

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 6/18/2019 at 9:00 a.m.

Objective: Provide advice to the Water Operations Management Team (WOMT) and National Marine Fisheries Service (NMFS) on measures to reduce adverse effects from Delta operations of the Central Valley Project and the State Water Project on salmonids and green sturgeon. DOSS will work with other technical teams. DOSS notes and advice can be found at the [NMFS Water Ops page: www.westcoast.fisheries.noaa.gov/central_valley/water_operations/doss.html](http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/doss.html).

CDFW: Duane Linander, Ken Kundargi, Geir Aasen, Kyle Griffiths, Jason Julienne

DWR: Chris Cook, Bryant Giorgi, Kevin Reece

NMFS: Kristin Begun

Reclamation: Elissa Buttermore, Tom Patton

SWRCB: Chris Carr, Michael Macon

USFWS: Craig Anderson, Felipe Carrillo

Agenda Items

1. Agenda review and introductions
2. RPA Implementation review (For the DOSS Dashboard, click on the "Triggers & Indices" tab at: [Bay Delta Live](#))
3. Current Operations
4. Smelt Working Group
5. Fish Monitoring: RSTs/trawls/seines
6. Fish Monitoring: Salvage
7. Hatchery Releases
8. DOSS Estimates of Fish Distribution
9. DOSS Feedback on Entrainment Risk
10. DOSS advice
11. DOSS Report WY 2019 Open Discussion
12. DOSS Report WY 2019 Schedule
13. Next DOSS meeting

Agenda Item 2.

RPA Implementation Review

Delta RPA Actions affecting operations during June:

Action IV.1.2¹ (DCC gate operations):

- DCC gates will remain closed from 5/21/19 through 6/15/19, per operations described in RPA IV.1.2.

Action IV.2.3³ (OMR Management):

¹ For details, see pages 62-66 in Enclosure 2 of the [2011 Amendments to the 2009 RPA: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

- Implementation of this action in WY 2019 is from 1/1/19 to 6/15/19, and requires that Old and Middle River (OMR) flow be no more negative than -5,000 cfs. OMR flows are reported weekly with the OMR index and the tidally filtered USGS gauges at the 5-day and 14- day running averages.
- Responses to exceedances of RPA action triggers require that OMR flows become more positive to meet the mandatory OMR flow limits required by the action.
- No salvage-based triggers that would require OMR to be more positive than -5,000 cfs were exceeded this week.

Agenda Item 3.

Current Operations (6/18/19)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	6,680	Jones Pumping Plant	1,600 ¹
Reservoir Releases (cfs)			
Feather - Oroville	2,000	American - Nimbus	7,300 ²
		Sacramento - Keswick	10,000
		Stanislaus – Goodwin	1,050 ³
		Trinity - Lewiston	1,800 ⁴
Reservoir Storage (in TAF)			
San Luis (SWP)	761	San Luis (CVP)	769
Oroville	3,460	Shasta	4,434 (decreasing)
New Melones	2,201 (increasing)	Folsom	926 (increasing)
Delta Operations			
DCC	Closed ⁵	Sacramento River at Freeport (cfs)	24,300
Outflow Index (cfs)	26,700	San Joaquin River at Vernalis (cfs)	11,200
E:I	18% (14-day avg.)	X2	63 km

¹ CVP exports had decreased from 4,400 cfs to 900 cfs for an O’Neill outage occurring today (6/18) to Friday (6/21). Exports are currently at 1,600 cfs due to demands.

² Nimbus releases are scheduled to decrease tonight to 6,400 cfs.

³ Goodwin releases will increase and decrease following a modified Appendix 2E pulse flow.

⁴ Trinity releases are continuing the ROD pulse flow schedule.

⁵ DCC gates may be open on Friday (6/21) depending on river flows.

Factors controlling Delta exports:

- 6/11/19 - 6/18/19: physical capacity (federal side), USACE Permits (state side)

Approximate OMR as of 6/15/19:

	USGS gauges (cfs)	Index (cfs)
Daily	-5,400	-4,500
5-day	-3,900	-3,100
14-day	-3,500	-3,200

Approximate OMR as of 6/17/19:

	Index (cfs)
Daily	-5,300
5-day	-4,600
14-day	-3,400

Weather Forecast

Warm temperatures over the northern and central Sacramento valley. A slow cooling trend through the end of the week dropping to near normal by Friday. Warmer temperatures again next weekend. A slight chance of afternoon mountain thunderstorms early next week.

