

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 4/5/16 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.

DWR: Aaron Miller, Rhiannon Mulligan, Kevin Reece, Mike Ford

Reclamation: Josh Israel, Peggy Manza

NMFS: Jeff Stuart, Kristin McCleery

CDFW: Bob Fujimura

SWRCB: Laurel Karren, Brittany Kammerer, Chris Carr

FWS: Craig Anderson

EPA: Erin Foresman

Agenda Items

1. Agenda review and introductions
2. RPA Implementation review
3. Current Operations
4. Smelt Working Group
5. Fish Monitoring: Salvage
6. Fish Monitoring: Hatchery winter-run Chinook acoustic-tracking
7. Fish Monitoring: RSTs/trawls/seines
8. Recent or Upcoming Hatchery Releases
9. DOSS Estimates of Fish Distribution and Entrainment Risk
10. DOSS Advice
11. Next DOSS meeting

Agenda Item 2.

RPA Implementation Review

Delta RPA Actions that may affect operations during March and April:

Action IV.1.2¹ (DCC gate operations):

- DCC gates have been closed since 12/15/15.

Action IV.2.3² (OMR Flow Management)

¹ 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

¹ For details, see pages 74-79 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

- No triggers exceeded over past week.
- Current OMR limit of -5,000 cfs is in effect for NMFS' species under this RPA action, (OMR limit of -2,500 cfs per FWS determination for Delta smelt larvae is more restrictive and is concurrently in effect).

Action IV.2.1³ (I:E ratio)

- Beginning 4/1/16, the inflow to export ratio (I:E) RPA action (*i.e.*, San Joaquin River inflow at Vernalis to combined CVP/SWP exports) is in effect.
- The current water yeartype is classified as a Critical⁴ year, requiring an I:E ratio of 1:1. This action restricts combined exports to 100% of Vernalis flow, or 1,500 cfs, whichever is greater).
- The I:E ratio in effect may change if the San Joaquin River basin water yeartype changes to “Dry” based on the upcoming April forecast.

Agenda Item 3.

Current Operations (3/29/16)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	500*	Jones Pumping Plant	1,000
Reservoir Releases (cfs)			
Feather - Oroville	1,900**	American - Nimbus	3,000
		Sacramento - Keswick	5,000
		Stanislaus - Goodwin	200***
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	641	San Luis (CVP)	407
Oroville	3,107	Shasta	4,066
New Melones	622	Folsom	712
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	25,182
Outflow Index (cfs)	~25,692	San Joaquin River at Vernalis (cfs)	903
E:I	3% (14-day avg.)	X2	<64 km

* SWP plans to adjust inflows to CCFB to mirror changes in the San Joaquin River flows at Vernalis and pumping by the Byron-Bethany Irrigation District while complying with RPA Action IV.2.1.

**Oroville reservoir was up to 6,000 cfs last week, currently at 1,900 cfs, and decreasing to 1,050 cfs on 4/7/16.

***Goodwin releases are scheduled to stay at 200 cfs until the weekend, when another scheduled “mini” pulse of 800 cfs will be released per the schedule 2-E table, and then decreasing back to 200 cfs after the pulse is completed.

³ For details, see pages 68-70 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

⁴ I:E Ratio in effect depends upon the San Joaquin basin yeartype. The yeartype based on the March 75% forecast is Critical.

OMR as of 4/2/16:

	USGS gauges (cfs)	Index ⁵ (cfs)
5-day	-2,710	-2,560
14-day	-3,440	-3,480

The daily OMR Index on 4/4/16 was -1,870 cfs.

Review of factors controlling Delta exports for the period 3/29/16 to 4/5/16:

- Tuesday (3/29/16 through Thursday (3/31/16) the FWS determination to protect Delta smelt larvae with an OMR no more negative than -2500 cfs was controlling.
- Friday (4/1/16) through Tuesday (4/5/16) the NMFS RPA action IV.2.1 is controlling.

Weather forecast indicates chance of precipitation this weekend and early next week as unsettled weather conditions move into area. More precipitation is expected the following weekend.

Agenda Item 4.

Smelt Working Group

The SWG met on Monday, 4/4/16 at 10am. Bartoo (FWS) provided the following SWG meeting summary via e-mail:

The Working Group agreed that given present distribution, current salvage, and Delta conditions, there was no indication that the projected combined exports of approximately 1500 cfs for the week (potentially resulting in daily average OMR flows of approximately -1800 cfs) need to be modified for the protection of Delta Smelt adults and larvae.

The Working Group discussed the risk of entrainment under the Service-provided advice framework. Under this framework the relative risk of entrainment for OMR flow ranges is discussed and assessed. . For the current week, the risk of entrainment of larval and juvenile Delta Smelt for each of the flow ranges is characterized as follows:

- -1250 to -2000 cfs has a low risk of entrainment,
- -2000 to -5000 cfs has a medium to high risk of entrainment.

This entrainment risk assessment would change, should exports levels change from what was reported for the week (1500 cfs resulting in -1800 cfs OMR).

The Working Group is following guidance for entrainment protections from both Action 2 (adult Delta Smelt) and Action 3 (juvenile Delta Smelt). The Working Group will continue to monitor Delta Smelt survey and salvage data and Delta conditions, and will meet again on Monday, April 11, 2016 at 10 am.

⁵ Beginning 2/16/16, the OMR Index values reported in the DOSS notes were calculated using an OMR Index equation that no longer includes (per the original intent of the index equation) the Contra Costa Water District's Rock Slough diversion in the export term. Beginning February 2016, the OMR Index values reported in the monthly OMR reports on the "CVO Reports" website (<http://www.usbr.gov/mp/cvo/index.html>) were calculated using this adjusted equation without the Rock Slough diversion.

SWG meeting notes are available at: http://www.fws.gov/sfbaydelta/cvp-swp/smelt_working_group.cfm.

Agenda Item 5.

Fish Monitoring: Salvage⁶

Fujimura (CDFW) provided the following summaries of salvage and loss at the SWP and CVP fish collection facilities. The salvage figures were generated on the CDFW salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

⁶ Salvage data reported in this section represent the total estimated and expanded salvage based on the number of fish observed at the fish collection facility. For example, if one steelhead is observed in the typical ½-hour sampling period within a 2-hour operation period, the single steelhead is expanded to a salvage of four.

DOSS Weekly Salvage Update
 Reporting Period: March 28-April 3, 2016
 Prepared by Bob Fujimura on April 4, 2016 16:25
 Preliminary Results -Subject to Revision

Criteria	28-Mar	29-Mar	30-Mar	31-Mar	1-Apr	2-Apr	3-Apr	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	0	0	0	0	↘	0.00
Wild steelhead	0	0	2.35	3.72	0	0	6.02	↘	1.73
Exports									
SWP daily export	2,530	2,931	3,454	3,072	910	1,101	901	↘	2,128
CVP daily export	5,095	3,867	3,912	3,908	2,001	1,977	1,976	↘	3,248
SWP reduced counts	0%	0%	0%	0%	0%	0%	0%	→	0%
CVP reduced counts	0%	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 fish facility 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	0	0	↘	36	56
Spring Run	4	17	↘	70	110
Late Fall Run	0	0	→	44	166
Fall Run	0	0	↘	82	92
Unclassified	0	0	→	14	NC
Total	4	17		246	425
Hatchery					
Winter Run	4	18	↘	213	629
Spring Run	58	66	↘	638	551
Late Fall Run	0	0	→	93	298
Fall Run	0	0	↘	5	7
Unclassified	0	0	→	0	0
Total	62	85		949	1,484

Trend = weekly loss per race; Salvage = estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time
 NC = can not be calculated

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	14	61	↘	108	263
Hatchery	26	54		1,278	3,438
Total	40	115		1,386	3,702

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

Figure 1. DOSS weekly salvage update for the reporting period 3/28/16-4/4/16.

