

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 4/4/2017 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: Duane Linander, Jerry Morinaka, Bob Fujimura

DWR: Bryant Giorgi, Kevin Reece, Farida Islam, Mike Ford

NMFS: Barb Byrne, Kristin McCleery

Reclamation: Tom Patton, Towns Burgess, Mike Hendrick, Elissa Buttermore, Travis Yonts, Josh Israel

SWRCB: Chris Carr, Chris Kwan

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/djfmfp)
3. Smelt Working Group update
4. Current Operations
5. Hatchery Releases
6. Fish Monitoring: Tracking of acoustic-tagged hatchery winter-run 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 April:

Action IV.1.2¹ (DCC gate operations):

- From February 1 to May 20, the gates will remain closed.

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 SJ Basin yeartype.
- The I:E ratio associated with the current “Wet” San Joaquin Basin yeartype is 4:1, but because the offramp condition is satisfied, no I:E ratio is currently required.
- ***Offramp:*** Exports are not restricted by the I:E ratio requirements of Action IV.2.1 when Vernalis flow is equal to or greater than 21,750 cfs.

Agenda Item 3.

Smelt Working Group update

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

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

Agenda Item 4.
Current Operations

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	0 ^A	Jones Pumping Plant	3,750 ^B
Reservoir Releases (cfs)			
Feather - Oroville	9,000	American - Nimbus	8,500 ^C
		Sacramento - Keswick	10,000
		Stanislaus - Goodwin	1,250 ^D
		Trinity – Lewiston	300 ^E
Reservoir Storage (in TAF)			
San Luis (SWP)	1,051	San Luis (CVP)	962
Oroville	2,714	Shasta	4,073
New Melones	1,826	Folsom	594
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	57,000
Outflow Index (cfs)	~88,000	San Joaquin River at Vernalis (cfs)	25,000
E:I	3.8% (3-day avg.) 3% (14-day avg.)	X2	<56 km

^A Clifton Court Forebay is shut down for repairs to the intake structure, likely until late April.

^B Includes ~2,400 cfs of pumping for the SWP because of the Clifton Court repairs.

^C Nimbus releases may be decreased to 6,500 tomorrow, 4/5/17, depending on the weather.

^D Stanislaus releases will be increased to 1,800 tomorrow, 4/5/17.

^E Trinity releases will be increased to 1,500 cfs tomorrow, 4/5/17.

OMR flows as of 4/3/17:

	Index (cfs)
Daily	+10,630
5-day	+11,624
14-day	+12,164

Approximate OMR flows as of 3/27/17:

	USGS gauges (cfs)	Index (cfs)
Daily	+13,500	+12,600
5-day	+12,800	+12,400
14-day	+13,100	+12,600

Factors controlling Delta exports:

- 3/28 – 4/4: Delta exports limited by real-time demand or available plant capacity.

The weather forecast predicts a widespread system arriving late Friday night or early Saturday, with drier and cooler temperatures after the system passes.

Agenda Item 5.

Hatchery Releases

On March 23, 2017, San Joaquin River Restoration Program released 350 adipose clipped and JSATS tagged spring-run Chinook salmon at Durham Ferry.

On April 4, 2017, USFWS will release approximately 645,257 brood year 2016 spring-run Chinook salmon from the Feather River Hatchery Annex facility into the Feather River at Boyd's Pump and Gridley boat ramp. The release will include 100% marked (adipose fin clip and CWT).

Agenda Item 6.

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

The acoustic tags are now past their 60 day expected battery life. Although many will still work for another 10 days, some tagged fish are likely to pass receivers undetected.

Livingston Stone National Fish Hatchery released approximately 141,388 hatchery winter-run Chinook at Caldwell Park in Redding on 2/2/17. 569 were acoustic-tagged with JSATS tags and NOAA's Southwest Fisheries Science Center (SWFSC) is tracking movement of these acoustic-tagged fish past several "real-time" receiver locations near Colusa and Sacramento. From 3/27/17 through 4/2/17, 4 acoustic-tagged hatchery winter-run Chinook salmon were detected at the receivers at Colusa, for a seasonal total of 259 fish (45.5%) past Colusa. Over the same period, a total of 4 detections were reported at the I80/Hwy50 Bridge receivers, for a seasonal total of 113 (19.9%). The Tower Bridge receiver stopped operating on 2/27/17.

Agenda Item 7.

