Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 2/6/2018 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, Duane Linander, Ken Kundargi
DWR: Farida Islam, Kevin Reece, Bryant Giorgi, Reza Shahcheraghi, Dan Yamanaka, Marianne Kirkland, Mike Ford
NMFS: Jeff Stuart, Kristin McCleery
Reclamation: Towns Burgess, Elissa Buttermore, Don Portz, Tom Patton, Josh Israel
SWRCB: Craig Williams
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/djfmp)
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:

Action IV.1.2[1] (DCC gate operations):
- Gates will remain closed from February 1 to May 20.

[1] For details, see pages 62-66 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

Action IV.2.3[2] (OMR Management):

- Implementation of this action in WY 2018 is from 1/1/18 through 6/15/18, and requires that Old and Middle River (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.

Action IV.3[3] (Reduce likelihood of entrainment or salvage at the export facilities, including alert that indicates that export operations may need to be altered):

- The third alert [November 1-February 28 Knights Landing Catch Index (KLCI) or Sacramento Catch Index (SCI) >10] was not triggered this past week.
- 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 (2/6/18)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	3,400	Jones Pumping Plant	2,700
Reservoir Releases (cfs)			
Feather - Oroville	1,750	American - Nimbus	3,000
		Sacramento - Keswick	4,000*
		Stanislaus - Goodwin	600
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	760	San Luis (CVP)	972
Oroville	1,434	Shasta	3,363
New Melones	1,982	Folsom	578
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	15,500
Outflow Index (cfs)	~11,400	San Joaquin River at Vernalis (cfs)	1,700
E:I	29% (14-day avg.)	X2	73 km

* Keswick releases scheduled to drop to 3,500 cfs by 2/16/18.

[2] For details, see pages 74-79 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

[3] For details, see pages 79-80 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

Approximate OMR as of 2/3/18:

	USGS gauges (cfs)	Index (cfs)
Daily	-4,700	-5,000
5-day	-4,900	-5,000
14-day	-4,900	-5,000

Approximate OMR as of 2/5/18:

	Index (cfs)
Daily	-5,000
5-day	-5,000
14-day	-5,000

Factors controlling Delta exports:

- 1/30-2/6: -5,000 cfs OMR limit per NMFS BiOp RPA Action IV.2.3. Location of X2 and Delta outflow is expected to become the controlling factors later in the week.

Weather Forecast

The outlook for the Sacramento region for the next week is a continuing dry weather pattern with above normal air temperatures this time of year.

Agenda Item 4.

Smelt Working Group Update

The Smelt Working Group met on Monday, 2/5/17 at 10 am. Chen (USFWS) provided the following Smelt Working Group meeting summary:

> The Smelt Working Group reviewed current Delta conditions, survey data, current water project operations, and forecasted weather. Current weather conditions are sunny and relatively warm, with no precipitation forecasted over the next few weeks. The 3-station average water temperature (Antioch, Rio Vista Bridge, and Mossdale) rose to over 12ºC on 2/4, which indicates the start of Action 3. Based on Delta conditions, the forecasted weather, 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, all of the adult Delta smelt detected from recent surveys have been pre-spawning fish, which indicates that the spawning season likely has not yet begun.
>
> The Group does not believe that a recommendation under Action 1, 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 week's forecasted weather. The Group will meet again next Monday, 2/12 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]	Chipps Is. Midwater Trawl[E]	Mossdale Kodiak Trawl[E]
Sample Date	1/31-2/5	1/29-2/5	1/29-2/4	1/22-2/5	1/22-2/5	1/29-2/2	1/28-2/3	1/28-2/3	1/29, 1/31, 2/2
Chinook									
FR Chinook	42 juveniles	13	14			155	24		
SR Chinook	2 juveniles			7,128	10,174	10			
WR Chinook	6 juveniles 8 smolts	6	1			9		2	
LFR Chinook								1	
Chinook (ad-clip)	34 LFR smolts 2 WR smolts	2* WR 4 LFR	1** WR 1 LFR			1****		18	
Steelhead (wild)	2	1							
Steelhead (ad-clip)	12		1***				1	9	
Green Sturgeon									
Flows (avg. cfs)	933	7,371	7,970	335	359				
W. Temp. (avg. °F)	53.2	52.7	52.3	43.4	43.3				
Turbidity (avg. NTU)	N/A	15.7	16.7	8.4	8.4				

[A] Tisdale RST sampling period was from 1/29 at 9:00 am to 2/5 at 9:45 am.
*2 ad-clipped winter-run are Greene/Fisher table winter-run size range but are assumed to be late-fall run since there have been no winter-run hatchery releases so far this water year.

