

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 1/19/16 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, Rhiannon Mulligan, Dan Yamanaka
Reclamation: Michele Palmer, Josh Israel, Dave van Rijn
NMFS: Barb Byrne, Meiling Roddam
CDFW: Bob Fujimura, Ken Kundargi, Duane Linander
USFWS: 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
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)

- No triggers exceeded over past week.

Agenda Item 3.

Current Operations (1/19/16)

SWP	CVP
Exports (cfs)	

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

Clifton Court Forebay	2,250	Jones Pumping Plant	2,000
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)	466	San Luis (CVP)	122
Oroville	1,173	Shasta	1,720
New Melones	347	Folsom	311
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	29,743
Outflow Index (cfs)	~34,000	San Joaquin River at Vernalis (cfs)	978
E:I	19.4% (14-day avg.)	X2	78 km

A voluntary -3,500 cfs OMR flow limit (per DWR/Reclamation flow proposal³ for reduction of Delta Smelt entrainment risk) is controlling exports today (1/16/16), and has been since Friday.

OMR as of 1/16/16:

	USGS gauges (cfs)	Index (cfs)
5-day	-4,414	-4,394
14-day	-3,915	-4,121

Agenda Item 4.

Smelt Working Group

The SWG will meet on Tuesday, 1/19/16 at 10am. 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 ^A	Jersey Pt./ Prisoners Pt. Trawls ^{A,B}	Sacramento Trawl ^{A,B}	Beach Seines ^{A,B}	Knights Landing RST ^C	Tisdale RST ^D	GCID RST ^E	Mossdale Kodiak Trawl ^A
Sample Date		1/10-1/18	1/10-1/18	1/10-1/18	1/11-1/18	1/11-1/18	1/11-1/14	

³ Flow proposal is described on p. 2 of the 1/14/16 FWS determination at:

http://www.fws.gov/sfbaydelta/documents/smelt_working_group/Determination_2016_01_14_final.pdf

Total Catch		39	37	587	5,761	2,140	449	
FR Chinook		4	34	582	5,668	2,121	398	
WR Chinook				2	16	5	3	
SR Chinook			1	3	32	1		
LFR Chinook								
Ad-Clipped Chinook		1			23	8		
Chinook Adult								
Steelhead (wild)					1	1		
Steelhead (ad-clip)			2		21	4	48	
Green Sturgeon								
Delta Smelt		34						
Splittail								
Longfin Smelt								
Flows (avg. cfs)					17,160	18,427		
W. Temp. (avg. °F)					48.6	48.5		
Turbidity (avg. NTU)					68.62	93		

^A Due to the holiday on Monday, 1/18/16, 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.

^B Data are from the monitoring summary for the DCC and early warning surveys.

^C Sampling period was from 1/11 at 10:30 am to 1/18 at 3:00 pm.

^D Sampling period was from 1/11 at 8:30 am to 1/18 at 8:30 am. During the entire sampling period the traps were modified to 50% catch.

^E The RST cone was lowered on 11/11 at 9:00 am. On 1/13 at 3:30 pm the cone was raised to avoid high flows and heavy debris. On 1/14 the RST was removed from the bypass channel at 9:00 am to avoid extremely high flows.

DFW reported that river stage is high enough that the Sacramento River spilled over the Tisdale weir over the past week. The Tisdale weir is downstream of the Tisdale RSTs, so that sampling location is unaffected. Fish that pass over the weir into the Sutter bypass re-enter the Sacramento River just upstream of Verona and downstream of the Knights Landing RSTs, so the Knights Landing monitoring location cannot sample some unknown fraction of migrating fish.

Red Bluff Diversion Dam (RBDD) Monitoring

USFWS biweekly report (1/1/16-1/14/16) 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)	2,953	321,113

Fish Salvage⁴:

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>.