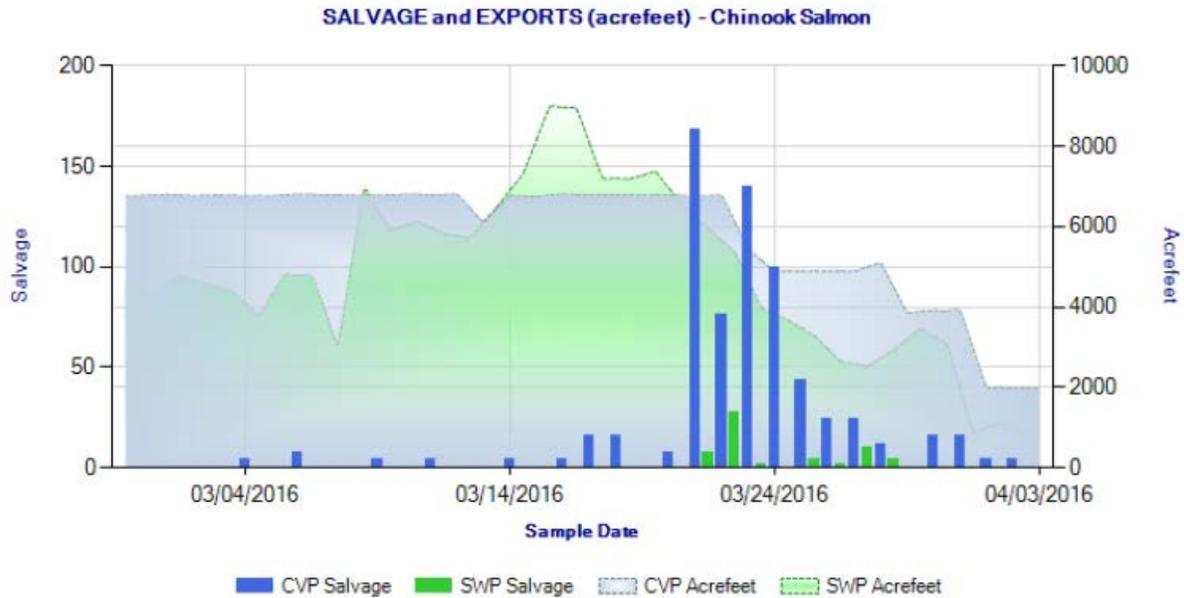


Figure 2. Daily salvage of Chinook salmon (all races) and water exports from the state and federal fish salvage facilities during February 29, 2016 through April 3, 2016.

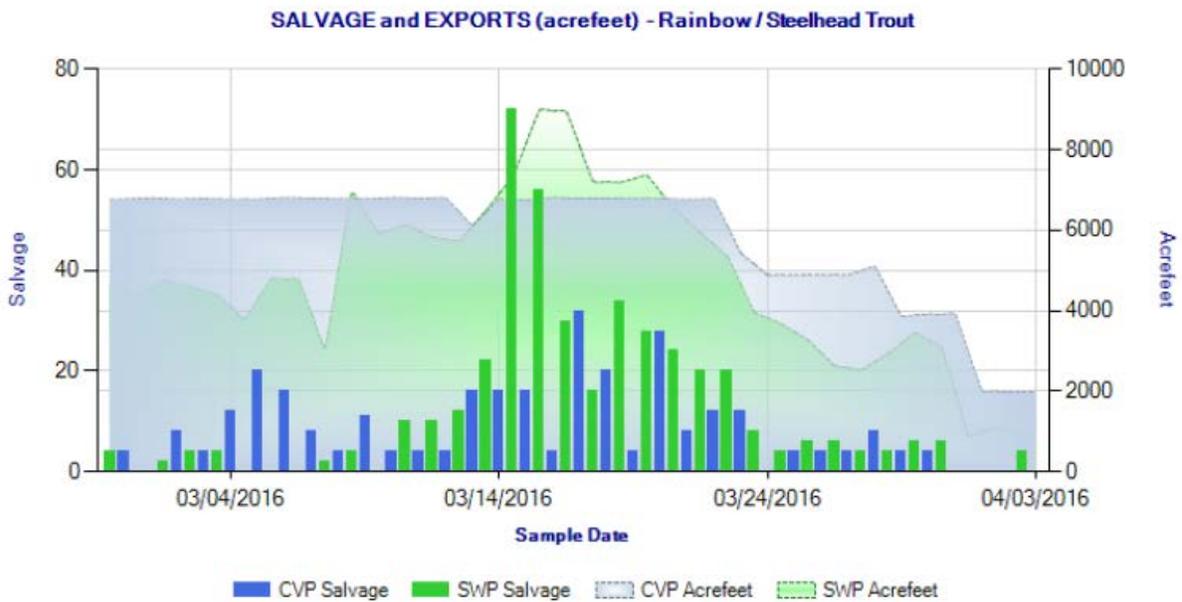


Figure 3. Daily salvage of steelhead and water exports from the state and federal fish salvage facilities during February 29, 2016 through April 3, 2016.

Preliminary salvage report for Monday, 4/4/16:

- No listed species observed at either facilities for Monday 4/4/16.

There was a 30 minute scheduled outage at the Tracy facility for staff training in the secondary channel – exports continued during this period. No salvage occurred during that time. There was a 15 minute outage at the SWP for predator removal, exports continued.

Coded-wire-tag recoveries

Mulligan (DWR) provided the following summary of coded-wire-tag recoveries at the SWP and CVP fish collection facilities. The cumulative loss of the hatchery winter-run Chinook group (released by Livingston Stone National Fish Hatchery (LSNFH) on 2/17/16 to 2/18/16) is 11.19, 0.003% of the number released. The most recent salvage of LSNFH hatchery winter-run Chinook occurred on Monday, 3/14/16. The cumulative loss of the third spring-run Chinook surrogate group (released from Coleman National Fish Hatchery on 1/12/16) continues to hold at 0.412%, near the 0.5% OMR trigger threshold under Action IV.2.3. Loss of Chinook within any spring-run Chinook surrogate group has not occurred since 2/12/16.

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES, 2015/2016

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 Concern Level	Second Concern Level	Date of First Loss ⁴	Date of Last Loss ⁴
6/11/2015 to 6/12/2015	LF	Coleman NFH	Balls Ferry Boat Ramp, Sacramento River	Production	0.00	434,227	n/a	0.000	n/a	n/a	n/a	*	*
12/9/2015	LF	Coleman NFH	Battle Creek	Production	305.22	261,213	n/a	0.117	n/a	n/a	n/a	12/25/2015	2/12/2016
12/11/2015	LF	Coleman NFH	Battle Creek	Spring Surrogate	128.05	77,000	n/a	0.166	n/a	0.5%	1.0%	12/25/2015	1/21/2016
12/22/2015	LF	Coleman NFH	Battle Creek	Spring Surrogate	188.93	68,000	n/a	0.278	n/a	0.5%	1.0%	1/6/2016	3/29/2016
1/12/2016	LF	Coleman NFH	Battle Creek	Spring Surrogate	278.65	67,700	n/a	0.412	n/a	0.5%	1.0%	1/20/2016	2/12/2016
2/17/2016 to 2/18/2016	W	Livingstone NFH	Sacramento River	Winter Run Production	11.19	420,006	155400	0.003	0.00720	0.5%	1.0%	3/6/2016	3/14/2016
3/14/2016	F	Coleman NFH	Battle Creek	Fall run Production	0.00	864,486	n/a	0.000	n/a	n/a	n/a	*	*
3/18/2016	S	Feather River Hatchery	San Joaquin River	River restoration program	514.96	105,000	n/a	0.490	n/a	n/a	n/a	3/20/2016	4/2/2016
3/22/2016	F	Coleman NFH	Battle Creek	Fall run Production	0.00	1,373,815	n/a	0.000	n/a	n/a	n/a	*	*
2/1/2016	F	Coleman NFH	Yolo bypass inundated Rice fields at Knaggs Ranch	special study	0.00	6,145	n/a	0.000	n/a	n/a	n/a	*	*
3/1/2016	F	Feather River Hatchery	Yolo bypass at Toe drain and Sacramento river at Elkhorn	special study	0.00	94,000	n/a	0.000	n/a	n/a	n/a	*	*

UNCONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES, 2015/2016

Facility	Unknown CWT Loss ⁵	Unread CWT Loss ⁶	Unknown Hatchery Loss ⁷	Acoustic Tag Loss ⁸	Number of Unassigned CWTs ⁹
SWP	35.30	0.00	0.00	0.00	0
CVP	7.95	0.00	0.00	0.00	0
TOTAL	43.25	0.00	0.00	0.00	0

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2015 through 6/21/2016.

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.

⁵Adipose-fin clipped Chinook was observed during fish count, but tag code could not be determined (e.g., damaged tag, lost tag, no tag, or Chinook released).

⁶Adipose-fin clipped Chinook was collected during fish count and has not been processed yet.

⁷CWT has been read, but hatchery release information not yet available.

⁸Adipose-fin clipped Chinook released due to presence of sutures.

⁹CWT cannot currently be assigned to a salvage record with certainty since the CWT was lost and then found. CWT may be assigned to a salvage record if new information is available.

¹⁰Chinook outside of the length-at-date criteria (Delta model) are not reported.

¹¹ Information not yet available.

DWR-DES Revised 4/05/2016

Preliminary data from DFW, DWR, FWS, and Reclamation; subject to revision.

Agenda Item 6.

