

**Delta Operations for Salmonids and Sturgeon (DOSS) Group**  
**Conference call: 12/31/2019 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:** Ken Kundargi, Duane Linander, Kyle Griffiths, Chris McKibbin, Page Uttley

**DWR:** Bryant Giorgi, Ian Uecker

**NMFS:** Jeff Stuart, Barb Byrne

**Reclamation:** Suzanne Manugian

**SWRCB:** Chris Carr, Stanley Mubako

**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. Rapid Genetic Protocol & Interim JPE-based Trigger Discussion
10. Debris issues at Skinner Fish Facility
11. DOSS Advice
12. Next DOSS Meeting

**Agenda Item 2.**

**RPA Implementation Review**

**Delta RPA Actions affecting operations during December:**

**Action IV.1.1 Alerts that indicate the Delta Cross Channel (DCC) gate operations may be triggered soon<sup>1</sup>:**

- 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 conducive to emigration. The First Alert is triggered if either the first component (greater

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<sup>1</sup> 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.

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.

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
12/23/2019	387	72%	400	68%
12/24/2019	217	-44%	257	-36%
12/25/2019	189	-13%	214	-17%
12/26/2019	174	-8%	191	-11%
12/27/2019	162	-7%	174	-9%
12/28/2019	155	-4%	163	-6%
12/29/2019	153	-1%	160	-2%
12/30/2019	154	1%	162	1%

- 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)
12/23/2019	9,276	49.1
12/24/2019	11,358	49.0
12/25/2019	11,273	48.9
12/26/2019	10,384	48.5
12/27/2019	9,934	47.2
12/28/2019	9,593	47.2
12/29/2019	9,275	47.5
12/30/2019	9,065	47.5

**Action IV.1.2<sup>2</sup> (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.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 (KLICI) or Sacramento Catch Index (SCI) >10] was not triggered this past week.

<sup>2</sup> For details, see pages 62-66 in Enclosure 2 of the [2011 Amendments to the 2009 RPA document](#).

<sup>3</sup> For details, see pages 79-80 in Enclosure 2 of the [2011 Amendments to the 2009 RPA document](#).

- 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 (12/31/2019)**

SWP		CVP	
<b>Exports (cfs)</b>			
Clifton Court Forebay	7,300 *	Jones Pumping Plant	3,500**
<b>Reservoir Releases (cfs)</b>			
Feather - Oroville	2,000	American - Nimbus	2,500
		Sacramento - Keswick	~5,600***
		Stanislaus - Goodwin	800
		Trinity - Lewiston	300
<b>Reservoir Storage (TAF)</b>			
San Luis (SWP)	879	San Luis (CVP)	393
Oroville	2,077	Shasta	3,328
New Melones	1,980	Folsom	513
<b>Delta Operations</b>			
DCC	Closed	Sacramento River at Freeport (cfs)	17,300
Outflow Index (cfs)	9,300	San Joaquin River at Vernalis (cfs)	2,300
E:I	49% (14-day avg.)	X2	79 km

\*SWP anticipates exporting 7,300 cfs today (12/31/2019), 2,700 cfs on 1/1/2020, and dropping to 2,000 cfs on 1/2/2020.

\*\*CVP anticipates exporting 3,500 cfs on 12/31/2019, increasing to 3,500 to 4,000 cfs on 1/1/2020, and increasing to 4,200 cfs on 1/2/2020.

\*\*\*Keswick releases are ramping down from 7,000 cfs to 5,000 cfs. The releases are currently ~5,600 cfs today (12/31/2019). Releases are targeting 5,000 cfs by 1/3/2020.

**Factors controlling Delta exports:**

- 12/22/2019-12/31/2019: US Army Corps permits and available physical capacity.
- Beginning 1/1/2020: OMR limit of no more negative than -5,000 cfs per Action IV.2.3.

**Approximate OMRs as of 12/28/2019:**

	USGS gauges (cfs)	Index (cfs)
Daily	-8,800	-9,200
5-day	-9,100	-9,200
14-day	-9,000	-9,200

**Approximate OMRs as of 12/30/2019:**

	Index (cfs)
Daily	-9,100
5-day	-9,100
14-day	-9,200

*Weather Forecast*

Generally dry through 1/10/2020 with a chance of precipitation in northern California 1/4-5/2020.

