

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 1/28/2020 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, Krystal Davis-Fadtke, Kyle Griffiths, Chris McKibbin, Jonathan Williams, Geir Aasen, Page Uttley, Farida Islam, Adam Chorazyczewski

DWR: Chris Cook, Bryant Giorgi, En-Ching Hsu, Mike Ford, Kevin Reece, Ming-Yen Tu

NMFS: Jeff Stuart, Kristin Begun

Reclamation: Suzanne Manugian, Tom Patton, Elissa Buttermore

SWRCB: Chris Carr, 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.

conducive 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 every day this past week and greater than 50% change in mean daily flow on 1/22 and 1/26/2020.

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
1/21/2020	165	4%	167	4%
1/22/2020	257	56%	230	38%
1/23/2020	226	-12%	228	-1%
1/24/2020	262	16%	247	9%
1/25/2020	263	0%	272	10%
1/26/2020	1,297	393%	1,054	288%
1/27/2020	912	-30%	821	-22%

- 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 every day this past week.

Date	Wilkins Slough (WLK)	Knights Landing (KL)
	Mean Daily Flow (cfs)	Daily water temperature (°F)
1/21/2020	8,311	46.8
1/22/2020	8,097	47.9
1/23/2020	9,042	49.0
1/24/2020	10,514	49.9
1/25/2020	9,977	50.4
1/26/2020	10,037	50.8
1/27/2020	14,117	*

*KL water temperature assumed to be below 56.3°F based on water temperature of 52.9°F at Wilkins Slough for 1/27/2020.

Action IV.1.2² (DCC gate operations):

- DCC gates are 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

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](#).

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 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 older juvenile 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 (1/28/2020)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	2,100 ^A	Jones Pumping Plant	4,200 ^B
Reservoir Releases (cfs)			
Feather - Oroville	1,750	American - Nimbus	2,000 ^C
		Sacramento - Keswick	5,000 ^D
		Stanislaus - Goodwin	800
		Trinity - Lewiston	300
Reservoir Storage (TAF)			
San Luis (SWP)	945	San Luis (CVP)	555
Oroville	2,179	Shasta	3,430
New Melones	1,983	Folsom	483
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	17,900 ^E
Outflow Index (cfs)	14,200	San Joaquin River at Vernalis (cfs)	2,100
E:I	33% (3-day avg.) 34% (14-day avg.)	X2	78 km

^A SWP exports will hold until 2/1/2020, then depending on Delta outflow and location of X2, either decrease or hold. 11,400 cfs Delta outflow will be maintained through next Tuesday (2/4/2020).

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

^B CVP exports are currently pumping 5 units. On 2/1/2020, Jones Pumping Plant will reduce exports by 2 units to approximately 2,600-2,700 cfs.

^C A new flow meter at Nimbus Dam have caused some differences in the reporting of reservoir releases between the channel gages and the dam gages. Field crews from USGS are currently calibrating the channel gages.

^D Keswick releases may decrease to 4,000 cfs. No change order has been issued yet.

^E Flows at Freeport expected to increase to the low 20,000s tomorrow (1/29/2020) with the higher flows from last week's precipitation events in the upper Sacramento Valley.

Factors controlling Delta exports:

- 1/21/2020-1/28/2020: OMR limit of no more negative than -5,000 cfs per Action IV.2.3. Location of X2 and Delta outflows may start controlling on 2/1/2020.

Approximate OMRs as of 1/25/2020:

	USGS gauges (cfs)	Index (cfs)
Daily	-5,100	-5,000
5-day	-5,000	-5,000
14-day	N/A*	-4,900

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

Approximate OMRs as of 1/27/2020:

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

Weather Forecast

Chance of precipitation today, mainly for areas north of Sacramento. Otherwise, dry conditions expected this week for most areas with above average temperatures. Precipitation chances may return late this weekend, mainly over the mountains.

Agenda Item 4.

Smelt Working Group

The Smelt Working Group met on Monday, 1/27/2020, at 10 am.