Fish Monitoring: Hatchery winter-run Chinook acoustic-tracking

LSNFH released approximately 420,000 hatchery winter-run Chinook at Bonnyview Bridge in Redding – one group on 2/17/16 and the other group on 2/18/16. 285 of each release group (for a total of 570) were acoustic-tagged with JSATS tags and NOAA’s Southwest Fisheries Science Center (SWFSC) is tracking movement of these acoustic-tagged fish past eight “real-time” receiver locations from Redding to Middle River.

The March 28 update summarizing last week’s notes is the latest winter-run update unless additional tagged fish show up at Tower Bridge. 49% of the acoustic-tagged hatchery winter-run Chinook had passed the Tower Bridge receiver in Sacramento.

Agenda Item 7.

Fish Monitoring: RSTs/trawls/seines

The following table presents fish monitoring data. Unless otherwise noted, reported sizes are fork length and runs are based on length at date criteria. See also:

<http://www.water.ca.gov/swp/operationscontrol/calfed/calfedmonitoring.cfm>.

Location	Chippis Is. Midwater Trawl ^A	Station 902/Jersey Pt./Prisoners Pt. Trawls ^A	Sacramento Trawl ^A	Beach Seines ^A	Knights Landing RST ^B	Tisdale RST ^C	GCID RST	Mossdale Kodiak Trawl ^A
Sample Date	3/28, 3/30, 4/1	902: 3/30 Jersey Pt: 3/29 Pris. Pt: 3/28	3/28, 3/30, 4/1	3/29, 3/31	3/29-4/3	3/29-4/4	4/2, 4/3, 4/4	3/28, 3/30, 4/1
FR Chinook	2	1	52	791	106	28	142	
WR Chinook	15		2			1	3	
SR Chinook	19		53	107	236	39	79	1
LFR Chinook								
Ad-Clipped Chinook	16		57	24	67	14	60	9
Chinook Adult								
Steelhead (wild)	1							
Steelhead (ad-clip)	2			1	1			
Green Sturgeon								
Delta Smelt								
Splittail	3							
Longfin Smelt								

Flows (avg. cfs)					13,267	12,333	1338	
W. Temp. (avg. °F)					58.8	58.5	61	
Turbidity (avg. NTU)					36.3	34.4	16.43	

^A Data reported in the 3/27 to 4/2 DJFMP sampling summary. Sacramento trawls switched from Kodiak trawl net to mid-water trawl net April 1. Mossdale trawl sampling being conducted by CDFW starting April 4 through end of June.

^B Sampling period was from 3/29 at 10:45 am to 4/3 at 9:45 am. 470 VIE-marked (purple) FRCS were released 1 mile up-river @ 10:20 on 3/29/16.

^C Sampling period was from 3/29 at 10:15 am to 4/4 at 9:00 am. Cones modified to 50% catch. CPUE formulas do not reflect modification.

Red Bluff Diversion Dam (RBDD) Monitoring

USFWS biweekly report (3/11/16-3/24/16) for preliminary estimates of passage by brood-year and run for unmarked juvenile Chinook salmon captured by rotary screw traps at RBDD included:

Run and Species	Biweekly Total	Brood Year Total
Winter-run Chinook (BY2015)	1,775	336,451

Agenda Item 8.

Recent or Upcoming Hatchery Releases

On April 6 and 7, 2016, the Department of Fish and Wildlife will release approximately 30,000 brood year 2015 yearling steelhead from Mokelumne River Hatchery into Mokelumne River. 20,000 will be released on 4/6 and 10,000 on 4/7. This release will include 100% marked (adipose fin clip) fish.

Agenda Item 9.

DOSS Estimates of Fish Distribution and Entrainment Risk

DOSS estimates of the current distribution of listed Chinook, as a percentage of the population, are based on recent monitoring data and historical migration timing patterns. As monitoring information is received, listed species distribution will be updated and included in the following table.

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 salmon¹</i>	<1% (Last week: same)	25% - 40% (Last week: 35% - 55%)	60% - 75% (Last week: 45% - 65%)
<i>Young-of-year (YOY) spring-run Chinook salmon*</i>	<5% (Last week: same)	30% - 40% (Last week: 40% - 50%)	55% - 65% (Last week: 45% - 55%)
<i>Hatchery winter-run Chinook salmon</i>	<1% (Last week: <5%)	10% - 20% (Last week: 30% - 50%)	80% - 90% (Last week: 45% - 65%)

*Once hatchery fall-run releases (75% of which are unmarked) occur upstream of a monitoring location, DOSS assumes that many of the unclipped spring-run-sized Chinook observed in monitoring may be unmarked fall-run Chinook that fall into the spring-run size range. Because Coleman National Fish Hatchery released 864,400 BY 2015 fall-run Chinook into Battle Creek on 3/14/16, and another 1,374,000 BY 2016 fall-run Chinook on 3/22/16. The average size for the released FRCS production fish were just slightly smaller than the size at date for the minimum size of SRCS.

Rationale for changes in distribution

Wild winter-run Chinook: The fraction of wild winter-run upstream of the Delta stayed the same since DOSS thinks a few stragglers may still remain upstream, but that this fraction is very small relative to the entire population. The increase in the fraction of wild winter-run having exited the Delta is based on lengthening days, warming weather, and seasonal timing (historical peak winter-run outmigration from the Delta is in March), all of which DOSS considers conducive to winter-run outmigration. 15 winter-run-sized wild Chinook were reported in the Chipps Trawl, opposed to two last week.

Wild spring-run Chinook: The fraction of wild spring-run upstream of the Delta stayed the same since there are still spring-run entering the Delta: 236 at Knight's Landing, 63 at Sacramento trawl (note that some or many of these may be unmarked hatchery fall-run Chinook; see footnote to fish distribution table). Flows were reduced this week, conducive to salmonid movement towards the western Delta. The increase in the fraction of wild spring-run having exited the Delta is based on the 19 spring-run-sized wild Chinook reported in the Chipps Trawl, warming temperatures, and seasonal timing. Therefore the DOSS group believes that more spring-run have exited the Delta this week as well.

Hatchery winter-run Chinook: The fraction of hatchery winter-run upstream of the Delta was reduced based on historical movement, their release was two months ago and they have been rearing in the Delta for two months, increased temperatures and reduced flow. The increase in the fraction of wild winter-run having exited the Delta is based on seasonal timing (peak winter-run outmigration from the Delta is in March), reduced flow, and increased temperatures. The decrease in the fraction of hatchery winter-run in the Delta was due to DOSS's estimate that more winter-run have exited the Delta.

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 associated with 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: Outflow has reduced over the last week but is still large enough to avoid reverse flows in the upper Delta. Flows are expected to continue next week.

- **Exposure Risk:** LOW (*last week: same*)
 - Flow and turbidities have decreased which are cues for salmonid movement, and most fish are likely to have moved downstream and into the Delta at this time.
- **Routing Risk:** LOW (*last week: same*)
 - Continued elevated river flows (~25,000 cfs) are expected to mute the tidal effects at Georgiana Slough and maintain positive downstream flows during all tidal phases (reducing the risk of routing into Georgiana Slough) for those fish remaining upstream of this divergence.
- **Overall Entrainment Risk:** LOW (*last week: same*)

CVP/SWP Facilities Entrainment Risk for listed salmonids in the Interior Delta over the next week: Most fish have moved through the Delta, the DCC barrier is in place, and export levels are lower this week which is a cue for salmonids to move downstream and out of the Delta.

- **Exposure Risk:** LOW (*last week: LOW TO MEDIUM*)
- **OMR/Export Risk:**
 - OMR -2,500 cfs to -3,500 cfs: LOW (*last week: same*)
 - OMR -3,500 cfs to -5,000 cfs: MEDIUM (*last week: same*)
- **Overall Entrainment Risk:**
 - OMR -2,500 cfs to -3,500 cfs: LOW (*last week: same*)
 - OMR -3,500 cfs to -5,000 cfs: LOW (*last week: MEDIUM*), or LOW TO MEDIUM if steelhead are observed in the Mossdale trawls.

Agenda Item 10.

