

**Delta Operations for Salmonids and Sturgeon (DOSS) Group**  
**Conference call: 5/1/2018 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:** Jason Julienne, Ken Kundargi, Duane Linander, Bob Fujimura

**DWR:** Kevin Reece, Bryant Giorgi, Farida Islam

**NMFS:** Jeff Stuart, Kristin McCleery

**Reclamation:** Elissa Buttermore, Towns Burgess, Tom Patton, Mike Hendrick

**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 April/May:**

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

- Gates will remain closed from February 1 to May 20.

**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 will be determined by the San Joaquin River inflow as measured at Vernalis. For the current

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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)

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 1/1/18 through 6/15/18, 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.
- Wild steelhead loss numbers were elevated on 4/24/18 and exceeded the first stage daily loss triggers. The wild steelhead loss was 36.64 fish and the combined exports for the Projects was 3.337 thousand acre feet (TAF). The calculated threshold for the first trigger for daily steelhead loss was 26.696 fish (8 fish/TAF \* 3.337 TAF/day = 26.696 fish/day). OMR flows were more positive than the required flows under the first stage trigger (i.e., no more negative than -3,500 cfs)

**Action IV.3<sup>3</sup> (Reduce likelihood of entrainment or salvage at the export facilities, including an alert that indicates that export operations may need to be altered):**

- Implementation of this action in WY 2018 is from 11/1/17 through 4/30/18.
- The third alert [March 1 through April 30: Knights Landing Catch Index (KLCI) or Sacramento Catch Index (SCI) >15] was not triggered during the past week.

**Agenda Item 3.**

**Current Operations (5/1/18)**

SWP		CVP	
<b>Exports (cfs)</b>			
Clifton Court Forebay	1000 <sup>A</sup>	Jones Pumping Plant	1,000
<b>Reservoir Releases (cfs)</b>			
Feather - Oroville	1050	American - Nimbus	2,000
		Sacramento - Keswick	7,000 <sup>B</sup>
		Stanislaus - Goodwin	1,500
		Trinity - Lewiston	850 <sup>C</sup>
<b>Reservoir Storage (in TAF)</b>			
San Luis (SWP)	893	San Luis (CVP)	862

<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)

<sup>3</sup> For details, see pages 79-80 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)

Oroville	2,433 (increasing)	Shasta	4,195
New Melones	2,062 (increasing)	Folsom	866 (increasing)
<b>Delta Operations</b>			
DCC	Closed	Sacramento River at Freeport (cfs)	13,200
Outflow Index (cfs)	~16,000	San Joaquin River at Vernalis (cfs)	4,400
E:I	5.5% (14-day avg.)	X2	64 km

<sup>A</sup> SWP exports will decrease to 500 cfs tomorrow (5/2).

<sup>B</sup> Keswick releases will increase to 7,250 cfs tomorrow (5/2).

<sup>C</sup> Lewiston releases will decrease to 750 cfs tonight (5/1), and then ramp back up to 1,750 cfs next week to meet pulse flow schedule.

Approximate OMRs as of 4/28/18:

	USGS gauges (cfs)	Index (cfs)
Daily	-600	0
5-day	-100	-100
14-day	200	+400

Approximate OMRs as of 4/30/18:

	Index (cfs)
Daily	+100
5-day	0
14-day	+300

Factors controlling Delta exports:

4/24-5/1: San Joaquin inflow-to-export ratio of 3:1 per NMFS BiOp RPA Action IV.2.1

Weather Forecast

Warm weather is expected for the Sacramento area this week with highs in the 80s, and reaching the low 90s next Tuesday. No precipitation is in the forecast.

**Agenda Item 4.**

**Smelt Working Group Update**

The Smelt Working Group met on Monday, 4/30/18 at 10 am. Anderson (USFWS) provided the following Smelt Working Group summary from the meeting summary distributed via email by Chen (USFWS).

