

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 1/31/2017 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, Duane Linander, Jason Julienne, Jerry Morinaka

DWR: Kevin Reece, Farida Islam, Norman Lee

NMFS: Barb Byrne, Kristin McCleery

Reclamation: Tom Patton, Mike Hendrick, Josh Israel, Travis Yonts

SWRCB: Chris Kwan, Chris Carr

USFWS: Craig Anderson, Leigh Bartoo

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. Smelt Working Group update
4. Current Operations
5. Hatchery Releases
6. Fish Monitoring: Salvage
7. Fish Monitoring: RSTs/trawls/seines
SacPAS (<http://www.cbr.washington.edu/sacramento/>) has some summaries of juvenile sampling)
8. 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 affecting operations during January:

Action IV.1.2¹ (DCC gate operations):

- From December 1 to January 31, the gates will remain closed, with limited exceptions.

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 more positive OMR levels have been exceeded.

Agenda Item 3.

Smelt Working Group update

The Smelt Working Group (SWG) met on Monday, 1/30/17 at 10am. Bartoo (USFWS) provided the following SWG meeting summary:

The Working Group reviewed current Delta conditions, survey data, and forecasted weather. Hydrology that meets the temporary release from OMR prescriptions as identified in the RPA Component 1, Action 2 (page 356) has been in effect since mid-January. Flows on the Sacramento River at Rio Vista are expected to drop below 90,000 cfs this week, however, with anticipated storms later this week, flows are expected to increase back above 90,000 cfs by the weekend. During the short time that Rio Vista flows will be less than 90,000 cfs, the SWG indicated that the anticipated OMR flows (Index -1,800 cfs today and anticipated to remain steady this week) are sufficiently protective of Delta Smelt.

The Working Group is following guidance for entrainment protections from Action 2 (adult Delta Smelt). The Working Group will continue to monitor Delta Smelt survey and salvage data and Delta conditions, and will meet again on Tuesday, February 7, 2017 at 10 am.

Agenda Item 4.

Current Operations

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	10,300	Jones Pumping Plant	4,200
Reservoir Releases (cfs)			
Feather - Oroville	15,000	American - Nimbus	6,400
		Sacramento - Keswick	26,000
		Stanislaus - Goodwin	200
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	1,020	San Luis (CVP)	667
Oroville	2,868	Shasta	3,589
New Melones	1,006	Folsom	410
Delta Operations			

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

DCC	Closed	Sacramento River at Freeport (cfs)	66,844
Outflow Index (cfs)	~104,000	San Joaquin River at Vernalis (cfs)	21,096
E:I	11.1% (3-day) 8.8% (14-day avg.)	X2	<56 km

OMR index as of 1/30/17:

- Daily: -2,053 cfs
- 5-day: 2,342
- 14-day: -3,810 cfs

Factors controlling Delta exports:

- 1/24 - 1/31: Both CVP and SWP facilities at maximum operational capacity

The weather forecast shows a system moving in Thursday and Friday, with possibly continued wet conditions next week.

Agenda Item 5.

Hatchery Releases

The production release of approximately 141,388 brood year 2016 winter-run Chinook salmon will be released into the Sacramento River (at Caldwell Park in Redding) from Livingston Stone National Fish Hatchery (CNFH) at dusk on February 2, 2017. All fish are marked with a clipped adipose fin and with CWT.

The NOAA Southwest Fisheries Science Center will be releasing a small number of acoustic tagged winter-run Chinook along with the hatchery release. Detections of these acoustic-tagged fish from a limited number of "real-time" acoustic receivers (near Colusa and Sacramento) will be reported to DOSS.

Agenda Item 6.

Fish Monitoring: Salvage³

Preliminary salvage for 1/30/17 included salvage of unclipped fall-run-sized Chinook salmon.

CDFW reported some short term salvage outages (days on which salvage outages occurred noted by yellow highlighting in table below) likely related to debris management.