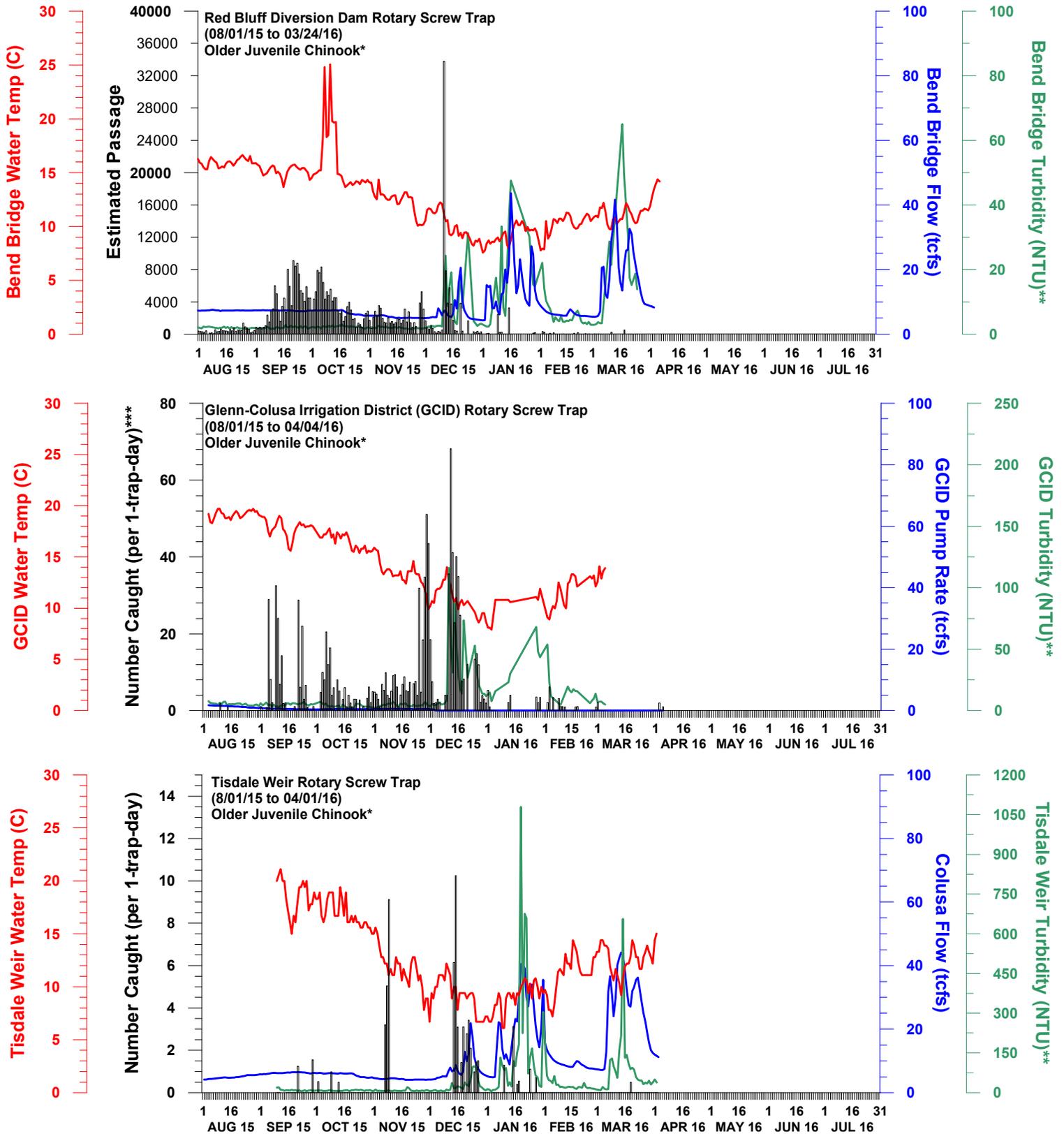
DOSS Advice to WOMT and NMFS: None

Agenda Item 11.

Next Meeting: The next DOSS conference call will be on 4/12/16 at 9am.

The following graphs were provided by DWR for Chinook salmon and steelhead observed at monitoring locations in the Sacramento and San Joaquin rivers and Delta. Also available at: <http://www.water.ca.gov/swp/operationscontrol/calfed/calfedmonitoring.cfm>

NUMBER OF UNMARKED OLDER JUVENILE CHINOOK MEASURED IN THE SACRAMENTO RIVER

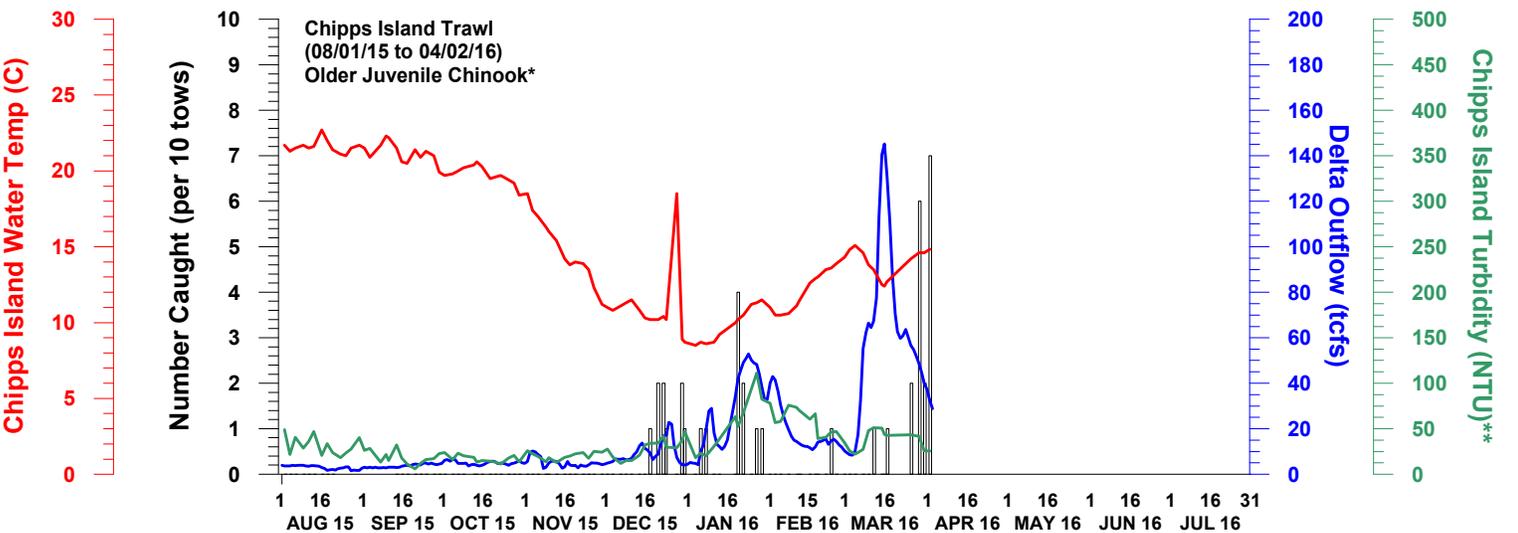
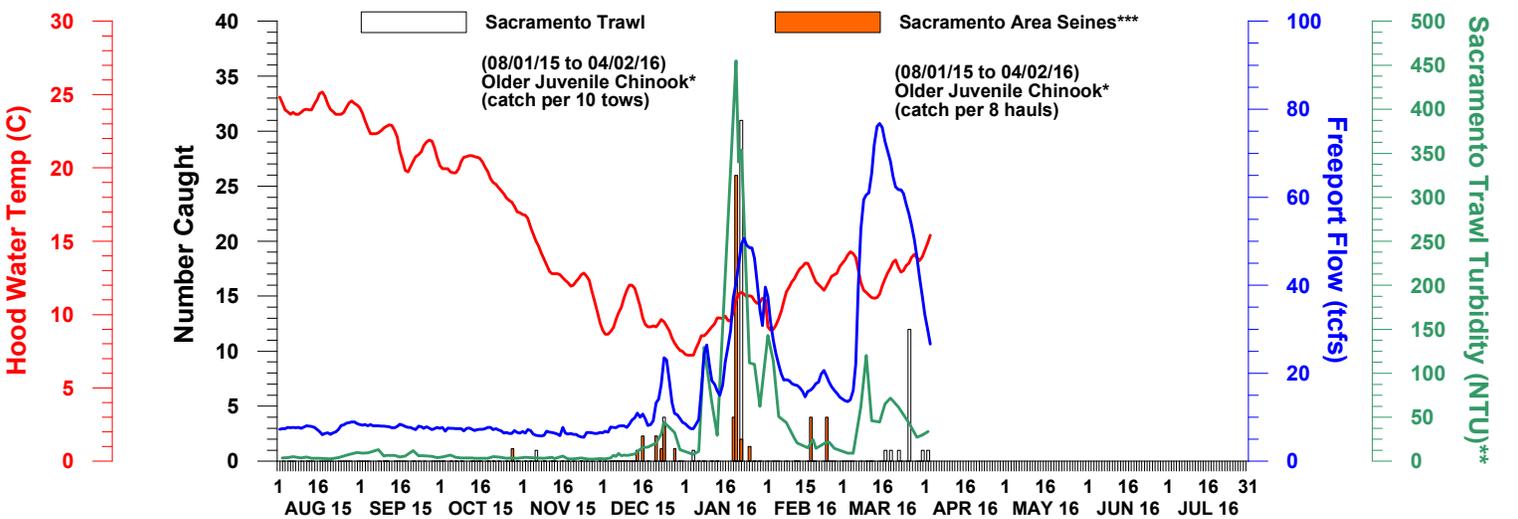
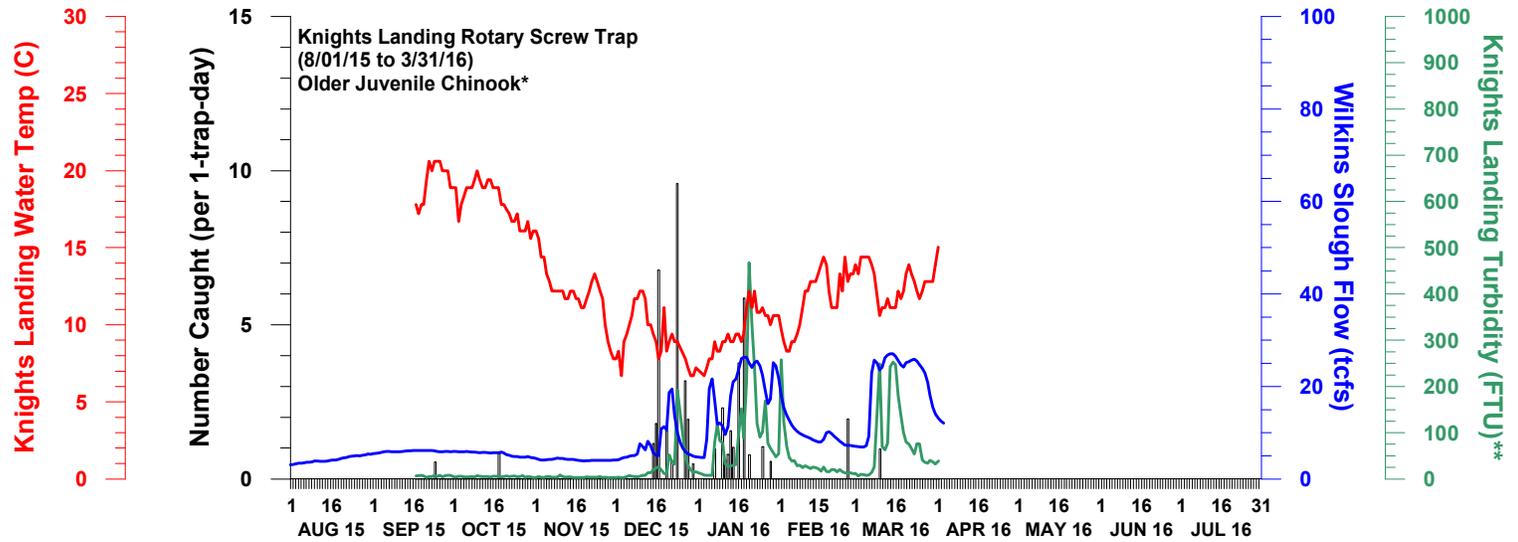


