

**Delta Operations for Salmonids and Sturgeon (DOSS) Group**  
**Conference call: 5/15/2018 at 9:00 am.**

**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: [http://www.westcoast.fisheries.noaa.gov/central\\_valley/water\\_operations/doss.html](http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/doss.html).

**CDFW:** Ken Kundargi, Duane Linander, Bob Fujimura, Kevin Reece

**DWR:** Farida Islam, Dan Yamanaka, Bryant Giorgi, Ming-Yen Tu

**NMFS:** Jeff Stuart, Kristin McCleery

**Reclamation:** Towns Burgess, Tom Patton

**SWRCB:** Chris Kwan, 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: [www.baydeltalive.com/djfmj](http://www.baydeltalive.com/djfmj))
3. Current Operations
4. Smelt working group update
5. Fish Monitoring: RSTs/trawls/seines
6. Fish Monitoring: Tracking of acoustic-tagged Chinook salmon
7. Fish Monitoring: Salvage
8. Hatchery Releases
9. DOSS Estimates of Fish Distribution
10. DOSS Estimates of Fish Entrainment Risk
11. DOSS advice
12. Next DOSS meeting

**Agenda Item 2.**

**RPA Implementation Review**

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

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

- Gates will remain closed from 2/1 to 5/20. After 5/20, gates will be opened on weekends and closed on weekdays through mid-June.
- Gates will be open for the Memorial Day weekend from Friday afternoon (5/25) to Tuesday morning (5/29).

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<sup>1</sup> For details, see pages 62-66 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: [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)

**Action IV.2.1 San Joaquin River to Export Ratio:**

- For the period from 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 water year type (determined on 4/9 to be below normal in the San Joaquin River basin), the ratio of San Joaquin River inflow to combined CVP and SWP exports is 3:1, 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.2.3<sup>2</sup> (OMR Management):**

- Implementation of this action in WY 2018 is from 1/1 through 6/15, and requires that OMR flow be no more negative than -5,000 cfs.
- 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.
- OMR flows are reported weekly with the OMR index and the tidally filtered USGS gauges at the 5-day and 14-day running averages.
- No exceedances of fish loss density or daily fish loss triggers occurred during the previous week.

**Agenda Item 3.**

**Current Operations (5/15/18)**

SWP		CVP	
<b>Exports (cfs)</b>			
Clifton Court Forebay	1,200 <sup>A</sup>	Jones Pumping Plant	1,850 <sup>A</sup>
<b>Reservoir Releases (cfs)</b>			
Feather - Oroville	1,050	American - Nimbus	1,750
		Sacramento - Keswick	8,750 <sup>B</sup>
		Stanislaus - Goodwin	3,000 <sup>C</sup>
		Trinity - Lewiston	1,850 <sup>D</sup>
<b>Reservoir Storage (in TAF)</b>			
San Luis (SWP)	874	San Luis (CVP)	777
Oroville	2,464	Shasta	4,114
New Melones	2,029	Folsom	922
<b>Delta Operations</b>			
DCC	Closed <sup>E</sup>	Sacramento River at Freeport (cfs)	7,900
Outflow Index (cfs)	~11,700	San Joaquin River at Vernalis (cfs)	4,340
E:I	18% (14-day avg.)	X2	74 km

<sup>A</sup> CVP exports will decrease to 1,000 cfs on Wednesday (5/16) and hold for a 3-day predator removal test. On Saturday (5/19) exports will return to 1,850 cfs. Combined SWP and CVP

<sup>2</sup> For details, see pages 74-79 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: [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)

exports are scheduled to meet the 3:1 San Joaquin River inflow to export ratio determined by RPA Action IV.2.1 for a below normal water year type in the San Joaquin River basin based on flows in the San Joaquin River at Vernalis. Additional exports above the 3:1 ratio level will pick up the additional irrigation district water released on the Stanislaus River at a 1:1 ratio per a WIIN Act action. Combined exports will be adjusted to smooth out any variations in flows based on the 14-day average inflow, allowing CVP exports to remain relatively steady through the rest of May.

<sup>B</sup> Keswick releases will increase to 9,250 cfs tonight (5/15) and to 9,500 on 5/17.

<sup>C</sup> Goodwin releases will remain at 3,000 cfs through the end of May. Currently releases are for both the Stanislaus River spring pulse flows per schedule 2-E under NMFS' RPA Action III.1.3 and an additional release of irrigation district water per a WIIN Act request. Total releases will remain steady at 3,000 cfs with the difference between the 2-E pulse flow schedule and 3,000 cfs made up by the irrigation district water releases.

