

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 5/14/2019 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, Jason Julienne, Kyle Griffiths
DWR: Chris Cook, Bryant Giorgi, Farida Islam, Dan Yamanaka
NMFS: Kristin Begun
Reclamation: Tom Patton, Elissa Buttermore
SWRCB: Michael Macon, Craig Williams, Chris Carr
USFWS: Craig Anderson

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. Next DOSS meeting

Agenda Item 2.

RPA Implementation Review

Delta RPA Actions affecting operations during May:

Action IV.1.2¹ (DCC gate operations):

- DCC gates will remain closed through 5/20/19, per operations described in RPA IV.1.2 starting 12/1/18.

Action IV.2.1 San Joaquin River Inflow to Export (I:E) Ratio

- For the period of 4/1 through 5/31, the level of combined SWP and CVP exports is determined by the San Joaquin River inflow as measured at Vernalis. For the current

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)

water year type (Wet in the San Joaquin River basin) the ratio of San Joaquin River inflow to combined CVP and SWP exports is 4:1, based on a 14-day running average.

- An exception procedure provides for minimum health and safety needs, identified as 1,500 cfs combined exports in the 2009 RPA with 2011 amendments.

Action IV.2.3³ (OMR Management):

- 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 (5/14/19)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	0*	Jones Pumping Plant	2,000**
Reservoir Releases (cfs)			
Feather - Oroville	7,500	American - Nimbus	9,000***
		Sacramento - Keswick	8,000
		Stanislaus – Goodwin	2,000
		Trinity - Lewiston	2,500****
Reservoir Storage (in TAF)			
San Luis (SWP)	769	San Luis (CVP)	783
Oroville	3,368	Shasta	4,290
New Melones	1,965	Folsom	909
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	~30,000
Outflow Index (cfs)	39,500	San Joaquin River at Vernalis (cfs)	9,360
E:I	5% (14-day avg.)	X2	~60 km

* SWP exports are currently at 0 cfs for work that is expected to end on Friday (5/17). Exports are scheduled to be at 1,600 cfs on Saturday (5/18).

** CVP Exports are scheduled to increase tomorrow (5/15) to 2,600 cfs, and decrease on Saturday (5/18) to 1,000 cfs.

*** Nimbus releases will decrease to 8,000 cfs on Friday (5/17) through the weekend.

**** Trinity releases are continuing ROD pulse flow schedule.

Factors controlling Delta exports:

- 5/7/19-5-14-19: 4:1 San Joaquin I:E ratio per NMFS BiOp RPA Action IV.2.1

Approximate OMR as of 5/11/19:

	USGS gauges (cfs)	Index (cfs)
Daily	2,500	1,700
5-day	1,900	1,600
14-day	1,500	1,600

Approximate OMR as of 5/13/19:

	Index (cfs)
Daily	2,000
5-day	1,800
14-day	1,600

Weather Forecast

Dry and mild weather is expected today, then cool, wet, and breezy weather starting on Wednesday and continuing into next week. 0.85 inches of rain expected tomorrow through Friday. In the mountains, 2 feet of snow is possible at higher elevations.

Agenda Item 4.

Smelt Working Group

The Smelt Working Group met on Monday, 5/13/19, at 10 am.

The Smelt Working Group (SWG) reviewed current Delta conditions, survey data, expected exports, and forecasted weather. River flows and reservoir releases are expected to continue tapering down this week, and OMR flow rates are expected to stay between +1,500 and +2,000 cfs with NMFS BiOp Action IV.2.1 San Joaquin River Inflow to Export (I:E) Ratio as the controlling factor. The SWG determined that the current overall risk of entrainment for Delta Smelt is very low, and that adults and larvae even in the South Delta would have a low 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 SWG plans to meet again next Monday, 5/20/19, 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 ^A	Tisdale RST ^B	Knights Landing RST ^C	Beach Seines ^D	Sacramento Trawl ^D	Chippis Is. Midwater Trawl ^D	Mossdale Kodiak Trawl ^E
Sample Date	5/9-5/13	5/2-5/13	5/5-5/13	5/6-5/10	5/5-5/7, 5/9-5/10	5/5-5/7, 5/9-5/10	5/6-5/11
Chinook							112
FR Chinook	420 juveniles	169	17	47	124	742	
SR Chinook	22 juveniles 36 smolts	8		2	9	239	
WR Chinook							
LFR Chinook							
Chinook (ad-clip)	174 FR	30 FR 4 SR	2 FR 2 SR		37	121	
Steelhead (wild)	6	1				2	
Steelhead (ad-clip)		1			1	1	
Green Sturgeon							
Flows (avg. cfs)	1,127	9,868	8,851				
W. Temp. (avg. °F)	62.86	62.1	66.4				
Turbidity (avg. NTU)	28.09	22.7	15.58				

^A GCID trap was raised on 5/3 in anticipation of the fall-run hatchery release and was lowered the morning of 5/9 and will continue trapping until further notice.

