

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 2/12/2019 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 and the State Water Project on salmonids and green sturgeon. DOSS will work with other technical teams. DOSS notes and advice can be found at: http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/doss.html.

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Agenda Items

1. Agenda review and introductions
2. RPA Implementation review (For the DOSS Dashboard, click on the "Triggers & Indices" tab at: www.baydeltalive.com/djfmj)
3. Current Operations
4. Smelt Working Group
5. Fish Monitoring: RSTs/trawls/seines
6. Fish Monitoring: Salvage
7. Genetic results of Salvaged Chinook
8. Hatchery Releases
9. DOSS Estimates of Fish Distribution
10. DOSS Feedback on Entrainment Risk
11. DOSS advice
12. Next DOSS meeting

Agenda Item 2.

RPA Implementation Review

Delta RPA Actions affecting operations during February:

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

- Starting on 10/1, the First Alert is triggered if either the first component (>95 cfs flow threshold) or second component (>50% change in mean daily flow) has been exceeded at either the Deer Creek gage at Vina (DCV), or the Mill Creek gage at Los Molinos

¹ For details, see pages 60-61 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf. 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.

(MLM). The First Alert was triggered every day this past week. See table below for details.

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
2/5/19	795	-59%	1,021	-46%
2/6/19	517	-35%	696	-32%
2/7/19	403	-22%	538	-23%
2/8/19	350	-13%	458	-15%
2/9/19	334	-5%	423	-8%
2/10/19	348	4%	392	-7%
2/11/19	307	-12%	343	-12%

- Second Alert (triggered only if both Knights Landing water temperatures are <56.3°F and Wilkins Slough flows are >7,500 cfs). The Second Alert was triggered every day this past week. See table below for details.

Wilkins Slough (WLK)		Knights Landing (KL)
Date	Mean Daily Flow (cfs)	Daily water temperature (°F)
2/5/19	25,761	50.4
2/6/19	25,173	49.0
2/7/19	23,198	47.7
2/8/19	21,154	47.5
2/9/19	18,968	47.4
2/10/19	17,463	47.4
2/11/19	16,646	47.7

Action IV.1.2² (DCC gate operations):

- DCC gates will remain closed per operations described in RPA IV.1.2 starting 12/1/18.

Action IV.2.3³ (OMR Management):

- Implementation of this action in WY 2019 began on 1/1/19, 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.
- On 2/6, the first stage trigger (spring-run surrogate release group #3) was exceeded requiring OMR flow to be no more negative than -3,500 cfs for 5 consecutive days. The 5-day action response occurred on 2/8-12. OMR flow of -5,000 cfs will resume tomorrow (2/13).

² For details, see pages 62-66 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

Action IV.3³ (Reduce likelihood of entrainment or salvage at the export facilities, including an alert that indicates that export operations may need to be altered):

- The Third Alert [November 1-February 28 Knights Landing Catch Index (KLCI) or Sacramento Catch Index (SCI) >10] was not triggered this past week.
- Since the action went into effect on 11/1/18, no salvage-based triggers that would require export reduction have been exceeded.

Agenda Item 3.

Current Operations (2/12/19)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	2,900*	Jones Pumping Plant	3,500**
Reservoir Releases (cfs)			
Feather - Oroville	1,750	American - Nimbus	15,000
		Sacramento - Keswick	3,250
		Stanislaus – Goodwin	600
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	987	San Luis (CVP)	843
Oroville	1,572	Shasta	3,121
New Melones	1,923	Folsom	619
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	43,800
Outflow Index (cfs)	~56,500	San Joaquin River at Vernalis (cfs)	5,500
E:I	14% (14-day avg.)	X2	> 58 km

* SWP exports are scheduled to increase tomorrow to ~4,200 cfs and may increase further depending on San Joaquin River flows.

** CVP exports are scheduled to increase tomorrow to 4,000 cfs.

Factors controlling Delta exports:

- 2/5/19-2/7/19: -5,000 cfs OMR limit per NMFS BiOp RPA Action IV.2.3
- 2/8/19-2/12/19: -3,500 cfs OMR limit per NMFS BiOp RPA Action IV.2.3

Approximate OMR as of 2/9/19:

	USGS gauges (cfs)	Index (cfs)
Daily	-4,000	-3,600
5-day	-3,900	-4,400
14-day	-4,400	-4,500

³ For details, see pages 79-80 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

Approximate OMR as of 2/11/19:

	Index (cfs)
Daily	-3,300
5-day	-3,800
14-day	-4,300

Weather Forecast

Light precipitation today with significant rain expected tonight. Rain may continue into the weekend. Warmer mild temperatures in the 40s and 50s expected in the Sacramento area this week.

