

**Delta Operations for Salmonids and Sturgeon (DOSS) Group**  
**Conference call: 2/16/16 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, Kevin Reece, Rhiannon Mulligan, Dan Yamanaka

**Reclamation:** Josh Israel, Peggy Manza

**NMFS:** Barb Byrne, Jeff Stuart

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

**SWRCB:** Matt Holland, Chris Carr

**FWS:** Craig Anderson

**EPA:** Erin Foresman

**Agenda Items**

1. Agenda review and introductions
2. RPA Implementation review
3. Update on genetic race assignment on salvaged Chinook
4. Current Operations
5. Smelt Working Group
6. Fish Monitoring
7. Release of hatchery winter-run Chinook
8. DOSS Advice
9. Next DOSS meeting

**Agenda Item 2.**

**RPA Implementation Review**

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

**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.**

**Update on genetic race assignment of unclipped Chinook handled at the CVP and SWP export facilities**

Genetic analysis has been completed for the most recent batch of tissue samples, from unclipped Chinook handled at the CVP and SWP export facilities from 1/17/16 through 2/7/16. Of the three tissue samples from winter-run-sized Chinook in this batch, one (from a 77 mm Chinook caught on 1/28/16 at the SWP) was confirmed to be from a genetic winter-run Chinook. A full summary is expected later this week.

**Agenda Item 4.**

**Current Operations (2/9/16)**

SWP		CVP	
<b>Exports (cfs)</b>			
Clifton Court Forebay	2,450	Jones Pumping Plant	3,400
<b>Reservoir Releases (cfs)</b>			
Feather - Oroville	950	American - Folsom	3,000
		Sacramento - Keswick	3,250
		Stanislaus - Goodwin	200
		Trinity - Lewiston	300
<b>Reservoir Storage (in TAF)</b>			
San Luis (SWP)	544	San Luis (CVP)	251
Oroville	1,708	Shasta	2,560
New Melones	428	Folsom	613
<b>Delta Operations</b>			
DCC	Closed	Sacramento River at Freeport (cfs)	16,707
Outflow Index (cfs)	12,201	San Joaquin River at Vernalis (cfs)	930
E:I	21% (14-day avg.)	X2	70 km

**Review of factors controlling Delta exports for the period 2/9/16 to 2/16/16:**

- *Tuesday (2/9/16):* -3,500 cfs OMR limit (per Reclamation & DWR voluntary turbidity management; FWS OMR limit of -4,000 in effect per 2/5/16 determination<sup>3</sup>)
- *Wednesday (2/10/16):* -4,000 cfs OMR limit (per Reclamation & DWR proposal and 2/10/16 FWS determination<sup>4</sup>: “The Service requests that Reclamation and DWR follow their proposal to slowly ramp to more negative flows throughout this week”)
- *Thursday (2/11/16):* -4,500 cfs OMR limit (per Reclamation & DWR proposal and 2/10/16 FWS determination: “The Service requests that Reclamation and DWR follow their proposal to slowly ramp to more negative flows throughout this week”)
- *Friday (2/12/16) – Tuesday (2/16/16):* -5,000 cfs OMR limit per both NMFS BiOp and 2/10/16 FWS determination.

<sup>3</sup> Available at: [http://www.fws.gov/sfbaydelta/cvp-swp/smelt\\_working\\_group.cfm](http://www.fws.gov/sfbaydelta/cvp-swp/smelt_working_group.cfm)

<sup>4</sup> Available at: [http://www.fws.gov/sfbaydelta/cvp-swp/smelt\\_working\\_group.cfm](http://www.fws.gov/sfbaydelta/cvp-swp/smelt_working_group.cfm)

OMR as of 2/12/16:

	USGS gauges (cfs)	Index* (cfs)
5-day	-3,634	-3,845
14-day	-2,907	-3,151

\*The OMR Index values reported to DOSS on 2/16/16 *do not* include Contra Costa Water District's Rock Slough diversion in the export term of the OMR Index equation.

**Agenda Item 5.**

**Smelt Working Group**

The SWG will meet on Tuesday, 2/16/16, at 10am. 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 6.**

**Fish Monitoring:** 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,B</sup>	Sacramento Trawl <sup>A,B</sup>	Beach Seines <sup>A,B</sup>	Knights Landing RST <sup>C</sup>	Tisdale RST <sup>D</sup>	GCID RST <sup>E</sup>	Mossdale Kodiak Trawl <sup>A</sup>
Sample Date		902: 2/12 Jersey Pt: 2/9, 2/11 Pris. Pt: 2/10	2/11	Verona & Elkhorn: 2/12	2/8-2/11	2/8-2/12	2/8-2/15	
Total Catch		22	0	160	32	39	245	
FR Chinook		19		160	31	39	240	
WR Chinook							2	
SR Chinook								
LFR Chinook								
Ad-Clipped Chinook								
Chinook Adult								
Steelhead (wild)							1	
Steelhead (ad-clip)					1		2	
Green Sturgeon								
Delta Smelt		3						
Splittail								

Location	Chippis Is. Midwater Trawl <sup>A</sup>	Station 902/Jersey Pt./Prisoners Pt. Trawls <sup>A,B</sup>	Sacramento Trawl <sup>A,B</sup>	Beach Seines <sup>A,B</sup>	Knights Landing RST <sup>C</sup>	Tisdale RST <sup>D</sup>	GCID RST <sup>E</sup>	Mossdale Kodiak Trawl <sup>A</sup>
Longfin Smelt								
Flows (avg. cfs)					9,963	9,258	1044	
W. Temp. (avg. °F)					53.3	53	53.01	
Turbidity (avg. NTU)					26.1	22	17.03 (based on 2/13-2/15 readings)	

<sup>A</sup> Due to the holiday on Monday, 2/15/16, DAT data was not sent to DOSS by the time of the DOSS call; DAT data is provided for convenience at the end of the meeting notes.

<sup>B</sup> Data are from the monitoring summary for the DCC and early warning surveys.

<sup>C</sup> Sampling period was from 2/8 at 9:15 am to 2/11 at 10:14 am.

<sup>D</sup> Sampling period was from 2/8 at 9:00 am to 2/12 at 9:30 am.

<sup>E</sup> Sampling period was from 2/8 at 9:00 am to 2/15 at 9:00 am.

#### **Fish 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 8-February 14, 2016  
 Prepared by Bob Fujimura on February 15, 2016 20:00  
 Preliminary Results -Subject to Revision

Criteria	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	Trend	
<b>Loss Densities</b>									
Wild older juvenile CS	0	0	0	0	0	0	0	↘	0.00
Wild steelhead	0	0.37	0	0	0	0	0	↘	0.09
<b>Exports</b>									
SWP daily export	3,327	2,530	3,988	5,519	4,964	4,448	4,871	↗	4,235
CVP daily export	4,379	4,849	4,850	5,315	6,443	6,784	6,753	↗	5,625
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 preliminary salvage and loss estimates

**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	↘	24	48
Spring Run	8	5	↗	8	5
Late Fall Run	0	0	↗	44	166
Fall Run	16	11	↗	48	49
Unclassified	0	0	↗	10	NC
<b>Total</b>	<b>24</b>	<b>16</b>		<b>134</b>	<b>268</b>
<b>Hatchery</b>					
Winter Run	19	56	↗	193	598
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>19</b>	<b>56</b>		<b>287</b>	<b>900</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	4	3	↘	26	40
Hatchery	54	161	↘	210	632
<b>Total</b>	<b>58</b>	<b>164</b>		<b>236</b>	<b>672</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 2/8/16-2/14/16.

