

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 5/23/2017 at 9:00 a.m.

Objective: Provide advice to the Water Operations Management Team (WOMT) and National Marine Fisheries Service (NMFS) on measures to reduce adverse effects from Delta operations of the Central Valley Project and the State Water Project on salmonids and green sturgeon. DOSS will work with other technical teams. DOSS notes and advice can be found at: http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/doss.html.

CDFW: Bob Fujimura, Jason Julienne, Jerry Morinaka
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EPA: Erin Foresman
NMFS: Barb Byrne, Kristin McCleery
Reclamation: Tom Patton, Towns Burgess
SWRCB: Chris Kwan, Chris Carr
USFWS: Craig Anderson, 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/djfmpr)
3. Smelt Working Group Update
4. Current Operations
5. Hatchery Releases
6. Fish Monitoring: Tracking of acoustic-tagged Chinook salmon
7. Fish Monitoring: Salvage
8. Fish Monitoring: RSTs/trawls/seines
9. DOSS Estimates of Fish Distribution and Assessments of Entrainment Risk
10. DOSS Advice
11. Next DOSS Meeting

Agenda Item 2.

RPA Implementation Review

Delta RPA Actions in effect during May:

Action IV.1.2¹ (DCC gate operations):

- From May 21 to June 15, the gates will be closed for up to 14 days.

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 2017 began 1/1/17, and requires that Old and Middle River (OMR) flow be no more negative than -5,000 cfs.
- Since the action went into effect on 1/1/17, no salvage-based triggers that would require OMR to be more positive than -5,000 cfs have been exceeded.

Action IV.2.1³ (I:E ratio)

- Implementation of this action in WY 2017 began 4/1/17, and requires a specific Vernalis flow-to-combined export ratio based on the San Joaquin Basin yeartype.
- The I:E ratio associated with the current “Wet” San Joaquin Basin yeartype is 4:1. Once the flood condition offramp was no longer satisfied, project operations transitioned into I:E ratio implementation (beginning 5/15).
- **Offramp⁴:** Exports are not restricted by the I:E ratio requirements of Action IV.2.1 when mean daily stage at Vernalis flow is equal to or greater than the flood monitor stage of 24.5 feet.

Agenda Item 3.

Smelt Working Group update

The Smelt Working Group (SWG) did not meet this week.

Agenda Item 4.

Current Operations

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	2,600	Jones Pumping Plant	1,800
Reservoir Releases (cfs)			
Feather - Oroville	10,300	American - Nimbus	9,500 ^A
		Sacramento - Keswick	13,000 ^B
		Stanislaus - Goodwin	5,000
		Trinity – Lewiston	4,300 ^C
Reservoir Storage (in TAF)			
San Luis (SWP)	1,028	San Luis (CVP)	961
Oroville	2,526	Shasta	4,378
New Melones	2,056	Folsom	830
Delta Operations (cfs)			
DCC	Closed ^D	Sacramento River at Freeport (cfs)	43,000

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 68-70 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

⁴ 5/1/17 clarification of San Joaquin I:E ratio flood condition offramp available under "Biological Opinion Actions" heading at: http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/

Outflow Index (cfs)	~59,000	San Joaquin River at Vernalis (cfs)	17,400
E:I	5.9% (14-day avg.)	X2	<62 km

^A Nimbus releases are scheduled to decrease to the 6,000 to 6,500 cfs range by Friday (5/26).

^B Keswick releases are scheduled to decrease tomorrow (5/24) to 12,000 cfs and to 11,000 cfs on Thursday (5/25).

^C Lewiston releases are scheduled to decrease to 4,100 cfs later today (5/23).

^D Non-BiOp-related DCC operational considerations: While Sacramento River flows near the DCC remain greater than ~20,000 cfs, the DCC may remain closed to avoid scouring around the gate structure.

