

**Delta Operations for Salmonids and Sturgeon (DOSS) Group**  
**Conference call: 6/11/2019 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 Griffith, Jason Julienne

**DWR:** Chris Cook, Bryant Giorgi, Dan Yamanaka, Farida Islam

**NMFS:** Kristin Begun

**Reclamation:** Elissa Buttermore

**SWRCB:** Craig Williams, Chris Carr

**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 Discussion
12. Next DOSS meeting

**Agenda Item 2.**

**RPA Implementation Review**

**Delta RPA Actions affecting operations during June:**

**Action IV.1.2<sup>1</sup> (DCC gate operations):**

- DCC gates will remain closed from 5/21/19 through 6/15/19, per operations described in RPA IV.1.2.
- Gates will likely remain closed on weekends due to continued high flows.

**Action IV.2.3<sup>3</sup> (OMR Management):**

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<sup>1</sup> 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 (6/11/19)**

SWP		CVP	
<b>Exports (cfs)</b>			
Clifton Court Forebay	6,680	Jones Pumping Plant	1,600 <sup>1</sup>
<b>Reservoir Releases (cfs)</b>			
Feather - Oroville	4,000	American - Nimbus	13,000 <sup>2</sup>
		Sacramento - Keswick	13000 <sup>3</sup>
		Stanislaus – Goodwin	1,300 <sup>4</sup>
		Trinity - Lewiston	2,100 <sup>5</sup>
<b>Reservoir Storage (in TAF)</b>			
San Luis (SWP)	735	San Luis (CVP)	772
Oroville	3,434	Shasta	4,457
New Melones	2,139	Folsom	929
<b>Delta Operations</b>			
DCC	Closed	Sacramento River at Freeport (cfs)	43,900
Outflow Index (cfs)	51,600	San Joaquin River at Vernalis (cfs)	15,500
E:I	18% (14-day avg.)	X2	60 km

<sup>1</sup> CVP exports are currently reduced to 1,600 cfs for a predator removal study. Exports will resume to 4,400 cfs around Friday.

<sup>2</sup> Nimbus releases will decrease to 11,000 cfs tonight around midnight (6/11).

<sup>3</sup> Keswick releases will decrease to 11,000 cfs today (6/11).

<sup>4</sup> Goodwin releases will increase and decrease following Appendix 2E scheduled pulse flow.

<sup>5</sup> Trinity releases are continuing the ROD pulse flow schedule.

**Factors controlling Delta exports:**

- 6/4/19 - 6/11/19: physical capacity (federal side), USACE Permits (state side)

**Approximate OMR as of 6/8/19:**

	USGS gauges (cfs)	Index (cfs)
Daily	-2,100	-2,900
5-day	-2,600	-3,100
14-day	-700	-900

Approximate OMR as of 6/10/19:

	Index (cfs)
Daily	-3,300
5-day	-3,000
14-day	-1,700

#### Weather Forecast

Above normal temperatures in the Sacramento Valley today and slowly cooling through the weekend, but remaining warmer than normal. Chance of thunderstorms in the mountains on Wednesday and Thursday, and again early next week.

#### Agenda Item 4.

##### **Smelt Working Group**

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

The Smelt Working Group (SWG) reviewed current Delta conditions, survey data, expected exports, and forecasted weather. River flows are beginning to taper down, and the water projects are both exporting at their full permitted capacity, resulting in OMR flow rates of around -3,000 cfs. The SWG determined that the overall risk of entrainment for fish in the system is low. However, due to the low fish population, fish could have went undetected by the field surveys in the South Delta and the Lower San Joaquin River, and fish that could be present in these areas could still be at risk of entrainment.

