Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 2/18/2020 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: Ken Kundargi, Kyle Griffiths, Chris McKibbin, Geir Aasen, Adam Chorazyczewski
DWR: Chris Cook, Brittany Davis, Farida Islam, Bryant Giorgi
Kearns & West: Matt Marvin
NMFS: Jeff Stuart, Kristin Begun
Reclamation: Suzanne Manugian, Thuy Washburn, Elissa Buttermore
SWRCB: Craig Williams, Michael Macon, Chris Carr
USFWS: Craig Anderson

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 February:

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

- 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

[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.

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) due to flows greater than 95 cfs every day this past week.

	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
2/11/2020	164	-2%	170	-3%
2/12/2020	163	-1%	166	-3%
2/13/2020	162	-1%	157	-5%
2/14/2020	161	-1%	154	-2%
2/15/2020	159	-1%	151	-2%
2/16/2020	158	-1%	150	0%
2/17/2020	158	0%	151	0%

- The Second Alert is triggered only if **both** Wilkins Slough flows are greater than 7,500 cfs and Knights Landing temperature is less than 56.3°F. The second alert is in effect beginning 10/1/2019, and was not triggered this past week.

	Wilkins Slough (WLK)	Knights Landing (KL)
Date	Mean Daily Flow (cfs)	Daily water temperature (°F)
2/11/2020	6,912	49.6
2/12/2020	6,704	50.3
2/13/2020	6,542	51.1
2/14/2020	6,726	51.9
2/15/2020	6,623	52.6
2/16/2020	6,475	53.7
2/17/2020	6,320	53.5

Action IV.1.2[2] (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.2.3[3] (OMR Management):

- Implementation of this action in WY 2020 began on 1/1/2020, and requires that Old and Middle River (OMR) flow be no more negative than -5,000 cfs. OMR flows are reported weekly with the OMR index and the tidally filtered USGS gauges at the 5-day and 14-day running averages.
- The official Juvenile Production Estimate (JPE) letter from NMFS was signed and issued to Reclamation on 2/3/2020. The JPE for natural-origin brood year (BY) 2019

[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.

Sacramento River winter-run Chinook salmon is 854,941. The first stage natural older juvenile Chinook salmon loss density trigger based on the BY 2019 JPE is 8.55 [(854,941 x 2 percent)/ 2,000 = 8.55] fish per TAF, and the second stage trigger is 17.10 [(854,941 x 2 percent)/1,000] fish per TAF. RPA Action IV.2.3 has default older juvenile Chinook salmon loss density triggers of 8 and 12 fish/TAF for the first and second stage triggers, respectively. Since the latter are lower than the JPE-based loss density trigger, they would be triggered first.

- When applying the rapid genetic analysis protocol, the first stage trigger is exceeded if genetically verified combined daily loss density of older-juvenile-sized winter-run Chinook salmon exceeds 4.27 fish per TAF of water exported, and the second stage trigger is exceeded if the genetically verified daily loss density of older-juvenile-sized winter-run Chinook salmon exceeds 8.55 fish per TAF of water exported.

Action IV.3[4] (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 (2/18/2020)

SWP		**CVP**	
Exports (cfs)			
Clifton Court Forebay	1,400	Jones Pumping Plant	800 cfs (1 unit)
Reservoir Releases (cfs)			
Feather - Oroville	1,750	American - Nimbus	1,750
		Sacramento - Keswick	4,000
		Stanislaus - Goodwin	250*
		Trinity - Lewiston	300
Reservoir Storage (TAF)			
San Luis (SWP)	947	San Luis (CVP)	551
Oroville	2,255	Shasta	3,544
New Melones	1,962	Folsom	472
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	12,700
Outflow Index (cfs)	11,600	San Joaquin River at Vernalis (cfs)	1,400

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

Delta Operations			
E:I	16% (3-day avg.) 14% (14-day)	X2	75 km

*Goodwin releases are scheduled to increase up to 1,500 cfs tomorrow (2/19/2020) to meet San Joaquin River water quality standards.

Factors controlling Delta exports:

- 2/11 – 2/18/2020: Delta outflow and February X2 requirements.

