

**Delta Operations for Salmonids and Sturgeon (DOSS) Group**  
**Conference call: 3/8/16 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](http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/doss.html).

**DWR:** Aaron Miller, Rhiannon Mulligan, Kevin Reece

**Reclamation:** Peggy Manza

**NMFS:** Barb Byrne, Jeff Stuart

**CDFW:** Bob Fujimura, Duane Linander, Ken Kundargi

**SWRCB:** Matt Holland, Chris Carr

**FWS:** Craig Anderson, Leigh Bartoo

**Agenda Items**

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

**Agenda Item 2.**

**RPA Implementation Review**

**Delta RPA Actions that may affect operations during March:**

**Action IV.1.2<sup>1</sup> (DCC gate operations):**

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

**Action IV.2.3<sup>2</sup> (OMR Flow Management)**

- No triggers exceeded over past week.
- OMR limit of -5,000 cfs is in effect

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<sup>1</sup> 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](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

<sup>2</sup> 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](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

**Agenda Item 3.**

**Current Operations (3/8/16)**

SWP		CVP	
<b>Exports (cfs)</b>			
Clifton Court Forebay	2,400	Jones Pumping Plant	3,400
<b>Reservoir Releases (cfs)</b>			
Feather - Oroville	800	American - Folsom	Ramping up from 8,000 on 3/7 to 15,000 by 11am today, 3/8.
		Sacramento - Keswick	3,250
		Stanislaus - Goodwin	200
		Trinity - Lewiston	300
<b>Reservoir Storage (in TAF)</b>			
San Luis (SWP)	579	San Luis (CVP)	336
Oroville	2,123	Shasta	3,041
New Melones	500	Folsom	698
<b>Delta Operations</b>			
DCC	Closed	Sacramento River at Freeport (cfs)	39,918
Outflow Index (cfs)	~55,200	San Joaquin River at Vernalis (cfs)	1,087
E:I	27% (14-day avg.)	X2	78 km

OMR as of 3/5/16:

	USGS gauges (cfs)	Index <sup>3</sup> (cfs)
5-day	-5,590	-4,980
14-day	-5,240	-4,990

The daily OMR Index on 3/7/16 was -4,980 cfs.

Review of factors controlling Delta exports for the period 3/1/16 to 3/8/16:

- *Friday (3/1/16) – Tuesday (3/8/16):* -5,000 cfs OMR limit per both NMFS BiOp and 2/10/16 FWS determination.

More rain is expected later this week; the Colusa river guidance plot<sup>4</sup> shows a flow peak of over 35,000 cfs this afternoon (from this weekend’s storm) and another peak on Saturday from the coming rain.

<sup>3</sup> 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.

<sup>4</sup> [http://cdec.water.ca.gov/guidance\\_plots/COL\\_gp.html](http://cdec.water.ca.gov/guidance_plots/COL_gp.html)

#### **Agenda Item 4.**

##### **Smelt Working Group**

The SWG met on Monday, 3/7/16 at 10am. Bartoo (FWS) provided the following SWG meeting summary:

The Working Group reviewed current Delta Smelt distribution, salvage data, and Delta conditions. The Working Group agreed that the relative risk of entrainment to adult Delta Smelt likely has decreased. Members noted that spawning likely is well underway, and adults are most likely holding their positions, rather than continuing migration.

The Working Group described 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 Delta Smelt for each of the flow ranges is characterized as follows:

- -1250 to -2000 cfs has a low risk of entrainment,
- -2000 to -3500 cfs has a medium to high risk of entrainment,
- -3500 to -5000 cfs has a high risk of entrainment.

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, March 14, 2016 at 10 am.

SWG meeting notes are available at: [http://www.fws.gov/sfbaydelta/cvp-swp/smelt\\_working\\_group.cfm](http://www.fws.gov/sfbaydelta/cvp-swp/smelt_working_group.cfm).

#### **Agenda Item 5.**

##### **Update on Chinook Genetic Results from Salvage Facilities**

Recent genetic testing of unclipped Chinook collected at the CVP/SWP export facilities through 2/25/16 (results provided at the end of the meeting notes) has confirmed a second genetic winter-run in salvage (caught 2/22/16), increasing the estimate of WY 2016 wild winter-run take at the export facilities (measured as "loss") to 11.47. The wild winter-run take limit for WY 2016 is 1,017.

##### **Winter-run-centric overview of genetic testing results to date:**

Of 49 unclipped Chinook collected through 2/25/16 at the export facilities during WY 2016, 11 were winter-run-sized and 38 were assigned to other runs based on the length-at-date criteria. No non-winter-run-sized fish have been confirmed to be genetic winter-run. Of the 11 winter-run-sized fish caught during WY 2016, two (2/11=18%) have been confirmed to be genetic winter-run:

- 1 WR-sized fish caught 1/28/16 at the SWP. Associated salvage=2; associated loss=8.59.
- 1 WR-sized fish caught 2/22/16 at the CVP. Associated salvage=4; associated loss=2.88.

No OMR loss-density triggers were tripped on 1/28 or 2/22 based on "older juvenile"-sized fish caught at the export facilities.

**Agenda Item 6.**

**Fish Monitoring: Salvage<sup>5</sup>**

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>.

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<sup>5</sup> 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: February 29-March 6, 2016  
 Prepared by Bob Fujimura on March 7, 2016 20:10  
 Preliminary Results -Subject to Revision

Criteria	29-Feb	1-Mar	2-Mar	3-Mar	4-Mar	5-Mar	6-Mar	Trend	
<b>Loss Densities</b>									
Wild older juvenile CS	0	0	0	0	0	0	0	↘	0
Wild steelhead	0	0	0	0	0	0	0	↘	0
<b>Exports</b>									
SWP daily export	4,626	4,352	4,738	4,591	4,385	3,799	4,793	↘	4,469
CVP daily export	6,759	6,802	6,764	6,782	6,763	6,765	6,806	→	6,777
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 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	↘	28	51
Spring Run	0	0	↘	16	10
Late Fall Run	0	0	→	44	166
Fall Run	4	4	↗	60	73
Unclassified	0	0	→	10	NC
<b>Total</b>	<b>4</b>	<b>4</b>		<b>158</b>	<b>299</b>
<b>Hatchery</b>					
Winter Run	8	6	↗	201	605
Spring Run	0	0	→	0	0
Late Fall Run	0	0	→	93	298
Fall Run	0	0	→	1	4
Unclassified	0	0	→	0	0
<b>Total</b>	<b>8</b>	<b>6</b>		<b>295</b>	<b>906</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 = 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	0	0	↘	42	80
Hatchery	78	104	↘	705	1,699
<b>Total</b>	<b>78</b>	<b>104</b>		<b>747</b>	<b>1,779</b>

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 2/29/16-3/6/16.

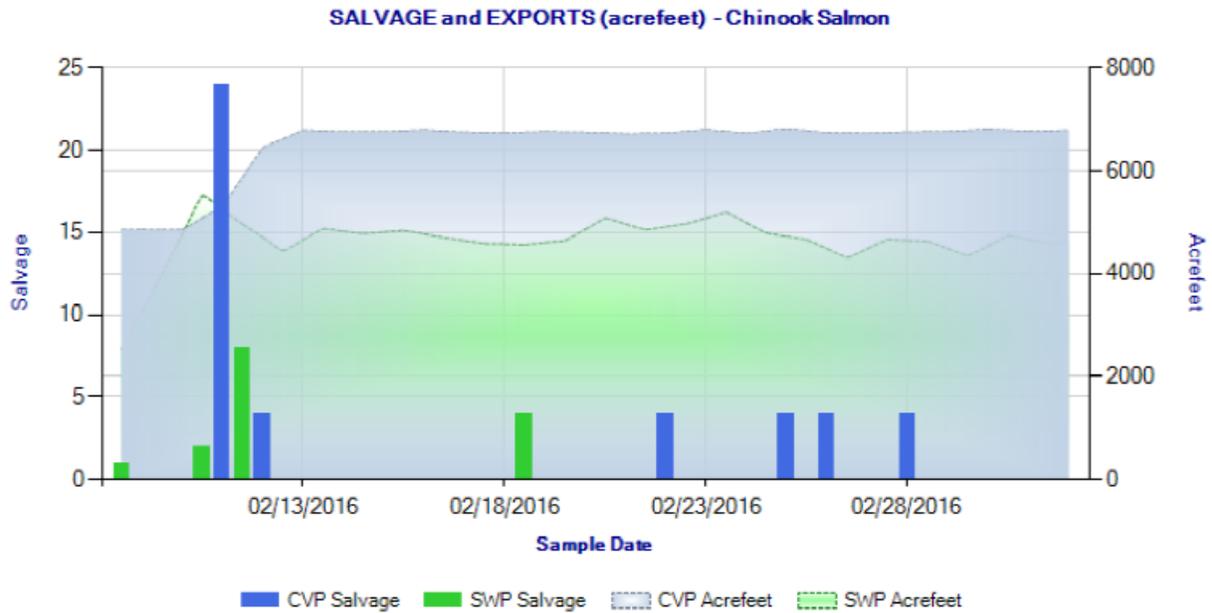


Figure 2. Daily salvage of Chinook salmon (all races) and water exports from the state and federal fish salvage facilities during February 9, 2016 through March 3, 2016.