Fish Monitoring: Salvage⁴

Preliminary salvage reports for Monday, 4/3/17, indicated salvage of clipped and unclipped spring-run-sized Chinook.

Based on the CWT codes observed over the past week (all associated with San Joaquin River Restoration Program releases of spring-run Chinook into the Eastside Bypass near Harmon Road) and preliminary data from the 4/3/17 Mossdale trawl sampling (reporting catch of spring-run-sized Chinook in a size range very similar to that observed in salvage), there was general consensus that most, if not all, of the Chinook observed in salvage over the past few weeks are outmigrating from the San Joaquin River basin.

Fujimura (CDFW) noted that the SWP did pump some water from Clifton Court Forebay one day over the past week⁵, but the radial gates were not opened.

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.

⁵ On 3/31/17; see HRO station data on CDEC: <http://cdec.water.ca.gov/cgi-progs/queryDaily?s=hro&d=today>

DOSS Weekly Salvage Update

Reporting Period: March 27-April 2, 2017

Prepared by Bob Fujimura on April 3, 2017 15:11

Preliminary Results -Subject to Revision

Criteria	27-Mar	28-Mar	29-Mar	30-Mar	31-Mar	1-Apr	2-Apr	Trend	
Loss Densities									
Wild older juvenile CS	0	0.39	0.77	0	0	0	0	↗	0.17
Wild steelhead	0	0	0	0	0	0	0	→	0
Exports									
SWP daily export	0	0	0	0	2,728	0	0	↗	390
CVP daily export	7,463	7,394	7,455	7,476	7,462	7,427	7,437	→	7,445
SWP reduced counts					53%			↗	53%
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 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
Wild					
Winter Run	12	9	↗	32	67
Spring Run	441	296	↗	561	442
Late Fall Run	0	0	→	20	73
Fall Run	4	3	↘	8,485	19,312
Unclassified	0	0	→	84	NC
Total	457	307		9,182	19,893
Hatchery					
Winter Run	8	6	↗	325	954
Spring Run	20	14	↗	20	14
Late Fall Run	0	0	→	639	1,387
Fall Run	0	0	→	116	192
Unclassified	0	0	→	6	NC
Total	28	20		1,106	2,547

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	0	0	→	28	77
Hatchery	0	0	→	29	118
Total	0	0		57	196

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

Generated by Bob Fujimura on April 3, 2017



Figure 1. Daily salvage of Chinook Salmon (all races) and water exports from the state and federal fish salvage facilities during Feb 14 through April 2, 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 Feb 14 through April 3, 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 4/3/17

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	1492.21	861,966	n/a	0.173	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	0.50%	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	0.50%	12/30/2016	1/29/2017
1/9/2017	LF	Coleman NFH	Battle Creek	Spring Surrogate	0.00	75,000	n/a	0	n/a	0.50%	*	*
2/2/2017	W	Livinstone NFH	Sacramento River	WR	0.00	141,388	n/a	0	n/a	0.50%	*	*
11/29/2016	S	SJRRP	San Joaquin River	Experimental	116.82	544	n/a	0.273	n/a	n/a	1/8/2017	1/17/2017
11/29/2016	F	SJRRP	San Joaquin River	Experimental	6.05	1,200	n/a	0.014	n/a	n/a	12/27/2016	1/14/2017

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	141.38				
CVP	2.6				
TOTAL	143.98				

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.

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 (as occurred with the 3/22/17 release of ~1.7 million fall-run Chinook from Coleman National Fish Hatchery into Battle Creek), 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	3/26-3/29, 3/31-4/1	3/26-4/1	3/27, 2/29, 3/30	3/26-4/2	3/25-3/29	-	4/3
FR Chinook	2	92	55	439	133		
SR Chinook	96	247	10	433	132		5
WR Chinook	61	31		2			
LFR Chinook							
Ad-Clipped Chinook	47	137	5	61 FR 79 SR 2 WR	91		1
Steelhead (ad-clip)	1						
Steelhead (wild)	1	1		3			
Green Sturgeon							
Flows (avg. cfs)				23,729	29,200		
W. Temp. (avg. °F)				54.7	51.7		
Turbidity (avg. NTU)				58.3	67.4		

^AData reported in the 3/26 to 4/1 DJFMP sampling summary.

^BKnights Landing RST sampling period was from 3/26 at 9:15 am to 4/2 at 9:15 am. Cones were modified to 50% catch from 3/29 to 3/31.