DWR-DES 04 APRIL 2016
 Preliminary data from DFW, FWS, GCID, and CDEC; subject to revision.

*Older juvenile Chinook defined as all Chinook greater than or equal to the minimum winter run length-at-date criteria and less than the maximum size included in the length-at-date criteria (Frank Fisher model) for which a race is assigned on a given sampling date.

-Tisdale: 12/12/2015-12/13/2015 there was a river right revolution malfunction.

NUMBER OF UNMARKED OLDER JUVENILE CHINOOK MEASURED IN THE LOWER SACRAMENTO RIVER AND CHIPPS ISLAND



DWR-DES 05 APRIL 2016

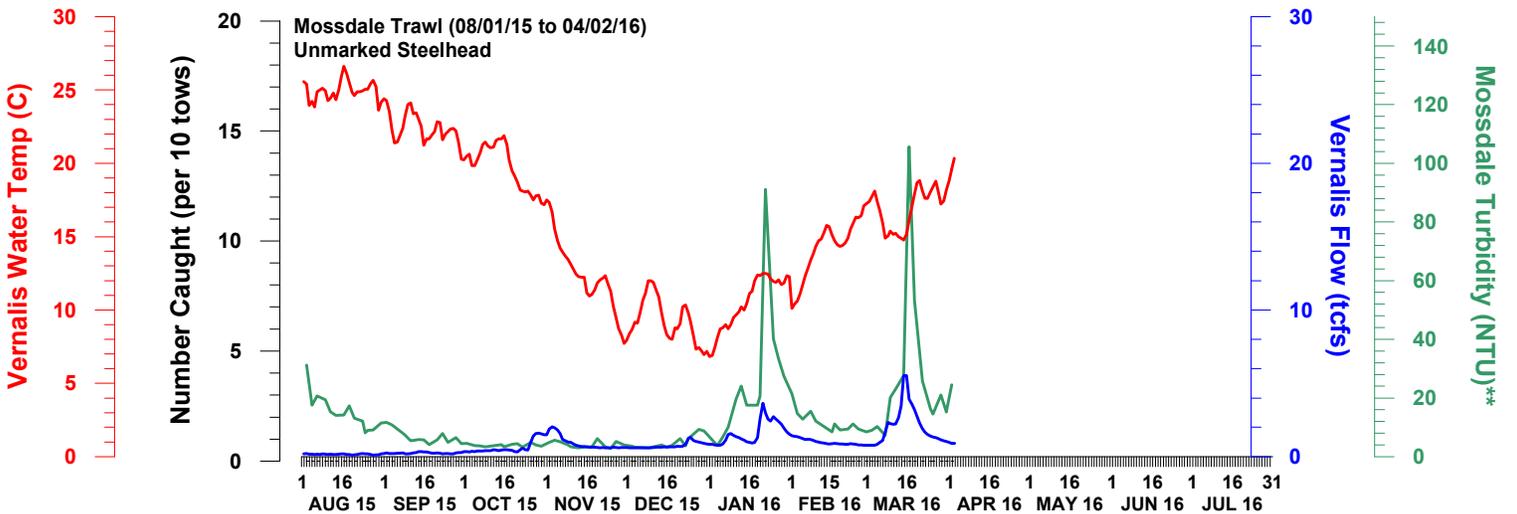
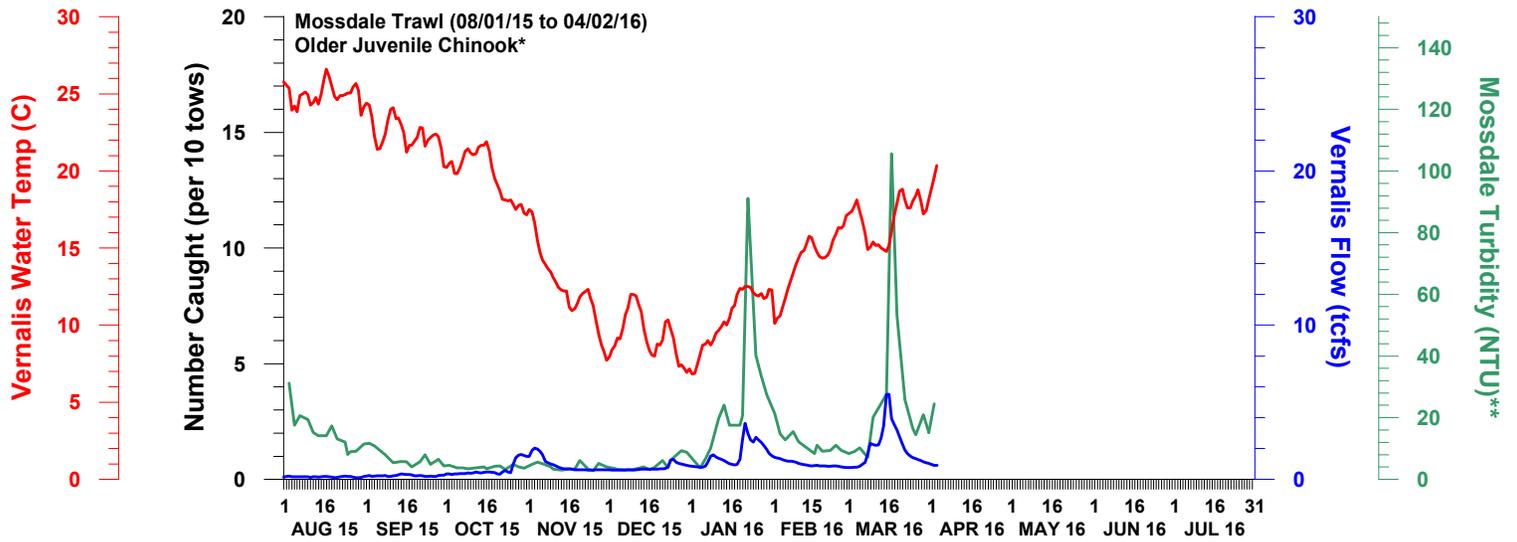
Preliminary data from DFW, FWS, and CDEC; subject to revision.