Approximate OMRs as of 2/15/2020:

	USGS gauges (cfs)	Index (cfs)
Daily	-1,700	-1,600
5-day	-2,500	-1,900
14-day	-4,000	-3,700

Approximate OMRs as of 2/17/2020:

	Index (cfs)
Daily	-1,600
5-day	-1,700
14-day	-3,200

Weather Forecast
The forecast for the Sacramento region predicts dry and mild conditions will continue this week, except for a slight chance of showers over the northern Sierra south of Tahoe on Friday. North winds will also persist much of the week.

Agenda Item 4.
Smelt Working Group
Due to the Monday holiday, the Smelt Working Group will meet today, 2/18/2020, at 10 am.

The following meeting summary was provided after the DOSS call:
The Smelt Working Group (SWG) reviewed current Delta conditions, survey data, expected exports, and forecasted weather. The SWG indicated that widespread, elevated turbidity conditions in the south Delta last week were likely to have caused delta smelt to enter the south Delta along with the turbidity intrusion, which reached the Bacon Island water quality station (peak of 46 NTU). The SWG agreed that while turbidity has declined this week, risk to delta smelt is elevated due to the preceding week's turbidity, which may have drawn spawning condition smelt into the lower San Joaquin River. The first ripe adult delta smelt was caught in the February SKT, indicating that fish are nearing spawning condition. In addition, the 3-station average temperature is 12.2 ℃ as of midnight on February 17 and is above the 12 degrees Celsius threshold to onramp Action 3 (entrainment protections for larval and juvenile delta smelt). The SWG did not make a specific recommendation for operations because OMR is projected to be -1,000 cfs or more positive by midweek, which is more positive than the range of

flows prescribed in the BiOp. The SWG defined risk to delta smelt based on OMR flows according to the following assessment:

OMR Flow Risk Assessment for week of 2/18/2020
-1250 to -2000 cfs: Low/moderate risk
-2000 to -3500 cfs: High risk
-3500 to -5000 cfs: High Risk

The SWP plans to meet again at 10 a.m. on Monday, 2/24/2020, to transition to implementation of the Reinitiation of Consultation on Long-Term Operations Biological Opinion.

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	Tisdale RST[A]	Knights Landing RST[B]	Beach Seines[C]	Sacramento Trawl[C]	Chipps Is. Midwater Trawl[C]	Mossdale Kodiak Trawl[C]
Sample Date	2/11-2/17	2/10-2/17	2/10-2/17	2/11-2/13	2/9, 2/10, 2/11, 2/13, 2/14	2/10-2/14	2/10, 2/12, 2/14
FR Chinook	190 juveniles	19	69	238	19		
SR Chinook				3			
WR Chinook				3			
LFR Chinook							
Chinook (ad-clip)			1 WR			2	
Steelhead (natural)							
Steelhead (ad-clip)					3	1	
Green Sturgeon							
Flows (avg. cfs)	894	5,712	6,635				
W. Temp. (avg. °F)	53.0	52.0	51.8				
Turbidity (avg. NTU)	N/A	6.4	11.0				

[A] Tisdale RST sampling period was from 2/10/2020 at 9:45 am to 2/17/2020 at 9:30 am.
[B] Knights Landing RST sampling period was from 2/10/2020 at 10:30 am to 2/17/200 at 11:30 am.
[C] Due to the Monday holiday, DatCall data were not yet available prior to the DOSS call. DJFMP sampling data taken from BayDeltaLive.com. DatCall data was received immediately after the conclusion of the DOSS call and incorporated for completeness.

Red Bluff Diversion Dam Biweekly Report

USFWS biweekly report (1/29-2/11/2020) for preliminary estimates of passage by 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 (BY 2019)	3,819	3,803,279 (2,474,555-5,132,002)
Spring-run Chinook (BY 2019)	3,948	51,233 (17,133-85,332)

Hatchery Releases

On 2/10/2020, the California Department of Fish and Wildlife (CDFW) released an estimated 53,089 BY 2019 spring-run Chinook salmon from the San Joaquin River Restoration Program's (SJRRP) Interim Salmon Conservation and Rearing Facility (SCARF) into the San Joaquin River. This release consisted of marked (adipose fin clip and CWT) juveniles, released at the Fremont Ford Bridge (Highway 140).