**Agenda Item 4.  
Smelt Working Group**

The Working Group reviewed current Delta conditions, survey data, expected exports, and forecasted weather. Current OMR index values of -9,200 cfs have remained steady and these highly negative flows in the OMR corridor were of concern to the group, however, the NMFS RPA going into effect on January 1, 2020, will reduce that concern. There is additional concern that past negative Qwest conditions and observed salmonid salvage may indicate past and current increased entrainment risk in the lower San Joaquin River. These conditions, coupled with low Delta Smelt population density, increase the uncertainty for entrainment risk management. The SWG concluded that there was no evidence of fish in the entrainment zone and not enough information to warrant advice.

The Working Group does not believe that a recommendation under Action 1 (adult pre-spawning Delta Smelt) is necessary to protect Delta Smelt at this time. The Working Group has asked the Service to evaluate the feasibility of additional EDSM surveys in the lower San Joaquin River should the environmental or salvage conditions warrant. The Working Group will continue to monitor Delta Smelt survey and salvage data and Delta conditions. The group will meet again on Monday, January 6, 2020, at 1000 hours.

**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 <sup>A</sup>	Tisdale RST <sup>B</sup>	Knights Landing RST <sup>C</sup>	Beach Seines <sup>D</sup>	Sacramento Trawl <sup>D,E</sup>	Chippis Is. Midwater Trawl <sup>D</sup>	Mossdale Kodiak Trawl <sup>D</sup>
Sample Date	12/30	12/23-12/30	12/23-12/29	12/23/19, 12/ 27/19	12/22-24, 12/26-27	12/22-12/23, 12/26-27	12/23, 12/26
FR Chinook	8	61	28	21			
SR Chinook		13	3	39			
WR Chinook	2	5	4	2		1	
LFR Chinook					2	3	
Chinook (ad-clip)		2 LFR			1	45	

<b>Steelhead (wild)</b>		1				
<b>Steelhead (ad-clip)</b>					1	
<b>Green Sturgeon</b>						
<b>Flows (avg. cfs)</b>		9,357	10,154			
<b>W. Temp. (avg. °F)</b>		48	48.2			
<b>Turbidity (avg. NTU)</b>		8.3	11.77			

<sup>A</sup> GCID RST removed from bypass channel on 12/1/2019 due to high flows and heavy debris, and for repairs. RST sampling resumed 12/30/19.

<sup>B</sup> Tisdale RST sampling period was from 12/22/2019 at 9:00 am to 12/30/2019 at 9:45 am.

<sup>C</sup> Knights Landing RST sampling period was from 12/22/2019 at 11:00 am to 12/29/2019 at 10:15 am. Cone effort was 50%.

<sup>D</sup> DJFMP data from [Bay Delta Live](#).

<sup>E</sup> One adult Chinook salmon was captured in the Sacramento Trawl.

### Red Bluff Diversion Dam Biweekly Report (Received after the conclusion of the call)

USFWS biweekly report (12/17/2019-12/31/2019) 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)	17,506	3,950,314 (2,580,674-5,319,954)
Spring-run Chinook (BY2019)	1,979	259,756 (156,080-363,432)

### Juvenile Green Sturgeon Monitoring Summary for DOSS; 12/31/2019 Sampling Season Summary

No information updates were received this week due to the leave schedules of staff for the holidays.

### CDFW Lower American River Carcass Survey

Reporting for survey period 12/26/2019-12/28/2019:

- 2,866 observed carcass
  - 340 females
    - 86 unclipped
    - 254 clipped
    - 340 female carcasses evaluated for spawn condition:
      - 31/340 (9%) prespawn mortalities
      - 8/340 (2%) partially spawned
      - 279/340 (65%) spawned
  - 345 males
    - 60 unclipped

- 285 clipped
- 139 Jaw Tag Recaptures
- 2,042 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: 50.5°F
  - Mean: 51.0°F
  - Maximum: 51.4°F

CDFW reported that peak spawning occurred mid-late December, so peak emergence is expected to occur in late March (similar pattern for hatchery production).

### **Hatchery Releases**

No updates received this past week.

### **Agenda Item 6.**

#### **Fish Monitoring: Salvage**

Griffiths (CDFW) provided the following salvage summary for the period of 12/23/2019-12/29/2019.

