

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 1/12/16 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, Kevin Reece, Mike Ford, Rhiannon Mulligan, Tracy Pettit

Reclamation: Michele Palmer, Josh Israel

NMFS: Barb Byrne, Jeff Stuart, Meiling Roddam

CDFW: Bob Fujimura, Ken Kundargi, Duane Linander

SWRCB: Chris Carr, Matt Holland

Agenda Items

1. Agenda review and introductions
2. RPA Implementation review
3. Current Operations
4. Smelt Working Group
5. Fish Monitoring
6. DOSS Advice
7. Next DOSS meeting

Agenda Item 2.

RPA Implementation Review

Delta RPA Actions that may affect operations during January:

Action IV.1.2¹ (DCC gate operations):

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

Action IV.2.3² (OMR Management based on salvage triggers)

- The older juvenile Chinook salmon observed at the SWP on 1/2/16 that resulted in exceedance of the first stage trigger was genetically tested and was determined to be a genetic fall-run Chinook salmon
- On Wednesday, 1/6/16, NMFS informed WOMT that, based on the genetic results "...the CVP and SWP do not need to continue to operate to the action response of the first stage

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

² 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

trigger in RPA Action IV.2.3, but rather, can revert back to an OMR no more negative than -5,000 cfs."

- No triggers exceeded over past week.

Agenda Item 3.

Current Operations (1/12/16)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	2,300	Jones Pumping Plant	3,800
Reservoir Releases (cfs)			
Feather - Oroville	950	American - Nimbus	500
		Sacramento - Keswick	3,250
		Stanislaus - Goodwin	200
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	442	San Luis (CVP)	89
Oroville	1,058	Shasta	1,510
New Melones	331	Folsom	267
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	18,294
Outflow Index (cfs)	13,000 (monthly avg.) 18,149 (7-day NDOI) 17,383 (14-day NDOI)	San Joaquin River at Vernalis (cfs)	1,368
E:I	~41% (14-day avg.)	X2	>81 km

The -5,000 cfs OMR flow limit (per the NMFS BiOp) is controlling today, and is likely to be controlling exports through the week.

River forecasts indicate Bend Bridge peaking at ~30,000 cfs on 1/13/16, and Verona peaking at ~26,000 cfs on 1/15/16.

OMR as of 1/9/16:

	USGS gauges* (cfs)	Index (cfs)
5-day	-3,896	-4,617
14-day	Not available	-4,509

*Miller (DWR) reported that there have been some equipment issues with the USGS gauges, thus the most recent OMR numbers he reported were for 1/9/15.

Agenda Item 4.

Smelt Working Group

The SWG met on Monday, 1/11/16. Bartoo (USFWS) sent the following update via email that was reported out to DOSS:

The Working Group reviewed current Delta Smelt distribution and salvage data, and current Delta conditions. The Working Group currently is following the guidance in the 2008 BiOp for Action 1 Part B. The Working Group recommended an immediate start to Action 1. Action 1 is a 14-day period when OMR flows are to be no more negative than -2000 cfs, with a corresponding 5-day average of no more negative than -2500 cfs.

At the time of the DOSS call, USFWS had made no determination based on the SWG advice.

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

Agenda Item 5.

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	Jersey Pt./ Prisoners Pt. Trawls	Sacramento Trawl	Beach Seines	Knights Landing RST ^A	Tisdale RST ^B	GCID RST ^C	Mossdale Kodiak Trawl
Sample Date	1/3-1/9	1/3-1/9	1/3-1/9	1/3-1/9	1/3-1/11	1/4-1/11		1/3-1/9
Total Catch	4	19	16	328	3,482	997		0
FR Chinook			15	319	3,451	993		
WR Chinook			1	1	5	2		
SR Chinook				8	22	2		
LFR Chinook	2							
Ad-Clipped Chinook	2				2			
Chinook Adult								
Steelhead (wild)								
Steelhead (ad-clip)					2			
Green Sturgeon								
Delta Smelt		19						
Splittail								
Longfin Smelt								
Flows (avg. cfs)					12,018	14,499		

W. Temp. (avg. °F)					46.7	46		
Turbidity (avg. NTU)					54.5	58		

^A Sampling period was from 1/3 at 9:45 am to 1/11 at 10:30 am. No sampling on 1/7 due to heavy debris load. Daytime only sampling on 1/8 from 8:30 am to 3:30 pm, and then normal sampling resumed on 1/9 at 8:15 am.

^B Sampling period was from 1/4 at 8:30 am to 1/11 at 8:30 am. From 1/6 at 3:15 pm to 1/11 at 8:30 am the traps were modified to 50% catch.

^C Traps were pulled on 1/5/16.

The third and final spring-run Chinook surrogate group of genetic late fall-run from Coleman was released on 1/12/16 in Battle Creek. A total of 67,700 ad-clipped, and coded-wire-tagged fish were released.