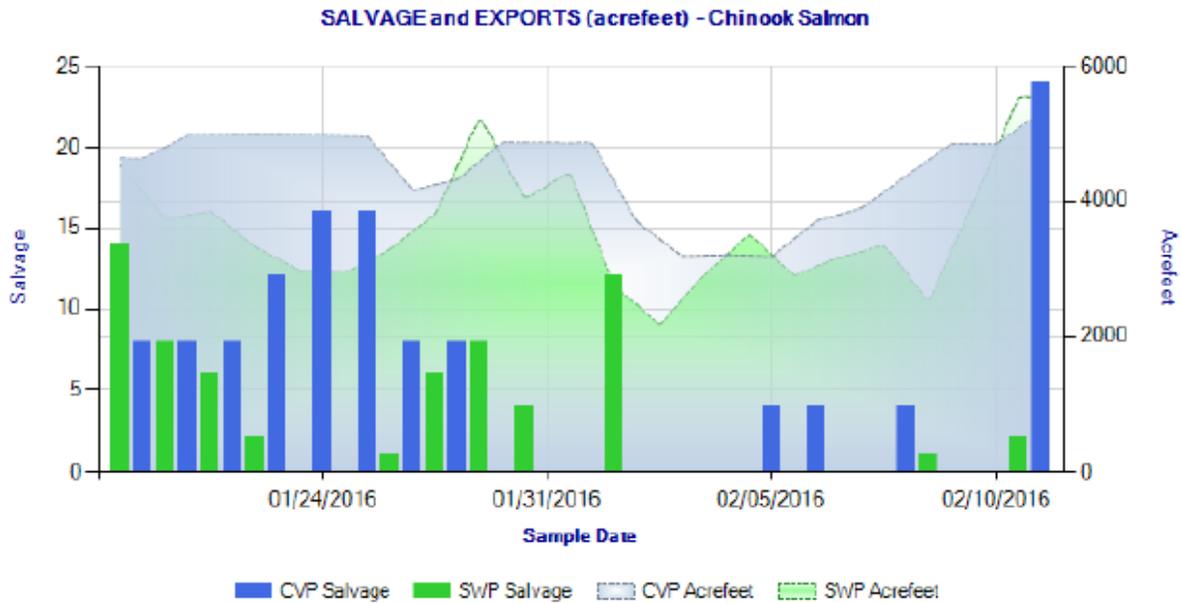


Figure 2. Daily salvage of Chinook salmon (all races) and water exports from the state and federal fish salvage facilities during January 20, 2016 through February 11, 2016.

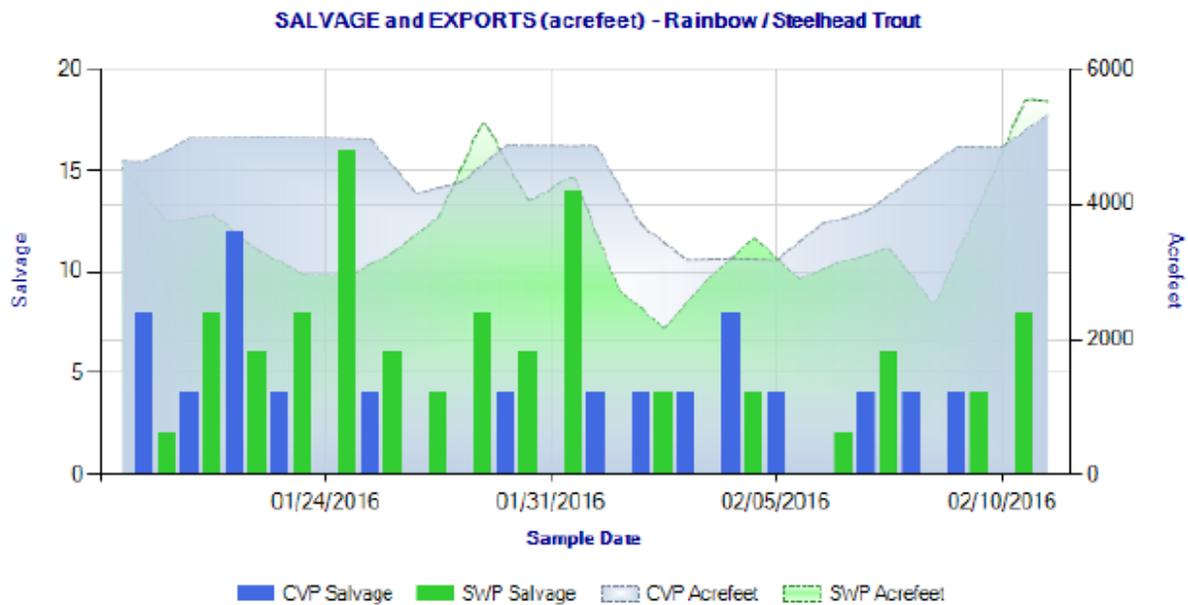


Figure 3. Daily salvage of steelhead and water exports from the state and federal fish salvage facilities during January 20, 2016 through February 11, 2016.

**Coded-wire-tag recoveries**

The updated summary of coded-wire-tag recoveries at the SWP and CVP fish collection facilities was not available during the DOSS call due to the Monday holiday; that information (received after the DOSS call) is provided at the end of the meeting notes for convenience.

**DOSS Estimates of Fish Distribution**

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>	5-10% (Last week: same)	90-95% (Last week: same)	0% - 5% (Last week: same)
<i>Young-of-year (YOY) spring-run Chinook salmon*</i>	35% - 45% (Last week: same)	55% - 65% (Last week: same)	0% - 5% (Last week: same)

\*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**
  - Relatively low flows and turbidities are expected to be associated with limited salmonid movement.
- **Routing Risk: MEDIUM**
  - Relatively low river flows (compared to Sacramento River flows during January storms) are associated with greater tidal effects at Georgiana Slough and a medium risk of routing into Georgiana Slough.
- **Overall Entrainment Risk: MEDIUM**

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

- **Exposure Risk: MEDIUM**
  - Listed runs are expected to have previously migrated into and be rearing within the Interior 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: LOW to MEDIUM
  - OMR -3,500 cfs to -5,000 cfs: MEDIUM

**Agenda Item 7.**

**Release of hatchery winter-run Chinook**

Byrne (NMFS) reported that Livingston Stone National Fish Hatchery will begin releasing the winter-run Chinook hatchery production on Wednesday (2/17/16) evening at Bonnyview Bridge in Redding.

**Agenda Item 8.**

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

**Agenda Item 9.**

**Next Meeting:** The next DOSS conference call will be on 2/23/16 at 9am.

The following “DAT data” for the period 2/7/16 to 2/13/16 was provided after the DOSS call and is provided in this week’s DOSS notes for convenience.

<b>Location</b>	<b>Chippis Is. Midwater Trawl</b>	<b>Station 902/Jersey Pt./ Prisoners Pt. Trawls</b>	<b>Sacramento Trawl</b>	<b>Beach Seines</b>	<b>Mossdale Trawl</b>
<b>Sample Date</b>	2/8, 2/11, 2/12	902: 2/12 Jersey Pt: 2/8, 2/9, 2/11 Pris. Pt: 2/8, 2/10	2/8, 2/11, 2/12	2/8-2/12	2/8, 2/10
<b>Total Catch</b>	<b>29</b>	<b>29</b>	<b>25</b>	<b>912</b>	<b>0</b>
<b>FR Chinook</b>		23	6	907	
<b>WR Chinook</b>				3	
<b>SR Chinook</b>				1	
<b>LFR Chinook</b>					
<b>Ad-Clipped Chinook</b>					
<b>Chinook Adult</b>					
<b>Steelhead (wild)</b>			4		
<b>Steelhead (ad-clip)</b>	21	2	15		
<b>Green Sturgeon</b>					
<b>Delta Smelt</b>		4			
<b>Splittail</b>	3			1	
<b>Longfin Smelt</b>	5				
<b>Flows (avg. cfs)</b>					
<b>W. Temp. (avg. °F)</b>					
<b>Turbidity (avg. NTU)</b>					

The following graphs were provided (after the DOSS call) 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>

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>1</sup>	Total Entering Delta	% Loss of Number Released <sup>2</sup>	% Loss of Total Entering Delta <sup>3</sup>	First Concern Level	Second Concern Level	Date of First Loss <sup>4</sup>	Date of Last Loss <sup>4</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

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

Facility	Unknown CWT Loss <sup>5</sup>	Unread CWT Loss <sup>6</sup>	Unknown Hatchery Loss <sup>7</sup>	Acoustic Tag Loss <sup>8</sup>	Number of Unassigned CWTs <sup>9</sup>
SWP	18.16	0.00	0.00	0.00	0
CVP	0.00	0.00	0.00	0.00	0
<b>TOTAL</b>	<b>18.16</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0</b>

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

<sup>1</sup>Number released with the adipose-fin clipped and a coded-wire tag (CWT).

<sup>2</sup>% Loss of Number Released = (Confirmed Loss/Number Released)\*100.

<sup>3</sup>% Loss of Total Entering Delta= (Confirmed Loss/Total Entering Delta)\*100.

