

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 3/6/2018 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

DWR: Farida Islam, Kevin Reece, Dan Yamanaka, Loi Tran

NMFS: Jeff Stuart, Kristin McCleery

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

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. Current Operations
4. Smelt working group update
5. Fish Monitoring: RSTs/trawls/seines
6. Fish Monitoring: Salvage
7. Hatchery Releases
8. DOSS Estimates of Fish Distribution
9. DOSS Estimates of Fish Entrainment Risk
10. DOSS advice
11. Next DOSS meeting

Agenda Item 2.

RPA Implementation Review

Delta RPA Actions affecting operations during February/March:

Action IV.1.2¹ (DCC gate operations):

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

Action IV.2.3² (OMR Management):

- Preliminary fish loss density triggers for older juvenile Chinook salmon were met on 3/1/18 (3.75 fish/TAF) and 3/2/18 (2.52 fish/TAF). Old and Middle River (OMR) values

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

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

were already more positive than the action response of no more negative than -3,500 cfs, thus no changes to exports were required. Rapid DNA analysis results indicated that none of the fish identified as winter-run by length at date (LAD) were indeed winter-run. The highest genetic run assignment probability identified them as Central Valley fall-run Chinook salmon.

- 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.
- Since the action went into effect on 1/1/18, no salvage-based triggers that would require OMR to be more positive than -5,000 cfs have been exceeded based on rapid DNA testing results.

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:
 - Knights Landing Catch Index (KLCI) or Sacramento Catch Index (SCI) >10 was not triggered since it began on 11/1 and ended on 2/28.
 - KLCI or SCI >15 was not triggered since it began on 3/1.
- Since the action went into effect on 11/1/17, no salvage-based triggers that would require export reduction have been exceeded.

Agenda Item 3.

Current Operations (3/6/18)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	3,800*	Jones Pumping Plant	1,700 (2 units)**
Reservoir Releases (cfs)			
Feather - Oroville	1,750	American - Nimbus	1,750
		Sacramento - Keswick	3,250
		Stanislaus - Goodwin	200
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	737	San Luis (CVP)	832
Oroville	1,477	Shasta	3,443
New Melones	1,914	Folsom	531
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	15,815

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

Outflow Index (cfs)	~20,800	San Joaquin River at Vernalis (cfs)	2,289
E:I	34.3 (14-day avg.)	X2	72 km

* SWP exports are expected to decrease to 3,000 cfs tomorrow (3/7).

**CVP exports are scheduled to increase tomorrow (3/7) to 2,700 cfs (3 units).

Approximate OMRs as of 3/3/18:

	USGS gauges (cfs)	Index (cfs)
Daily	-3,010	-3,720
5-day	-2,871	-3,240
14-day	-1,541	-1,540

Approximate OMRs as of 3/5/18:

	Index (cfs)
Daily	-4,388
5-day	-3,800
14-day	-2,020

Factors controlling Delta exports:

- 2/27-3/6: E/I ratio

Weather Forecast

The weather forecast for the Sacramento region is mild weather through mid-week, with a chance of precipitation for the second half of the week.

Agenda Item 4.

Smelt Working Group Update

The Smelt Working Group met on Monday, 3/5/18 at 10 am. Anderson (USFWS) provided a 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 cool, with precipitation forecasted starting this Sunday. The 3-station average water temperature (Antioch, Rio Vista Bridge, and Mossdale) has remained below 12°C since 2/14, which is the temperature indicative of spawning identified in the Biological Opinion and a trigger for the start of Action 3. Based on Delta conditions, water export levels, and the lack of recent detections of Delta smelt from surveys within the entrainment risk area, the Group concluded that the risk for Delta smelt and longfin smelt entrainment is low. In addition, no larval Delta smelt and no spawning adult Delta smelt have been detected, which indicates that the spawning season may have not yet begun.

The Smelt Working Group does not believe that a recommendation under Action 2 (adult pre-spawning Delta smelt) or Action 3 (larval Delta smelt) is necessary to protect Delta smelt at this time. The Group will continue to monitor Delta smelt survey and salvage

data, Delta conditions, and this Sunday's forecasted precipitation. The Group will meet again next Monday, 3/12/18 at 10 am.

Agenda Item 5.

Fish Monitoring: The following table presents fish monitoring data summarized over the past week. Empty cells indicate zero catches at those locations with sample dates shown.