<sup>D</sup> Lewiston releases will continue to follow the pulse flow schedule over the next week or two.

<sup>E</sup> DCC Gates are currently closed and will open on Friday, 5/25, for Memorial Day weekend and will close on Tuesday, 5/29. Gates will open on Fridays and close on Mondays through mid-June, and then will remain open for the summer.

Approximate OMRs as of 5/12/18:

	USGS gauges (cfs)	Index (cfs)
Daily	-2,400	-1,000
5-day	-700	+100
14-day	-200	+200

Approximate OMRs as of 5/14/18:

	Index (cfs)
Daily	-800
5-day	-400
14-day	+100

Factors controlling Delta exports:

5/8-5/15: San Joaquin inflow-to-export ratio of 3:1 per NMFS BiOp RPA Action IV.2.1

Weather Forecast

Potential thunderstorms/showers may occur tomorrow morning across the Sacramento region. Mild temperatures and dry weather expected for the rest of the week.

**Agenda Item 4.**

**Smelt Working Group Update**

The Smelt Working Group met on Monday, 5/14/18 at 10 am. Anderson (USFWS) provided an update during the DOSS call. Chen (USFWS) provided the following Smelt Working Group summary via email.

The Smelt Working Group reviewed current Delta conditions, survey data, current water project operations, and forecasted weather. Current weather is sunny and warm with minor precipitation forecasted for Wednesday morning. The 3-station average water

temperature (Antioch, Rio Vista Bridge, and Mossdale) has remained above 12°C since 3/8, which is the temperature indicative of suitable spawning identified in the Biological Opinion and a trigger for the start of Action 3. OMR flows, which are currently at approximately -3,200 cfs, are expected to be at around -1,000 cfs starting tomorrow and for the rest of the week. Based on Delta conditions, water export levels, and the survey data, the Group concluded that the risk for Delta Smelt entrainment would be low for OMR flows of more positive than -1,250 cfs, low to medium for OMR flows between -1,250 cfs and -3,500 cfs, and medium for OMR flows between -3,500 cfs to -5,000 cfs.

The Service notified Reclamation that conditions had been met to begin implementation of Action 3 (protections for larval and juvenile Delta Smelt) on 3/26 and requires an OMR flow of no more negative than -5,000 cfs. The Smelt Working Group will continue to monitor Delta Smelt survey and salvage data and Delta conditions. The Group will meet again next Monday, 5/21, at 10 am.

**Agenda Item 5.**

Fish Monitoring: The following table presents fish monitoring data summarized over the past week. Empty cells indicate zero catches at those locations with sample dates shown.

Location	GCID RST <sup>A</sup>	Tisdale RST <sup>B</sup>	Knights Landing RST <sup>C</sup>	Butte Creek Fyke trap <sup>D</sup>	Butte Creek RST <sup>E</sup>	Beach Seines <sup>F</sup>	Sacramento Trawl <sup>F</sup>	Chippis Island Midwater Trawl <sup>F</sup>	Mossdale Kodiak Trawl <sup>G</sup>
Sample Date	5/8-5/14	5/7-5/11	5/7-5/14	5/7-5/14	5/7-5/14	5/8, 5/9, 5/11	5/7, 5/9, 5/11, 5/12	5/7, 5/9, 5/11	5/3-5/5, 5/7-5/8, 5/10-5/12
Chinook									320
FR Chinook	1,472 juveniles	1	7			32	110	97	
SR Chinook	14 juveniles 32 smolts			591	543		1	6	
WR Chinook									
LFR Chinook									
Chinook (ad-clip)	110 FR juveniles 1 FR smolt						20	30	
Steelhead (wild)	7								1
Steelhead (ad-clip)								1	
Green Sturgeon									
Flows (avg. cfs)	965	5,835	4,333	292	293				
W. Temp. (avg. °F)	62.1	64.8	68.3	53.1	52.8				

<b>Turbidity (avg. NTU)</b>	13.5	15.6	10.0	7.5	7.5				
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<sup>A</sup> GCID RST cone was raised on 5/11 at 10:00 am due to high winds and heavy debris and was lowered at 7:00 pm. Cone was raised on 5/13 at 9:00 am because it was heavily coated with debris reducing the RPMs and was lowered at 9:00 pm. Cone was raised on 5/14 at 9:00 am due to heavy debris and was lowered at 9:00 pm.

<sup>B</sup> Tisdale RST sampling period was from 5/7 at 10:00 am to 5/11 at 9:30 am.