The Smelt Working Group (SWG) reviewed current Delta conditions, survey data, expected exports, and forecasted weather. Turbidity has remained low and the 3-station average under Action 1 of the BiOp is below 5 NTU. Delta smelt have been detected in the lower Sacramento River this past week. Delta water temperatures are warming this week and have the potential to on-ramp Action 3 when the daily 3-station average reaches 12 degrees Celsius. While turbidity remains clear, the rise in temperature may signal smelt to begin spawning in the next few weeks and the SWG expects smelt to begin moving soon regardless of a clear turbidity/flow cue.

The SWP does not believe that a recommendation under Action 1 (adult pre-spawning Delta Smelt) is necessary to protect Delta Smelt at this time. The SWP will continue to

monitor Delta Smelt survey, salvage data, and Delta conditions. The SWP will meet again on Monday, 2/3/2020, 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	1/20-1/25	1/20-1/24	1/20-1/26	1/21-1/24	1/19, 1/21-1/24	1/19, 1/21, 1/23-1/25	1/21, 1/23-1/24
FR Chinook	896 juveniles	295	342	12	1		
SR Chinook		2	1	3			
WR Chinook	2 juveniles	2	3		1		
LFR Chinook						1	
Chinook (ad-clip)	2 FR juveniles		1 FR		1	2	
Steelhead (wild)					1		
Steelhead (ad-clip)	8			1	8	1	
Green Sturgeon	-						
Flows (avg. cfs)	1,473	8,510	9,290				
W. Temp. (avg. °F)	51.2	49	49.1				
Turbidity (avg. NTU)	N/A	6.9	10.03				

^A GCID RST cone was lowered on 1/20/2020, and raised on 1/25/2020 in anticipation of high flows.

^B Tisdale RST sampling period was from 1/20/2020 at 9:30 am to 1/24/2020 at 10:00 am.

^C Knights Landing RST sampling period was from 1/20/2020 at 9:45 am to 1/26/2020 at 11:00 am.

^D Data reported in the 1/19/2020 to 1/25/2020 DJFMP sampling summary.

Hatchery Releases

On 1/23/2020, CDFW released approximately 900 brood year 2018 spring-run Chinook salmon from the San Joaquin River Restoration Program’s (SJRRP) Salmon Conservation and Research Facility (SCARF) into the San Joaquin River. This release consisted of marked (Passive Integrated Transponder (PIT), adipose fin clip, and coded wire tag (CWT) yearlings that are being released as part of a multi-life stage release strategy for the SJRRP.

Juvenile Green Sturgeon Monitoring Summary for DOSS; 1/28/2020 Sampling Season Summary. 2020 Season sampling initiated on 1/2/2020.

- No juvenile sturgeon captured and tagged during the 2020 sampling season (seven sampling events to date).
- One juvenile green sturgeon tagged on 12/12/2019 was detected at the sampling site northwest of Sherman Lake on 1/21 and 1/23/2020 (A69-1602-12220).
- One adult white sturgeon tagged on 3/11/2014 in the San Joaquin River by USFWS Lodi staff was detected at the sampling site northwest of Sherman Lake on 1/21 and 1/23/2020 (A69-9001-27541).

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 1/21 to 1/26/2020, 730 juvenile fall-run and 4 spring-run Chinook salmon were observed. Flows at the Eye Side Channel were an average 800 cfs, water temperature 47°F, and turbidity 1.2 NTU. At the Herringer site for 1/21 to 1/26/2020, 608 fall-run and 1 spring-run Chinook salmon were observed. Flows were an average 1,808 cfs, water temperature 48°F, and turbidity 1.5 NTU.

Mortalities were 32% of catch at the Eye Side Channel.

Stanislaus River Caswell RST Data

Pacific States Marine Fisheries Commission provided the catch summary for the Stanislaus River Caswell RST. For the period of 1/8 to 1/24/2020, 6 unclipped Chinook salmon were observed.

Lower American River RST Data

Linander (CDFW) provided the catch summary for the lower American River RST data. For the period of 1/6 to 1/23/2020, 1,215 length-at-date juvenile fall-run and 2 juvenile winter-run Chinook salmon were observed.

Agenda Item 6.

Fish Monitoring: Salvage

Griffiths (CDFW) provided the following salvage summary for the period of 1/20 to 1/26/2020.