^B Tisdale RST sampling period was from 5/2 at 10:45 am to 5/13 at 10:00 am.

^C Knights Landing RST sampling period was from 5/5 at 11:45 am to 5/13 at 11:00 am.

^D Data reported in the 4/28 to 5/4 DJFMP sampling summary. *One of the ad-clipped fish observed at Chippis Island trawl was left pelvic fin and ad-clipped, indicating it was a Battle Creek winter-run from LSNFH.

^E 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 (4/23/19-5/6/19) 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)	207	1,168,167 (685,145-1,651,183)
Spring-run Chinook (BY2018)	47,287	3,303,945 (-2,723,530-9,374,524)

Tracking of acoustic-tagged winter-run Chinook salmon released at Caldwell Park

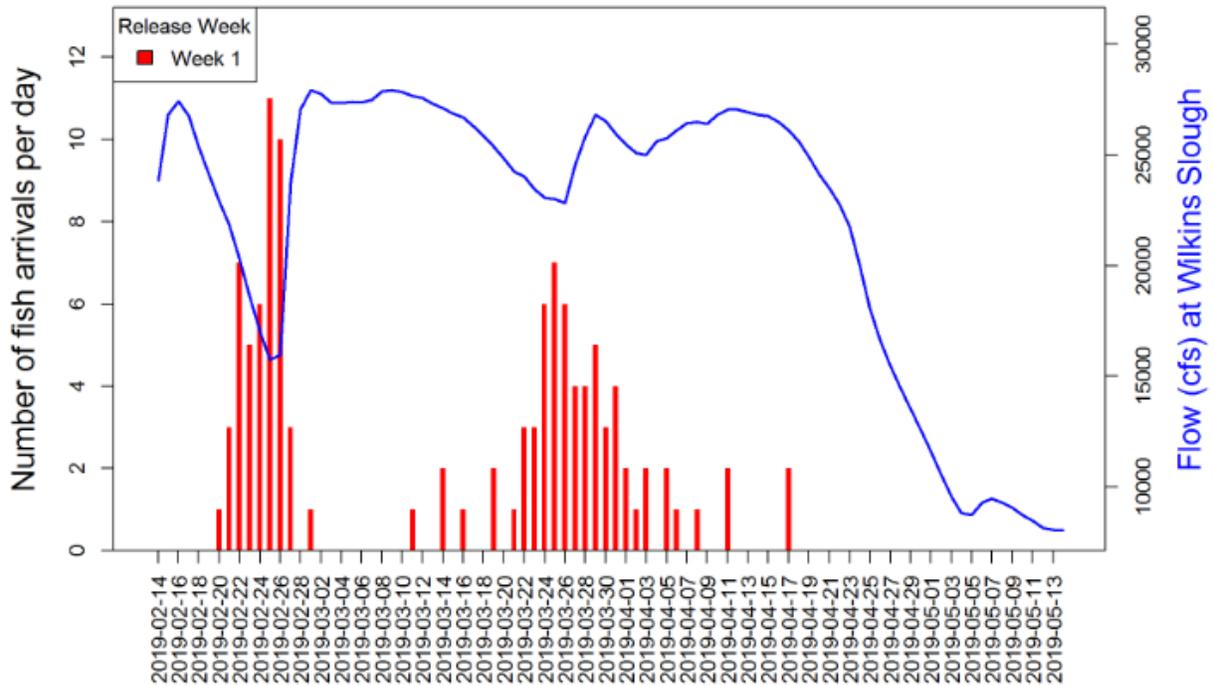
The Livingston Stone National Fish Hatchery released acoustic-tagged (JSATS) winter-run Chinook salmon from brood year 2018. The following table provides the detection frequencies downstream of the release site. Detections through 5/14/19 below.