[B] Knights Landing RST sampling period was from 1/29 at 11:00 am to 2/4 at 12:15 pm.
**1 ad-clipped winter-run determined from Greene/Fisher table winter-run size range but is assumed to be a late-fall run since there have been no winter-run hatchery releases so far this water year.
***One additional steelhead was inadvertently returned to the river before assessing for the presence of an adipose fin and taking length and weight measurements.

[C] Butte Creek Fyke trap sampling period was from 1/22 at 8:00 am to 2/5 at 9:00 am.

[D] Butte Creek RST sampling period was from 1/22 at 7:00 am to 2/2 at 9:00 am. RST set to half cone from 1/22 to 1/30, clicker malfunction on 1/25, and the RST cone was stopped when checked on 1/29 and 1/30.

[E] Data reported in the 1/28 to 2/3 DJFMP sampling summary.
****1 ad-clipped CHN collected at the beach seines was marked with Bismark brown.

Agenda Item 6.

Fish Monitoring: Salvage[4]

Fujimura (CDFW) provided a salvage summary. One wild steelhead was observed in salvage on 2/1/18 (expanded to 4 fish). No listed Chinook salmon or green sturgeon were observed during the reporting period of 1/29-2/4.

Stuart (NMFS) reported data that were received this morning (2/6):

At the CVP, 1 unclipped winter-run Chinook salmon by length-at-date criteria was observed on 2/5/18 in salvage (expanded to 4 fish), a total of ~2.72 winter-run Chinook salmon lost. No other Chinook or steelhead were observed. *Note that this winter-run Chinook salmon was observed in salvage after the following tables and graphs were generated.

At the SWP over the period of 1/31 to 2/5/18, 10 clipped Chinook salmon were observed in salvage (expanded to 18 fish), a total of ~79 clipped Chinook salmon lost. CWTs place these fish in the following hatchery releases of late fall-run Chinook salmon: 2 fish from the first surrogate release, 2 from the first production release, and 5 fish from the second production release. One fish did not have a CWT.

[4] Salvage data reported in this section represent the total estimated and expanded salvage based on the number of fish observed at the fish collection facility. For example, if one steelhead is observed in the typical ½-hour sampling period within a 2-hour operation period, the single steelhead is expanded to a salvage of four.

DOSS Weekly Salvage Update

Reporting Period: January 29-February 4, 2018

Prepared by Bob Fujimura on February 5, 2018 15:28

Preliminary Results -Subject to Revision

Criteria	29-Jan	30-Jan	31-Jan	1-Feb	2-Feb	3-Feb	4-Feb	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	0	0	0	0	→	0
Wild steelhead	0	0	0	**1.52**	0	0	0	↗	**0.22**
Exports									
SWP daily export	5,037	5,726	7,112	6,001	6,902	6,324	7,200	↗	6,329
CVP daily export	7,018	7,034	5,396	5,366	5,404	5,395	5,397	↘	5,859
SWP reduced counts	0%	0%	0%	0%	0%	0%	0%	→	0%
CVP reduced counts	0%	0%	0%	0%	0%	0%	0%	↘	0%

Loss Density = fish lost/TAF; water export = AF; Trend = compared to previous week; wild = adipose fin present

Loss = estimated number of fish lost at the CVP and SWP Delta export facilities based on estimated salvage (see below)

Reduced counts = percentage of time that routine salvage sample time were less than 30 min per 2 hours of salvage and export operations

Yellow highlighted dates indicate brief fish salvage facility interruption occurred

Tan highlighted date indicate 90 min TFCF outage for scheduled maintenance inspection