*Older juvenile Chinook defined as all Chinook greater than or equal to the minimum winter run length-at-date criteria and less than the maximum size included in the length-at-date criteria (Frank Fisher Model) for which a race is assigned on a given sampling date.

**Turbidity is a discrete measurement and is not measured continuously. Therefore, data are interpolated on days when turbidity was not measured unless data are missing for more than five days. Knights Landing turbidity measured in FTU, which should be roughly equivalent to NTU.

***Sacramento area seine route consists of the following seine sites: Verona, Elkhorn, Sand Cove, Discovery Park, American River, Miller Park, Sherwood Harbor, and Garcia Bend. Bars are stacked if Chinook caught from the trawl and seines are from the same day.

NUMBER OF UNMARKED OLDER JUVENILE CHINOOK AND STEELHEAD MEASURED IN THE SAN JOAQUIN RIVER

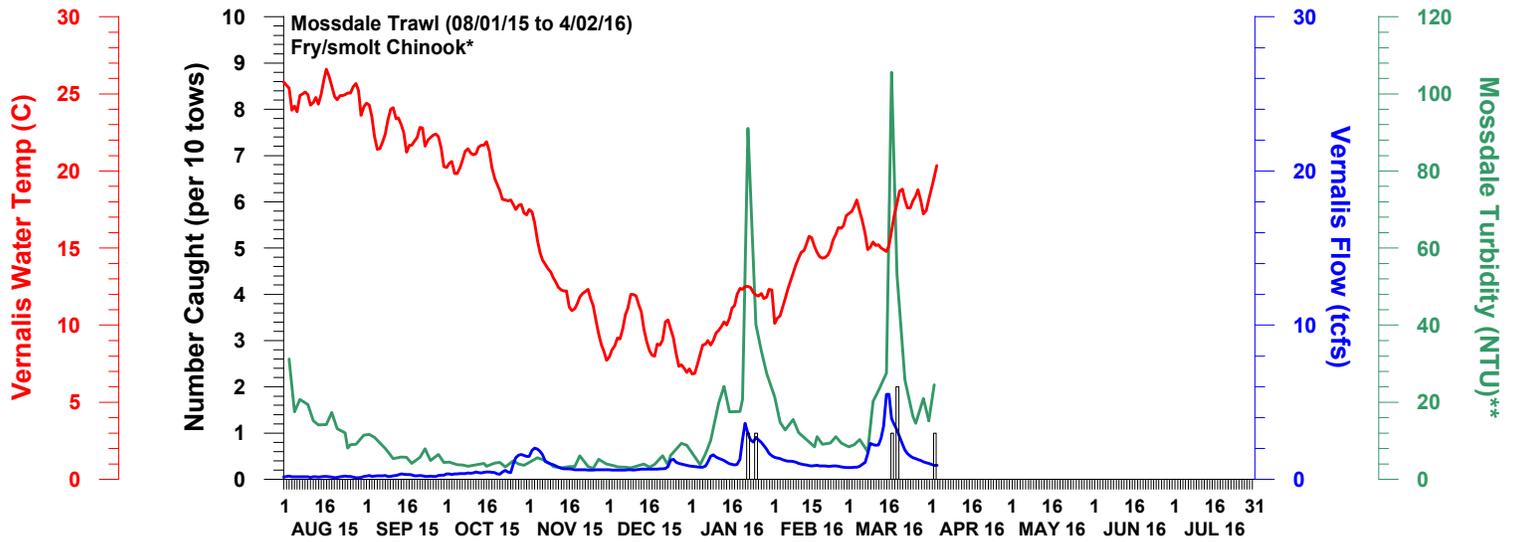


DWR-DES 05 APRIL 2016
Preliminary data from FWS and CDEC; subject to revision.

*Older juvenile Chinook defined as all Chinook greater than or equal to the minimum winter run length-at-date criteria and less than the maximum size included in the length-at-date criteria (Frank Fisher model) for which a race is assigned on a given sampling date.

**Turbidity is a discrete measurement and is not measured continuously. Therefore, data are interpolated on days when turbidity was not measured unless data are missing for more than five days.

NUMBER OF UNMARKED FRY/SMOLT CHINOOK MEASURED IN THE SAN JOAQUIN RIVER



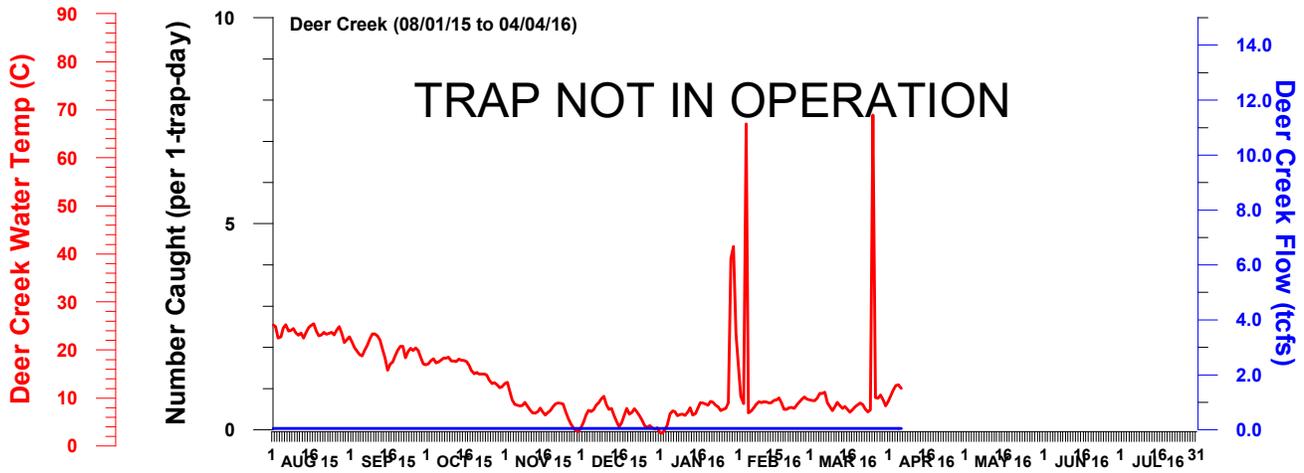
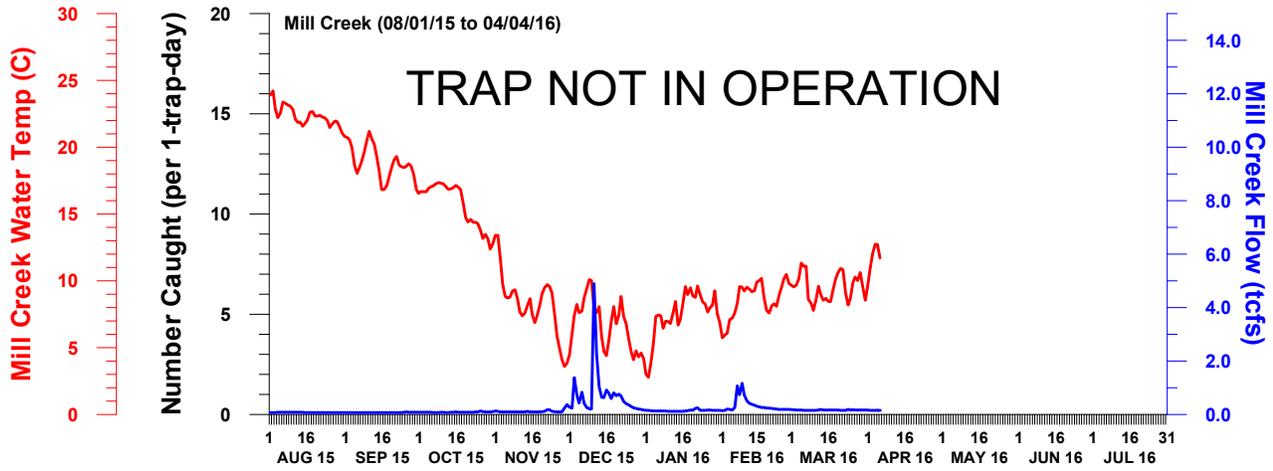
DWR-DES 05 APRIL 2016

Preliminary data from FWS and CDEC; subject to revision.