Date of release	2/14/19
# acoustically tagged (JSATS)	650 fish
Butte City Bridge	195 (30%)
Tower Bridge	112 (17%)
Minimum survival to Tower Bridge	44%*
I-80/50 Bridge	126 (19%)
Georgiana Slough	21 (3%)
Detections at Benicia Bridge	163 (25%)
Minimum survival to Benicia Bridge	26%

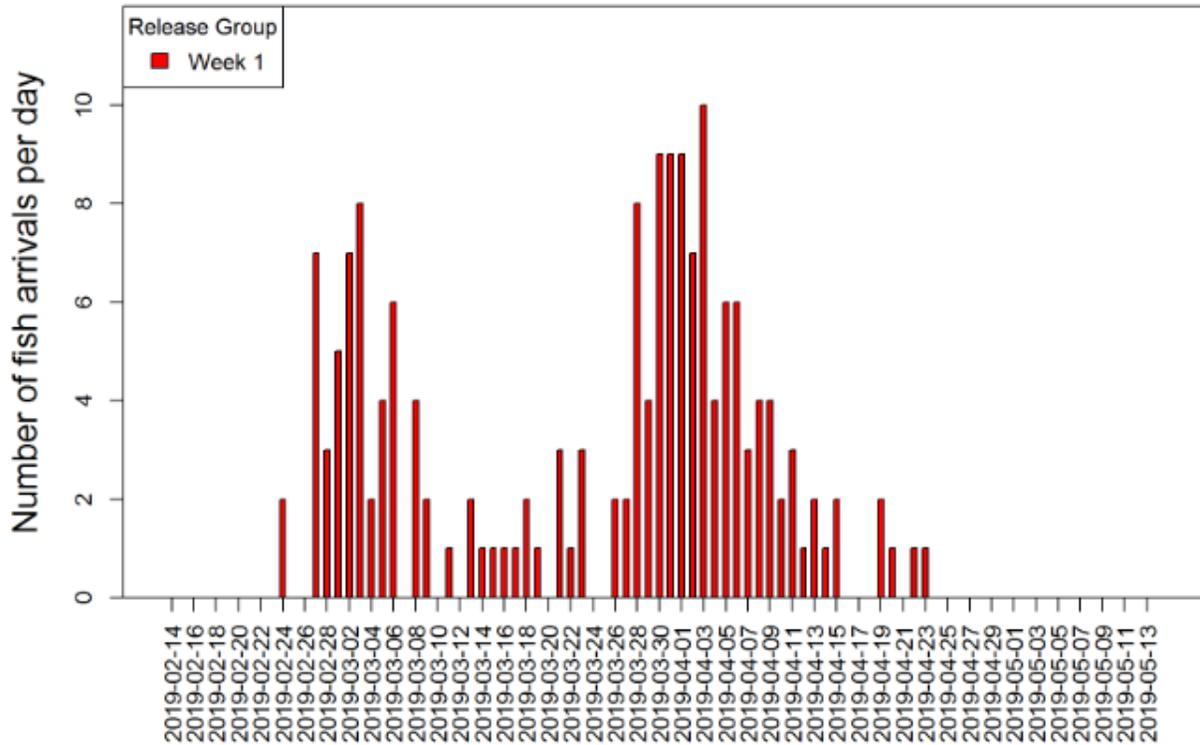
* Minimum survival estimate assumes some fish may have taken Yolo Bypass route.

[Winter-Run Acoustic Tagging Project: https://calfishtrack.github.io/real-time/pageLSWR_2019.html](https://calfishtrack.github.io/real-time/pageLSWR_2019.html)