The Smelt Working Group reviewed current Delta conditions, survey data, current water project operations, and forecasted weather. Current weather is partly cloudy with sunny and warm temperatures forecasted for the rest of the week. 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. Flows in the Sacramento River are expected to gradually decrease while flows in the San Joaquin River are expected to

increase, and OMR flows are expected to be positive 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 is very low.

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, 5/7 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>
<b>Sample Date</b>	4/25-4/30	4/23-4/30	4/23-4/29	4/16-4/30	4/16-4/30	4/24-4/27	4/23, 4/26, 4/27	4/22-4/25, 4/27-4/28	4/23-4/24, 4/26-4/28
<b>Chinook</b>									286
<b>FR Chinook</b>	1,098 juveniles	23	105			38	38	217	
<b>SR Chinook</b>	24 juveniles 5 smolts		16	534	649		7	317	
<b>WR Chinook</b>	1 smolt								
<b>LFR Chinook</b>									
<b>Chinook (ad-clip)</b>	176 FR juveniles 1 FR smolt	4 FR	26 FR, 5 SR				8	115	
<b>Steelhead (wild)</b>	2		2	1	2				4
<b>Steelhead (ad-clip)</b>			1					1	
<b>Green Sturgeon</b>									
<b>Flows (avg. cfs)</b>	938	6,446	6,099	446	446				
<b>W. Temp. (avg. °F)</b>	62.2	62.7	66.3	47.7	47.7				
<b>Turbidity (avg. NTU)</b>	12.0	17.6	14.2	8.9	8.9				

<sup>A</sup> GCID trap cone was raised on 4/21 in anticipation of the fall-run hatchery release and was lowered back in the water on 4/25. No sampling data was collected on 4/29 due to RST malfunction.

<sup>B</sup> Tisdale RST sampling period was from 4/23 at 9:30 am to 4/30 at 10:30 am.

<sup>C</sup> Knights Landing RST sampling period was from 4/23 at 10:45 am to 4/29 at 12:00 pm.

<sup>D</sup> Butte Creek Fyke trap sampling period was from 4/16 at 9:00 am to 4/30 at 9:00 am.

<sup>E</sup> Butte Creek RST sampling period was from. 4/16 at 8:30 am to 4/30 at 8:30 am. 4 adult Chinook salmon were collected on 4/22, 4 on 4/23, and 2 on 4/24 (10 total).

<sup>F</sup> Data reported in the 4/22 to 4/28 DJFMP sampling summary.

<sup>G</sup> Mossdale Trawl sampling is being conducted by CDFW (Region 4) from 4/1 to 6/30. 3 RBT (steelhead) collected on 4/23 were 219, 266, and 343 mm smolts and 1 RBT collected on 4/28 was a 255 mm smolt.