### DOSS Weekly Salvage Update

Reporting Period: December 23-December 29, 2019  
 Prepared by Kyle Griffiths on December 30, 2019 15:58  
 Preliminary Results -Subject to Revision

Criteria	23-Dec	24-Dec	25-Dec	26-Dec	27-Dec	28-Dec	29-Dec	Trend	
<b>Loss Densities</b>									
Wild older juvenile CS	0	0	0	0	0	0	0	→	0.00
Wild steelhead	0	0	0	0	0	0	0	→	0.00
<b>Exports</b>									
SWP daily export	13,232	14,059	15,034	14,072	14,081	15,268	14,585	↘	14,333
CVP daily export	7,279	8,244	6,259	6,822	6,904	6,898	6,894	↘	7,043
SWP reduced counts	100%	100%	100%	100%	100%	100%	100%		
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
<b>Wild</b>					
Winter Run	0	0	→	0	0
Spring Run	0	0	→	0	0
Late Fall Run	0	0	→	8	6
Fall Run	0	0	→	4	3
Unclassified	0	0	→	0	0
<b>Total</b>	<b>0</b>	<b>0</b>		<b>12</b>	<b>9</b>
<b>Hatchery</b>					
Winter Run	0	0	→	0	0
Spring Run	0	0	↘	128	88
Late Fall Run	68	47	↘	120	82
Fall Run	0	0	↘	16	11
Unclassified	0	0	→	0	0
<b>Total</b>	<b>68</b>	<b>47</b>		<b>264</b>	<b>181</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	0	0	→	0	0
Hatchery	0	0	→	4	3
<b>Total</b>	<b>0</b>	<b>0</b>		<b>4</b>	<b>3</b>

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

Tracy facility has modified fish handling protocol to include scanning for pit-tags to allow for recognition and release of pit-tagged San Joaquin River Restoration Program study fish. Skinner's protocol already accommodates this.

Skinner has reduced counts (usually to 10 minutes, rather than 30 minutes, per 2-hour period) to help manage high debris loading.

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

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 12/27/19

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>
12/9/2019	LF	Coleman NFH	Battle Creek	Spring Surrogate	10.40	84,869	n/a	0.012	n/a	0.5%	12/22/2019	12/24/2019
12/18/2019	LF	Coleman NFH	Battle Creek	Spring Surrogate	0	77,672	n/a		n/a	0.5%		

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2019 through 12/26/2019.

<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.

## 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>	45-60% Last week: 50-65%	40-55% Last week: 35-50%	0-1% Last week: 0%
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	75-80% Last week: 80-85%	20-25% Last week: 15-20%	0% Last week: 0%

### Rationale for changes in distribution

#### *Wild winter-run Chinook salmon:*

Over 3.9 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, 5 length-at-date winter-run Chinook salmon were captured at Tisdale, 4 at Knights Landing, 2 at the beach seines, and 0 in 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, for an estimated presence in the Delta of 40-55% of the winter-run Chinook salmon population. The first winter-run Chinook salmon of the season was reported in the Chipps Island Trawl, and for this reason DOSS estimated that up to 1% of the winter-run population has exited the Delta.

#### *Wild spring-run Chinook salmon:*

13 length-at-date spring-run Chinook salmon were observed at Tisdale, 3 at Knights Landing, 39 in the beach seines, and 0 in the Sacramento trawl this past week. Because of continued presence of spring-run Chinook salmon at monitoring locations in the lower Sacramento River, DOSS

estimates that an additional 5% of the spring-run Chinook salmon population has entered the Delta, for an estimated presence in the Delta of 20-25% of the spring-run Chinook salmon population. No spring-run Chinook salmon have yet been observed in the Chipps Island Trawl.

### **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: MEDIUM** (increased exports and more negative OMRs)
  - Approximately 40-55% of juvenile winter-run Chinook salmon estimated to be in the Delta.
  - Approximately 20-25% of juvenile spring-run Chinook salmon estimated to be in the Delta.
  - Anticipate continued migration of salmonids into Delta.
- **Routing Risk: LOW**
  - DCC is closed.
  - Flows are predicted to be high enough to mute tidal effects around Georgiana Slough.
  - Lack of precipitation in forecast and decreasing river flows increase risk of routing risk into Central and Interior Delta.
- **Overall Entrainment Risk: LOW-MEDIUM**