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



Detections at Benicia Bridge



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

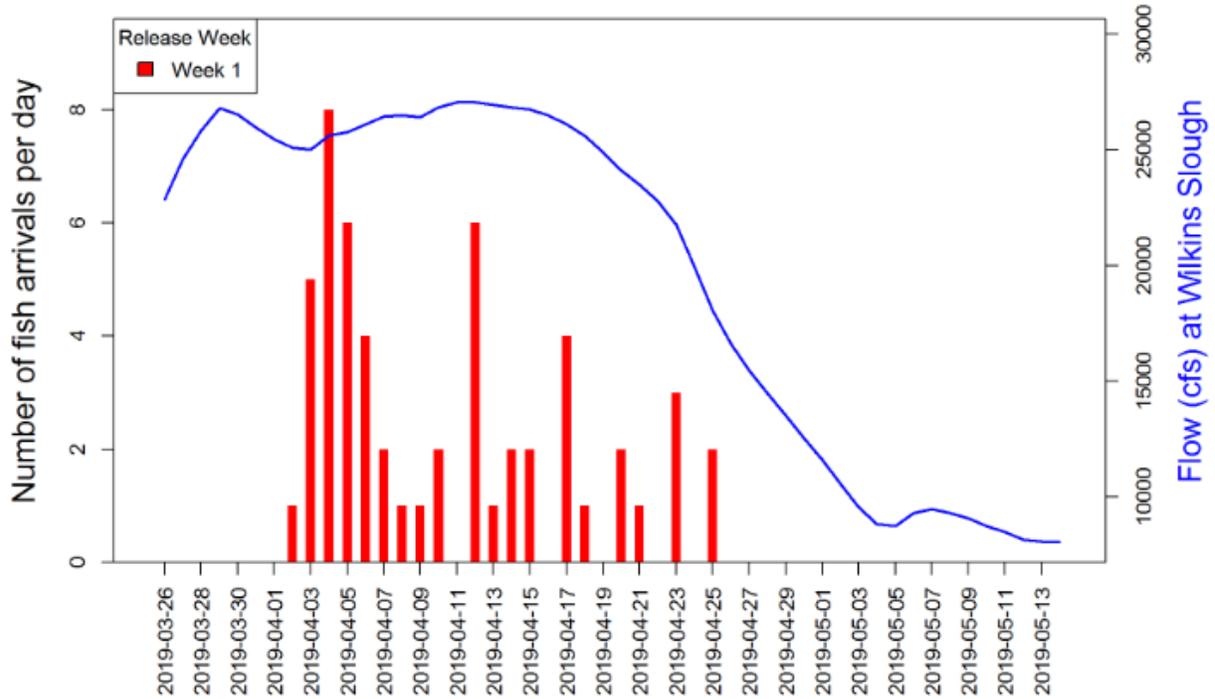
The Livingston Stone National Fish Hatchery released acoustic-tagged (JSATS) winter-run Chinook salmon from brood year 2018. The following table provides the detection frequencies downstream of the release site. Detections through 5/14/19 below.

Date of release	3/26/19
# acoustically tagged (JSATS)	500 fish
Butte City Bridge	31 (6%)
Tower Bridge	54 (11%)
Minimum survival to Tower Bridge	23%*
I-80/50 Bridge	81 (16%)
Georgiana Slough	22 (4%)
Detections at Benicia Bridge	70 (14%)
Minimum survival to Benicia Bridge	14%

* Minimum survival estimate assumes some fish may have taken Yolo Bypass route.

[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



Update: On 5/7/19, the USFWS reported that 3 winter-run Chinook salmon returned to Coleman National Fish Hatchery. All 3 are likely two year old males and all had adipose and left ventral fin clips. Genetic samples were taken and results are expected on Thursday. As per the fishery agency agreed upon protocols, these fish are being held at Coleman National Fish Hatchery and will be transferred to Livingston Stone National Fish Hatchery.



Battle Creek jump start winter-run return to Coleman National Fish Hatchery on 5/5/19 and 5/7/19 (Image provided by USFWS).

Feather River

Cook (DWR) provided Feather River RST data for two RST sites on the Feather River. At the Eye Side Channel from 5/6 to 5/10, 47 fall-run Chinook salmon and 2 wild

steelhead were observed. Flows were an average 3,500 cfs, water temperature 52°F, and turbidity 2.7 NTU. At the Herringer site from 5/6 to 5/10, 107 fall-run Chinook salmon, 1 late-fall-run Chinook salmon, 4 ad-clipped spring-run Chinook salmon, and 5 wild steelhead were observed. Flows were an average 7,625 cfs, water temperature 55°F, and turbidity 3.0 NTU. Both cones were raised on 5/10.

Agenda Item 6.

Fish Monitoring: Salvage

Griffiths (CDFW) provided a salvage summary for the period of 5/6-5/12.

Chinook salmon

Unclipped (wild origin) Chinook: Weekly salvage of wild origin Chinook salmon included 470 spring-run and 538 fall-run sized fish (estimated from subsample). Total WY19 salvage of wild-origin Chinook salmon is 5,937 fish.

Clipped (hatchery origin) Chinook: No ad-clipped fish were observed this week in salvage. Total WY19 salvage of ad-clipped Chinook is 1,699 fish.

Steelhead

Unclipped steelhead: 11 fish salvaged for a season total to date of 406.

Clipped steelhead: 1 fish salvaged for a season total to date of 1,831.

Operations:

The federal facility noted a brief pause in salvage (5 minutes) to drain a secondary channel to inspect debris accumulation. The salvage: count ratio remained above ¼.

Both facilities have begun salvaging young-of-year Splittail. The federal facility is salvaging many more than the state facility.

The state facility has shut down for annual maintenance as of 5/13. Export and salvage are expected to resume on 5/17.

