Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 1/23/2018 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: Jason Julienne, Duane Linander, Ken Kundargi, Bob Fujimura
DWR: Farida Islam, Kevin Reece, Bryant Giorgi
NMFS: Jeff Stuart, Kristin McCleery
Reclamation: Towns Burgess, Elissa Buttermore, Mike Hendrick, Don Portz
SWRCB: 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/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 January:

Action IV.1.1 [Alerts that indicate the Delta Cross Channel (DCC) gate operations may be triggered soon] [1]:

- The First Alert is triggered if either the first component (river flows >95 cfs or the second component (>50% change in mean daily river flow) is met. The first alert was triggered every day this past week based on Mill Creek and Deer Creek flows. See table below for details.

[1] For details, see pages 60-61 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. Note that in October 2014, NMFS approved a modification of the first component of the first alert to a 95 cfs mean daily flow threshold in either Mill Creek or Deer Creek in lieu of operating the Mill and Deer Creek rotary screw traps.

	Mill Creek (MLM)		Deer Creek (DCV)	
Date	mean daily flow (cfs)	change in mean daily flow	mean daily flow (cfs)	change in mean daily flow
1/16/2018	230	4%	231	2%
1/17/2018	217	-6%	234	1%
1/18/2018	554	155%	334	43%
1/19/2018	706	27%	596	78%
1/20/2018	417	-41%	412	-31%
1/21/2018	324	-22%	335	-19%
1/22/2018	436	35%	339	1%

- Second Alert is triggered only if both Knights Landing temperatures are less than 56.3°F and Wilkins Slough flows are greater than 7,500 cfs.
    - The second alert was triggered from 1/20 to 1/22. See table below for details.

	Wilkins Slough (WLK)	Knights Landing (KL)
Date	Mean Daily Flow (cfs)	Daily water temperature (°F)
1/16/2018	7454	53
1/17/2018	7216	52
1/18/2018	7111	52
1/19/2018	7107	52
1/20/2018	9813	52
1/21/2018	10275	51
1/22/2018	8947	50

Action IV.1.2[2] (DCC gate operations):

- Gates will remain closed per operations described in RPA Action IV.1.2 starting 12/1/17.

Action IV.2.3[3] (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.
- Until the official JPE letter is issued, the threshold for the minimum fish density threshold trigger described in Action IV.2.3 will be 2.5 fish /TAF (first stage trigger) and 5 fish/TAF (second stage trigger).

[2] 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

[3] 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

Action IV.3[4] (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 of listed salmonids has occurred and thus no salvage-based triggers that would require export reduction have been exceeded.

Agenda Item 3.

Current Operations (1/23/18)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	2,900	Jones Pumping Plant	3,500
Reservoir Releases (cfs)			
Feather - Oroville	1,750	American - Nimbus	3,000
		Sacramento - Keswick	4,000
		Stanislaus - Goodwin	962*
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	748	San Luis (CVP)	967 (full)
Oroville	1,350	Shasta	3,295
New Melones	1,983	Folsom	580
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	18,700
Outflow Index (cfs)	~16,300	San Joaquin River at Vernalis (cfs)	2,285
E:I	27% (14-day avg.)	X2	73 km

* Releases at Goodwin will increase to 1,500 cfs today (1/23) and decrease to 600 cfs tomorrow (1/24).

Approximate OMR as of 1/20/18:

	USGS gauges (cfs)	Index (cfs)
Daily	-4,200	-4,900
5-day	-4,800	-5,000
14-day	-4,700	-5,000

Approximate OMR as of 1/22/18:

	Index (cfs)
Daily	-4,900
5-day	-5,000

[4] 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

14-day	-5,000

Factors controlling Delta exports:

- 1/16-1/23: -5,000 cfs OMR limit per NMFS BiOp RPA Action IV.2.3

Weather Forecast

A storm system will move through the Sacramento Valley on Wednesday and Thursday (1/24-1/25) with a chance of precipitation. It will be cloudy over the weekend with a drier weather pattern developing through the end of the month.

Agenda Item 4.