<sup>4</sup>Date of first and last loss accounts for all CWT loss even those from special studies where salvage and loss=0.

<sup>5</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>6</sup>Adipose-fin clipped Chinook was collected during fish count and has not been processed yet.

<sup>7</sup>CWT has been read, but hatchery release information not yet available.

<sup>8</sup>Adipose-fin clipped Chinook released due to presence of sutures.

<sup>9</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.

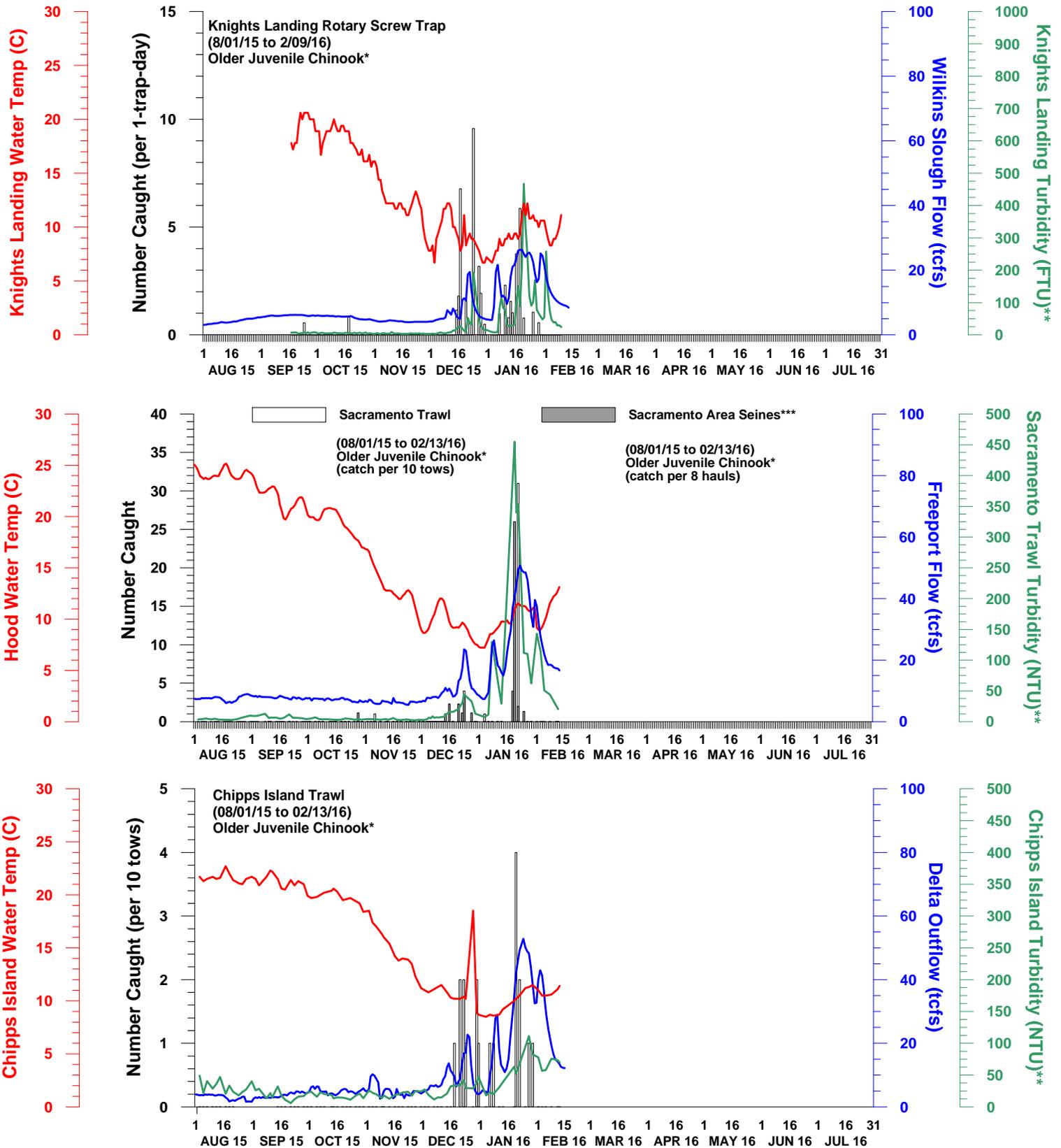
\*\* Information not yet available.

DWR-DES Revised 02/17/2016

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



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



DWR-DES 17 FEB 2016

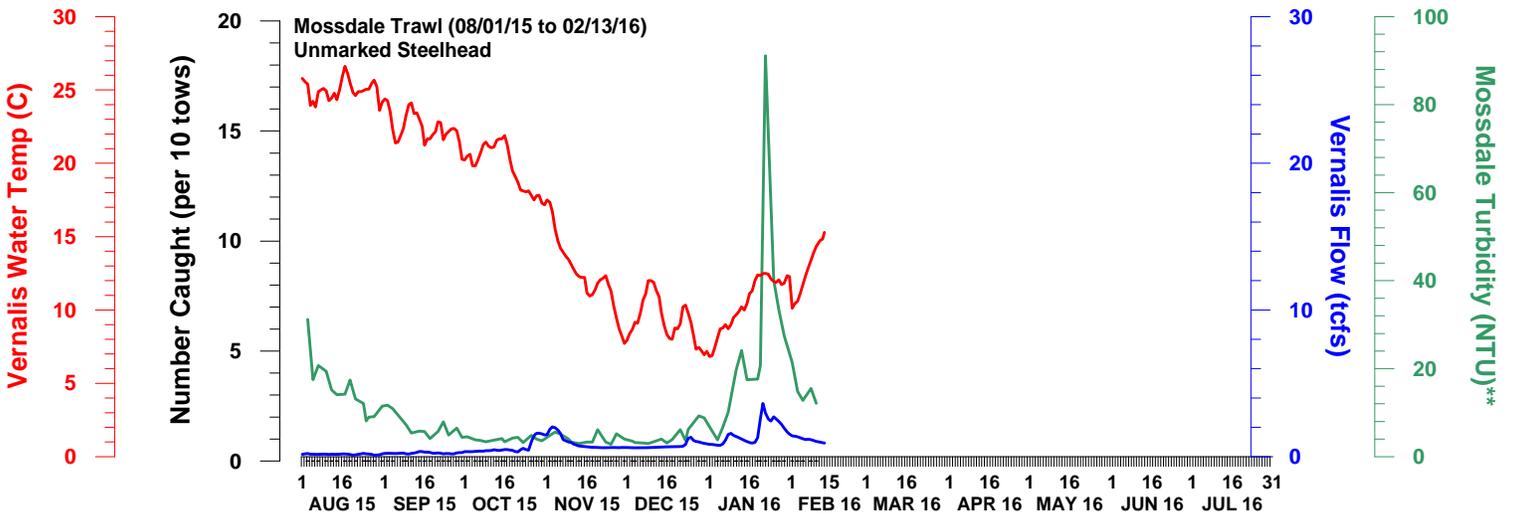
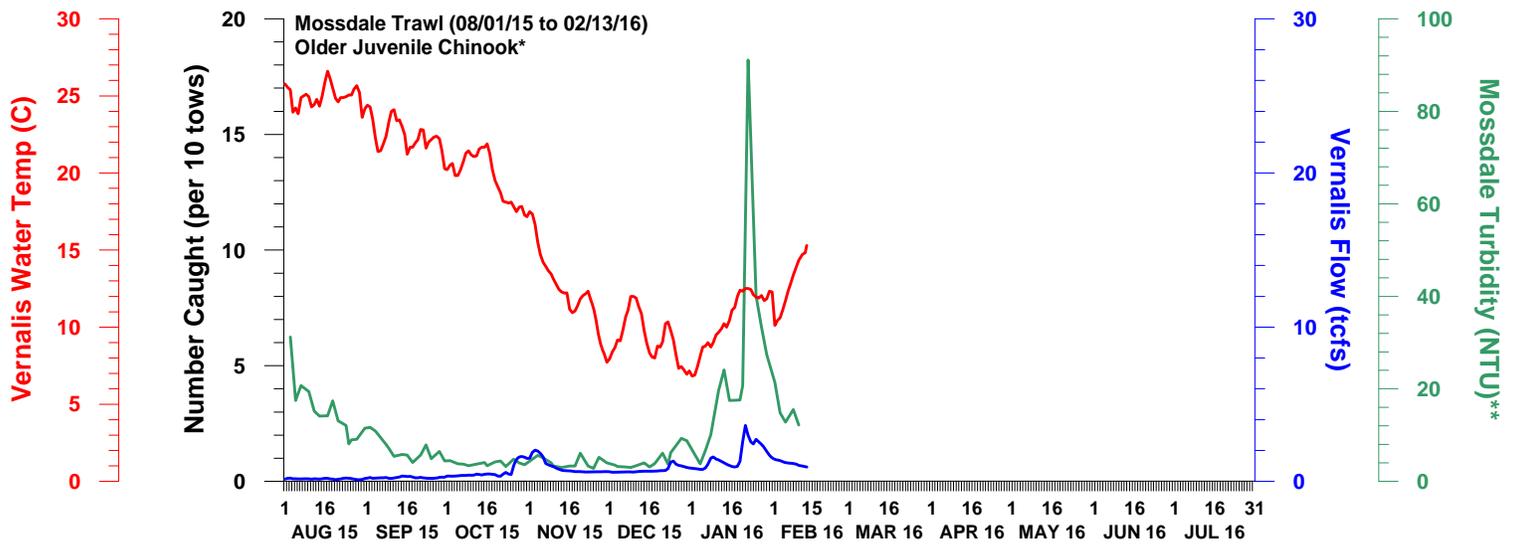
Preliminary data from DFW, FWS, and CDEC; subject to revision.

