

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 4/17/2018 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.

CDFW: Bob Fujimura, Ken Kundargi, Jason Julienne

DWR: Farida Islam, Kevin Reece, Bryant Giorgi, Dan Yamanaka, Marianne Kirkland, Mike Ford

NMFS: Jeff Stuart, Kristin McCleery

Reclamation: Elissa Buttermore, Don Portz, Towns Burgess, Mike Hendrick

SWRCB: Chris Kwan

USFWS: Felipe Carrillo, 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)
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:

Action IV.1.2¹ (DCC gate operations):

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

Action IV.2.1 San Joaquin River to Export Ratio

¹ 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

- 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 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.2.3² (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 will 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.
- The wild steelhead loss first stage trigger was exceeded on 4/2 and second stage trigger on 4/7. The latter required OMR flows be no more negative than -2,500 cfs for 5 days beginning on 4/9.
- The wild steelhead loss first stage trigger was exceeded on 4/14/18. The wild steelhead loss numbers were 51.96 steelhead at the SWP, and 5.44 steelhead at the CVP; for a cumulative loss of 57.40 steelhead. The total daily export volume for 4/14/18 was 6.294 thousand acre feet (TAF) of water. The first stage loss trigger was calculated as 50.35 steelhead (8 fish/TAF * 6.294 TAF = 50.35 fish). The required response to the first stage exceedance dictates that OMR flows be no more negative than -3,500 cfs for five consecutive days. OMR flows were already more positive than this due to the inflow to export ratio required by RPA action IV.2.1 and no operational changes were required.

Action IV.3³ (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 (4/17/18)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	500 ^A	Jones Pumping Plant	2,600 ^B

² 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

³ 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

Reservoir Releases (cfs)			
Feather - Oroville	4,000 ^C	American - Nimbus	5,000 ^D
		Sacramento - Keswick	3,250
		Stanislaus - Goodwin	1,500
		Trinity - Lewiston	1,355 ^E
Reservoir Storage (in TAF)			
San Luis (SWP)	927	San Luis (CVP)	908
Oroville	2,280	Shasta	4,129
New Melones	2,060	Folsom	780
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	34,200
Outflow Index (cfs)	~43,700	San Joaquin River at Vernalis (cfs)	7,800
E:I	5% (14-day avg.)	X2	60 km

^A SWP exports will increase to 800 cfs by tomorrow (4/18).

^B CVP exports will decrease to 1,000 cfs tomorrow (4/18).

^C Release flows will decrease to 2,500 cfs by this afternoon (4/17/18)

^D Nimbus Dam change order requires releases to decrease from 5,000 cfs down to 2,500 cfs between 4/18 and 4/23.

^E Lewiston releases began pulse flows yesterday (4/16). Today's peak value is ~1,800 cfs. Flow will gradually decrease each day to target 300 cfs on 4/22/18.

Approximate OMRs as of 4/14/18:

	USGS gauges (cfs)	Index (cfs)
Daily	400	1,000
5-day	800	800
14-day	-1,900	-1,900

Approximate OMRs as of 4/16/18:

	Index (cfs)
Daily	800
5-day	1,000
14-day	-1,200

Factors controlling Delta exports:

4/10-4/17: San Joaquin inflow-to-export ratio of 3:1 per NMFS BiOp RPA Action IV.2.1

Weather Forecast

The weather forecast for the Central Valley indicates a chance of showers on Wednesday and Thursday, with warmer and dryer weather later in the week.

Agenda Item 4.