Fish Salvage³:

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

³Salvage 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: January 4-January 10, 2016
 Prepared by Bob Fujimura on January 11, 2016 20:10
 Preliminary Results -Subject to Revision

Criteria	4-Jan	5-Jan	6-Jan	7-Jan	8-Jan	9-Jan	10-Jan	Trend	
Loss Densities									
Wild older juvenile CS	0	1.26	0	0	0	0	0	↘	0.18
Wild steelhead	0	0	0	0	0	0	0	↘	0.00
Exports									
SWP daily export	2,898	5,271	8,290	6,840	6,291	5,881	4,979	↘	5,779
CVP daily export	1,599	1,590	2,727	3,888	5,154	5,682	6,768	↘	3,915
SWP reduced counts	0%	0%	0%	8%	0%	0%	0%	↘	1.14%
CVP reduced counts	0%	0%	0%	0%	0%	0%	0%	↘	0.00%

Loss Density = fish lost/TAF; water export = AF; Trend = compared to previous week; wild = adipose fin present
 Loss = estimated number of fish lost at the CVP and SWP Delta export facilities based on estimated salvage (see below)
 Reduced counts = percentage of time that routine salvage sample time were less than 30 min per 2 hours of salvage and export operations
 Yellow highlighted dates indicate TFCF salvage outage occurred

Chinook Salmon Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities
 Race determined by size at date of capture; hatchery = adipose fin missing;

Category	Weekly Total			Season Total	
	Salvage	Loss	Trend	Salvage	Loss
Wild					
Winter Run	2	9	↘	4	17
Spring Run	0	0	↘	0	0
Late Fall Run	0	0	↘	44	166
Fall Run	0	0	↘	4	18
Unclassified	10	NC	↘	10	NC
Total	12	9		62	201
Hatchery					
Winter Run	21	88	↘	45	172
Spring Run	0	0	↘	0	0
Late Fall Run	14	84	↘	55	244
Fall Run	0	0	↘	1	4
Unclassified	0	0	↘	0	0
Total	35	130		101	421

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	↘	0	0
Hatchery	0	0	↘	0	0
Total	0	0		0	0

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 1/4/16-1/10/16.

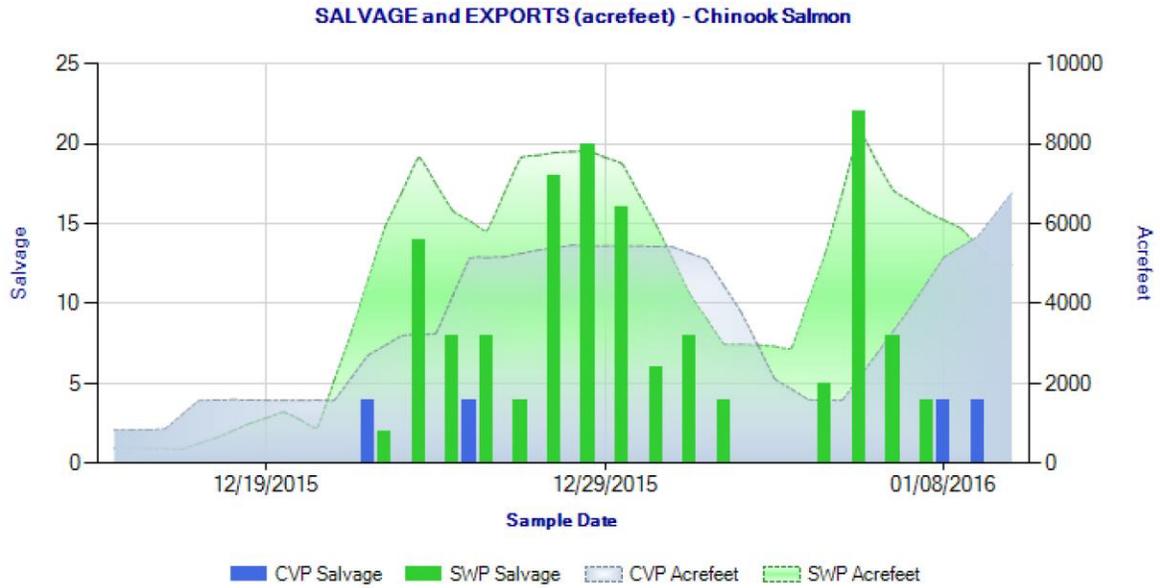


Figure 2. Daily salvage of Chinook salmon (all races) and water exports from the state and federal fish salvage facilities during December 15, 2015 through January 10, 2016.