\*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

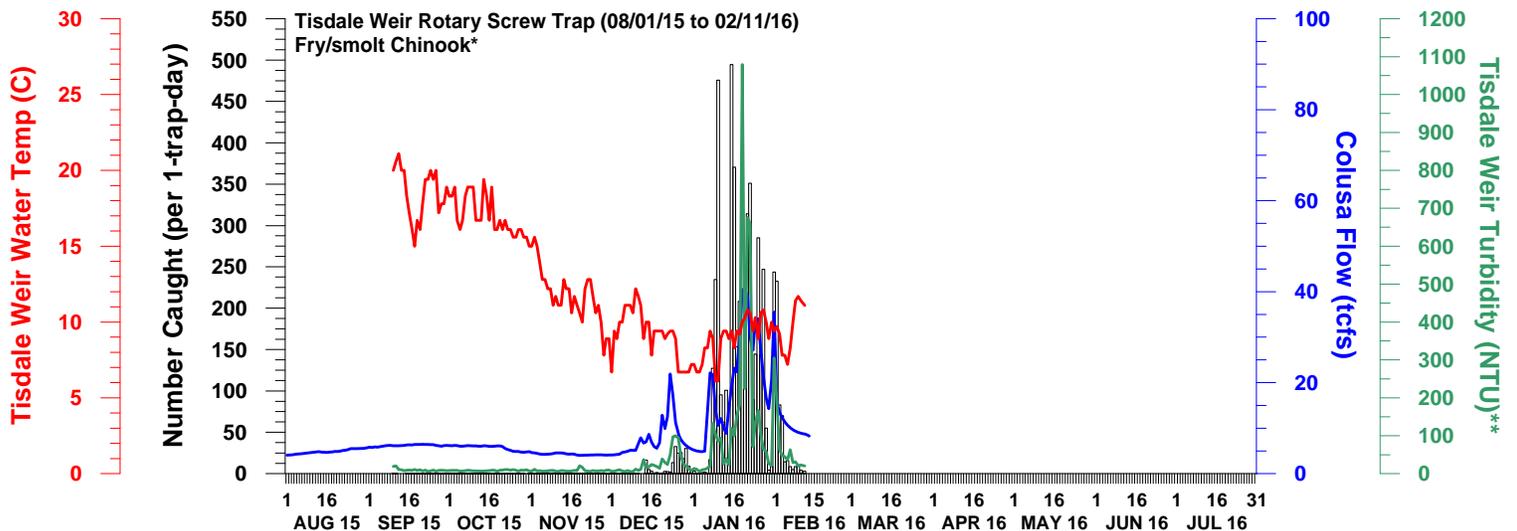
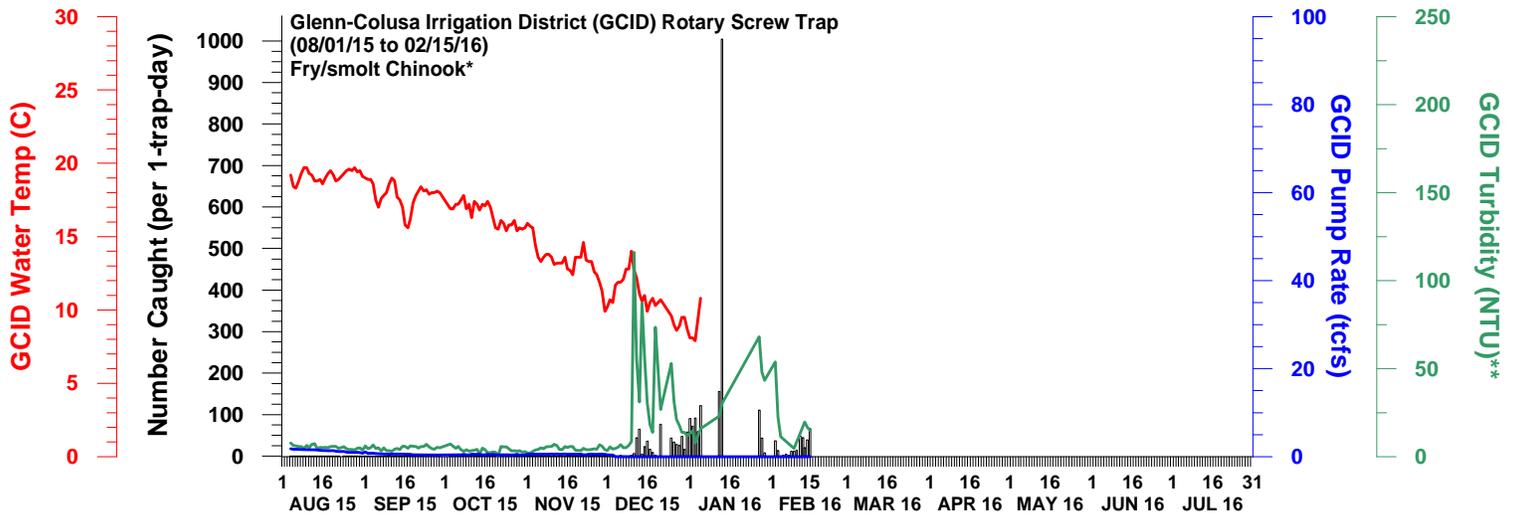
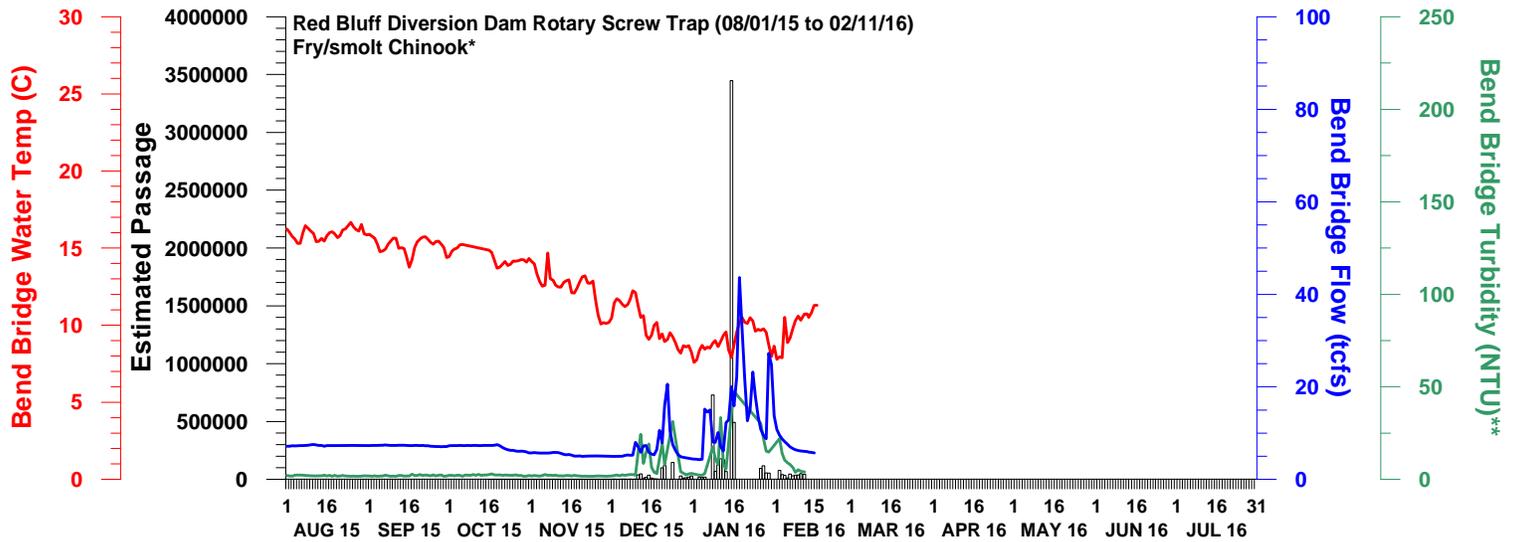


DWR-DES 17 FEB 2016  
Preliminary data from FWS and CDEC; subject to revision.

