

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 1/9/2018 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, Bob Fujimura, Duane Linander

DWR: Kevin Reece, Bryant Giorgi, Reza Shahcheraghi, Farida Islam

NMFS: Jeff Stuart, Garwin Yip, Kristin McCleery

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

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/djfmj)
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 advice
10. 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.

Date	Mill Creek (MLM)		Deer Creek (DCV)	
	mean daily flow (cfs)	change in mean daily flow	mean daily flow (cfs)	change in mean daily flow
1/2/2018	142	0%	138	0%
1/3/2018	141	-1%	137	0%
1/4/2018	145	3%	142	4%
1/5/2018	161	11%	157	11%
1/6/2018	212	32%	187	19%
1/7/2018	172	-19%	162	-13%
1/8/2018	201	17%	181	12%

- 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 not triggered this week. See table below for details.

Date	Wilkins Slough (WLK)	Knights Landing (KL)
	Mean Daily Flow (cfs)	Daily water temperature (°F)
1/2/2018	5305	45
1/3/2018	5221	48
1/4/2018	5200	49
1/5/2018	5089	49
1/6/2018	5065	52
1/7/2018	5067	52
1/8/2018	5440	52

Action IV.1.2² (DCC gate operations):

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

Action IV.2.3³ (OMR Management):

- Implementation of this action in WY 2018 began on 1/1/18, 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.

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.3⁴ (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 (1/9/18)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	2,600 ¹	Jones Pumping Plant	3,500 (4 units)
Reservoir Releases (cfs)			
Feather - Oroville	1,750	American - Nimbus	3,000 ²
		Sacramento - Keswick	4,000
		Stanislaus - Goodwin	1,500 ³
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	744	San Luis (CVP)	923
Oroville	1,238	Shasta	3,229
New Melones	1,986	Folsom	542
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	14,000
Outflow Index (cfs)	~18,700	San Joaquin River at Vernalis (cfs)	1,833
E:I	38% (14-day avg.)	X2	>81 km ⁴

¹ Exports at Clifton Court may increase slightly (~2,700 cfs) tomorrow (1/10), targeting -5,000 OMR limit.

² A Change Order was issued for Nimbus Dam during the DOSS call to increase releases to the American River from 2,000 cfs to 3,000 cfs by 1pm today (1/9).

³ Goodwin releases will increase and decrease between 800 cfs and 1,500 cfs through 1/18 in order to manage storage levels.

⁴ Limit of X2 calculation.

Approximate OMR as of 1/6/18:

	USGS gauges (cfs)	Index (cfs)
Daily	-4,500	-4,900
14-day	-5,300	-5,300

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

Approximate OMR as of 1/8/18:

	Index (cfs)
Daily	-4,900
14-day	-5,200

Factors controlling Delta exports:

- 1/2-1/9: -5,000 cfs OMR limit per NMFS BiOp RPA Action IV.2.3

Weather Forecast

A storm system moved into northern California yesterday and today bringing rain to the Central Valley and rain and snow to the mountains. Another series of storms are expected to arrive by this coming weekend and continue through most of next week. These storm systems look fairly wet and should bring additional rain to the Central Valley and rain/snow to the mountains.

Agenda Item 4.

Smelt Working Group Update

The Smelt Working Group met on Monday, 1/8/18 at 10 am. E. Chen (USFWS) provided the following Smelt Working Group meeting summary:

The Working Group reviewed current Delta conditions, survey data, expected water project operations, and forecasted weather. Current conditions are wet, and precipitation is forecasted through tomorrow. Flows in the Sacramento and San Joaquin rivers are expected to be elevated later this week. Based on Delta conditions, the forecasted weather, and the lack of recent detections of Delta smelt from surveys within the entrainment risk area, the Working Group concluded that the risk for Delta smelt and longfin smelt entrainment is low.

The Working Group does not believe that a recommendation under Action 1 or Action 2 (adult pre-spawning Delta smelt) is necessary to protect Delta smelt at this time. The Working Group will continue to monitor Delta smelt survey and salvage data, Delta conditions, and particularly this week’s forecasted precipitation and turbidity. Due to the upcoming federal holiday on Monday, 1/15/18, the Working Group will meet again on Tuesday, 1/16/18.