Agenda Item 4.

Smelt Working Group

The Smelt Working Group met on Monday, 6/17/19, at 10 am.

The Smelt Working Group (SWG) reviewed current Delta conditions, survey data, expected exports, and forecasted weather. River flows are continuing to taper down, and the CVP will be undergoing scheduled reduced exports from tomorrow through Friday, resulting in OMR flow rates of around -2,500 cfs. With no new detections of any Delta Smelt in the system this past week, the SWG could not accurately predict the fish distribution. Assuming that the lack of fish detections in the South Delta implies that there are few fish in that area, the SWG determined that overall risk of entrainment for Delta Smelt in the system is low.

On 1/31, the 3-station average daily water temperature at Mossdale, the Rio Vista Bridge, and Antioch exceeded 12°C, which is the temperature indicative of Delta Smelt spawning as identified in the Biological Opinion and a potential trigger for the start of Action 3. The Service determined on 2/6 that Action 3 had been implemented for the protection of larval and juvenile Delta Smelt. The implementation of Action 3 requires OMR flow rates to be no more negative than -5,000 cfs on a 14-day running average. The SWG will continue to monitor Delta Smelt survey and salvage data and Delta conditions, and the group plans to meet again for the final meeting of WY2019 next Monday, 6/24 at 10 am.

Agenda Item 5.

Fish Monitoring: The following table presents fish monitoring data summarized over the past week. Unless otherwise noted, reported sizes are fork length. Empty cells indicate zero catches at those locations with sample dates shown.

Location	GCID RST	Tisdale RST ^A	Knights Landing RST ^B	Beach Seines ^C	Sacramento Trawl ^C	Chippis Is. Midwater Trawl ^C	Mossdale Kodiak Trawl ^D
Sample Date	6/11-6/17	6/7-6/14	6/6-6/17	6/10, 6/12, 6/14	6/10, 6/12, 6/14	6/10, 6/12, 6/14	-
Chinook							
FR Chinook	162 juveniles 10 smolts			2	2	30	
SR Chinook	2 smolts						
WR Chinook							
LFR Chinook							
Chinook (ad-clip)						1	
Steelhead (wild)	1						
Steelhead (ad-clip)							
Green Sturgeon							
Flows (avg. cfs)	1,422	11,902	10,965				
W. Temp. (avg. °F)	62.79	62.3	67.8				
Turbidity (avg. NTU)	24.29	22.7	16.92				

^A Tisdale RST sampling period was from 6/7 at 11:00 am to 6/14 at 10:00 am.

^B Knights Landing RST sampling period was from 6/6 at 10:15 am to 6/17 at 10:00 am.

^C Data reported in the 6/9 to 6/15 DJFMP sampling summary.

^D Mossdale trawls sampled by CDFW (Region 4) instead of the DJFMP between 4/1 and 6/30.

Feather River RST Data

Cook (DWR) provided Feather River RST data for two RST sites on the Feather River. At the Eye Side Channel from 6/10 to 6/14, 12 fall-run Chinook salmon were observed. Flows were an average 2,900 cfs, water temperature 55°F, and turbidity 1.7 NTU. At the Herringer site from 6/10 to 6/14, 3 fall-run Chinook salmon and 1 ad-clipped spring-run Chinook salmon were observed. Flows were an average 5,200 cfs, water temperature 60°F, and turbidity 2.1 NTU.

Agenda Item 6.

Fish Monitoring: Salvage

Griffiths (CDFW) provided a salvage summary for the period of 6/10-6/16.

Chinook salmon

Unclipped (wild origin) Chinook: Weekly salvage of wild origin Chinook salmon included 4 spring-run and 108 fall-run sized fish (estimated from subsample). Total WY19 salvage of wild-origin Chinook salmon is 11,573 fish.

Clipped (hatchery origin) Chinook: 0 ad-clipped Chinook salmon were observed this week in salvage. Total WY19 salvage of ad-clipped Chinook is 1,703 fish.

Steelhead

Unclipped steelhead: 4 fish salvaged for a season total to date of 442.

Clipped steelhead: 5 fish salvaged for a season total to date of 1,845.

Sturgeon

No sturgeon were salvaged at either facility this week. The last date of white sturgeon salvage was 3/13/2019 at the state facility. Last verified salvage of green sturgeon was 1/22/2016 at the state facility.