Smelt Working Group Update

The Smelt Working Group met on Monday, 4/16/18 at 10 am. 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 cool and overcast with minor precipitation forecasted through the end of the day. 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. The fish surveys from previous weeks have also detected spawning adult Delta smelt and Delta smelt larvae. River flows have remained relatively high, 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 and lower than it was for last week. The Group advised that entrainment risk would still be high for OMR flows of more negative than -5,000 cfs, medium for OMR flows of -3,500 to -5,000 cfs, and low at OMR flows of more positive than -3,500 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, 4/23 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	Tisdale RST ^A	Knights Landing RST ^B	Butte Creek Fyke trap ^C	Butte Creek RST ^D	Beach Seines ^E	Sacramento Trawl ^E	Chippis Island Midwater Trawl ^E	Mossdale Kodiak Trawl ^F
Sample Date	-	4/6-4/16	4/8-4/16	3/26-4/6, 4/10-4/16	3/27-4/6, 4/10-4/16	4/9-4/11, 4/13	4/9, 4/11, 4/13	4/8, 4/10-4/12, 4/14	4/9-4/14
Chinook									188
FR Chinook		21	187			66	36	32	
SR Chinook		2	245	295	312	11	45	171	
WR Chinook								13	
LFR Chinook			3						
Chinook (ad-clip)		8 FR, 6 SR	48 FR, 49 SR, 3 WR			6	16	86	4
Steelhead (wild)		1			2		1		1

Steelhead (ad-clip)		1				1	1	9	
Green Sturgeon									
Flows (avg. cfs)		14,075	16,399	809	805				
W. Temp. (avg. °F)		54.9	58.2	46.0	46.4				
Turbidity (avg. NTU)		40.0	80.3	10.3	10.5				

^A Tisdale RST sampling period was from 4/6 at 9:30 am to 4/16 at 9:45 am. The traps were pulled and moved downstream on 4/7 due to heavy debris.

^B Knights Landing RST sampling period was from 4/8 at 12:00 pm to 4/16 at 10:15 am. From 4/10 to 4/13 half cone sampling occurred, catch totals reflect assumed totals of full cone sampling. The 3 clipped (adipose and pelvic fin) winter-run were from the Battle Creek release.

^C Butte Creek fyke trap sampling period was from 3/26 at 9:30 am to 4/16 at 9:00 am. The trap was pulled from 4/6 to 4/9 and was re-set on 4/10.

^D Butte Creek RST sampling period was from 3/27 at 1:00 pm to 4/16 at 8:30 am. The trap was pulled from 4/6 to 4/9 and was re-set on 4/10.

^E Data reported in the 4/8 to 4/14 DJFMP sampling summary. Not included in the table above are 3 CHNE (the code used for spray-dyed Chinook, usually representing fish used for a gear efficiency trial) reported at the beach seines, 1 CHNE at the Sac Trawl, 1 CHNE at Chipps Island, 2 CHNP (pelvic clipped Chinook) at Sac Trawl, and 7 CHNP at Chipps Island.

^F Mossdale Trawl sampling is being conducted by CDFW (Region 4) from 4/1 to 6/30. The 1 RBT (steelhead) collected on 4/10 was a 301 mm smolt.

Red Bluff Diversion Dam (RBDD)

USFWS biweekly report (3/26/18-4/8/18) 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 (BY2017)	501*	601,105 (415,768-786,442)***
Spring-run Chinook (BY2017)	3,183**	47,983 (18,217-77,748)***

*Biweekly catch decreased by 18,479 fish from previous biweekly total of 18,980.

**Biweekly catch decreased by 18,478 fish from previous biweekly total of 21,661.

*** Estimated brood year totals have been adjusted in the 4/10/18 biweekly report for genetically identified winter-run that were classified as spring-run by LAD. Approximate shift of 120,000 fish from spring-run to winter-run classification. Original and revised biweekly reports from 10/8/17 through 3/25/18 can be found at: https://www.fws.gov/redbluff/rbdd_biweekly_final.html.

Agenda Item 6.