OMR flows as of 5/22/17:

	Index (cfs)
Daily	4,580
5-day	5,039
14-day	3,449

Approximate OMR flows as of 5/20/17:

	USGS gauges (cfs)	Index (cfs)
Daily	4,697	5,190
5-day	5,050	5,283
14-day	3,216	3,195

Factors controlling Delta exports:

- 5/16 – 5/23 Delta exports limited by Action IV.2.1 (I:E ratio).

The weather forecast indicates cooler temperatures and dry conditions over the next week.

Agenda Item 5.

Hatchery Releases

See tables summarizing hatchery releases at:

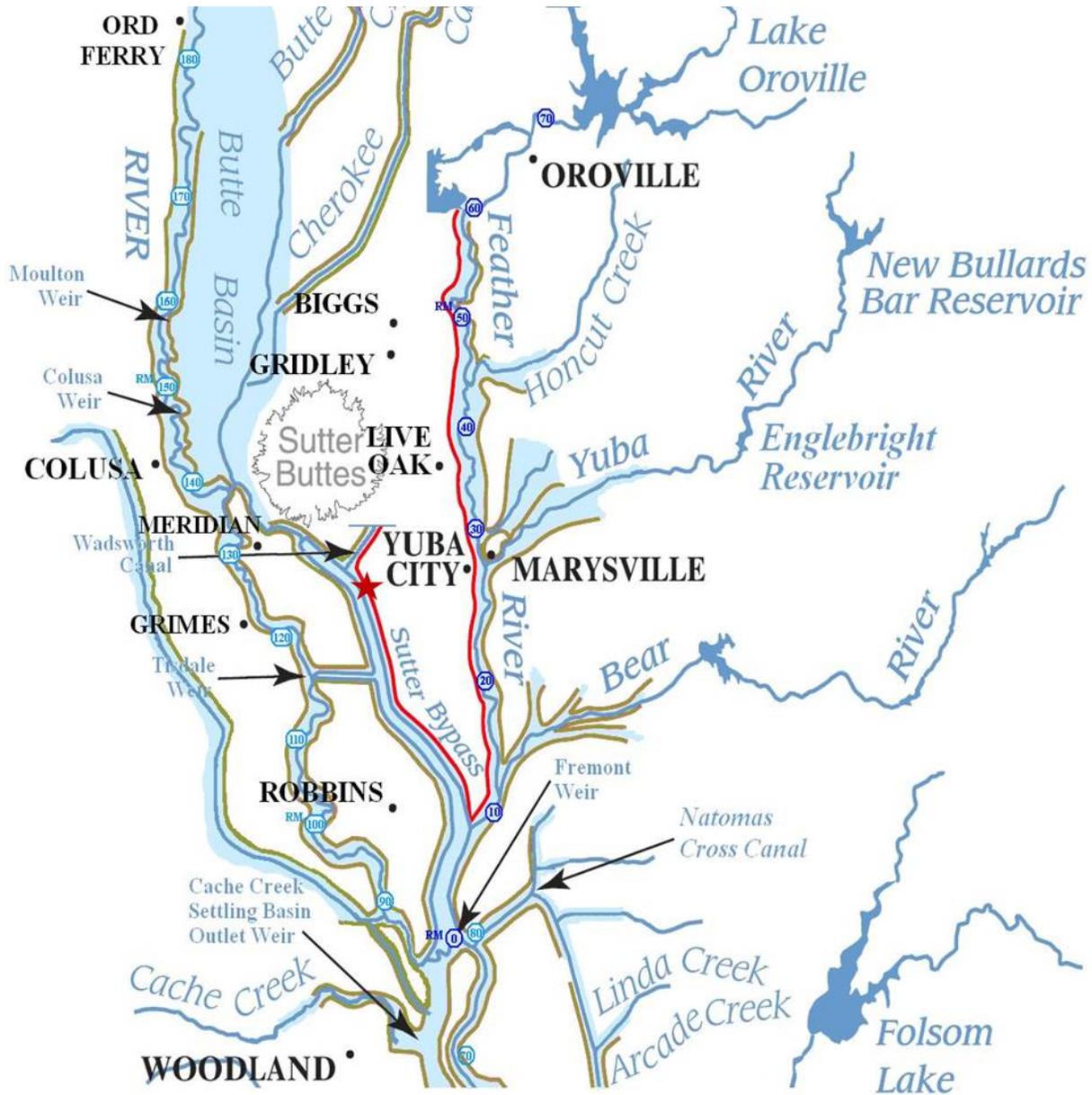
http://www.cbr.washington.edu/sacramento/data/delta_cwt_tables.html. Note that releases are listed in different tables based on whether or not confirmed loss at the SWP and CVP Delta Fish Facilities has been reported; check all tables to review recent releases.