⁴Salvage 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 11-January 17, 2016
 Prepared by Bob Fujimura on January 18, 2016 10:50
 Preliminary Results -Subject to Revision

Criteria	11-Jan	12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan	Trend	
Loss Densities									
Wild older juvenile CS	0.00	0.24	0.00	0.26	0.00	0.42	0.00	↘	0.13
Wild steelhead	0	0	0	0	0	0	0	↘	0.00
Exports									
SWP daily export	4,322	5,020	4,817	3,731	4,348	4,634	4,179	↘	4,436
CVP daily export	7,196	7,214	7,234	7,177	4,805	3,770	3,775	↘	5,882
SWP reduced counts	0%	0%	0%	0%	0%	0%	0%	↘	0%
CVP reduced counts	17%	25%	17%	0%	0%	0%	0%	↘	8%

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 non-QC preliminary results

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	12	10	↘	18	27
Spring Run	0	0	↘	0	0
Late Fall Run	0	0	↘	44	166
Fall Run	0	0	↘	4	18
Unclassified	0	0	↘	10	NC
Total	12	10		74	211
Hatchery					
Winter Run	22	47	↘	67	219
Spring Run	0	0	↘	0	0
Late Fall Run	0	0	↘	55	244
Fall Run	0	0	↘	1	4
Unclassified	0	0	↘	0	0
Total	22	47		123	468

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 1/11/16-1/17/16.

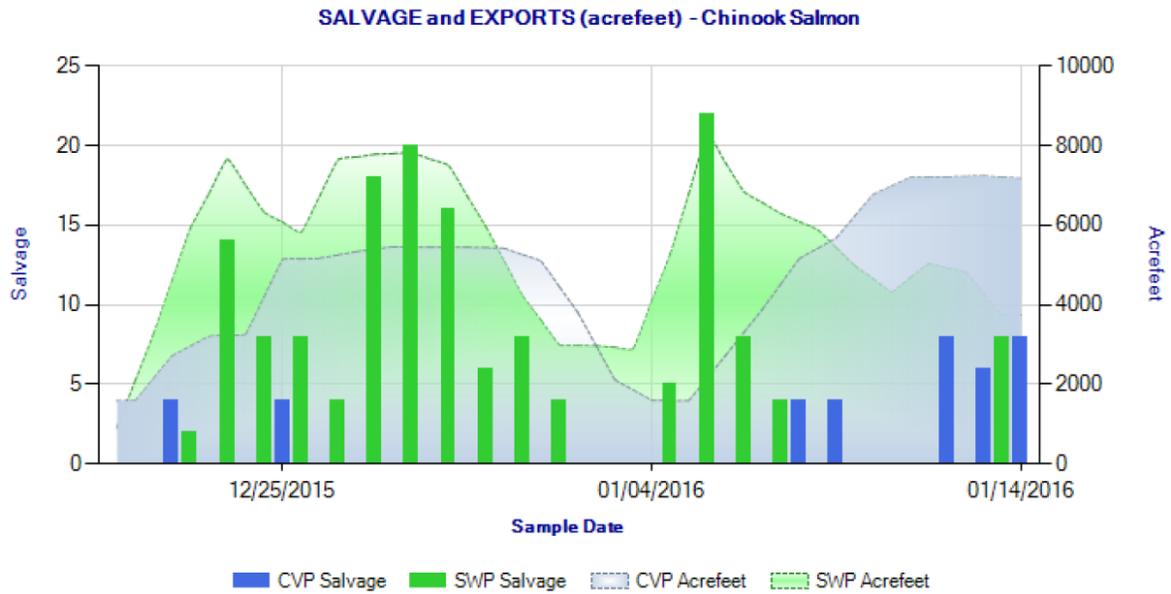


Figure 2. Daily salvage of Chinook salmon (all races) and water exports from the state and federal fish salvage facilities during December 21, 2015 through January 14, 2016.