Chinook salmon:

Unclipped (natural origin) Chinook salmon: Weekly salvage of natural-origin Chinook salmon: 8 winter-run Chinook salmon. Total WY 2020 salvage of natural-origin Chinook salmon: 24 fish.

Clipped (hatchery origin) Chinook salmon: zero ad-clipped 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. Total WY 2020 salvage of steelhead: zero natural origin steelhead and 4 ad-clipped steelhead.

One clipped steelhead (270 mm) was recovered yesterday, 1/27/2020, and will be included in next week's salvage report.

Green sturgeon:

No green sturgeon have been salvaged at either facility during WY 2020.

Operations:

No reduced counts this week.

DOSS Weekly Salvage Update

Reporting Period: January 20-January 26, 2020

Prepared by Kyle Griffiths on January 27, 2020 15:42

Preliminary Results -Subject to Revision

Criteria	20-Jan	21-Jan	22-Jan	23-Jan	24-Jan	25-Jan	26-Jan	Trend	
Loss Densities									
Wild older juvenile CS	0.20	0	0.19	0	0	0	0	↗	0.06
Wild steelhead	0	0	0	0	0	0	0	→	0.00
Exports									
SWP daily export	4,536	3,846	5,198	3,834	3,325	5,209	4,525	↗	4,353
CVP daily export	8,296	8,373	8,343	8,374	8,332	8,337	8,324	→	8,340
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	8	5	↗	8	5
Spring Run	0	0	→	0	0
Late Fall Run	0	0	↗	12	8
Fall Run	0	0	→	4	3
Unclassified	0	0	→	0	0
Total	8	5		24	16
Hatchery					
Winter Run	0	0	→	0	0
Spring Run	0	0	→	128	88
Late Fall Run	0	0	↗	187	148
Fall Run	0	0	↗	21	14
Unclassified	0	0	→	0	0
Total	0	0		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. No additional fish from these release groups have been salvaged since 1/10/2020.

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>	25-40% Last week: 30-45%	58-72% Last week: 53-67%	2-3% Last week: same
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	50-55% Last week: 55-60%	45-50% Last week: 40-45%	0% Last week: same

Rationale for changes in distribution

Wild winter-run Chinook salmon:

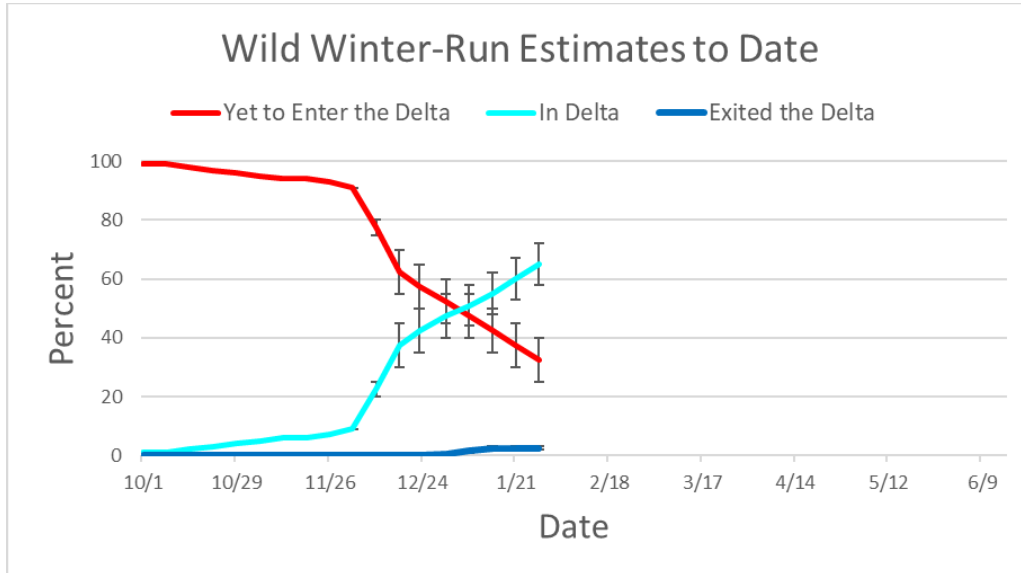
Over 3.7 million BY 2019 winter-run Chinook salmon have passed RBDD so far this year. In the last week, 2 length-at-date winter-run Chinook salmon were captured at GCID, 2 at Tisdale, 3 at Knights Landing, and 1 at the Sacramento trawl. Because of continued presence of winter-run Chinook salmon at monitoring 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.

