

**Delta Operations for Salmonids and Sturgeon (DOSS) Group**  
**Conference call: 12/10/2019 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, Jason Julienne

**DWR:** Norman Lee, Mike Ford, Farida Islam

**NMFS:** Kristin Begun, Garwin Yip

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

**SWRCB:** Michael Macon, Craig Williams

**USFWS:** Felipe Carrillo

**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 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

---

<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, as well as exceeding a 50% increase in mean daily flows on 12/7/2019.

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
12/3/2019	181	-33%	193	-32%
12/4/2019	154	-15%	156	-19%
12/5/2019	144	-6%	144	-7%
12/6/2019	146	1%	143	-1%
12/7/2019	338	132%	386	170%
12/8/2019	407	20%	482	25%
12/9/2019	246	-40%	299	-38%

- 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 this past week on 12/4/2019, 12/8/2019, and 12/9/2019.

Date	Wilkins Slough (WLK)	Knights Landing (KL)
	Mean Daily Flow (cfs)	Daily water temperature (°F)
12/3/2019	7,457	47.2
12/4/2019	8,312	49.4
12/5/2019	7,452	50.9
12/6/2019	7,039	51.8
12/7/2019	6,995	53.5
12/8/2019	7,803	54.5
12/9/2019	13,869	54.2

**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 (KLCI) or Sacramento Catch Index (SCI) >10] was triggered on 12/6/2019, based on KLCI. 13 fish were caught on 12/6/2019 and total fishing time was 10.52 hours. Since Knights Landing

<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](#).

RST was fishing at 50% cone effort, KLCI was doubled to represent full cone effort triggered this past week. Therefore, KLCI = 59.32.

- 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 (12/10/2019)**

SWP		CVP	
<b>Exports (cfs)</b>			
Clifton Court Forebay	6,680	Jones Pumping Plant	3,400*
<b>Reservoir Releases (cfs)</b>			
Feather - Oroville	2,500	American - Nimbus	2,500
		Sacramento - Keswick	5,000
		Stanislaus - Goodwin	4,000
		Trinity - Lewiston	300
<b>Reservoir Storage (TAF)</b>			
San Luis (SWP)	701	San Luis (CVP)	280
Oroville	1,977	Shasta	3,264
New Melones	1,986	Folsom	505
<b>Delta Operations</b>			
DCC	Closed	Sacramento River at Freeport (cfs)	20,938
Outflow Index (cfs)	~21,300	San Joaquin River at Vernalis (cfs)	5,946
E:I	37.4% (3-day) 49.9% (14-day avg.)	X2	>81 km

\* CVP capacity is limited by the maintenance of 2 pumping units.

Factors controlling Delta exports:

- 12/3/2019 – 12/4/2019: E/I ratio.
- 12/5/2019-12/10/2019: Available physical capacity.

Approximate OMRs as of 12/9/2019:

	Index (cfs)
Daily	-6,900
5-day	-7,200
14-day	-7,400

*Weather Forecast*

The forecast for the Sacramento valley shows precipitation chances returning to areas north of Sacramento on late Tuesday with more widespread precipitation expected late in the week. Periods of rain and mountain snow in northern California expected Friday through the weekend.

Precipitation on Friday mainly looks limited to the mountains and foothills with snow levels high over 7,000 feet.

**Agenda Item 4.**

**Smelt Working Group**

The Smelt Working Group met on Monday, 12/9/2019.

The Smelt Working Group (SWG) reviewed current Delta conditions, survey data, expected exports, and forecasted weather. The SWG indicated that the precipitation forecasted for this week would be minor, and a “first flush” event is unlikely to occur this week. Field surveys have not detected any Delta Smelt outside of Suisun Bay in the past week. Additionally, the moderate rise in turbidity levels in the south and central Delta last week has declined. The SWG concluded that the risk for Delta Smelt entrainment is low.

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 group will meet again on Monday, 12/16/2019 at 10 am.