Agenda Item 4.

Smelt Working Group

The Smelt Working Group met on Monday, 2/11/19, at 10 am.

The Smelt Working Group (SWG) reviewed current Delta conditions, survey data, expected exports, and forecasted weather. The incidental take limit (ITL) for the yearling spring-run Chinook salmon surrogate release group number 3 from the Coleman National Fish Hatchery was exceeded this past week, and OMR flows have been limited to -3,500 cfs until tomorrow. On 1/31, the 3-station average daily water temperature at Mossdale, the Rio Vista Bridge, and Antioch exceeded 12°C, which is the temperature indicative of Delta Smelt spawning as identified in the Biological Opinion and a trigger for the start of Action 3. The SWG determined that with increased rivers flows due to the upcoming storm, more positive OMR flows, and lower turbidity levels around the OMR corridor, the risk for Delta Smelt entrainment is lower this week than it was last week. The SWG advised that the risk of entrainment for Delta Smelt would be low for OMR flows of between -1,250 to -2,000 cfs, low for flows between -2,000 to -3,500 cfs, and medium for flows between -3,500 to -5,000 cfs.

The Service notified Reclamation on February 6 that Action 3 had been implemented for the protection of larval and juvenile Delta Smelt, which requires OMR flow rates to be no more negative than -5,000 cfs on a 14-day running average. The SWG will continue to monitor Delta Smelt survey and salvage data and Delta conditions, and the group plans to meet again next Tuesday, 2/19/19 at 10 am.

Agenda Item 5.

Fish Monitoring: The following table presents fish monitoring data summarized over the past week. Unless otherwise noted, reported sizes are fork length. Empty cells indicate zero catches at those locations with sample dates shown.

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	2/7-2/11	2/3-2/8	2/4-2/11	2/4-2/7	2/4-2/7, 2/9	2/3-2/7, 2/9	2/4, 2/6-2/7
FR Chinook	46 juveniles	103	479	290	254		48
SR Chinook	7 juveniles	1	4	26	9		
WR Chinook	11 juveniles 6 smolts	1	1	3	2	1	1
LFR Chinook							
Chinook (ad-clip)	1 LFR smolt					1	1
Steelhead (wild)	2		1				
Steelhead (ad-clip)	11	1	7		6	15	
Green Sturgeon							
Flows (avg. cfs)	1,277	32,918	21,298				
W. Temp. (avg. °F)	48.25	56	48.2				
Turbidity (avg. NTU)	18.15	67.0	93.37				

^A The GCID RST cone was raised on 2/1 due to predicted high flows and lowered on the morning of 2/7.

^B Tisdale RST sampling period was from 2/3 at 10:00 am to 2/8 at 9:30 am. RST trap fishing effort at 50% effort on 2/5 to 2/8.

^C Knights Landing RST sampling period was from 2/4 at 10:15 am to 2/11 at 10:15 am. RST trap fishing effort at 50%.

^D Data reported in the 2/3 to 2/9 DJFMP sampling summary.

Enhanced Delta Smelt Monitoring (EDSM):

Eleven fall-run Chinook salmon, 4 winter-run Chinook salmon, and 4 clipped steelhead were observed in the EDSM this past week.

CDFW carcass surveys

- **American River:** Chinook salmon carcass surveys began on Monday, 10/15/18. The survey area is from Nimbus Dam to Watt Avenue. The Nimbus Basin was closed to all fishing on 3/1/2018. Chinook salmon spawning is currently monitored in this area. The weir was pulled out during the week of 12/10 and is no longer part of the survey. Carcass surveys for the 2018-2019 season concluded on 1/9/2019 with a total of 12,581 carcasses

observed with peak carcass observation occurring during the week of 12/3/2018. It is estimated that peak emergence will be during the beginning of March.

Stanislaus River weir

Monitoring at the weir near Riverbank (for upstream passage of adult salmonids) began on 9/5/18. **The weir is currently not sampling due to high flows.** The cumulative net upstream passage through 2/4/19 is 4,779 Chinook salmon (26% were ad-clipped, indicating a verifiable hatchery origin; hatcheries ad-clip 25% of their production fall-run Chinook salmon), and 25 steelhead (data provided by FISHBIO in their 2/5/19 Stanislaus Weir Update). Sixteen of the steelhead passing the weir were greater than 16 inches. Of these 16 fish, 6 were ad-clipped indicating a hatchery origin, and 10 were unclipped indicating a natural origin.