<sup>C</sup> Knights Landing RST sampling period was from 5/7 at 11:00 am to 5/14 at 10:45 am.

<sup>D</sup> Butte Creek Fyke trap sampling period was from 5/7 at 9:00 am to 5/14 at 9:00 am.

<sup>E</sup> Butte Creek RST sampling period was from 5/7 at 8:30 am to 5/14 at 8:30 am.

<sup>F</sup> Data reported in the 5/6 to 5/12 DJFMP sampling summary. One 595 mm adult Chinook salmon was collected at Chipps Island Trawl.

<sup>G</sup> Mossdale Trawl sampling is being conducted by CDFW (Region 4) from 4/1 to 6/30. RBT (rainbow trout) was a 278 mm smolt on 5/8.

**Agenda Item 6.**

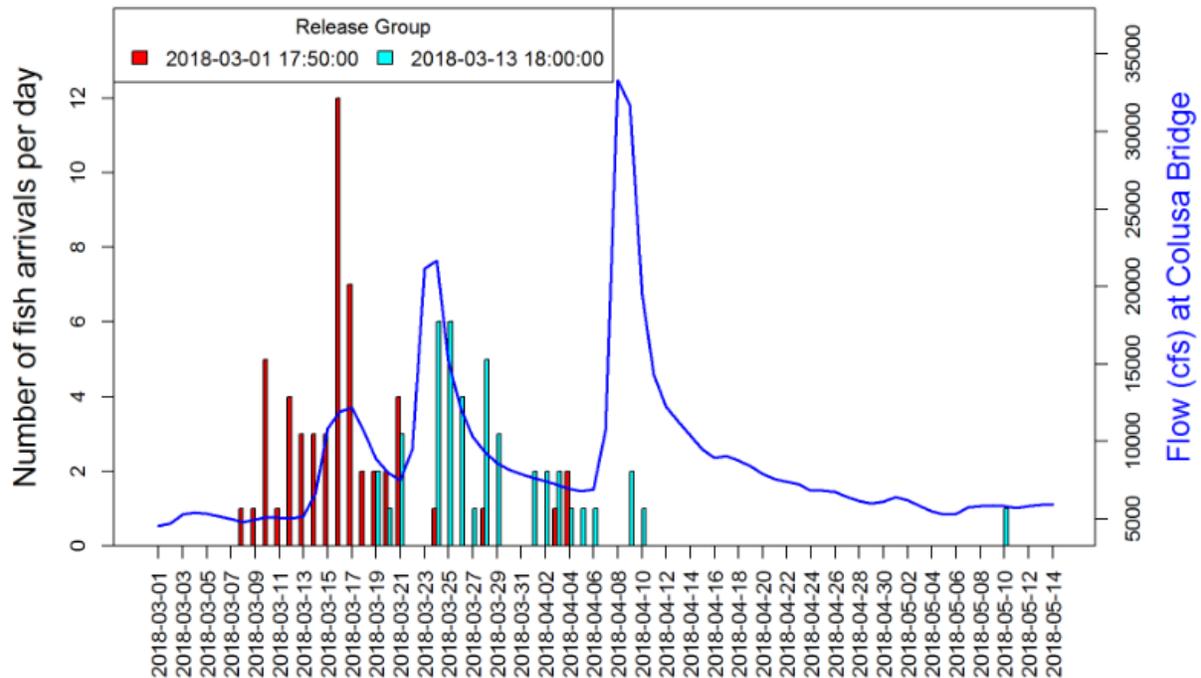
**Fish Monitoring: Tracking of acoustic-tagged hatchery winter-run Chinook salmon**

The Livingston Stone National Fish Hatchery released acoustic-tagged (JSATS) winter-run Chinook salmon from brood year 2017. The following table provides the detection frequency at Tower Bridge and Sacramento I-80/50 Bridge from 3/8 to 5/14.

	First Release Group	Second Release Group
<b>Date of release</b>	<b>3/1/2018</b>	<b>3/13/2018</b>
# acoustically tagged (JSATS)	361	239
Detections at Tower Bridge	55 (15.2%)	44 (18.4%)
Detections at the Sacramento I-80/50 Bridge	54 (15.0%)	32 (13.4%)
Detections at Old River	1 (0.3%)	0
Detections at Benicia West	1 (0.3%)	0
Minimum Survival to Tower Bridge	21.2%	30.4%
95% Confidence Interval	16.9% to 26.3%	23.6% to 38.3%

<https://calfishtrack.github.io/real-time/pageLSWR.html>

Detections at Tower Bridge (downtown Sacramento) versus Sacramento River flows at Colusa Bridge



**Agenda Item 7.**

**Fish Monitoring: Salvage<sup>3</sup>**

Fujimura (CDFW) provided a salvage summary for the period of 5/7/18-5/13/18.