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 next Monday, 6/17/19 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 <sup>A</sup>	Knights Landing RST <sup>B</sup>	Beach Seines <sup>C</sup>	Sacramento Trawl <sup>C</sup>	Chippys Is. Midwater Trawl <sup>C</sup>	Mossdale Kodiak Trawl <sup>D</sup>
Sample Date	6/4-6/10	5/30-6/10	6/2-6/10	6/3, 6/5, 6/7	6/3, 6/5, 6/7	6/3, 6/5, 6/7	6/3-6/8
Chinook						1 adult	28
FR Chinook	34 juveniles		1	2	2	69	
SR Chinook							
WR Chinook							
LFR Chinook							
Chinook (ad-clip)						5	
Steelhead (wild)							
Steelhead (ad-clip)							
Green Sturgeon							
Flows (avg. cfs)	1,777	14,443	14,189				
W. Temp. (avg. °F)	61.19	63	67.2				
Turbidity (avg. NTU)	31.30	25.7	18.98				

<sup>A</sup> Tisdale RST sampling period was from 5/30 at 9:00 am to 6/10 at 10:30 am.

<sup>B</sup> Knights Landing RST sampling period was from 6/2 at 8:45 am to 6/10 at 10:45 am.

<sup>C</sup> Data reported in the 6/2 to 6/8 DJFMP sampling summary.

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

### Red Bluff Diversion Dam (RBDD)

USFWS biweekly report (5/21/19-6/3/19) for preliminary estimates of passage by brood-year and run for unmarked juvenile Chinook salmon captured by rotary screw traps at RBDD included:

Run and Species	Biweekly Total	Brood Year Total (90% CI)
Winter-run Chinook (BY2018)	0	1,168,265 (685,046-1,651,478)
Spring-run Chinook (BY2018)	3,483	3,322,934 (-2,713,841-9,402,811)

### Tracking of acoustic-tagged winter-run Chinook salmon released at Battle Creek

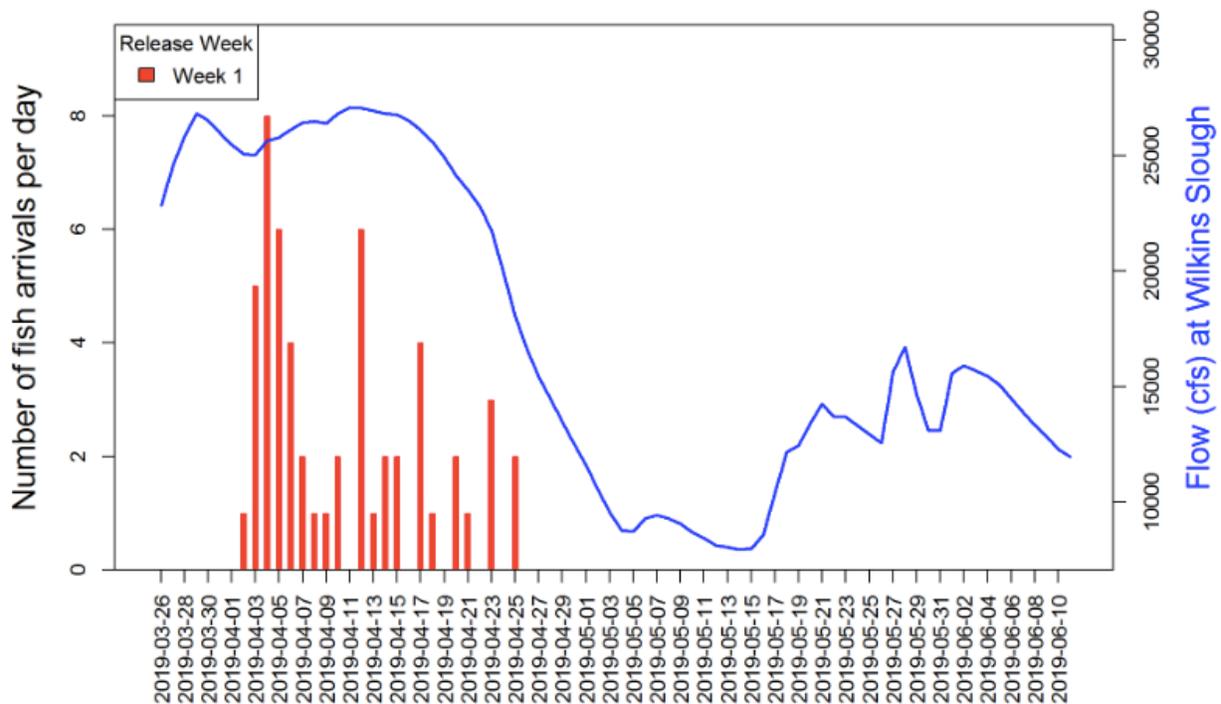
The Livingston Stone National Fish Hatchery released acoustic-tagged (JSATS) winter-run Chinook salmon from brood year 2018. The following table provides the detection frequencies downstream of the release site. The last detection at Benicia Bridge was on 4/28/19. Detection data through 6/11/19 below.