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

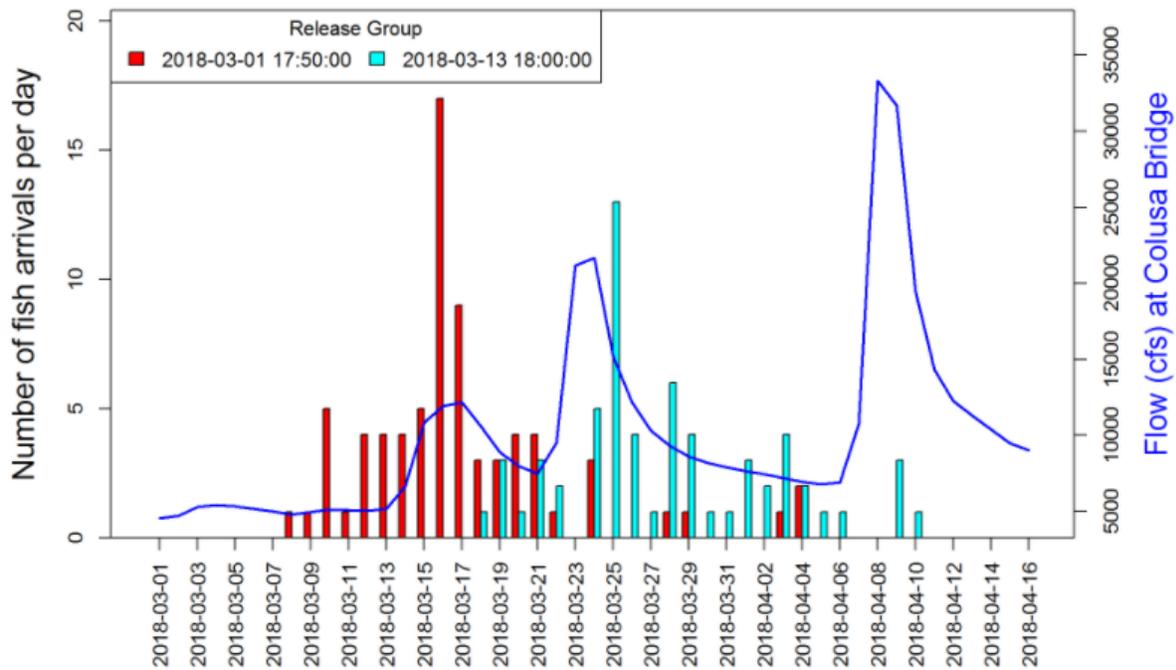
The Livingston Stone National Fish Hatchery released acoustic-tagged (JSATS) winter-run Chinook salmon from brood year 2017. The following table provides the detection frequency at Tower Bridge and Sacramento I-80/50 Bridge from 3/8 to 4/16.

	First Release Group	Second Release Group
Date of release	3/1/2018	3/13/2018
# acoustically tagged (JSATS)	361	239
Detections at Tower Bridge	72 (20%)	56 (23%)

Detections at the Sacramento I-80/50 Bridge	68 (19%)	48 (20%)
Minimum Survival to Tower Bridge	20.6%	26.4%
95% Confidence Interval	16.7% to 25.1%	21.1% to 32.4%

<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: Salvage⁴

Fujimura (CDFW) provided a salvage summary for the period of April 9-April 15, 2018.

The number of juvenile Chinook salmon salvaged last week decreased compared to the previous week. The reported salvage of salmon from the CVP and SWP for this reporting week was: 4 winter-run size, 1,656 spring-run size, and 878 fall-run size unclipped juvenile Chinook salmon; and 8 winter-run size, 38 spring-run size, and 1 late fall-run size clipped (hatchery) juvenile Chinook salmon.

The number of steelhead salvaged last week also decreased compared to the previous week. The reported salvage from the CVP and SWP for steelhead for this reporting week was: 115 wild steelhead and 53 hatchery steelhead.

⁴ 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.

Wild steelhead were salvaged every day last week and resulted in daily loss densities between 1.58 to 9.12 fish/TAF.

Four white sturgeon were salvaged last week at the SWP on 4/9.

Preliminary results for yesterday (4/16) indicate more unclipped juvenile Chinook salmon were salvaged at the CVP and SWP fish facilities -- mostly spring-run sized Chinook salmon with the remainder in the fall-run size range. A few hatchery steelhead were also salvaged at both facilities.