On 2/19-2/21/2020, CDFW will release approximately 465,000 BY 2019 steelhead from Nimbus Fish Hatchery into the Lower American River at Sunrise Boat ramp. This release will include 100% marked (adipose fin clip) fish.

On 2/20 and 2/21/2020, CDFW will release approximately 54,000 BY 2019 steelhead from Mokelumne River Hatchery into the Mokelumne River at the Feist Ranch site. This release will include 100% marked (adipose fin clip) fish.

Juvenile Green Sturgeon Monitoring Summary for DOSS; 2/18/2020 Sampling Season Summary. 2020 Season sampling initiated on 1/2/2020.

- One juvenile green sturgeon tagged on 2/6/2020; BY 2019; 33 cm fork length; 255 g; Tag ID A69-1602-11439
- One juvenile white sturgeon tagged on 2/4/2020; BY 2019, 47 cm fork length; 340 g; Tag ID A69-1602-11453
- 2020 CPUE for juvenile green sturgeon as of 2/13/2020 is 0.016 per hour or 0.077 per sampling day (13 sampling days)
- 2020 CPUE for juvenile white sturgeon as of 2/13/2020 is 0.016 per hour or 0.077 per sampling day (13 sampling days)

Summary of sturgeon detections in the Sacramento River north of Sherman Lake; approximate coordinates 38.06024° N and -121.08015° W; 2/11 and 2/13/2020.

Species; life stage	Date tagged or First Detection[FD]	Tag ID	Tagging Location[1] or First Detection[2]	Tagging Entity	Detection Date(s)
Green sturgeon; juvenile	12/12/2019	A69-1602-12220	Sacramento River north of Sherman Lake[1]	CDFW	2/11/2020
Green sturgeon; juvenile	2/6/2020	A69-1602-11439	Sacramento River north of Sherman Lake[1]	CDFW	2/11/2020
White sturgeon; adult	5/4/2017	A69-9001-25741	Fremont Weir[1]	CDFW	2/13/2020

Species; life stage	Date tagged or First Detection[FD]	Tag ID	Tagging Location[1] or First Detection[2]	Tagging Entity	Detection Date(s)
White sturgeon; adult	3/20/2012	A69-1303-63050	San Joaquin River[1]	USFWS-Lodi	2/11/2020
White sturgeon; adult	3/11/2014	A69-9001-27541	San Joaquin River[1]	USFWS-Lodi	2/11, 2/13/2020
White sturgeon; adult	4/3/2014	A69-9001-27463	San Joaquin River[1]	USFWS-Lodi	2/11/2020
White sturgeon; adult	3/20/2012	A69-0101-19545	San Joaquin River[1]	USFWS-Lodi	2/13/2020
White sturgeon; adult	10/8/2010[FD]	A69-1303-47854	Chipps Island[2]	UC Davis	2/13/2020
White sturgeon; adult	10/20/2011[FD]	A69-1303-56448	Benicia Bridge[2]	UC Davis	2/13/2020
White sturgeon; adult	10/12/2011[FD]	A69-1303-56462	Chipps Island[2]	UC Davis	2/11/2020
White sturgeon; adult	3/26/2014[FD]	A69-9001-25632	Sacramento River at Steamboat Slough[2]	UC Davis	2/11/2020
White sturgeon; adult	4/4/2012[FD]	A69-1303-56491	Sacramento River at Deep Water Shipping Channel[2]	UC Davis	2/11, 2/13/2020

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 2/10 to 2/17/2020, 17,800 juvenile fall-run and 14 spring-run Chinook salmon and 1 late fall-run Chinook salmon were observed. Flows at the Eye Side Channel were an average 800 cfs, water temperature 47°F, and turbidity 1.3 NTU. At the Herringer site for 2/10 to 2/17/2020, 8,914 fall-run and 40 spring-run Chinook salmon were observed. Flows were an average 1,750 cfs, water temperature 49.5°F, and turbidity 1.6 NTU.

340 mortalities were observed at the Eye Side Channel and 43 at the Herringer site. Mortalities remain at around 2% at the Eye Side trap.