<b>Date of release</b>	<b>3/26/19</b>
<b># acoustically tagged (JSATS)</b>	<b>500 fish</b>
Butte City Bridge	31 (6%)
Tower Bridge	54 (11%)
Minimum survival to Tower Bridge	23%*
I-80/50 Bridge	82 (16%)
Georgiana Slough	22 (4%)
Detections at Benicia Bridge	70 (14%)
Minimum survival to Benicia Bridge	14%

\*If Yolo Bypass Weirs were overtopping during migration, fish may have taken that route, and therefore this is a minimum estimate of survival.

[Battle Creek Winter-Run Acoustic Tagging Project: https://calfishtrack.github.io/real-time/pageBCJSWR\\_2019.html](https://calfishtrack.github.io/real-time/pageBCJSWR_2019.html)

**Detections at Tower Bridge (downtown Sacramento) versus Sacramento River flows at Wilkins Slough**



**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 6/3 to 6/7, 5 fall-run Chinook salmon were observed. Flows were an average 5,063 cfs, water temperature 57°F, and turbidity 2.0 NTU. At the Herringer site from 6/3 to 6/7, 1 fall-run Chinook salmon were observed. Flows were an average 10,125 cfs, water temperature 60.3°F, and turbidity 2.2 NTU.

**Agenda Item 6.**

**Fish Monitoring: Salvage**

Griffiths (CDFW) provided a salvage summary for the period of 6/3-6/9.

Chinook salmon

Unclipped (wild origin) Chinook: Weekly salvage of wild origin Chinook salmon included 16 spring-run and 472 fall-run sized fish (estimated from subsample). Total WY19 salvage of wild-origin Chinook salmon is 11,461 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: 6 fish salvaged for a season total to date of 438.

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

Operations:

The state facility reduced counts due to high fish salvage between 6/6 at 2400 hours to 6/7 at 0300 hours. Three counts were affected.

## DOSS Weekly Salvage Update

Reporting Period: June 3-June 9, 2019

Prepared by Kyle Griffiths on June 10, 2019 15:30

Preliminary Results -Subject to Revision

Criteria	3-Jun	4-Jun	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun	Trend	
<b>Loss Densities</b>									
Wild older juvenile CS	0	0	0	0	0	0	0	→	0.00
Wild steelhead	1.23	0	0	0	0	0	0	↘	0.18
<b>Exports</b>									
SWP daily export	12,835	13,209	13,624	13,113	12,887	13,171	12,841	↗	13,097
CVP daily export	8,333	8,470	8,683	8,691	8,677	8,656	8,632	↗	8,592
SWP reduced counts	0	0	0	4%	12.5%	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	
	Salvage	Loss	Trend	Salvage	Loss
<b>Wild</b>					
Winter Run	0	0	→	184	537
Spring Run	16	10	↗	2,175	6,099
Late Fall Run	0	0	→	3	13
Fall Run	472	598	↗	9,095	12,430
Unclassified	0	0	→	4	NC
<b>Total</b>	<b>488</b>	<b>609</b>		<b>11,461</b>	<b>19,080</b>
<b>Hatchery</b>					
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
<b>Total</b>	<b>0</b>	<b>0</b>		<b>1,703</b>	<b>5,546</b>