**Agenda Item 6.**

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

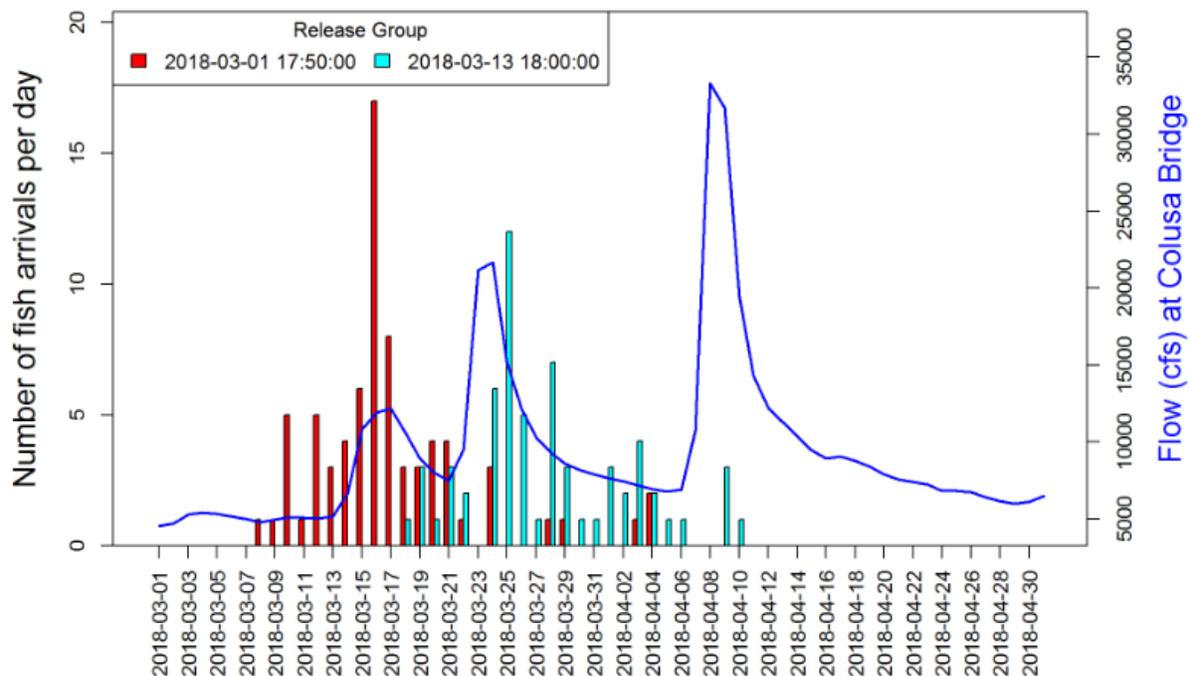
The Livingston Stone National Fish Hatchery released acoustic-tagged (JSATS) winter-run Chinook salmon from brood year 2017. The following table provides the detection frequency at Tower Bridge and Sacramento I-80/50 Bridge from 3/8 to 5/1.

	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	72 (20%)	57 (24%)
Detections at the Sacramento I-80/50 Bridge	68 (19%)	48 (20%)
Detections at Old River	0	1 (0.4%)
Minimum Survival to Tower Bridge	20.6%	0.0%*
95% Confidence Interval	16.7% to 25.1%	0.0% to 0.0%*

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

\* These values were likely a computational error, since survival of the 3/13 release was 26.4% as of 4/17/18.

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



**Agenda Item 7.**

**Fish Monitoring: Salvage<sup>4</sup>**

Fujimura (CDFW) provided a salvage summary for the period of 4/23-29/18.

The number of juvenile Chinook salvaged last week was similar to the previous week. The reported salvage of salmon from the CVP and SWP for this reporting week was: 496 spring-run size and 741 fall-run size unclipped juvenile Chinook salmon; and 1 spring-run size clipped (hatchery) juvenile Chinook salmon.

The number of steelhead salvaged last week was slightly less compared to the previous week. The reported salvage of steelhead from the CVP and SWP for this reporting week was: 28 wild steelhead and 2 hatchery steelhead.

Wild steelhead were salvaged every day last week and resulted in daily loss densities ranging from 1.03 to 10.38 fish/TAF.

No sturgeon were salvaged last week.

Preliminary results for yesterday (4/30) indicate more clipped juvenile Chinook salmon were salvaged at the CVP and SWP fish facilities -- mostly spring-run and fall-run sized Chinook salmon, and 1 wild steelhead.

<sup>4</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.

On 4/24, the Tracy Fish Collection Facility scheduled a 2.5 hour outage to conduct maintenance on the secondary channel screens. This occurred while the Tracy pumping plant continued to export water.