Stanislaus River Caswell RST Data

Pacific States Marine Fisheries Commission (PSMFC) provided the catch summary for the Stanislaus River Caswell RST. For the period of 1/8 to 2/14/2020, 397 unclipped juvenile fall-run Chinook salmon were observed.

Lower American River RST Data

PSMFC provided the catch summary for the lower American River RST data. For the period of 2/7 to 2/14/2020, 39,211 length-at-date juvenile fall-run, 11 spring-run, and 31 winter-run Chinook salmon were observed. It was noted that the catch of winter-run Chinook salmon-sized fish has been greater than in recent years, perhaps indicating more non-natal rearing is occurring in the American River this year, or that there were more juvenile winter-run Chinook salmon in the system resulting in higher catch.

Fall-run Chinook salmon were stained for a mark recapture trial on the island near the Watt Avenue RST. Fish were released approximately 0.5 miles upstream of the traps across the width of the river. See photo below of stained and LAD fall-run Chinook salmon.

LAD fall-run Chinook salmon next to BBY stained fall-run Chinook salmon recaptures (orange) from the 2nd mark-recapture trial (photo taken 2/14/2020, the day after the fish were released).

Agenda Item 6.
Fish Monitoring: Salvage
Griffiths (CDFW) provided the following salvage summary for the period of 2/10 to 2/16/2020.

Chinook salmon:
Unclipped (natural origin) Chinook salmon: Weekly salvage of natural-origin Chinook salmon: 8 fall-run Chinook salmon. Total WY 2020 salvage of natural-origin Chinook salmon: 60 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 salmon: 352 fish.

Steelhead:
8 ad-clipped steelhead were observed in salvage during the reporting period. Total WY 2020 salvage of steelhead: zero natural origin steelhead and 16 ad-clipped steelhead.

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

Operations:
Griffiths (CDFW) noted that salvage counts at the SWP were increased from the standard 30 minute counts to 50% of the pumping period to try to enhance detection of fish.

DOSS Weekly Salvage Update

Reporting Period: February 10-February 16, 2020

Prepared by Kyle Griffiths on February 18, 2020 8:18

Preliminary Results -Subject to Revision

Criteria	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	0	0	0	0		0.00
Wild steelhead	0	0	0	0	0	0	0		0.00
Exports									
SWP daily export	6,214	2,882	1,603	3,238	3,466	2,443	3,213		3,294
CVP daily export	5,215	5,246	3,659	1,744	1,738	1,737	1,738		3,011
SWP reduced counts	0	0	0	0	0	0	0		
CVP reduced counts	0	8%	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;

		Weekly Total			Season Total	
Category		**Salvage**	**Loss**	**Trend**	**Salvage**	**Loss**
Wild						
	Winter Run	0	0	↘	20	14
	Spring Run	0	0	→	0	0
	Late Fall Run	0	0	→	12	8
	Fall Run	8	6	↘	28	19
	Unclassified	0	0	→	0	0
	Total	**8**	**6**		**60**	**41**
Hatchery						
	Winter Run	0	0	→	8	5
	Spring Run	0	0	→	128	88
	Late Fall Run	0	0	→	195	153
	Fall Run	0	0	→	21	14
	Unclassified	0	0	→	0	0
	Total	**0**	**0**		**352**	**261**

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

	Weekly Total			Season Total	
Category	**Salvage**	**Loss**	**Trend**	**Salvage**	**Loss**
Wild	0	0	→	0	0
Hatchery	8	5	↗	16	11
Total	**8**	**5**		**16**	**11**

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

DWR provided the below summary of hatchery spring-run surrogate Chinook salmon losses at the facilities last week. No additional spring-run surrogate Chinook salmon have been observed in salvage over the past week.

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 2/6/2020

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	20.21	84,869	n/a	0.024	n/a	0.5%	12/22/2019	1/9/2020
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
1/13/2020	LF	Coleman NFH	Battle Creek	Spring Surrogate		77,866	n/a		n/a	0.5%		

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2019 through 2/6/2020.