Agenda Item 6.

Fish Monitoring: Tracking of acoustic-tagged Chinook salmon

The Coleman National Fish Hatchery released 290 acoustic tagged (JSATS) fall-run Chinook salmon into Battle Creek on 4/21/17. No fish were detected at the Sacramento I-80/50 Bridge over the most recent reporting period of 5/15-5/17. The cumulative detections since release (4/21-5/17) is 24 (8% of released fish).

The Sutter Bypass acoustic tagging project used a rotary screw trap (RST) installed at Weir 2 in the East Borrow of the Sutter Bypass (RST location shown by red star on map below) to collect outmigrating Chinook salmon (expected to be a mix of spring-run and fall-run Chinook salmon). 190 Chinook salmon were collected, tagged with JSATS, and released below Weir 2 from 5/5 to 5/12. Over the last week (5/16-5/22), 5 fish were detected by realtime receivers at the Sacramento I80/50 Bridge. The cumulative detections since the earliest release is 40 (11% of released fish).



Agenda Item 7.

Fish Monitoring: Salvage⁵

An 80mm juvenile white sturgeon (confirmed as white sturgeon based on genetic analysis) was handled on 5/18/17, for a salvage of 4. This is the first sturgeon salvaged since early February 2017.

⁵ 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 15-May 21, 2017
 Prepared by Bob Fujimura on May 22, 2017 15:39
 Preliminary Results -Subject to Revision

Criteria	15-May	16-May	17-May	18-May	19-May	20-May	21-May	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	0	0	0	0	→	0
Wild steelhead	0	0	0	2.88	0	0	1.79	↗	0.67
Exports									
SWP daily export	4,557	5,623	5,141	4,970	5,137	4,578	4,677	↘	4,955
CVP daily export	5,497	5,445	5,525	4,983	4,974	4,983	4,984	↘	5,199
SWP reduced counts	58%	83%	100%	92%	42%	42%	17%	↗	62%
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 outage occurred

Chinook Salmon Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities
 Race determined by size at date of capture; hatchery = adipose fin missing;

Category	Weekly Total			Season Total	
	Salvage	Loss	Trend	Salvage	Loss
Wild					
Winter Run	0	0	→	46	111
Spring Run	3,363	10,695	↘	23,979	64,287
Late Fall Run	0	0	→	20	73
Fall Run	1,151	2,524	↗	10,207	23,114
Unclassified	0	0	→	97	NC
Total	4,514	13,219		34,349	87,585
Hatchery					
Winter Run	0	0	↘	368	1,009
Spring Run	44	132	↘	931	1,666
Late Fall Run	0	0	→	639	1,387
Fall Run	48	84	↗	184	289
Unclassified	0	0	→	6	NC
Total	92	216		2,128	4,351

Trend = weekly loss per race; Salvage = estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time
 NC = can not be calculated

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	14	46	↗	48	149
Hatchery	0	0	↘	39	162
Total	14	46		87	311