The number of unclipped juvenile Chinook salmon salvaged last week increased compared to the previous week. The reported salvage of salmon from the CVP and SWP for this reporting week was: 2,263 fall-run size, 357 spring-run size, and 1 winter-run size unclipped juvenile Chinook salmon. No clipped salmon were salvaged.

The number of steelhead salvaged last week increased compared to the previous week. The reported salvage of steelhead from the CVP and SWP for this reporting week was 70 wild steelhead and no hatchery steelhead.

Wild steelhead were salvaged six days last week and resulted in daily loss densities ranging from 0.76 to 4.56 fish/TAF.

No sturgeon were salvaged last week.

Preliminary results for yesterday (5/14/18) indicate unclipped juvenile Chinook salmon were salvaged at the CVP and SWP fish facilities -- mostly fall-run size and spring-run size Chinook salmon and some wild steelhead.

<sup>3</sup> Salvage data reported in this section represent the total estimated and expanded salvage based on the number of fish observed at the fish collection facility. For example, if one steelhead is observed in the typical ½-hour sampling period within a 2-hour operation period, the single steelhead is expanded to a salvage of four.

## DOSS Weekly Salvage Update

Reporting Period: May 7-May 13, 2018

Prepared by Bob Fujimura on May 14, 2018 15:57

Preliminary Results -Subject to Revision

Criteria	7-May	8-May	9-May	10-May	11-May	12-May	13-May	Trend	
<b>Loss Densities</b>									
Wild older juvenile CS	0	0	0	0	0	0.62	0	↗	0.09
Wild steelhead	2.54	0	0.76	2.27	4.56	2.56	1.42	↘	2.01
<b>Exports</b>									
SWP daily export	175	0	0	0	799	1,822	2,464	↘	751
CVP daily export	3,668	3,697	3,599	3,594	3,599	5,181	5,221	↗	4,080
SWP reduced counts	0%				0%	0%	0%	→	0%
CVP reduced counts	0%	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 brief fish facility salvage interruption 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	1	4	↗	113	296
Spring Run	357	535	↘	9,257	17,669
Late Fall Run	0	0	→	5	7
Fall Run	2,263	2,465	↘	6,923	10,216
Unclassified	0	0	→	4	NC
<b>Total</b>	<b>2,621</b>	<b>3,004</b>		<b>16,302</b>	<b>28,188</b>
<b>Hatchery</b>					
Winter Run	0	0	→	48	183
Spring Run	0	0	→	1,006	1,724
Late Fall Run	0	0	→	71	236
Fall Run	0	0	→	0	0
Unclassified	0	0	→	1	NC
<b>Total</b>	<b>0</b>	<b>0</b>		<b>1,126</b>	<b>2,144</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	70	70	↘	992	2,521
Hatchery	0	0	↘	728	2,446
<b>Total</b>	<b>70</b>	<b>70</b>		<b>1,720</b>	<b>4,966</b>