Mulligan (DWR) provided the following summary of coded-wire-tag recoveries at the SWP and CVP fish collection facilities:

CONFIRMED HATCHERY (ADPOSE-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	Total Entering Delta	% Loss of Number Released	% Loss of Total Entering Delta	First Concern Level	Second Concern Level	Date of First Loss	Date of Last Loss
6/11/2015 to 6/12/2015	LF	Coleman NFH	Bulls 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	265.40	251,213	n/a	0.002	n/a	n/a	n/a	12/25/2015	1/8/2016
12/11/2015	LF	Coleman NFH	Battle Creek	Spring Surrogate	109.71	77,000	n/a	0.142	n/a	0.5%	1.0%	12/25/2015	1/8/2016
12/22/2015	LF	Coleman NFH	Battle Creek	Spring Surrogate	27.58	66,000	n/a	0.041	n/a	0.5%	1.0%	1/6/2016	1/7/2016
1/12/2016	LF	Coleman NFH	Battle Creek	Spring Surrogate	0.00	67,700	n/a	0.000	n/a	0.5%	1.0%	*	*

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

Facility	Unknown CWT Loss	Unread CWT Loss	Acoustic Tag Loss	Number of Unassigned CWT
SWP	18.16	0.00	0.00	0
CVP	0.00	0.00	0.00	0
TOTAL	18.16	0.00	0.00	0

SWP and CVP adPOSE-fm clipped Chinook lost from 12/29/2015

*Number released with the adPOSE-fm clipped and a coded-wire tag (CWT).

**% Loss of Number Released = (Confirmed Loss/Number Released)*100.

***% Loss of Total Entering Delta= (Confirmed Loss/Total Entering Delta)*100.

†Date of first and last loss accounts for all CWT loss even those from special studies where salvage and loss=0.

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

†ADPOSE-fm 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).

†ADPOSE-fm clipped Chinook was collected during fish count and has not been processed yet.

†ADPOSE-fm clipped Chinook released due to presence of sutures.

†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 07/12/2016

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

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.

Based on the recent Sacramento River monitoring data, the DOSS group made a significant adjustment to its estimate of winter-run distribution, now estimating that most winter-run Chinook have migrated into the Delta. This new estimate is based on the strong responses by YOY fall-run Chinook, but not winter-run Chinook, to the precipitation events and increasing river flows, as indicated by high daily catches of YOY fall-run Chinook at the RBDD, GCID, Tisdale, and Knights Landing rotary screw traps. DOSS interprets the lack of response by winter-run Chinook as an indication that winter-run Chinook are no longer present in high numbers in the upper reaches of the Sacramento River. Concurrent catches of winter-run Chinook in the Sacramento area beach seines and trawls indicate that these fish have entered the Delta.

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>	10% - 25% (Last week: 70% - 75%)	75% - 90% (Last week: 25% - 30%)	0% - 1% (Last week: 0%)
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	~70% (Last week: 85%)	30% (Last week: 15%)	0% - 1% (Last week: 0%)

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 followed by corresponding matrix tables.

Interior Delta Entrainment Risk:

- **Exposure Risk:** HIGH for listed fish in the Sacramento River over the next week
 - Flow and turbidity increases, which cue salmonid movement, are expected in response to forecasted rains
- **Routing Risk:** LOW to MEDIUM for fish in the Sacramento River over the next week
 - 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.

Interior Delta Entrainment Risk for listed species			
Exposure Risk	Routing Risk		
	Low	Medium	High
Low			
Medium			
High	X	X	

- **Overall Entrainment Risk:** MEDIUM to HIGH for fish in the Sacramento River into the Interior Delta

CVP/SWP Facilities Entrainment Risk:

- **Exposure Risk:** MEDIUM for fish in the Interior Delta over the next week
 - Listed runs are expected to have previously migrated into and be rearing within the Interior Delta.
- **OMR/Export Risk:** MEDIUM to HIGH for fish in the Interior Delta over the next week
 - DOSS assumed an OMR flow of -5,000 cfs through the week
 - Risks associated with OMR levels of -5,000 cfs may be partially offset (especially for fish in, or north of, the mainstem San Joaquin River) by increased river flows due to forecasted rains.
 - The OMR flow of -5,000 cfs has a medium risk for fish at higher Delta inflows, and a high risk for fish at lower Delta inflows.

CVP/SWP Facilities Entrainment Risk for listed species			
Exposure Risk	OMR/Export Risk		
	Low	Medium	High
Low			
Medium		X	X
High			

- **Overall Entrainment Risk:** MEDIUM to HIGH for fish in the Interior Delta into the CVP/SWP Facilities

Agenda Item 6.