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

CONFIRMED HATCHERY (ADIPPOSE-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
01/12/2015 to 01/12/2016	LF	Coleman NFH	Salt Ferry Boat Ramp, Sacramento River	Production	0.00	654,297	n/a	0.00%	n/a	n/a	n/a	-	-
03/07/2015	LF	Coleman NFH	Battle Creek	Production	283.76	57,413	n/a	0.00%	n/a	n/a	n/a	12/25/2015	11/4/2016
12/11/2015	LF	Coleman NFH	Battle Creek	Spring Surrogate	109.71	77,000	n/a	0.14%	n/a	0.4%	1.0%	12/25/2015	10/2/2016
12/22/2015	LF	Coleman NFH	Battle Creek	Spring Surrogate	56.54	68,000	n/a	0.08%	n/a	0.2%	1.0%	10/2/2016	11/9/2016
1/12/2016	LF	Coleman NFH	Battle Creek	Spring Surrogate	0.00	67,700	n/a	0.00%	n/a	0.5%	1.0%	-	-

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

Facility	Unknown CWT Loss	Unread CWT Loss	Accounted Tag Loss	Number of Unassigned CWTs
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 adipose-fin clipped Chinook lost from 12/25/2015

n=Number released with the adipose-fin 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.

Adipose-fin clipped Chinook was observed during fish count, but tag code could not be determined (e.g., damaged tag, lost tag, or Chinook accidentally released).

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

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

Adipose-fin 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.

** DWIR-DES Released 01/10/2016

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.

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>	15% (Last week: 10% - 25%)	85% (Last week: 75% - 90%)	0% - 5% (Last week: 0% - 1%)
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	40% - 50% (Last week: ~70%)	50% - 60% (Last week: 30%)	0% - 5% (Last week: 0% - 1%)

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 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:** LOW to MEDIUM (if OMR stays at -3,500 cfs through the week); MEDIUM (if OMR goes to -5,000 cfs through the week) for fish in the Interior Delta over the next week

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 for fish in the Interior Delta into the CVP/SWP Facilities

Agenda Item 6.

DOSS Advice to WOMT and NMFS: None

Agenda Item 7.