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

Generated by Bob Fujimura on May 14, 2018

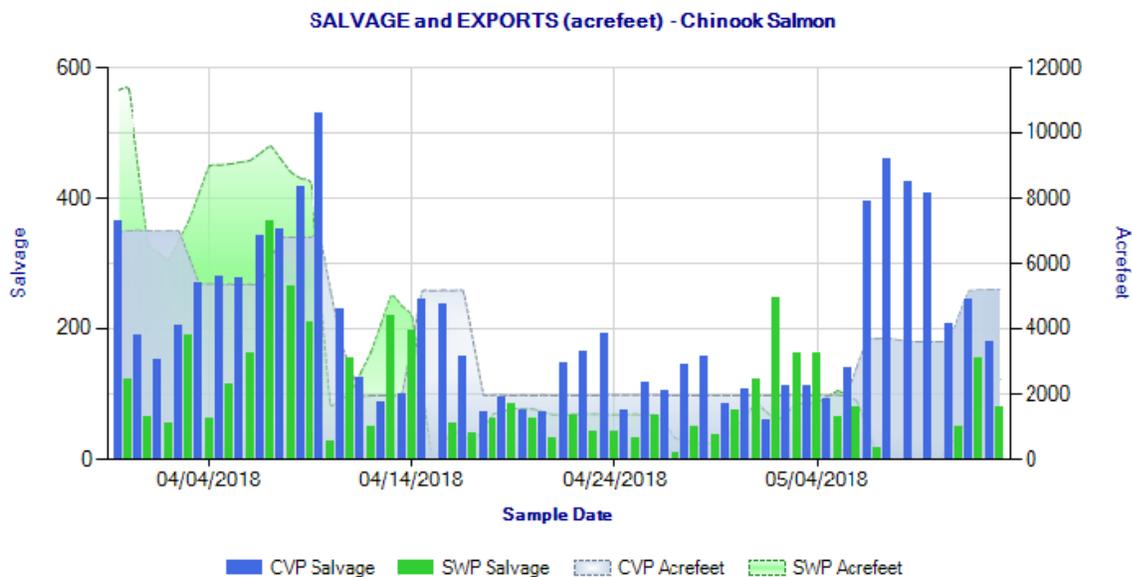


Figure 1. Daily salvage of Chinook Salmon (all races) and water exports from the state and federal fish salvage facilities during March 31 through May 13, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

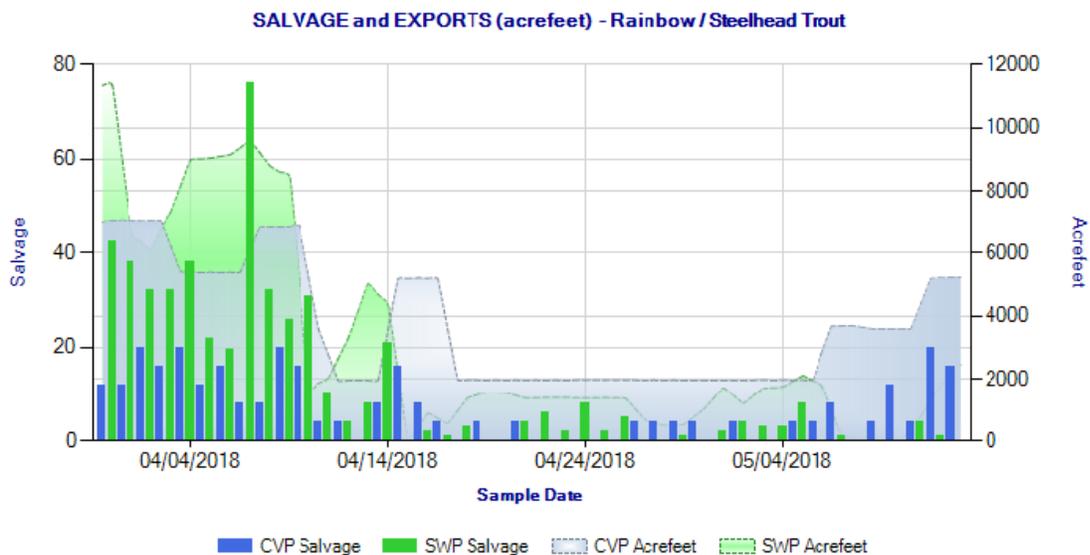


Figure 2. Daily salvage of Rainbow/Steelhead and water exports from the state and federal fish salvage facilities during March 31 through May 13, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