^CTisdale RST sampling period was from 3/25 at 10:00 am to 3/29 at 10:00 am.

^DNo GCID RST sampling has been reported since 3/20/17.

^EMossdale trawl sampling will be conducted by CDFW April through June.

Red Bluff Diversion Dam (RBDD)

USFWS biweekly report (3/12/17-3/25/17) 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)	5,091	536,288 (384,827-687,749)
Spring-run Chinook (BY2016)	8,813	89,759 (-19,075-198,592)

Enhanced Delta Smelt Monitoring (EDSM) Catch

EDSM data posted on DJFMP website:

https://www.fws.gov/lodi/juvenile_fish_monitoring_program/jfmp_index.htm

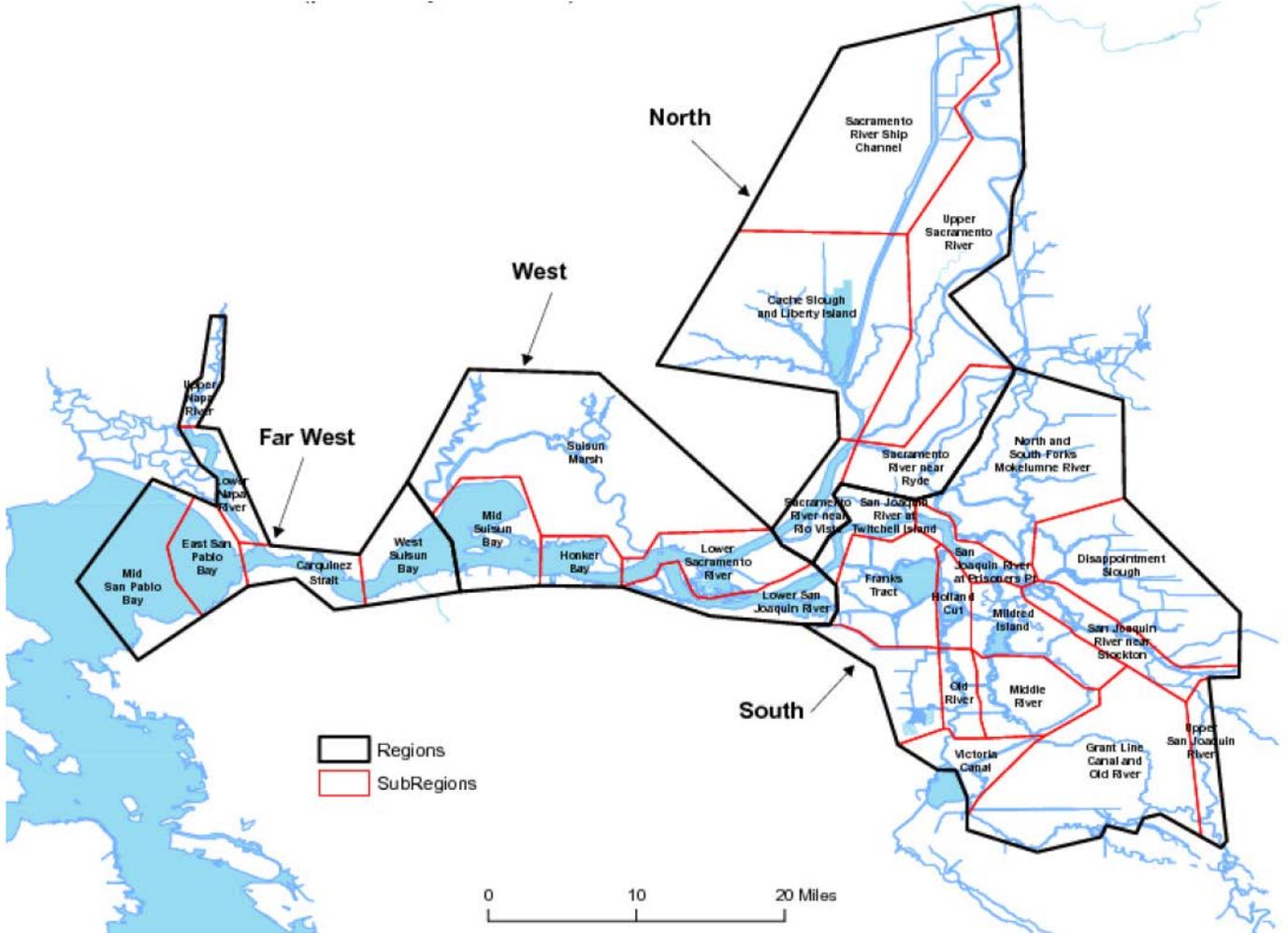
Chinook run assignments for unclipped fish are based on length-at-date criteria. DOSS acknowledges the limitations of the length-at-date criteria, particularly in distinguishing between young-of-year spring run Chinook and young-of-year fall-run Chinook. Additionally, once hatchery fall-run releases (75% of which are unmarked) occur upstream of a monitoring location (as occurred with the 3/22/17 release of ~1.7 million fall-run Chinook from Coleman National Fish Hatchery into Battle Creek), 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.