**Agenda Item 5.**

**Fish Monitoring:** The following table presents fish monitoring data summarized over the past week.

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</sup>	Chipps Is. Midwater Trawl <sup>D</sup>	Mossdale Kodiak Trawl <sup>D</sup>
Sample Date		12/2-12/6	12/2-12/9	12/2-12/5	12/1-12/2, 12/4-12/5, 12/7	12/2-12/4, 12/7	12/2, 12/4-12/5
FR Chinook							
SR Chinook			1	1			
WR Chinook		10	20	4			
LFR Chinook			4	1			1
Chinook (ad-clip)				1			
Steelhead (wild)							
Steelhead (ad-clip)							
Green Sturgeon							
Flows (avg. cfs)		7,240	7,347				
W. Temp. (avg. °F)		49.8	52.0				

<b>Turbidity (avg. NTU)</b>		9.0	26.44				
-----------------------------	--	-----	-------	--	--	--	--

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

<sup>B</sup> Tisdale RST sampling period was from 12/2/2019 at 10:00 am to 12/6/2019 at 9:45 am.

<sup>C</sup> Knights Landing RST sampling period was from 12/2/2019 at 10:00 am to 12/9/2019 at 2:00 pm. Cone effort was 50%. Trap cones raised on 12/3/2019 at 10:00 am due to an anchor cable failure and lowered back in the water on 12/4/2019 at 12:15 pm. Trap cones were raised on 12/9/2019 at 2:00 pm in anticipation of increasing flow and debris.

<sup>D</sup> Data reported in the 12/1/2019 to 12/7/2019 DJFMP sampling summary.

### Red Bluff Diversion Dam (RBDD)

USFWS biweekly report (11/19/2019-12/2/2019) 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)	108,341	3,793,199 (2,512,915-5,073,482)
Spring-run Chinook (BY2019)	12,714	236,969 (151,028-322,911)

### Juvenile Green Sturgeon Monitoring Summary for DOSS; 12/10/2019 Sampling Season Summary

- No juvenile sturgeon were tagged at the sampling site northwest of Sherman Lake since 11/5/2019.
- Four juvenile green sturgeon detected at sampling site northwest of Sherman Lake:
  - 1 tagged on 12/27/2018 was detected on 11/26/2019 (A69-1602-12231);
  - 1 tagged on 2/7/2019 was detected on 12/6/2019 (A69-1602-11446);
  - 1 tagged on 10/3/2019 was detected on 11/26/2019 (A69-1602-12235);
  - 1 tagged on 11/5/2019 was detected on 11/26/2019 and 12/3/2019 (A69-1602-12219).
- One juvenile white sturgeon tagged on 8/6/2019 was detected on 11/26/2019, 12/3/2019, and 12/6/2019 at sampling site northwest of Sherman Lake (A69-1602-12229).
- Four adult white sturgeon tagged by USFWS Lodi staff in the San Joaquin River were detected at sampling site northwest of Sherman Lake:
  - 1 tagged 3/11/2014 detected on 11/26/2019, 12/3/2019 and 12/6/2019 (A69-9001-25741);
  - 1 tagged 4/3/2014 detected 11/26/2019, 12/3/2019, and 12/6/2019 (A69-9001-27462);
  - 2 tagged 3/31/2016 detected 11/26/2019 (A69-9001-19545) and (A69-9001-19546).
- One adult white sturgeon tagged by UCD Biotelemetry Lab at an unknown location in March 2014 detected at sampling site northwest of Sherman Lake 11/26/2019 (A69-9001-25618).

- One adult white sturgeon tagged by UCD Biotelemetry Lab at an unknown location in April 2014 detected at sampling site northwest of Sherman Lake 12/3/2019 and 12/6/2019 (A69-9001-25623).

\* Please refer to the 10/8/2019 DOSS notes for a summary of the 2018 sampling season summary.

## **CDFW Lower American River Carcass Survey**

Reporting for survey period 12/2/2019-12/6/2019:

- 2,156 observed carcasses
  - 588 female
    - 241 unclipped
    - 347 clipped
    - 587 female carcasses evaluated for spawn condition:
      - 150/587 (26%) prespawn mortalities
      - 30/587 (5%) partially spawned
      - 392/587 (67%) spawned
      - 15/587 were too deteriorated to determine spawning condition
  - 629 males
    - 173 unclipped
    - 456 clipped
  - 939 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: 54.7°F
  - Mean: 55.2°F
  - Maximum: 55.4°F

### **Hatchery Releases:**

The U.S. Fish and Wildlife Service (USFWS) released approximately 825,000 BY 2019 late-fall-run Chinook salmon on 12/5/2019 into Battle Creek at the Coleman National Fish Hatchery. This group was 100% marked (with an adipose fin clip) and coded-wire tagged and had an overall estimated average fork length of 145 mm.