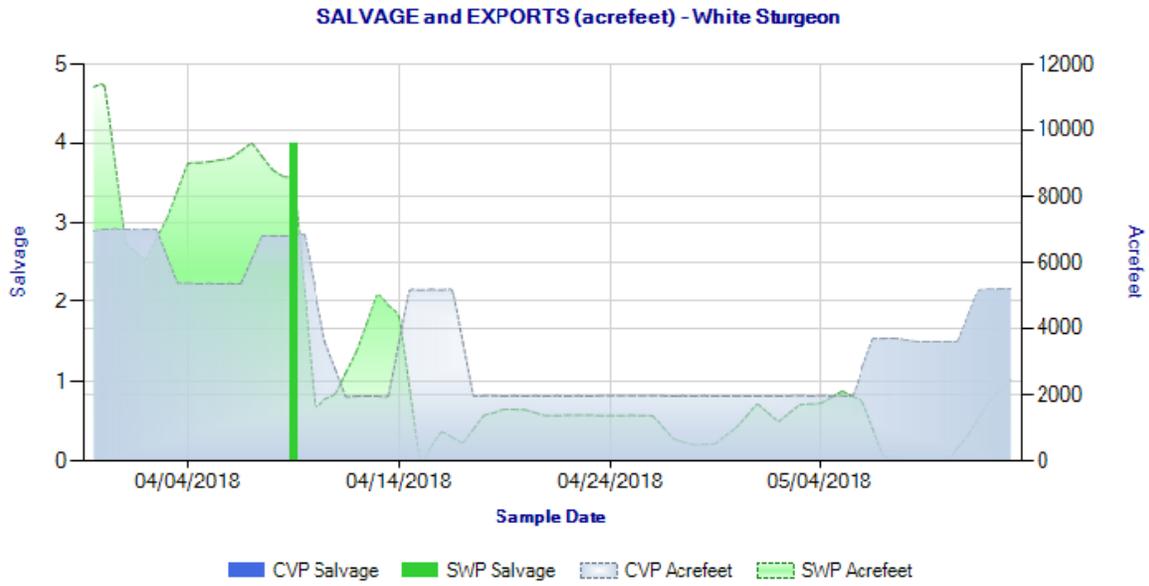


Figure 3. Daily salvage of White Sturgeon and water exports from the state and federal fish salvage facilities during March 31 through May 13, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

**CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 4/19/18**

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 Trigger	Date of First Loss <sup>4</sup>	Date of Last Loss <sup>4</sup>
12/21/2017	LF	Coleman NFH	Battle Creek	Production	35.68	297,370	n/a	0.012	n/a	n/a	1/23/2018	4/14/2018
1/5/2018	LF	Coleman NFH	Battle Creek	Production	130.62	519,791	n/a	0.025	n/a	n/a	1/31/2018	3/28/2018
1/8/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	12.99	78,786	n/a	0.016	n/a	0.5%	1/31/2018	3/26/2018
1/19/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	0	71,645	n/a	0.000	n/a	0.5%	*	*
1/25/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	25.68	84,922	n/a	0.030	n/a	0.5%	*	3/8/2018
3/1/2018, 3/13/2018	W	Livingstone NFH	Sacramento River	Production	55.4	216,746	n/a	0.026	n/a	0.5%	3/22/2018	4/9/2018
12/21/2017	S	SJRRP	San Joaquin River	Experimental	13.16	1450	n/a	0.908	n/a	n/a	1/11/2018	3/13/2018
1/19/2018	S	SJRRP	San Joaquin River	Experimental	167.35	31184	n/a	0.537	n/a	n/a	3/14/2018	4/13/2018
1/26/2018	S	SJRRP	San Joaquin River	Experimental	253.16	49549	n/a	0.511	n/a	n/a	3/11/2018	4/13/2018
3/2/2018	S	SJRRP	San Joaquin River	Experimental	762	87115	n/a	0.875	n/a	n/a	3/30/2018	4/11/2018

**UNCONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES, 2017/2018**

Facility	Unknown CWT Loss <sup>5</sup>	Unread CWT Loss <sup>6</sup>	Unknown Hatchery Loss <sup>7</sup>	Acoustic Tag Loss <sup>8</sup>	Number of Unassigned CWTs <sup>9</sup>
SWP	296.14				
CVP	16.02				
<b>TOTAL</b>	<b>312.16</b>				

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2017 through 4/19/2018.

<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.

<sup>5</sup> Adipose-fin clipped Chinook was observed during fish count, but tag code could not be determined (e.g., damaged tag, lost tag, no tag, or Chinook released).

<sup>6</sup> Adipose-fin clipped Chinook was collected during fish count and has not been processed yet.

<sup>7</sup> CWT has been read, but hatchery release information not yet available.

<sup>8</sup> Adipose-fin clipped Chinook released due to presence of sutures.

<sup>9</sup> CWT cannot currently be assigned to a salvage record with certainty since the CWT was lost and then found. CWT may be assigned to a salvage record if new information is available.

\* Information not yet available.

DWR-DES Revised 4/20/2018

Preliminary data from DFW, DWR, FWS, and Reclamation; subject to revision.

**Agenda Item 8.**

**Hatchery Releases**

On 5/10/18, the California Department of Fish and Wildlife released a total of approximately 1,340,000 brood year 2017 fall-run Chinook salmon from the Nimbus Fish Hatchery into the Lower American River at Sunrise and Jibboom Streets. The release included 25% marked (adipose fin clip and CWT) fish.

An additional 1,340,000 brood year 2017 fall-run Chinook salmon will be released later in May from the Nimbus Fish Hatchery (approximately 5/21 – 5/23/18) into the American River. The timing of the release will be when the DCC Gates are closed when the fish are expected to be passing the location of the gates.