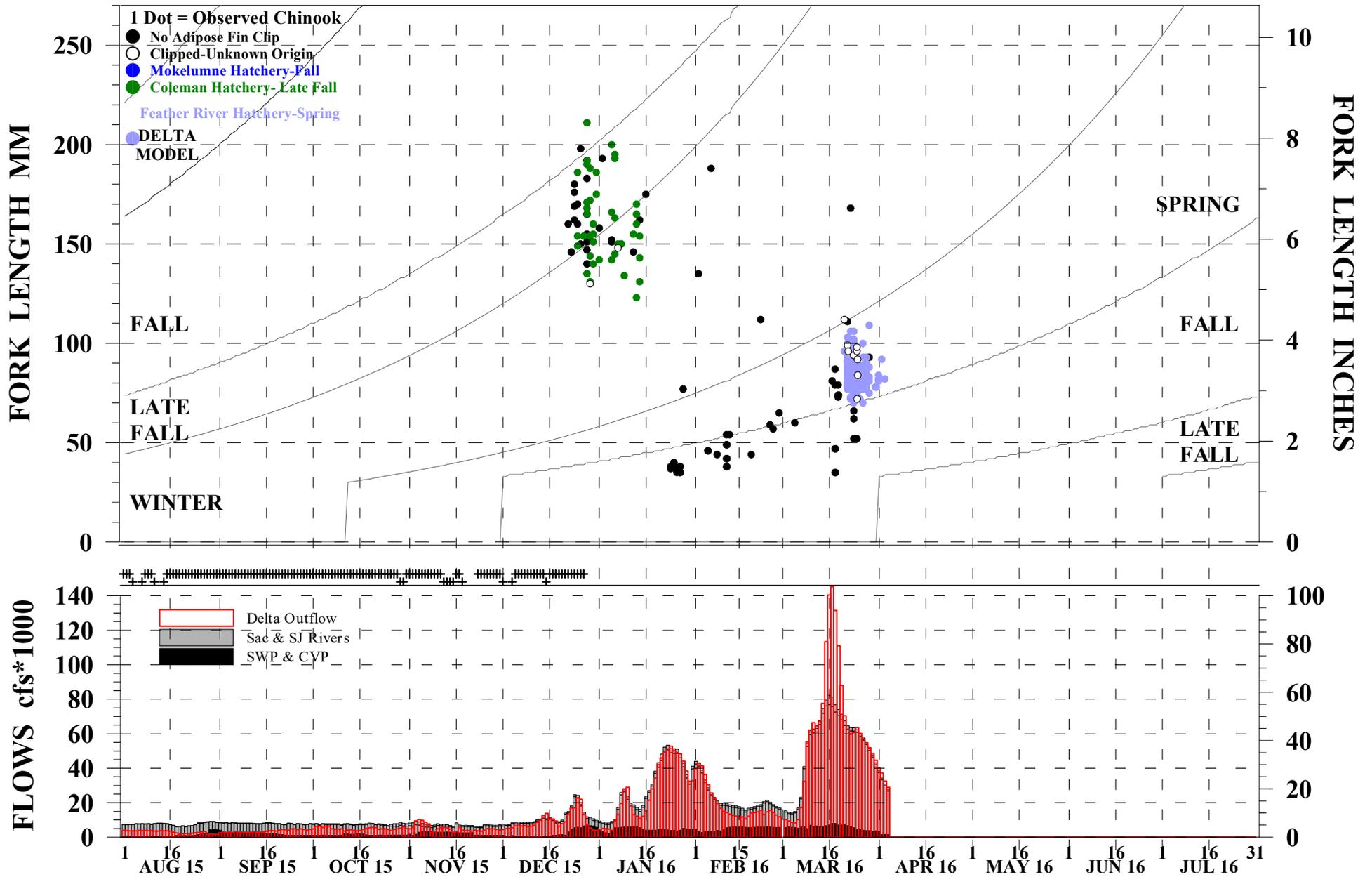
*Fry/smolt Chinook defined as all Chinook less than the minimum winter run length-at-date criteria (Frank Fisher model).

**Turbidity is a discrete measurement and is not measured continuously. Therefore, data are interpolated on days when turbidity was not measured unless data are missing for more than five days.

WATER TEMPERATURE AND FLOW MEASURED AT MILL AND DEER CREEK



OBSERVED CHINOOK SALVAGE AT THE SWP & CVP DELTA FISH FACILITIES 08/01/2015 THROUGH 04/04/2016

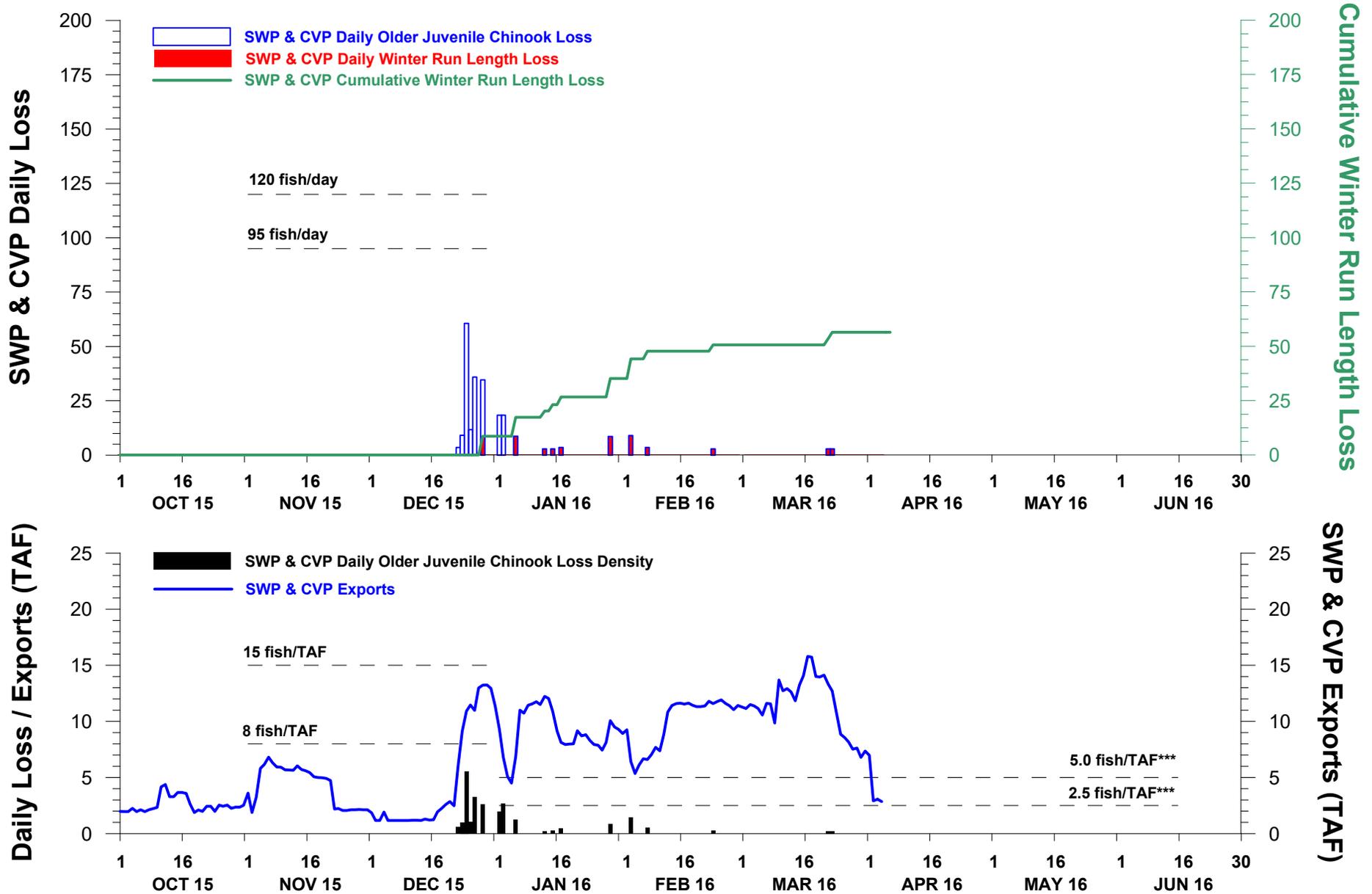


DWR-DES 04 APRIL 2016

Preliminary data from DFW, DWR, FWS, Reclamation, and CDEC; subject to revision.

*Chinook not measured for length and Chinook outside of the length-at-date criteria (Delta model) are not reported.