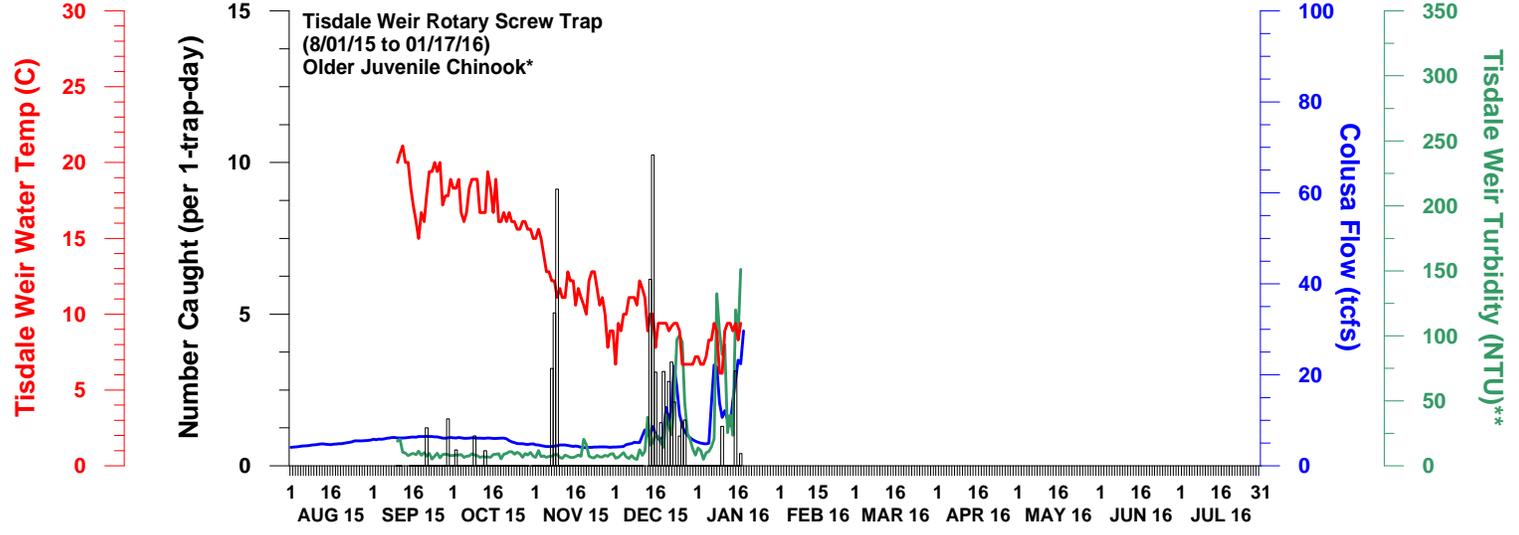
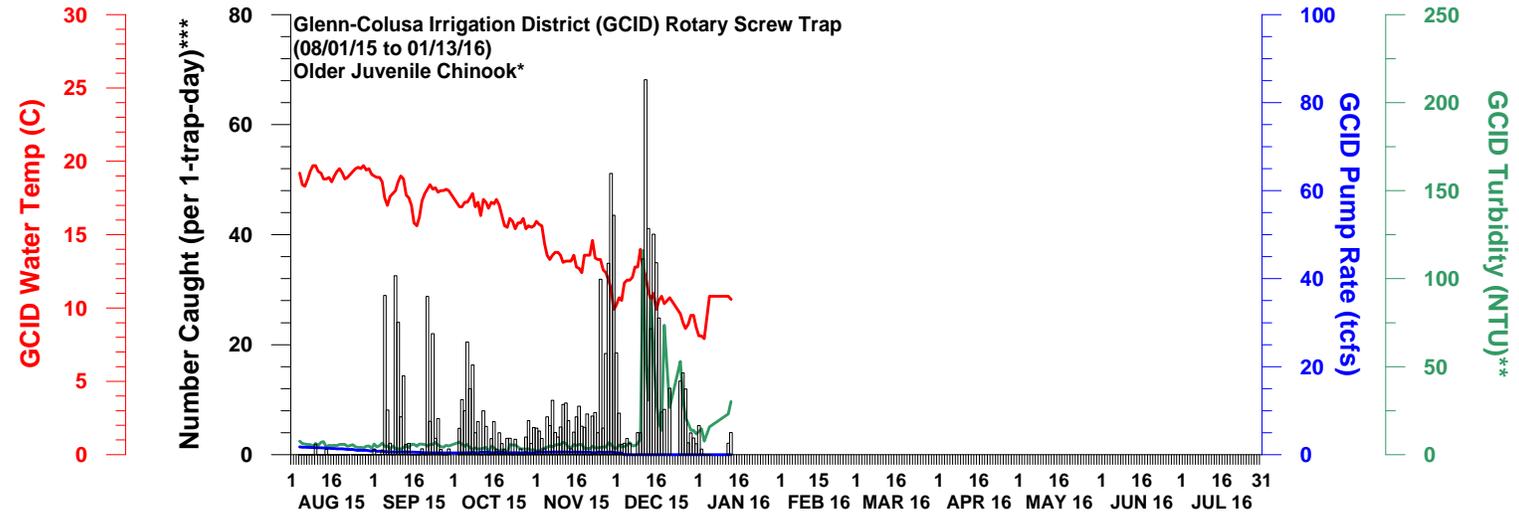