Smelt Working Group Update

Due to the partial Federal government shutdown, the Smelt Working Group did not meet this week. The next meeting will be on Monday, 1/29/18 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]	Chipps Is. Midwater Trawl[E]	Mossdale Kodiak Trawl[E]
Sample Date	1/16-1/22	1/15-1/22	1/15-1/22	1/12-1/22	1/12-1/22	1/15-1/19	1/14-1/20	1/14-1/20	1/16-1/17, 1/19
Chinook									
FR Chinook	45 juveniles	10				310	17		
SR Chinook	1 juvenile			9572	5704	1			
WR Chinook	27 juveniles 2 smolts	3	1			20	2	1	
LFR Chinook	4 smolts					1		1	
Chinook (ad-clip)	243 LFR	5 LFR					4	74	
Steelhead (wild)	1	1			1			1	
Steelhead (ad-clip)	94	5	1			2	4	9	
Green Sturgeon									
Flows (avg. cfs)	980	7593	8301	276	276				
W. Temp. (avg. °F)	52.2	52	51.7	6.9	6.9				
Turbidity (avg. NTU)	15.0	18.0	17.7	7.6	7.6				

[A] Tisdale RST sampling period was from 1/15 at 10:00 am to 1/22 at 9:15 am.
[B] Knights Landing RST sampling period was from 1/15 at 11:00 am to 1/22 at 10:30 am.
[C] Butte Creek Fyke trap sampling period was from 1/12 at 9:30 am to 1/22 at 8:00 am.
[D] Butte Creek RST sampling period was from 1/12 at 9:00 am to 1/22 at 7:00 am. A clicker malfunction occurred on 1/13 and 1/16. The RST was set to half cone on 1/19 and 1/21.
[E] Data reported in the 1/14 to 1/20 DJFMP sampling summary.

Red Bluff Diversion Dam (RBDD)
USFWS biweekly report (1/1/18-1/14/18) for preliminary estimates of passage by brood-year and run for unmarked juvenile Chinook salmon captured by rotary screw traps at RBDD included:

Run and Species	Biweekly Total	Brood Year Total (90% CI)
Winter-run Chinook (BY2017)	6,801*	439,362 (311,947-566,777)
Spring-run Chinook (BY2017)	927**	129,866 (94,590-165,143)

*Biweekly catch decreased by 2,173 fish from previous biweekly total of 8,974.
**Biweekly catch increased by 354 fish from previous biweekly total of 573.

Agenda Item 6.
Fish Monitoring: Salvage
B. Fujimura (CDFW) provided a salvage summary.

Eight hatchery steelhead were salvaged on Sunday (1/21) at the Tracy Fish Collection Facility. No Chinook salmon or sturgeon was observed at either of the state or federal fish salvage facilities.

DOSS Weekly Salvage Update

Reporting Period: January 15-January 21, 2018

Prepared by Bob Fujimura on January 22, 2018 15:37

Preliminary Results -Subject to Revision

Criteria	15-Jan	16-Jan	17-Jan	18-Jan	19-Jan	20-Jan	21-Jan	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	0	0	0	0	→	0
Wild steelhead	0	0	0	0	0	0	0	→	0
Exports									
SWP daily export	5,532	4,479	5,874	6,011	6,350	5,481	5,830	↗	5,651
CVP daily export	7,039	7,042	7,033	7,037	7,049	7,047	7,021	→	7,038
SWP reduced counts	0%	0%	0%	0%	0%	0%	**8%**	↗	**1%**
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

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	0	0	→	0	0
Fall Run	0	0	→	0	0
Unclassified	0	0	→	1	NC
Total	**0**	**0**		**9**	**6**

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	0	0	→	0	0
Hatchery	8	5	↗	8	5
Total	**8**	**5**		**8**	**5**