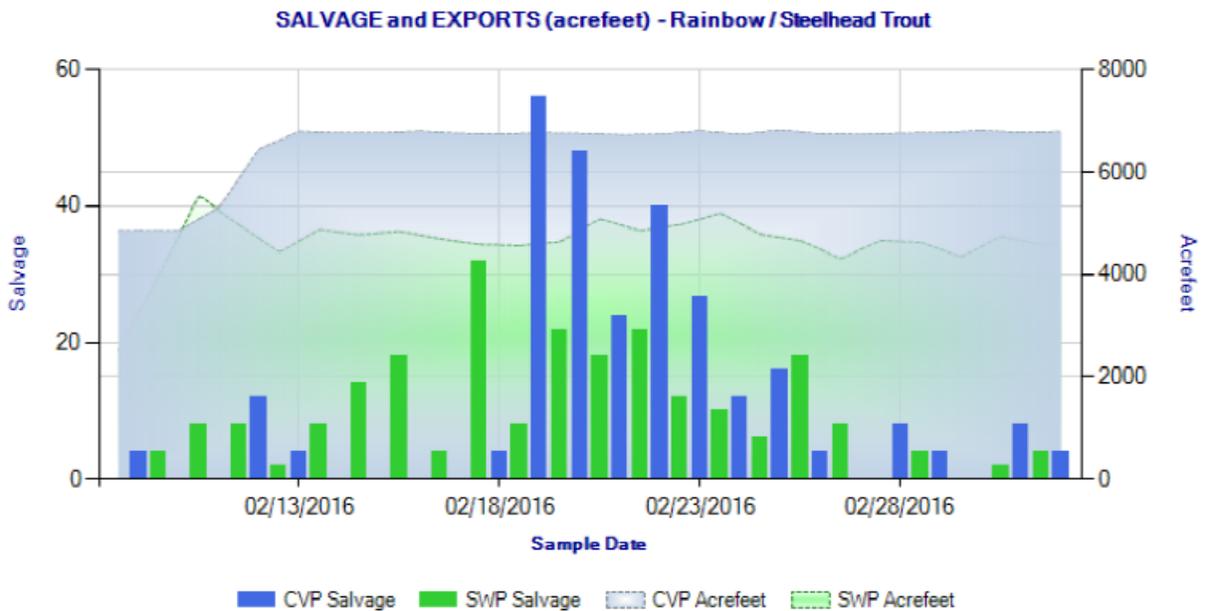


Figure 3. Daily salvage of steelhead and water exports from the state and federal fish salvage facilities during February 9, 2016 through March 3, 2016.

Preliminary salvage report for Monday, 3/7/16, was that 2 clipped steelhead were observed at the CVP for a total salvage of 8.

**Coded-wire-tag recoveries**

Mulligan (DWR) provided the following summary of coded-wire-tag recoveries at the SWP and CVP fish collection facilities. The first salvage of hatchery winter-run Chinook from the

Livingston Stone National Fish Hatchery release occurred on Sunday. Two hatchery winter-run were collected for a total salvage of 8, and a loss of 5.76 (0.001% of the number released). 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 <sup>a</sup>	Total Entering Delta	% Loss of Number Released <sup>b</sup>	% Loss of Total Entering Delta <sup>c</sup>	First Concern Level	Second Concern Level	Date of First Loss <sup>d</sup>	Date of Last Loss <sup>e</sup>
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	170.59	68,000	n/a	0.251	n/a	0.5%	1.0%	1/6/2016	2/2/2016
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	Livingston stone NFH	Sacramento River	Winter Run Production	5.76	420,006	155,400	0.001	0.0037	0.5%	1.0%	3/6/2016	3/6/2016

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

Facility	Unknown CWT Loss <sup>a</sup>	Unread CWT Loss <sup>b</sup>	Unknown Hatchery Loss <sup>c</sup>	Acoustic Tag Loss <sup>d</sup>	Number of Unassigned CWT <sup>e</sup>
SWP	18.16	0.00	0.00	0.00	0
CVP	0.00	0.00	0.00	0.00	0
TOTAL	18.16	0.00	0.00	0.00	0

SWP and CVP adipose-fin clipped Chinook lost from 12/25/2015

<sup>a</sup>Number released with the adipose-fin clipped and a coded-wire tag (CWT).

<sup>b</sup>% Loss of Number Released = (Confirmed Loss/Number Released)\*100.

<sup>c</sup>% Loss of Total Entering Delta= (Confirmed Loss/Total Entering Delta)\*100.

<sup>d</sup>Date of first and last loss accounts for all CWT loss even those from special studies where salvage and loss=0.

<sup>e</sup>Adipose-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 accidentally released).

<sup>f</sup>Adipose-fin clipped Chinook was collected during fish count and has not been processed yet.

<sup>g</sup>CWT has been read, but hatchery release information not yet available.

<sup>h</sup>Adipose-fin clipped Chinook released due to presence of sutures.

<sup>i</sup>CWT 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.

\*\* Information not yet available.

DWR-DES Revised 03/07/2016

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

**Agenda Item 7.**

**Fish Monitoring: Hatchery winter-run Chinook acoustic-tracking**

Livingston Stone National Fish Hatchery released two groups of about 210,000 (for a total of 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.

Highlights from the latest (as of 9:00 am on 3/7/16) acoustic-tracking data from Arnold Amman (SWFSC) are provided below.

- Rough estimate of survival between Redding and Colusa is ~68%, the highest survival through that reach compared to the previous three years of data.
- Saw an increase in tags detected at Tower Bridge over the past few days.
- 43.2% of the first release and 44.9% of the second release have passed the Tower Bridge receiver in Sacramento.

Livingston Stone National Fish Hatchery JSATS acoustic tagged smolt movement as of 3/7/2016 09:00

Table 1. FIRST RELEASE ONLY - Preliminary Data, subject to change

FASTEST FISH ID: 4AA8						
Location	rkm of location	Total Fish detected	First arrival	Travel Time (days)	Speed (rkm/day)	Speed (miles/day)
Redding	540.4	285	2/17/2016 18:00			
Colusa	314.4	195	2/20/2016 5:40	2.5	90.9	56.5
Tisdale	269.2	169	2/20/2016 20:38	0.6	72.5	45.0
Knights Landing	224.1	149	2/21/2016 11:09	0.6	74.6	46.3
Verona	203.5	104	* went through this area when receivers not operating			
Tower Bridge	172.0	123	2/22/2016 4:22	0.7	72.6	45.1
I80 Bridge	170.8	123	2/22/2016 4:54	0.0	53.9	33.5
Hood	138.9	75				
Middle River	150	0				

Table 2. SECOND RELEASE ONLY - Preliminary Data, subject to change

FASTEST FISH ID: 4AD2						
Location	rkm of location	Total Fish detected	First arrival	Travel Time (days)	Speed (rkm/day)	Speed (miles/day)
Redding	540.4	285	2/18/2016 18:00			
Colusa	314.4	194	2/21/2016 9:18	2.6	85.7	53.2
Tisdale	269.2	169	2/22/2016 1:20	0.7	67.7	42.1
Knights Landing	224.1	142	2/22/2016 17:55	0.7	65.3	40.6
Verona	203.5	103	2/22/2016 23:30	0.2	88.4	54.9
Tower Bridge	172.0	128	2/23/2016 19:30	0.8	37.8	23.5
I80 Bridge	170.8	125	2/23/2016 20:01	0.0	56.1	34.8
Hood	138.9	75				
Middle River	150	0				

Redding - Bonnyview = site of release, fish trucked from LSNFH.

Bonnyview is 6.8 river miles below the usual Caldwell Park release location.

rkm of location = distance via mainstem path from Golden Gate Bridge, GG Bridge = 0 rkm.

Travel Time = arrival date to location minus arrival date of location above / distance

Verona receivers not online until 2/22/2016 13:23

Hood receiver online starting 2/26/2016 14:35

Table 3. Survival estimates by reach for Livingston Stone National Fish Hatchery JSATS acoustic tagged winter-run juveniles for BY2012, BY2013, BY2014.

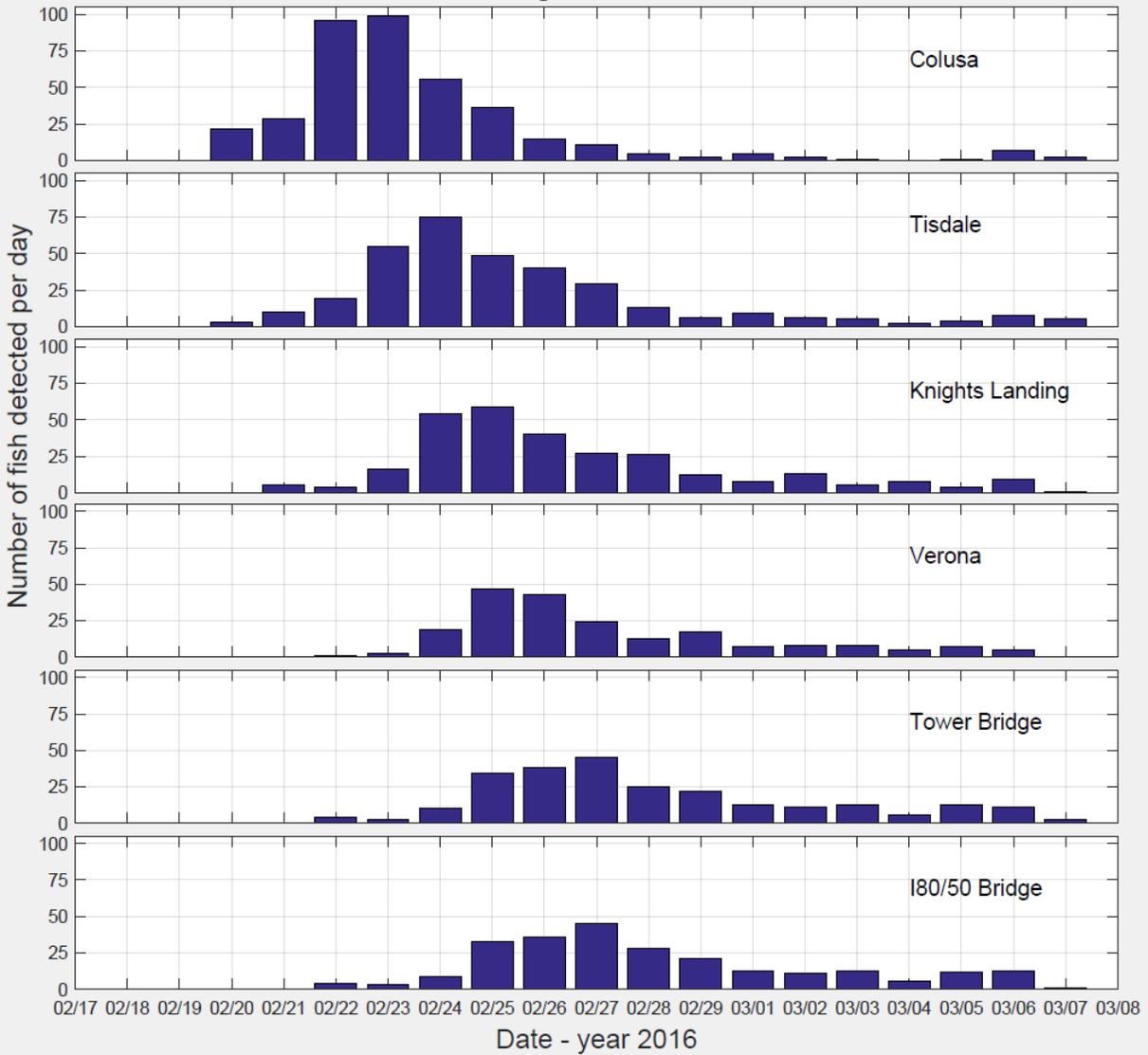
Reach	Reach Length (rkm)	Survival Estimates			
		BY2012	BY2013	BY2014 release 1	BY2014 release 2
Redding to Colusa	237	0.204	0.419	0.510	0.600
Colusa to Tisdale	45	0.811	0.983	0.989	0.968
Tisdale to Knights Landing	45	0.996	0.986	0.916	0.942
Kights Landing to Verona	21	0.900	1.000	0.973	0.999
Verona to Tower/I80 Bridge	32	1.000	0.931	0.972	0.962
I80 to Hood	33	NA	NA	NA	0.961
Redding to Tower/I80 Bridge	379	0.149	0.378	0.441	0.525

*BY = Brood Year, hatchery releases occur in next calander year, example BY2012 were released 2013  
Survival estimates from Cormack-Jolly-Seber model with survival and detection probability varying by reach  
Release of hatchery fish each year occurred in early February at Redding, Caldwell Park*

Table 4. Average travel time in days from release location to each downriver location for the two release groups of LSNFH winter-run Chinook salmon juveniles.