Operations:

The state facility reduced a count on 6/11 due to high debris flow. The state facility reduced counts due to high fish numbers on 6/12, 6/15 & 6/16. The federal facility did not reduce any counts this week but reported 60 minutes of unscreened water export on 6/11 for screen maintenance.

DOSS Weekly Salvage Update

Reporting Period: June 10-June 16, 2019

Prepared by Kyle Griffiths on June 17, 2019 15:57

Preliminary Results -Subject to Revision

Criteria	10-Jun	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	0	0	0	0	→	0.00
Wild steelhead	0.81	0	0	0	0	0	0	↘	0.12
Exports									
SWP daily export	13,049	13,356	13,080	12,686	13,393	13,588	12,808	→	13,137
CVP daily export	8,447	3,445	3,200	8,667	8,682	6,865	8,658	↘	6,852
SWP reduced counts	0	8%	17%	0	0	33%	29%		
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	
	Salvage	Loss	Trend	Salvage	Loss
Wild					
Winter Run	0	0	→	184	537
Spring Run	4	3	↘	2,179	6,102
Late Fall Run	0	0	→	3	13
Fall Run	108	69	↘	9,203	12,499
Unclassified	0	0	→	4	NC
Total	112	71		11,573	19,151
Hatchery					
Winter Run	0	0	→	87	366
Spring Run	0	0	→	1,254	4,402
Late Fall Run	0	0	→	354	776
Fall Run	0	0	→	4	3
Unclassified	0	0	→	4	NC
Total	0	0		1,703	5,546

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	4	17	↘	442	1,465
Hatchery	0	0	↘	1,845	5,778
Total	4	17		2,287	7,243

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

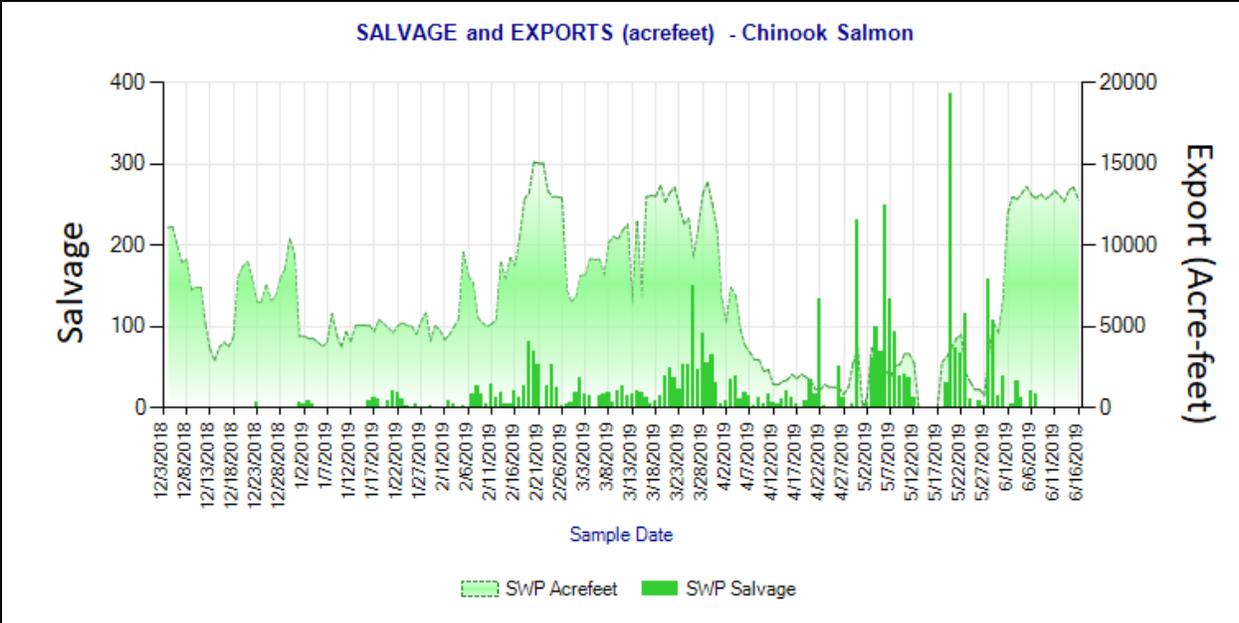


Fig 1. Chinook Salmon Salvage at SWP Facility (values = number of fish salvaged; bars) and export (acre-feet) at state salvage facilities (dashed lines). All CS races/origins combined. Dates: 12/4/2018 - 6/16/2019.