DOSS Weekly Salvage Update

Reporting Period: April 9-April 15, 2018
Prepared by Bob Fujimura on April 16, 2018 16:17
Preliminary Results -Subject to Revision

Criteria	9-Apr	10-Apr	11-Apr	12-Apr	13-Apr	14-Apr	15-Apr	Trend	
Loss Densities									
Wild older juvenile CS	0	0.34	0	0	0	0	0	↘	0.05
Wild steelhead	5.84	7.86	3.56	3.31	4.97	9.12	1.58	↘	5.18
Exports									
SWP daily export	8,394	1,713	2,024	3,289	5,008	4,338	0	↘	3,538
CVP daily export	6,803	6,834	3,598	1,941	1,960	1,956	5,172	↘	4,038
SWP reduced counts	0%	0%	0%	0%	17%	0%	0%	↗	3%
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 salvage facility interruption occurred
Tan highlighted date indicates wild daily loss density exceeded 1st trigger of 8.0 fish/TAF

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	4	3	↘	124	331
Spring Run	1,656	3,455	↘	7,053	12,868
Late Fall Run	0	0	↘	5	7
Fall Run	878	1,173	↗	2,376	3,057
Unclassified	0	0	→	4	NC
Total	2,538	4,631		9,562	16,263
Hatchery					
Winter Run	8	35	↗	48	183
Spring Run	38	120	↘	1,004	1,716
Late Fall Run	1	4	↗	71	236
Fall Run	0	0	↗	0	0
Unclassified	0	0	→	1	NC
Total	47	160		1,124	2,135

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	115	294	↘	842	2,244
Hatchery	53	186	↘	706	2,387
Total	168	479		1,548	4,630

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

Generated by Bob Fujimura on April 16, 2018

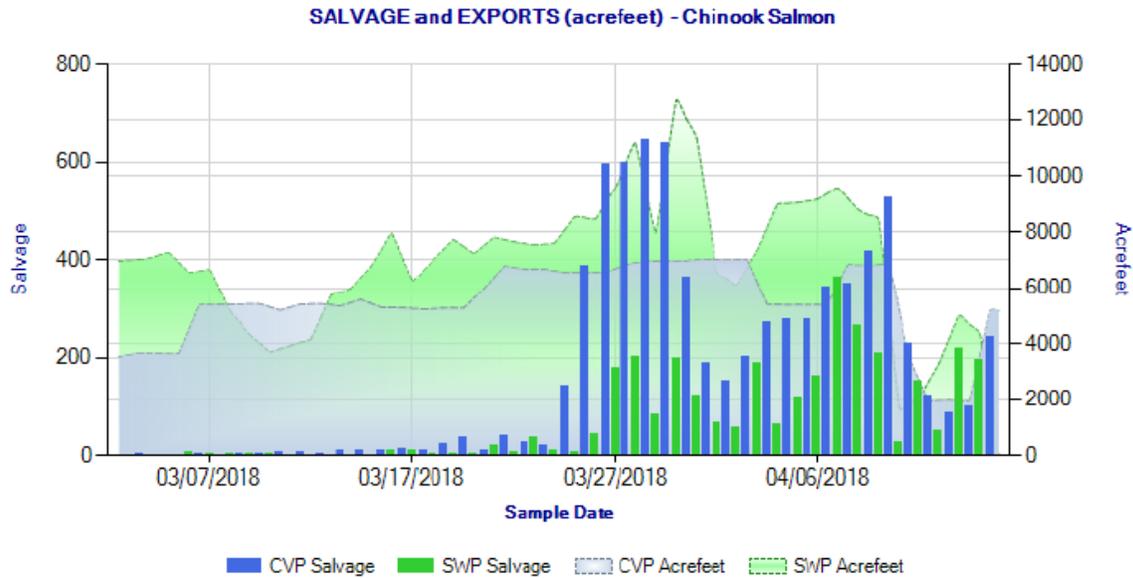


Figure 1. Daily salvage of Chinook Salmon (all races) and water exports from the state and federal fish salvage facilities during March 3 through April 15, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

