

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 3/27/2018 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, Jason Julienne, Ken Kundargi

DWR: Farida Islam, Kevin Reece, Bryant Giorgi

NMFS: Jeff Stuart, Kristin McCleery

Reclamation: Elissa Buttermore, Mike Hendrick, Tom Patton

SWRCB: Chris Kwan, Chris Carr

USFWS: Felipe Carrillo

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 March:

Action IV.1.2¹ (DCC gate operations):

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

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

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. OMR flows are reported weekly with the OMR index and the tidally filtered USGS gauges at the 5-day and 14-day running averages.
- Daily older juvenile Chinook salmon loss density exceeded the threshold of the first stage trigger of 2.5 fish/TAF during the past week. On 3/25 (reported on 3/26), the combined wild older juvenile Chinook salmon loss density was 3.39 fish/TAF. The Projects were scheduled to implement the action response of OMR no more negative than -3,500 cfs beginning on 3/28.

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 (3/27/18)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	5,000*	Jones Pumping Plant	3,300 (4 units)**
Reservoir Releases (cfs)			
Feather - Oroville	3,800	American - Nimbus	10,000
		Sacramento - Keswick	3,250
		Stanislaus - Goodwin	200
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	872	San Luis (CVP)	860
Oroville	2,013	Shasta	3,805
New Melones	2,001	Folsom	834
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	51,000
Outflow Index (cfs)	~65,200	San Joaquin River at Vernalis (cfs)	7,200
E:I	20% (14-day avg.)	X2	West of Chipps Island***

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

- * SWP exports will decrease to 4,000 cfs tomorrow (3/28) to start the 5-day action response of OMR no more negative than -3,500 cfs, ending on 4/1.
- ** CVP exports will increase to 3,500 cfs tomorrow (3/28).
- *** Port Chicago gauge is currently offline, but X2 position is west of Chipps Island.

Approximate OMRs as of 3/24/18:

	USGS gauges (cfs)	Index (cfs)
Daily	-5,100	-5,200
5-day	-5,300	-5,300
14-day	-4,800	-4,800

Approximate OMRs as of 3/26/18:

	Index (cfs)
Daily	-4,200
5-day	-5,100
14-day	-5,000

Factors controlling Delta exports:

3/20-3/27: -5,000 cfs OMR limit per NMFS BiOp RPA Action IV.2.3

Weather Forecast

Warm temperatures expected in the 70s and 80s this week in the Sacramento Valley, and 50s to 70s in the mountains. Breezy conditions in the western Sacramento Valley this week.

Agenda Item 4.

Smelt Working Group Update

The Smelt Working Group met on Monday, 3/26/18 at 10 am. Stuart (NMFS) provided a Smelt Working Group summary on the DOSS call. Chen (USFWS) distributed the following Smelt Working Group meeting summary via email:

The Smelt Working Group reviewed current Delta conditions, survey data, current water project operations, and forecasted weather. Current weather conditions are sunny and relatively warm, with no precipitation forecasted for 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 spawning identified in the Biological Opinion and a trigger for the start of Action 3. The fish surveys have also detected spawning adult Delta Smelt and larval Delta Smelt. OMR indices are currently at approximately -4,800 cfs and expected to be more negative and held at -5,000 cfs for the rest of the week depending on the river flows. Based on Delta conditions, water export levels, and the survey data, the Group concluded that similar to last week, Delta Smelt entrainment risk would 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.

Action 3 (protections for larval Delta Smelt) is expected to be implemented this week. The Smelt Working Group will continue to monitor Delta Smelt survey and salvage data, Delta conditions, and this week’s forecasted precipitation. The Group will meet again next Monday, 3/26 at 10 am.

On the 3/27 DOSS call, Giorgi (DWR) added that on 3/26, the USFWS issued a determination to initiate Action 3 (protections for larval and juvenile Delta smelt). Action 3 specifies that OMR should be no more negative than -5,000 on a 14-day running average, with a range of OMR flow between -1,250 and -5,000 cfs.