**DOSS Weekly Salvage Update**

Reporting Period: April 23-April 29, 2018

Prepared by Bob Fujimura on April 30, 2018 14:59

Preliminary Results -Subject to Revision

Criteria	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr	28-Apr	29-Apr	Trend	
<b>Loss Densities</b>									
Wild older juvenile CS	0	0	0	0	0	0	0	→	0
Wild steelhead	2.59	10.38	1.29	6.50	1.03	1.11	1.09	↗	3.43
<b>Exports</b>									
SWP daily export	1,386	1,373	1,381	1,364	680	495	527	↘	1,029
CVP daily export	1,963	1,964	1,965	1,967	1,967	1,961	1,960	↘	1,964
SWP reduced counts	0%	0%	0%	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

Tan highlighted date indicate a major 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	→	112	292
Spring Run	496	886	↘	8,384	15,477
Late Fall Run	0	0	→	5	7
Fall Run	741	1,116	↗	3,556	4,896
Unclassified	0	0	→	4	NC
<b>Total</b>	<b>1,237</b>	<b>2,002</b>		<b>12,061</b>	<b>20,672</b>
<b>Hatchery</b>					
Winter Run	0	0	→	48	183
Spring Run	1	4	→	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>1</b>	<b>4</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	28	77	↗	891	2,375
Hatchery	2	9	↘	723	2,424
<b>Total</b>	<b>30</b>	<b>86</b>		<b>1,614</b>	<b>4,799</b>

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

Generated by Bob Fujimura on April 30, 2018

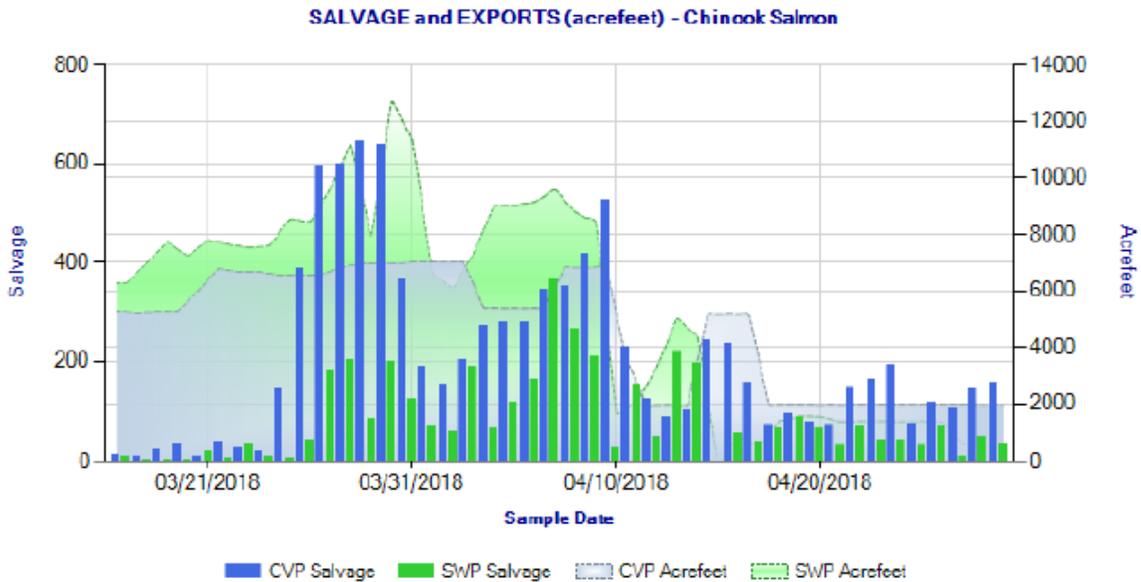


Figure 1. Daily salvage of Chinook Salmon (all races) and water exports from the state and federal fish salvage facilities during March 17 through April 29, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

