

**Delta Operations for Salmonids and Sturgeon (DOSS) Group**  
**Conference call: 2/20/2018 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](http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/doss.html).

**CDFW:** Bob Fujimura, Ken Kundargi

**DWR:** Farida Islam, Kevin Reece, Dan Yamanaka, Marianne Kirkland, Bryant Giorgi, Ming-Yen Tu

**NMFS:** Jeff Stuart, Kristin McCleery

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

**SWRCB:** Chris Kwan

**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/djfmj](http://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 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<sup>1</sup> (DCC gate operations):**

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

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<sup>1</sup> 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](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<sup>2</sup> (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<sup>3</sup> (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 (2/20/18)**

SWP		CVP	
<b>Exports (cfs)</b>			
Clifton Court Forebay	800	Jones Pumping Plant	800
<b>Reservoir Releases (cfs)</b>			
Feather - Oroville	2,000*	American - Nimbus	2,400**
		Sacramento - Keswick	3,250
		Stanislaus - Goodwin	1,500***
		Trinity - Lewiston	300
<b>Reservoir Storage (in TAF)</b>			
San Luis (SWP)	748	San Luis (CVP)	913
Oroville	1,460	Shasta	3,394
New Melones	1,959	Folsom	551
<b>Delta Operations</b>			
DCC	Closed	Sacramento River at Freeport (cfs)	11,600
Outflow Index (cfs)	~11,800	San Joaquin River at Vernalis (cfs)	2,242
E:I	14% (14-day avg.)	X2	75 km

\* Oroville releases are currently at 2,000 cfs, and will increase to 2,250 cfs tomorrow (2/21) to help meet D-1641 outflow requirements.

\*\* Nimbus releases will increase to 3,000 cfs later today (2/20) to help meet D-1641 outflow requirements.

<sup>2</sup> 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](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

<sup>3</sup> 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](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

\*\*\* Goodwin releases will increase to 1,600 cfs later today (2/20) to meet Vernalis flow standards.

Approximate OMR as of 2/17/18:

	USGS gauges (cfs)	Index (cfs)
Daily	-2,600	-2,000
5-day	-2,000	-1,700
14-day	-3,900	-3,700

Approximate OMR as of 2/19/18:

	Index (cfs)
Daily	-200
5-day	-1,600
14-day	-3,100

Factors controlling Delta exports:

- 2/13-2/19: D-1641 Delta outflow requirements and X2 location.

#### Weather Forecast

The weather outlook for the Sacramento region for next week is a continuing dry weather pattern with cooler air temperatures. Chance of a small storm at the end of the month.

#### **Agenda Item 4.**

##### **Smelt Working Group Update**

The Smelt Working Group will meet after the DOSS call today (2/20) 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 <sup>A</sup>	Knights Landing RST <sup>B</sup>	Butte Creek Fyke trap <sup>C</sup>	Butte Creek RST <sup>D</sup>	Beach Seines <sup>E</sup>	Sacramento Trawl <sup>E</sup>	Chippis Is. Midwater Trawl <sup>E</sup>	Mossdale Kodiak Trawl <sup>E</sup>
<b>Sample Date</b>	2/13-2/19	2/12-2/16	2/12-2/19	-	-	2/12-2/15	2/11, 2/13-2/17	2/11, 2/13-2/15, 2/17	2/12, 2/14, 2/16
<b>FR Chinook</b>						58	5		1
<b>SR Chinook</b>	4 juveniles					2	3		
<b>WR Chinook</b>	2 juveniles 7 smolts						4	1	
<b>LFR Chinook</b>									
<b>Chinook (ad-clip)</b>	4 LFR smolts							2	
<b>Steelhead (wild)</b>							2		

<b>Steelhead (ad-clip)</b>	10		3				15		
<b>Green Sturgeon</b>									
<b>Flows (avg. cfs)</b>	747	5,488	5,218						
<b>W. Temp. (avg. °F)</b>	51.2	50.0	49.9						
<b>Turbidity (avg. NTU)</b>	29.9	19.9	11.1						

<sup>A</sup> Tisdale RST sampling period was from 2/12 at 9:45 am to 2/16 at 11:00 am.

<sup>B</sup> Knights Landing RST sampling period was from 2/12 at 12:00 am to 2/19 at 11:30 am.

<sup>C</sup> Butte Creek Fyke trap data not received prior to the DOSS call.