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 ^A	Tisdale RST ^B	Knights Landing RST ^C	Butte Creek Fyke trap ^D	Butte Creek RST ^E	Beach Seines ^F	Sacramento Trawl ^F	Chippis Island Midwater Trawl ^F	Mossdale Kodiak Trawl ^F
Sample Date	-	3/19-3/26	3/19-3/26	3/19-3/20	3/19-3/21	3/19, 3/21-2/23	3/18-3/20-3/22, 3/24	3/18-3/20-3/22, 3/24	3/19, 2/21, 3/23
FR Chinook		24	6			108	83		
SR Chinook		1	7	20	154	24	15		
WR Chinook			2				5	19	
LFR Chinook									
Chinook (ad-clip)			1 WR			2	11	13	8
Steelhead (wild)					1			1	
Steelhead (ad-clip)			1			9	8	15	
Green Sturgeon									
Flows (avg. cfs)		13,681	13,740	476	803				
W. Temp. (avg. °F)		54.4	53.4	42.8	43.7				
Turbidity (avg. NTU)		35.5	36.3	6.5	9.9				

^A GCID trap was pulled on 3/13 due to recent release of hatchery winter-run Chinook salmon.

^B Tisdale RST sampling period was from 3/19 at 9:30 am to 3/26 at 10:00 am. The trap was changed to half cone on 3/22 at 10:00 am and returned to full cone operation on 3/25 at 10:30 am.

^C Knights Landing RST sampling period was from 3/19 at 10:15 am to 3/26 at 10:15 am. Turbidity meter not functioning on 3/22 and backwater effect from increased flow out of the Feather River muted Sac flows at Knights Landing causing little to no cone rotation on 3/23.

^D Butte Creek Fyke trap sampling period was from 3/19 at 9:45 am to 3/20 at 9:30 am. The fyke trap was pulled from the water on 3/20.

^E Butte Creek RST sampling period was from 3/19 at 9:15 am to 3/21 at 8:30 am. RST cone was raised 3/21.

^F Data reported in the 3/18 to 3/24 DJFMP sampling summary. EDSM Trawls collected 1 fall-run, 2 winter-run, and 1 hatchery Chinook salmon, and 3 hatchery steelhead.

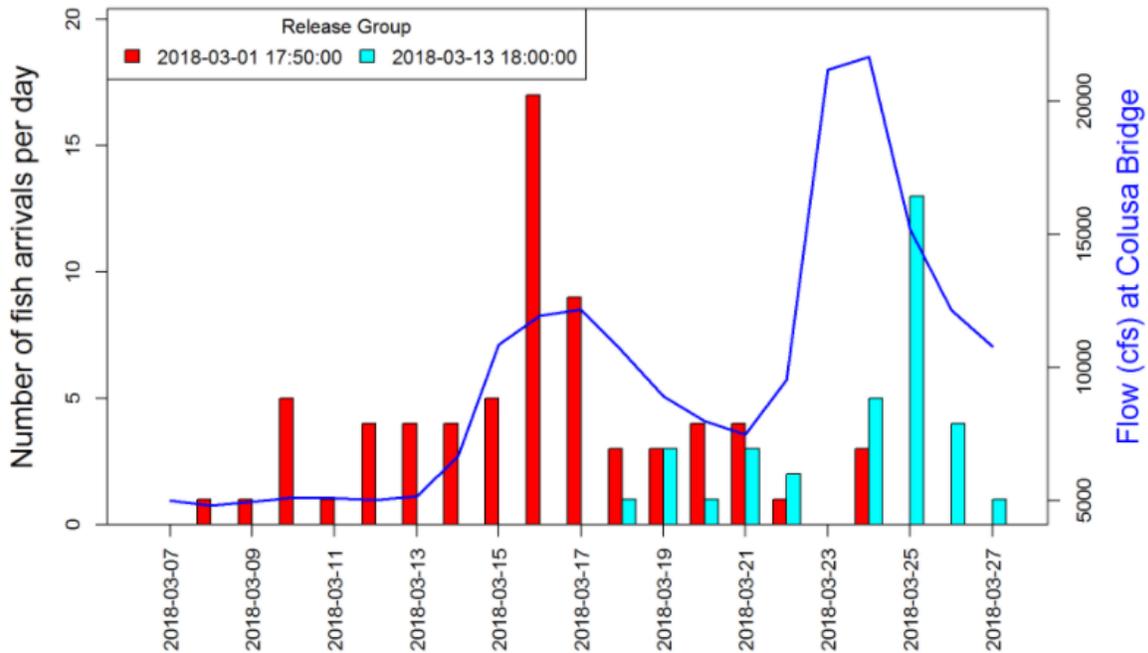
Agenda Item 6.

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 3/27.

	First Release Group	Second Release Group
Date of release	3/1/2018	3/13/2018
# acoustically tagged (JSATS)	361	239
Detections at Tower Bridge	67 (19%)	30 (13%)
Detections at the Sacramento I-80/50 Bridge	63 (17%)	24 (10%)

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 March 19-25, 2018.