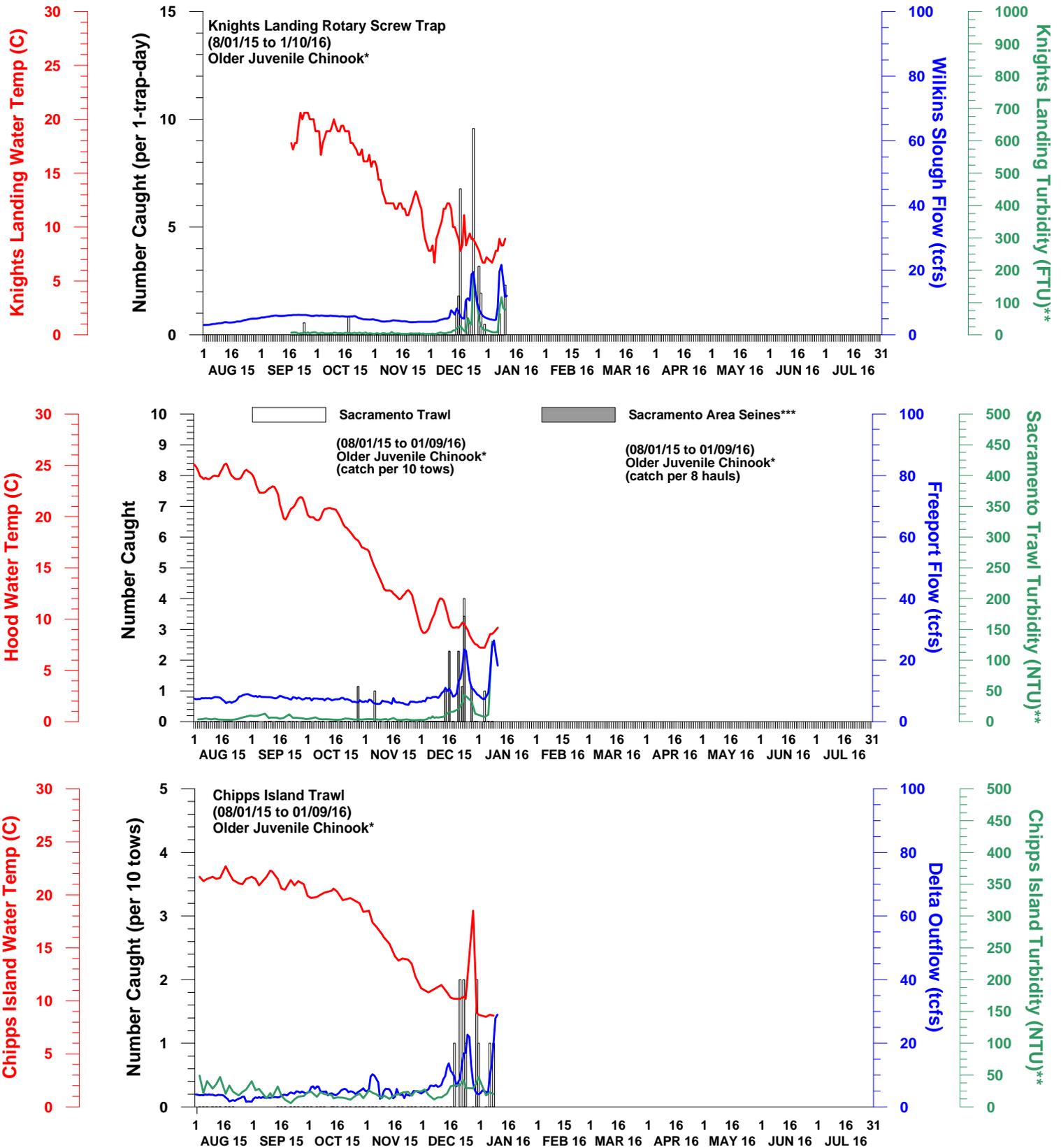
DOSS Advice to WOMT and NMFS: None

Agenda Item 7.

Next Meeting: The next DOSS conference call will be on 1/19/16 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 LOWER SACRAMENTO RIVER AND CHIPPS ISLAND



