

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 1/21/2020 at 9:00 a.m.

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 (CVP) and the State Water Project (SWP) on salmonids and green sturgeon. DOSS will work with other technical teams. DOSS notes and advice can be found here: [CCV Water Operations DOSS page](#).

CDFW: Duane Linander, Ken Kundargi, Kyle Griffiths, Chris McKibbin, Jonathan Williams, Geir Aasen, Page Uttley

DWR: Chris Cook, Tracy Pettit, Bryant Giorgi, En-Ching Hsu, Mike Ford

NMFS: Jeff Stuart, Garwin Yip, Kristin Begun

Reclamation: Suzanne Manugian, Tom Patton, Elissa Buttermore, Towns Burgess

SWRCB: Chris Carr, Michael Macon, Craig Williams

USFWS: Felipe Carrillo, Craig Anderson

Kearns & West: Matt Marvin

Agenda Items:

1. Agenda review and introductions
2. RPA Implementation review (For the DOSS Dashboard, click on the "Triggers & Indices" tab at: [Bay Delta Live](#))
3. Current Operations
4. Smelt Working Group
5. Fish Monitoring: RSTs/trawls/seines
6. Fish Monitoring: Salvage
7. DOSS Estimates of Fish Distribution
8. Risk of Entrainment
9. Other Topics
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 soon¹:

- The First Alert has two components. Capture of yearling-sized spring-run Chinook salmon at the mouths of natal tributaries between October and April indicates that emigration from the tributaries has started or is occurring. As an environmental surrogate to the capture of the yearling-sized spring-run Chinook salmon, which are difficult to capture in the rotary screw traps, tributary flow increases are used to signal conditions

¹ For details, see pages 60-61 in Enclosure 2 of the [2011 Amendments to the 2009 RPA document](#). 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.

conductive to emigration. The First Alert is triggered if either the first component (greater than 95 cfs flow threshold) or second component (greater than 50% change in mean daily flow) are exceeded. The First Alert was triggered (yellow highlights) this past week due to flows greater than 95 cfs.

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
1/14/2020	154	5%	148	4%
1/15/2020	149	-3%	146	-2%
1/16/2020	212	42%	190	30%
1/17/2020	207	-2%	197	4%
1/18/2020	175	-15%	171	-13%
1/19/2020	164	-6%	162	-5%
1/20/2020	159	-3%	161	0%

- The Second Alert is triggered only if **both** Wilkins Slough flows are greater than 7,500 cfs and Knights Landing temperature is less than 56.3°F. The second alert is in effect beginning 10/1/2019, and was triggered on 1/18-1/20/2020.

Wilkins Slough (WLK)		Knights Landing (KL)
Date	Mean Daily Flow (cfs)	Daily water temperature (°F)
1/14/2020	7,226	48.9
1/15/2020	7,183	48.5
1/16/2020	7,336	48.1
1/17/2020	7,425	47.2
1/18/2020	9,649	46.8
1/19/2020	9,893	47.2
1/20/2020	8,847	47.1

Action IV.1.2² (DCC gate operations):

- DCC gates will remain closed per operations described in RPA Action IV.1.2 starting 12/1/2019 and are expected to remain closed until mid-May.

Action IV.2.3³ (OMR Management):

- Implementation of this action in WY 2020 began on 1/1/2020, 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](#).

³ For details, see pages 74-79 in Enclosure 2 of the [2011 Amendments to the 2009 RPA document](#).

- Until the official JPE letter is issued, the first stage trigger is exceeded when the combined daily SWP/CVP older juvenile Chinook salmon loss is 8 fish/TAF and second stage trigger is 12 fish/TAF, as described in Action IV.2.3 for length-at-date fish.
- The interim first stage trigger is exceeded if genetically verified combined daily loss density of older-juvenile-sized winter-run Chinook salmon exceeds 5.23 fish per TAF of water exported, and the interim second stage trigger is exceeded if the genetically verified daily loss density of older-juvenile-sized winter-run Chinook salmon exceeds 10.45 fish per TAF of water exported.

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 is triggered during November 1-February 28 when Knights Landing Catch Index (KLCI) or Sacramento Catch Index (SCI) >10 fish. The third alert was not triggered this past week.
- Since the action went into effect on 11/1/2019, no salvage-based triggers that would require export reduction have been exceeded.