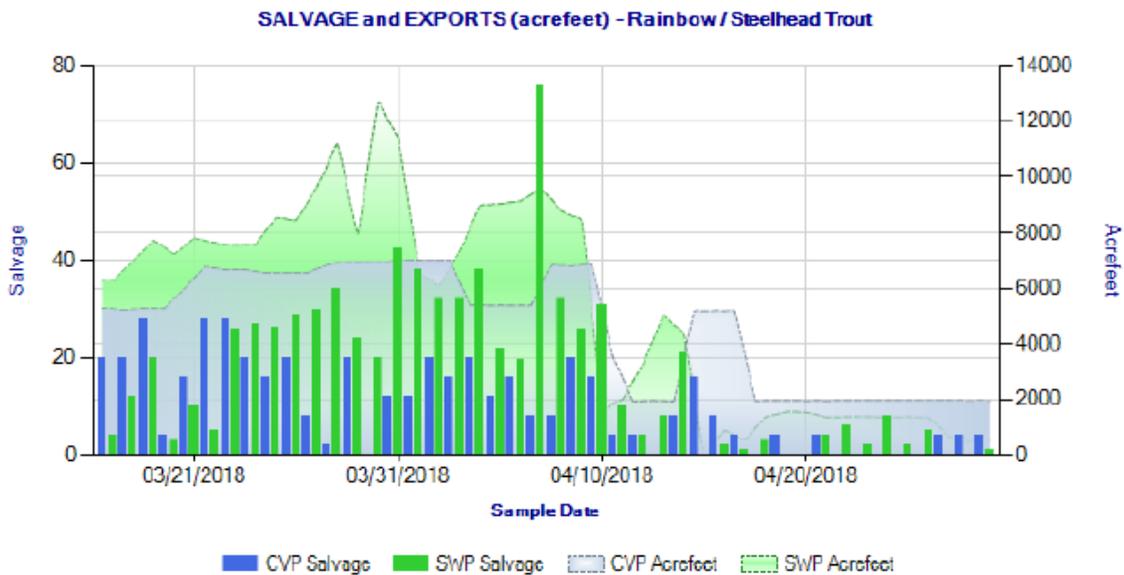


Figure 2. Daily salvage of Rainbow/Steelhead and water exports from the state and federal fish salvage facilities during March 17 through April 29, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

**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**

Amended notification: on 4/24/18, CDFW released approximately 660,000 brood year 2017 fall-run Chinook salmon from the Feather River Fish Hatchery into San Pablo Bay from the Mare Island net pens. The release included 25% marked (adipose fin clip and CWT) fish.

On 4/29/18, 4/30/18, and 5/1/18, CDFW released approximately 1,950,000 brood year 2017 fall-run Chinook salmon from the Feather River Fish Hatchery into San Pablo Bay from the Mare Island net pens. This release included 25% marked (adipose fin clip and CWT) fish.

On 5/2/18, CDFW will release approximately 1,000,000 brood year 2017 fall-run Chinook salmon from the Feather River Fish Hatchery into the Sacramento River at Elk Horn Boat Launch Facility. This release included 25% marked (adipose fin clip and CWT) fish.

On 5/2/18, CDFW will release approximately 240,000 brood year 2017 fall-run Chinook salmon from the Mokelumne River Hatchery into the Coastside Fishing Club net pens at Pillar Point Harbor. This release will be the first of three weekly releases totally 720,000, and will included 100% marked (adipose fin clip and CWT) fish.

On 5/3/18 and 5/4/18, CDFW will release approximately 900,000 brood year 2017 fall-run Chinook salmon from the Mokelumne River Hatchery into the San Joaquin River at the Sherman Island net pens. This release included 25% marked (adipose fin clip and CWT) fish.

**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>	<1% (Last week: <1%)	1% (Last week: <5%)	>98% (Last week: >95%)
<i>Wild young-of-year spring-run Chinook salmon</i>	<1% (Last week: <1%)	10-15% (Last week: 25%)	84-89% (Last week: 75%)
<i>Hatchery winter-run Chinook salmon</i>	<1% (Last week: <1%)	5% (Last week: <10%)	>94% (Last week: >90%)