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

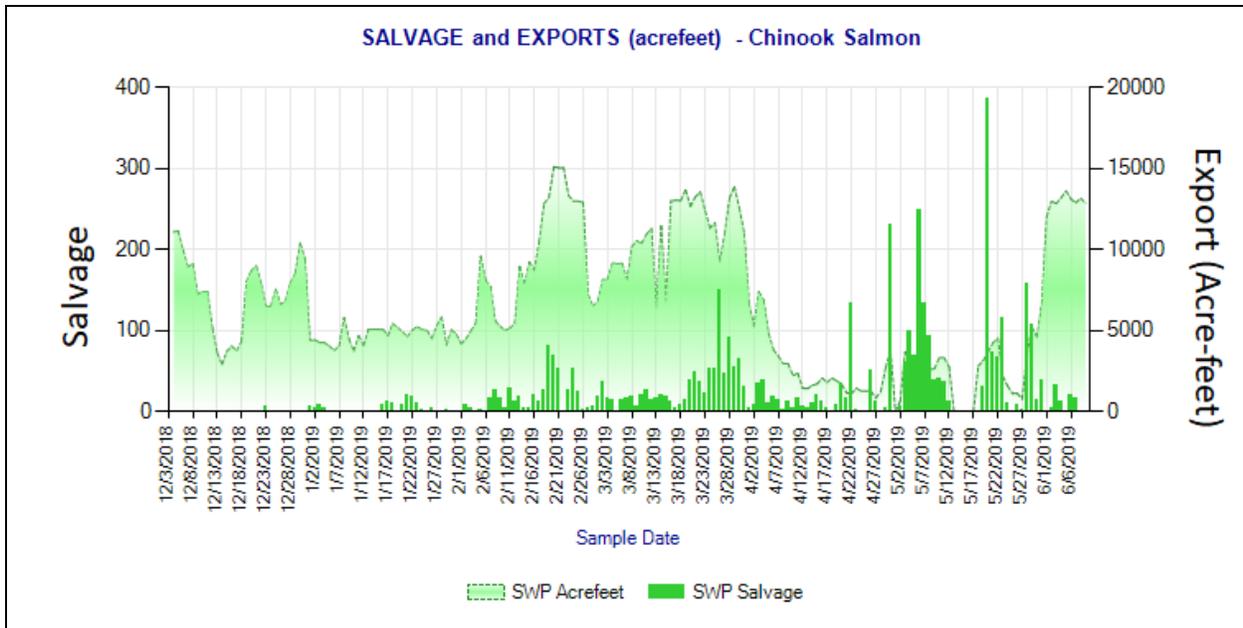
NC = cannot be calculated; hatchery salmon salvage and loss estimates have been corrected using CWT readings when available

## Steelhead Weekly/Season Salvage and Loss

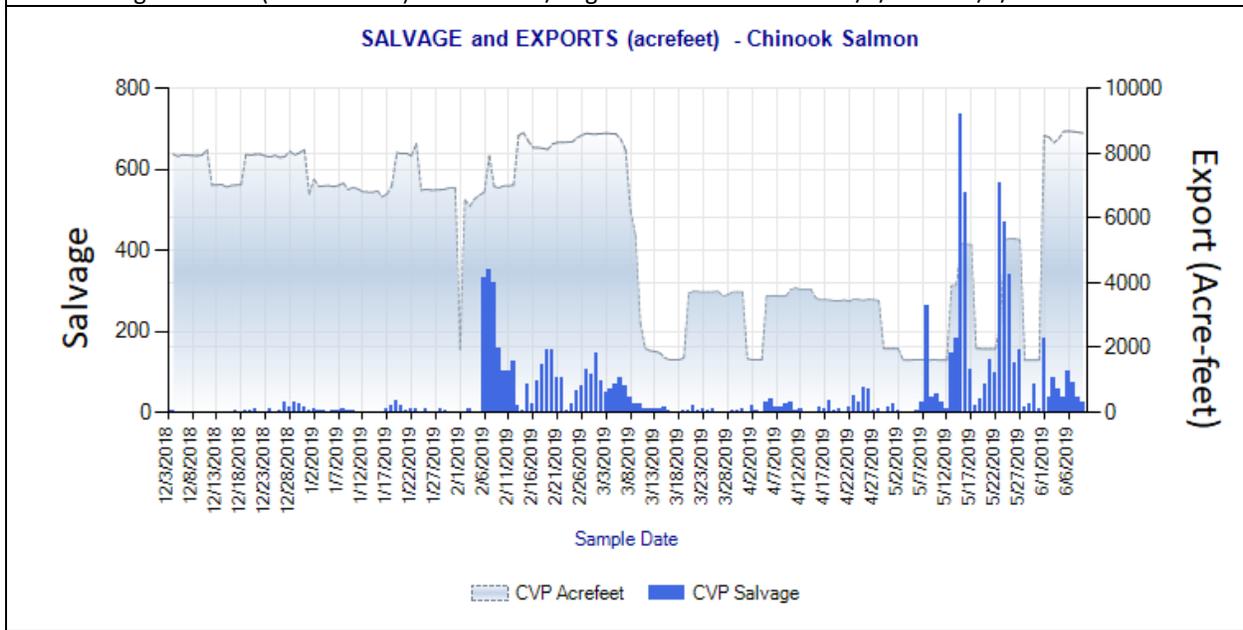
Combined salvage and loss for both CVP and SWP fish facilities