Agenda Item 3.

Current Operations (1/21/2020)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	2,300*	Jones Pumping Plant	4,200
Reservoir Releases (cfs)			
Feather - Oroville	1,900**	American - Nimbus	2,000
		Sacramento - Keswick	5,000
		Stanislaus - Goodwin	800
		Trinity - Lewiston	300
Reservoir Storage (TAF)			
San Luis (SWP)	937	San Luis (CVP)	520
Oroville	2,130	Shasta	3,353
New Melones	1,983	Folsom	478
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	16,300
Outflow Index (cfs)	14,900	San Joaquin River at Vernalis (cfs)	2,475
E:I	34% (3-day avg.) 36% (14-day avg.)	X2	80 km

* SWP exports are scheduled to decrease to 2,100 cfs tomorrow, 1/22/2020.

** Oroville releases are scheduled to decrease to 1,750 cfs on 1/24/2020.

⁴ For details, see pages 79-80 in Enclosure 2 of the [2011 Amendments to the 2009 RPA document](#).

Factors controlling Delta exports:

- 1/14/2020-1/21/2020: OMR limit of no more negative than -5,000 cfs per Action IV.2.3.

Approximate OMRs as of 1/18/2020:

	USGS gauges (cfs)	Index (cfs)
Daily	-4,500	-4,900
5-day	*	-5,000
14-day*	*	-4,900

*OBI gage was down on 1/12 – 1/15/2020.

Approximate OMRs as of 1/20/2020:

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

Weather Forecast

The forecast for the Sacramento area shows a weather system bringing light to moderate amounts of precipitation to interior NorCal through tonight (approximately 0.1 inches to Sacramento). Dry conditions return for the end of the week, then another weather system is possible by late in the weekend.

Agenda Item 4.

Smelt Working Group

The Smelt Working Group will meet today, 1/21/2020, at 10 am.

(Received after the DOSS call.) The Smelt Working Group (SWG) reviewed current Delta conditions, survey data, expected exports, and forecasted weather. The current OMR index value is -4,800 cfs in compliance with the NMFS RPA which went into effect on 1/1/2020. Environmental conditions are relatively steady. Turbidity at the three stations under RPA Action 1 is low (<7 NTU), although Franks Tract has experienced elevated turbidity. Three Delta smelt were detected in EDSM surveys last week (one by SKT #1 in the Lower Sacramento River, two by EDSM in the Lower Sacramento River and Montezuma Slough).

The SWG concluded that there was no evidence of fish in the entrainment zone and not enough information to warrant advice.

The SWG does not believe that a recommendation under Action 1 (adult pre-spawning Delta Smelt) is necessary to protect Delta Smelt at this time. The SWG will continue to monitor Delta Smelt survey and salvage data and Delta conditions. The SWG will meet again on Monday, 1/27/2020, at 10 a.m.

Agenda Item 5.

Fish Monitoring: The following table presents fish monitoring data summarized over the past week. Unless otherwise noted, reported races are based on fork length (length-at-date).

Location	GCID RST ^A	Tisdale RST ^B	Knights Landing RST ^C	Beach Seines ^D	Sacramento Trawl ^D	Chippis Is. Midwater Trawl ^D	Mossdale Kodiak Trawl ^D
Sample Date	1/14-1/16	1/12-1/20	1/12-1/20	1/13-1/16	1/13-1/14, 1/16-1/17	1/12-1/14, 1/16-1/18	1/13, 1/15,1/17
FR Chinook	66 juveniles	146	7	17			
SR Chinook				21	1		
WR Chinook		1		3			
LFR Chinook	2 juveniles						
Chinook (ad-clip)	20 WR smolts	1 FR				1	
Steelhead (wild)					2		
Steelhead (ad-clip)	6				2		
Green Sturgeon							
Flows (avg. cfs)	1,104	7,595	8,113				
W. Temp. (avg. °F)	48.78	48	47.8				
Turbidity (avg. NTU)	N/A	6.2	7.39				

^A GCID RST Cone raised on 1/16/2020 in anticipation of high flows and heavy debris.

^B Tisdale RST sampling period was from 1/12/2020 at 9:30 am to 1/20/2020 at 9:30 am.