\*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



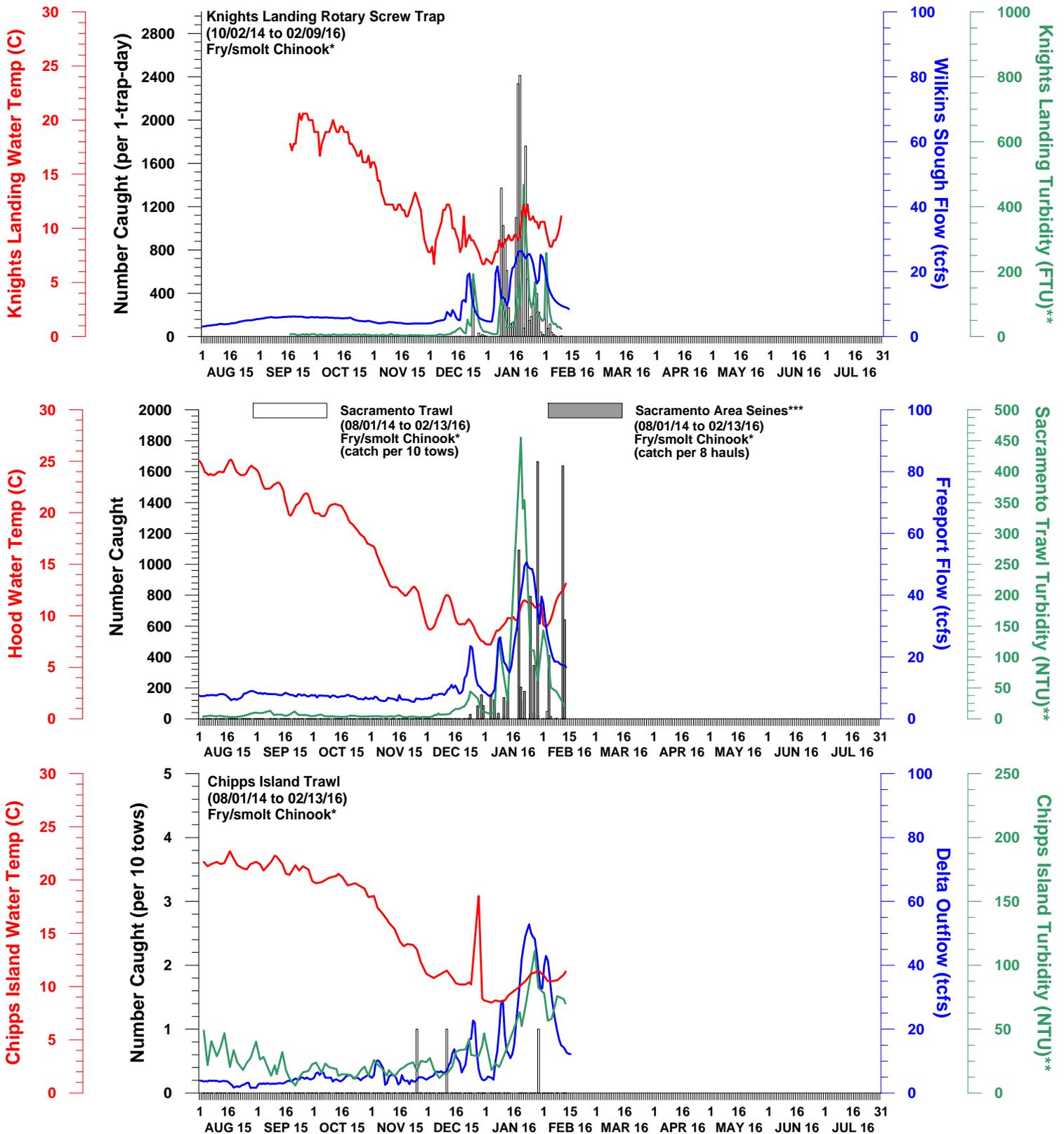
DWR-DES 17 FEB 2016

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 17 FEB 2016

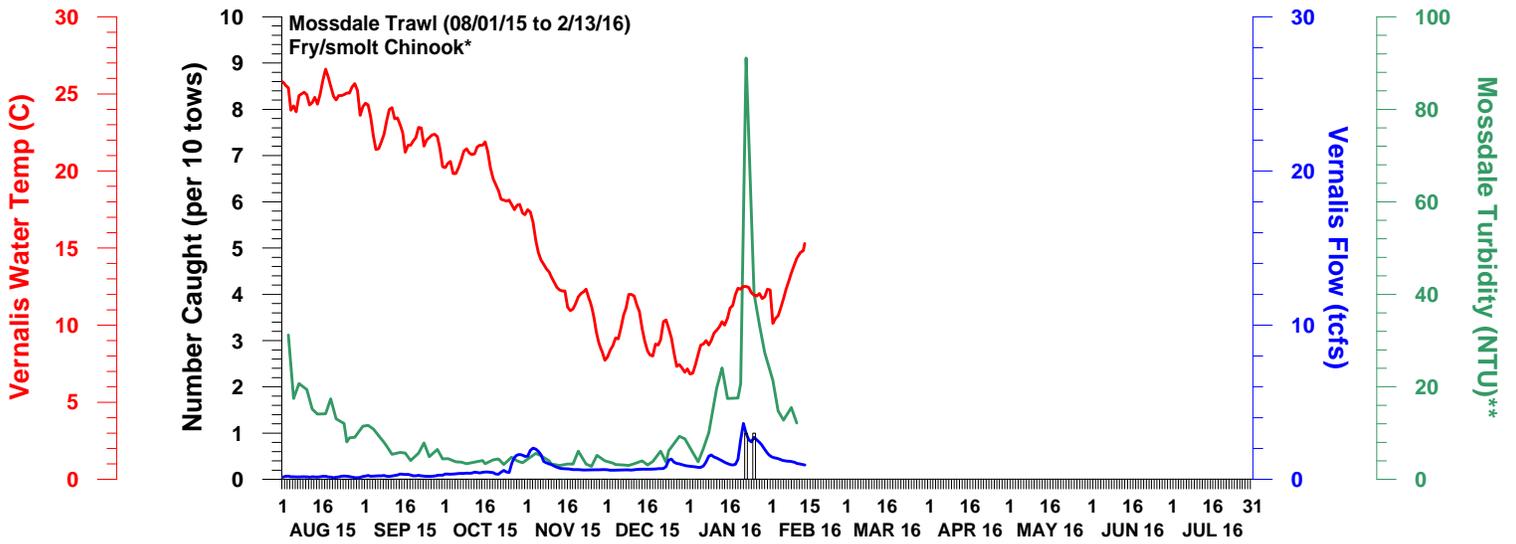
Preliminary data from DFW, FWS, and CDEC; subject to revision.