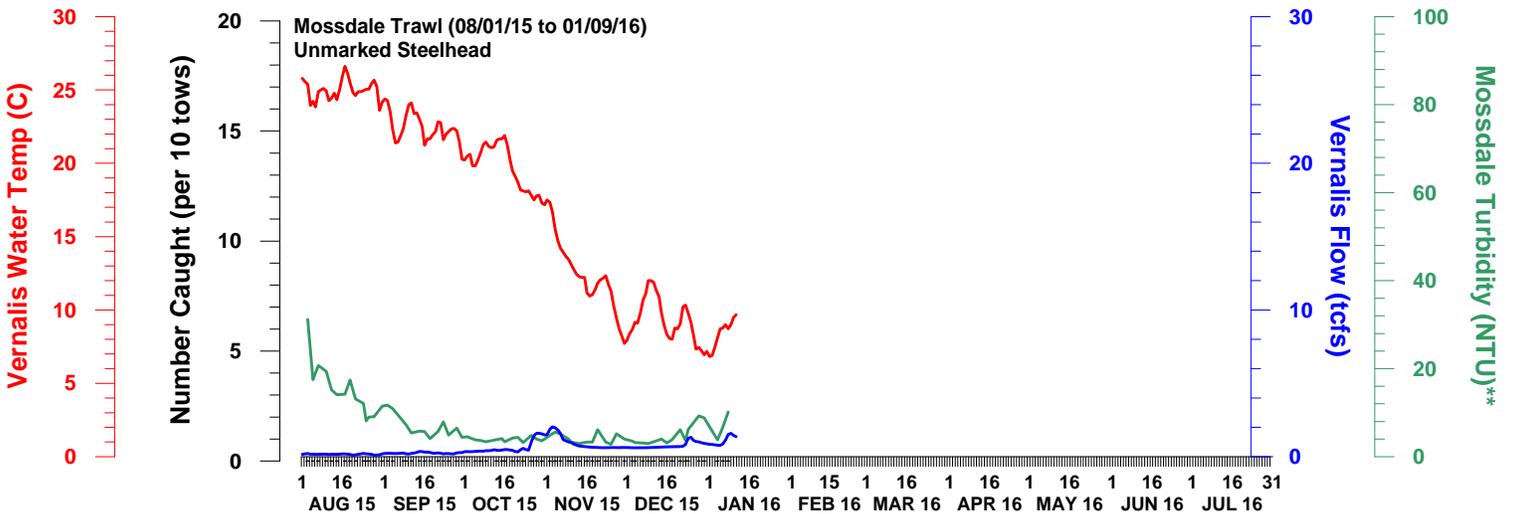
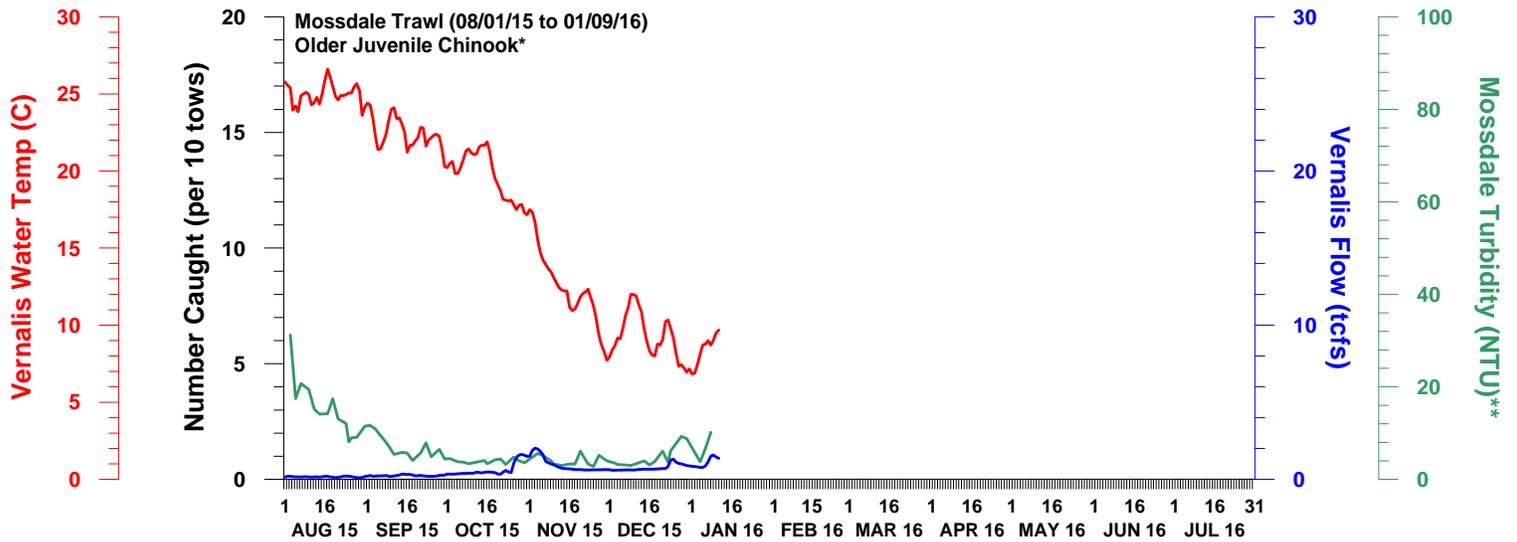
DWR-DES 12 January 2016
 Preliminary data from DFW, FWS, and CDEC; subject to revision.