³ 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: January 23-January 29, 2017

prepared by Bob Fujimura on January 30, 2017 15:55_corrected 1/31/17 9:

Preliminary Results -Subject to Revision

Criteria	23-Jan	24-Jan	25-Jan	26-Jan	27-Jan	28-Jan	29-Jan	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	0	0	0	0	↘	0
Wild steelhead	0	0	0.61	0	0	0	0	↘	0.09
Exports									
SWP daily export	20,297	20,288	20,297	20,297	20,297	20,297	20,297	↗	20,296
CVP daily export	8,052	8,035	8,020	7,995	7,972	7,955	7,964	↗	7,999
SWP reduced counts	58%	33%	0%	0%	0%	0%	0%	↘	13%
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 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	↗	12	23
Spring Run	0	0	↗	0	0
Late Fall Run	0	0	↗	12	39
Fall Run	2,188	5,082	↗	4,516	7,246
Unclassified	6	NC	↗	84	NC
Total	2,194	5,082		4,624	7,308
Hatchery					
Winter Run	4	17	↘	320	961
Spring Run	0	0	↘	0	0
Late Fall Run	21	75	↘	631	1,352
Fall Run	0	0	↘	116	192
Unclassified	0	0	↘	6	NC
Total	25	92		1,073	2,505

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	4	17	↗	20	57
Hatchery	0	0	↗	0	0
Total	4	17		20	57

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

Generated by Bob Fujimura on January 30, 2017

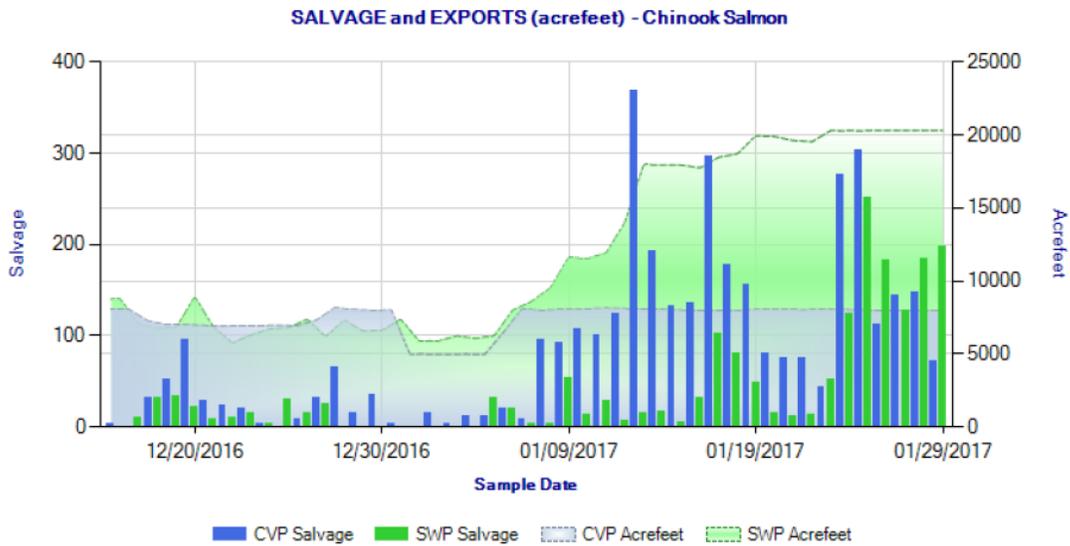


Figure 1. Daily salvage of Chinook Salmon (all races) and water exports from the state and federal fish salvage facilities during Dec 16, 2016 through Jan 29, 2017. Graph obtained from the DFG salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