Location	rkm	Release Date	
		2/17/2016	2/18/2016
Colusa	314	6.2	6.0
Tisdale	269	8.4	7.6
Knights Landing	224	9.7	8.5
Verona	203	10.4	9.0
Tower Bridge	172	11.1	10.2
I80 Bridge	171	11.1	10.2
Hood	138	12.1	10.8

**Winter-run hatchery juveniles detected per day**  
**570 fish released in Redding 2/17-2/18 - data as of 3/7/2016 9:00**



**Agenda Item 8.**

**Fish Monitoring: RSTs/trawls/seines**

The following table presents fish monitoring data. Unless otherwise noted, reported sizes are fork length. See also:

<http://www.water.ca.gov/swp/operationscontrol/calFed/calFedMonitoring.cfm>.

Location	Chippis Is. Midwater Trawl <sup>A</sup>	Station 902/Jersey Pt./Prisoners Pt. Trawls <sup>A</sup>	Sacramento Trawl <sup>A</sup>	Beach Seines <sup>A</sup>	Knights Landing RST <sup>B</sup>	Tisdale RST <sup>C</sup>	GCID RST <sup>D</sup>	Mossdale Kodiak Trawl <sup>A</sup>
<b>Sample Date</b>	2/29, 3/2, 3/4	902: 3/4 Jersey Pt: 3/1, 3/3 Pris. Pt: 2/29, 3/2	2/29, 3/2, 3/4	3/1, 3/3, 3/4	2/29-3/4	2/28-3/6	2/29-3/4	2/29, 3/2, 3/4
<b>FR Chinook</b>		No species of management concern	1	372	1	22	5	No species of management concern
<b>WR Chinook</b>								
<b>SR Chinook</b>			1	10	1	2		
<b>LFR Chinook</b>								
<b>Ad-Clipped Chinook</b>	42		1	1	1	15	2 (WR-sized)	
<b>Chinook Adult</b>								
<b>Steelhead (wild)</b>								
<b>Steelhead (ad-clip)</b>	8 (1 with acoustic-tag)			1		1		
<b>Green Sturgeon</b>								
<b>Delta Smelt</b>								
<b>Splittail</b>								
<b>Longfin Smelt</b>								
<b>Flows (avg. cfs)</b>					6,978	7,477	954	
<b>W. Temp. (avg. °F)</b>					57.5	56.9	56.6	
<b>Turbidity (avg. NTU)</b>					8.4	13.6	6.5	

<sup>A</sup> Data reported in the 2/28 to 3/5 DJFMP sampling summary

<sup>B</sup> Sampling period was from 2/29 at 9:15 am to 3/4 at 9:45 am.

<sup>C</sup> Sampling period was from 2/28 at 8:30 am to 3/6 at 4:00 pm. Cones were modified to 50% catch at 9:00 am on 3/6.

<sup>D</sup> Sampling period was from 2/29 at 9:00 am to 3/4 at 9:00 am, at which time the GCID trap was pulled from the bypass channel to avoid the expected peak in high flows and heavy debris.

**Monitoring Summary for DCC and Early Warning surveys:** This table provides recent monitoring information not included in the 2/28 to 3/5 DJFMP sampling summary and thus not captured in the table above.

Location	Prisoners Pt. Trawls	Sacramento Trawl
Sample Date	3/7	3/7
FR Chinook	0	12
WR Chinook	0	0
SR Chinook	0	0
Ad-Clipped Chinook	0	6*
Delta Smelt	0	0

\*87-94 mm; likely hatchery winter-run from the mid-February release

**Agenda Item 9.**

**Recent or Upcoming Hatchery Releases**

The Mokelumne River Hatchery will be releasing 50,000 yearling steelhead at New Hope Landing (near Walnut Grove) on 3/7/16 and 3/8/16.

**Agenda Item 10.**

**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 salmon</i>	<5% (Last week: same)	>95% (Last week: same)	<5% (Last week: same)
<i>Young-of-year (YOY) spring-run Chinook salmon*</i>	30% - 40% (Last week: same)	60% - 70% (Last week: same)	0% - 5% (Last week: same)
<i>Hatchery winter-run Chinook salmon</i>	5-25% (Last week: >50%)	50-80% (Last week: 25-50%)	10-40% (Last week: <5%)

\*When reviewing monitoring data, DOSS assumes that some of the juvenile Chinook categorized as fall-run (based on the length at date criteria) are actually genetic spring-run Chinook.

### **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:**

- **Exposure Risk: MEDIUM**
  - Increased flows and turbidities, expected in response to forecasted rains, may cue salmonid movement.
- **Routing Risk: LOW to MEDIUM**
  - Because increased river flows are expected to mute the tidal effects at Georgiana Slough (reducing the risk of routing into Georgiana Slough), the highest outflow for the week has a low risk, and lower flows have a medium risk.
- **Overall Entrainment Risk: LOW to MEDIUM**

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

- **Exposure Risk: MEDIUM to HIGH**
  - Natural-origin individuals from listed runs are expected to have previously migrated into and be rearing within the Interior Delta; a substantial fraction of the hatchery winter-run production is estimated to be present in the Delta.
- **OMR/Export Risk:**
  - OMR -2,500 cfs to -3,500 cfs: LOW
  - OMR -3,500 cfs to -5,000 cfs: MEDIUM to HIGH
- **Overall Entrainment Risk:**
  - OMR -2,500 cfs to -3,500 cfs: MEDIUM
  - OMR -3,500 cfs to -5,000 cfs: MEDIUM to HIGH

**Agenda Item 11.**

**DOSS Advice to WOMT and NMFS:** None

**Agenda Item 12.**

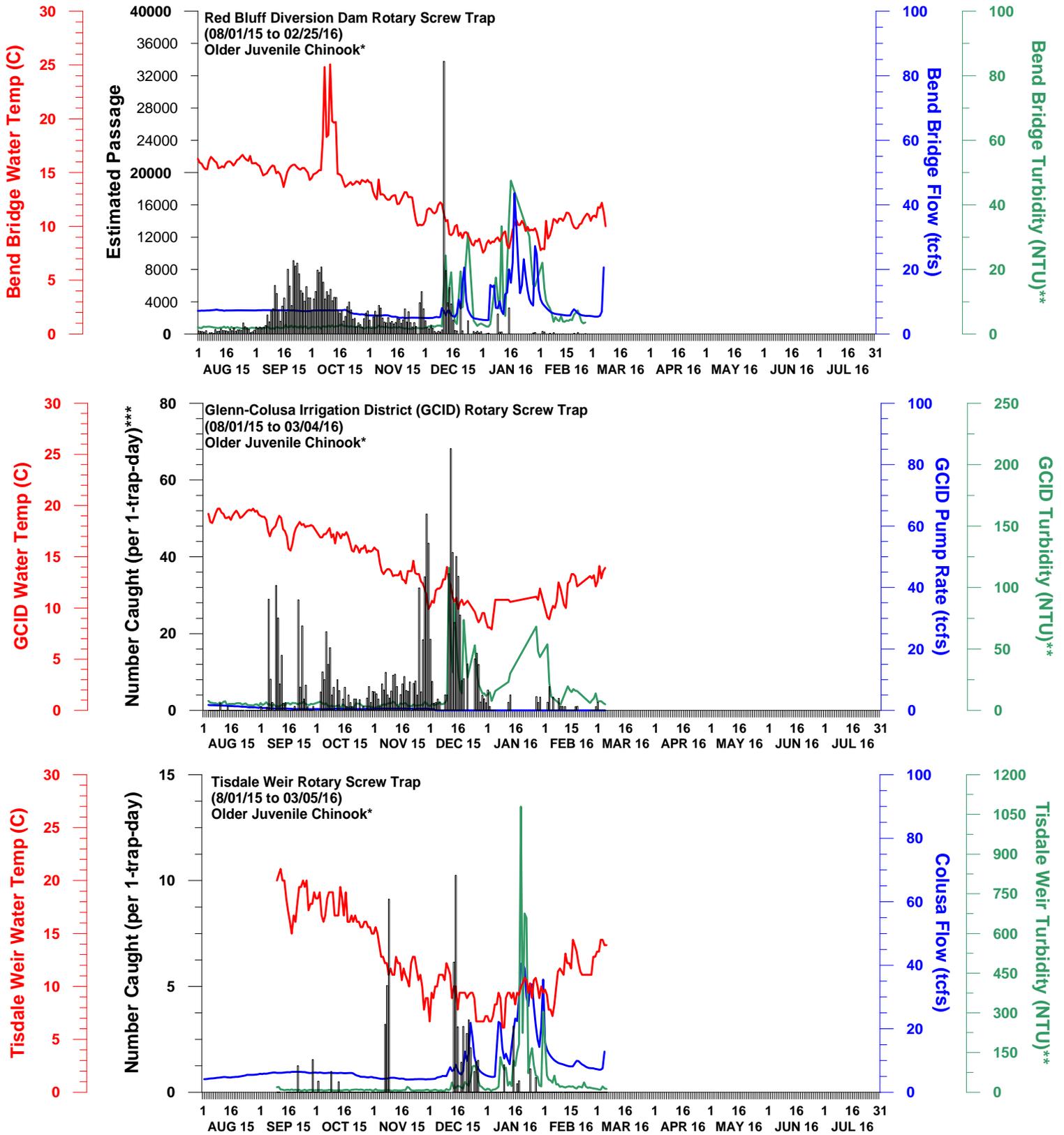
**Next Meeting:** The next DOSS conference call will be on 3/15/16 at 9am.