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

Generated by Bob Fujimura on January 22, 2018

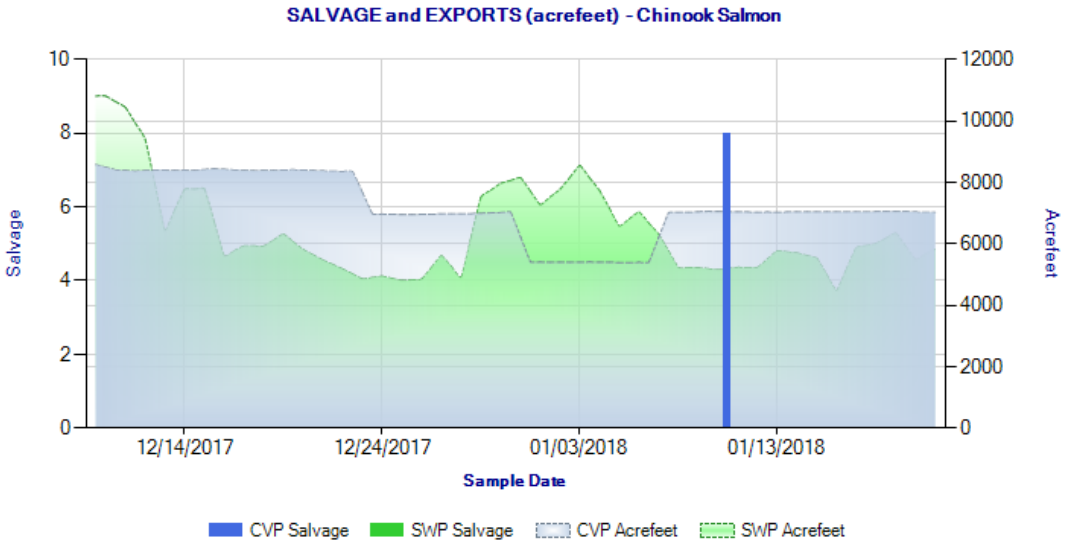


Figure 1. Daily salvage of Chinook Salmon (all races) and water exports from the state and federal fish salvage facilities during December 10 through January 21, 2018. Graph obtained from the DFG salvage monitoring web page: http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx.

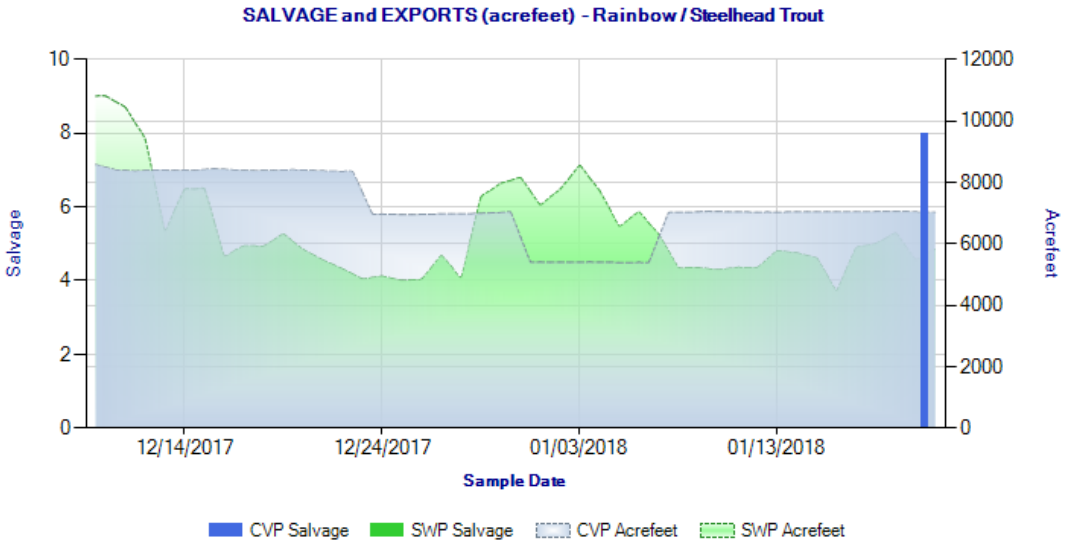


Figure 2. Daily salvage of Rainbow/Steelhead and water exports from the state and federal fish salvage facilities during December 10 through January 21, 2018. Graph obtained from the DFG salvage monitoring web page: http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx.

Agenda Item 7.

Hatchery Releases

Stuart (NMFS) reported that on 1/19/18, the second spring-run surrogate group of approximately 72,000 brood year (BY) 2017 late-fall Chinook salmon were released from Coleman National Fish Hatchery (CNFH) into Battle Creek. On 1/25/18, the third and final group of spring-run surrogates will be released from CNFH into Battle Creek (~72,000 BY17 CNFH late-fall run Chinook salmon all marked with an adipose fin clip and CWT).

Portz (Reclamation) reported that approximately 250,000 spring-run juveniles were released into Reach 5 of the San Joaquin River (near State Highway 140) as part of the San Joaquin River Restoration Program starting on 1/19/18. A second release will occur on 1/26/18, and a third release will occur later (the date yet to be determined). Release groups will range in size from 30,000 to 100,000 fish. All fish will be adipose fin clipped and marked with a CWT. A subset of 700 juveniles will be tagged with acoustic transmitters and released among the larger groups to track fish movements and survival.

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.