Category	Weekly Total			Season Total	
	Salvage	Loss	Trend	Salvage	Loss
Wild	6	26	↘	438	1,448
Hatchery	5	22	↘	1,845	5,778
<b>Total</b>	<b>11</b>	<b>48</b>		<b>2,283</b>	<b>7,225</b>

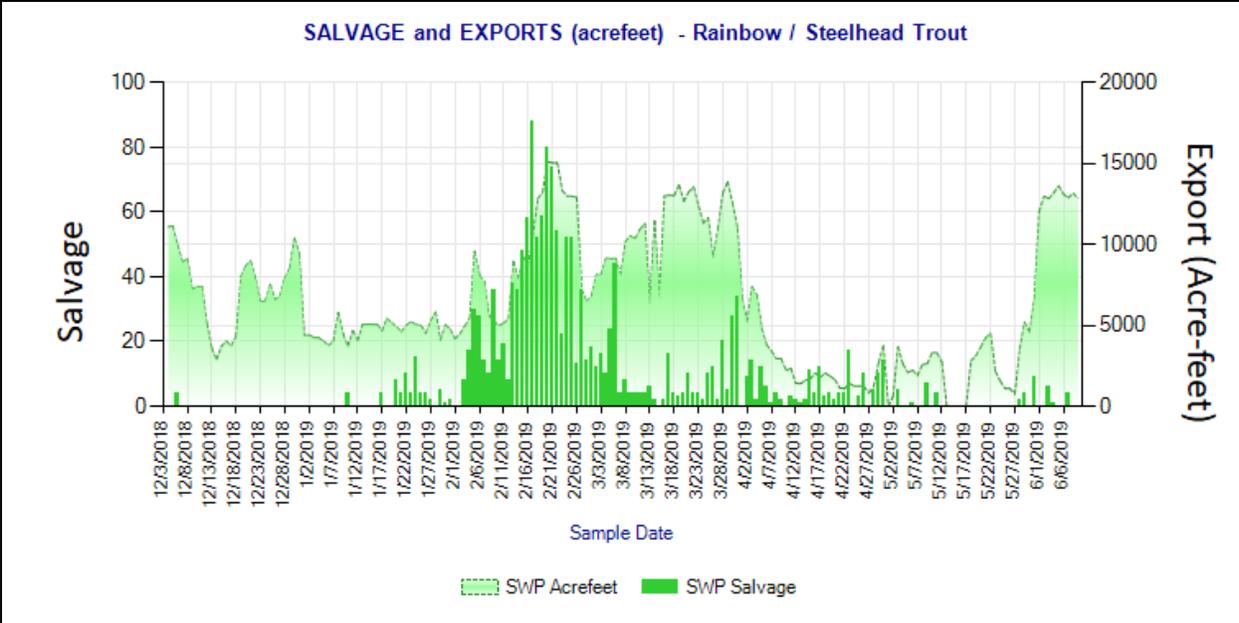
State Water Project loss = salvage x 4.33; Central Valley Project loss = salvage x 0.68