The following genetic results were provided by DWR.

FACILITY	DATE	TIME	ForkLength	Delta LD Model Race ID	Genetic Assignment	PosProb1	Group	SALVAGE	LOSS
SWP									
1	12/23/2015	14:00	146	LF	Non-winter	1.000	Fall	2.0	9.16
1	12/24/2015	16:00	162	LF	Non-Winter	1.000	Late Fall	2.0	9.16
1	12/24/2015	13:00	169	LF	Non-winter	1.000	Fall	4.0	17.15
1	12/24/2015	13:00	176	LF	Non-Winter	1.000	Late Fall	4.0	17.15
1	12/24/2015	13:00	180	LF	Non-winter	1.000	Fall	4.0	17.15
1	12/25/2015	02:00	160	LF	Non-winter	1.000	Fall	2.0	8.57
1	12/26/2015	09:00	150	LF	Non-winter	1.000	Fall	4.0	17.95
1	12/26/2015	09:00	198	F	Non-Winter	1.000	Late Fall	4.0	17.95
1	12/28/2015	07:30	140	W	Non-winter	1.000	Fall	1.0	4.33
1	12/28/2015	07:30	147	W	Non-winter	1.000	Fall	1.0	4.33
1	12/28/2015	07:30	151	LF	Non-winter	1.000	Fall	1.0	4.33
1	12/28/2015	07:30	153	LF	Non-winter	1.000	Fall	1.0	4.33
1	12/28/2015	07:30	155	LF	Non-winter	1.000	Fall	1.0	4.33
1	12/28/2015	07:30	165	LF	Non-winter	1.000	Fall	1.0	4.33
1	12/28/2015	07:30	183	LF	Non-Winter	1.000	Late Fall	1.0	4.33
1	12/28/2015	07:30	192	LF	Non-winter	1.000	Fall	1.0	4.33
1	01/01/2016	05:00	158	LF	Non-winter	1.000	Fall	4.0	18.30
1	01/02/2016	05:00	193	LF	Non-winter	1.000	Fall	4.0	18.32
1	01/05/2016	08:00	151	W	Non-winter	1.000	Fall	1.0	4.33
1	01/05/2016	08:00	152	W	Non-Winter	1.000	Late Fall	1.0	4.33
1	01/28/2016	02:00	77	W	Winter	1.000	Winter	2.0	8.59
1	02/02/2016	02:00	135	W	Non-winter	1.000	Fall	2.0	9.05
1	02/19/2016	13:00	44	F	Non-winter	1.000	Fall	4.0	16.92
CVP									
2	12/22/2015	10:00	160	LF	Non-winter	1.000	Spring	4.0	3.52
2	12/25/2015	08:00	170	LF	Non-winter	1.000	Fall	4.0	3.19
2	01/12/2016	10:00	146	W	Non-Winter	1.000	Late Fall	4.0	2.88
2	01/14/2016	23:59	162	W	Non-winter	1.000	Fall	4.0	2.88
2	01/16/2016	04:00	175	W	Non-winter	1.000	Fall	4.0	3.52
2	01/24/2016	10:00	37	F	Non-winter	1.000	Fall	4.0	2.76
2	01/24/2016	08:00	38	F	Non-winter	1.000	Fall	4.0	2.76
2	01/25/2016	12:00	40	F	Non-winter	1.000	Fall	4.0	2.76
2	01/26/2016	18:48	35	F	Non-winter	1.000	Fall	0.0	0.00
2	01/26/2016	15:56	36	F	Non-winter	1.000	Fall	0.0	0.00
2	01/26/2016	16:00	37	F	Non-winter	1.000	Fall	4.0	3.01
2	01/27/2016	08:00	35	F	Non-winter	1.000	Fall	4.0	3.01
2	01/27/2016	12:35	38	F	Non-winter	1.000	Fall	0.0	0.00
2	01/27/2016	14:00	38	F	Non-winter	1.000	Fall	4.0	2.76
2	02/05/2016	12:00	46	F	Non-winter	1.000	Fall	4.0	3.01
2	02/06/2016	22:00	188	W	Non-winter	1.000	Fall	4.0	3.52
2	02/08/2016	14:00	44	F	Non-winter	1.000	Fall	4.0	2.76
2	02/11/2016	12:00	38	F	Non-winter	1.000	Fall	0.0	0.00
2	02/11/2016	12:00	38	F	Non-winter	1.000	Fall	4.0	2.76
2	02/11/2016	12:00	42	F	Non-winter	1.000	Fall	4.0	2.76
2	02/11/2016	12:00	42	F	Non-winter	1.000	Fall	0.0	0.00
2	02/11/2016	22:00	49	F	Non-winter	1.000	Fall	4.0	2.76
2	02/11/2016	22:00	49	F	Non-winter	1.000	Fall	0.0	0.00
2	02/11/2016	12:00	54	S	Non-winter	1.000	Fall	4.0	2.76
2	02/12/2016	12:00	54	S	Non-winter	1.000	Fall	4.0	2.54
2	02/22/2016	10:00	112	W	Winter	1.000	Winter	4.0	2.88

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

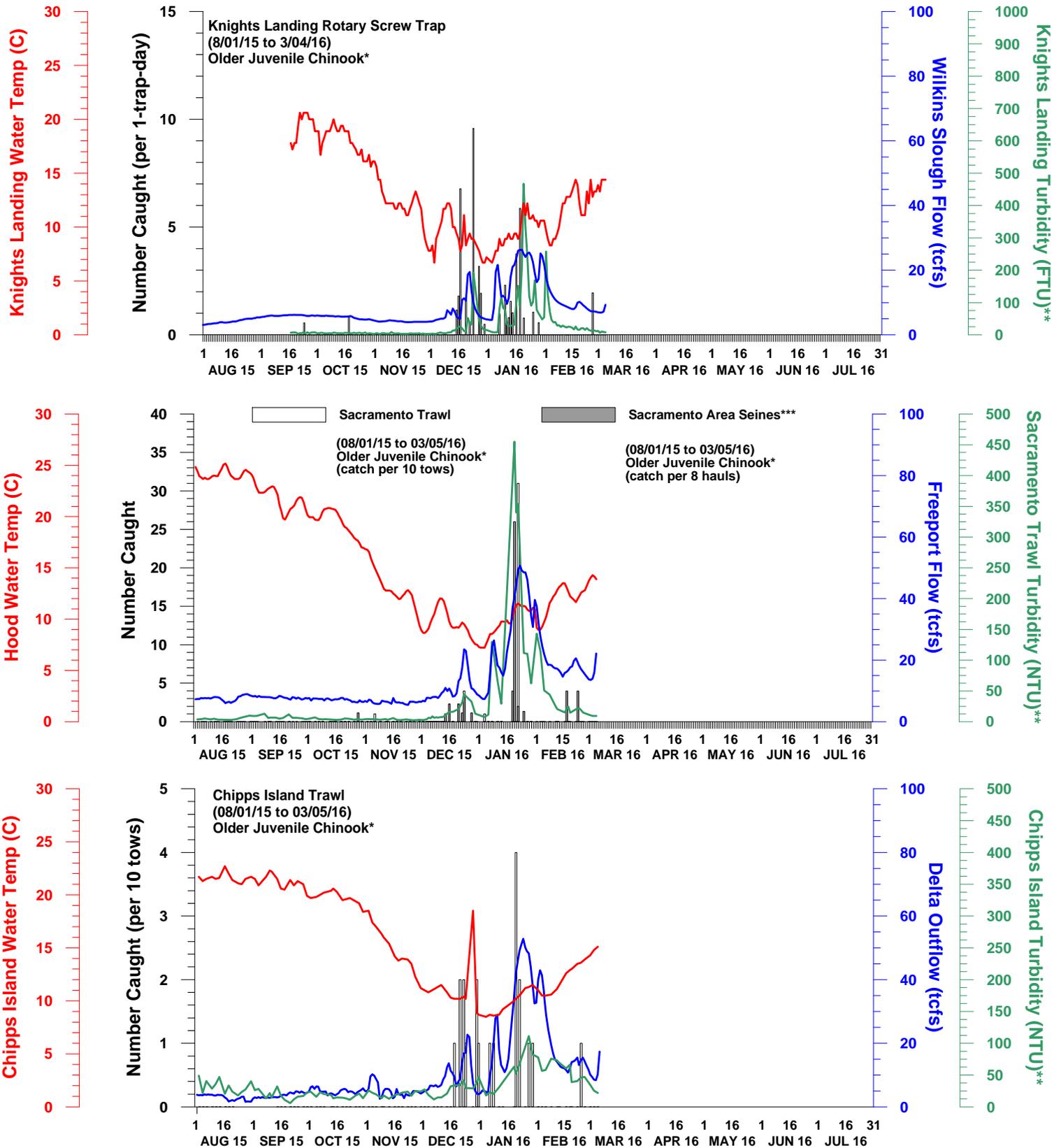


DWR-DES 08 MARCH 2016  
 Preliminary data from DFW, FWS, GCID, and CDEC; subject to revision.