The number of juvenile Chinook salmon salvaged last week dramatically increased compared to the previous week. 85 wild winter-run size and 142 wild spring-run size Chinook salmon were salvaged. 6 hatchery winter-run size and 166 hatchery spring-run size salmon were salvaged.

The number of wild and hatchery steelhead salvaged last week showed similar increases compared to the previously week. 197 wild steelhead and 60 hatchery steelhead were salvaged last week.

Older juvenile Chinook salmon and wild steelhead were salvaged most days last week and resulted in daily loss densities from 0.25 to 3.39 fish/TAF for wild older juvenile Chinook salmon and 0.91 to 7.45 fish/TAF for wild steelhead.

No sturgeon were salvaged last week.

Preliminary results for yesterday (3/26) indicate high numbers of salvaged juvenile Chinook salmon and steelhead at both facilities, mostly wild fish and in spring-run size range for salmon.

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.

DOSS Weekly Salvage Update

Reporting Period: March 19-March 25, 2018
 Prepared by Bob Fujimura on March 26, 2018 14:53
 Preliminary Results -Subject to Revision

Criteria	19-Mar	20-Mar	21-Mar	22-Mar	23-Mar	24-Mar	25-Mar	Trend	
Loss Densities									
Wild older juvenile CS	0	0.25	1.28	2.27	2.09	1.45	3.39	↗	1.53
Wild steelhead	6.81	0.91	1.42	2.07	7.45	6.42	3.59	↗	4.10
Exports									
SWP daily export	7,706	7,233	7,791	7,631	7,523	7,598	8,532	↗	7,716
CVP daily export	5,264	5,267	5,981	6,765	6,664	6,661	6,546	↗	6,164
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
 Yellow highlighted dates indicate brief fish facility interruption occurred
 Tan highlighted date indicates daily loss density exceeded 2.50 fish/TAF trigger

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	85	155	↗	131	303
Spring Run	142	186	↗	146	188
Late Fall Run	0	0	↗	1	4
Fall Run	0	0	↗	36	40
Unclassified	0	0	↗	4	NC
Total	227	341		318	536
Hatchery					
Winter Run	6	12	↗	34	122
Spring Run	166	261	↗	267	410
Late Fall Run	0	0	↗	63	216
Fall Run	0	0	↗	0	0
Unclassified	0	0	↗	1	NC
Total	172	273		365	748

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	197	400	↗	330	654
Hatchery	60	203	↗	407	1,348
Total	257	603		737	2,002

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

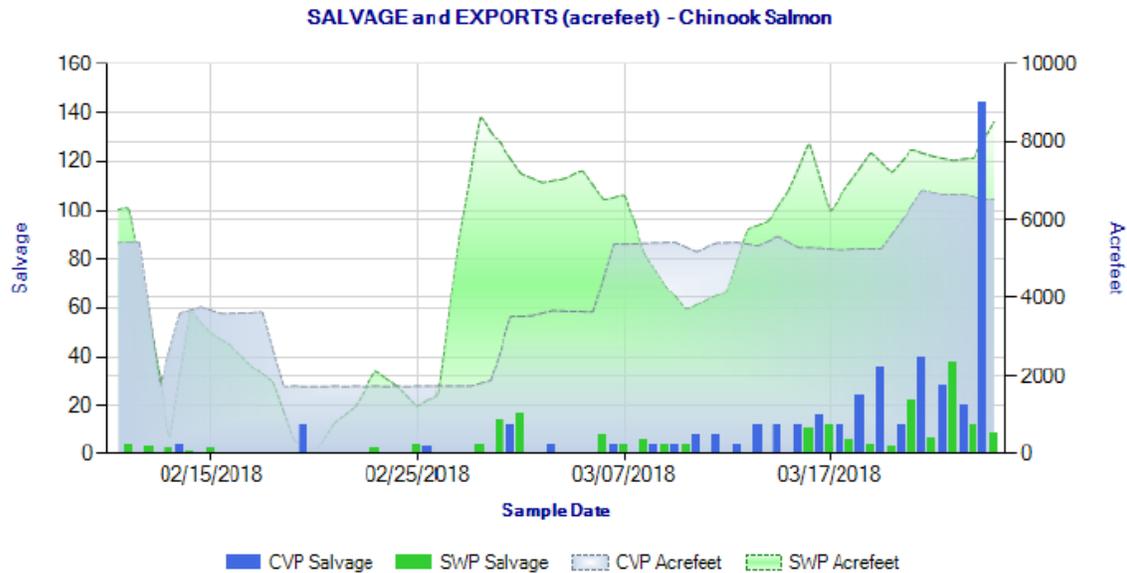


Figure 1. Daily salvage of Chinook Salmon (all races) and water exports from the state and federal fish salvage facilities during February 11 through March 25, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