Acoustic-tagged green sturgeon

CDFW has acoustic-tagged 40 juvenile sturgeon (35 green sturgeon and 5 white sturgeon) captured between 7/24/18 and 12/27/18 near Sherman Lake on the Sacramento River (western Delta). Fork lengths of these fish range between 39 cm and 94 cm. 31 individuals have been detected (near the Sherman Lake tagging location) between 8/14/18 and 1/3/19. **No new updates reported in the last week.**

Agenda Item 6.

Fish Monitoring: Salvage

Griffiths (CDFW) provided a salvage summary for the period of 2/4-2/10.

Unclipped winter-run-sized Chinook were observed at the federal facility 2/6 and 2/7 and at the state facility on 2/8. Weekly salvage of wild origin Chinook salmon was 14 individuals. Many wild origin fall-run-sized Chinook were observed this week at both facilities, but primarily at the federal facility. At the federal facility, fall-run-sized Chinook were observed each day from 2/6 – 2/10, and at the state facility on 2/7, 2/8, and 2/9. This group of fall-run-sized Chinook may have been associated with higher outflow from the San Joaquin basin. The total weekly salvage for this group was 1,255 fall-run Chinook salmon.

Salvage totals are extrapolated from subsample inflation factors. Weekly salvage of wild-origin Chinook was **1,269** and the WY19 total salvage is **1,344** fish.

Clipped winter-run-sized Chinook were observed at the federal facility on 2/6, 2/7, and 2/9, and at the state facility 2/5 and 2/7 – 2/10. Clipped spring-run-sized Chinook salmon were observed at the federal facility on 2/8 and state facility 2/9. Clipped Chinook salmon were salvaged from the Coleman National Fish Hatchery release group 3 (released 1/4/19). **Salvage from this group exceeded the RPA Action IV.2.3 trigger this week.** Other clipped Chinook recovered were identified with CWT codes as spring-run San Joaquin River Restoration Program SCARF (Salmon Conservation and Release Facility) releases (released 1/31/19).

Weekly salvage of clipped (hatchery origin) Chinook salmon was **55** individuals, for a WY19 total of **403**.

Unclipped steelhead were observed at the state facility 2/5, 2/6, 2/9, & 2/10, and at the federal facility 2/7 and 2/10. The weekly salvage total of unclipped steelhead was 35, raising the seasonal salvage total to 79. Clipped steelhead were observed at both facilities each day 2/4 – 2/10/19. The weekly salvage total of clipped steelhead was **290**, raising the seasonal salvage total to **498**.

No sturgeon were salvaged this week.

No outages were noted in fish facilities operational notes this week.

DOSS Weekly Salvage Update

Reporting Period: February 4-February 10, 2019

Prepared by Kyle Griffiths on February 11, 2019 16:1

Preliminary Results -Subject to Revision

Criteria	4-Feb	5-Feb	6-Feb	7-Feb	8-Feb	9-Feb	10-Feb	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0.19	0.33	0.70	0	0	↘	0.18
Wild steelhead	0	1.06	1.46	0.17	0	4.27	1.18	↗	1.16
Exports									
SWP daily export	5,434	9,575	8,073	7,699	5,558	5,236	4,980	↗	6,651
CVP daily export	6,598	6,717	6,803	7,925	6,975	6,939	7,003	↗	6,994
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	14	17	↘	58	92
Spring Run	0	0	→	0	0
Late Fall Run	0	0	→	3	13
Fall Run	1,255	915	↗	1,283	949
Unclassified	0	0	→	0	0
Total	1,269	932		1,344	1,054
Hatchery					
Winter Run	11	32	↗	11	32
Spring Run	25	33	↗	57	54
Late Fall Run	15	51	↗	331	690
Fall Run	4	3	↗	4	3
Unclassified	0	0	→	0	0
Total	55	119		403	779

Trend = weekly loss per race; Salvage = estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time