\*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 08 MARCH 2016

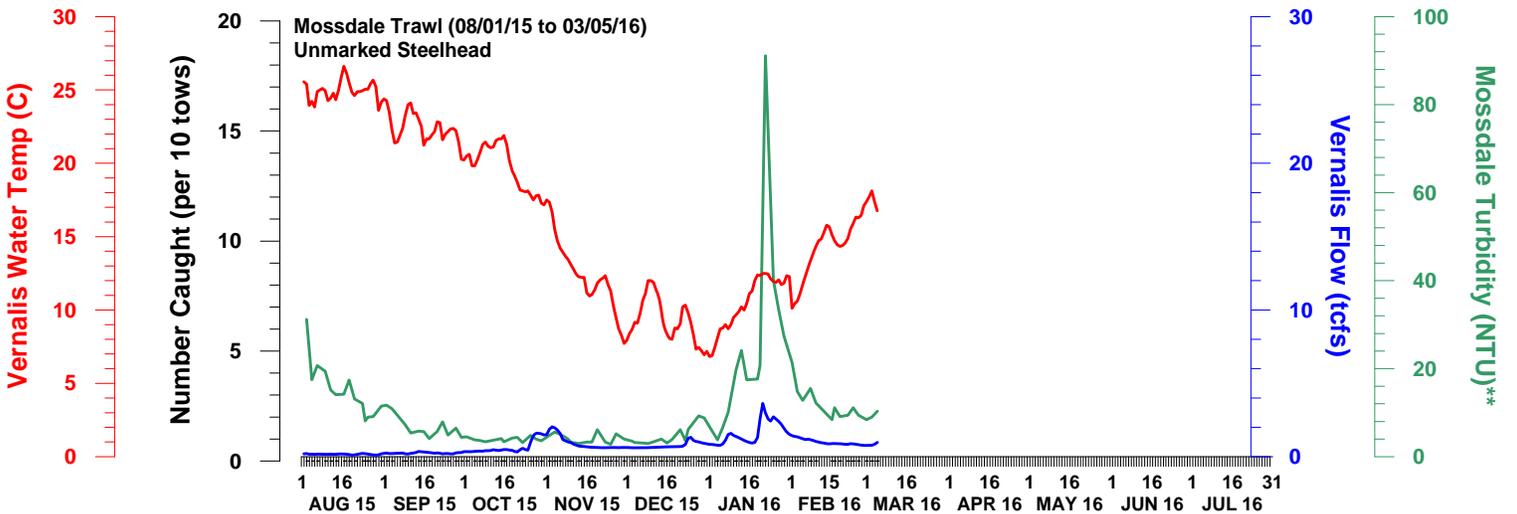
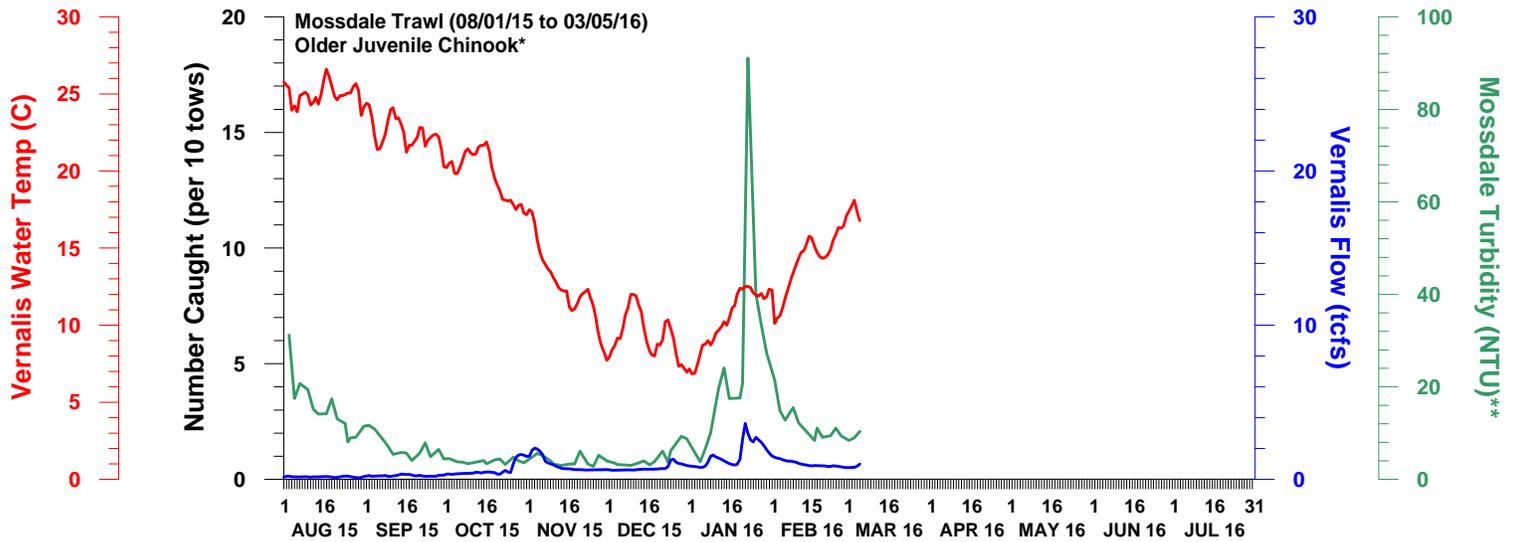
Preliminary data from DFW, FWS, and CDEC; subject to revision.

\*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

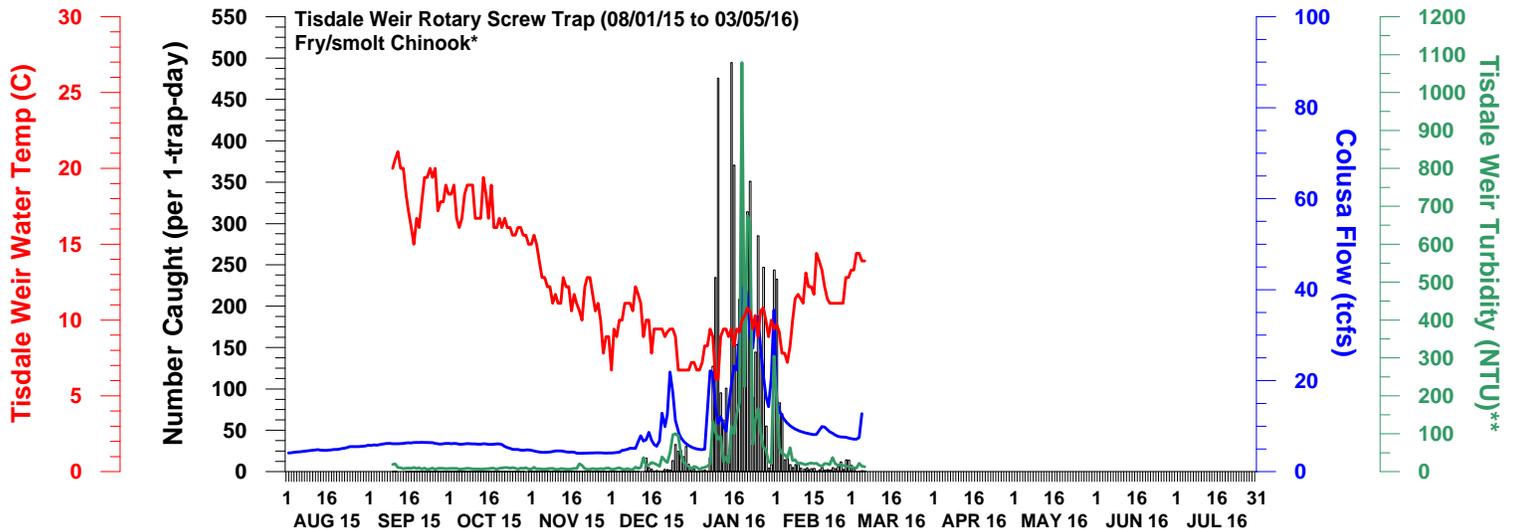
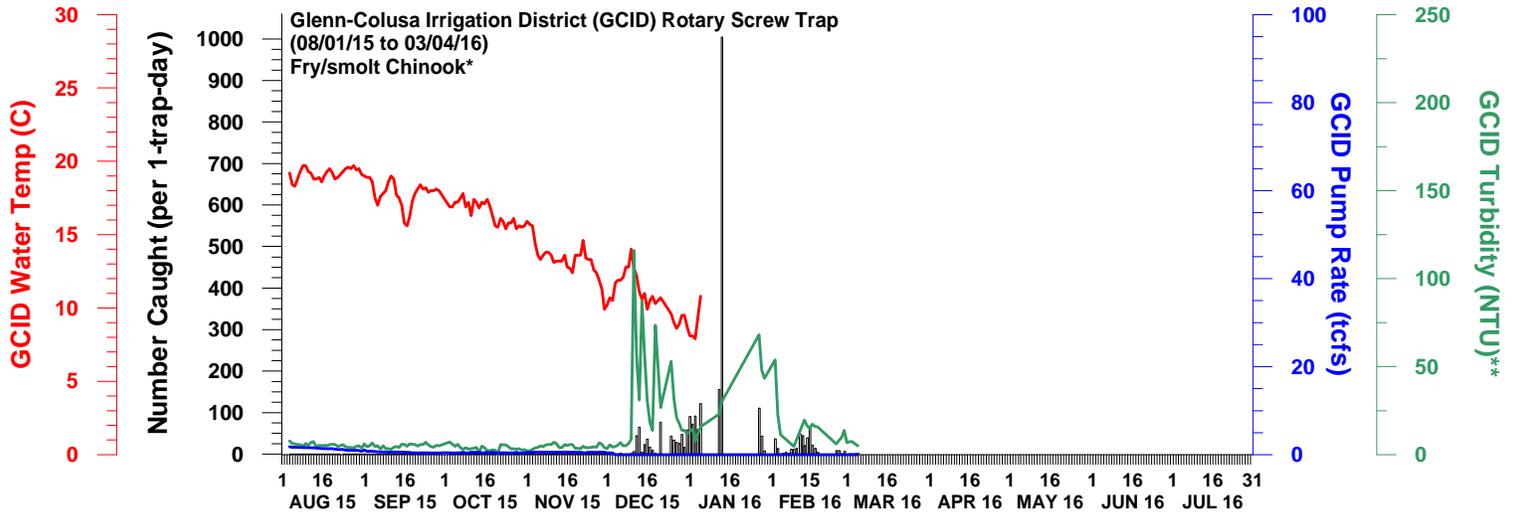
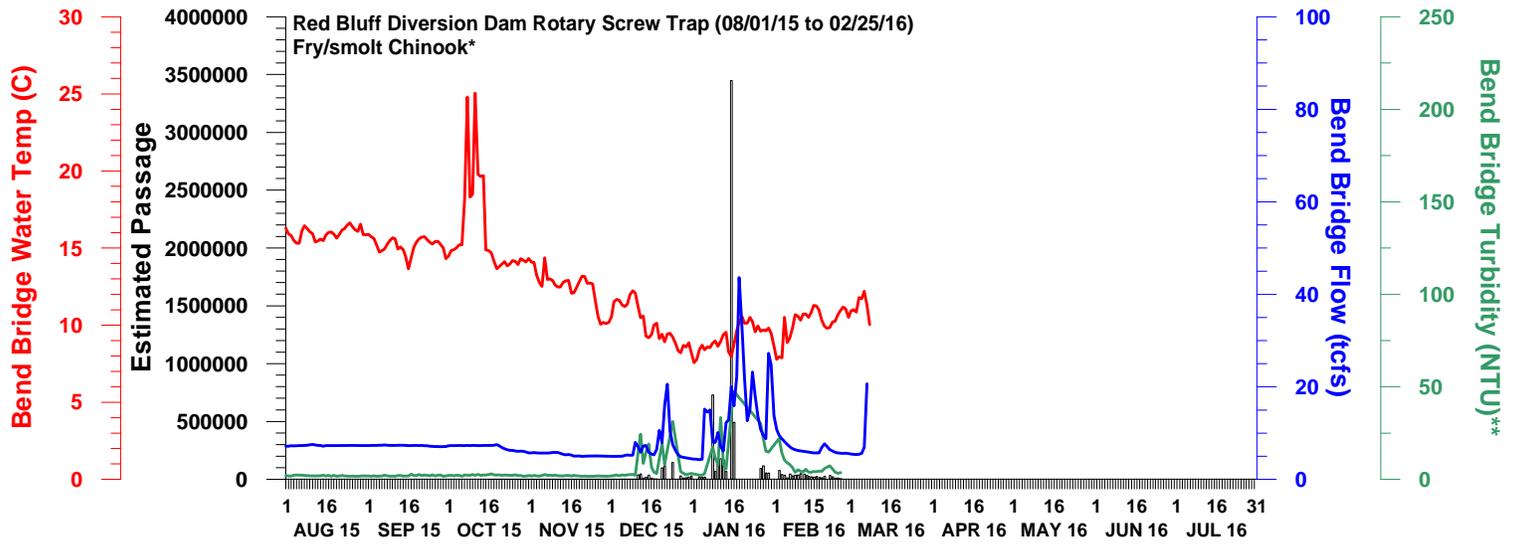