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

- **Exposure Risk: LOW-MEDIUM**
  - Listed Chinook salmon from the Sacramento River basin have been observed in multiple monitoring sites in the lower Sacramento River and northern Delta.
  - Flows are expected to decrease this week due to lack of precipitation. Salvage is expected to decrease this week compared to last week, since exports will be reduced 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 cfs: MEDIUM-HIGH
  - OMR -7,500 cfs: HIGH
  - OMR -9,000 cfs: HIGH
- **Overall Entrainment Risk:**
  - OMR -2,500 cfs: LOW
  - OMR -3,500 cfs: LOW
  - OMR -5,000 cfs: LOW-MEDIUM
  - OMR -6,250 cfs: MEDIUM-HIGH
  - OMR -7,500 cfs: MEDIUM-HIGH
  - OMR -9,000 cfs: HIGH

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

**Agenda Item 9.**

**Rapid Genetic Protocol & Interim JPE-based Trigger Discussion**

Stuart (NMFS) reiterated that under RPA Action IV.2.3, using the length-at-date method for run assignment (for which thresholds are calculated based on 2% of the JPE), the daily older juvenile Chinook salmon loss density thresholds of greater than 8 or 12 fish/TAF for the first and second stage triggers, respectively, are lower than the estimated JPE-based loss density triggers for this year and, thus, will be the controlling fish density trigger. However, Reclamation and DWR will be conducting rapid genetic analysis in the event of an older juvenile Chinook salmon loss density trigger exceedance based on the length-at-date method. Using the rapid genetic analysis protocol (for which thresholds are calculated based on 1% of the JPE), the JPE-based loss density triggers are lower than the 8 or 12 fish/TAF for the first and second stage triggers, respectively, and thus, will be the controlling fish density trigger after genetic analysis.

Therefore, an interim JPE-based fish density trigger is necessary to assess loss density based on genetic analysis. See DOSS advice, attached and summarized below, for details on interim trigger values.

#### **Agenda Item 10.**

##### **Debris Issues at Skinner Fish Facility**

CDFW reported issues related to high amounts of vegetation debris at Skinner interfering with fish handling during salvage operations conducted during high export conditions. Vegetation is being separated to keep it out of the transport truck, and some fish are being discarded along with the vegetation. Under these circumstances, actual loss is presumed to be higher than calculated loss. Following reduction of exports on January 1 to meet the OMR flow criteria of no more negative than -5,000 cfs, per NMFS' RPA action IV.2.3, the amount of vegetation entering the Skinner Facility is expected to decrease. This should improve the problem regarding excessive vegetation biomass impeding fish handling during salvage operations. NMFS asked DOSS members for ideas to help Skinner operators manage the debris in a way that still allowed for all fish to be salvaged.

Suggestions included:

- Empty the holding tanks more frequently to accumulate less debris.
- Have operators spend more time to separate fish from debris, for example with an interim rinse step.

#### **Agenda Item 11.**

##### **DOSS Advice to WOMT and NMFS:**

The brood year 2019 JPE is estimated to be 1,045,071 winter-run Chinook salmon entering the Delta. Based on the associated calculations for the first- and second-stage JPE-based triggers in Action IV.2.3, the JPE-based trigger values would exceed the maximum trigger thresholds for the first stage (multiplier of 8 fish per TAF) and the second stage (multiplier of 12 fish per TAF) responses. DOSS advises that, if the official JPE for winter-run Chinook salmon is not available by January 1, 2020, Action IV.2.3 be implemented using the triggers for the first stage (multiplier of 8 fish per TAF) and the second stage (multiplier of 12 fish per TAF) based on length-at-date run assignment for older juveniles for the initial response, and then apply the interim JPE-based trigger values using the results of the genetic run assignment when they become available as follows:

- Length-at-date based triggers
  - The first stage action trigger is exceeded if daily SWP/CVP older juvenile Chinook salmon loss is greater than the value of 8.0 fish per TAF multiplied by volume exported (in TAF); exceedance would require OMR to be no more negative than -3,500 cfs for at least five days.
  - The second stage action trigger is exceeded if daily SWP/CVP older juvenile Chinook salmon loss is greater than the value of 12.0 fish per TAF multiplied by volume exported (in TAF); exceedance would require OMR to be no more negative than -2,500 cfs for at least five days.

- JPE-based triggers<sup>4</sup>
  - The interim first stage trigger is exceeded if the genetically verified daily loss density of older-juvenile-sized winter-run Chinook salmon exceeds 5.23 fish per TAF of water exported; exceedance would require OMR to be no more negative than -3,500 cfs for at least five days.
  - 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; exceedance would require OMR to be no more negative than -2,500 cfs for at least five days.