NON-CLIPPED WINTER RUN & OLDER JUVENILE CHINOOK LOSS AT THE DELTA FISH FACILITIES 01 OCT 2015 THROUGH 04 APRIL 2016



DWR-DES 05 APRIL 2016

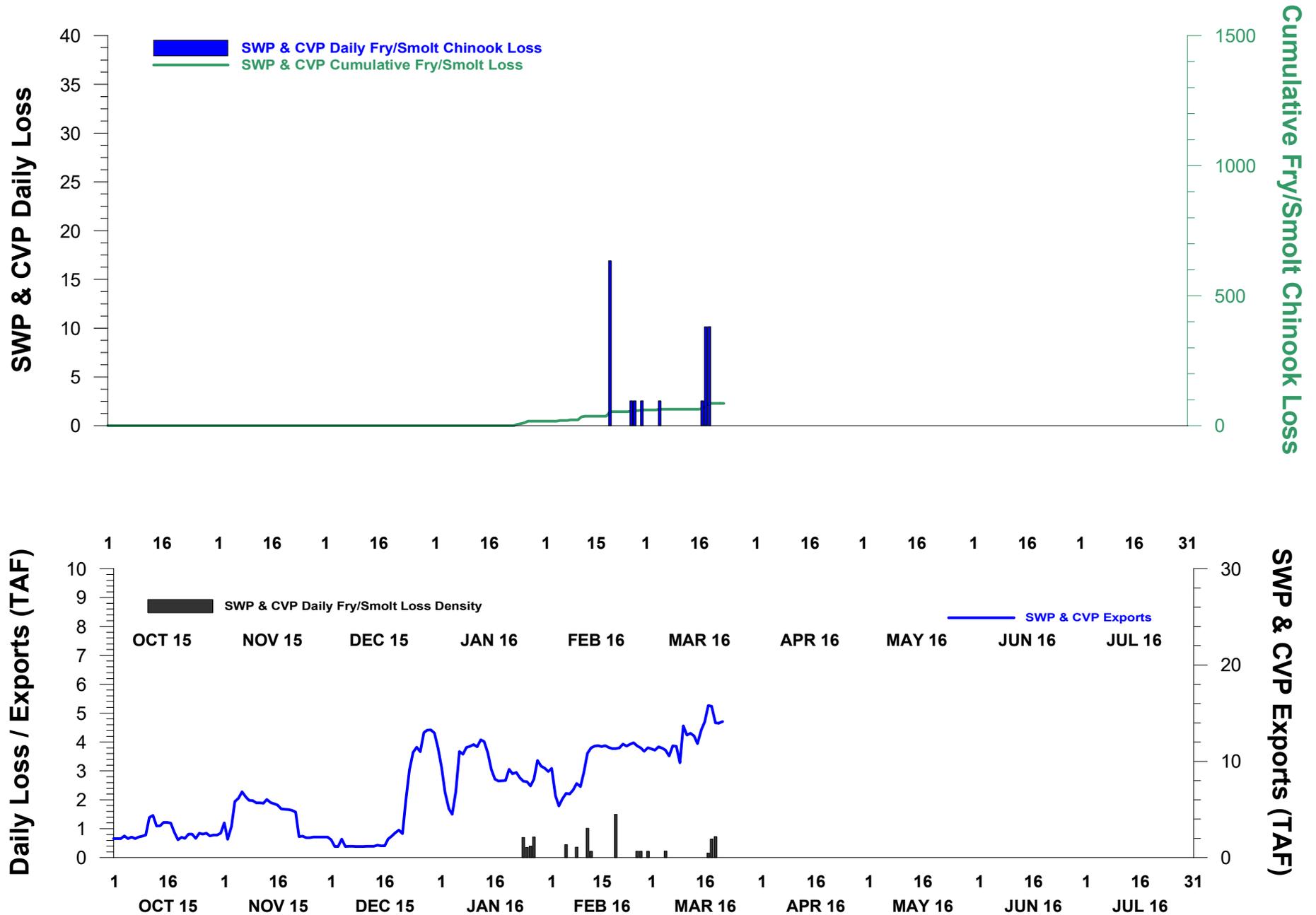
Preliminary data from DFW; subject to revision.

*Older juvenile Chinook defined as all Chinook greater than or equal to the minimum winter run length-at-date criteria and less than the maximum size included in the length-at-date criteria (Delta model) for which a race is assigned on a given sampling date.

**ITL (Incidental Take Limit) is based on the JPE, which is not yet available.

***minimum value determined by NMFS

NON-CLIPPED FRY/SMOLT CHINOOK LOSS AT THE DELTA FISH FACILITIES 01 OCT 2014 THROUGH 04 APRIL 2016

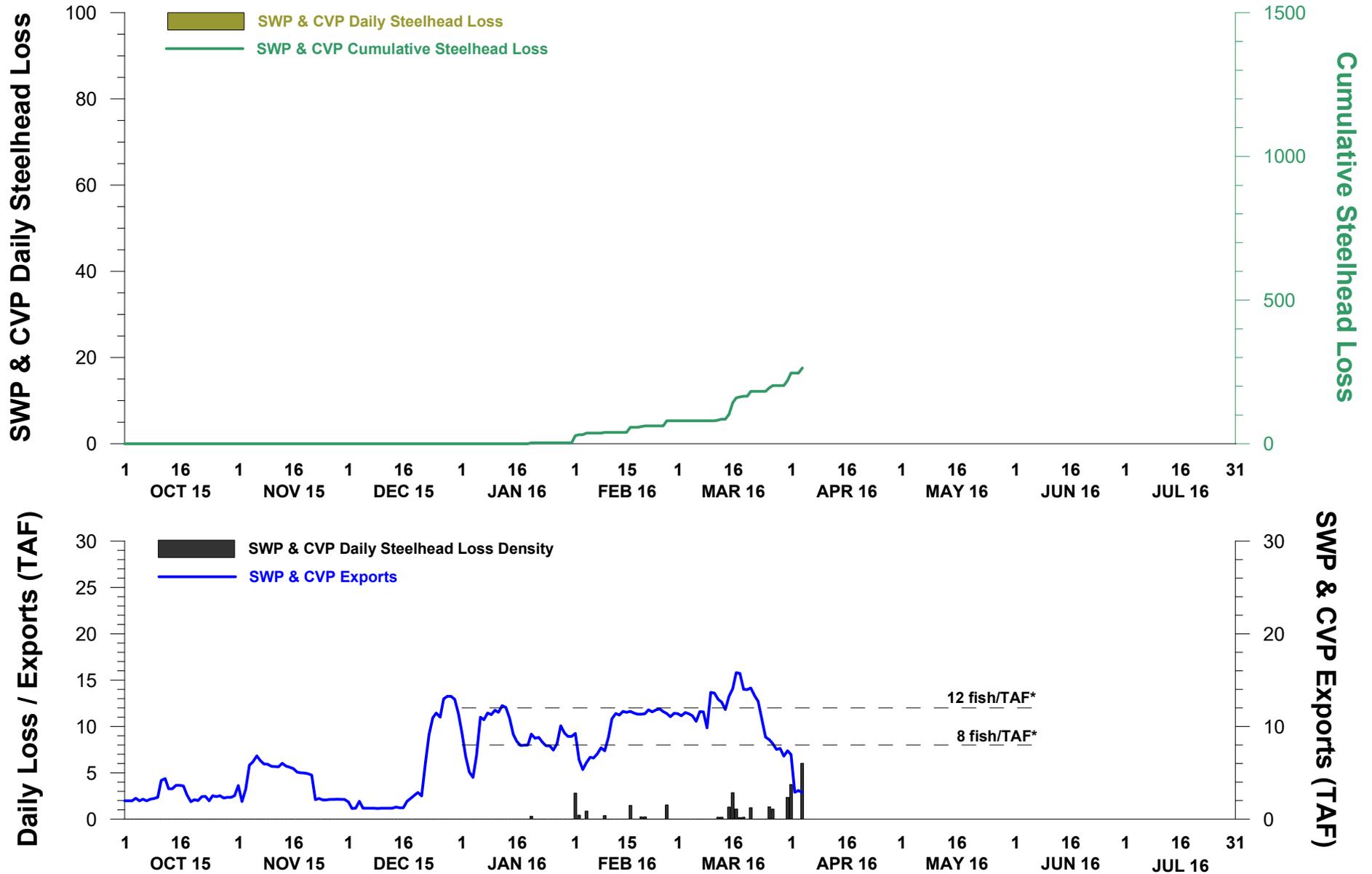


DWR-DES 05 APRIL 2016

Preliminary data from DFW; subject to revision.

*Fry/smolt Chinook defined as all Chinook less than the minimum winter run length-at-date criteria (Delta model).

NON-CLIPPED STEELHEAD LOSS AT THE DELTA FISH FACILITIES 01 OCT 2015 THROUGH 04 APRIL 2016



DWR-DES 5 APRIL 2016

Preliminary data from DFW; subject to revision.

*Used to roughly estimate whether the daily loss is greater than 8 fish/TAF multiplied by the volume exported in TAF or 12 fish/TAF multiplied by the volume exported in TAF.

STEELHEAD SALVAGE AT THE DELTA FISH FACILITIES 01 OCT 2015 THROUGH 05 APRIL 2016