**Agenda Item 9.**

**DOSS Estimates of Fish Distribution**

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

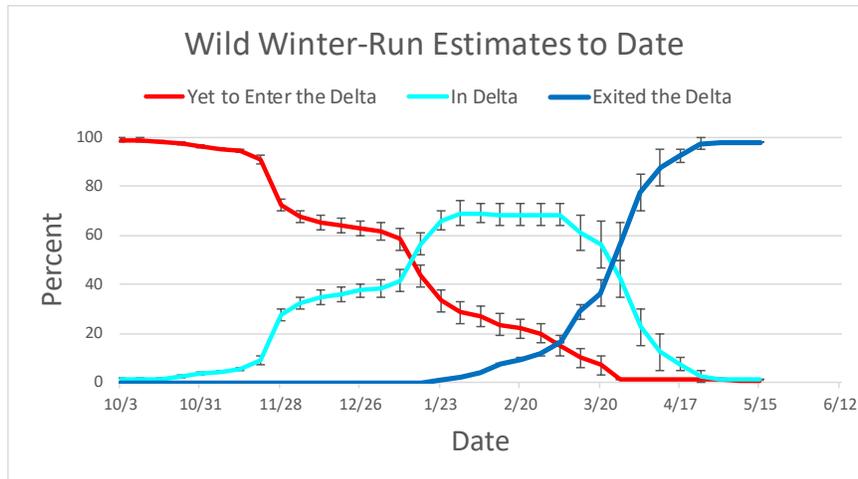
<b>Location</b>	<b>Yet to Enter Delta (Upstream of Knights Landing)</b>	<b>In the Delta</b>	<b>Exited the Delta (Past Chipps Island)</b>
<i>Wild young-of-year winter-run Chinook salmon</i>	0-1% (Last week: same)	<1% (Last week: same)	>98% (Last week: same)
<i>Wild young-of-year spring-run Chinook salmon</i>	<1% (Last week: same)	2-5% (Last week: 5-10%)	94-98% (Last week: 89-94%)
<i>Hatchery winter-run Chinook salmon</i>	0-1% (Last week: same)	0-1% (Last week: 1%)	99% (Last week >98%)

**Rationale for changes in distribution**

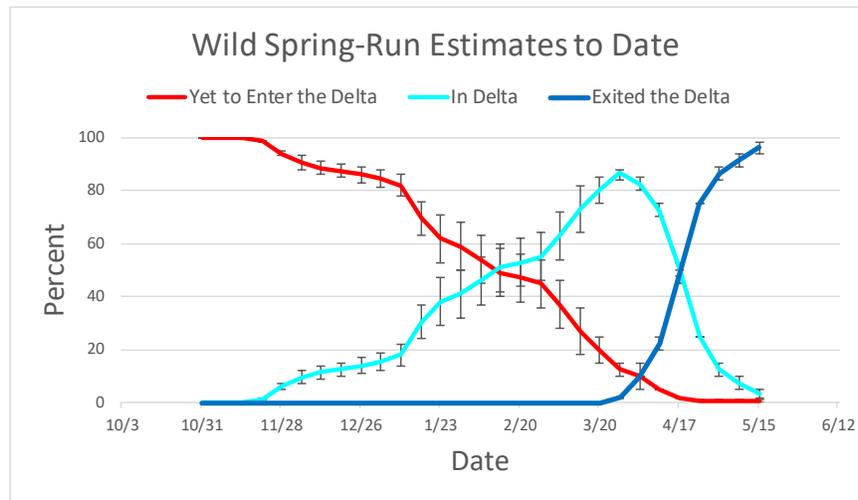
Wild winter-run Chinook: No winter-run sized fish were observed at monitoring locations this past week. DOSS estimated that at least 98% of the winter-run population has exited past Chipps Island and that 0-1% remain upstream or in the Delta.

Wild spring-run Chinook: 46 spring-run sized fish were observed at GCID, approximately 1,100 at Butte Creek, 1 in the Sacramento Trawl, and 6 in the Chipps Island Trawl this past week. Since fish were observed at locations within the Delta and at Chipps Island trawl, DOSS estimated that less than less than 1% of the spring-run population remain upstream of the Delta and 94-98% of the population has exited the Delta past Chipps Island.