[1]**Number 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.**
[4]**Date of first and last loss accounts for all CWT loss even those from special studies where salvage and loss=0.**

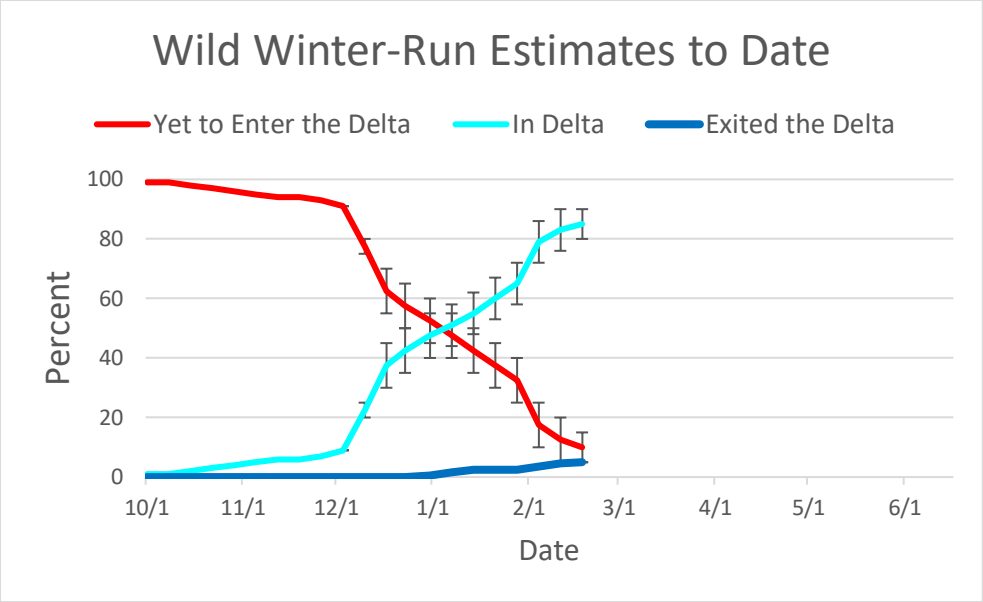
DWR-DES Revised 2/7/2020
Preliminary data from DFW, DWR, FWS, and Reclamation; subject to revision.

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.

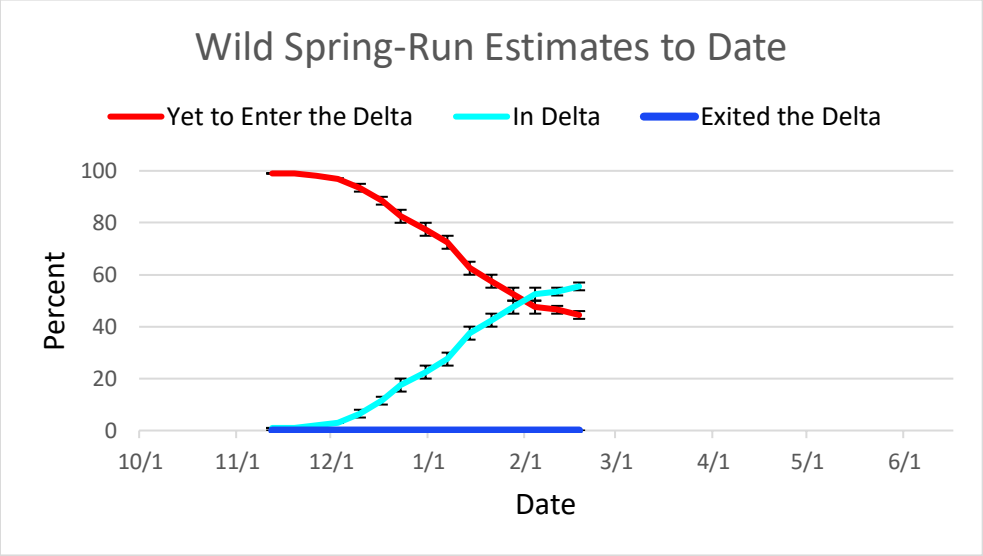
Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chipps Island)
Young-of-year (YOY) winter-run Chinook salmon	5-15% Last week: 5-20%	80-90% Last week: 76-90%	5% Last week: 4-5%
Young-of-year (YOY) spring-run Chinook salmon	43-46% Last week: 45-48%	54-57% Last week: 52-55%	0% Last week: same