*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

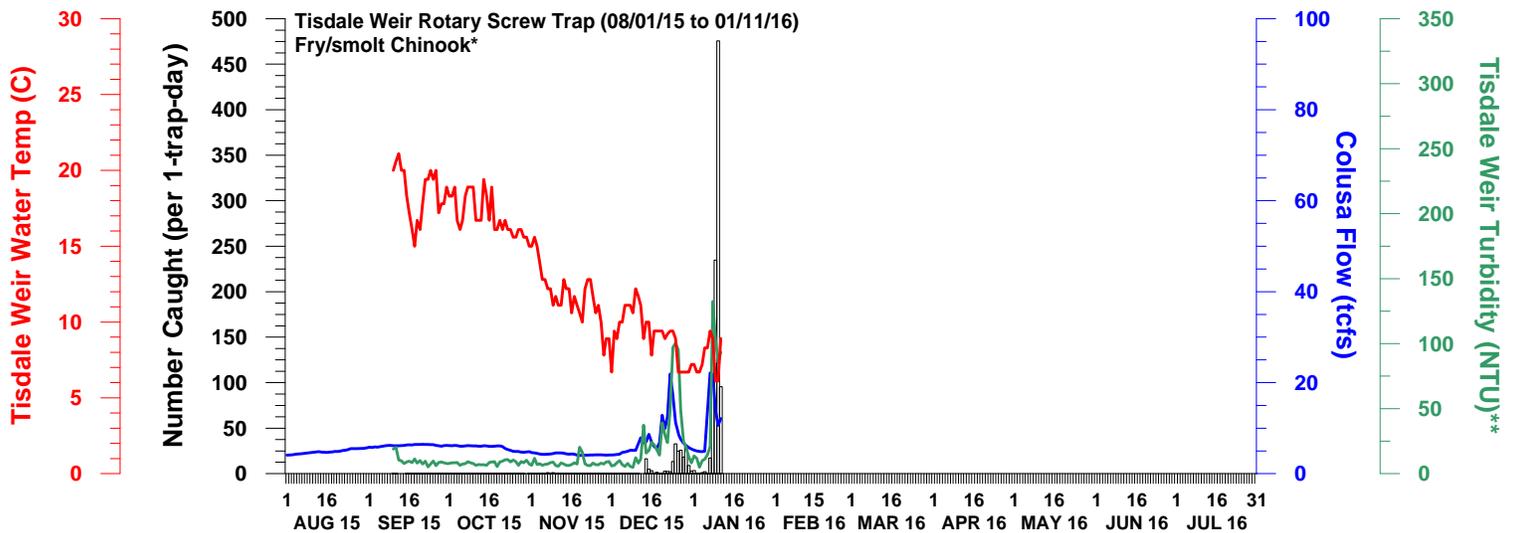
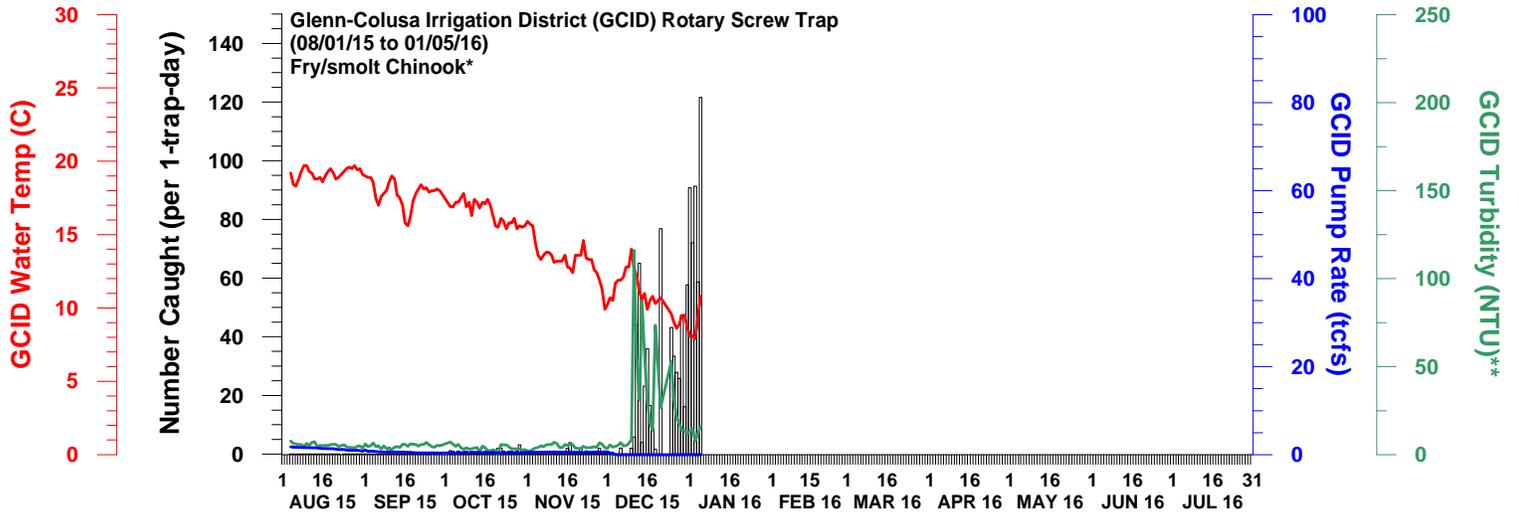
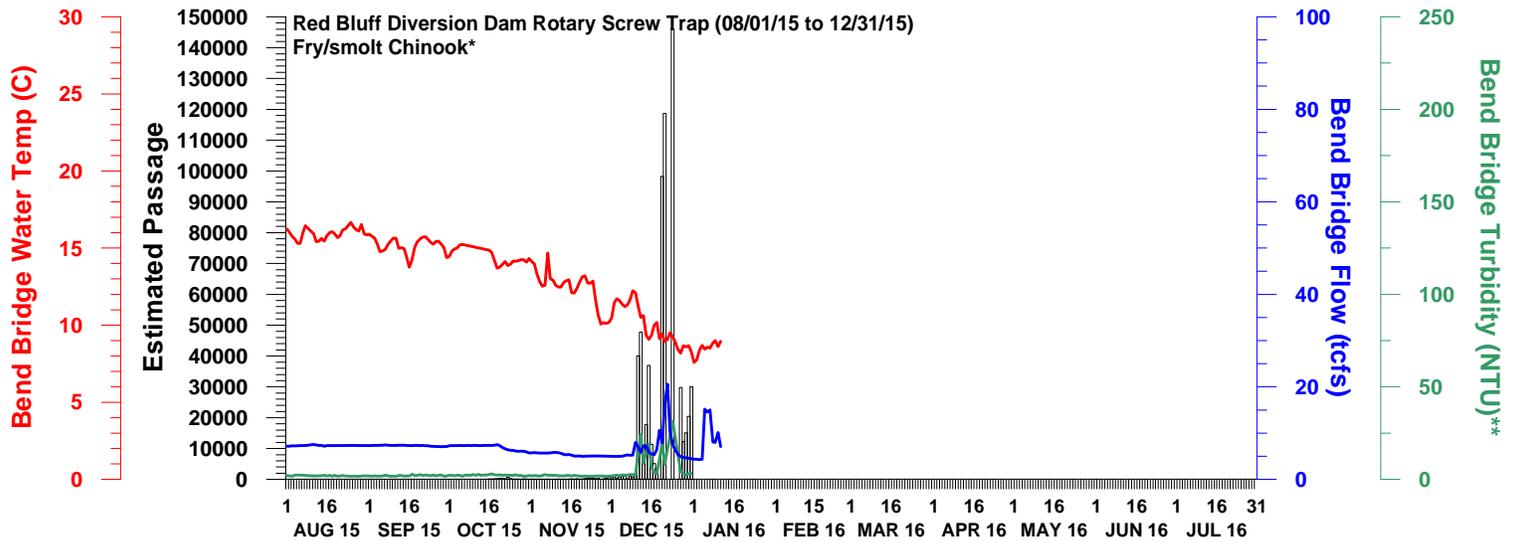