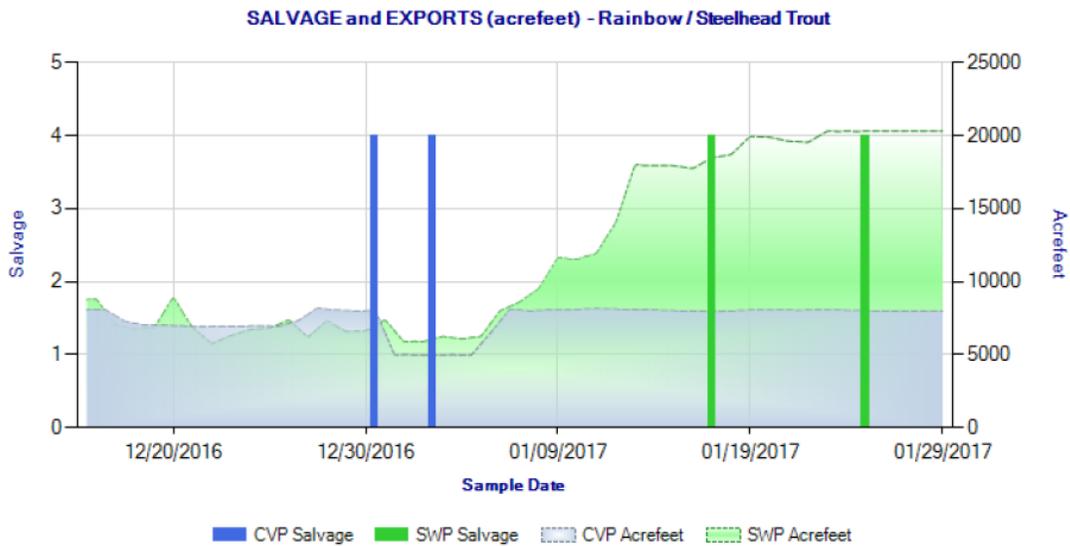


Figure 2. Daily salvage of Steelhead and water exports from the state and federal fish salvage facilities during Dec 16, 2016 through Jan 29, 2017. Graph obtained from the DFG salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 1/29/17

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 Concern Level	Second Concern Level	Date of First Loss ⁴	Date of Last Loss ⁴
12/9/2016	LF	Coleman NFH	Battle Creek	Production	1348.01	861,966	n/a	0.156	n/a	n/a	n/a	12/18/2016	1/23/2017
12/12/2016	LF	Coleman NFH	Battle Creek	Spring Surrogate	179.22	75,000	n/a	0.239	n/a	0.50%	1.00%	12/22/2016	1/19/2017
12/21/2016	LF	Coleman NFH	Battle Creek	Spring Surrogate	236.21	81,279	n/a	0.291	n/a	0.50%	1.00%	1/5/2017	1/16/2017
1/9/2017	LF	Coleman NFH	Battle Creek	Spring Surrogate	0.00	75,000	n/a	0	n/a	0.50%	1.00%	*	*

Facility	Unknown CWT Loss ⁵	Unread CWT Loss ⁶	Unknown Hatchery Loss ⁷	Acoustic Tag Loss ⁸	Number of Unassigned CWTs ⁹
SWP	102.58				
CVP	2.60				
TOTAL	105.18				

*This table is an update to the CWT table originally shared with DOSS, which did not include all CWTs recovered within the reporting period.

Agenda Item 7.

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. When reviewing spring-run catch in the monitoring data, DOSS considers that run misclassifications might arise from both large genetic fall-run falling into the spring-run sized class and small genetic spring-run falling into the fall-run size class.

Location	Chippis Is. Midwater Trawl ^{A, E}	Sacramento Trawl ^A	Beach Seines ^A	Knights Landing RST ^B	Tisdale RST ^C	GCID RST ^D	Mossdale Kodiak Trawl ^A
Sample Date	1/23, 1/25, 1/27	1/23, 1/25, 1/27	1/23-1/27	1/22-1/29	1/19-1/29		1/23, 1/25-1/27
FR Chinook		85	147	638	175		10
SR Chinook		2	7	5	3		
WR Chinook			2	2			
LFR Chinook							
Ad-Clipped Chinook	3		1	1 WR			
Steelhead (ad-clip)				5	4		
Steelhead (wild)							
Green Sturgeon							
Flows (avg. cfs)				27,129	44,500		
W. Temp. (avg. °F)				47.4	45.3		
Turbidity (avg. NTU)				128.0	157.0		

^AData reported in the 1/22 to 1/28 DJFMP sampling summary.

^BKnights Landing RST sampling period was from 1/22 at 9:45 am to 1/29 at 9:45 am.

^CTisdale RST sampling period was from 1/19 at 10:00 am to 1/29 at 10:00 am.

^DThe GCID RST cone was pulled on 1/3 at 9:00 pm due to predicted high flows and heavy debris.

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 (CHNW=winter-run Chinook, CHNS=spring-run Chinook, CHNF=fall-run Chinook, CHNL=late-fall-run Chinook) 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. When reviewing spring-run catch in the monitoring data, DOSS considers that run misclassifications might arise from both large genetic fall-run falling into the spring-run sized class and small genetic spring-run falling into the fall-run size class. “CHNT” represents ad-clipped Chinook and “RBT” represents catch of *Oncorhynchus mykiss*, which may exhibit either a resident life-history expression (rainbow trout) or an ocean-going life-history expression (steelhead).

Over the last week of sampling, a total of 11 fall-run-sized Chinook 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.