Rationale for changes in distribution
Natural winter-run Chinook salmon:
Over 3.8 million BY 2019 winter-run Chinook salmon have passed RBDD so far in water year 2020. In the last week, 3 length-at-date winter-run Chinook salmon were captured at in the beach seines, and none at any other monitoring locations. Because a few more winter-run Chinook salmon were observed at monitoring locations in the lower Sacramento River and Delta, DOSS estimates that an additional 0-5% of the winter-run Chinook salmon population has moved downstream into the Delta. Since no winter-run Chinook salmon were observed at Chipps Island trawl, and no storm events have recently occurred, DOSS estimates that an additional 0-1% of the winter-run Chinook salmon population has exited the Delta. Based on the time of year, winter-run Chinook salmon juveniles are likely to be rearing in the Delta after emigrating from upstream locations on the Sacramento River.

Natural spring-run Chinook salmon:
3 length-at-date spring-run Chinook salmon were observed in the beach seines and at no other monitoring locations this past week. Because few spring-run Chinook salmon were observed at monitoring locations this past week, DOSS estimates that an additional 2% of the spring-run Chinook salmon population has entered the Delta. The DOSS team notes that monitoring activities on the eastside tributaries (i.e. Butte Creek, Mill Creek, Deer Creek) have not provided data yet this year, so the migratory impact of these populations to the mainstem Sacramento population are not known yet for this year. No spring-run Chinook salmon have been observed in the Chipps Island trawl this season.



WY 2020 natural winter-run distribution estimates to date.



WY 2020 natural 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** (Lower flows in the lower Sacramento River predicted)
    - Approximately 80-90% of the juvenile BY 2019 population of winter-run Chinook salmon are estimated to be in the Delta.
    - Approximately 54-57% of the juvenile BY 2019 population of spring-run Chinook salmon are estimated to be in the Delta.
    - California Central Valley steelhead are in the lower Sacramento and Northern Delta based on monitoring data.
    - Clipped steelhead have been seen at the fish salvage facilities.
    - Anticipate emigration to continue into the Delta.

- **Routing Risk: MEDIUM**
    - DCC is closed.
    - Flows are predicted to decrease compared to last week, currently ~12,700 cfs inflow to the Delta from the Sacramento River, lower flows enhance the effects of tides around Georgiana Slough and Threemile Slough, leading to a higher probability of routing into these waterways.

- **Overall Entrainment Risk: MEDIUM-HIGH**

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 junctions of Georgiana Slough, Mokelumne River, and San Joaquin River confluences).
    - Flows into the Delta are expected to decrease this week.

- Salvage is expected to remain at stable levels this week. 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.
- Exports have the potential to decrease in the next week in order to meet Delta outflow and X2 location requirements. OMR is expected to be more positive than last week (~-1,500 cfs).

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

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

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

Agenda Item 9.
Other Topics
Stuart (NMFS) reminded the DOSS team that Reclamation is prepared to lead the DOSS group once the Record of Decision (ROD) for the reinitiation of consultation on long-term operation of the CVP and SWP is signed. Reclamation believes that the ROD may be signed this week.

Kundargi (CDFW) informed the group that a hatchery steelhead release is scheduled to occur on 2/20/2020 from the Mokelumne River Hatchery. More clipped steelhead may be observed in salvage.

Buttermore (Reclamation) will send out genetic results, which will be attached to this week's final DOSS notes.

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 is scheduled for **2/25/2020 at 9 a.m**.

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

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.

Preliminary genetic results indicate that all Chinook salvaged during this water year that have been analyzed were fall/late fall-run.

Sample Date	Fork Length	Assignment	PosProb1	Group	PosProb2	Delta Model	Facility
12/3/2019	185	Non-winter	1.000	Late Fall	0.500	Fall	CVP
12/5/2019	168	Non-winter	1.000	Fall	0.987	Late Fall	CVP
1/18/2020	181	Non-winter	1.000	Fall	0.903	Late Fall	CVP
1/20/2020	170	Non-winter	1.000	Fall	0.985	Winter	CVP
1/22/2020	135	Non-winter	1.000	Fall	0.997	Winter	CVP

Preliminary Results