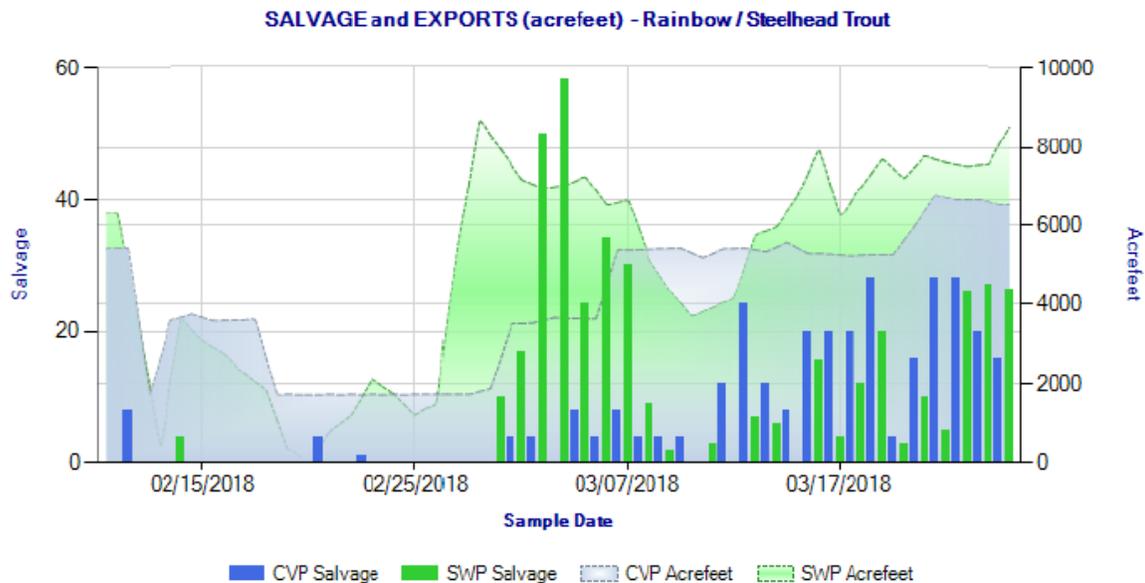


Figure 2. Daily salvage of Rainbow/Steelhead and water exports from the state and federal fish salvage facilities during February 11 through March 25, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 3/22/18

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	20.31	297,370	n/a	0.007	n/a	n/a	1/23/2018	2/23/2018
1/5/2018	LF	Coleman NFH	Battle Creek	Production	131.39	519,791	n/a	0.025	n/a	n/a	1/31/2018	3/2/2018
1/8/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	8.66	78,786	n/a	0.011	n/a	0.5%	1/31/2018	2/1/2018
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	16.87	84,922	n/a	0.020	n/a	0.5%	*	3/8/2018
3/1/2018	W	Livingstone NFH	Sacramento River	Production	2.88	216,746	n/a	0.001	n/a	0.5%	3/22/2018	3/22/2018
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	95.44	31184	n/a	0.306	n/a	n/a	3/14/2018	3/22/2018
1/26/2018	S	SJRRP	San Joaquin River	Experimental	78.26	49549	n/a	0.158	n/a	n/a	3/11/2018	3/22/2018

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	Unknown Hatchery Loss	Acoustic Tag Loss	Number of Unassigned CWTs
SWP	133.76				
CVP	5.52				
TOTAL	139.28				

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2017 through 3/22/2018.

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).

* Information not yet available.

DWR-DES Revised 3/23/2018

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

Agenda Item 8.

Hatchery Releases

The USFWS distributed a notification for the release of 500,000 brood year 2017 spring-run Chinook salmon to the Feather River at Boyd’s Pump from Feather River Fish Hatchery on 3/26. Fish were 100% ad-clipped.