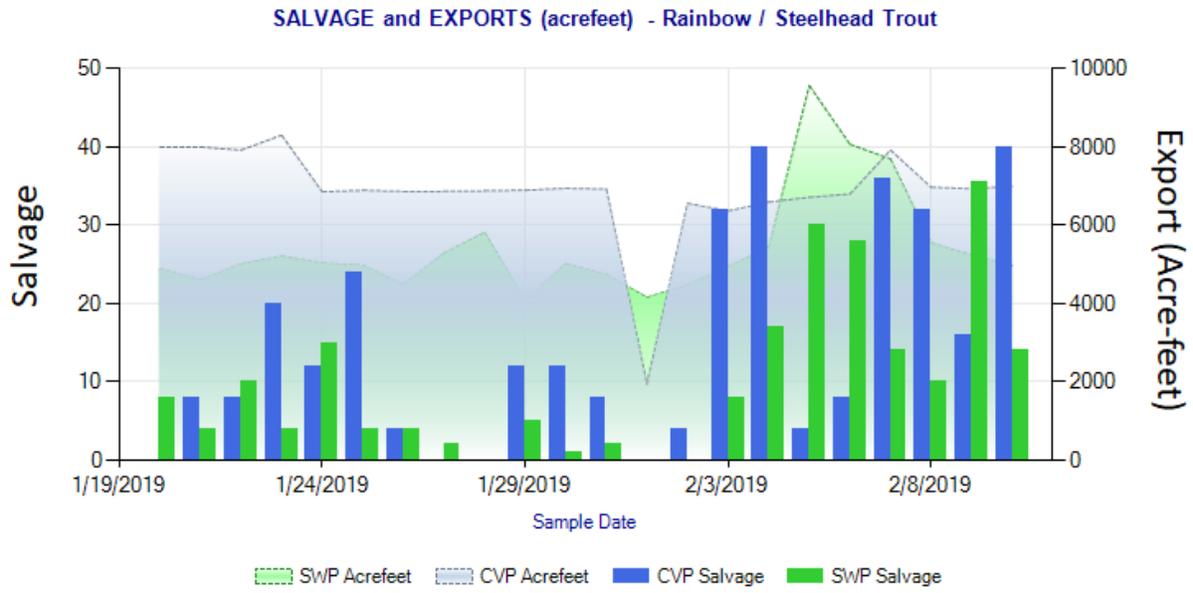
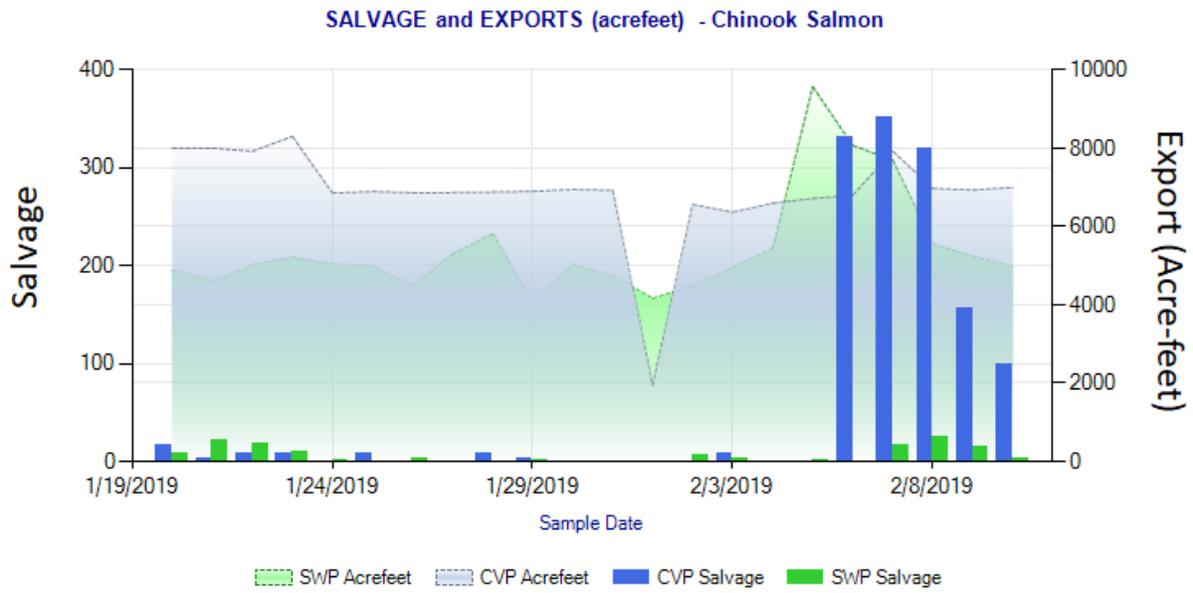
NC = cannot be calculated; hatchery salmon salvage and loss estimates have been corrected using CWT readings when available