DWR-DES 08 MARCH 2016  
Preliminary data from FWS and CDEC; subject to revision.

\*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 SACRAMENTO RIVER



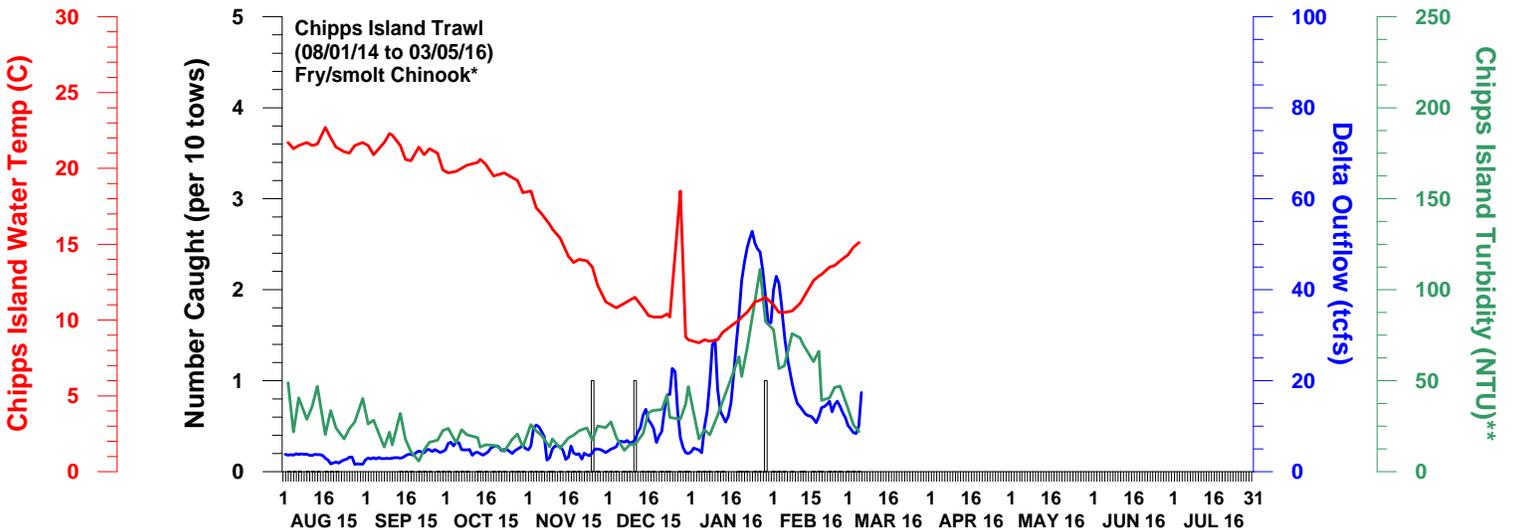
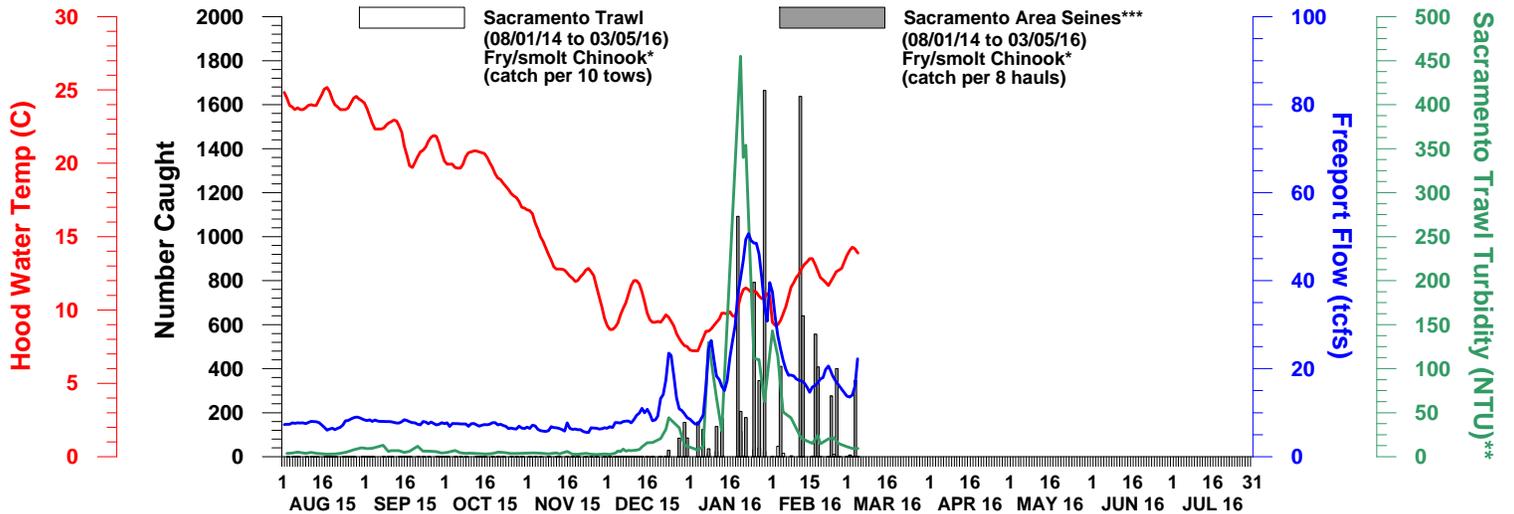
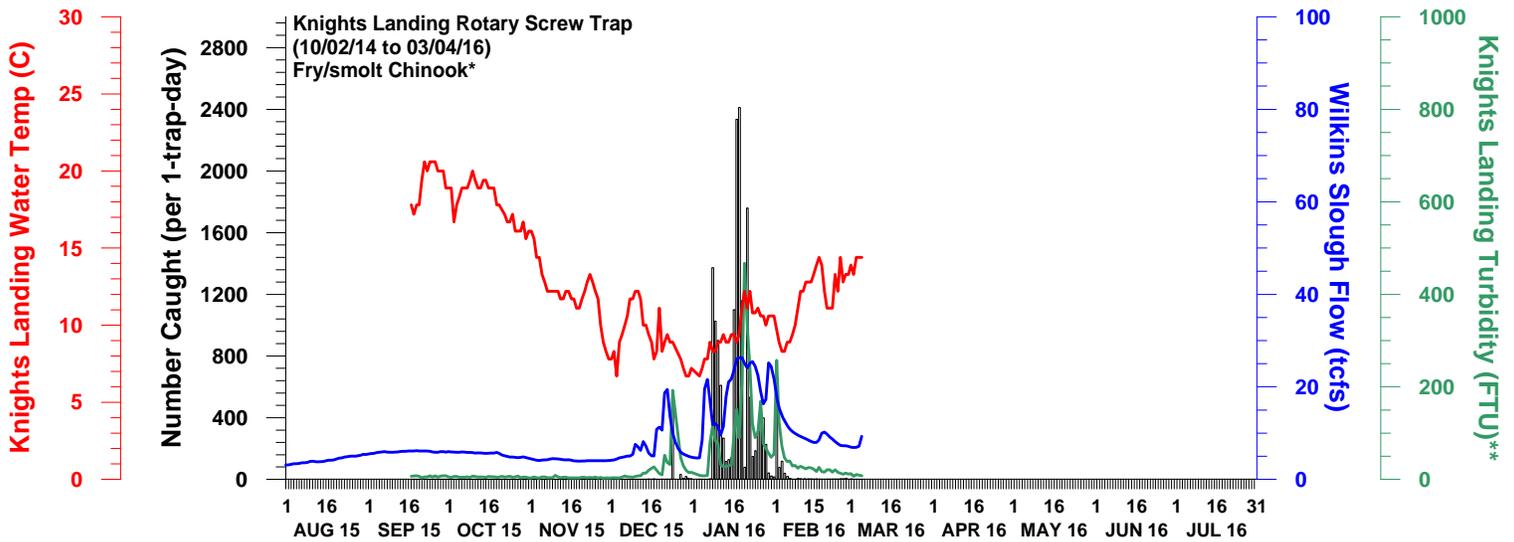
DWR-DES 8 March 2016

Preliminary data from DFW, FWS, GCID, 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.