<sup>D</sup> Butte Creek RST data not received prior to the DOSS call.

<sup>E</sup> Data reported in the 2/11-2/17 DJFMP sampling period were received after the DOSS call.

### **Agenda Item 6.**

#### **Fish Monitoring: Salvage<sup>4</sup>**

Fujimura (CDFW) provided the following salvage summary.

For the period of 2/12-2/18, 4 hatchery late fall-run Chinook were salvaged at the CVP and 8 hatchery late fall-run Chinook were salvaged at the SWP.

Eight hatchery steelhead were salvage at the CVP facility and 4 wild steelhead were salvaged at the SWP.

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<sup>4</sup> 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: February 12-February 18, 2018

Prepared by Bob Fujimura on February 19, 2018 9:20

Preliminary Results -Subject to Revision

Criteria	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb	18-Feb	Trend	
<b>Loss Densities</b>									
Wild older juvenile CS	0	0	0	0	0	0	0	↘	0
Wild steelhead	0	0	2.40	0	0	0	0	↗	0.34
<b>Exports</b>									
SWP daily export	3,446	473	3,622	3,097	2,770	2,257	1,830	↘	2,499
CVP daily export	5,408	1,743	3,596	3,758	3,593	3,612	3,618	↘	3,618
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
<b>Wild</b>					
Winter Run	0	0	↘	4	3
Spring Run	0	0	↘	0	0
Late Fall Run	0	0	↘	1	4
Fall Run	0	0	→	0	0
Unclassified	0	0	→	0	0
<b>Total</b>	<b>0</b>	<b>0</b>		<b>5</b>	<b>8</b>
<b>Hatchery</b>					
Winter Run	0	0	→	4	3
Spring Run	0	0	→	8	6
Late Fall Run	12	38	↘	43	156
Fall Run	0	0	→	0	0
Unclassified	0	0	→	1	NC
<b>Total</b>	<b>12</b>	<b>38</b>		<b>56</b>	<b>164</b>

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	4	17	→	12	52
Hatchery	8	5	→	25	17
<b>Total</b>	<b>12</b>	<b>23</b>		<b>37</b>	<b>69</b>

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

Generated by Bob Fujimura on February 19, 2018

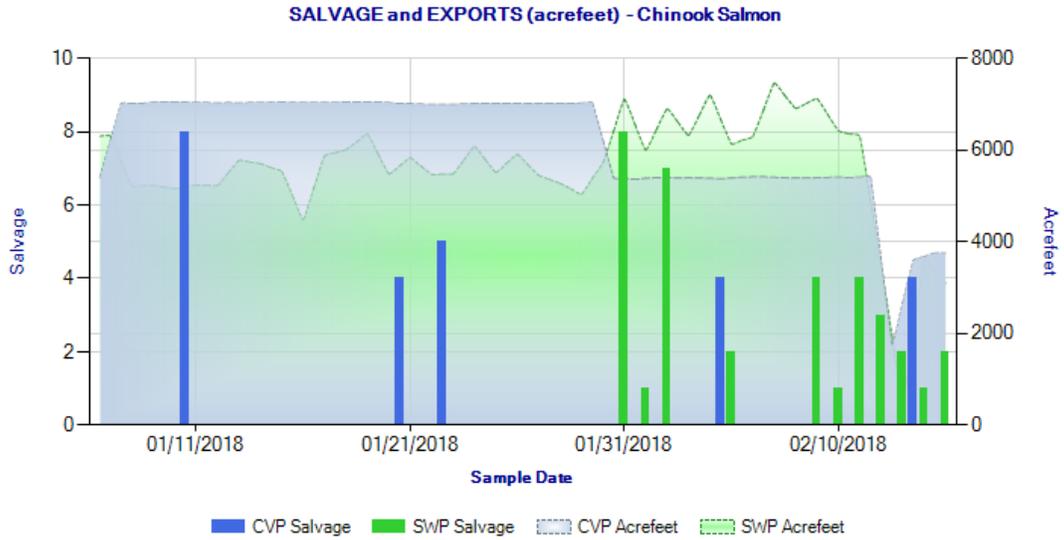


Figure 1. Daily salvage of Chinook Salmon (all races) and water exports from the state and federal fish salvage facilities during January 7 through February 15, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