For the sampling period 3/24/17-3/30/17, a total of 2 fall-run-sized Chinook, 18 spring-run Chinook, 17 winter-run, 6 adipose clipped Chinook, and 2 adipose clipped steelhead were caught across all sampling sites. Salmonid catch in the EDSM sampling is summarized in the table below by subregion, and in the bubble plots by individual sampling location.

Subregion	Raw catch						Total Tow Minutes	Catch per 10-minute tow*						Region
	Fall-run Chinook	Spring-run Chinook	Winter-run Chinook	Late-fall-run Chinook	Tagged Chinook	Tagged Steelhead		Fall-run Chinook	Spring-run Chinook	Winter-run Chinook	Late-fall-run Chinook	Tagged Chinook	Tagged Steelhead	
Upper Sacramento River	0	1	2	0	0	0	80	0.00	0.13	0.25	0.00	0.00	0.00	North
Old River	0	0	1	0	0	0	80	0.00	0.00	0.13	0.00	0.00	0.00	South
San Joaquin River at Prisoner's Pt	1	0	0	0	0	0	100	0.10	0.00	0.00	0.00	0.00	0.00	
San Joaquin River near Twitchell Island	0	1	0	0	0	0	200	0.00	0.05	0.00	0.00	0.00	0.00	
Victoria Canal	0	0	1	0	0	0	80	0.00	0.00	0.13	0.00	0.00	0.00	
Suisun Marsh	0	1	0	0	0	0	25	0.00	0.40	0.00	0.00	0.00	0.00	West
Carquinez Strait	0	9	7	0	1	1	80	0.00	1.13	0.88	0.00	0.13	0.13	Far West
East San Pablo Bay	0	4	1	0	1	0	80	0.00	0.50	0.13	0.00	0.13	0.00	
Lower Napa River	0	0	0	0	1	0	80	0.00	0.00	0.00	0.00	0.13	0.00	
West Suisun Bay	1	2	5	0	3	1	80	0.13	0.25	0.63	0.00	0.38	0.13	
Total	2	18	17	0	6	2	885							

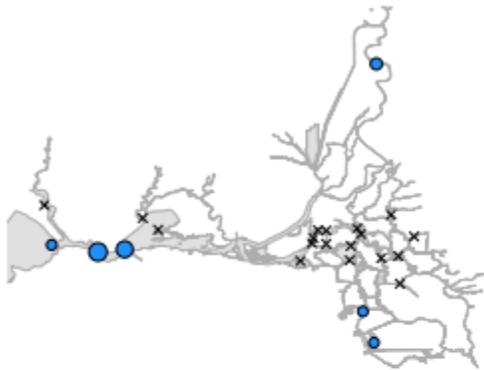
*Raw catch/(Total tow minutes/10)

Map of EDSM sampling regions and subregions:

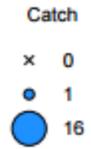
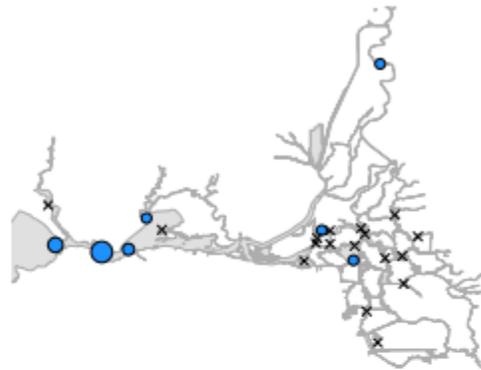