\*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



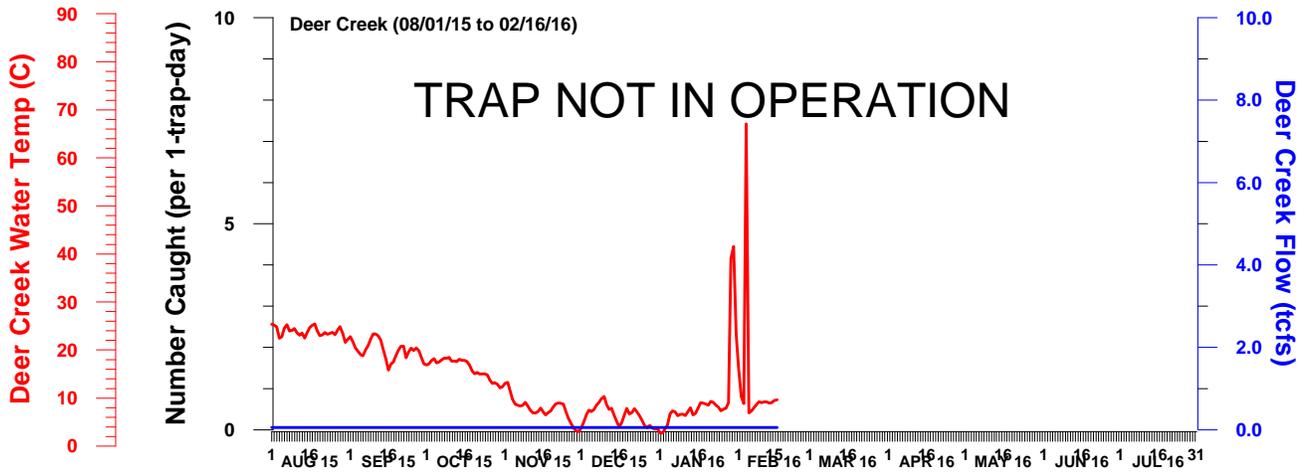
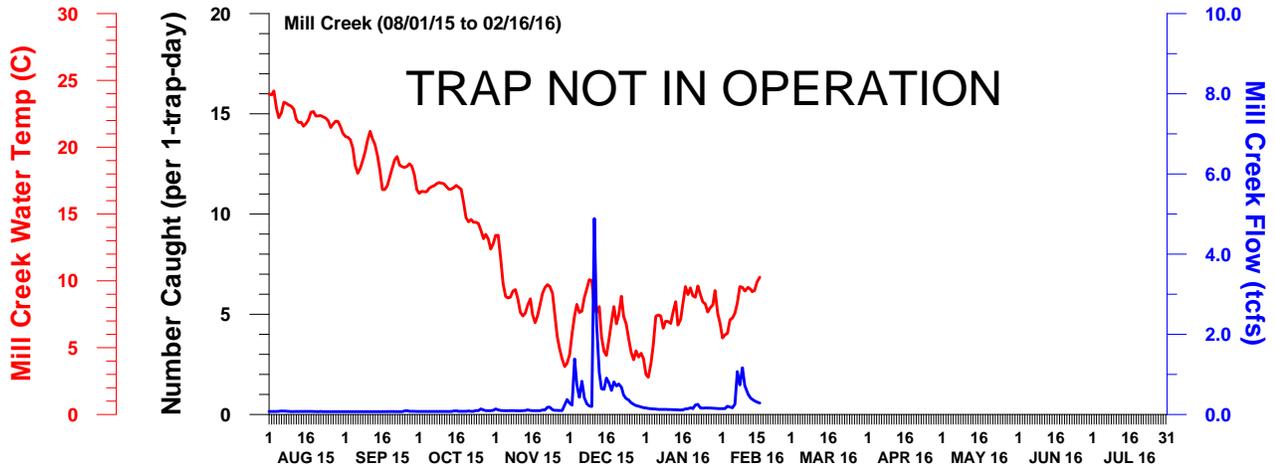
DWR-DES 17 FEB 2016

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/>).

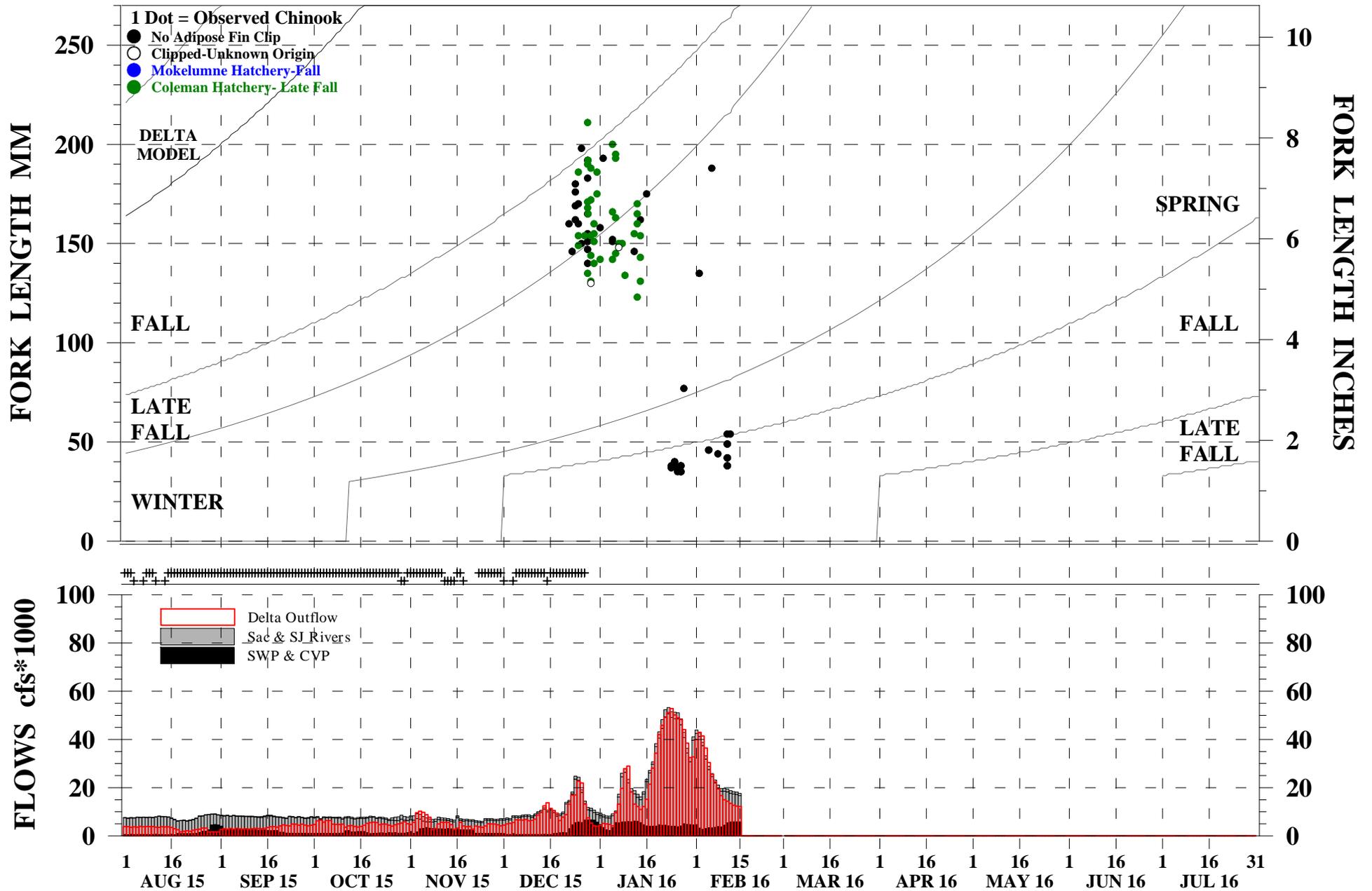
Mossdale Trawl data were either obtained directly from FWS, Stockton Fish and Wildlife Office or from DFW (Region 4).