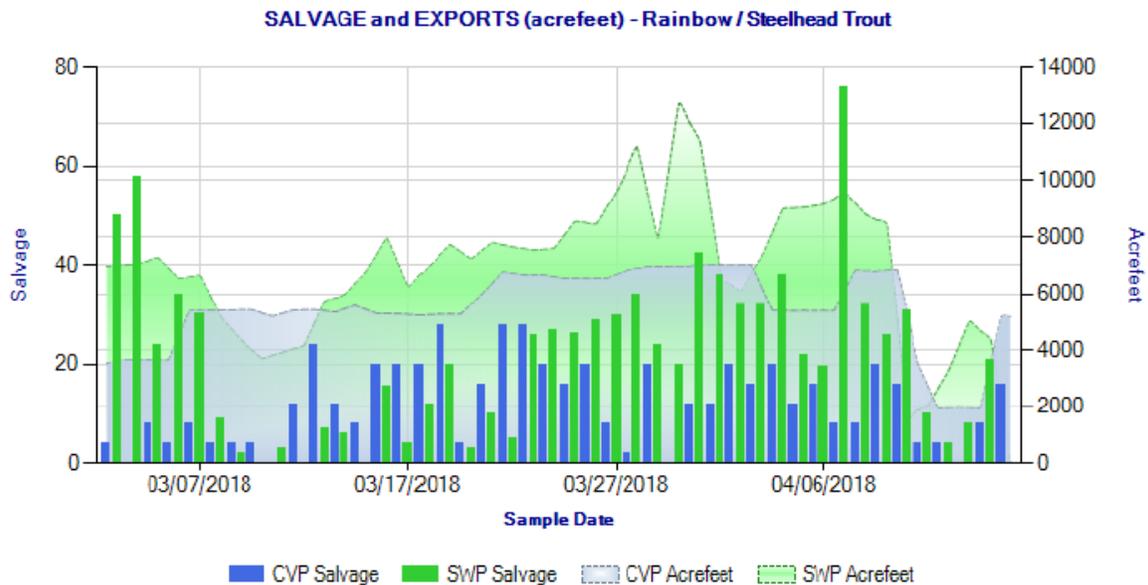


Figure 2. Daily salvage of Rainbow/Steelhead and water exports from the state and federal fish salvage facilities during March 3 through April 15, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 4/12/18

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 Trigger	Date of First Loss ⁴	Date of Last Loss ⁴
12/21/2017	LF	Coleman NFH	Battle Creek	Production	31.35	297,370	n/a	0.011	n/a	n/a	1/23/2018	3/16/2018
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	149.55	31184	n/a	0.480	n/a	n/a	3/14/2018	4/3/2018
1/26/2018	S	SJRRP	San Joaquin River	Experimental	236.34	49549	n/a	0.477	n/a	n/a	3/11/2018	4/4/2018
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 ⁵	Unread CWT Loss ⁶	Unknown Hatchery Loss ⁷	Acoustic Tag Loss ⁸	Number of Unassigned CWTs ⁹
SWP	296.14				
CVP	16.02				
TOTAL	312.16				

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2017 through 4/12/2018.

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.

⁵Adipose-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).

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

⁷CWT has been read, but hatchery release information not yet available.

⁸Adipose-fin clipped Chinook released due to presence of sutures.

⁹CWT 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 4/13/2018

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

Agenda Item 8.

Hatchery Releases

The USFWS scheduled a release of approximately 1,171,749 brood year 2017 fall-run Chinook salmon from the Coleman National Fish Hatchery into Battle Creek on 4/13/18. The release was 25% marked (adipose fin clip and CWT) fish.

The CDFW scheduled a release of approximately 400,000 brood year 2017 fall-run Chinook salmon from the Merced River Hatchery into the San Joaquin River at Sherman Island by net pen on 4/13/18 and 4/14/18. The release was 25% marked (adipose fin clip and CWT) fish.