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

Generated by Bob Fujimura on May 22, 2017

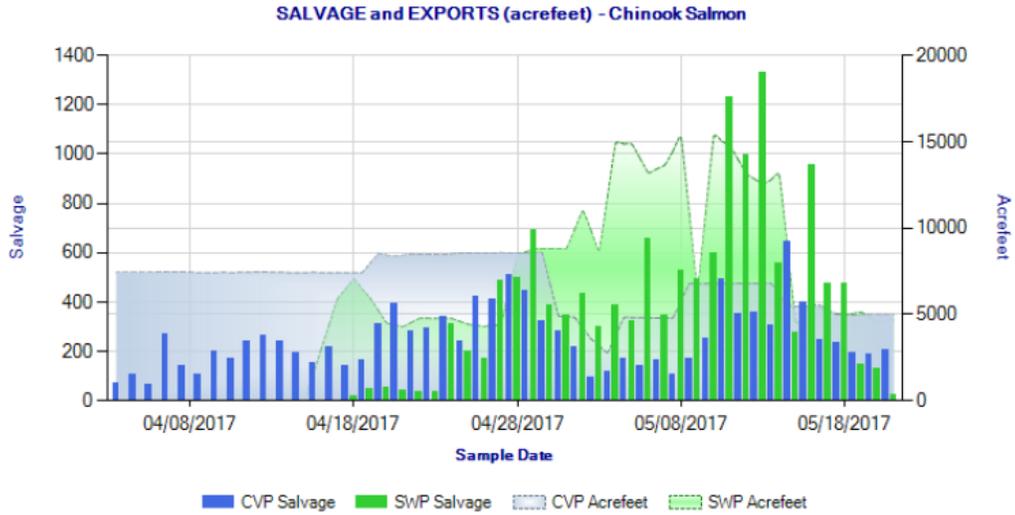


Figure 1. Daily salvage of Chinook Salmon (all races) and water exports from the state and federal fish salvage facilities during April 4 through May 21, 2017. Graph obtained from the DFG salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

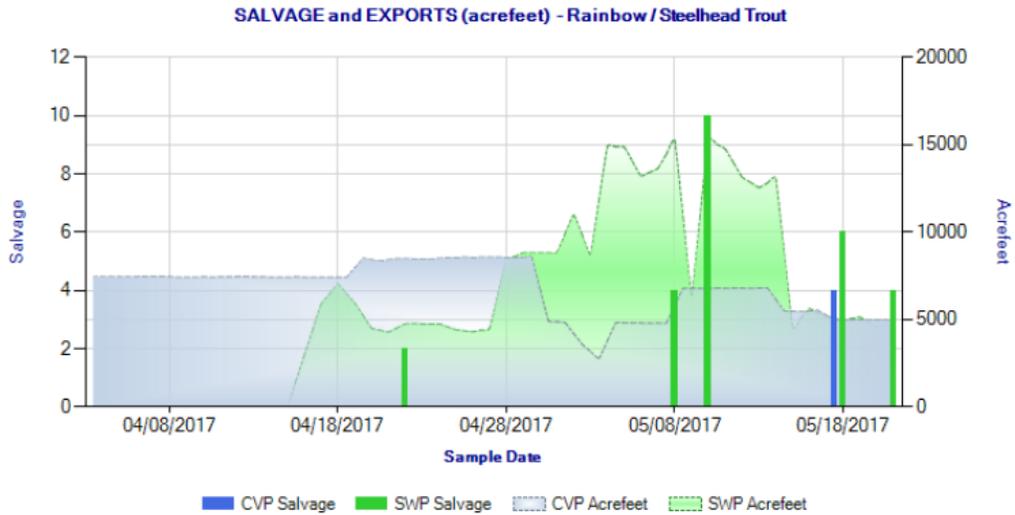


Figure 2. Daily salvage of Steelhead and water exports from the state and federal fish salvage facilities during April 4 through May 21, 2017. Graph obtained from the DFG salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES through 5/10/17