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	35	108	↗	79	192
Hatchery	290	656	↗	498	1,031
Total	325	763		577	1,223

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



CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 2/7/19

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 Trigg	Date of First Loss ⁴	Date of Last Loss ⁴
12/3/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	49.68	61,277	n/a	0.081	n/a	0.5%	12/27/2018	1/21/2019
12/14/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	15.88	66,266	n/a	0.024	n/a	0.5%	12/27/2018	1/20/2019
1/4/2019	LF	Coleman NFH	Battle Creek	Spring Surrogate	397.94	73,952	n/a	0.538	n/a	0.5%	1/16/2019	2/7/2019

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2018 through 2/7/2019.

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.

Agenda Item 7.

Preliminary Genetic Data for CVP/SWP Salvage – Data subject to revision.

Caution should be exercised when interpreting population assignment results, as the nuances of the statistical analysis used to generate the results may not be apparent. The mathematical error regarding the broad determination of winter run versus non-winter run is essentially zero. There is high confidence in the “Assignment” and probability shown in “PosProb1”, so that information could be viewed as “certain”. Regarding finer sub-divisions of population assignment, error can increase. The “Group” label is categorized by run type (or race); however, there is little genetic difference between fall and late-fall. It is more appropriate to collapse the information into the National Marine Fisheries Service’s designated Evolutionary Significant Units (ESU): 1) fall/late fall; 2) spring; and 3) winter. Regarding the probabilities themselves, a value greater than 0.80 is viewed as highly likely and is interpreted as the observed assignment was statistically greater to the group shown than to any other possible group. Similarly, values lower than 0.80 are statistically less uncertain.

For the results provided, assignment probabilities shown in “PosProbs 2” were low at the race level (i.e. fall or late fall), but were quite certain at the ESU level (i.e., fall and late fall). In addition, known introgression between Feather River spring-run and Feather River fall-run Chinook salmon may result in low assignment probabilities.

The “Best” label is a legacy term, and denotes the single reference collection – in the baseline used for assignment – that the individual fish assigned to most-likely matches. The “Best” results are provided for personal interest only, as many of reference collections are not genetically different.

Preliminary genetic results indicate all older juvenile sized Chinook salvaged during this water year that have been tested were fall/late fall-run, with the exception of one fish salvaged at the CVP on January 18, 2019 (see table below).

Sample Date	Fork Length	Assignment	PosProb1	Group	PosProb2	Best	PosProb3	Central_Valley_fa	Central_Valley_lfa	Central_Valley_sp	Central_Valley_wi	Delta Model	Facility
12/4/18 10:00	132	Non-winter	1.000	Fall	1.000	MillCrfa	1.000	1.000	0.000	0.000	0.000	Late Fall	CVP
12/23/18 13:00	146	Non-winter	1.000	Fall	0.992	ButteCrfa	0.397	0.992	0.000	0.008	0.000	Late Fall	SWP
12/31/18 14:00	122	Non-winter	1.000	Fall	0.993	BattleCrfa	0.815	0.993	0.000	0.007	0.000	Winter	CVP
1/2/19 13:00	156	Non-winter	1.000	Fall	0.936	ButteCrfa	0.446	0.936	0.000	0.064	0.000	Winter	SWP
1/2/19 14:00	143	Non-winter	1.000	Fall	0.991	ButteCrfa	0.447	0.991	0.000	0.009	0.000	Winter	CVP
1/3/19 16:00	138	Non-winter	1.000	Fall	0.997	ButteCrfa	0.687	0.997	0.000	0.003	0.000	Winter	CVP
1/6/19 16:00	138	Non-winter	1.000	Fall	0.995	FeatherRHfa	0.350	0.995	0.000	0.005	0.000	Winter	CVP
1/17/19 8:00	140	Non-winter	1.000	Fall	1.000	ButteCrfa	0.829	1.000	0.000	0.000	0.000	Winter	CVP
1/18/19 16:00	116	Winter	1.000	Winter	1.000	USacramentoRHwi	1.000	0.000	0.000	0.000	1.000	Winter	CVP
1/20/19 15:00	123	Non-winter	1.000	Fall	1.000	ButteCrfa	0.863	1.000	0.000	0.000	0.000	Winter	SWP
1/22/19 11:00	136	Non-winter	1.000	Fall	0.999	ButteCrfa	0.772	0.999	0.000	0.001	0.000	Winter	SWP
1/23/19 17:40	203	Non-winter	1.000	Fall	1.000	ButteCrfa	0.886	1.000	0.000	0.000	0.000	Late fall	SWP
1/25/19 8:00	39	Non-winter	1.000	Fall	1.000	ButteCrfa	0.917	1.000	0.000	0.000	0.000	Fall	CVP

Agenda Item 8.