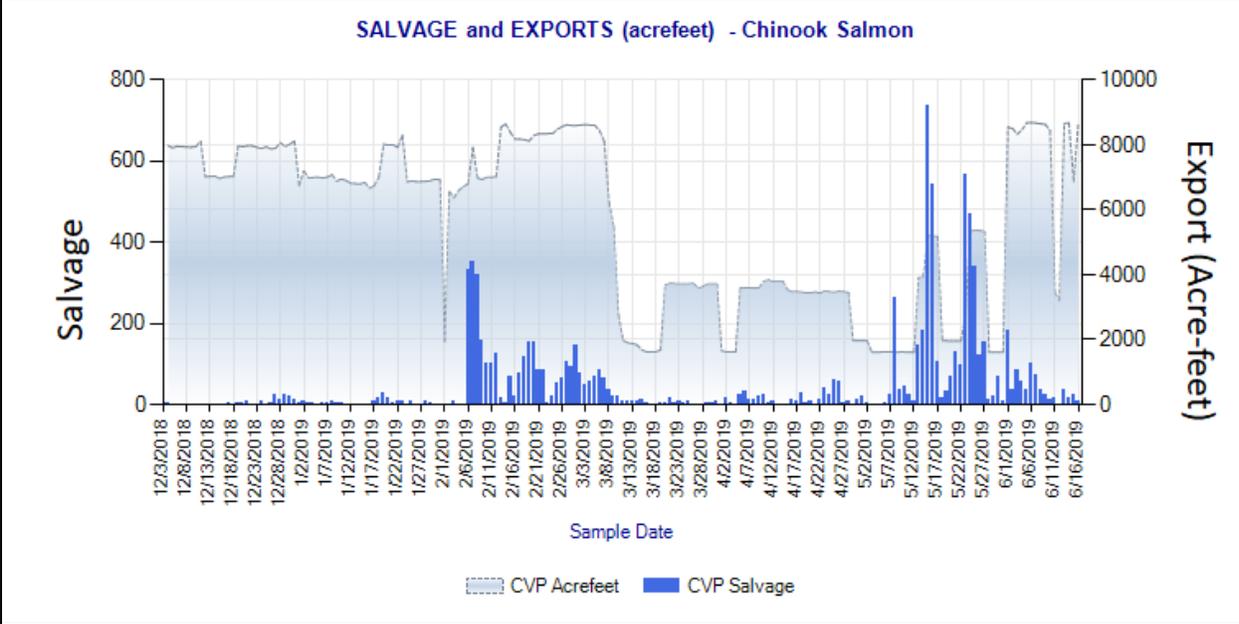


Fig 2. Chinook Salmon Salvage at CVP Facility (values = number of fish salvaged; bars) and export (acre-feet) at federal salvage facilities (dashed lines). All CS races/origins combined. Dates: 12/4/2018 - 6/16/2019.