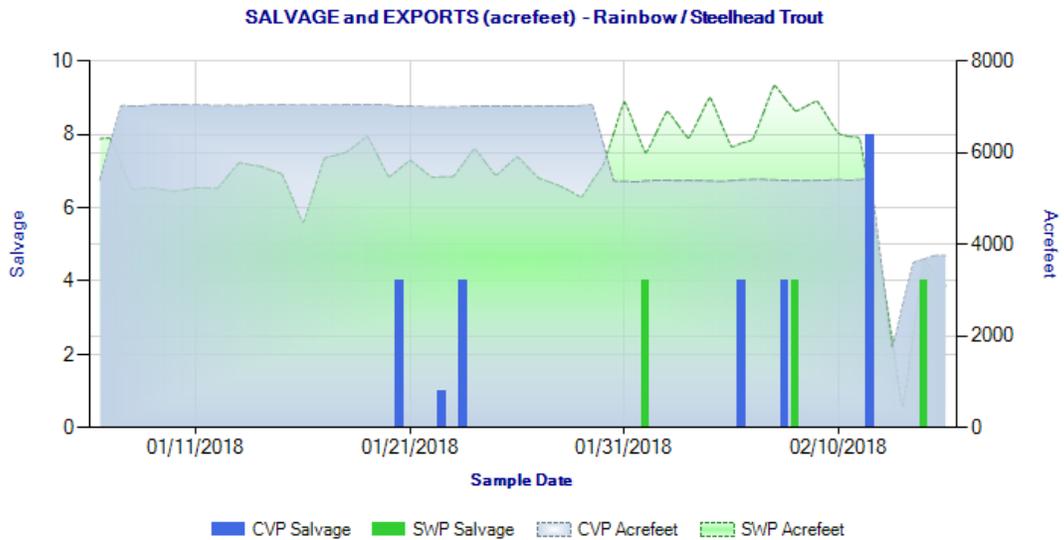


Figure 2. Daily salvage of Rainbow/Steelhead and water exports from the state and federal fish salvage facilities during January 7 through February 15, 2018. Graph obtained from the DFG salvage monitoring web page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 2/15/18

Release Date	CWT Race	Hatchery	Release Site	Release Type	Confirmed Loss	Number Released <sup>1</sup>	Total Entering Delta	% Loss of Number Released <sup>2</sup>	% Loss of Total Entering Delta <sup>3</sup>	First Stage Trigger	Date of First Loss <sup>4</sup>	Date of Last Loss <sup>4</sup>
12/21/2017	LF	Coleman NFH	Battle Creek	Production	11.54	297,370	n/a	0.004	n/a	n/a	1/23/2018	1/31/2018
1/5/2018	LF	Coleman NFH	Battle Creek	Production	104.37	519,791	n/a	0.020	n/a	n/a	1/31/2018	2/15/2018
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	0	84,922	n/a	0.000	n/a	0.5%	*	*
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 <sup>5</sup>	Unread CWT Loss <sup>6</sup>	Unknown Hatchery Loss <sup>7</sup>	Acoustic Tag Loss <sup>8</sup>	Number of Unassigned CWTs <sup>9</sup>
SWP	26.29				
CVP					
<b>TOTAL</b>	<b>26.29</b>				

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2017 through 2/15/2018.

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

<sup>2</sup>% Loss of Number Released = (Confirmed Loss/Number Released)\*100.

<sup>3</sup>% Loss of Total Entering Delta= (Confirmed Loss/Total Entering Delta)\*100.

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

<sup>5</sup>Adipose-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).

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

<sup>7</sup>CWT has been read, but hatchery release information not yet available.

<sup>8</sup>Adipose-fin clipped Chinook released due to presence of sutures.

<sup>9</sup>CWT 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.

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

\*\* Information not yet available.

DWR-DES Revised 2/16/2018

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

**Agenda Item 7.**

**Hatchery Releases**

Stuart (NMFS) informed the DOSS group that the hatchery produced winter-run are still being held in the Livingston Stone National Fish Hatchery, and the release will ideally coincide with a precipitation event. The group of hatchery winter-run slated for release into Battle Creek are still being held until they are of appropriate size. Reece (DWR) informed DOSS that alternative release strategies are being discussed for these groups if there are no rain events in the next several weeks.