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	Chippis Is. Midwater Trawl ^A	Sacramento Trawl ^A	Beach Seines ^A	Knights Landing RST ^B	Tisdale RST ^C	GCID RST ^D	Mossdale Kodiak Trawl ^A
Sample Date	1/2-1/6	12/31-1/6	1/1-1/3, 1/5	12/28-1/8	12/28-1/8	1/2-1/8	1/3-1/5
Chinook							
FR Chinook			4				

SR Chinook			1			1 juvenile	
WR Chinook			1		1	11 juveniles	
LFR Chinook							
Ad- Clipped Chinook						1 LFR juvenile 83 LFR smolts	
Steelhead (ad-clip)				1		12	
Steelhead (wild)						1	
Green Sturgeon							
Flows (avg. cfs)				5230	5059	759	
W. Temp. (avg. °F)				48.8	51	53.9	
Turbidity (avg. NTU)				12.8	13.9	7.6	

^A Data reported in the 12/31 to 1/6 DJFMP sampling summary.

^B Knights Landing RST sampling period was from 12/28 at 11:00 am to 1/8 at 10:00 am.

^C Tisdale RST sampling period was from 12/28 at 9:45 am to 1/8 at 10:30 am.

^D On 1/4-1/8, the GCID RST was in operation for 8 hours daily during high volume hatchery releases.

Red Bluff Diversion Dam (RBDD)

USFWS biweekly report (12/17/17-12/31/17) 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)	8,974*	432,561 (309,931-555,192)
Spring-run Chinook (BY2017)	573**	128,939 (94,334-163,545)

*Biweekly catch decreased by 2,080 fish from previous biweekly total of 11,054.

**Biweekly catch dropped 5,892 fish from previous biweekly total of 6,465.

Agenda Item 6.

Fish Monitoring: Salvage

B. Fujimura (CDFW) provided a salvage summary. No listed fish species have been observed in salvage since the start of the current water year on 10/1/17.

Reminder: NMFS determined that the minimum fish density threshold trigger described in Action IV.2.3 of the Reasonable and Prudent Alternative (RPA) of the 2009 NMFS Biological Opinion on Long Term Operations of the Central Valley Project (CVP) and State Water Project (SWP) (NMFS BiOp) be used for the interim period between January 1, 2018, and the issuance of the NMFS Juvenile Production Estimate (JPE) letter to the Bureau of Reclamation.

DOSS Weekly Salvage Update

Reporting Period: January 1-January 7, 2018

Prepared by Bob Fujimura on January 8, 2018 18:30

Preliminary Results -Subject to Revision

Criteria	1-Jan	2-Jan	3-Jan	4-Jan	5-Jan	6-Jan	7-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	7,271	7,776	8,546	7,736	6,572	7,036	6,304	↗	7,320
CVP daily export	5,417	5,397	5,399	5,407	5,401	5,392	5,405	↘	5,403
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

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	→	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	→	0	0
Late Fall Run	0	0	→	0	0
Fall Run	0	0	→	0	0
Unclassified	0	0	→	1	NC
Total	0	0		1	0

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

Category	Weekly Total			Season Total	
	Salvage	Loss	Trend	Salvage	Loss
Wild	0	0	→	0	0
Hatchery	0	0	→	0	0
Total	0	0		0	0

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

Generated by Bob Fujimura on January 8, 2018

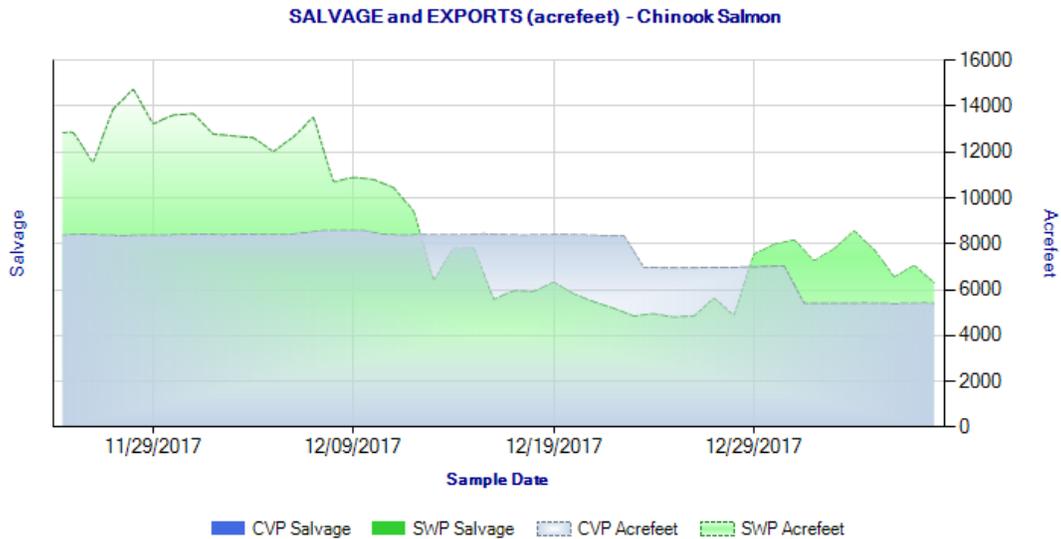


Figure 1. Daily salvage of Chinook Salmon (all races) and water exports from the state and federal fish salvage facilities during November 25 through January 7, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