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
12/9/2016	LF	Coleman NFH	Battle Creek	Production	1642.62	861,966	n/a	0.191	n/a	n/a	12/18/2016	1/23/2017
12/12/2016	LF	Coleman NFH	Battle Creek	Spring Surrogate	181.82	75,000	n/a	0.242	n/a	0.5%	12/22/2016	1/19/2017
12/21/2016	LF	Coleman NFH	Battle Creek	Spring Surrogate	346.73	81,279	n/a	0.427	n/a	0.5%	12/30/2016	1/29/2017
1/9/2017	LF	Coleman NFH	Battle Creek	Spring Surrogate	0.00	75,000	n/a	0.000	n/a	0.5%	*	*
2/2/2017	W	Livinstone NFH	Sacramento River	WR	0.00	141,388	n/a	0.000	n/a	0.5%	*	*
11/29/2016	S	SJRRP	San Joaquin River	Experimental	175.35	1200	n/a	14.613	n/a	n/a	12/23/2017	1/25/2017
11/29/2016	F	SJRRP	San Joaquin River	Experimental	6.05	544	n/a	1.112	n/a	n/a	12/27/2016	1/14/2017
3/6/2017	S	SCARF	San Joaquin River	Experimental	609.49	60,108	n/a	1.014	n/a	n/a	3/29/2017	5/7/2010
3/6/2017	S	SIRF	San Joaquin River	Experimental	392.76	38,106	n/a	1.031	n/a	n/a	4/2/2017	5/10/2017
4/24/2017	F	MRH	Merced River	Experimental	19.24	70,591	n/a	0.027	n/a	n/a	42857	5/10/2017

UNCONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES, 2016/2017

Facility	Unknown CWT Loss ⁵	Unread CWT Loss ⁶	Unknown Hatchery Loss ⁷	Acoustic Tag Loss ⁸	Number of Unassigned CWTs ⁹
SWP	234.58				
CVP	32.88				
TOTAL	267.46				

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2016 through 5/10/2017.

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.

¹⁰Chinook outside of the length-at-date criteria (Delta model) are not reported.

** Information not yet available.

DWR-DES Revised 5/12/2017

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

Agenda Item 8.

Fish Monitoring: The following table presents fish monitoring data summarized over the identified sampling dates. Unless otherwise noted, any reported sizes are fork length. Chinook run assignments are based on length-at-date criteria. DOSS acknowledges the limitations of the length-at-date criteria, particularly in distinguishing between young-of-year spring run Chinook and young-of-year fall-run Chinook. Additionally, once hatchery fall-run releases (75% of which are unmarked) occur upstream of a monitoring location (the first of which occurred on 3/22/17 for the current outmigration season), DOSS assumes that many of the unclipped spring-run-sized Chinook (and perhaps some of the winter-run-sized Chinook) observed in monitoring may be unmarked hatchery fall-run Chinook that fall into the spring-run or winter-run size ranges.

Location	Chippis Is. Midwater Trawl ^A	Sacramento Trawl ^A	Beach Seines ^A	Knights Landing RST ^B	Tisdale RST ^C	GCID RST ^D	Mossdale Kodiak Trawl ^E
Sample Date	5/14-5/20	5/14-5/20	5/15-5/19	5/14-5/21	5/10-5/21	5/18-5/22	5/14-5/20
Chinook							762
FR Chinook	915	443	40	2	1	69 juveniles	
SR Chinook	180	33	1			1 smolt	
WR Chinook							
LFR Chinook							
Ad-Clipped Chinook	308	295	6			19 FR juveniles 2 FR smolts	50
Steelhead (ad-clip)	2						
Steelhead (wild)				1			
Green Sturgeon							
Flows (avg. cfs)				12,799	13,045	1,865	
W. Temp. (avg. °F)				61.6	60	58.7	
Turbidity (avg. NTU)				22.3	25.9	15.8	

^A Data reported in the 5/14-5/20 DJFMP sampling summary. Not included in the table above are the 1 CHNE (the code used for spray-dyed Chinook, usually represent fish used for a gear efficiency trial) reported at the Sacramento Trawl and 1 CHNE at the Chippis Island Trawl.

^B Knights Landing RST sampling period was from 5/14 at 11:30 am to 5/21 at 10:45 am.