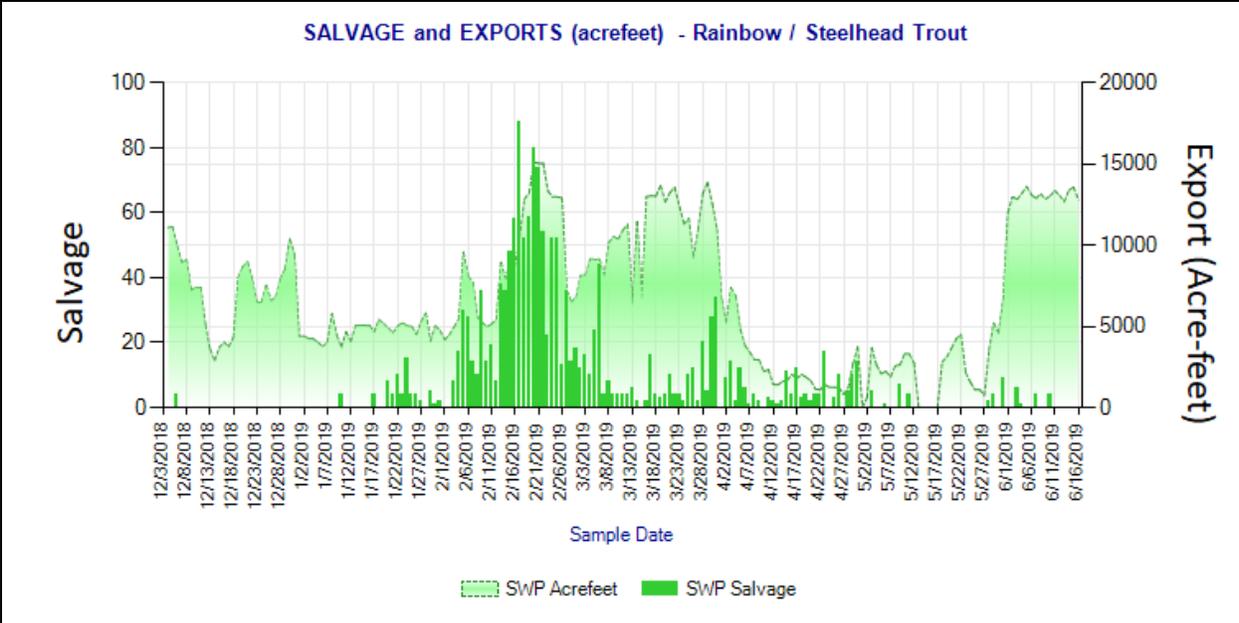


Fig 3. Steelhead/Rainbow Trout salvage at SWP Facility (values = number of fish salvaged; bars) and export (acre-feet) at state salvage facilities (dashed lines). All CS races/origins combined. Dates: 12/4/2018 - 6/16/2019.

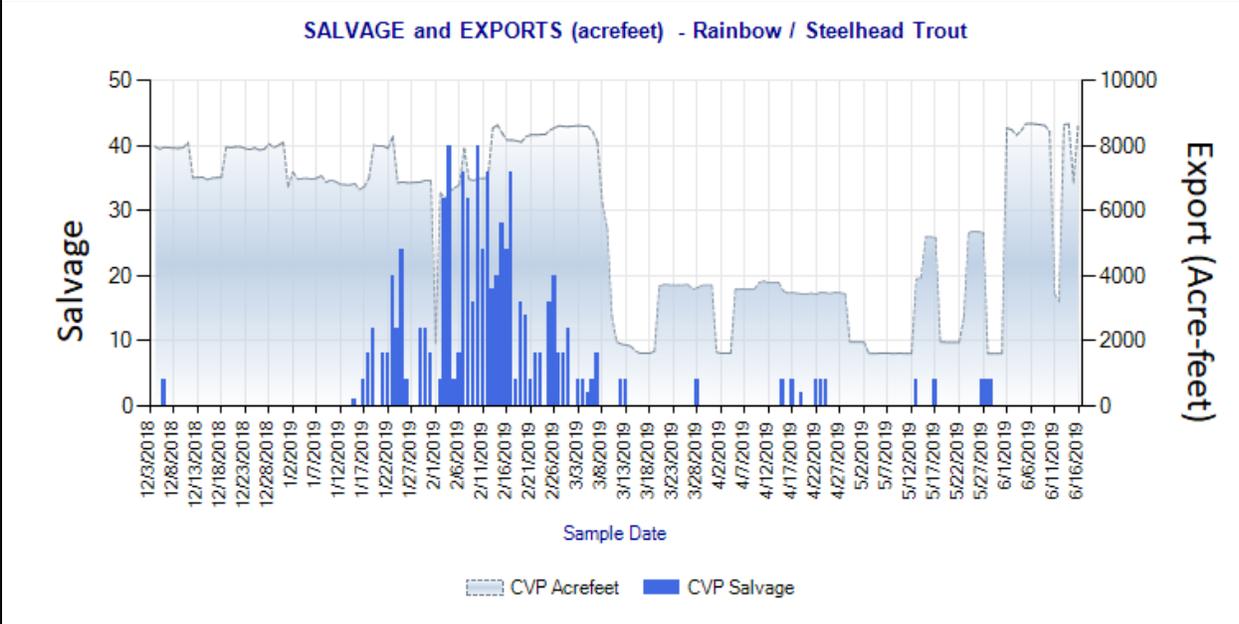


Fig 4. Steelhead/Rainbow Trout salvage at CVP Facility (values = number of fish salvaged; bars) and export (acre-feet) at federal salvage facilities (dashed lines). All CS races/origins combined. Dates: 12/4/2018 - 6/16/2019.