DWR-DES 12 January 2016
Preliminary data from FWS and CDEC; subject to revision.

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NUMBER OF UNMARKED FRY/SMOLT CHINOOK MEASURED IN THE SACRAMENTO RIVER



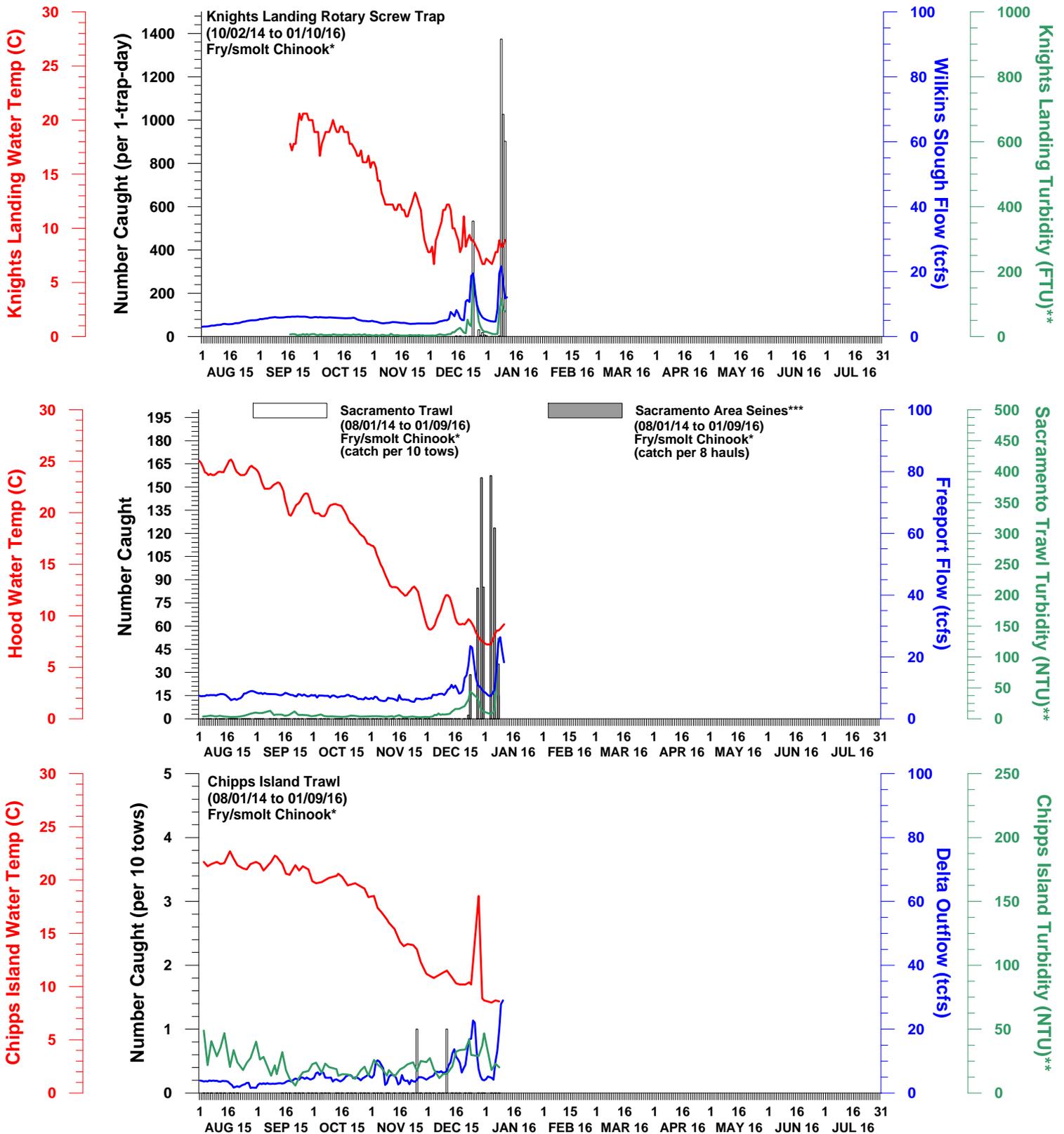
DWR-DES 12 January 2016

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 12 January 2016

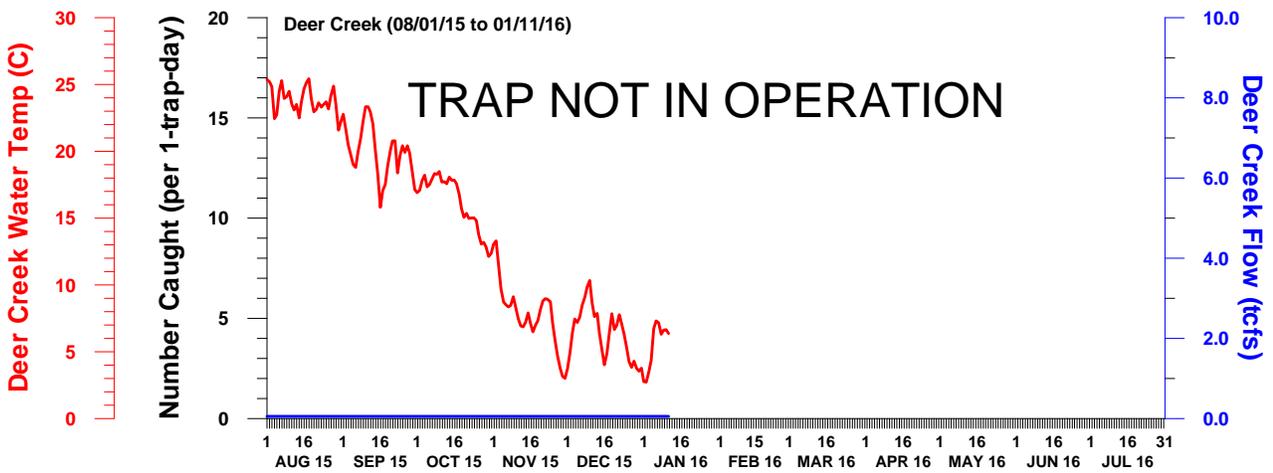