^C Knights Landing RST sampling period was from 1/12/2020 at 10:45 am to 1/20/2020 at 9:45 am.

^D DatCall data not yet available at the time of call due to the Monday holiday. DJFMP data retrieved from [Bay Delta Live](#). DAT monitoring data reported in the 1/12/2020 to 1/18/2020 DJFMP sampling period received after the DOSS call.

Red Bluff Diversion Dam Biweekly Report

USFWS biweekly report (1/1/2020-1/14/2020) for preliminary estimates of passage by Brood Year (BY) and run for unmarked juvenile Chinook salmon captured by rotary screw traps at RBDD included:

Run and Species	Biweekly Total	BY Total (90% CI)
Winter-run Chinook (BY2019)*	3,573	3,781,229 (2,473,397-5,089,060)
Spring-run Chinook (BY2019)	1,155	36,655 (14,498-58,813)

*Note: Passage estimates were revised for the period October 16 thru November 18, 2019 due to genetic assignments of fish that differed from assignments based on length-at-date criteria. Previous biweekly

total for winter-run was 17,506 fish and BY total 3,950,314, and biweekly total for spring-run was 1,979 fish and BY total 259,756 fish.

Juvenile Green Sturgeon Monitoring Summary for DOSS; 1/17/2020 Sampling Season Summary. 2020 Season sampling initiated on 1/2/2020.

- No juvenile sturgeon captured and tagged to date during the 2020 sampling season (five sampling events).
- One adult white sturgeon tagged by USFWS Lodi staff on 3/11/2014 in the San Joaquin River, detected at sampling site northwest of Sherman Lake: 1/15/2020 and again on 1/16/2020 (A69-9001-25741).

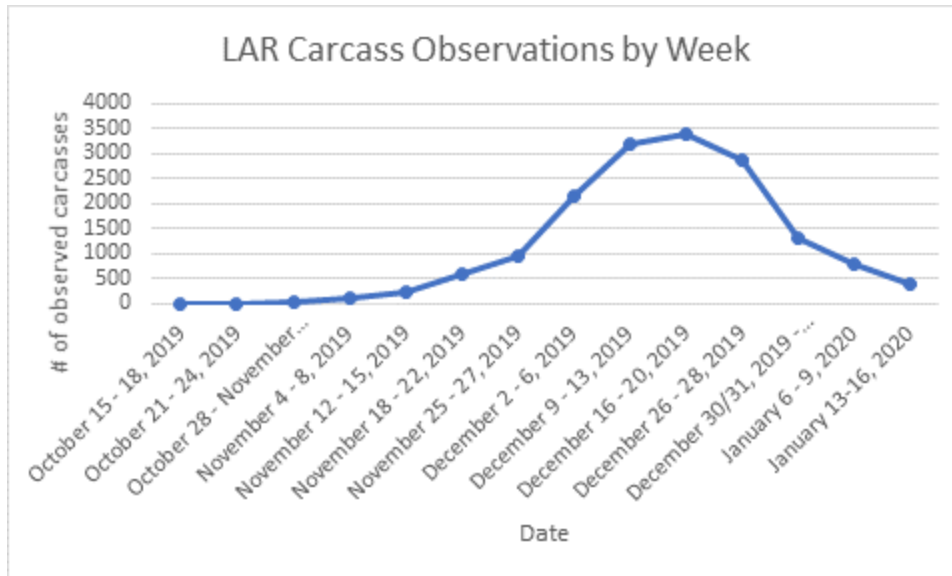
CDFW Lower American River Carcass Survey

Reporting for survey period 1/13/2020-1/15/2020:

- 396 observed fall-run Chinook salmon carcasses
 - 24 females
 - 3 unclipped
 - 21 clipped
 - 24 female carcasses evaluated for spawn condition:
 - 0/24 (0%) prespawn mortalities
 - 2/24 (8%) partially spawned
 - 15/24 (63%) spawned
 - 14 males
 - 1 unclipped
 - 13 clipped
 - 22 Jaw Tag Recaptures
 - 336 carcasses too deteriorated to determine sex
- Temperatures at Fair Oaks (USGS gage 11446500, ~0.25 mile downstream of Hazel Ave) during the survey period:
 - Minimum: 48.9°F
 - Mean: 49.5°F
 - Maximum: 49.8°F

Preliminary Season Summary:

- Total fall-run Chinook salmon carcasses observed: 16,081
 - Clipped/Unclipped ratio for in-river carcasses: 4,088/16,081 = 25.42%
 - Peak fall-run Chinook salmon emergence estimate: Early March



Hatchery Releases

None.