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 Chipps Island)
<i>Wild young-of-year winter-run Chinook salmon</i>	1% (Last week: 3-11%)	35-50% (Last week: 47-66%)	50-65% (Last week: 31-42%)
<i>Wild young-of-year spring-run Chinook salmon</i>	10-15% (Last week: 15-25%)	85-88% (Last week: 75-85%)	2% (Last week: 0%)
<i>Hatchery winter-run Chinook salmon</i>	75-85% (Last week: 85-90%)	15-25% (Last week: 10-15%)	0% (Last week: 0%)

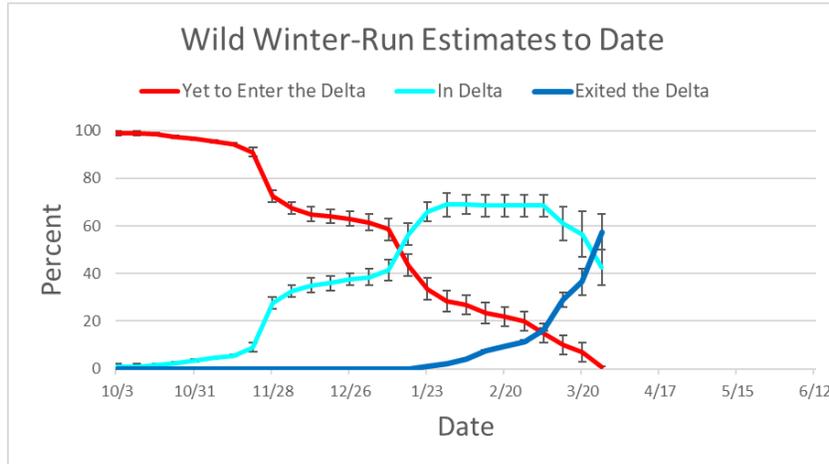
Rationale for changes in distribution

Wild winter-run Chinook: 2 winter-run sized fish were observed at Knights Landing, 5 at Sacramento Trawl, and 19 at Chipps Island this past week. Since more fish were observed at monitoring locations and flows and turbidities are elevated due to recent rain events, DOSS estimated that 99% of the winter-run population has moved downstream of Knights Landing. Since 19 more fish were observed at Chipps Island Trawl and due to recent high flows, DOSS estimates that at least 50% have exited past Chipps Island.

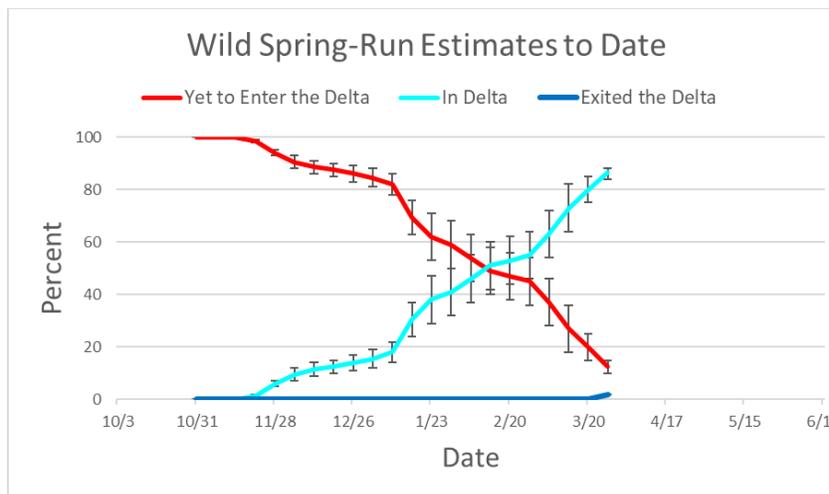
Wild spring-run Chinook: 1 spring-run sized fish was observed at Tisdale, 7 at Knights Landing, 174 at Butte Creek, 24 in the beach seines, and 15 at Sacramento Trawl this past week. Since more fish were observed at locations upstream and within the Delta, DOSS estimated that an additional 5-10% of the spring-run population has moved into the Delta. There is also the potential that some of the fish classified as spring-run by the length-at-date criteria may actually be late emerging and slow growing winter-run Chinook salmon. Cooler river water temperatures this year may have delayed spawning and slowed the emergence and growth of winter-run fry in the upper Sacramento River, and thus these fish would fall into the size criteria for spring-run at this time of year. Likewise, some spring-run may fall into the fall-run length-at-date size criteria due to slow growth in cooler waters. Increased flows and turbidities recently have likely triggered movement of spring-run downstream. Although none have been observed at Chipps Island Trawl, DOSS estimated that 2% of spring-run have exited past Chipps Island, as young-of-year spring-run could be rearing west of 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 an additional 5-10%