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 6/18/19

Release Date	CWT Race	Hatchery	Release Site	Release Type	Confirmed Loss	Number Released ¹	Total Entering Delta	% Loss of Number Released ²	% Loss of Total Entering Delta ³	First Stage Trigg	Date of First Loss ⁴	Date of Last Loss ⁴
12/3/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	67.33	61,277	n/a	0.110	n/a	0.5%	12/27/2018	2/16/2019
12/14/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	24.57	66,266	n/a	0.037	n/a	0.5%	12/27/2018	2/10/2019
1/4/2019	LF	Coleman NFH	Battle Creek	Spring Surrogate	457.26	73,952	n/a	0.618	n/a	0.5%	1/16/2019	2/20/2019

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2018 through 6/18/2019.

¹Number released with the adipose-fin clipped and a coded-wire tag (CWT).

²% Loss of Number Released = (Confirmed Loss/Number Released)*100.

³% Loss of Total Entering Delta= (Confirmed Loss/Total Entering Delta)*100.

⁴Date of first and last loss accounts for all CWT loss even those from special studies where salvage and loss=0.

Agenda Item 7.
Hatchery Releases
 None.

Agenda Item 8.
DOSS Estimates of Fish Distribution

DOSS 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% (Last week: same)	0% (Last week: same)	100% (Last week: same)
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	0% (Last week: same)	0-1% (Last week: same)	99-100% (Last week: same)
<i>Hatchery winter-run Chinook salmon</i>	0% (Last week: same)	0% (Last week: same)	100% (Last week: same)

Rationale for distribution

Wild winter-run Chinook:

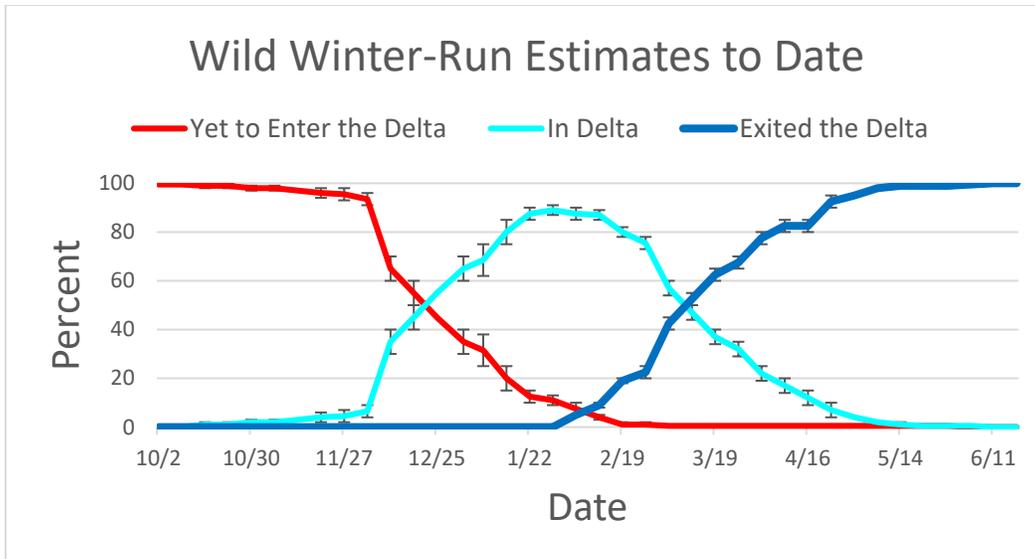
No wild winter-run Chinook salmon have been observed at monitoring locations in recent weeks. Since none have been observed, and due to life history and seasonal timing, DOSS estimates that 100 percent of wild winter-run Chinook salmon population has exited the Delta past Chipps Island.

Wild spring-run Chinook:

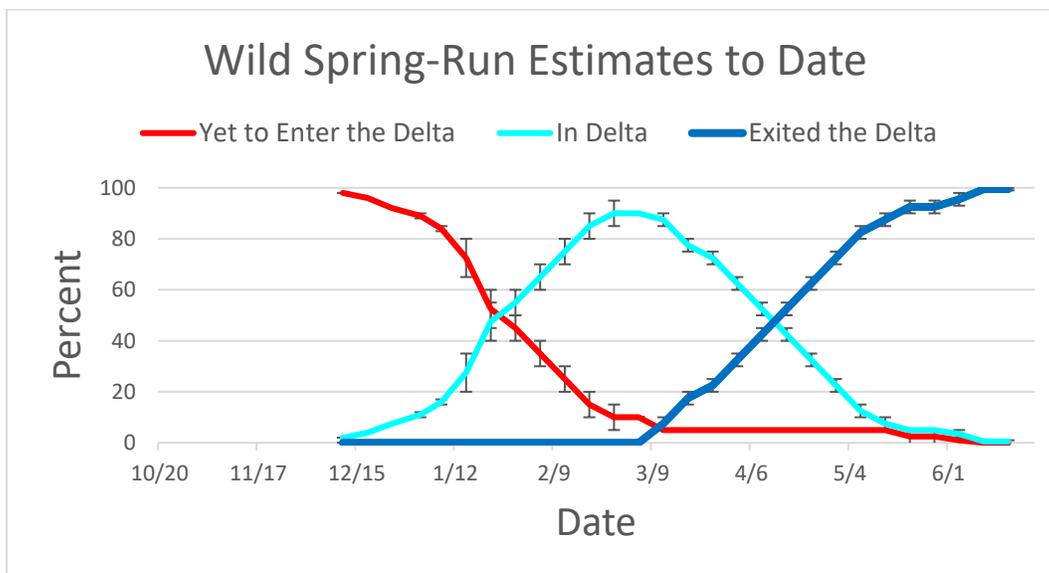
Two wild spring-run Chinook salmon smolts were observed at GCID and none at any other monitoring locations. Since two were observed, and due to life history and seasonal timing, DOSS estimates that 99-100 percent of the population has exited the Delta past Chipps Island, 0-1 percent are in the Delta, and 0 percent remain upstream of Knights Landing.

Hatchery winter-run Chinook:

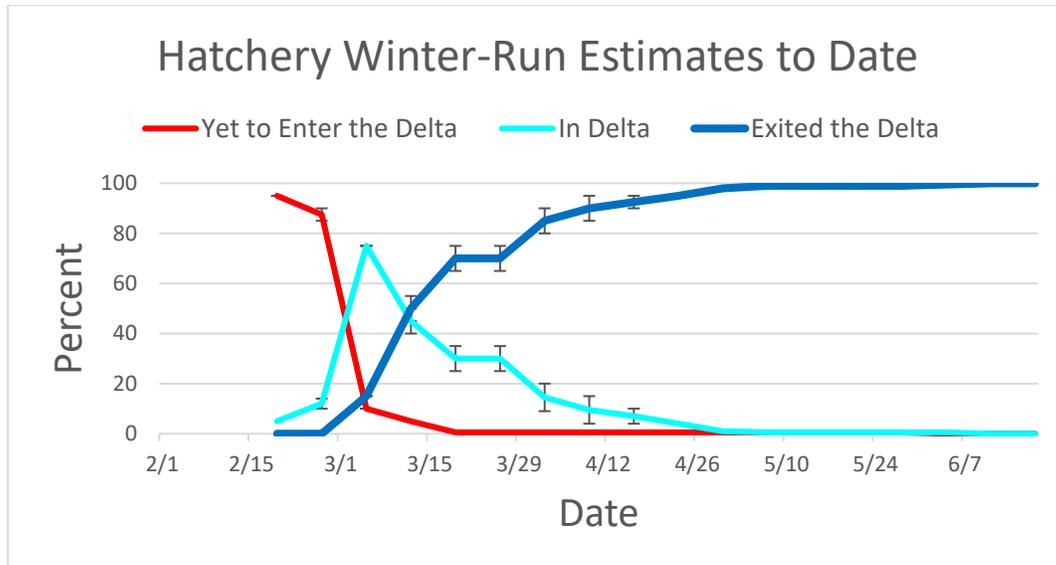
No additional acoustic tagged fish have been detected at receivers in the past month. Since none have been detected, DOSS estimates 100 percent of the group has migrated through the Delta past Chipps Island.



WY 2019 wild winter-run distribution estimates to date.



WY 2019 wild spring-run distribution estimates to date.



WY 2019 hatchery winter-run distribution estimates to date.

Agenda Item 9.

DOSS Feedback on Entrainment Risk

DOSS provides weekly entrainment risk outlooks by considering (a) two different categories of entrainment risk based on listed fish distribution and (b) factors that influence their potential for entrainment. The two entrainment risk categories considered include:

Interior Delta Entrainment Risk: fish in the Sacramento River that have the potential to be entrained into the Interior Delta through the Delta Cross Channel (when open) and/or Georgiana Slough; and

- **CVP/SWP Facilities Entrainment Risk:** fish in the Interior Delta that have the potential to be entrained into the CVP/SWP facilities.