Location	GCID RST	Tisdale RST ^A	Knights Landing RST ^B	Butte Creek Fyke trap ^C	Butte Creek RST ^D	Beach Seines ^E	Sacramento Trawl ^E	Chippis Is. Midwater Trawl ^E	Mossdale Kodiak Trawl ^E
Sample Date	2/28-3/4*	2/23-3/5	2/25-3/5	2/20-2/28	2/20-2/28	2/27-2/28, 3/1-3/2	2/25, 2/27-3/1, 3/3	2/25, 2/27-3/1, 3/3	2/26, 2/28, 3/2
FR Chinook	6 juveniles	2				147	9		3
SR Chinook	5 juveniles	1		1,251	2,289	32	2		
WR Chinook	1 smolt					2		4	
LFR Chinook									
Chinook (ad-clip)	959 WR smolts								
Steelhead (wild)							1	2	
Steelhead (ad-clip)						3	36	32	
Green Sturgeon									
Flows (avg. cfs)	737	4,573	4,906	220	220				
W. Temp. (avg. °F)	48.2	49.3	47.4	37.6	37.6				
Turbidity (avg. NTU)	N/A	15.9	13.2	7.9	7.9				

* GCID trap pulled on 3/4 due to high volume of hatchery released winter-run Chinook salmon.

^A Tisdale RST sampling period was from 2/23 at 9:30 am to 3/5 at 9:45 am.

^B Knights Landing RST sampling period was from 2/25 at 10:30 am to 3/5 at 11:15 am.

^C Butte Creek Fyke trap sampling period was from 2/20 at 9:30 am to 2/28 at 9:30 am.

^D Butte Creek RST sampling period was from 2/20 at 8:30 am to 2/28 at 8:30 am.

^E Data reported in the 2/25 to 3/3 DJFMP sampling summary. Data included 1 RBT (rainbow trout) and 10 RBTC (rainbow trout clipped) in EDSM Trawls.

Agenda Item 6.

Fish Monitoring: Salvage⁴

Due to technical difficulties, Fujimura (CDFW) provided an updated salvage summary after the DOSS call.

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.

Preliminary results for the 2/26-3/4 period show an increase of unclipped juvenile Chinook salmon. The total estimated salvage of unclipped Chinook salmon from both facilities is 30 fish in the winter-run and fall-run size LAD ranges. Also, the total estimated salvage of clipped Chinook salmon from both facilities this week is 24 fish, mostly in winter-run size range by LAD. This is an increase from the previous reporting period covered on the last DOSS call. On 3/1 and 3/2/18, the loss density of older wild juvenile Chinook salmon exceeded the first stage trigger of 2.5 fish /thousand acre feet, but as Stuart (NMFS) mentioned, those fish were determined to be genetically fall-run based on the results of the rapid DNA testing.

Eight wild steelhead were salvaged on 3/3/18 and the daily loss density was 1.91 fish/TAF that was below the first stage trigger. One hundred and thirty-five hatchery steelhead were also salvaged last week.

DOSS Weekly Salvage Update

Reporting Period: February 26-March 4, 2018

Prepared by Bob Fujimura on March 6, 2018 21:13

Preliminary Results -Subject to Revision

Criteria	26-Feb	27-Feb	28-Feb	1-Mar	2-Mar	3-Mar	4-Mar	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	3.75	2.52	0	0	↗	0.90
Wild steelhead	0	0	0	0	0	1.91	0	↗	0.27
Exports									
SWP daily export	1,551	5,511	8,626	7,938	7,197	6,972	7,057	↗	6,407
CVP daily export	1,736	1,738	1,731	1,888	3,511	3,545	3,673	↗	2,546
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

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	14	64	↗	22	71
Spring Run	0	0	→	0	0
Late Fall Run	0	0	→	1	4
Fall Run	16	12	↗	20	15
Unclassified	0	0	→	0	0
Total	30	76		43	91
Hatchery					
Winter Run	12	55	↗	20	75
Spring Run	4	7	↗	12	13
Late Fall Run	8	35	↗	57	204
Fall Run	0	0	→	0	0
Unclassified	0	0	→	1	NC
Total	24	97		90	292

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

Yellow highlighted dates indicate brief fish salvage interruption occurred

Tan highlighted value indicate exceedence of loss density trigger of 2.5 fish/TAF