In addition to the advice regarding the interim JPE triggers for implementing RPA Action IV.2.3; DOSS recommends that NMFS and WOMT support the creation of an interagency team to find solutions to the fish handling issues associated with heavy vegetation loads at the fish salvage facilities. It has become apparent during the recent heavy vegetation loads at Skinner that fish are being lost in the removal of vegetation from the collecting tanks while being transferred to the tanker trucks. These losses are unaccounted for during the salvage process.

**Agenda Item 12.**

**Next Meeting:** The next DOSS conference call will be on **1/7/2020 at 9 am.**

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<sup>4</sup> Loss density to be evaluated according to the implementation procedures described in the 12/20/19 letter from NMFS to Reclamation regarding rapid genetic analysis:  
<https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/california-central-valley-water-operations-biological#rapid-genetic-analysis-for-juvenile-chinook-salmon-salvaged-at-cvp-and-swp>

Attachment 1:

## **DOSS ADVICE RE: AN INTERIM JPE-BASED TRIGGER FOR IMPLEMENTATION OF ACTION IV.2.3**

**12/31/2019**

### Background

Action IV.2.3<sup>5</sup> of the Reasonable and Prudent Alternative (RPA) of the 2009 NMFS Biological Opinion on Long-Term Operations of the Central Valley Project and State Water Project (NMFS BiOp) requires Old and Middle River flows more positive than -5,000 cfs when specified action triggers are exceeded. Action IV.2.3 includes four distinct first-stage action triggers, and three distinct second-stage action triggers. Both the first- and second-stage sets of triggers include a trigger based on the Juvenile Production Estimate (JPE) for the current winter-run Chinook salmon brood year population. As described in the 12/20/19 NMFS letter supporting the genetic analysis protocol<sup>6</sup>, the JPE-based action trigger threshold for Action IV.2.3 when applying rapid genetic analysis is calculated as 1% of the winter-run JPE divided by 2,000 (for the first-stage trigger) or by 1,000 (for the second-stage trigger). Minimum trigger values are 2.5 fish per thousand acre-feet (TAF) for the first-stage trigger and 5.0 fish per TAF for the second-stage trigger<sup>7</sup>.

If the official JPE letter to Reclamation for winter-run Chinook salmon is not available by January 1, 2020, the Delta Operations for Salmonids and Sturgeon technical team (DOSS) advises implementation of the JPE-based fish density trigger as described below.

### Rationale for Selecting the Interim Fish Density Triggers

The implementation of RPA IV.2.3 is initially based on the observation of older juvenile Chinook salmon in salvage at the Tracy Fish Collection Facility and the Skinner Delta Fish Protection Facility collectively. Older juvenile Chinook salmon are defined as those fish greater in length than the minimum size of winter-run Chinook salmon at a given date, hereafter referred to as length-at-date (LAD). This older juvenile group may include late fall-run Chinook salmon, yearling spring- and fall-run Chinook salmon, as well as young-of-the-year winter-run Chinook salmon. The number of observed older juvenile Chinook salmon in salvage is expanded to account for fractional sampling periods and the appropriate loss multipliers applied for a

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<sup>5</sup> See pages 74-79 of Enclosure 2 of the 2011 RPA Amendments, available online 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>6</sup> <https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/california-central-valley-water-operations-biological#rapid-genetic-analysis-for-juvenile-chinook-salmon-salvaged-at-cvp-and-swp>

<sup>7</sup> The minimum threshold for the second-stage JPE-based trigger in IV.2.3 is 5.0 fish/TAF, not the 2.5 fish/TAF listed in the 2011 RPA Amendments. The 1/24/12 DOSS notes ([http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Delta%20Operations%20for%20Salmonids%20and%20Sturgeon/DOSS%20WY2012/final\\_notes\\_012412.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Delta%20Operations%20for%20Salmonids%20and%20Sturgeon/DOSS%20WY2012/final_notes_012412.pdf)) acknowledge this clarification.

particular salvage facility and flow conditions to arrive at the loss estimate. The cumulative loss of older juveniles is then divided by the cumulative volume of water pumped during the day (24 hour period) to derive the loss density value (loss of fish/ TAF of exported water). The calculated loss density value is then compared to the trigger thresholds as defined in RPA IV.2.3 to determine if a trigger threshold has been exceeded.