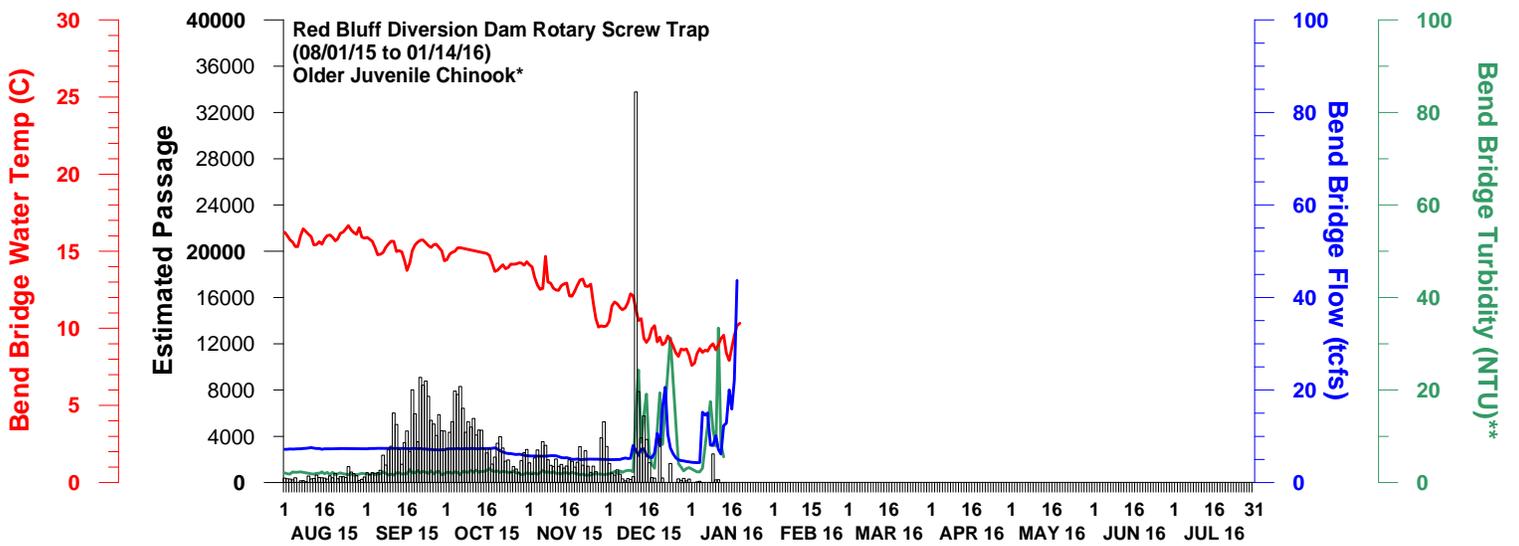
Next Meeting: The next DOSS conference call will be on 1/26/16 at 9am.