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	8	20	↗	24	75
Hatchery	135	570	↗	165	590
Total	143	590		189	665

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

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 3/1/18

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	First Stage Triggers	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	113.55	519,791	n/a	0.022	n/a	n/a	1/31/2018	3/1/2018
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	3.88	84,922	n/a	0.005	n/a	0.5%	2/20/2018	2/20/2018
12/21/2017	S	SJRRP	San Joaquin River	Experimental	5.64	1450	n/a	0.389	n/a	n/a	1/11/2018	1/11/2018
1/19/2018	S	SJRRP	San Joaquin River	Experimental	0	210	n/a	0.000	n/a	n/a	*	*

UNCONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES, 2017/2018

Facility	Unknown CWT Loss ⁵	Unread CWT Loss ⁶	Unknown Hatchery Loss ⁷	Acoustic Tag Loss ⁸	Number of Unassigned CWTs ⁹
SWP	26.29				
CVP					
TOTAL	63.15				

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

¹Number released with the adipose-fin clipped and a coded-wire tag (CWT).

²% Loss of Number Released = (Confirmed Loss/Number Released)*100.

³% Loss of Total Entering Delta= (Confirmed Loss/Total Entering Delta)*100.

⁴Date of first and last loss accounts for all CWT loss even those from special studies where salvage and loss=0.

⁵Adipose-fin clipped Chinook was observed during fish count, but tag code could not be determined (e.g., damaged tag, lost tag, no tag, or Chinook released).

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

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

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

⁹CWT cannot currently be assigned to a salvage record with certainty since the CWT was lost and then found. CWT may be assigned to a salvage record if new information is available.

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

** Information not yet available.

DWR-DES Revised 3/2/2018

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

Agenda Item 7.

Hatchery Releases

The USFWS distributed a notification for the release of 217,840 hatchery produced winter-run Chinook salmon from the Livingston Stone National Fish Hatchery to the Sacramento River on 3/1-3/2, planned to coincided with a rain event in the Central Valley region. A correction was provided: Since the weather event that prompted the production release did not materialize to the extent predicted, the second half of the release (scheduled 3/2) was postponed until weather conditions are more favorable. On 3/1, approximately 114,399 winter-run Chinook salmon were released into the Sacramento River. This release represents approximately half of the production of Livingston Stone National Fish Hatchery brood year 2017. All 217,840 fish were 100% ad-clipped and coded wire tagged (CWT).

Agenda Item 8.

DOSS Estimates of Fish Distribution

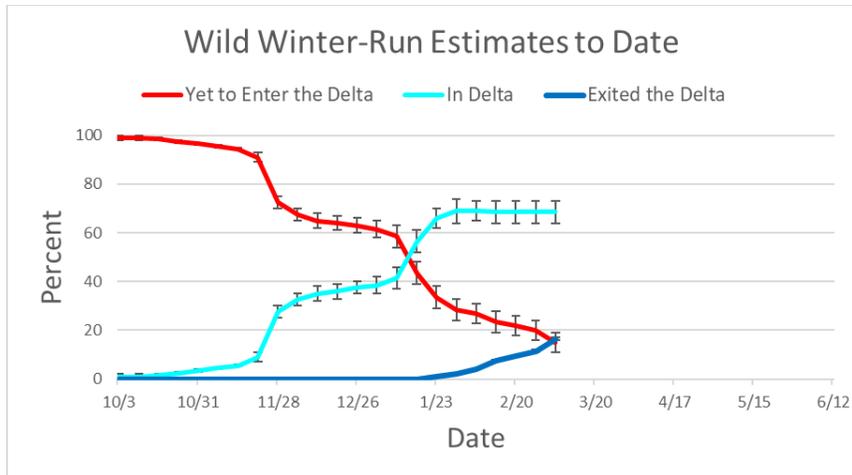
DOSS estimates of the current distribution of listed Chinook and steelhead, as a percentage of the population, are based on recent monitoring data and historical migration timing patterns.