- The JPE-based trigger thresholds, based on the LAD run characterization for older juveniles, divide the JPE by 2 percent (2%) to derive the incidental take limit (ITL). The 2% value is used to accommodate potential misidentification of runs by LAD determinations. The First Stage Trigger is calculated by dividing the incidental take limit (2% of JPE) by 2000 to provide the loss density trigger threshold. The Second Stage Trigger is derived by dividing the incidental take limit (2% of JPE) by 1000. The minimum levels for the first and second stage triggers are 2.5 fish/TAF and 5.0 fish/TAF, respectively.
- The maximum calculated loss trigger thresholds for the first and second stages are derived by multiplying the daily export volumes by 8 fish/TAF and 12 fish/TAF (respectively) to determine the maximum number of older juveniles that may be lost during operations in a given day.

Initial export responses to meet the more positive OMR conditions are taken if any of the first or second trigger thresholds, based on LAD determinations, are exceeded.

Current application of the genetic analysis protocol provides the genetic-based determinations of the race assignment of the older juvenile Chinook salmon that triggered an exceedance of a trigger threshold in Action IV.2.3. Since the ambiguity of the true race of the older juvenile fish is eliminated by the genetic analysis, the JPE-based action trigger threshold for Action IV.2.3, when applying rapid genetic analysis results, is calculated as 1% of the winter-run JPE divided by 2,000 (for the first-stage trigger) or by 1,000 (for the second-stage trigger). The minimum trigger values are still 2.5 fish per thousand acre-feet (TAF) for the first-stage trigger and 5.0 fish per TAF for the second-stage trigger. The maximum trigger values are still calculated by multiplying the cumulative daily export volume by 8.0 fish/TAF for the first-stage trigger and 12 fish/TAF for the second-stage trigger. After the genetic determinations are made, the loss density is recalculated and applied as described in the December 20, 2019 NMFS letter supporting the genetic analysis protocol. If the subsequent genetic-based loss density is below the trigger thresholds determined for genetic run assignment, then the OMR restrictions are rescinded and exports may continue at their previous level. Conversely, if the genetic-based loss density is still above the genetic-based trigger thresholds, then the actions taken to meet the OMR restrictions remain in place.

#### DOSS Advice

The brood year 2019 JPE is estimated to be 1,045,071 winter-run Chinook salmon entering the Delta. Based on the associated calculations for the first- and second-stage JPE-based triggers in Action IV.2.3, the JPE-based trigger values would exceed the maximum trigger thresholds for the first stage (multiplier of 8 fish per TAF) and the second stage (multiplier of 12 fish per TAF) responses. **DOSS advises that, if the official JPE for winter-run Chinook salmon is not available by January 1, 2020, Action IV.2.3 be implemented using the triggers for the first stage (multiplier of 8 fish per TAF) and the second stage (multiplier of 12 fish per TAF) based on length-at-date run assignment for older juveniles for the initial response, and then**

**apply the interim JPE-based trigger values using the results of the genetic run assignment when they become available as follows:**

- Length-at-date triggers
  - The first stage action trigger is exceeded if daily SWP/CVP older juvenile Chinook salmon loss is greater than the value of 8.0 fish per TAF multiplied by volume exported (in TAF); exceedance would require OMR to be no more negative than -3,500 cfs for at least five days.
  - The second stage action trigger is exceeded if daily SWP/CVP older juvenile Chinook salmon loss is greater than the value of 12.0 fish per TAF multiplied by volume exported (in TAF); exceedance would require OMR to be no more negative than -2,500 cfs for at least five days.
- JPE-based triggers<sup>8</sup>
  - The interim first stage trigger is exceeded if the genetically verified daily loss density of older-juvenile-sized winter-run Chinook salmon exceeds 5.23 fish per TAF of water exported; exceedance would require OMR to be no more negative than -3,500 cfs for at least five days.
  - 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; exceedance would require OMR to be no more negative than -2,500 cfs for at least five days.

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<sup>8</sup> Loss density to be evaluated according to the implementation procedures described in the 12/20/19 letter from NMFS to Reclamation regarding rapid genetic analysis:  
<https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/california-central-valley-water-operations-biological#rapid-genetic-analysis-for-juvenile-chinook-salmon-salvaged-at-cvp-and-swp>