DOSS Weekly Salvage Update

Reporting Period: May 6-May 12, 2019

Prepared by Kyle Griffiths on May 13, 2019 15:59

Preliminary Results -Subject to Revision

Criteria	6-May	7-May	8-May	9-May	10-May	11-May	12-May	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	0	0	0	0	→	0.00
Wild steelhead	0	0	0	7.14	0	3.53	0	↘	1.52
Exports									
SWP daily export	2,225	1,897	2,572	2,625	3,298	3,293	2,742	↗	2,665
CVP daily export	1,617	1,622	1,616	1,619	1,619	1,614	1,610	↘	1,617
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	
	Salvage	Loss	Trend	Salvage	Loss
Wild					
Winter Run	0	0	→	184	537
Spring Run	470	1,563	↗	1,294	4,275
Late Fall Run	0	0	→	3	13
Fall Run	538	1,253	↗	4,452	5,897
Unclassified	0	0	→	4	NC
Total	1,008	2,816		5,937	10,723
Hatchery					
Winter Run	0	0	→	87	366
Spring Run	0	0	↘	1,250	4,399
Late Fall Run	0	0	→	354	776
Fall Run	0	0	→	4	3
Unclassified	0	0	→	4	NC
Total	0	0		1,699	5,543

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	11	48	↘	406	1,367
Hatchery	1	4	↘	1,831	5,732
Total	12	52		2,237	7,099

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

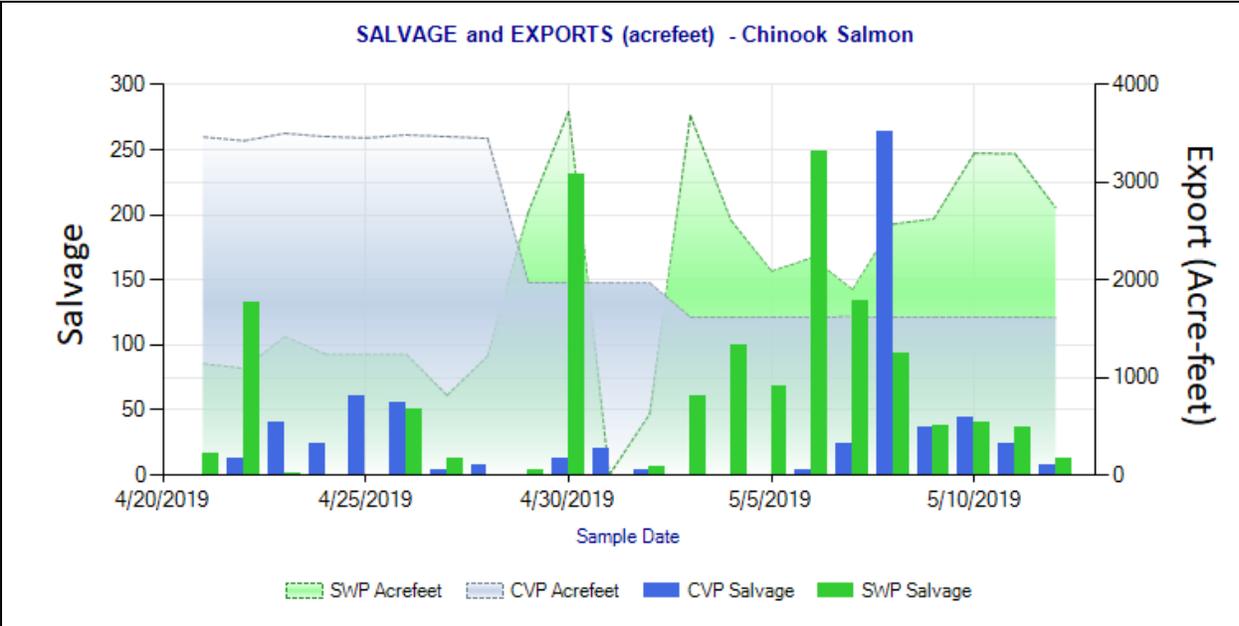


Fig 1. Chinook Salmon Salvage (values = number of fish salvaged) and export (acre-feet) at state/federal salvage facilities. All CS races/origins combined. Dates: 4/21 – 5/12.