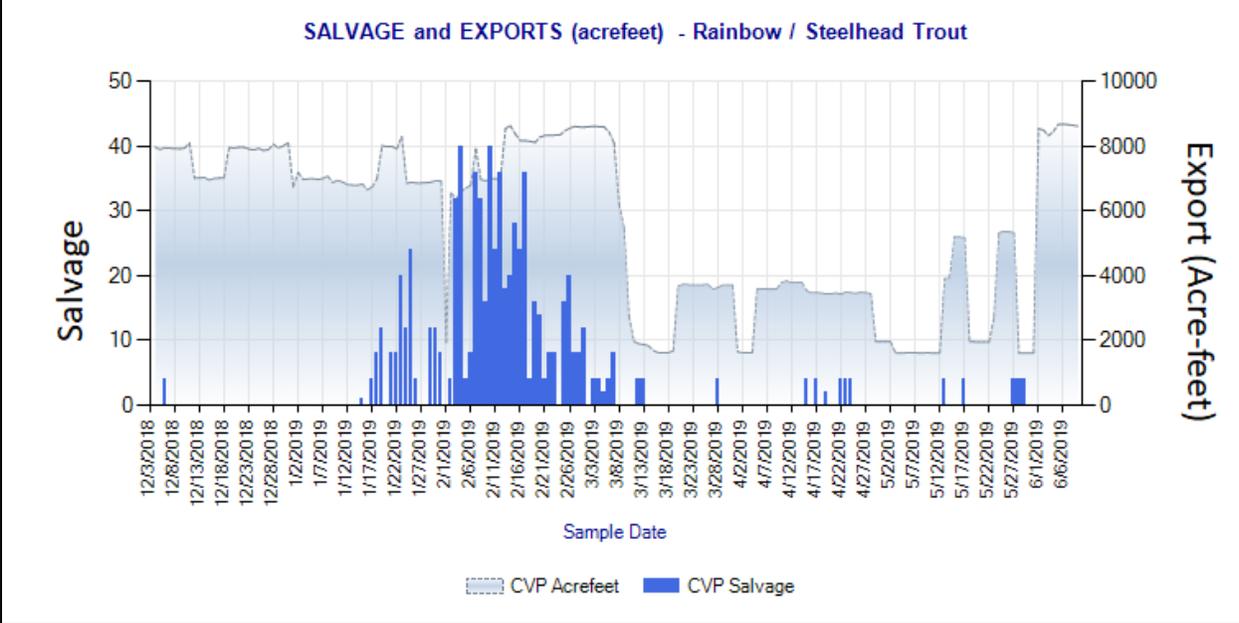
**Fig 1. Chinook Salmon Salvage at SWP Facility** (values = number of fish salvaged; bars) and export (acre-feet) at state salvage facilities (dashed lines). All CS races/origins combined. Dates: 12/4/2018 - 6/9/2019.



**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 - 6/9/2019.



**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 – 6/9/2019.



**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 – 6/9/2019.

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 6/11/19

Release Date	CWT Race	Hatchery	Release Site	Release Type	Confirmed Loss	Number Released <sup>1</sup>	Total Entering Delta	% Loss of Number Released <sup>2</sup>	% Loss of Total Entering Delta <sup>3</sup>	First Stage Trigg	Date of First Loss <sup>4</sup>	Date of Last Loss <sup>4</sup>
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 6/11/2019.

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

<sup>2</sup>% Loss of Number Released = (Confirmed Loss/Number Released)\*100.

<sup>3</sup>% Loss of Total Entering Delta= (Confirmed Loss/Total Entering Delta)\*100.

<sup>4</sup>Date 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: 0%)	0% (Last week: 0-1%)	100% (Last week: 99-100%)
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	0% (Last week: 0-2%)	0-1% (Last week: 2-5%)	99-100% (Last week: 93-98%)
<i>Hatchery winter-run Chinook salmon</i>	0% (Last week: 0%)	0% (Last week: 0-1%)	100% (Last week: 99-100%)

**Rationale for distribution**

Wild winter-run Chinook:

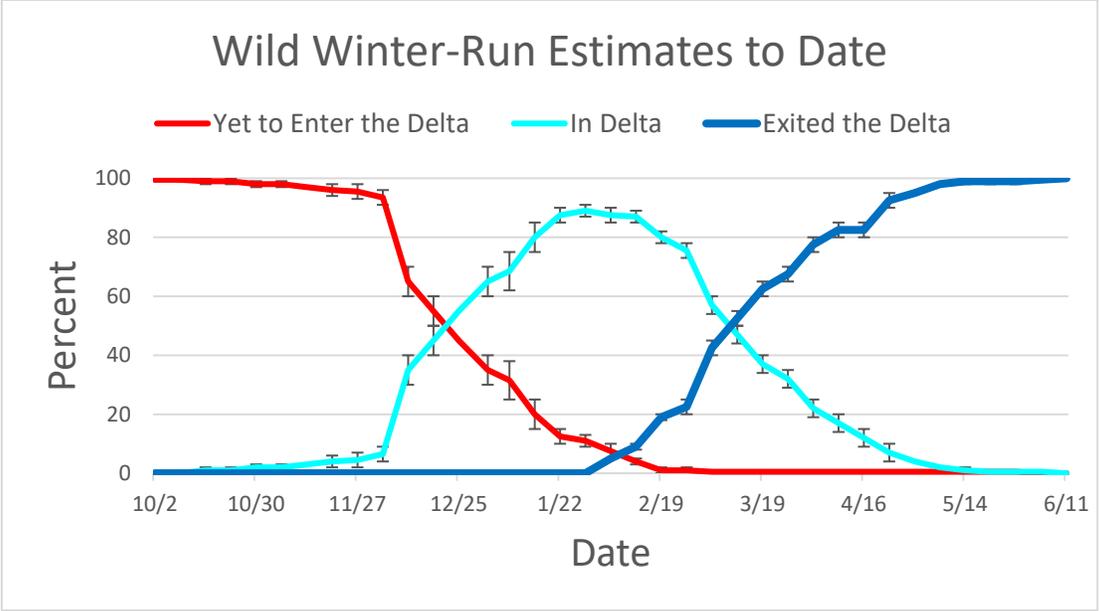
No wild winter-run Chinook salmon were observed at monitoring locations this week. Since none have been observed upstream of the Delta in several weeks, and due to life history and seasonal timing, DOSS estimates that 100 percent of wild winter-run Chinook salmon population has exited the Delta past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

Wild spring-run Chinook:

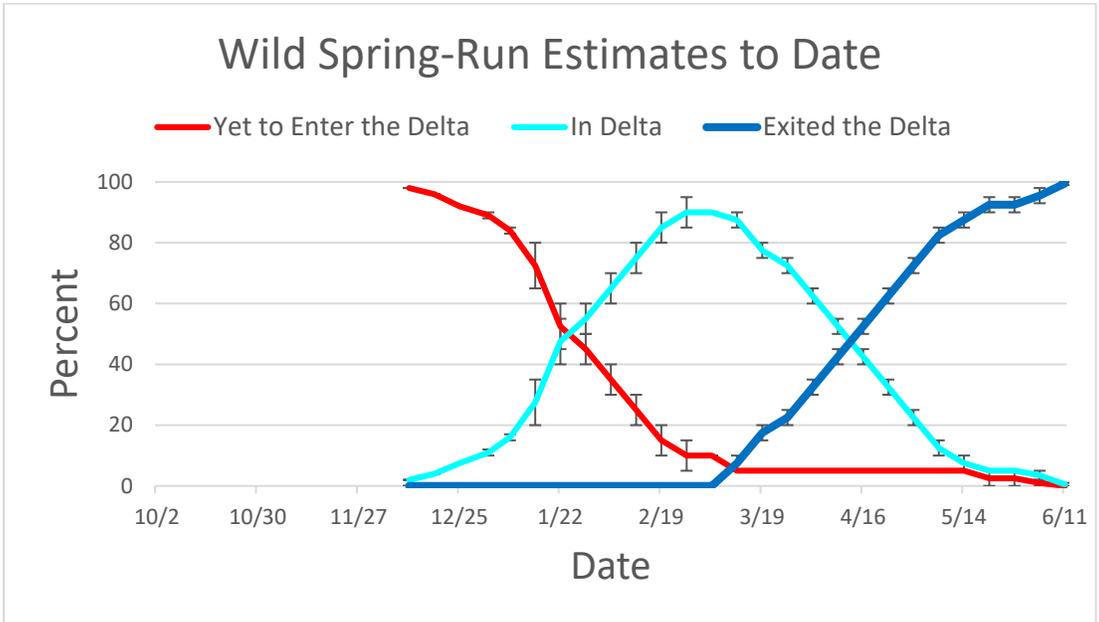
No wild spring-run Chinook salmon smolts were observed at monitoring locations this week. Since none were observed, and due to life history and seasonal timing, DOSS estimates that 99-100 percent of the population has exited the Delta past Chipps Island, 0-1 percent are in the Delta, and 0 percent remain upstream of Knights Landing.