# NUMBER OF UNMARKED FRY/SMOLT CHINOOK MEASURED IN THE LOWER SACRAMENTO RIVER AND CHIPPS ISLAND



DWR-DES 08 MARCH 2016

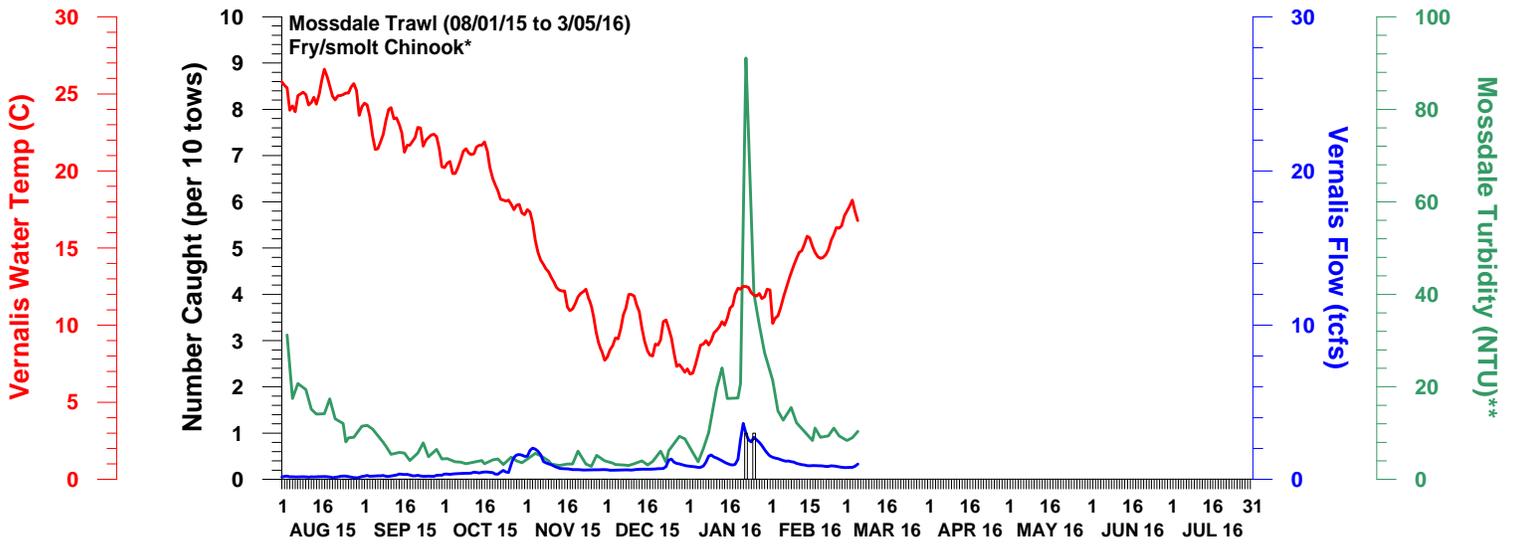
Preliminary data from DFW, FWS, and CDEC; subject to revision.

\*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. 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 FRY/SMOLT CHINOOK MEASURED IN THE SAN JOAQUIN RIVER



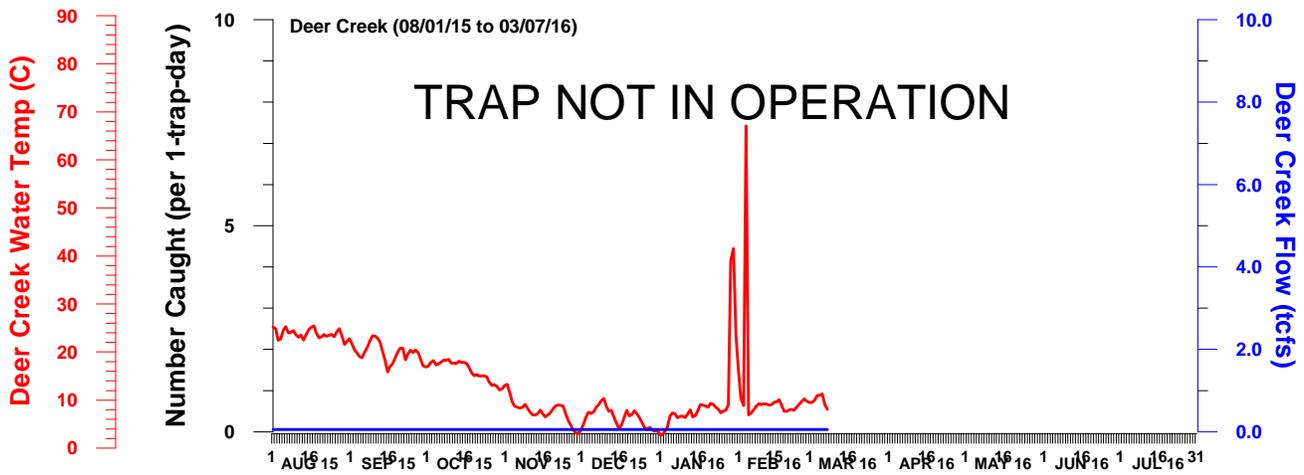
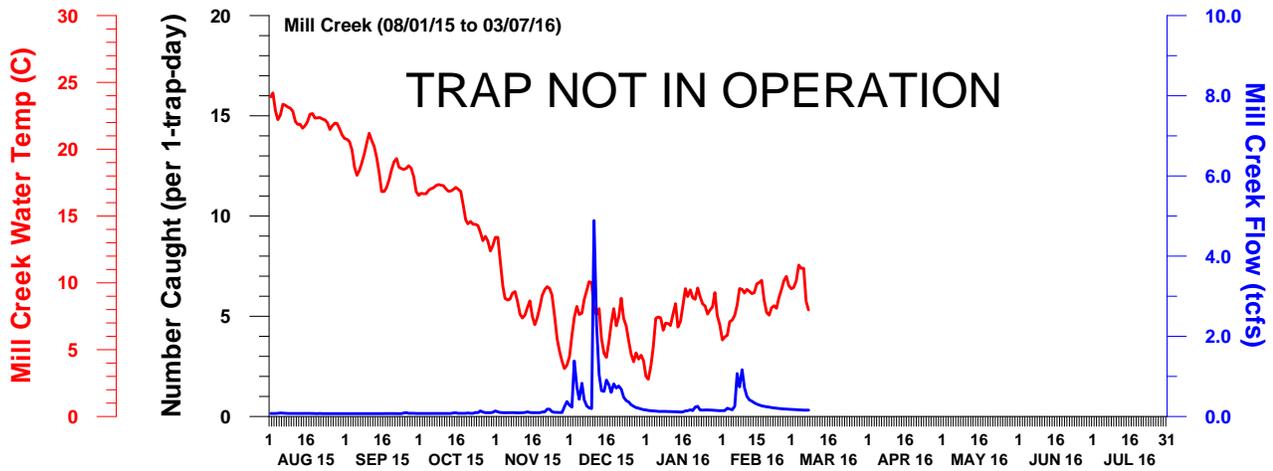
DWR-DES 08 MARCH 2016

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



## **Data Acquisition:**

All data are preliminary and subject to revision.

The estimated passage data for the Red Bluff Diversion Dam were obtained directly from the US Fish and Wildlife Service (FWS), Red Bluff Fish and Wildlife Office ([http://www.fws.gov/redbluff/rbdd\\_biweekly\\_final.html](http://www.fws.gov/redbluff/rbdd_biweekly_final.html)).

The catch data for Glenn-Colusa Irrigation District (GCID) were obtained directly from GCID.

The catch data for Tisdale Weir and Knights Landing were obtained directly from the California Department of Fish and Wildlife (DFW)<sup>1</sup>, North Central Region.

Sacramento River Trawl, Sacramento Area Beach Seine, and Chipps Island Trawl data were obtained directly from FWS, Stockton Fish and Wildlife Office (<http://www.fws.gov/stockton/ifmp/>).

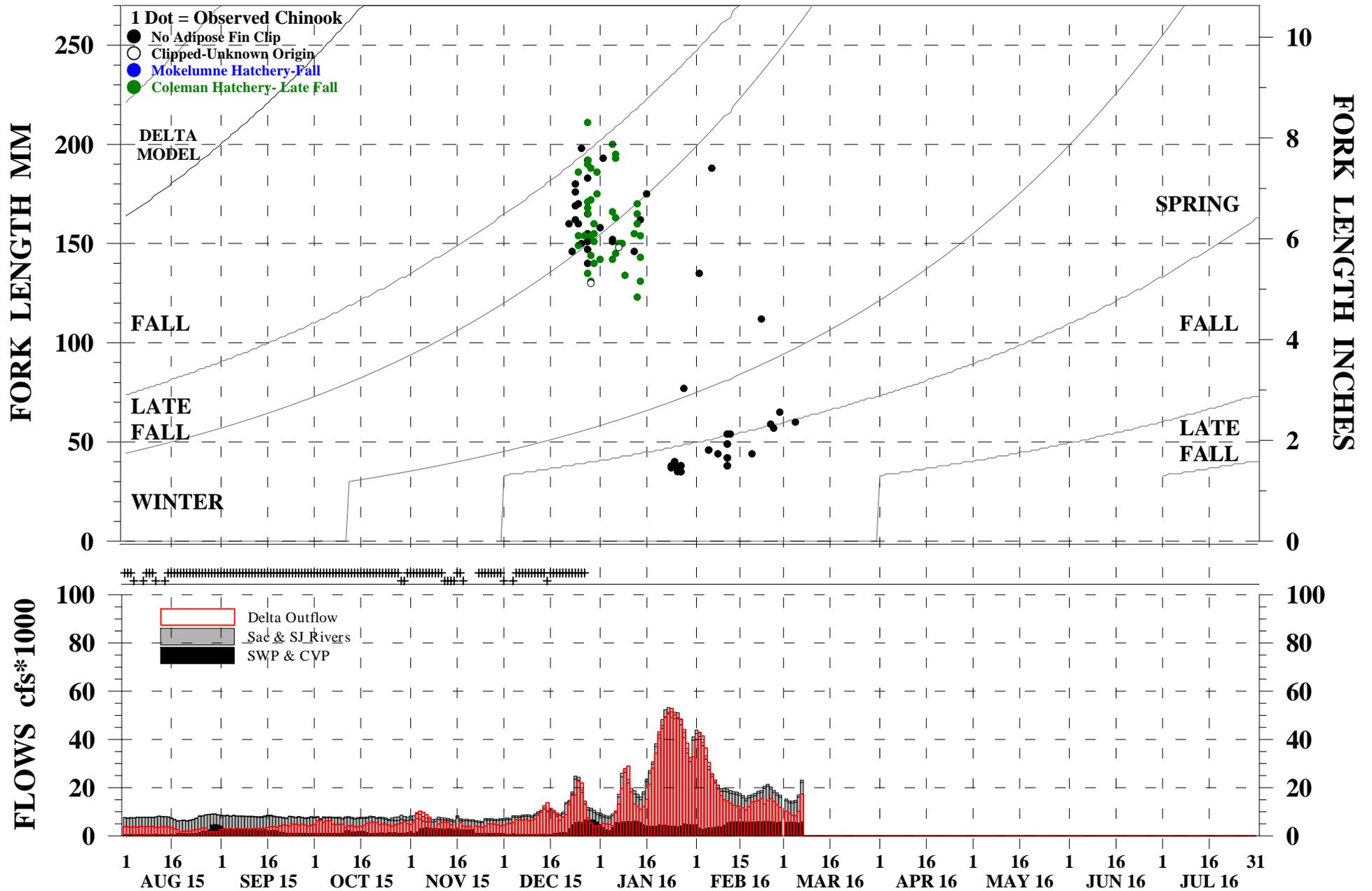
Mossdale Trawl data were either obtained directly from FWS, Stockton Fish and Wildlife Office or from DFW (Region 4).