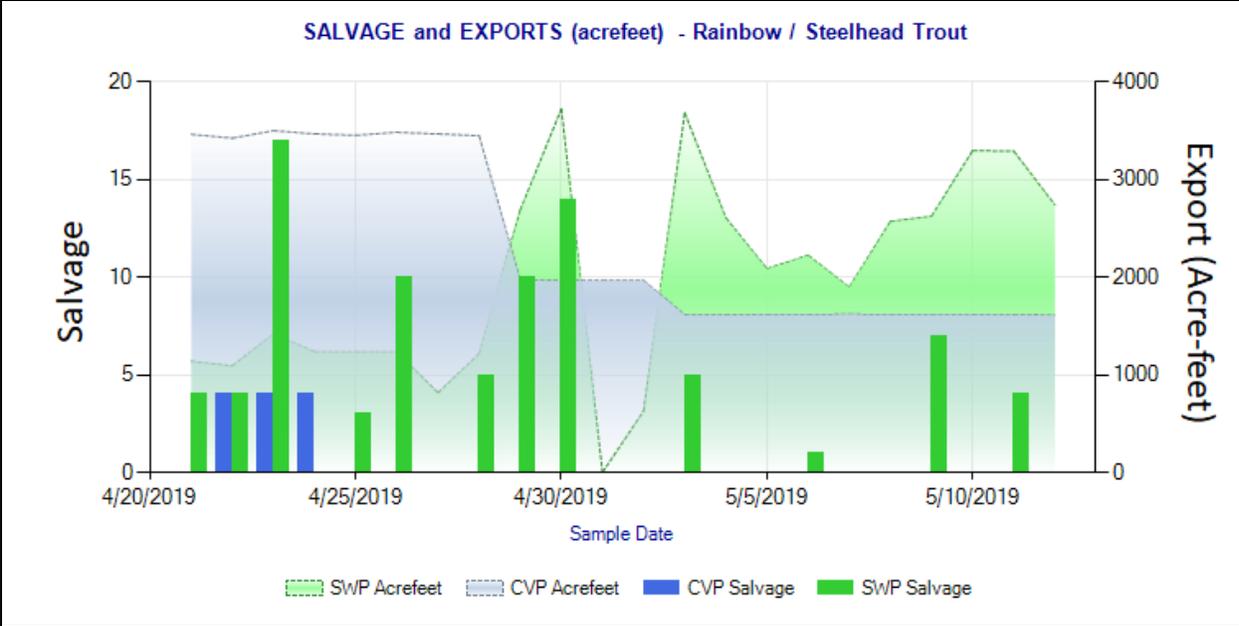


Figure 2. Salvage of clipped & unclipped Steelhead for state & federal salvage facilities. Dates: 4/21 – 5/12.

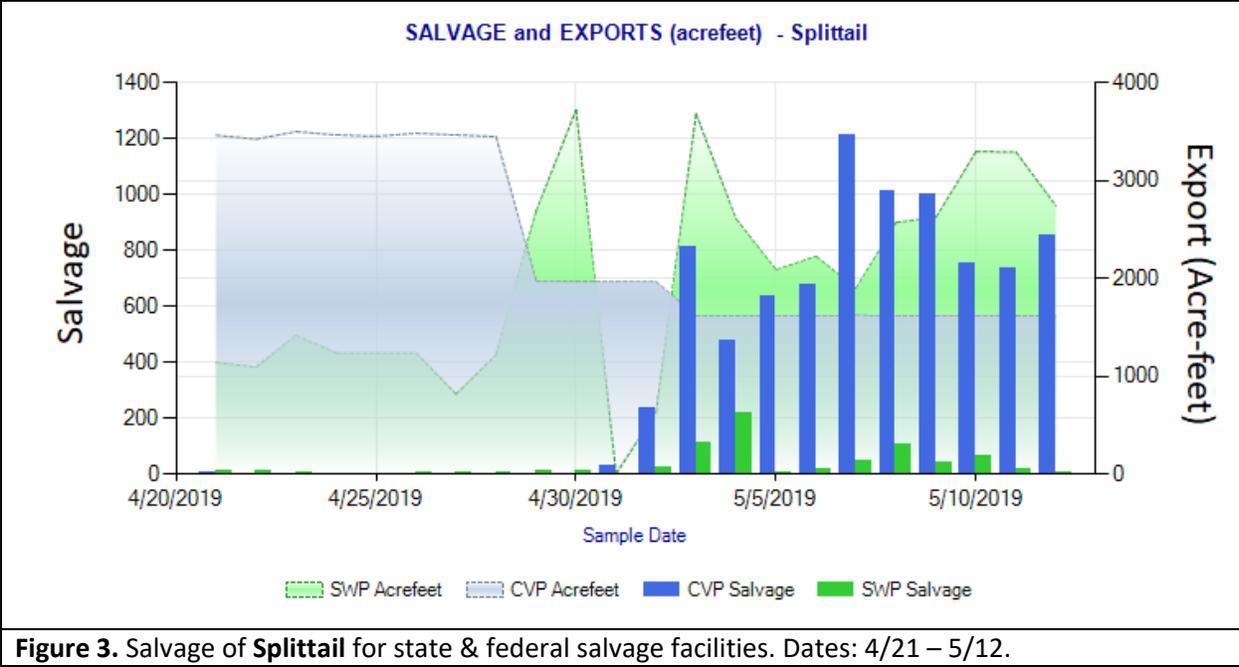


Figure 3. Salvage of **Splittail** for state & federal salvage facilities. Dates: 4/21 – 5/12.