	Raw catch						Total Tow minutes	Catch per 10-minute tow*						
	CHNW	CHNS	CHNF	CHNL	CHNT	RBT		CHNW	CHNS	CHNF	CHNL	CHNT	RBT	
Cache Slough and Liberty Island	0	0	0	0	0	0	65	0	0	0.00	0	0	0	North
Sacramento River near Rio Vista	0	0	1	0	0	0	25	0	0	0.40	0	0	0	
San Joaquin River at Prisoner's Pt	0	0	4	0	0	0	415	0	0	0.10	0	0	0	South
San Joaquin River near Twitchell Island	0	0	2	0	0	0	120	0	0	0.17	0	0	0	
Honker Bay	0	0	1	0	0	0	50	0	0	0.20	0	0	0	West
Lower Sacramento River	0	0	0	0	0	0	25	0	0	0.00	0	0	0	
Mid Suisun Bay	0	0	3	0	0	0	95	0	0	0.32	0	0	0	
Suisun Marsh	0	0	0	0	0	0	10	0	0	0.00	0	0	0	
Total	0	0	11	0	0	0	805							

*(Total catch/Total tow minutes)*10

EDSM Sampling 1/23/17 – 1/26/17

Unclipped Winter-run Chinook



Unclipped Spring-run Chinook



Catch

x 0

• 1

• 3

All unclipped Chinook



All clipped Chinook



EDSM Sampling 1/23/17 – 1/26/17

All unclipped steelhead



All clipped steelhead



Catch

x 0

Agenda Item 8.

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.

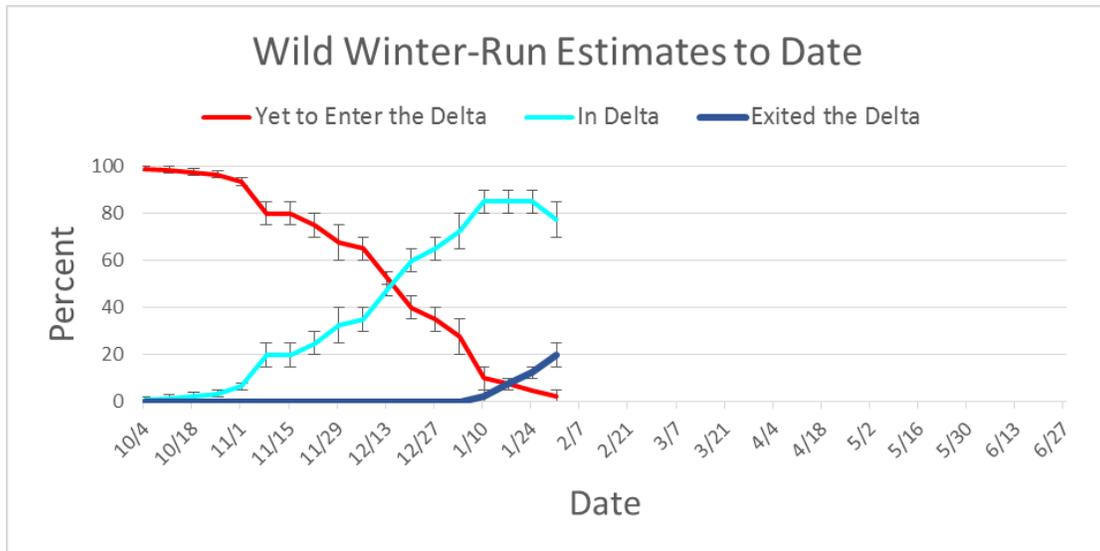
Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chippis Island)
<i>Wild young-of-year (YOY) winter-run Chinook salmon*</i>	0%-5% (Last week: 5%)	70%-85% (Last week: 80%-90%)	15%-25% (Last week: 10%-15%)
<i>Wild young-of-year (YOY) spring-run Chinook salmon*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

* 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. When reviewing spring-run catch in the monitoring data, DOSS considers that run misclassifications might arise from both large genetic fall-run falling into the spring-run sized class and small genetic spring-run falling into the fall-run size class.