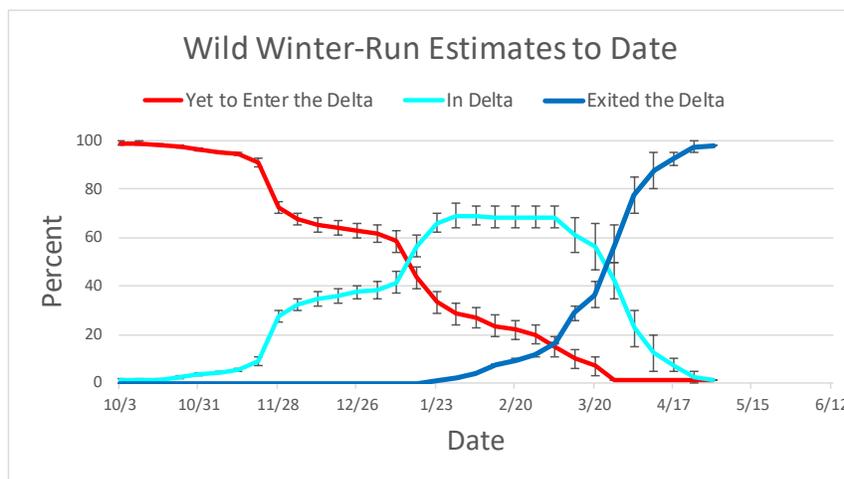
**Rationale for changes in distribution**

Wild winter-run Chinook: 1 smolt winter-run sized fish was observed at GCID and at no other monitoring locations this past week. DOSS estimated that at least 98% of the winter-run population has exited past Chipps Island and that less than 1% remain upstream of the Delta.

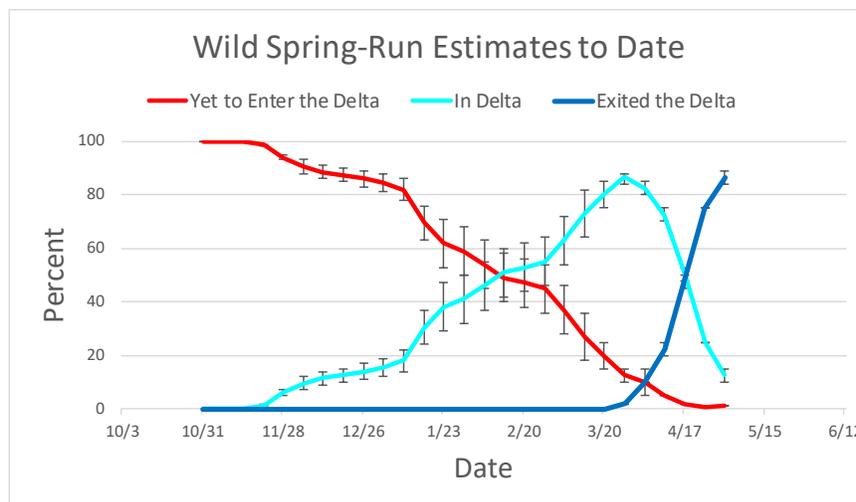
Wild spring-run Chinook: 25 spring-run sized fish were observed at GCID, 16 at Knights Landing, almost 1,200 at Butte Creek, 7 in the Sacramento Trawl, and 317 in the Chipps Island

Trawl this past week. Since fish were observed at locations within the Delta and many at Chipps Island trawl, DOSS estimated that less than less than 1% of the spring-run population are upstream of the Delta and 84-89% of the population has exited the Delta past Chipps Island. The large number of spring-run observed at Chipps Island trawl was likely influenced by the large releases of fall-run hatchery Chinook salmon, which have some overlap with the sizes of spring-run Chinook salmon based on the length at date criteria.