**Agenda Item 8.**

**DOSS Estimates of Fish Distribution**

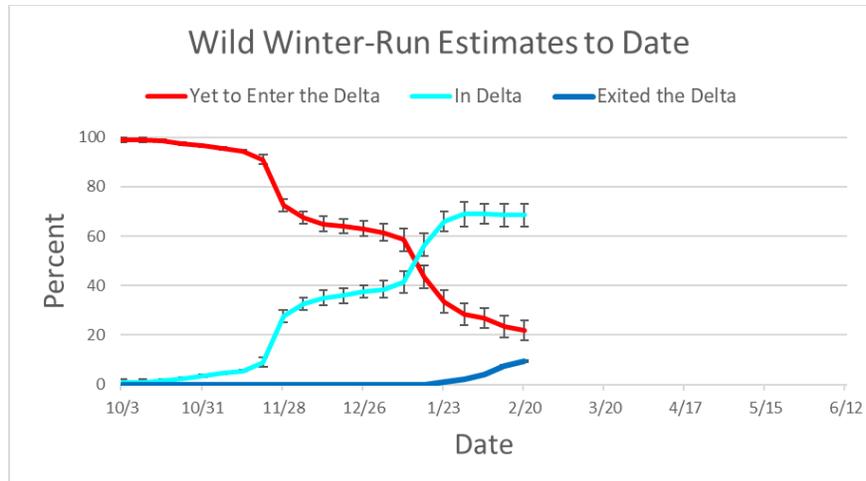
DOSS estimates of the current distribution of listed Chinook and steelhead, as a percentage of the population, are based on recent monitoring data and historical migration timing patterns.

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>	18-26% (Last week: 19-28%)	64-73% (Last week: 64-73%)	9-10% (Last week: 7-8%)
<i>Wild young-of-year spring-run Chinook salmon</i>	38-56% (Last week: 40-58%)	44-62% (Last week: 42-60%)	0% (Last week: 0%)

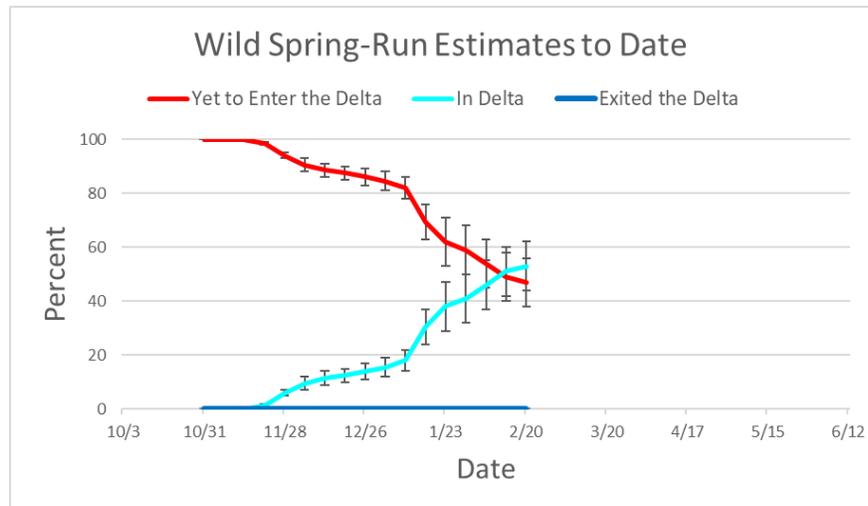
**Rationale for changes in distribution**

Wild winter-run Chinook: Monitoring data were limited this week due to the Monday holiday. However, 9 winter-run sized fish were observed at GCID. Since more fish were observed and river conditions are similar to last week, DOSS estimated that an additional 2% of the winter-run population has moved through the Delta.

Wild spring-run Chinook: Monitoring data were limited this week due to the Monday holiday. However, 4 spring-run sized fish were observed at GCID. Since a few more fish were observed and river conditions are similar to last week, DOSS estimated that an additional 2% 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.
  - The proportion of the winter-run population that is in the Delta and vulnerable to entrainment is approximately 64-73%. A few winter-run have been observed in the lower Sacramento River section between Sacramento and DCC.
  - Approximately 44-62% 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 routes 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<sup>5</sup>: MEDIUM -HIGH
  - OMR -7,500 cfs<sup>5</sup>: MEDIUM-HIGH (incrementally higher risk if Vernalis flows decrease)
  - OMR -9,000 cfs<sup>5</sup>: 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<sup>5</sup>: MEDIUM-HIGH
  - OMR -7,500 cfs<sup>5</sup>: MEDIUM-HIGH
  - OMR -9,000 cfs<sup>5</sup>: 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 CVP/SWP 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 **2/27/2018 at 9 am.**

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