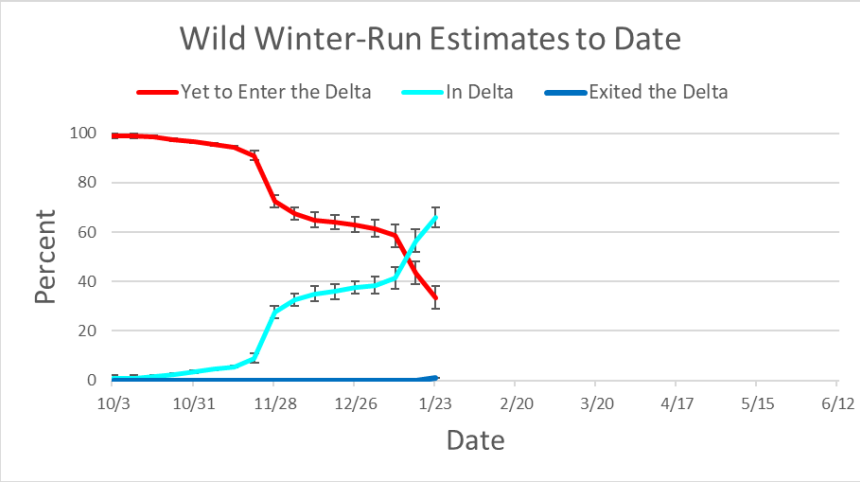
Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chipps Island)
Wild young-of-year winter-run Chinook salmon	29-38% (Last week: 39-48%)	61-70% (Last week: 52-61%)	~1% (Last week: 0%)
Wild young-of-year spring-run Chinook salmon	53-71% (Last week: 63-76%)	29-47% (Last week: 24-37%)	0% (Last week: 0%)

Rationale for changes in distribution

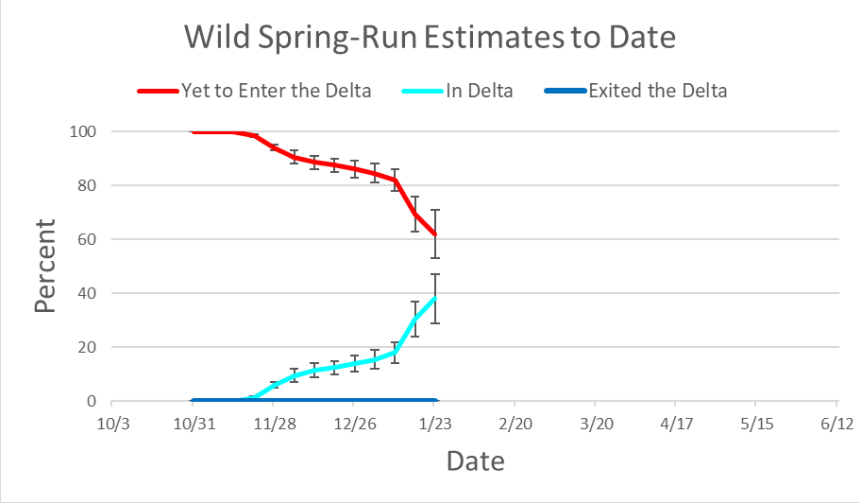
Wild winter-run Chinook: Over the past week, 29 juvenile winter-run-sized fish were observed at GCID, 3 at Tisdale, 1 at Knights Landing, 20 at the beach seines, 2 at Sac Trawl, and the first winter-run of the year at Chipps Island. Since last week's rain increased river flows and turbidity, and more fish were observed at monitoring locations, DOSS estimated that an additional 10% of the winter-run population has moved into the Delta during the past week.

Wild spring-run Chinook: 1 spring-run-sized fish was observed at GCID, 1 at the beach seines, and over 15,000 at Butte this past week. Since last week's rain increased river flows and turbidity, and more fish were observed at monitoring locations, DOSS estimated that an additional 5-10% of the spring-run population has moved into the Delta. The majority of spring-run are still considered to be rearing upriver. 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
  - Increased flows and turbidities from recent storms have stimulated fish movement.
  - Approximately 60-70% of the winter-run 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.
  - Approximately 30-50% 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 is scheduled to go out 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.
  - A clipped Chinook salmon was captured in the Sacramento River near Rio Vista in Delta smelt monitoring efforts.
  - A clipped steelhead was captured near the Sacramento-San Joaquin River confluence (probably hatchery steelhead from CNFH) during Delta smelt monitoring.

- **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

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

- **Exposure Risk:** MEDIUM

- Clipped steelhead were observed in salvage on 1/21/18, presumably from earlier hatchery releases from CNFH.
- 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: LOW-MEDIUM
  - OMR -6,250 cfs[5]: MEDIUM
  - OMR -7,500 cfs[5]: 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). Different DOSS members ranked the risk as either a medium or a high risk.)

- **Overall Entrainment Risk:**
  - OMR -2,500 cfs: LOW-MEDIUM
  - OMR -3,500 cfs: LOW-MEDIUM
  - OMR -5,000 cfs: MEDIUM
  - OMR -6,250 cfs[5]: MEDIUM (but higher than -5,000 cfs OMR)
  - 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 **1/30/2018 at 9 am.**

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