Influencing factors considered include:

- **Exposure Risk** (both categories): estimated scale (low, medium, high) of fish anticipated to be in vicinity of an entrainment risk,
- **Routing Risk** (Interior Delta Entrainment Risk): estimated scale (low, medium, high) that flow split conditions could result in fish migrating into the interior delta instead of remaining in main channel, and
- **OMR/Export Risk** (CVP/SWP Facilities Entrainment Risk): for fish in the Interior Delta, estimated scale (low, medium, high) that OMR and/or Export levels could result in entrainment into the CVP/SWP facilities.

To provide an overall assessment of entrainment risk, the estimated current status of these influencing factors are described below for each of the entrainment risk categories.

Interior Delta Entrainment Risk for listed salmonids in the Sacramento River over the next week:

- **Exposure Risk: LOW**
 - Approximately 0% of winter run juveniles estimated to be in the Delta.
 - Approximately 0-1% of spring run juveniles estimated to be in the Delta.
 - Central Valley steelhead are in the system, including the Delta.
- **Routing Risk: LOW**
 - DCC is closed but may be open as early as Friday (6/21) depending on flows.
 - Flows are elevated on the Sacramento River (24,300 cfs) which result in a muting of tidal effects around Georgiana Slough and Threemile Slough.
 - Some fish observed in salvage are assumed to be of Sacramento River origin, and may have chosen interior routes. These fish could also be of San Joaquin River origin.
- **Overall Entrainment Risk: LOW**
 - Inflows from the Sacramento River are expected to remain high over the next week which balances exports to remain in the Low entrainment risk.

CVP/SWP Facilities Entrainment Risk for listed salmonids in the Interior Delta over the next week:

- **Exposure Risk: LOW**
 - Listed Chinook salmon and steelhead have been salvaged.
 - The risk of entrainment, especially for steelhead remains unchanged.
 - Exposure risk is low for San Joaquin steelhead and low for Sacramento listed fish based on historical salvage data and positive OMRs.
 - Unmarked Chinook salmon observed in salvage may have originated from San Joaquin River.
- **OMR/Export Risk:**
 - OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: LOW
 - OMR -5,000 cfs: MEDIUM
 - OMR -6,250 cfs²: MEDIUM-HIGH
 - OMR -7,500 cfs²: HIGH
 - OMR -9,000 cfs²: HIGH
- **Overall Entrainment Risk:**
 - OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: LOW
 - OMR -5,000 cfs: MEDIUM
 - OMR -6,250 cfs²: MEDIUM-HIGH
 - OMR -7,500 cfs²: HIGH
 - OMR -9,000 cfs²: HIGH

²By request of management, DOSS also assessed risks at an OMR flow more negative than -5,000 cfs.

These assessments are based on anticipated and current hydrology and fish distributions for the next week.

Agenda Item 10.

DOSS Advice to WOMT and NMFS: None

Agenda Item 11.

WY 2019 DOSS Annual Report: Open Discussion

Comparing DOSS Distribution Estimates to Data:

Options for comparing monitoring data to the DOSS group's weekly estimates of what percent of natural-origin spring-run and winter-run have yet to enter the Delta (Knights Landing data), are in the Delta (combined beach seine and Sacramento trawl data), or have exited the Delta (Chippis Island trawl data), and how to adjust catch number to account for hatchery release influence. The group discussed options and will brainstorm during the break, re-assessing adjustment options on the next DOSS call.

Agenda Item 12.

DOSS Report WY 2019 Schedule

Monday, 7/15/19: Section authors send drafts to Kristin

Friday, 7/19/19: First draft to DOSS for review

2 weeks for review

Friday 8/2/19: DOSS comments due

Tuesday 8/6/19 DOSS call, 9 am to discuss comments

2 weeks to make revisions

Friday, 8/16/19: Final draft to DOSS (for second review) & management (for first review; Mike Hendrick, Garwin Yip, Donna Garcia, Jana Affonso)

3 weeks for review

Friday, 9/6/19: Final comments from DOSS & management due

2 weeks to make final revisions.

Tuesday, 9/10/19, 9am – DOSS call to discuss revisions

Friday, 9/20/19: Final report shared with DOSS & management

Agenda Item 13.

Next Meeting: The next DOSS conference call will be on **8/6/19 at 9am** to discuss the draft DOSS annual report.