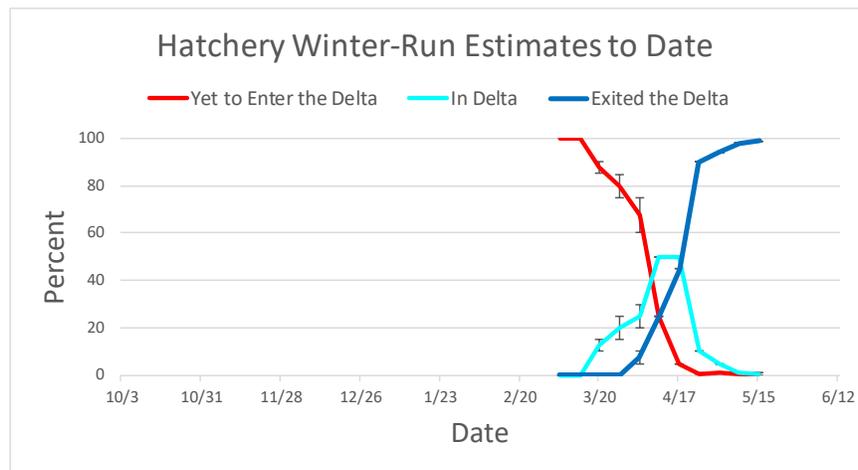
Hatchery winter-run Chinook: Approximately 20-26% of the hatchery-released fish from the two releases on the Sacramento River in Redding have been detected by the acoustic receiver arrays located on the Tower and I-80/ US-50 bridges in Sacramento. Minimum survival is estimated at approximately 25%. One fish from the second release group was detected last week. DOSS estimated that most hatchery winter-run Chinook salmon have moved out of the upper river and through the Delta, with >98% moving past Chipps Island.



**WY 2018 wild winter-run distribution estimates to date.**



**WY 2018 wild spring-run distribution estimates to date.**



**WY 2018 hatchery winter-run distribution estimates to date.**

## **Agenda Item 10.**

### **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**
  - Most of the wild winter-run Chinook salmon population for BY17 has moved through the Delta at this time.
  - Most of the BY17 wild spring-run Chinook salmon population has moved through the Delta at this time (94-98%).
  - Most of the hatchery winter-run Chinook salmon population has moved through the Delta at this time (99%).
  - Reduced numbers of wild steelhead are still being observed in the Delta and at Chipps Island.
  - Wild steelhead are still being observed in the Mossdale Trawls.
- **Routing Risk: MEDIUM**
  - Sacramento River inflows are currently ~11,700 cfs and are within the range of being affected by tidal flows at Georgiana Slough and Three Mile Slough.
  - Delta Cross Channel is closed.
- **Overall Entrainment Risk: LOW-MEDIUM**

- Fish are present in the Delta but high river inflows and predicted positive/neutral OMR and Qwest reduce the risk of entrainment into the central and southern Delta.

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

- **Exposure Risk: MEDIUM-HIGH**
  - Clipped steelhead and wild steelhead have been observed in salvage.
  - Clipped and wild Chinook salmon have been seen in salvage.
  - Continuing to see Chinook salmon and steelhead in lower Sacramento River and western Delta monitoring efforts (Chippis Island and in the river confluence region)
  - SKT trawl has captured clipped and unclipped Chinook salmon in the San Joaquin River and southern Delta.
  - Greater proportions of the winter-run and spring-run Chinook salmon populations are estimated to have moved into the Delta or out of the Delta than remain upstream
  - Increased exports due to the WIIN Act and higher Stanislaus (3,000 cfs through May) and Tuolumne flows may present issues for steelhead migrating out of the San Joaquin River basin.
- **OMR/Export Risk:**
  - OMR -2,500 cfs: LOW
  - OMR -3,500 cfs: MEDIUM
  - OMR -5,000 cfs: MEDIUM-HIGH
  - OMR -6,250 cfs<sup>4</sup>: HIGH
  - OMR -7,500 cfs<sup>4</sup>: HIGH (incrementally higher risk if Vernalis flows decrease)
  - OMR -9,000 cfs<sup>4</sup>: HIGH (full export capacity, footprint of export effects extend into the western Delta and lower San Joaquin River).
- **Overall Entrainment Risk:**
  - OMR -2,500 cfs: LOW-MEDIUM
  - OMR -3,500 cfs: MEDIUM (higher than last week)
  - OMR -5,000 cfs: MEDIUM-HIGH
  - OMR -6,250 cfs<sup>4</sup>: MEDIUM-HIGH
  - OMR -7,500 cfs<sup>4</sup>: MEDIUM-HIGH
  - OMR -9,000 cfs<sup>4</sup>: MEDIUM-HIGH

These assessments are based on current hydrology and fish distributions.

**Agenda Item 11.**

**DOSS Advice to WOMT and NMFS:** None.

**Agenda Item 12.**

**Next Meeting:** The next DOSS conference call will be on **5/22/2018 at 9 am.**

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<sup>4</sup>By request of management, DOSS also assessed risks at an OMR flow more negative than -5,000 cfs.