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 02/17/2016

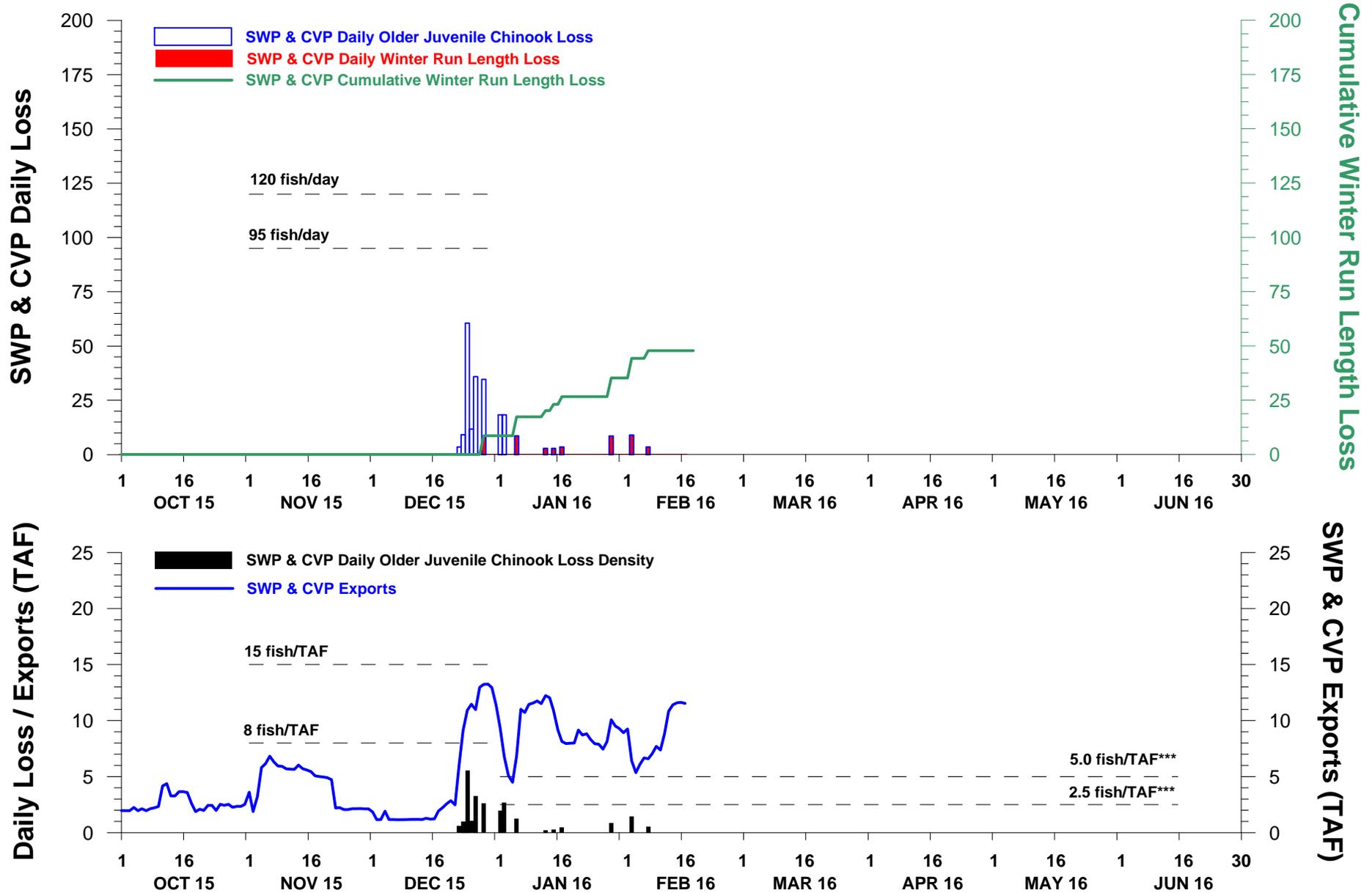


DWR-DES 17 FEB 2016

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 17 FEB 2016



DWR-DES 17 FEB 2016

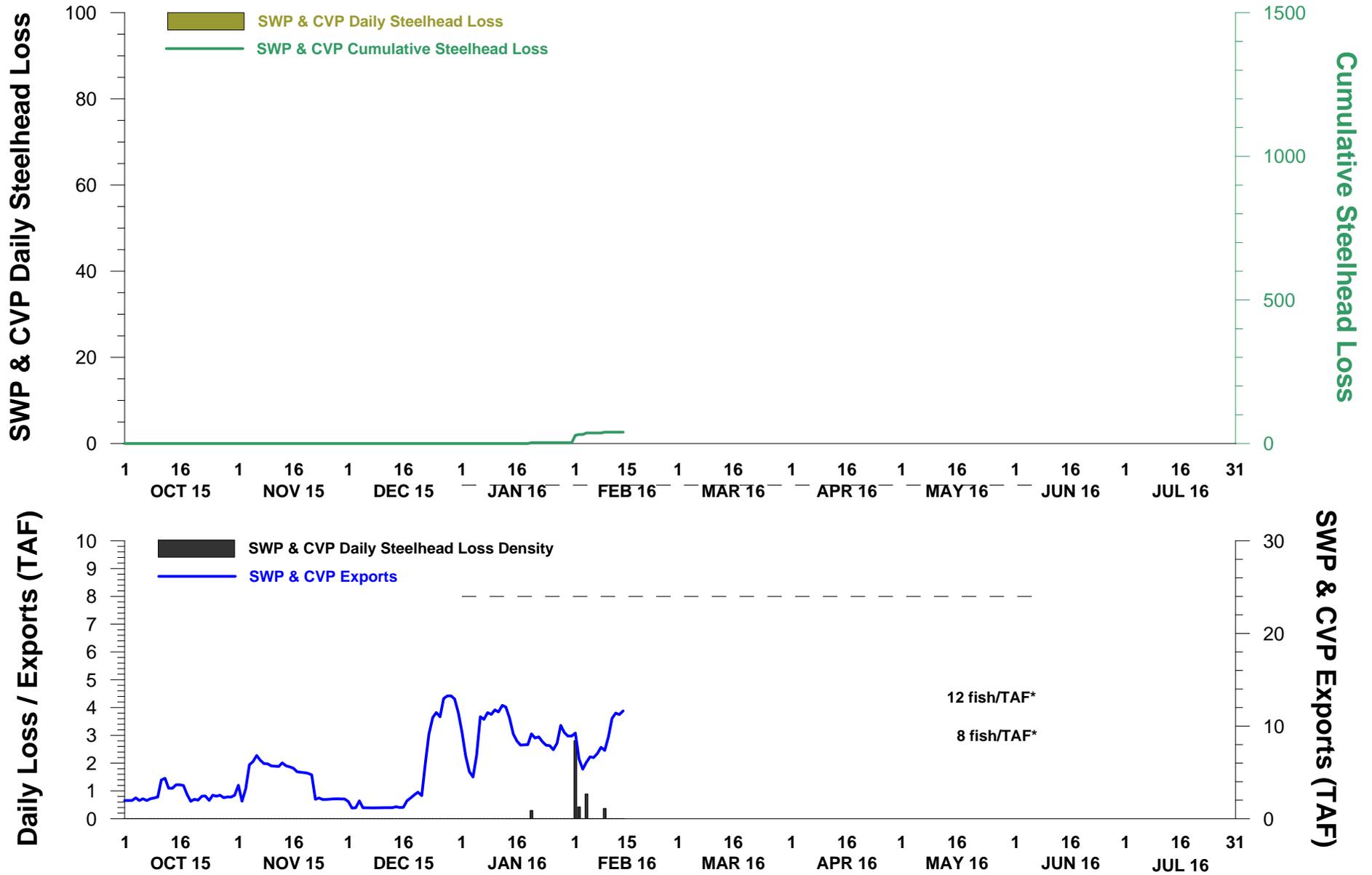
Preliminary data from DFW; subject to revision.