EDSM Sampling 3/24/17 – 3/30/17

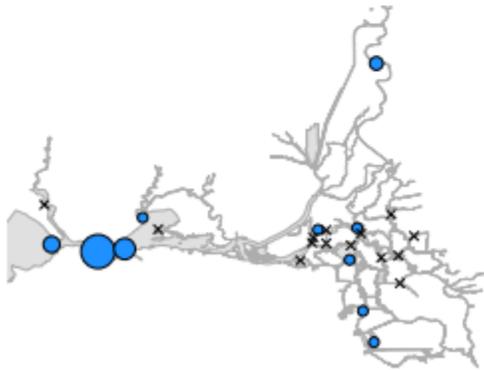
Unclipped Winter-run Chinook



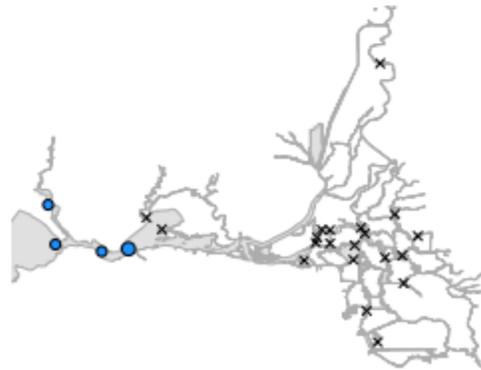
Unclipped Spring-run Chinook



All unclipped Chinook



All clipped Chinook

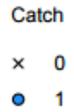


EDSM Sampling 3/24/17 – 3/30/17

All unclipped steelhead



All clipped steelhead



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 used to make Chinook run assignments in the monitoring data, 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 (as occurred with the 3/22/17 release of ~1.7 million fall-run Chinook from Coleman National Fish Hatchery into Battle Creek), 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.

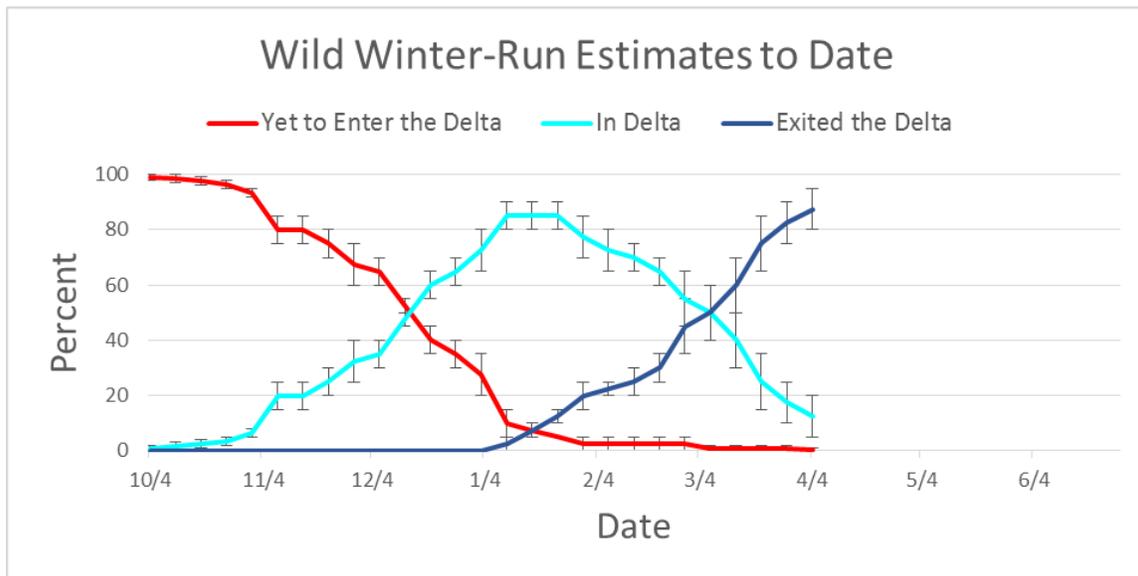
Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chippis Island)
<i>Wild young-of-year (YOY) winter-run Chinook salmon</i>	0%-1% (Last week: 0%-2%)	5%-20% (Last week: 10%-25%)	80%-95% (Last week: 75%-90%)
<i>Wild young-of-year (YOY) spring-run Chinook salmon</i>	5%-15% (Last week: same)	25%-50% (Last week: 30%-60%)	40%-70% (Last week: 35%-60%)
<i>Hatchery winter-run Chinook salmon (released 2/2/17)</i>	5%-10% (Last week: 10%-20%)	10%-30% (Last week: 20%-40%)	65%-85% (Last week: 50%-70%)