^C Tisdale RST sampling period was from 5/10 at 10:00 am to 5/21 at 10:00 am. Both traps were modified to 50% cone sampling during the sampling period.

^D GCID RST sampling period was from 5/18 to 5/22.

^E Mossdale trawl sampling period was from 5/14 to 5/20.

Red Bluff Diversion Dam (RBDD)^{6*}

USFWS biweekly report (5/7/17-5/20/17) for preliminary daily estimates of passage for all runs of unmarked juvenile Chinook salmon and steelhead captured by rotary screw traps at RBDD included:

Run and Species	Biweekly Total	Brood Year Total (90% CI)
Winter-run Chinook (BY2016)	0	537,519 (385,409-689,630)
Spring-run Chinook (BY2016)	11,668	988,946 (-258,884-2,236,777)

Agenda Item 9.

DOSS Estimates of Fish Distribution and Assessment of Entrainment Risk

DOSS estimates of the current distribution of listed Chinook, as a percentage of the population, are based on recent monitoring data and historical migration timing patterns. DOSS acknowledges the limitations of the length-at-date criteria, particularly in distinguishing between young-of-year spring run Chinook and young-of-year fall-run Chinook. Additionally, once hatchery fall-run releases (75% of which are unmarked) occur upstream of a monitoring location (the first of which occurred on 3/22/17 for the current outmigration season), DOSS assumes that many of the unclipped spring-run-sized Chinook (and perhaps some of the winter-run-sized Chinook) observed in monitoring may be unmarked hatchery fall-run Chinook that fall into the spring-run or winter-run size ranges.

Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chipps Island)
<i>Wild young-of-year (YOY) winter-run Chinook salmon</i>	0% (Last week: same)	0%-1% (Last week: 1%-2%)	99%-100% (Last week: 98%-100%)
<i>Wild young-of-year (YOY) spring-run Chinook salmon</i>	0%-5% (Last week: same)	0%-5% (Last week: 5%-10%)	90%-100% (Last week: 85%-95%)
<i>Hatchery winter-run Chinook salmon (released 2/2/17)</i>	0% (Last week: same)	0%-1% (Last week: 0%-2%)	99%-100% (Last week: 98%-100%)

Rationale for changes in distribution

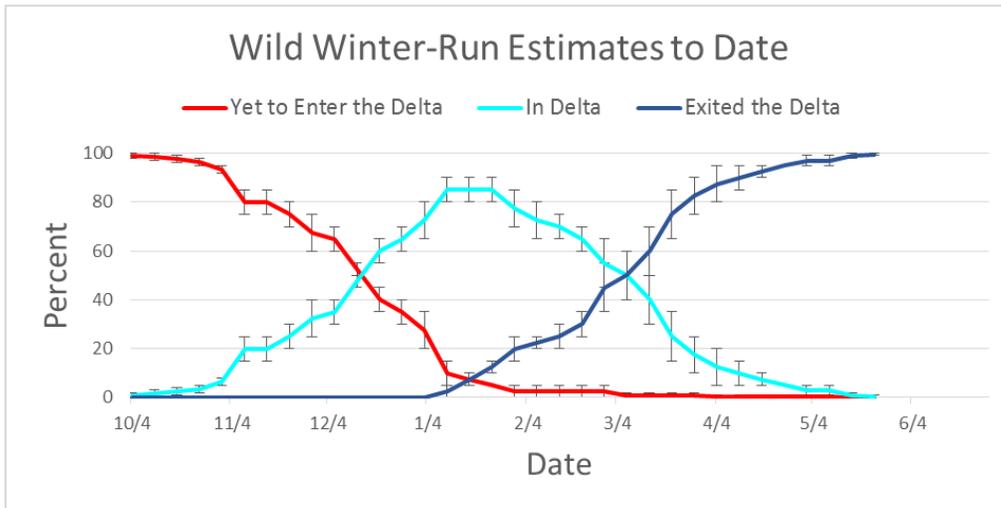
Wild winter-run Chinook: Over the past week no juvenile winter-run-sized Chinook salmon were observed at any monitoring locations. Based on monitoring observations and seasonal timing, DOSS estimated that nearly all wild winter-run Chinook have moved out of the Delta past Chipps Island.