\*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 STEELHEAD LOSS AT THE DELTA FISH FACILITIES 01 OCT 2015 THROUGH 17 FEB 2016

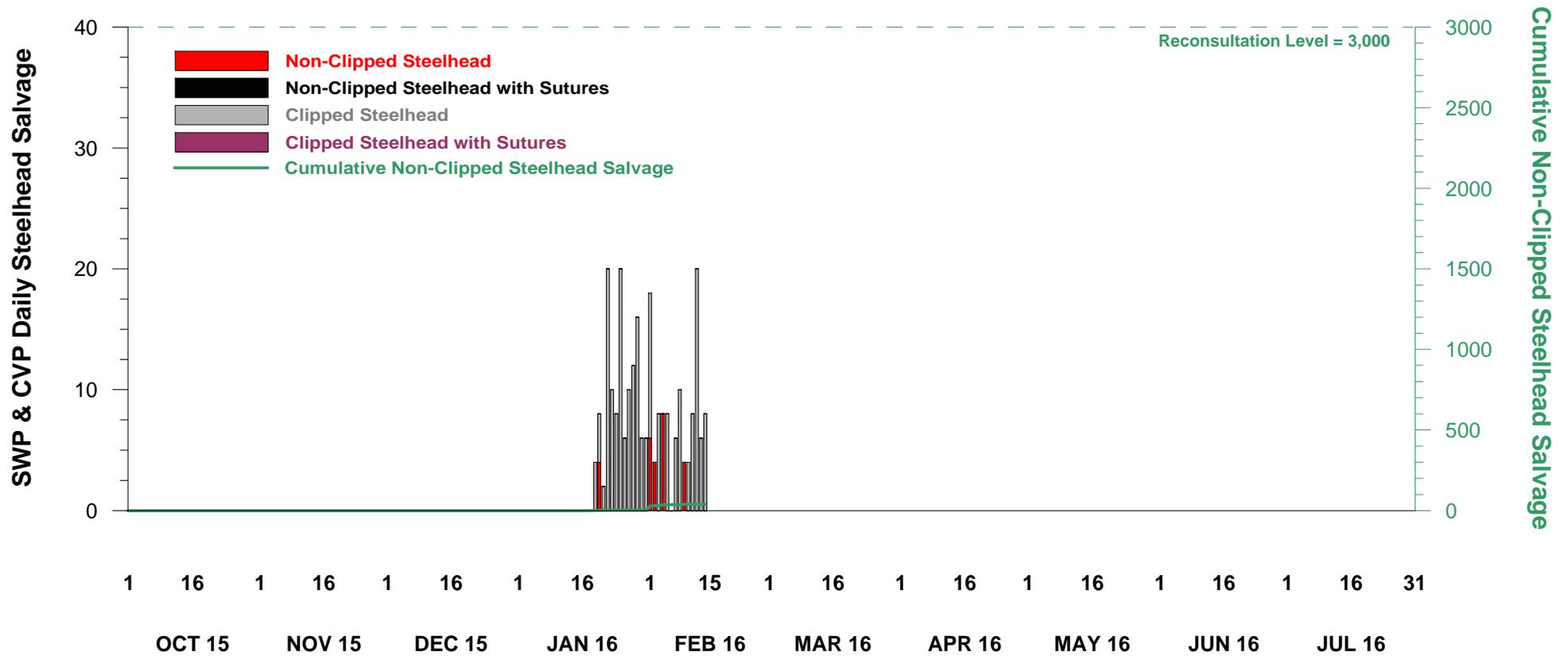


DWR-DES 17 FEB 2016

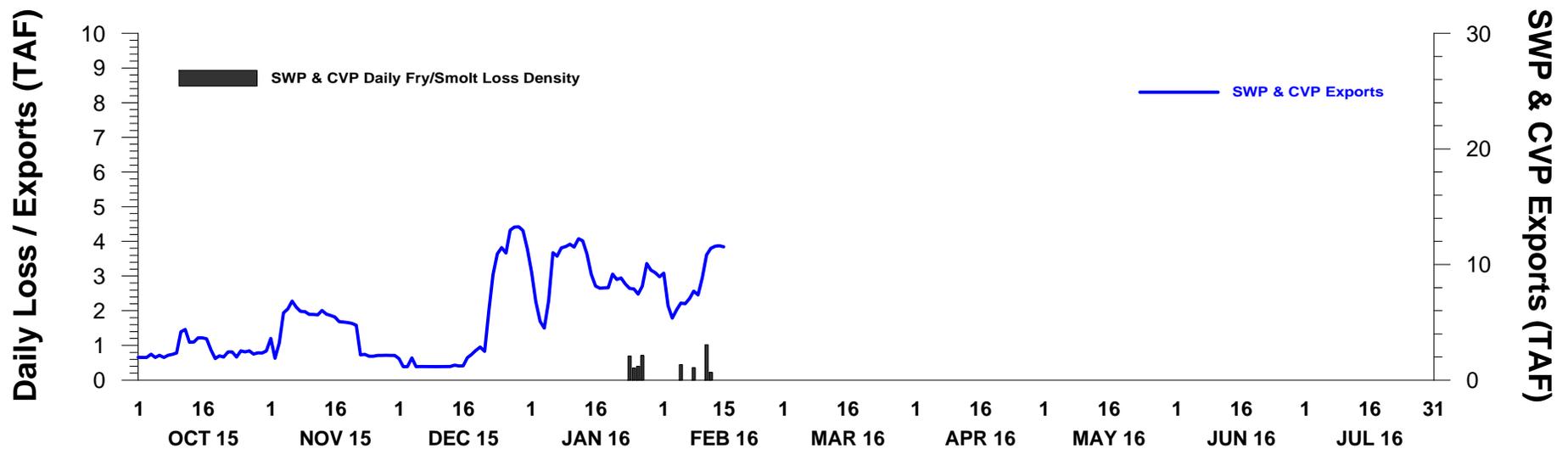
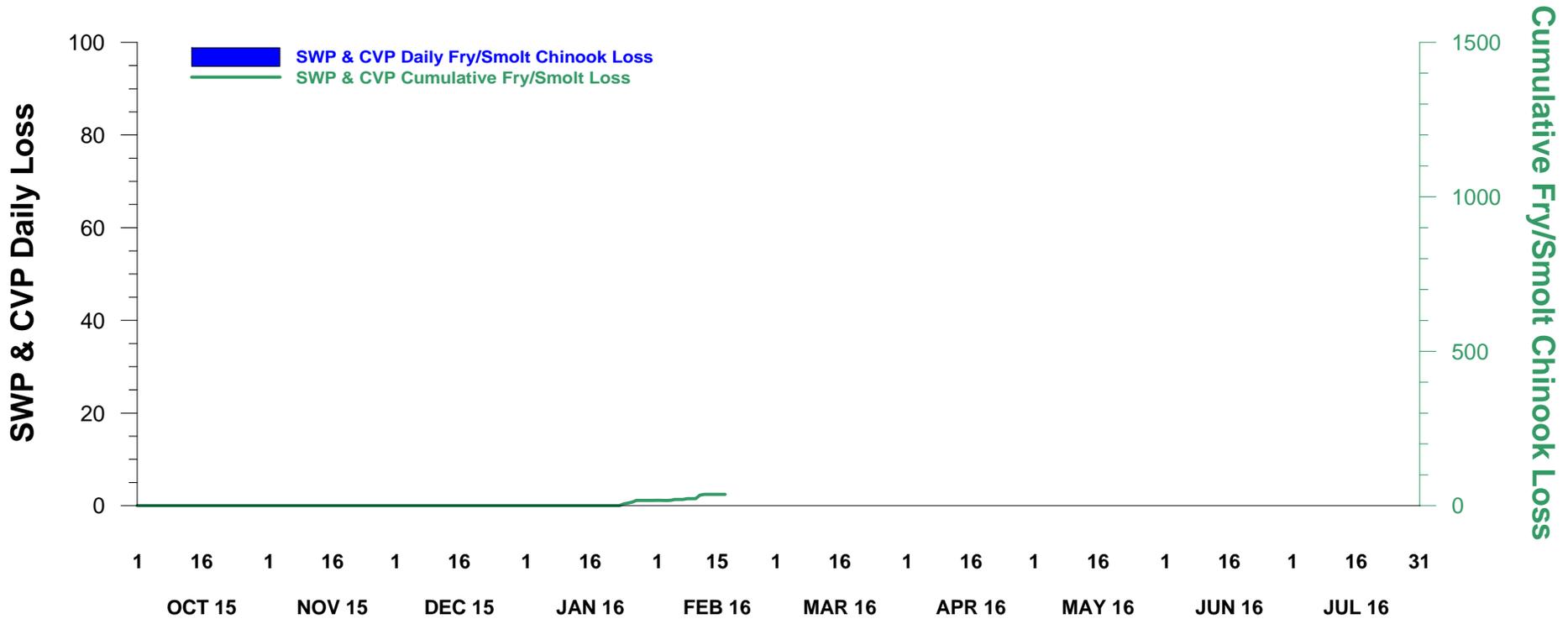
Preliminary data from DFW; subject to revision.

\*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 17 FEB 2016



# NON-CLIPPED FRY/SMOLT CHINOOK LOSS AT THE DELTA FISH FACILITIES 01 OCT 2014 THROUGH 17 FEB 2016



DWR-DES 17 FEB 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).