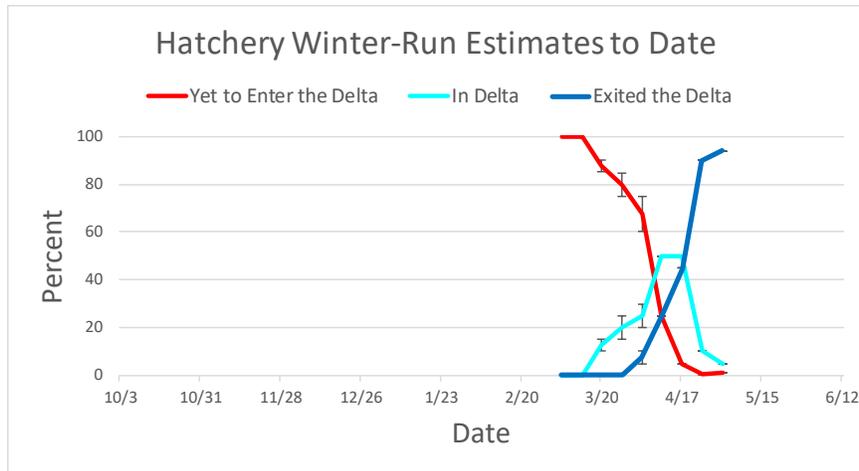
Hatchery winter-run Chinook: No additional acoustically-tagged hatchery winter-run were reporting at real-time monitoring locations this past week, however, DOSS estimated that there may be a few fish left in the system, and that at least 94% have existed the Delta. This estimate assumes a high in-river survival rate but does not account for predation or other sources of mortality.



**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**
  - Approximately 99% of the winter-run Chinook salmon population has moved downstream into the Delta or have already exited past Chipps Island.

- Hatchery production winter-run releases have occurred and the pulse of acoustically-tagged fish has been detected moving through the Sacramento area receiver arrays.
  - Hatchery winter-run Chinook salmon have been salvaged at the Project's fish salvage facilities.
  - Wild winter-run Chinook salmon have been observed at the salvage facilities (DNA verified).
  - Spring Kodiak Trawl data also indicate winter-run are in the central and western Delta.
  - Increased flows and turbidities from recent storms are expected to have stimulated fish movement.
  - Winter-run continue to be present in the Delta and are likely to continue rearing there for the next several weeks, until leaving the Delta, elevating their exposure risk.
  - Fewer winter-run have been seen recently in the lower Sacramento River section between Sacramento and the DCC and more winter-run have been observed in the catch at Chipps Island over the past few weeks, indicating that most of the population has moved out of the Delta past Chipps Island.
  - Approximately 10-15% of spring run population is in Delta and 84-89% of the population is expected to have exited the Delta.
  - Surrogate spring-run Chinook salmon hatchery releases of late-fall run Chinook salmon that are captured during DJFMP monitoring or in salvage are in the Delta. The last release occurred on 1/25/18. CWTs from ad-clipped Chinook salmon are being read from fish collected during monitoring.
  - Wild and hatchery Chinook salmon and steelhead have been observed in the Chipps Island trawls.
  - Wild and hatchery Chinook salmon have been observed in beach seines from the North Delta and Liberty Island regions.
  - Wild and hatchery Chinook salmon as well as hatchery steelhead have been observed in the EDSM efforts.
  - Wild and hatchery salmonids and steelhead have been observed in salvage.
- **Routing Risk: MEDIUM**
    - Sacramento River inflows are currently ~13,200 cfs and are high enough to mute tidal effects 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 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**
  - 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
- **OMR/Export Risk:**
    - OMR -2,500 cfs: LOW
    - OMR -3,500 cfs: MEDIUM
    - OMR -5,000 cfs: MEDIUM-HIGH
    - OMR -6,250 cfs<sup>5</sup>: HIGH
    - OMR -7,500 cfs<sup>5</sup>: HIGH (incrementally higher risk if Vernalis flows decrease)
    - OMR -9,000 cfs<sup>5</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 (but lower than -5,000 cfs OMR risk)
    - OMR -5,000 cfs: MEDIUM
    - OMR -6,250 cfs<sup>5</sup>: MEDIUM-HIGH
    - OMR -7,500 cfs<sup>5</sup>: MEDIUM-HIGH
    - OMR -9,000 cfs<sup>5</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 **5/8/2018 at 9 am.**

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