The hydrology data were either downloaded from the California Data Exchange Center (CDEC) (<http://cdec.water.ca.gov>) or obtained directly from the California Department of Water Resources, Operations Control Office.

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<sup>1</sup> Formerly known as the California Department of Fish and Game (DFG).

# OBSERVED CHINOOK SALVAGE AT THE SWP & CVP DELTA FISH FACILITIES 08/01/2015 THROUGH 03/01/2016

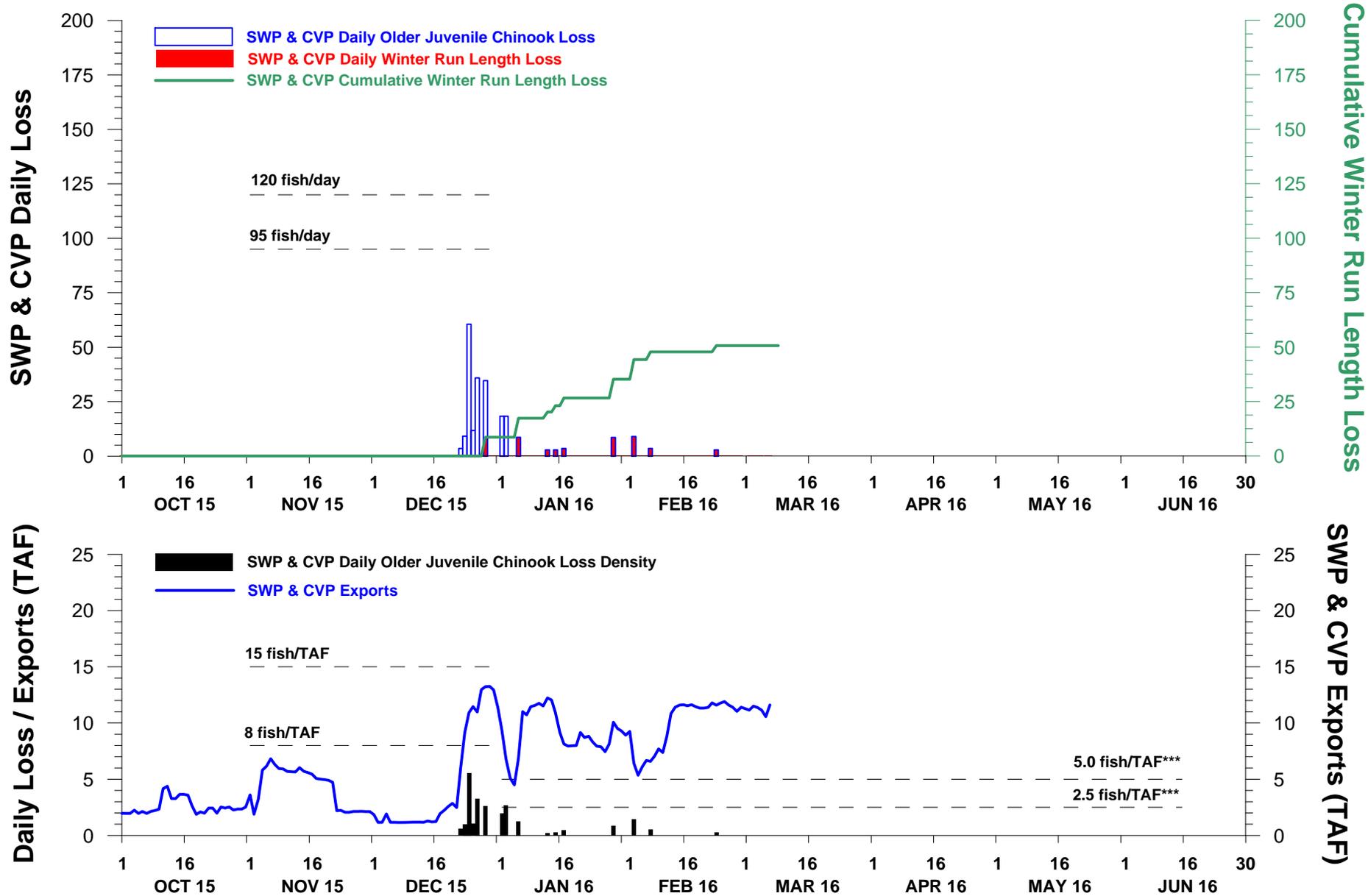


DWR-DES 08 MARCH 2016

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 01 MARCH 2016



DWR-DES 08 MARCH 2016

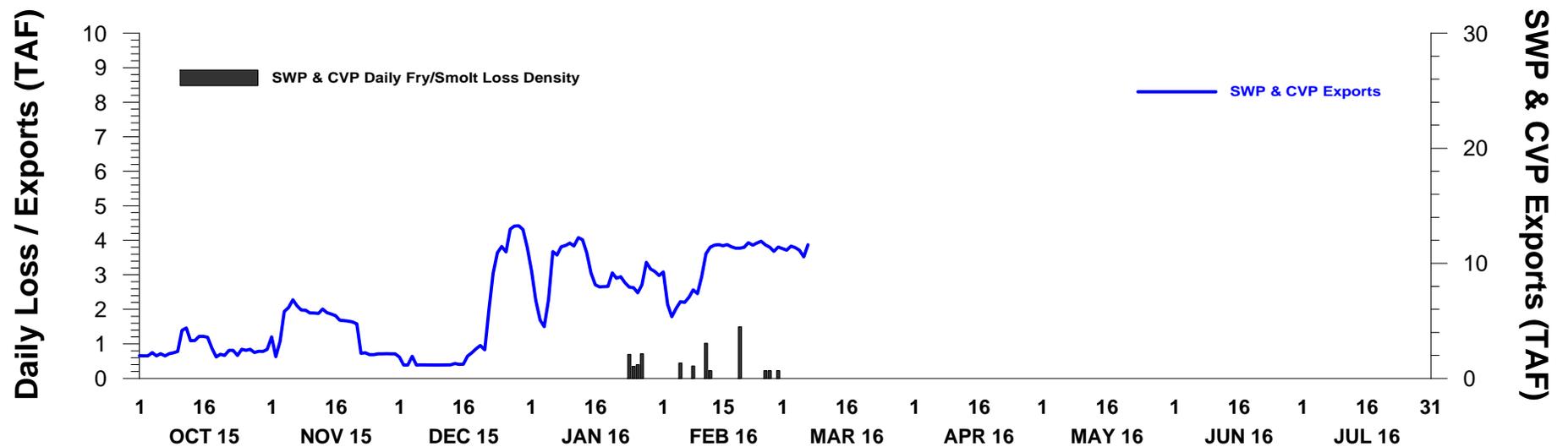
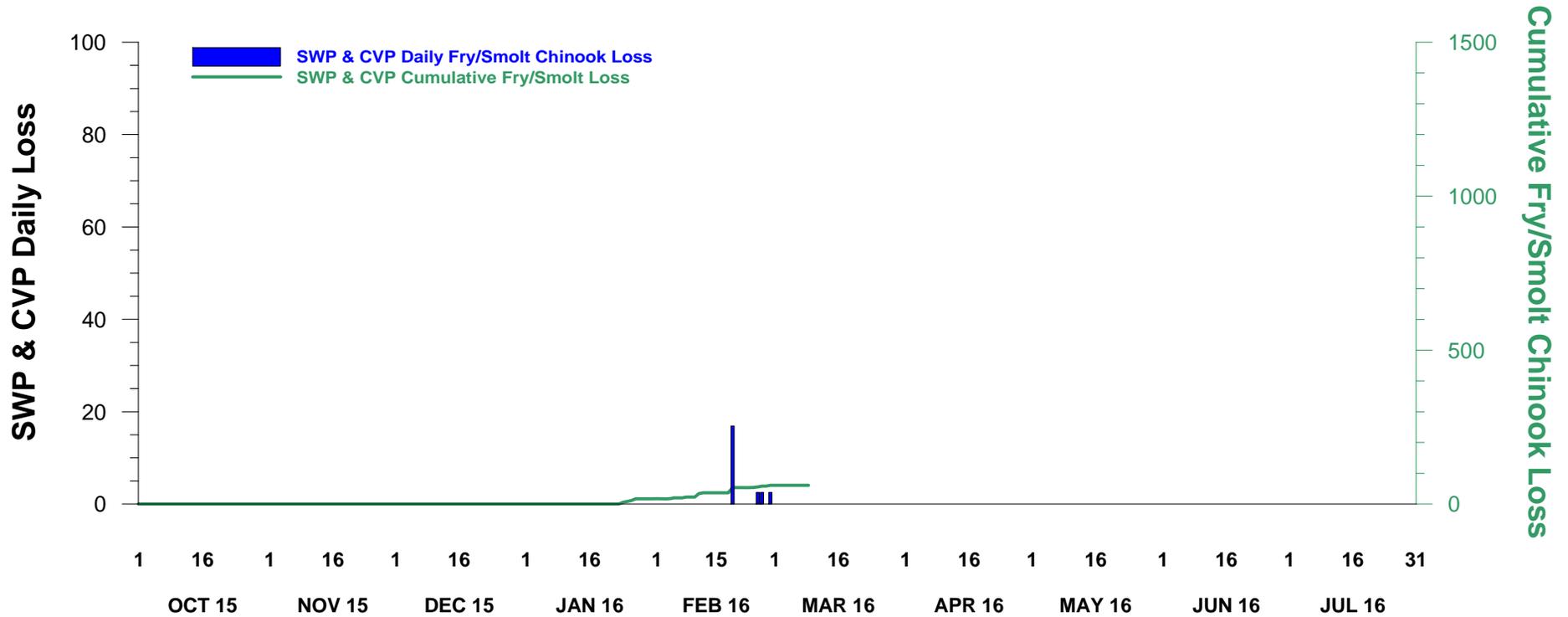
Preliminary data from DFW; subject to revision.

\*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 01 MARCH 2016



DWR-DES 08 MARCH 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).