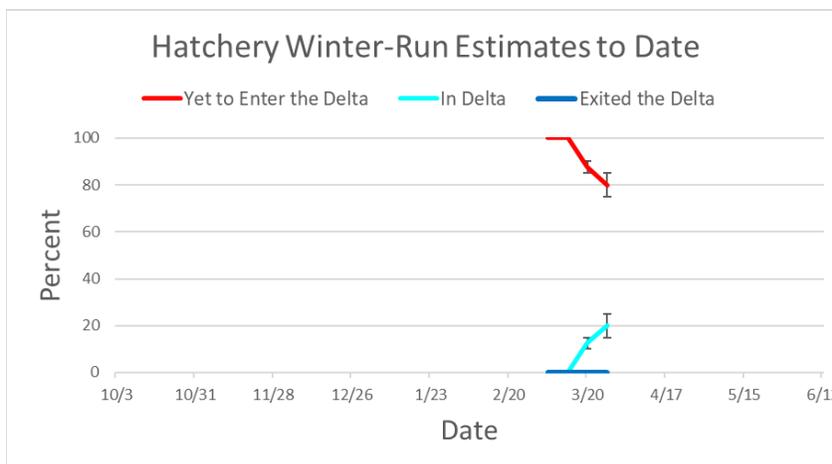
have entered the Delta. This estimate assumes a high in-river survival rate but does not account for predation or other sources of mortality.



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: 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 acoustically-tagged fish are beginning to be detected by Sacramento area receivers.
 - 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, elevating their exposure risk.
 - A few winter-run have been seen in the lower Sacramento River section between Sacramento and the DCC and several winter-run have been observed in the catch at Chipps Island over the past few weeks, indicating that most of the population is

in the Delta and not upstream, and that increasing numbers are beginning to move out of the Delta past Chipps Island (50-65% of the population).

- Approximately 85-88% of spring run population is in Delta.
 - Surrogate spring-run Chinook salmon hatchery releases of late-fall run Chinook salmon are in the Delta. The last release occurred on 1/25/18. CWTs from captured 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**
 - River flows are not high enough to mute tidal influence at Georgiana Slough and Three Mile Slough, allowing redirection of fish into these routes on flood tides.
 - Delta Cross Channel is closed.
 - **Overall Entrainment Risk: MEDIUM-HIGH**
 - Increased movement of winter-run Chinook salmon, spring-run Chinook salmon, and steelhead into the Delta and remaining within the Delta increase overall risk of entrainment into the interior Delta.

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

- **Exposure Risk: HIGH**
 - Hatchery and wild steelhead have been observed in salvage.
 - Hatchery and wild Chinook salmon have been observed 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).
 - Greater proportions of winter-run and spring-run Chinook salmon populations are estimated to have moved into the Delta than remain upstream.
- **OMR/Export Risk:**
 - OMR -2,500 cfs: LOW-MEDIUM (higher San Joaquin River flows reduce this risk from last week)
 - OMR -3,500 cfs: MEDIUM
 - OMR -5,000 cfs: MEDIUM-HIGH
 - OMR -6,250 cfs⁵: HIGH

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

- 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 western Delta and lower San Joaquin River).
- **Overall Entrainment Risk:**
 - OMR -2,500 cfs: MEDIUM (high SJR flows)
 - OMR -3,500 cfs: MEDIUM
 - 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:

DOSS thinks that the continuing increased presence of listed salmonids, including hatchery winter-run, in the Delta increases the risk of entrainment into the interior Delta and potential future exposure to the SWP and CVP fish collection facilities. Furthermore, the increased salvage of winter-run and spring-run sized Chinook salmon, as well as wild steelhead over the past week demonstrates the presence of listed fish in the area surrounding the Central Valley Project (CVP) and State Water Project (SWP) fish facilities and therefore increases their vulnerability to entrainment at the two facilities. DOSS advises that OMR flows more negative than -5,000 cfs will have high overall entrainment risks at the CVP and SWP fish salvage facilities given current wild and hatchery winter-run Chinook salmon distributions, and recent salvage and loss of unclipped steelhead. OMR flows more negative than -5,000 cfs will create conditions that are not protective of listed salmonids in the southern Delta.

Agenda Item 12.

Next Meeting: The next DOSS conference call will be on **4/3/2018 at 9 am.**