slough (junction of the Sacramento and San Joaquin rivers) are not estimated by the STARS model. However, QWEST is expected to be positive this week.

- SaMT members noted that STARS model predicts that it takes roughly 15 days to get to Chipps Island via the Georgiana Slough route versus 9-10 days coming from the Sacramento River and Sutter and Steamboat slough routes. This means exposure to predation along the Georgiana Slough migratory route is nearly 50% greater.

DSM2

DSM2 – Results are provided in the Assessment documents weekly on Tuesdays and Fridays. Additionally, a Monday document is circulated prior to the Tuesday meeting. SaMT reviewed the latest DSM2 modeling results.

Sensitivity to Operational Actions - SaMT Feedback on Entrainment Risk

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

- 1) After January 1, are more than 5% of the juveniles from one or more salmonid species present in the Delta?
 - Yes.
 - Currently 19-20% natural winter-run Chinook salmon, 48-68% spring-run Chinook salmon, 40-45% of hatchery winter-run Chinook salmon, and 30-50% 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?
 - 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.
 - Storms events will also cue fish movement. Precipitation events occurred over the past week.
 - 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), SaMT believes 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.

- Under conditions similar to those being experienced currently in past years without the Head of Old River Barrier in place, 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 > 1,022).
 - The SaMT expects to see more San Joaquin River origin fish salvaged at the CVP.
 - Currently there are a considerable amount of spring-run Chinook salmon-sized fish by LAD of unknown origin in the salvage of the CVP fish collection facilities. Since the Mossdale Trawl is not monitoring currently, it is not possible to determine if these fish are originating in the San Joaquin River basin and moving towards the CVP fish collection facilities via the Head of Old River route.
 - Increase in Chinook catch at the Caswell rotary screw traps were observed and are likely a result of pulse flows on the Stanislaus River. However, fork length is unknown given Mossdale Trawl is not monitoring currently.
- 3) How much loss has occurred in the past week (4/6/20 - 4/12/20)?
- Losses of both clipped and unclipped salmonids have been observed at the SWP and CVP facilities. Fish salvage began to decrease recently on the State side, due to reduced exports (shifting more exports to CVP). An increase in salvage at the CVP of San Joaquin-origin salmonids is expected over the upcoming weeks.
 - In the past week, natural-origin winter-run sized Chinook salmon were salvaged at the Delta fish collection facilities (weekly loss = 3 fish).
 - Natural-origin spring-run sized Chinook salmon (LAD) were salvaged last week at the Delta fish collection facilities (weekly loss = 576 fish). Many of these fish are likely misidentified hatchery fall-run Chinook salmon that overlap with the spring-run Chinook salmon sizes by LAD.
 - Hatchery-origin spring-run Chinook salmon were salvaged at both facilities (weekly loss = 284 fish). All fish were from the SJRRP releases, none were from the Feather River Fish Hatchery spring-run Chinook salmon releases.
 - Hatchery-origin steelhead were observed in salvage at both facilities (weekly loss = 92 fish).
 - Natural-origin steelhead were observed in salvage at both facilities (weekly loss = 74).
- 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 for the upcoming week 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.

- 5) If a single-year loss threshold has been exceeded, do continued OMR restrictions benefit fish movement based on real-time information?
 - o 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?
 - o Not applicable. Current OMR flows more positive than -5,000 cfs.

Agenda Item 7.

Other Topics

- Assessment will be finalized on 4/14/20

Agenda Item 8.

Additional Considerations for WOMT

- Operating according to the finalized CDFW ITP. It will take time to align operations under the State ITP and ROC on LTO between the two Projects. There is a request by CDFW to incorporate ITP thresholds into Assessment questions and the Salmon Monitoring Team notes.
- The ITP includes additional elements for its risk assessment, such as attachment qualifiers for the risk of entrainment into the central Delta as well as entrainment at the facilities. As such, it was recommended that these considerations be integrated into weekly conversations on questions 2 and 3 of the Assessment Evaluation section to fulfill ITP requirements.
- There is a large amount of information discussed on the Tuesday morning calls that would be better facilitated by extending the length of the call.

Agenda Item 9.

Next SaMT Meeting is scheduled for Tuesday, 4/21/20 at 9:00 a.m.