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>	11-19% (Last week: 16-24%)	64-73% (Last week: 64-73%)	16-17% (Last week: 11-12%)
<i>Wild young-of-year spring-run Chinook salmon</i>	28-46% (Last week: 36-54%)	54-72% (Last week: 46-64%)	0% (Last week: 0%)

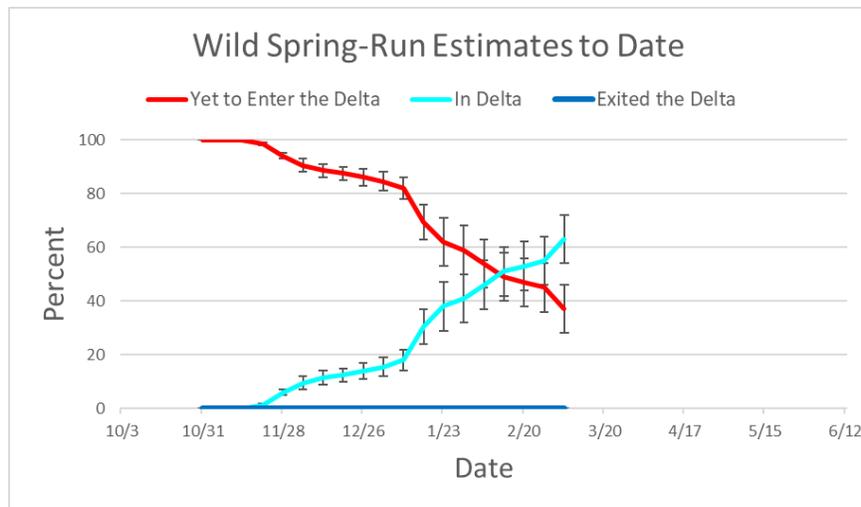
Rationale for changes in distribution

Wild winter-run Chinook: One winter-run sized fish was observed at GCID, 2 at the beach seines, and 4 at Chipps Island this past week. Since fish were observed at monitoring locations, including at Chipps Island, DOSS estimated that an additional 5% of the winter-run population has moved through the Delta.

Wild spring-run Chinook: 5 spring-run sized fish were observed at GCID, 1 at Tisdale, over 3,500 at Butte Creek, 32 in the beach seines, and 2 at Sacramento Trawl this past week. Since more fish were observed at locations upstream and within the Delta and none were observed exiting at Chipps Island, DOSS estimated that an additional 8% 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.



WY 2018 wild winter-run distribution estimates to date.



WY 2018 wild spring-run distribution estimates to date.

Agenda Item 9.

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: MEDIUM-HIGH** (higher than last week's risk estimate)
 - Increased flows and turbidities from recent storms are expected to stimulate 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.
 - Approximately 64-73% of winter-run Chinook salmon population is downstream of Knights Landing at this time, a few winter-run have been seen in the lower Sacramento River section between Sacramento and 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.
 - Approximately 54-72% of spring run population is in Delta
 - Surrogate spring-run Chinook salmon hatchery releases of late-fall run Chinook salmon are in the system. The last release occurred on 1/25/18. CWTs from captured clipped Chinook salmon are being read from fish collected during monitoring.
 - Wild Chinook salmon and steelhead as well as clipped Chinook salmon and steelhead have been observed in the Chipps Island trawls.
 - Wild and clipped Chinook salmon have been observed in beach seines from the North Delta and Liberty Island regions.
 - Wild and clipped Chinook salmon as well as clipped steelhead have been observed in the EDSM efforts.
 - Wild and clipped salmonids 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:** MEDIUM-HIGH (higher than last week's risk estimate)
 - Clipped steelhead and wild steelhead have been observed in salvage.
 - Clipped 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 (Chippis 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
 - OMR -3,500 cfs: LOW
 - OMR -5,000 cfs: MEDIUM
 - OMR -6,250 cfs⁵: MEDIUM -HIGH
 - OMR -7,500 cfs⁵: MEDIUM-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 (higher than last week's risk estimate)
 - OMR -3,500 cfs: MEDIUM (higher than last week's risk estimate)
 - OMR -5,000 cfs: MEDIUM-HIGH (higher than last week's risk estimate)
 - OMR -6,250 cfs⁵: MEDIUM-HIGH (higher than last week's risk estimate)
 - OMR -7,500 cfs⁵: MEDIUM-HIGH (higher than last week's risk estimate)
 - OMR -9,000 cfs⁵: HIGH (higher than last week's risk estimate)

These assessments are based on current hydrology and fish distributions.

Agenda Item 10.

DOSS Advice to WOMT and NMFS: None.

Agenda Item 11.

Next Meeting: The next DOSS conference call will be on **3/13/2018 at 9 am.**

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