The CDFW scheduled a release of approximately 1,000,000 brood year 2017 fall-run Chinook salmon from the Feather River Hatchery into San Pablo Bay net pens at Mare Island on 4/16/18 and 4/17/18. The release was 25% marked (adipose fin clip and CWT) fish.

The CDFW scheduled a release of approximately 450,000 brood year 2017 fall-run Chinook salmon from the Mokelumne River Hatchery into the San Joaquin River at Sherman Island net pen site on 4/19/18. The release will be 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.

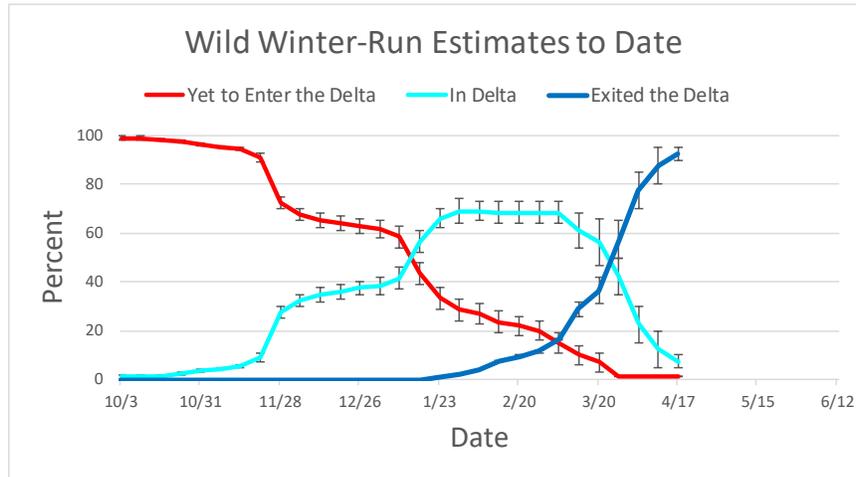
Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chippis Island)
<i>Wild young-of-year winter-run Chinook salmon</i>	<1% (Last week: same)	5-10% (Last week: 5-20%)	90-95% (Last week: 80-95%)
<i>Wild young-of-year spring-run Chinook salmon</i>	2% (Last week: 5%)	48-53% (Last week: 70-75%)	45-50% (Last week: 20-25%)
<i>Hatchery winter-run Chinook salmon</i>	5% (Last week: 25%)	50% (Last week: same)	45% (Last week: 25%)

Rationale for changes in distribution

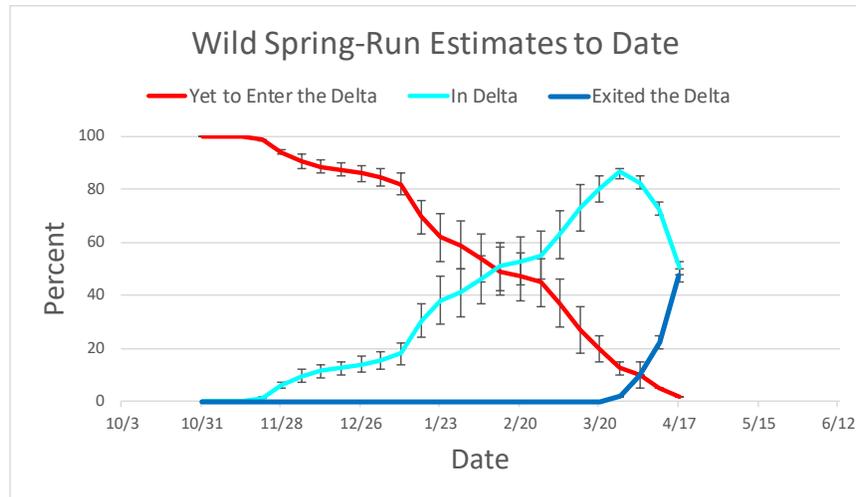
Wild winter-run Chinook: 13 winter-run sized fish were observed at Chipps Island this past week and at no other monitoring locations. DOSS estimated that 90-95% of the winter-run population has exited past Chipps Island and that less than 1% remain upstream of the Delta.