Wild spring-run Chinook: Over the past week, 33 juvenile spring-run-sized Chinook were observed at the Sacramento trawl, 1 in the beach seines, and 180 at Chipps Island. Since fewer

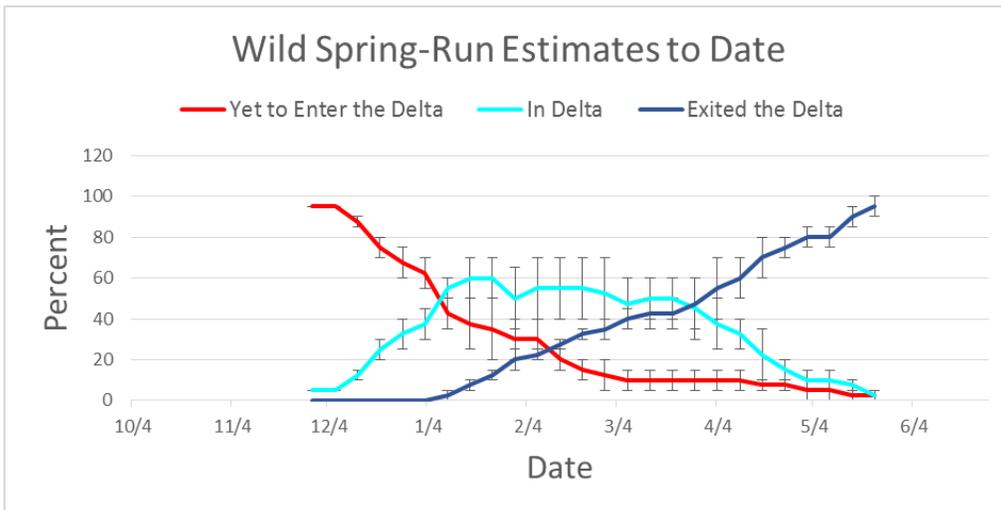
⁶ RBDD data were received after the DOSS call and are provided in this week's notes for convenience.

spring-run-sized fish were observed at monitoring sites this week and many are expected to be hatchery fall-run, DOSS assumes 5% more have moved out of the Delta past Chipps Island.

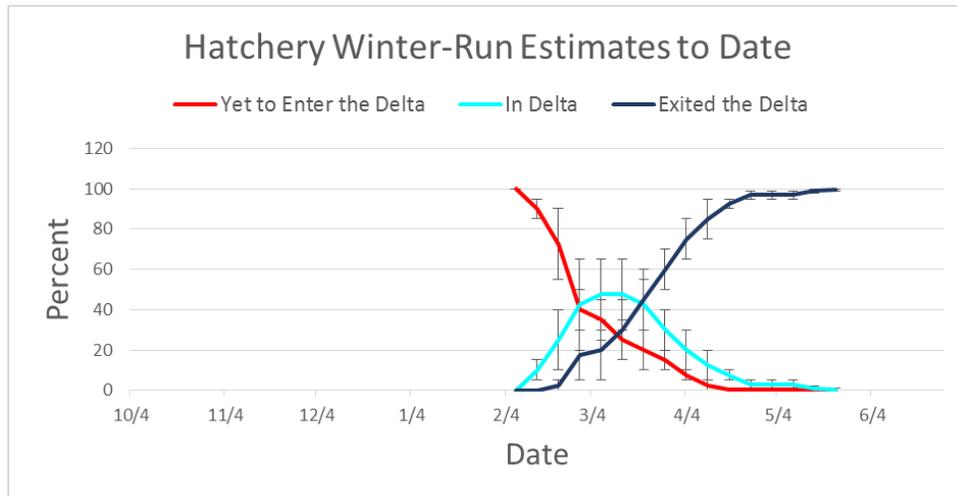
Hatchery winter-run Chinook: Over the past week, many ad-clipped Chinook were reported at monitoring locations in the Delta and at Chipps, but (except at the salvage facilities) no CWT information is available for the recent week’s monitoring catch. Migration information on the acoustic-tagged hatchery winter-run Chinook is no longer available since the JSATS tags have reached their 60-day battery life. At this time of year, no hatchery winter-run Chinook are expected to remain upstream of the Delta. Based on seasonal timing, DOSS estimates that nearly all hatchery winter-run have moved out of the Delta past Chipps Island..