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 5/6/19

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 5/6/2019.

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

On 5/13/19, the California Department of Fish and Wildlife (CDFW) released approximately 668,761 brood year 2018 fall-run Chinook salmon from Feather River Hatchery into San Pablo Bay at the Conoco net pen site. This release included 25% marked (adipose fin clip) and Coded Wire Tagged (CWT) fish.

On 5/14/19, CDFW will release approximately 607,000 brood year 2018 fall-run Chinook salmon from Nimbus Fish Hatchery into the San Pablo Bay at the Conoco Net Pen site. This release will include 25% marked (adipose fin clip) and CWT fish.

On 5/15/19, CDFW will release approximately 400,000 brood year 2018 fall-run Chinook salmon from Mokelumne River Hatchery into the Mokelumne River. 200,000 below Woodbridge Dam and 200,000 at Mokelumne River Hatchery. This release will include two groups of 100% CWT fish.

On 5/15/19, CDFW will release approximately 800,000 brood year 2018 fall-run Chinook salmon from Nimbus Fish Hatchery into the Lower American River at Sunrise Boat Ramp. This release will include 25% marked (adipose fin clip) and CWT fish.

On 5/16/19, CDFW will release approximately 800,000 brood year 2018 fall-run Chinook salmon from Nimbus Fish Hatchery into the Lower American River at Sunrise Boat Ramp. This release will include 25% marked (adipose fin clip) and CWT fish.

On 5/18/19, CDFW will release approximately 240,000 brood year 2018 fall-run Chinook salmon from Mokelumne River Hatchery into the Coastside Fishing Club Net Pens in Pillar Point Harbor. This release will be the first of three weekly releases totaling 720,000 and will include 100% CWT fish.

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>	0-1% (Last week: 0-1%)	0-2% (Last week: 2%)	98-100% (Last week: 97-98%)
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	5% (Last week: 5%)	5-10% (Last week: 10-15%)	85-90% (Last week: 80-85%)
<i>Hatchery winter-run Chinook salmon</i>	0-1% (Last week: 0-1%)	0-1% (Last week: 0-1%)	98-100% (Last week: 98-100%)

Rationale for distribution

Wild winter-run Chinook:

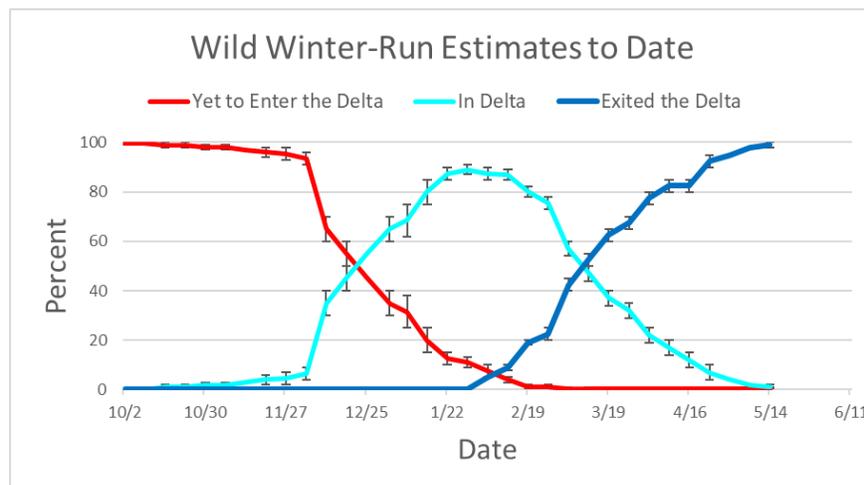
No wild winter-run Chinook salmon were observed at monitoring locations this week. Since none were observed, and due to life history and seasonal timing, DOSS estimates that 98-100 percent of wild winter-run Chinook salmon population has exited the Delta past Chipps Island, with few fish remain upstream of Knights Landing.