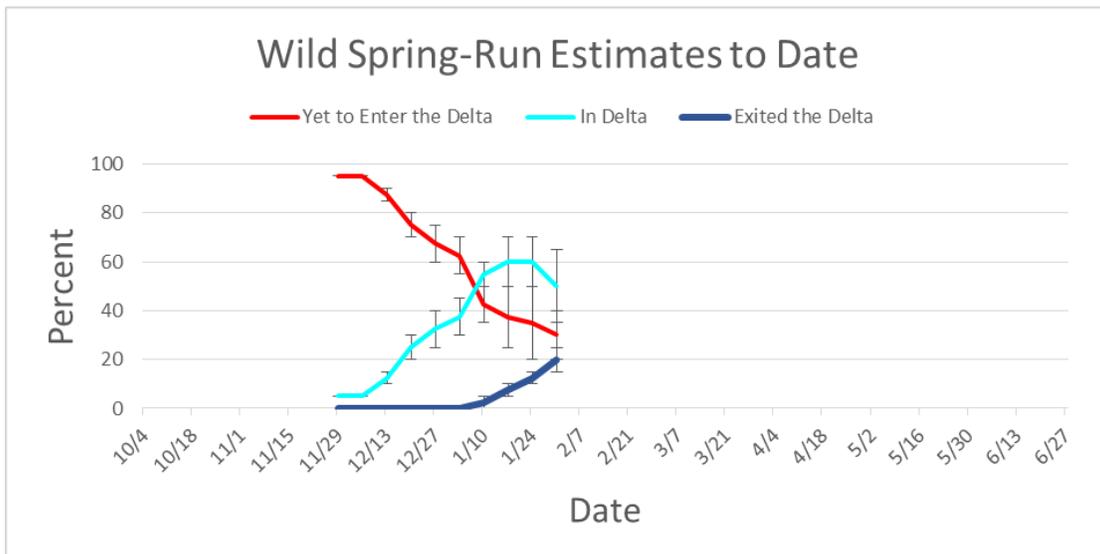
Rationale for changes in distribution

Wild winter-run Chinook: While relatively few juvenile winter-run-sized Chinook salmon were observed at monitoring locations upstream of the Delta, DOSS considered that the trap efficiency was likely lower at the recent high flows (because the traps are sampling a smaller fraction of the water passing each trapping location). Also, DOSS noted that with all weirs spilling, some winter-run Chinook entered the flood bypasses and did not pass by some trapping locations. Because of the high flows and due to seasonal timing, DOSS estimated that some winter-run Chinook moved into the Delta, and a similar fraction exited past Chippis Island, potentially rearing westward in Honker, Grizzly, Suisun and San Pablo Bays.

Wild spring-run Chinook: Over the past week, 3 juvenile spring-run-sized Chinook were observed at Tisdale, 5 at Knights Landing and 9 in the beach seines and Sac trawl. When estimating the wild spring-run Chinook distribution, DOSS considered that trap efficiency was likely lower at the recent high flows (because the traps are sampling a smaller fraction of the water passing each trapping location) and that with all weirs spilling, some spring-run Chinook entered the flood bypasses and did not pass by some trapping locations. Because of the high flows and due to seasonal timing, DOSS estimated that some spring-run Chinook moved into the Delta, and a similar fraction exited past Chippis Island, potentially rearing westward in Honker, Grizzly, Suisun and San Pablo Bays.



WY 2017 wild winter-run distribution estimates to date.



WY 2017 wild spring-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 from recent rains, which are cues for salmonid movement, have been high since the weekend and are expected to remain high through the coming weekend.
 - 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.
 - 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.
 - However, we are seeing Sacramento-basin-origin fish in salvage
- **Overall Entrainment Risk: MEDIUM**

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

- **Exposure Risk: MEDIUM-HIGH**
 - Have seen high salvage of unclipped Chinook, some portion of which are likely from the Sacramento basin.
 - Beginning in mid-January, have seen salmonid catch (fall-run-sized Chinook, no steelhead to date) at Mossdale.
- **OMR/Export Risk:**
 - OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: MEDIUM
 - OMR -5,000 cfs: HIGH

- OMR -6,250 cfs⁵: 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
 - 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, and with the expectation that most ESA-listed salmonids will be entering the Delta from the Sacramento basin, 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-HIGH exposure risk and less so (given projected hydrology) by the OMR/Export Risk.

Considering projected hydrologic conditions, the difference between OMR levels of -5,000 and -6,250 represents an incrementally elevated overall entrainment risk to Sacramento Basin salmonid populations. This assessment is likely to change should export levels continue at the current levels and Vernalis flows decrease, at which point risk to Sacramento Basin salmonids will increase.

Agenda Item 9.

DOSS Advice to NMFS and WOMT: None

Agenda Item 10.

Next Meeting: The next DOSS conference call will be on **2/7/17 at 9am.**

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