WY 2017 wild winter-run distribution estimates to date.



WY 2017 wild spring-run distribution estimates to date.



WY 2017 hatchery winter-run distribution estimates to date.

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. Risks are unchanged from the previous week unless noted otherwise.

Interior Delta Entrainment Risk for listed salmonids in the Sacramento River over the next week:

- **Exposure Risk: LOW** (last week: LOW-MED)
 - Most winter-run and spring-run Chinook salmon are estimated to have migrated out of the Delta past Chipps Island.

- **Routing Risk: LOW**
 - Intermediate river flows are expected to mute the tidal effects at Georgiana Slough (reducing the risk of routing into Georgiana Slough).
 - Delta Cross Channel is closed and likely to remain closed even after 5/20 if river flow remains above ~20,000 cfs.
- **Overall Entrainment Risk: LOW**

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

DOSS notes that these risk assessments at negative OMR levels are not relevant to current OMR levels of ~5,000 cfs, which are projected to stay positive through the weekend.

- **Exposure Risk: MEDIUM**
 - OMR is positive.
 - Beginning in mid-January, saw salmonid catch (fall-run-sized Chinook, no steelhead to date) at Mossdale. Mossdale sampling did not occur from 2/10/17 to 4/2/17 due to high flows; recent data from Mossdale⁷ reported catch of unclipped and clipped Chinook salmon (likely a mix of fall-run Chinook and hatchery spring-run Chinook).
 - All recent salvage of hatchery Chinook is from releases in the San Joaquin Basin suggesting that most of the unclipped Chinook observed in recent salvage are also of San Joaquin basin origin.
 - For the salvage reporting period of 5/15/17-5/21/17, 14 wild and steelhead were salvaged at the export facilities.
 - DOSS estimates that most Sacramento basin winter-run and spring-run Chinook salmon have exited the Delta past Chipps Island.
- **OMR/Export Risk:**
 - OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: MEDIUM
 - OMR -5,000 cfs: HIGH
 - OMR -6,250 cfs⁸: incrementally HIGHER (given projected hydrology and high Vernalis flow)

Some members expect the relative risk of entrainment of an OMR limit of -6,250 compared to -5,000 cfs to further increase when Vernalis flows decrease.

- **Overall Entrainment Risk:**
 - OMR -2,500 cfs: LOW

⁷ The past week's data from the Mossdale Trawl was not available during DOSS; DOSS assumed that catch patterns at Mossdale would be similar to that observed last week.

⁸By request of management, DOSS also assessed risks at an OMR flow more negative than -5,000 cfs.

- OMR -3,500 cfs: LOW-MEDIUM (given projected hydrology and high Vernalis flow)
- OMR -5,000 cfs: MEDIUM-HIGH (given projected hydrology and high Vernalis flow)
- OMR -6,250 cfs⁶: incrementally higher within MEDIUM-HIGH (given projected hydrology and high Vernalis flow)

Considering the continued high Vernalis flows forecasted through the weekend, most members agreed that overall entrainment risk into the export facilities is lower at most OMR levels than it would be under lower flow conditions. The overall entrainment risk was driven in large part by the MEDIUM exposure risk and less so (given projected hydrology) by the OMR/Export Risk.

Agenda Item 11.

DOSS Advice to NMFS and WOMT: None

Agenda Item 12.

Next Meeting: The next DOSS conference call will be on **5/30/17 at 9am.**