Feather River RST Data

Cook (DWR) provided Feather River RST data for two RST sites on the Feather River. At the Eye Side Channel from 1/14/2020 to 1/20/2020, 488 juvenile fall-run, 2 spring-run, and 2 late-fall-run Chinook salmon were observed. Flows at the Eye Side Channel were an average 800 cfs, water temperature 46°F, and turbidity 1.2 NTU. At the Herringer site for the same dates (1/14/2020 to 1/20/2020), 818 fall-run Chinook salmon were observed. Flows were an average 2,000 cfs, water temperature 46°F, and turbidity 1.9 NTU.

Mortalities were 24% of catch at the Eye Side Channel.

Agenda Item 6.

Fish Monitoring: Salvage

Griffiths (CDFW) provided the following salvage summary for the period of 1/13/2020-1/19/2020.

Chinook salmon:

Unclipped (natural origin) Chinook salmon: Weekly salvage of natural-origin Chinook salmon: 4 late-fall-run Chinook salmon. Total WY 2020 salvage of natural-origin Chinook salmon: 16 fish.

A wild winter-run sized Chinook salmon was observed on 1/20/2020 at the CVP, which was observed outside of this reporting period. This is the first wild winter-run Chinook salmon observed in salvage this water year.

Clipped (hatchery origin) Chinook salmon: 6 ad-clipped late-fall-run and 1 fall-run Chinook salmon were observed this week in salvage. Total WY 2020 salvage of ad-clipped Chinook: 336 fish.

Steelhead:

No steelhead were salvaged during the reporting period.

The seasonal (10/1/2019 to present) salvage totals of all steelhead at the federal facility are 4 adipose clipped (loss= 2.72) and zero non-adipose clipped (loss= 0.00).

Green sturgeon:

No green sturgeon have been salvaged at either facility for the 2020 water year.

Operations:

There were no reduced counts at the SWP this week, indicating that the vegetation is no longer an issue.

DOSS Weekly Salvage Update

Reporting Period: January 13-January 19, 2020

Prepared by Kyle Griffiths on January 21, 2020 8:18

Preliminary Results -Subject to Revision

Criteria	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan	18-Jan	19-Jan	Average
Loss Densities								
Wild older juvenile CS	0	0	0	0	0	0.22	0	0.03
Wild steelhead	0	0	0	0	0	0	0	0.00
Exports								
SWP daily export	3,851	3,859	3,858	4,527	3,813	3,832	5,193	4133
CVP daily export	8,341	8,462	8,457	8,341	8,153	8,197	8,300	8322
SWP reduced counts	0	0	0	0	0	0	0	
CVP reduced counts	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 TFCF salvage outage 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	4	2.6	↗	12	8.6
Fall Run	0	0	→	4	3
Unclassified	0	0	→	0	0
Total	0	0		16	11.6
Hatchery					
Winter Run	0	0	→	0	0
Spring Run	0	0	→	128	88
Late Fall Run	6	8	↘	187	148
Fall Run	1	1	↗	21	14
Unclassified	0	0	→	0	0
Total	7	8		336	250

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	→	4	3
Total	0	0		4	3

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

DWR provided the below summary of hatchery Chinook salmon loss at the facilities:

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 1/10/20

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 Delta ³	First Stage Trigger	Date of First Loss ⁴	Date of Last Loss ⁴
12/9/2019	LF	Coleman NFH	Battle Creek	Spring Surrogate	15.88	84,869	n/a	0.019	n/a	0.5%	12/22/2019	1/2/2020
12/18/2019	LF	Coleman NFH	Battle Creek	Spring Surrogate	25.03	77,672	n/a	0.032	n/a	0.5%	1/1/2020	1/4/2020

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2019 through 1/9/2020.

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.

DWR-DES Revised 1/10/2020

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

Agenda Item 7.