Wild spring-run Chinook:

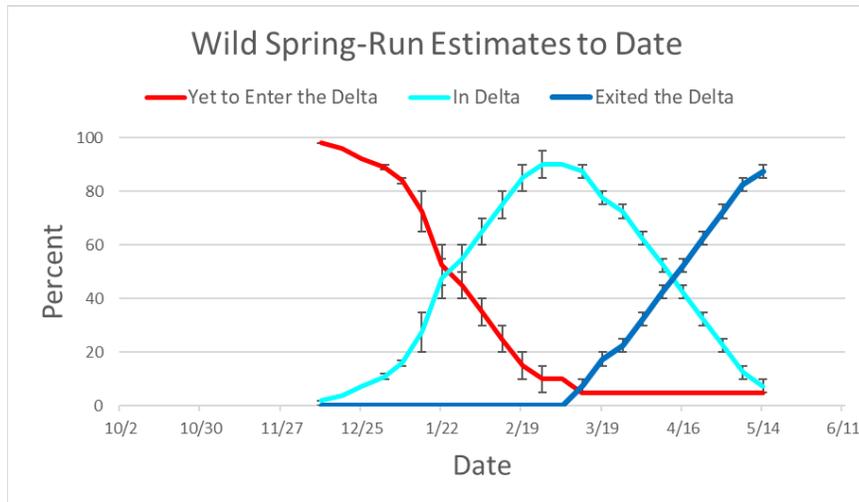
58 wild spring-run Chinook salmon were observed at GCID, 8 at Tisdale, 2 at the beach seines, 9 at Sacramento trawl, and 239 at Chipps Island trawl. Many of these fish are assumed to be unmarked hatchery fall-run Chinook recently released upstream. Since fish were observed at monitoring locations, and due to life history and seasonal timing, DOSS estimates that an additional 5 percent of the population has exited the Delta past Chipps Island and 5 percent remain upstream of Knights Landing.

Hatchery winter-run Chinook:

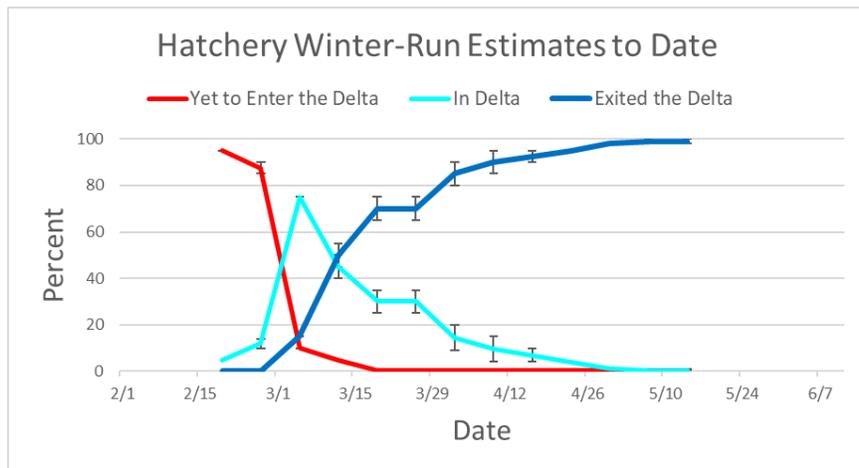
195 acoustically-tagged (AT) hatchery winter-run have been detected at Butte City Bridge, 112 at Tower Bridge, 126 at I80-50, and 163 at Benicia Bridge. No additional fish were detected at receivers in the past week. Since no fish were detected, DOSS estimates the majority of the group has migrated through the Delta past Chipps Island. This estimate assumes a high in-river survival rate and does not account for predation or other sources of mortality.



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-MEDIUM**
 - Approximately 0-2% of winter run juveniles estimated to be in the Delta.
 - Approximately 5-10% 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 (~30,000 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 to Medium entrainment risk.

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

- **Exposure Risk: LOW-MEDIUM**
 - Listed Chinook salmon and steelhead have been salvaged and observed in monitoring sites in the Delta.
 - Flows at San Joaquin River are decreasing, but so are exports based on inflows at Vernalis. The risk of entrainment, especially for steelhead remains unchanged.
 - OMR is expected to remain positive over the next week.
 - Exposure risk is medium for San Joaquin steelhead and low for Sacramento listed fish.
 - 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 cfs⁴: HIGH
- OMR -9,000 cfs⁴: HIGH

- **Overall Entrainment Risk:**
 - OMR -2,500 cfs: LOW-MEDIUM
 - OMR -3,500 cfs: LOW-MEDIUM
 - OMR -5,000 cfs: MEDIUM
 - OMR -6,250 cfs⁴: MEDIUM-HIGH
 - OMR -7,500 cfs⁴: HIGH
 - OMR -9,000 cfs⁴: 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.

Next Meeting: The next DOSS conference call will be on **5/21/19 at 9am.**

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