Hatchery Releases

On 2/13/2019, the U.S. Fish and Wildlife Service (USFWS) will release approximately 225,017 brood year 2018 winter-run Chinook salmon from the Livingston Stone National Fish Hatchery into the Sacramento River at Caldwell Park Boat Ramp in Redding, California. These fish are approximately 85 mm fork length and are 100% coded-wire tagged and marked with an adipose-fin clip.

San Joaquin River Restoration Program (SJRRP) efficiency trial releases will occur over a period of 16 weeks. 64 releases (16 replicates at 4 RST sites) of 600 juveniles will total approximately 40,000 fish. The releases began on 1/29/19.

Agenda Item 9.

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>	3-5% (Last week: 5-10%)	85-89% (Last week: 85-90%)	8-10% (Last week: 5%)
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	20-30% (Last week: 30-40%)	70-80% (Last week: 60-70%)	0% (Last week: 0%)

Rationale for distribution

Wild winter-run Chinook:

Seventeen wild winter-run Chinook salmon were observed at the GCID RST, 1 at Tisdale, 1 at Knights Landing, 3 at the beach seines, 2 at Sacramento trawl, 1 at Chipps Island trawl, and 1 at Mossdale. Since fish were observed at monitoring locations, Sacramento River flows were high this past week, and assuming some winter-run Chinook may have bypassed some trapping locations and are potentially rearing westward past Chipps Island, DOSS estimates that approximately 2-5 percent of wild winter-run Chinook salmon population has migrated through the Delta this past week.

Wild spring-run Chinook:

Seven wild spring-run Chinook salmon were observed GCID, 1 at Tisdale, 4 at Knights Landing, 26 at the beach seines, and 9 at Sacramento trawl. Since Sacramento River flows were high this past week and a greater number of fish were observed at monitoring locations, DOSS estimates that an additional 10 percent of the population has entered the Delta this past week. Since no spring-run were observed at Chipps Island trawl, no wild spring-run Chinook salmon are estimated to have exited the Delta.

Agenda Item 10.

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**
 - Approximately 85-90% of winter run juveniles estimated to be in the Delta.
 - Approximately 60-70% of spring run juveniles estimated to be in the Delta.
 - Central Valley steelhead are in the system, including the Delta.
- **Routing Risk: LOW**
 - DCC is closed.
 - Flows are elevated on the Sacramento River (~30,000 cfs) which increases the muting of tidal effects around Georgiana Slough and Threemile Slough. Flows are expected to remain elevated through the week.
 - OMR flow was reduced to no more negative than -3,500 cfs on 2/8 to reduce incidental take at the export facilities in the south Delta. OMR flow will resume to no more negative than -5,000 cfs tomorrow (2/13).
- **Overall Entrainment Risk: MEDIUM-HIGH**
 - Flows at San Joaquin River are predicted to increase over the next week increasing exports and the risk of entrainment, especially for steelhead.

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

- **Exposure Risk: MEDIUM**
 - Listed Chinook salmon have been salvaged and observed in monitoring sites in the Delta.
 - Exports are going up but are not substantial increases in light of extra river inflow.
 - OMR will be -5,000 cfs or more positive.

- **OMR/Export Risk:**
 - OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: LOW
 - OMR -5,000 cfs: MEDIUM
 - OMR -6,250 cfs⁴: MEDIUM-HIGH
 - OMR -7,500 cfs⁴: HIGH
 - OMR -9,000 cfs⁴: HIGH

- **Overall Entrainment Risk:**
 - OMR -2,500 cfs: LOW-MEDIUM
 - OMR -3,500 cfs: LOW-MEDIUM
 - OMR -5,000 cfs: MEDIUM
 - OMR -6,250 cfs⁴: MEDIUM-HIGH
 - OMR -7,500 cfs⁴: HIGH
 - OMR -9,000 cfs⁴: HIGH

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

Agenda Item 11.

DOSS Advice to WOMT and NMFS: None

Agenda Item 12.

Next Meeting: The next DOSS conference call will be on **2/19/19 at 9am.**

⁴By request of management, DOSS also assessed risks at an OMR flow more negative than -5,000 cfs.