DOSS Estimates of Fish Distribution

DOSS estimates of the current distribution of listed Chinook salmon, 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>Young-of-year (YOY) winter-run Chinook salmon</i>	30-45% Last week: 35-50%	53-67% Last week: 48-62%	2-3% Last week: same
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	55-60% Last week: 60-65%	40-45% Last week: 35-40%	0% Last week: same

Rationale for changes in distribution

Wild winter-run Chinook salmon:

Over 3.7 million BY 2019 winter-run Chinook salmon have passed RBDD this year and approximately 6,300 BY19 winter-run Chinook salmon have been captured by the GCID RSTs since 8/1/2019. In the last week, 1 length-at-date winter-run Chinook salmon was captured at Tisdale and 3 at the beach seines. Because of continued presence of winter-run Chinook salmon at monitoring locations in the lower Sacramento River and Delta, DOSS estimates that an additional 5% of the winter-run Chinook salmon population has entered the Delta. Since none were observed at Chipps Island trawl, DOSS estimates that no additional winter-run Chinook salmon have exited the Delta.

Kundargi (CDFW) noted that with the large production of winter-run Chinook salmon this year, DOSS expected to see more detections in the Sacramento River monitoring. Potential reasons for

this are a lower level of detection efficiency this season for monitoring efforts or the possibility of low survival in the lower Sacramento River.

Wild spring-run Chinook salmon:

21 length-at-date spring-run Chinook salmon were observed in the beach seines and 1 at Sacramento trawl this past week. Because of continued presence of spring-run Chinook salmon observed at monitoring locations in the Delta, DOSS estimates that an additional 5% of the spring-run Chinook salmon population has entered the Delta. No spring-run Chinook salmon have been observed in the Chipps Island Trawl this season.

Agenda Item 8.

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: HIGH** (Higher flows in the Sacramento River predicted with upcoming storm events)
 - Approximately 53-67% of juvenile winter-run Chinook salmon estimated to be in the Delta.
 - Approximately 40-45% of juvenile spring-run Chinook salmon estimated to be in the Delta.
 - Central Valley steelhead are in the lower Sacramento and Northern Delta.
 - Anticipate outmigration to continue into the Delta.

- **Routing Risk: LOW**
 - DCC is closed.
 - Flows are predicted to remain similar to last week, ~16,000 cfs inflow to Delta from Sacramento River enhancing the muting of tidal effects around Georgiana Slough.
 - Precipitation in the forecast for the weekend and increasing river flows decrease risk of routing into central and interior delta.

- **Overall Entrainment Risk: MEDIUM** (reflecting similarity to last week's conditions)

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

- **Exposure Risk: MEDIUM**
 - Listed Chinook salmon from the Sacramento River basin continue to be observed in monitoring sites in the lower Sacramento River and northern Delta (more fish at the junction of Georgiana Slough, Mokelumne River, and San Joaquin River confluence).
 - Flows are expected to increase this week due to precipitation events.
 - Salvage is expected to remain at stable levels this week compared to last week, since exports will continue to manage to the -5,000 cfs OMR limit from Action IV.2.3 of the NMFS 2009 BiOp. Decreased exports are associated with a less negative OMR and a reduced zone of entrainment.

- **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: HIGH
 - OMR -9,000 cfs⁵: HIGH

- **Overall Entrainment 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: HIGH
 - OMR -9,000 cfs⁵: HIGH

These assessments are based on anticipated and current hydrology and fish distributions for the next week.

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

Agenda Item 9.

Other Topics

Stuart (NMFS) reminded the group that Reclamation will be taking over the weekly DOSS calls. And that part of risk assessment (for DCC gate operation and OMR management) may include steelhead distribution estimates. The Record of Decision may be signed as early as next week. Buttermore (Reclamation) discussed using historical information when there is a lack of real-time information for distribution estimates. SacPAS includes figures that summarize steelhead distribution, which could be helpful. There may be some concerns with using real-time steelhead distribution for risk assessment. Stuart pointed out that detection efficiency for steelhead is very low, making real-time assessment of steelhead distribution difficult.

Agenda Item 10.

DOSS Advice to WOMT and NMFS:

No recommendations for changes to current operations.

Agenda Item 11.

Next Meeting: The next DOSS conference call will be on **1/28/2020 at 9 a.m.**