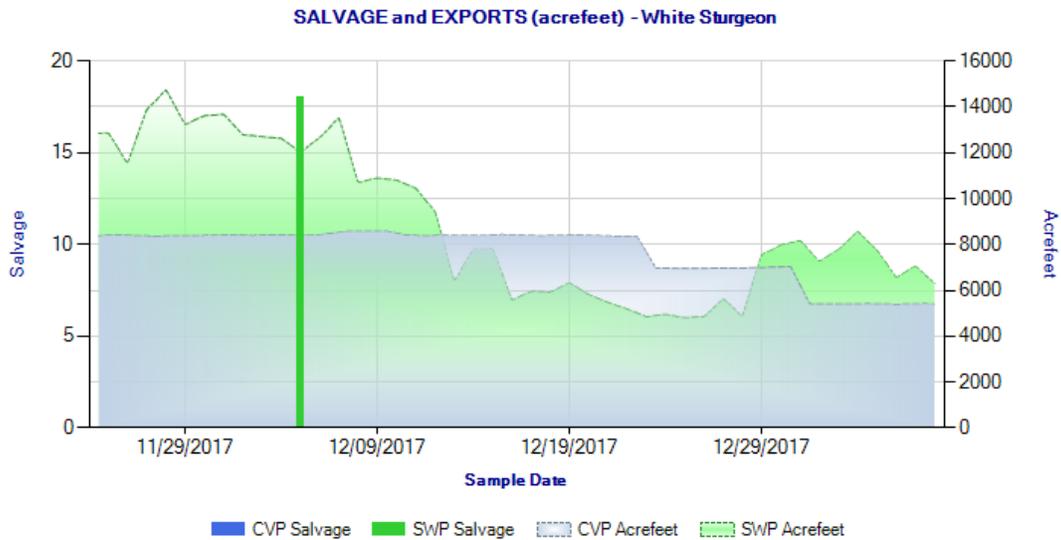


Figure 2. Daily salvage of White Sturgeon and water exports from the state and federal fish salvage facilities during November 25 through January 7, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

Agenda Item 7.

Hatchery Releases

The U.S. Fish and Wildlife Service provided the following hatchery release notifications:

On 1/5/18⁵, approximately 520,000 brood year 2017 late-fall Chinook were released into Battle Creek at the Coleman National Fish Hatchery. This group was 100% marked (with an adipose-fin clip) and coded-wire tagged and has an overall estimated average fork length of 145 mm.

On 1/8/18, the first spring-run surrogate group of approximately 79,000 brood year 2017 late-fall Chinook Salmon were released into Battle Creek at the Coleman National Fish Hatchery. The purpose of this experimental late-fall release is to provide insight into the migratory behavior and fate of yearling spring Chinook Salmon emigrating from the upper Sacramento River and its tributaries.

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.

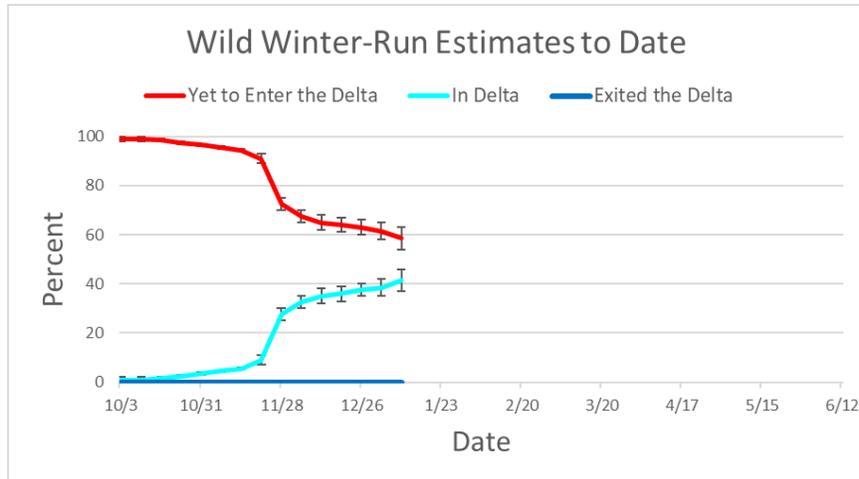
Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chipps Island)
<i>Wild young-of-year winter-run Chinook salmon</i>	54-63% (Last week: 57-65%)	37-46% (Last week: 35-43%)	0% (Last week: 0%)
<i>Wild young-of-year spring-run Chinook salmon</i>	78-86% (Last week: 81-88%)	14-22% (Last week: 12-19%)	0% (Last week: 0%)