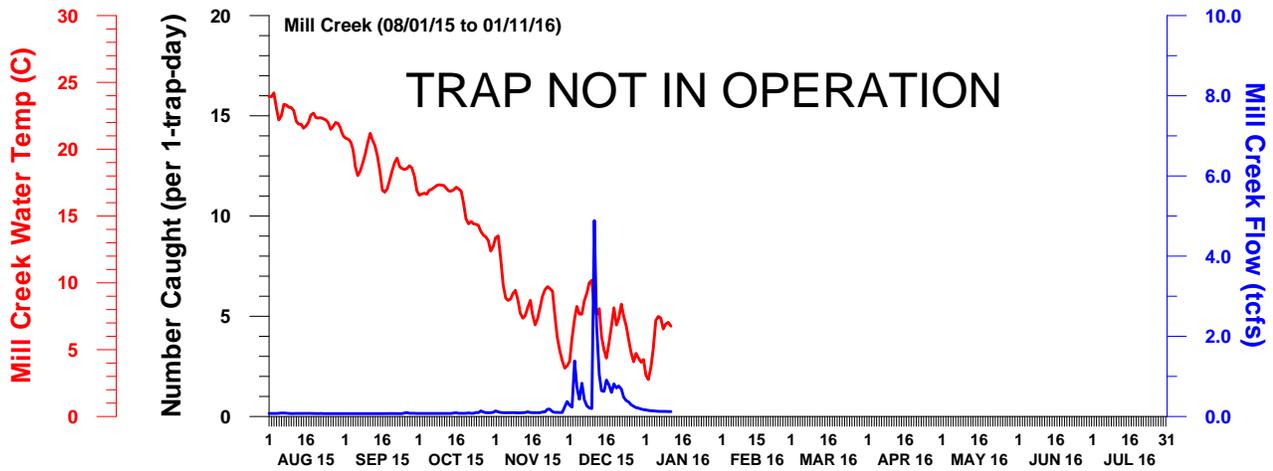
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WATER TEMPERATURE AND FLOW MEASURED AT MILL AND DEER CREEK



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).

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)¹, 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.

¹ Formerly known as the California Department of Fish and Game (DFG).