The USFWS released approximately 338,000 BY 2019 steelhead into the Sacramento River at Bend Bridge boat ramp on 12/6-7/2019. This group was 100% marked (only with an adipose fin clip) and had an estimated average fork length of 195 mm. Bend Bridge is located at river mile 258, or about 14 river miles downstream of the Battle Creek confluence.

The USFWS planned the experimental release of approximately 84,869 BY 2019 late-fall-run Chinook salmon on 12/9/2019 into Battle Creek at Coleman National Fish Hatchery. The purpose of this experimental release is to provide insight into the migratory behavior and fate of yearling spring-run Chinook salmon emigrating from the upper Sacramento River and its tributaries.

On 12/5/2019, the California Department of Fish and Wildlife released approximately 9,600 BY 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 tagged yearlings that were released as part of a multi-life stage release strategy for the SJRRP.

**Agenda Item 6.**

**Fish Monitoring: Salvage**

Griffiths (CDFW) provided the following salvage summary for the period of 12/2/2019-12/8/2019.

No listed fish species were observed this week. Two late-fall-run and 1 fall-run Chinook salmon were salvaged at the CVP.

*Operations:*

The SWP has been reducing counts due to heavy vegetation this past week.

## DOSS Weekly Salvage Update

Reporting Period: December 2-December 8, 2019

Prepared by Kyle Griffiths on December 9, 2019 14:26

Preliminary Results -Subject to Revision

Criteria	2-Dec	3-Dec	4-Dec	5-Dec	6-Dec	7-Dec	8-Dec	Trend	
<b>Loss Densities</b>									
Wild older juvenile CS	0	0.16	0	0.14	0.15	0	0	↗	0.06
Wild steelhead	0	0	0	0	0	0	0	→	0.00
<b>Exports</b>									
SWP daily export	10,832	11,728	12,332	14,336	12,849	12,784	14,119	↗	12,711
CVP daily export	6,789	6,775	6,875	6,865	6,890	6,940	6,950	↗	6,869
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	8	6	↗	8	6
Fall Run	4	3	↗	4	3
Unclassified	0	0	→	0	0
<b>Total</b>	<b>12</b>	<b>9</b>		<b>12</b>	<b>9</b>
<b>Hatchery</b>					
Winter Run	0	0	→	0	0
Spring Run	0	0	→	0	0
Late Fall Run	0	0	→	0	0
Fall Run	0	0	→	0	0
Unclassified	0	0	→	0	0
<b>Total</b>	<b>0</b>	<b>0</b>		<b>0</b>	<b>0</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

**Agenda Item 7.**

**DOSS Estimates of Fish Distribution**

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

<b>Location</b>	<b>Yet to Enter Delta (Upstream of Knights Landing)</b>	<b>In the Delta</b>	<b>Exited the Delta (Past Chippis Island)</b>
<i>Young-of-year (YOY) winter-run Chinook salmon</i>	75-80% (Last week: 91%)	20-25% (Last week: 9%)	0% (Last week: same)
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	92-95% (Last week: 97%)	5-8% (Last week: 3%)	0% (Last week: same)

**Rationale for changes in distribution**

*Wild winter-run Chinook salmon:*

Nearly 3.8 million BY 2019 winter-run Chinook salmon have passed RBDD this year, approximately 6,300 BY19 winter-run Chinook salmon have been captured by the GCID RSTs since 8/1/2019, and 82 at the Knights Landing RSTs since 9/5/2019. In the last week, 10 length-at-date winter-run Chinook salmon were captured at Tisdale, 20 at Knights Landing, 4 at the beach seines, and at no other monitoring locations in the Delta. Since a greater number of winter-run Chinook salmon were observed over the past week, and taking into consideration that Knights Landing was operating at half cone and had limited sampling time, DOSS estimates that 20-25% of the winter-run population has entered the Delta. Since the valley has received a couple of rain events and another event is in the forecast over the next weekend, increased river flows will likely trigger more winter-run to migrate into the Delta over the next week.