Rationale for changes in distribution

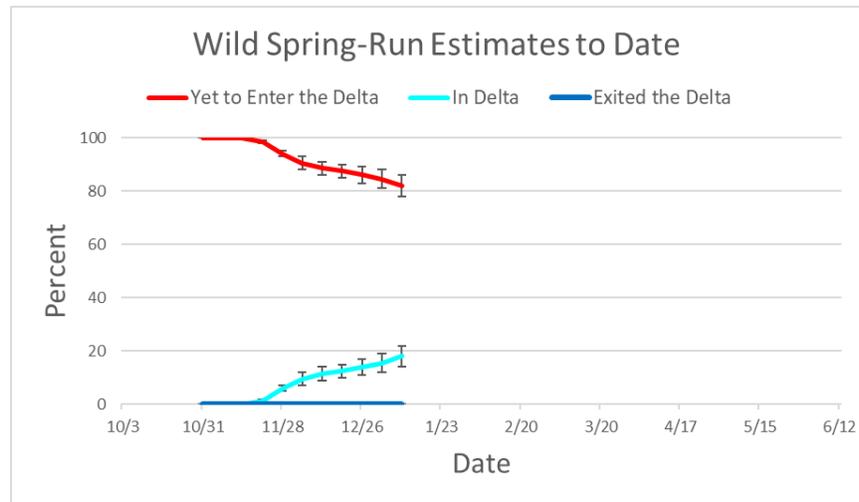
Wild winter-run Chinook: 11 juvenile winter-run-sized fish were observed at GCID, 1 at Tisdale, and 1 at the beach seines this past week. Since some fish were observed at monitoring locations and turbidity and flows are slightly increasing, DOSS estimated that an additional 2-3% of the winter-run population has moved into the Delta during the past week, and the remaining proportion of the winter-run population are still holding upriver.

Wild spring-run Chinook: 1 spring-run-sized fish was observed at GCID and 1 at the beach seines this past week. Since few spring-run were observed at monitoring locations and rivers flows and turbidity are slightly increasing, DOSS estimated that an additional 2-3% 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.

⁵ The release date was revised by USFWS from January 4 to January 5, 2018.



WY 2018 wild winter-run distribution estimates to date.



WY 2018 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: LOW to MEDIUM**
 - Increased flows and turbidities from recent storms expected to stimulate fish movement.
 - Approximately 40% of population is downstream of Knights Landing at this time, but no listed fish seen in the lower Sacramento River section between Sacramento and DCC.
 - Several hatchery releases of late-fall run Chinook salmon and steelhead have occurred recently.
- **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: LOW-MEDIUM**

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

- **Exposure Risk: LOW**
 - No listed salmonids have been seen in the CVP/SWP salvage this water year.
 - No listed salmonids have been detected in fish monitoring in the lower Sacramento Delta (Chippis and Sacramento trawls) or in the EDSM trawls.
- **OMR/Export Risk:**
 - OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: LOW
 - OMR -5,000 cfs: LOW
 - OMR -6,250 cfs⁶: LOW (but higher than -5,000 cfs OMR)

⁶By request of management, DOSS also assessed risks at an OMR flow more negative than -5,000 cfs.

- OMR -7,500 cfs⁶: LOW-MEDIUM (incrementally higher risk if Vernalis flows decrease)
- OMR -9,000 cfs⁶: MEDIUM (likely resulting from full export capacity, footprint of export effects extend into western Delta and lower San Joaquin River)

DOSS expects the relative risk of entrainment to further increase with an OMR limit of -6,250 cfs compared to -5,000 cfs due to the release of a spring-run surrogate group this week.

- **Overall Entrainment Risk:**
 - OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: LOW
 - OMR -5,000 cfs: LOW
 - OMR -6,250 cfs⁶: LOW
 - OMR -7,500 cfs⁶: LOW-MEDIUM
 - OMR -9,000 cfs⁶: LOW-MEDIUM

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

Agenda Item 9.

DOSS Advice to WOMT and NMFS:

For the week of 1/09/18 to 01/15/18, the Delta Operations for Salmonids and Sturgeon technical team (DOSS) advises the following:

- NMFS and WOMT should continue to monitor the Delta water quality conditions during DCC gate closures. Gate operations may be required if water quality conditions become degraded per D-1641 criteria and it is determined that opening gates will improve water quality conditions, per the conditions described in RPA Action IV.1.2.
- DOSS recommends that both NMFS and Reclamation monitor river flows and fish monitoring information in response to the current weather systems that are moving through northern California and again over the weekend in light of potential WIIN Act related changes to water operations.

Agenda Item 10.

Next Meeting: The next DOSS conference call will be on **1/16/2018 at 9 am.**