Hatchery winter-run Chinook:

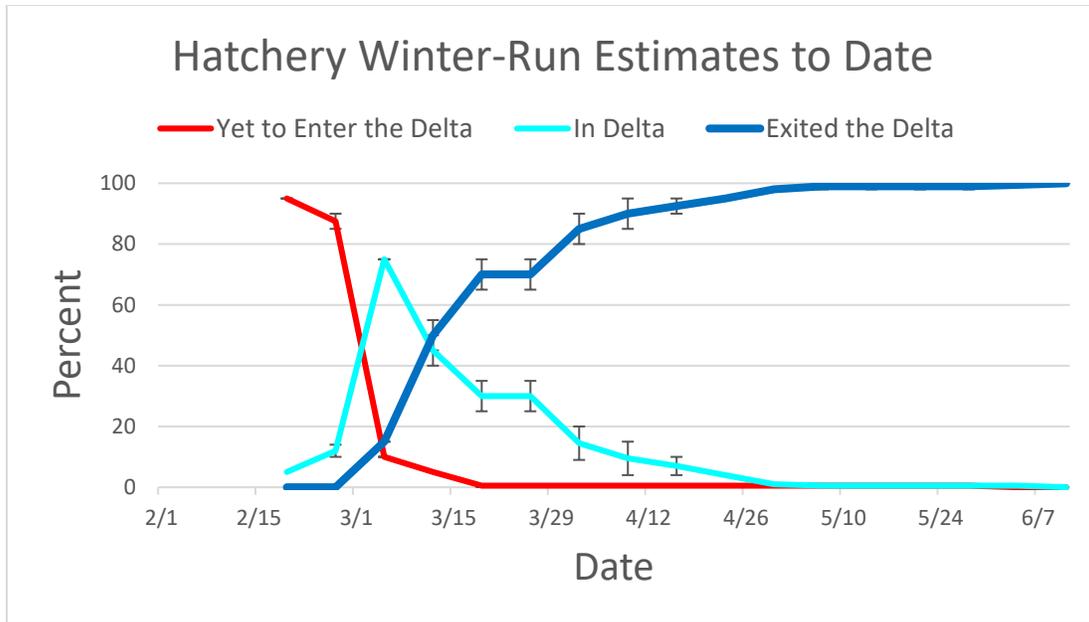
No additional acoustic tagged fish have been detected at receivers in the past month. Since none have been detected, DOSS estimates 100 percent of the group has migrated through the Delta past Chipps Island.



**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.
  - Flows are elevated on the Sacramento River (43,900 cfs) which result in a muting of tidal effects around Georgiana Slough and Threemile Slough. Flows are expected to remain around 30,000 cfs for the duration of the week.
  - 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 cfs<sup>2</sup>: MEDIUM-HIGH
  - OMR -7,500 cfs<sup>2</sup>: HIGH
  - OMR -9,000 cfs<sup>2</sup>: HIGH
- **Overall Entrainment Risk:**
  - OMR -2,500 cfs: LOW
  - OMR -3,500 cfs: LOW
  - OMR -5,000 cfs: MEDIUM

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

- OMR -6,250 cfs<sup>2</sup>: MEDIUM-HIGH
- OMR -7,500 cfs<sup>2</sup>: HIGH
- OMR -9,000 cfs<sup>2</sup>: HIGH

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.**

**Discussion of Assignments for the DOSS WY 2019 Annual Report**

Begun (NMFS) discussed section assignments for the annual report that were distributed last week, as well as a draft timeline of due dates for draft sections. The annual report discussion will continue next week (6/18) on our last DOSS call of the water year.

**Agenda Item 12.**

**Next Meeting:** The next DOSS conference call will be on **6/18/19 at 9am.**