Wild spring-run Chinook: 2 spring-run sized fish were observed at Tisdale, 245 at Knights Landing, over 600 at Butte Creek, 11 in the beach seines, 45 in the Sacramento Trawl, and 171 in the Chipps Island Trawl this past week. Since many more fish were observed at locations within the Delta and at Chipps Island trawl, DOSS estimated that 2% of the spring-run population remain upstream of the Delta and an additional 25% of the population has exited the Delta past Chipps Island.

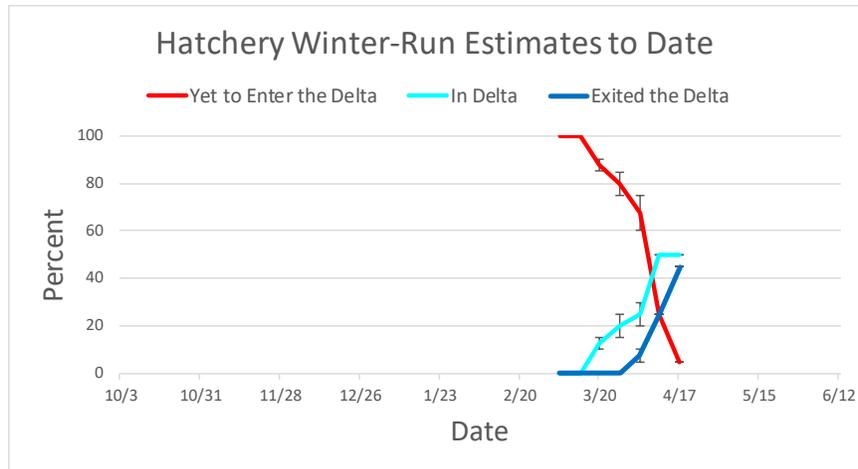
Hatchery winter-run Chinook: Based on real-time monitoring of the acoustically-tagged hatchery winter-run at Tower Bridge and the I-80/50 Bridge, DOSS estimated that the majority of the release groups have entered the Delta and based on the size of clipped Chinook salmon recovered in the Chipps Island trawl, DOSS estimates that 5% of the hatchery produced winter-run remain upstream of the Delta and that 45% have exited past Chipps Island. 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: HIGH**
 - 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 48-53% of spring run population is in Delta, with an additional 25% of the population having 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: LOW-MEDIUM**
 - Sacramento River inflows are currently ~34,200 cfs and are high enough to mute tidal effects at Georgiana Slough and Three Mile Slough.
 - Delta Cross Channel is closed.
 - **Overall Entrainment Risk: 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: 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 (Chipps 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 WRCS and SRCS 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 (higher San Joaquin River flows reduce this risk)
 - OMR -3,500 cfs: MEDIUM
 - OMR -5,000 cfs: MEDIUM-HIGH
 - OMR -6,250 cfs⁵: HIGH
 - OMR -7,500 cfs⁵: HIGH (incrementally higher risk if Vernalis flows decrease)
 - OMR -9,000 cfs⁵: HIGH (full export capacity, footprint of export effects extend into the western Delta and lower San Joaquin River). Different DOSS members ranked the risk as either a medium or high risk.
 - **Overall Entrainment Risk:**
 - OMR -2,500 cfs: MEDIUM (high San Joaquin River flows)
 - OMR -3,500 cfs: MEDIUM-HIGH (but lower than -5,000 cfs OMR risk)
 - OMR -5,000 cfs: MEDIUM-HIGH
 - OMR -6,250 cfs⁵: HIGH
 - OMR -7,500 cfs⁵: HIGH
 - OMR -9,000 cfs⁵: 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 **4/24/2018 at 9 am.**

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