The following “DAT data” was provided after the DOSS call and is provided in this week’s DOSS notes for convenience.

Location	Chippis Is. Midwater Trawl	Jersey Pt./ Prisoners Pt. Trawls	Sacramento Trawl	Beach Seines	Mossdale Trawl
Sample Date	1/10-1/16	1/10-1/16	1/10-1/16	1/10-1/16	1/10-1/16
Total Catch	20	29	37	1,177	0
FR Chinook		4	34	1,168	
WR Chinook				4	
SR Chinook			1	3	
LFR Chinook	1				
Ad-Clipped Chinook	11				
Chinook Adult					
Steelhead (wild)					
Steelhead (ad-clip)			2	1	
Green Sturgeon					
Delta Smelt		25			
Splittail				1	
Longfin Smelt	8				
Flows (avg. cfs)					
W. Temp. (avg. °F)					
Turbidity (avg. NTU)					

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>

NUMBER OF UNMARKED OLDER JUVENILE CHINOOK MEASURED IN THE SACRAMENTO RIVER

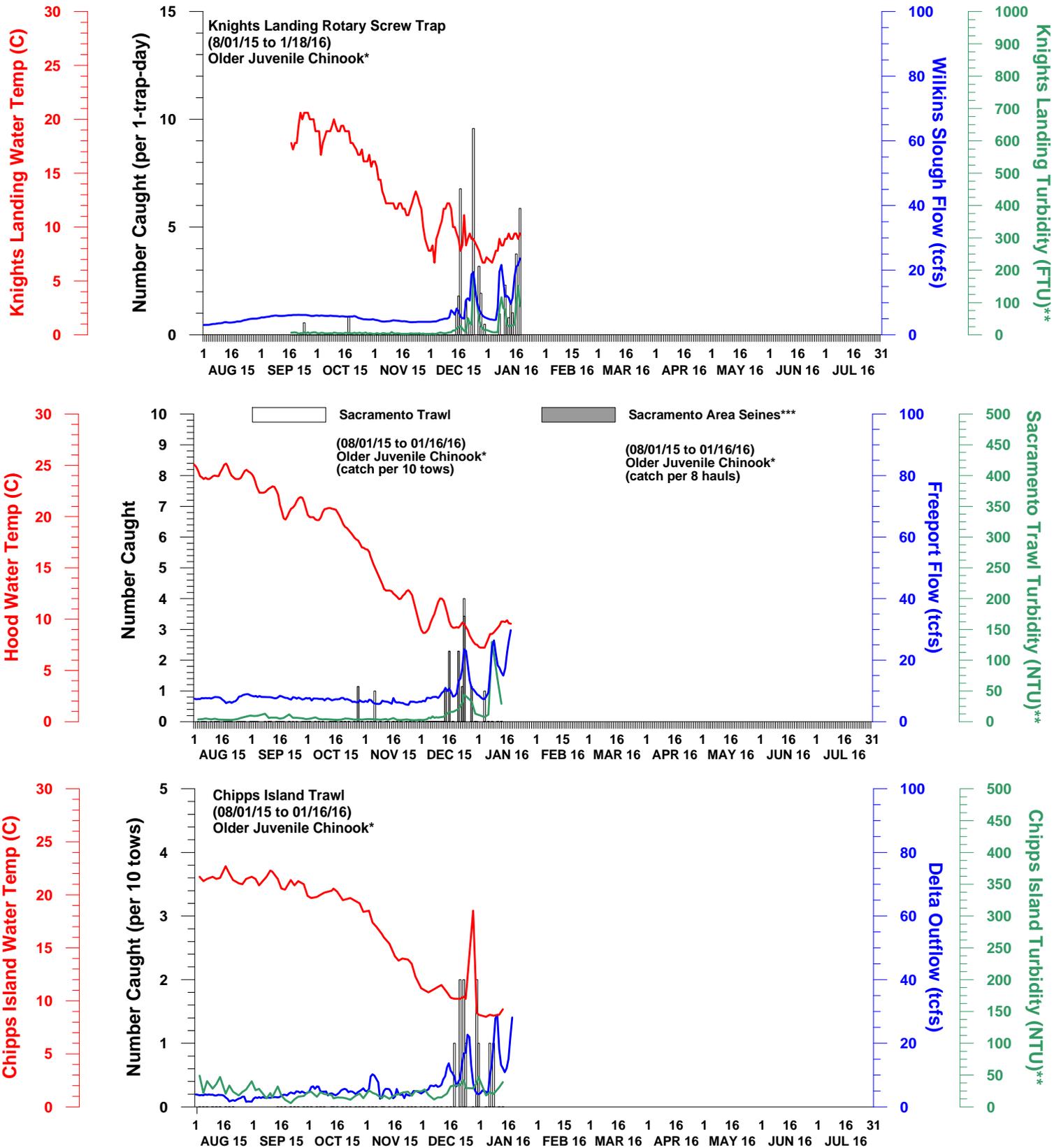


DWR-DES 20 January 2016
 Preliminary data from DFW, FWS, GCID, and CDEC; subject to revision.