*Wild spring-run Chinook salmon:*

One length-at-date spring-run Chinook salmon was observed at Tisdale, 1 in the beach seines, and at no other monitoring locations this past week. Since 2 spring-run Chinook salmon were observed this past week including one in the Delta, DOSS estimates that 5-8% of the spring-run Chinook salmon population has moved into the Delta. DOSS took into consideration that Knights Landing was operating at half cone and had limited sampling time. Since more precipitation is in the forecast, increased river flows could trigger part of the spring-run population to migrate into the Delta over the next week.

**Agenda Item 8.**

**Risk of Entrainment**

*Risk of entrainment of listed salmonids into Central and South Delta:*

The risk of entrainment to fish that are present in the lower Sacramento River and upper Delta waterways is higher than last week, but still considered low. Sacramento River inflows to the Delta are increased compared to last week (~21,000 cfs), and may decrease this week with decreased precipitation amounts. DCC gates are closed, which will help prevent juveniles from straying into the south Delta. Fish migration is expected to continue to increase into the Delta. With DCC gates closed, access to the Delta interior is primarily through Georgiana Slough.

Increased flows on the Sacramento River will help to mute tidal influence in this section of the Sacramento River. Overall risk of juvenile winter-run Chinook salmon entrainment into the interior Delta is considered low as a percentile of population but absolute numbers may increase due to a larger population of young-of-year winter-run Chinook salmon this year.

*Export Risk:*

The overall export risk is slightly higher than last week but still considered low. QWEST flows are more positive due to river inflows, OMR flows are slightly less negative than last week (-6,900 cfs vs -7,700 cfs) and the percentage of Delta inflow exported has decreased since last week (currently 37.4% 3-day average). However, export levels remain at approximately 10,000 cfs (6,680 cfs at SWP and 3,400 cfs at CVP), and more fish have been observed at monitoring locations. The overall export risk of entrainment is slightly higher than last week due to more fish in the vicinity of the exports' area of influence this week.

**Agenda Item 9.**

**Other Topics**

DOSS discussed whether an interim JPE would be needed prior to the end of the year since the JPE is used to determine one of the fish density triggers for RPA Action IV.2.3 (OMR Flow Management), which is in effect beginning on 1/1/2020. Based on current information, this year's JPE-based fish density trigger will likely be greater than 8 fish/TAF. Since RPA Action IV.2.3 already has a fish density trigger of 8 fish/TAF, a higher JPE-based fish density trigger would not affect implementation of RPA Action IV.2.3. The DOSS group agreed that an interim JPE and JPE-based fish density trigger did not seem necessary.

Yip (NMFS) asked if Reclamation would be requesting rapid genetic analysis protocol this year to determine genetics-based run classification of unclipped juvenile Chinook salmon. Buttermore (Reclamation) confirmed that Reclamation will have a contract with Cramer Fish Sciences this water year through June.

Begun (NMFS) discussed the delayed communication over the Thanksgiving holiday for the DCC gate closure. Ford (DWR) said this was discussed on the WOMT call and asked if DOSS recommended any changes to protocol to ensure agencies are informed when catch indices are exceeded. Patton (Reclamation) suggested that the DCC protocol be distributed to the DOSS group at the start of each water year to make sure any new staff are aware of procedures. Yip (NMFS) added that the notification protocol for OMR loss density trigger exceedances should also be distributed.

Begun (NMFS) informed the group that Niemela (USFWS) contacted her this morning to let NMFS know that a portion of the Coleman National Fish Hatchery late-fall-run Chinook salmon had been accidentally released and not set aside for a DWR study (Clifton Court Forebay efficiency study). Niemela asked if 3,000 fish from spring-run Chinook salmon surrogate group #2 could be provided to the Clifton Court Forebay study. Begun provided consent to reduce the surrogate group by 3,000 fish. The DOSS group discussed the release and agreed that the spring-run Chinook salmon surrogate group should not be affected by this reduction. The spring-run Chinook salmon surrogate release group #2 was approximately 80,600 fish, and is now approximately 77,600 fish.

**Agenda Item 10.**

**DOSS Advice to WOMT and NMFS:**

No operational advice to NMFS or WOMT but a “heads up” for potential fish movement, and the potential for exceeding KLCI or SCI triggers for the third alert of RPA Action IV.3. Listed salmonids are expected to start showing up in salvage at the Federal and State fish facilities in the near future based on current hydrology and the time of year.

**Agenda Item 11.**

**Next Meeting:** The next DOSS conference call will be on **12/17/2019 at 9am.**