Last week, 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. DOSS is still concerned

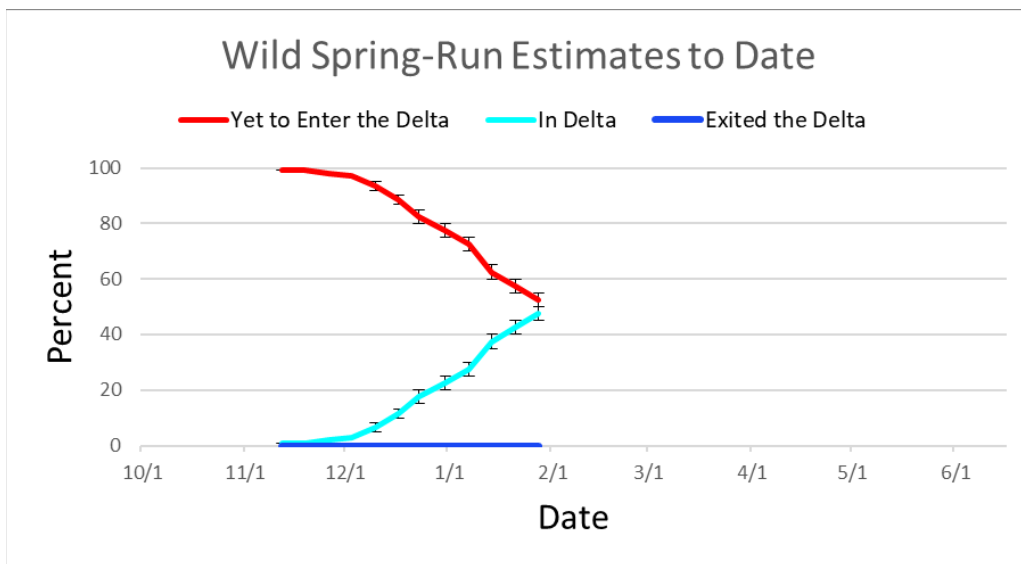
with the low levels of winter-run Chinook salmon observed in the lower river monitoring locations.

Wild spring-run Chinook salmon:

2 length-at-date spring-run Chinook salmon were observed at Tisdale, 1 at Knights Landing, and 3 in the beach seines 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.



WY 2020 wild winter-run distribution estimates to date.



WY 2020 wild spring-run distribution estimates to date.

**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 lower Sacramento River predicted with last week's storm events)
 - Approximately 58-72% of juvenile winter-run Chinook salmon estimated to be in the Delta.
 - Approximately 45-50% of juvenile spring-run Chinook salmon estimated to be in the Delta.
 - Central Valley steelhead are in the lower Sacramento and Northern Delta.
 - Anticipate emigration to continue into the Delta.
- **Routing Risk: LOW**
 - DCC is closed.
 - Flows are predicted to increase slightly compared to last week, currently ~18,000 cfs inflow to Delta from the Sacramento River, with a predicted peak of 20,000 to 24,000 cfs later this week as the pulse from last week's precipitation events reach the Delta. The higher flows enhance the muting of tidal effects around Georgiana Slough.
 - Chance of precipitation in the forecast for the weekend and increased 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). The first 2 wild winter-run Chinook salmon and a clipped steelhead were observed in salvage last week, indicating that at least some fish from the Sacramento River basin have moved into the central and southern Delta.
 - Flows into the Delta are expected to increase this week due to recent precipitation events.
 - Salvage is expected to remain at stable levels this week, then decrease over the weekend as exports may be reduced to meet February operation requirements. Exports will continue to be managed to the no more negative than -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.

Agenda Item 9.

Other Topics

Stuart (NMFS): Reclamation is prepared to lead the DOSS group when the Record of Decision for the reinitiation of consultation on long-term operation of the CVP and SWP (ROD) is signed.

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

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 **2/4/2020 at 9 a.m.**