*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 20 January 2016

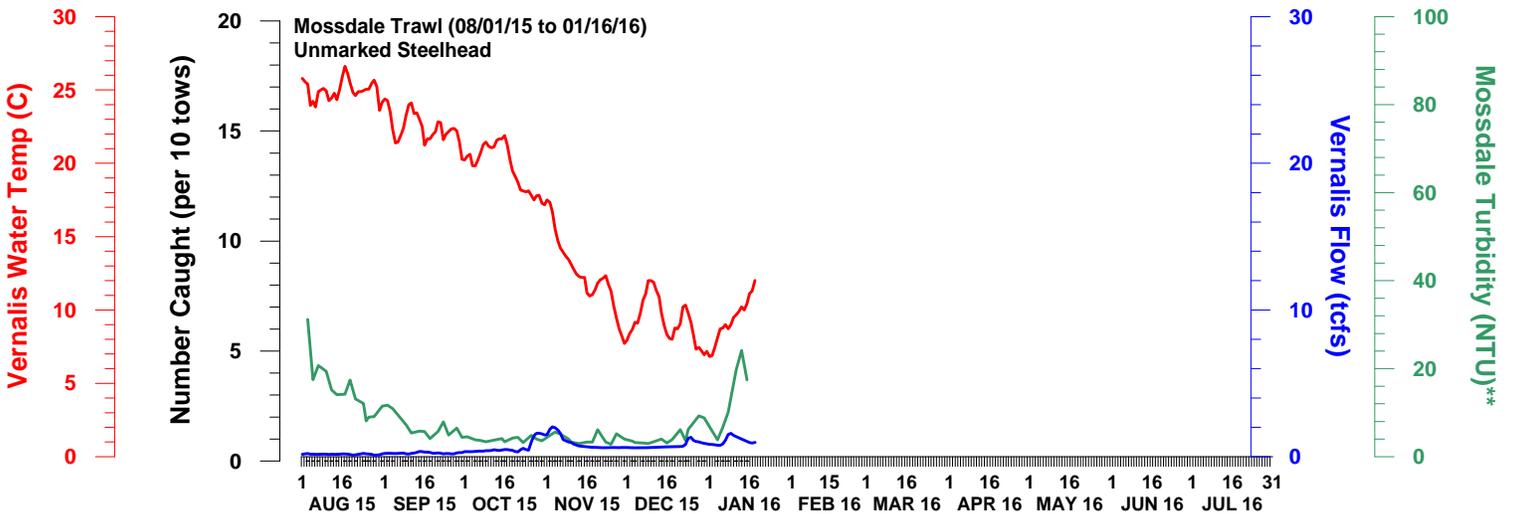
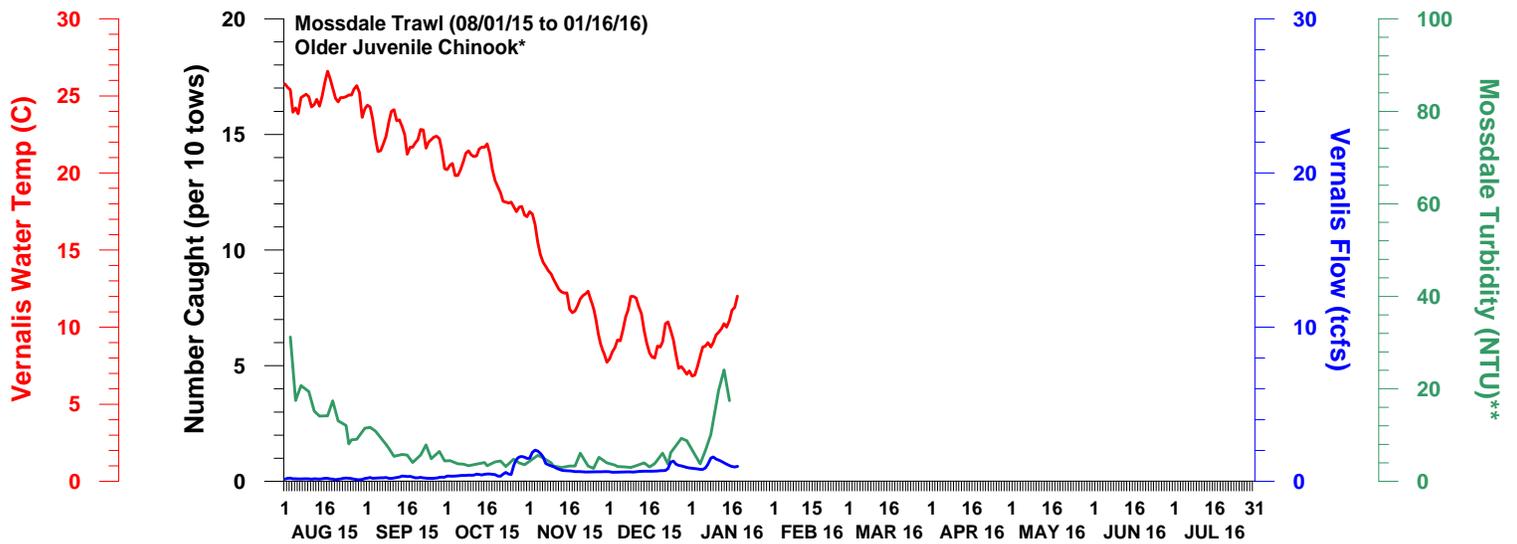
Preliminary data from DFW, FWS, and CDEC; subject to revision.