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;

	Weekly Total			Season Total	
Category	**Salvage**	**Loss**	**Trend**	**Salvage**	**Loss**
Wild					
Winter Run	0	0	→	0	0
Spring Run	0	0	→	0	0
Late Fall Run	0	0	→	0	0
Fall Run	0	0	→	0	0
Unclassified	0	0	→	0	0
Total	**0**	**0**		**0**	**0**
Hatchery					
Winter Run	0	0	→	0	0
Spring Run	0	0	→	8	6
Late Fall Run	16	70	↗	21	74
Fall Run	0	0	→	0	0
Unclassified	0	0	→	1	NC
Total	**16**	**70**		**30**	**79**

Trend = weekly loss per race; Salvage = estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time

NC = cannot be calculated; hatchery salmon salvage and loss estimates have been corrected using CWT readings when available

Steelhead Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities

	Weekly Total			Season Total	
Category	**Salvage**	**Loss**	**Trend**	**Salvage**	**Loss**
Wild	4	17	↗	4	17
Hatchery	0	0	↘	13	9
Total	**4**	**17**		**17**	**26**

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

Generated by Bob Fujimura on February 2, 2018

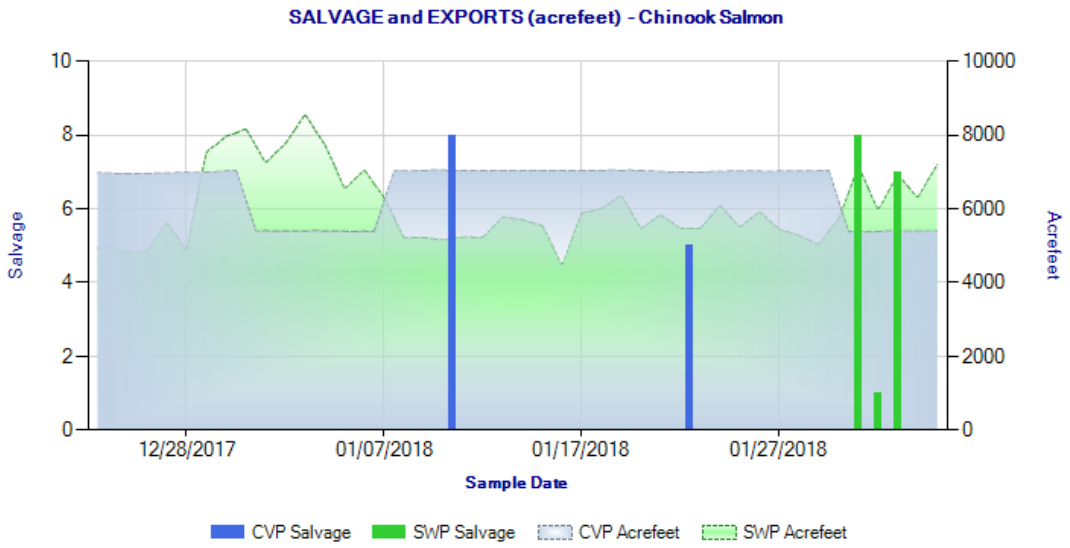


Figure 1. Daily salvage of Chinook Salmon (all races) and water exports from the state and federal fish salvage facilities during December 24 through February 4, 2018. Graph obtained from the DFG salvage monitoring web page: http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx.