Rationale for changes in distribution

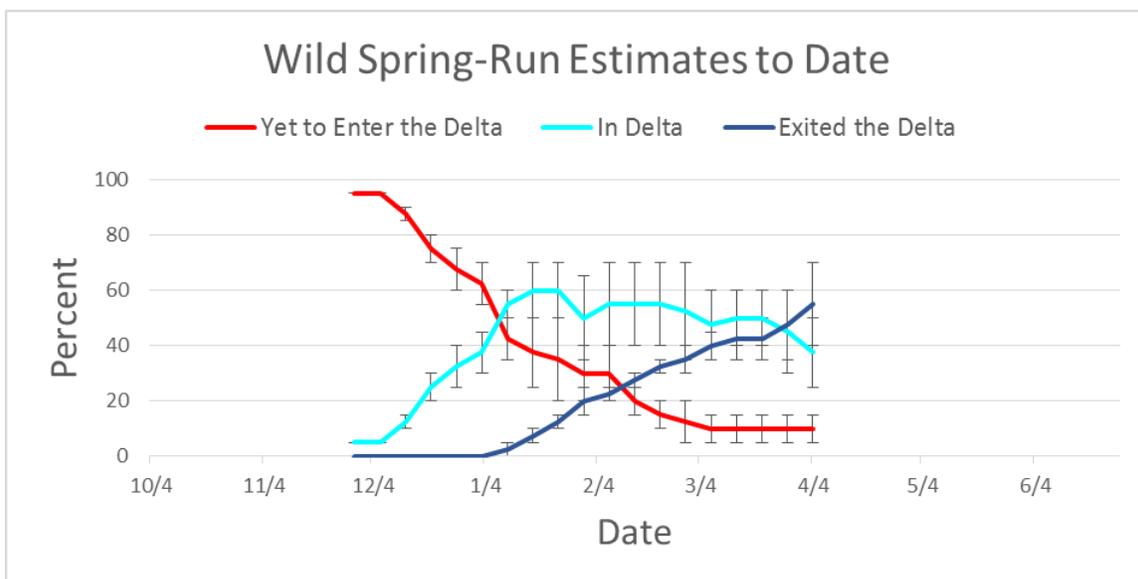
Wild winter-run Chinook: Over the past week 2 juvenile winter-run-sized Chinook salmon were observed at the Knights Landing rotary screw traps, 31 at the Sacramento trawl, 61 at Chippis Island, and 17 were detected in the EDSM sampling, mostly in the Far West region. Some Sacramento River weirs were not spilling over the past week, reducing the opportunities for winter-run Chinook to enter the flood bypasses and not pass by some sampling locations. Because more fish were observed at Chippis Trawl and due to seasonal timing, DOSS estimated that more winter-run Chinook moved past Chippis Island. At the current time of year, it's expected that most of the winter-run Chinook observed at Chippis Island will soon enter the ocean rather than rear westward in Honker, Grizzly, Suisun and San Pablo Bays.

Wild spring-run Chinook: Over the past week, 433 juvenile spring-run-sized Chinook were observed at Knights Landing, 132 at Tisdale, 247 at the Sacramento trawl, 10 in the beach seines, 5 at Mossdale, and 96 at Chippis Island. 18 juvenile spring-run-sized Chinook were also observed in the EDSM sampling, mostly in the Far West region. Some Sacramento River weirs were not spilling over the past week, reducing the opportunities for spring-run Chinook to enter the flood bypasses and not pass by some sampling locations. Because high numbers of spring-run-sized fish were observed at multiple monitoring sites this week and due to season timing, DOSS estimated that more spring-run Chinook moved past Chippis Island. At the current time of year, some of the spring-run Chinook that have exited past Chippis Island may be ready to enter the ocean; others may potentially be rearing westward in Honker, Grizzly, Suisun and San Pablo Bays.