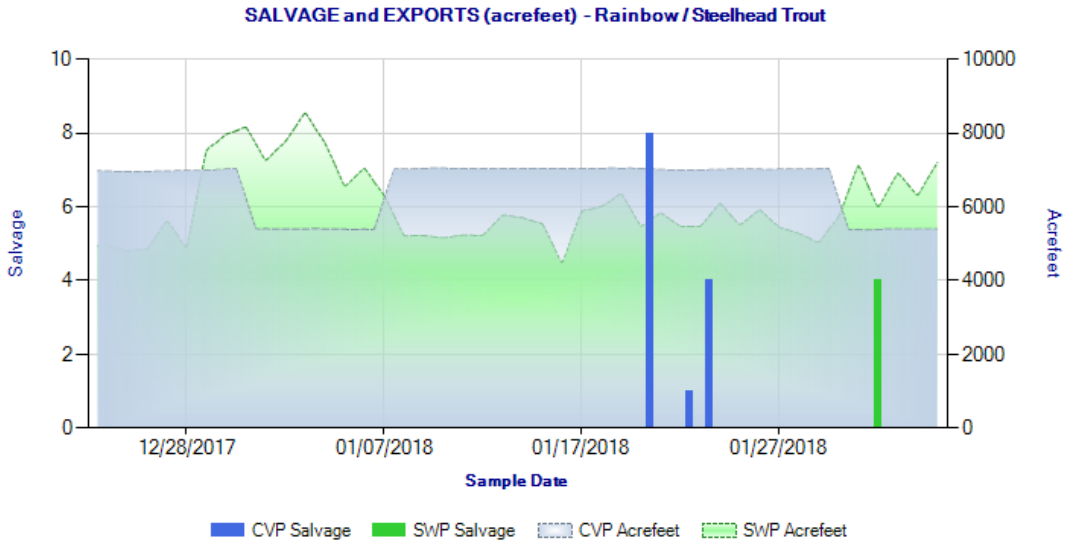


Figure 2. Daily salvage of Rainbow/Steelhead and water exports from the state and federal fish salvage facilities during December 24 through February 4, 2018. Graph obtained from the DFG salvage monitoring web page: http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx.

Agenda Item 7.

Hatchery Releases

Two releases of winter-run hatchery fish are scheduled to occur: a release on the Sacramento River at Caldwell Park, and a release on Battle Creek, ~200,000 fish per release, with approximately 90,000 fish estimated to survive to the Delta. The Sacramento release site fish are ready to be released (as of 2/6/18), but hatchery staff has informed NMFS that they are waiting for a precipitation event for the release of fish. This may not happen for several weeks given the current weather forecasts.

Agenda Item 8.

DOSS Estimates of Fish Distribution

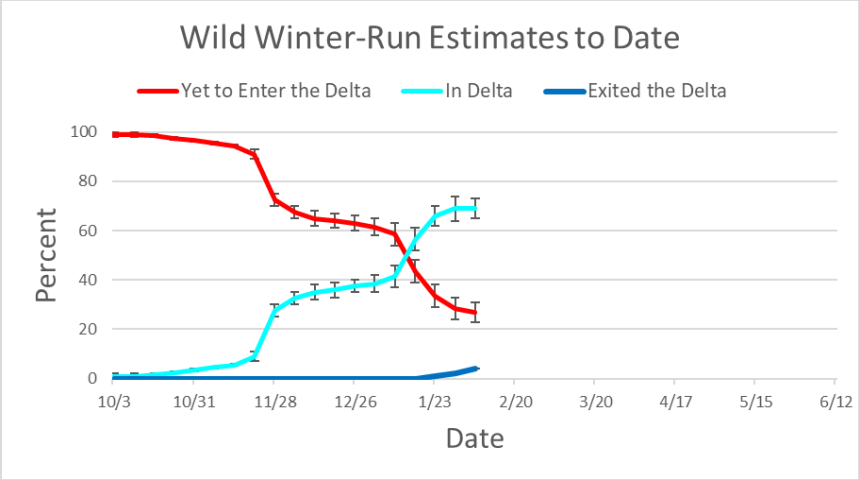
DOSS estimates of the current distribution of listed Chinook and steelhead, as a percentage of the population, are based on recent monitoring data and historical migration timing patterns.

Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chipps Island)
Wild young-of-year winter-run Chinook salmon	23-31% (Last week: 24-33%)	65-73% (Last week: 64-74%)	4% (Last week: 2%)
Wild young-of-year spring-run Chinook salmon	45-63% (Last week: 50-68%)	37-55% (Last week: 32--50%)	0% (Last week: 0%)

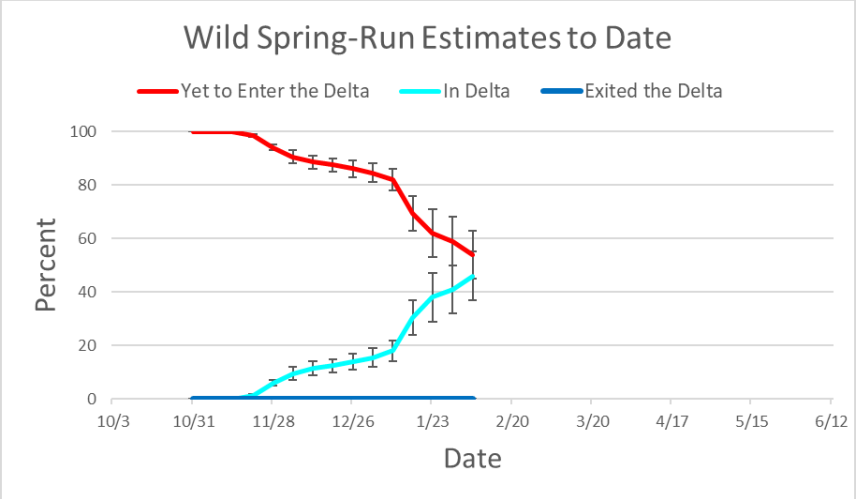
Rationale for changes in distribution

Wild winter-run Chinook: Over the past week, 14 juvenile winter-run-sized fish were observed at GCID, 6 at Tisdale, 1 at Knights Landing (RSTs), 9 at the beach seine locations, and 2 at Chipps Island trawl. Flows and turbidity have decreased this week. Since some fish were observed at monitoring locations, DOSS estimated that an additional 3% of the winter-run population has moved downstream into the Delta during the past week. Since 2 more winter-run were observed at Chipps Island trawl, DOSS estimated an additional 2% of the population has exited the Delta over the past week.

Wild spring-run Chinook: A continuing presence of juvenile spring-run Chinook salmon has been observed in monitoring efforts over the past week: 2 spring-run-sized fish were observed at GCID, over 17,000 fish at the Butte Creek monitoring locations, and 10 fish at the beach seine locations, and at no other monitoring locations this past week. Flows and turbidity have decreased this week. Since more fish were observed at monitoring locations, DOSS estimated that an additional 5% 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
  - Increased flows and turbidities from recent storms have stimulated fish movement.
  - Approximately 69-79% of the winter-run population is downstream of Knights Landing at this time, a few winter-run have been observed in the lower Sacramento River section between Sacramento and DCC. An additional two winter-run have been observed in the Chipps Island trawl this week
  - Approximately 37-55% of spring-run population is in the 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 not high enough to mute tidal influence at Georgiana Slough and Three Mile Slough allowing redirection of fish into these route on flood tides.
  - Delta Cross Channel is closed.

- **Overall Entrainment Risk:** MEDIUM-HIGH

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

- **Exposure Risk:** MEDIUM-HIGH
  - 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 (Chipps Island and in the river confluence region).

- **OMR/Export Risk:**
  - OMR -2,500 cfs: LOW
  - OMR -3,500 cfs: LOW
  - OMR -5,000 cfs: MEDIUM
  - OMR -6,250 cfs[5]: MEDIUM -HIGH
  - OMR -7,500 cfs[5]5 above: MEDIUM-HIGH (incrementally higher risk if Vernalis flows decrease)
  - OMR -9,000 cfs[5]: 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
  - OMR -3,500 cfs: MEDIUM
  - OMR -5,000 cfs: MEDIUM-HIGH
  - OMR -6,250 cfs[5]: MEDIUM-HIGH
  - OMR -7,500 cfs[5]: MEDIUM-HIGH
  - OMR -9,000 cfs[5]: HIGH

These assessments are based on current hydrology and fish distributions. Should more fish from the Sacramento or San Joaquin basins be detected at monitoring locations in the Delta, the risk of entrainment into the interior Delta or at the SWP/CVP facilities will increase.

Agenda Item 10.
DOSS Advice to WOMT and NMFS: None.

Agenda Item 11.
Next Meeting: The next DOSS conference call will be on **2/13/2018 at 9 am.**

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