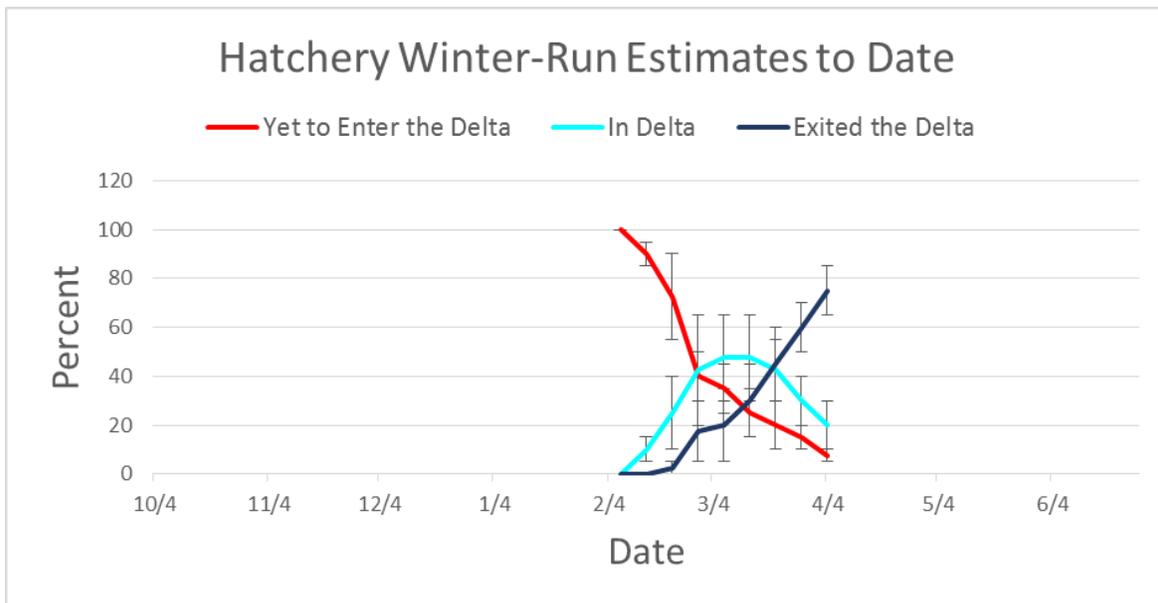
Hatchery winter-run Chinook: Over the past week, 4 winter-run hatchery Chinook were detected at receivers at Colusa and 4 at the I80/50 Bridge. At this time of year, the decrease in tag detections at Colusa compared to last week may indicate that fewer hatchery winter-run Chinook remain upstream to move into the Delta. Also, the acoustic tags are at the end of their battery life and may not be detected. Based on detections and seasonal timing, DOSS estimates that more hatchery winter-run have moved through the Delta. Two winter-run-sized ad-clipped Chinook were also reported at the Knights Landing rotary screw traps showing continued presence of (likely) hatchery winter-run upstream of the Delta. With high Sacramento River flows at the time of the winter-run hatchery release (early February), many hatchery winter-run may have reared upstream on inundated floodplains.



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.

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

- **Exposure Risk: HIGH**
 - Flow and turbidities, which are cues for salmonid movement, remain high (flow) or intermediate (turbidity).
 - Some fish are going into bypasses. Fish entering the Yolo Bypass will exit the bypass downstream of the Georgiana Slough junction, reducing entrainment risk into the interior Delta.
 - For the period 3/28/17 to 4/3/17, the Tisdale weir spilled⁸ for six days, the Fremont weir spilled for four days. The Colusa weir and the Moulton weir did not spill during this period.
 - Overall, despite bypass overflow, the group assessed the exposure risk as high.

- **Routing Risk: LOW**
 - Continued high 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.

- **Overall Entrainment Risk: MEDIUM**

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 ~10,500 cfs, which are projected to stay >8,000 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; preliminary data from 4/3/17 reported catch of unclipped and clipped spring-run-sized Chinook salmon.
 - Of the fish predicted to be “In the Delta”, DOSS expects that many are in the Yolo Bypass and not at risk of entrainment into the export facilities.
 - All recent catches of hatchery Chinook are 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.

- **OMR/Export Risk:**
 - OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: MEDIUM
 - OMR -5,000 cfs: HIGH
 - OMR -6,250 cfs⁹: incrementally HIGHER (given projected hydrology and high Vernalis flow)

⁸ A summary of river stage relative to crest height of the weirs on the Sacramento River is available at: http://www.cbr.washington.edu/sacramento/data/alert_weirs.html

⁹By request of management, DOSS also assessed risks at an OMR flow more negative than -5,000 cfs.

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
 - 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 high Sacramento River and 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 10.

DOSS Advice to NMFS and WOMT: None

Agenda Item 11.

Next Meeting: The next DOSS conference call will be on **4/11/17 at 9am.**