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**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

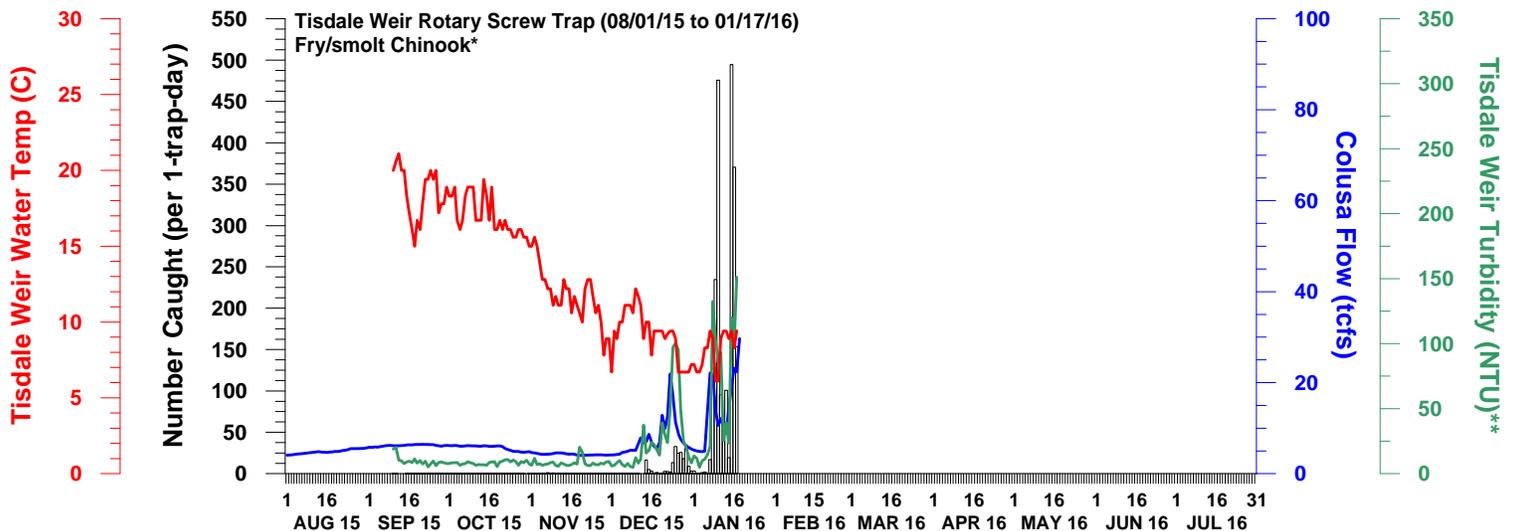
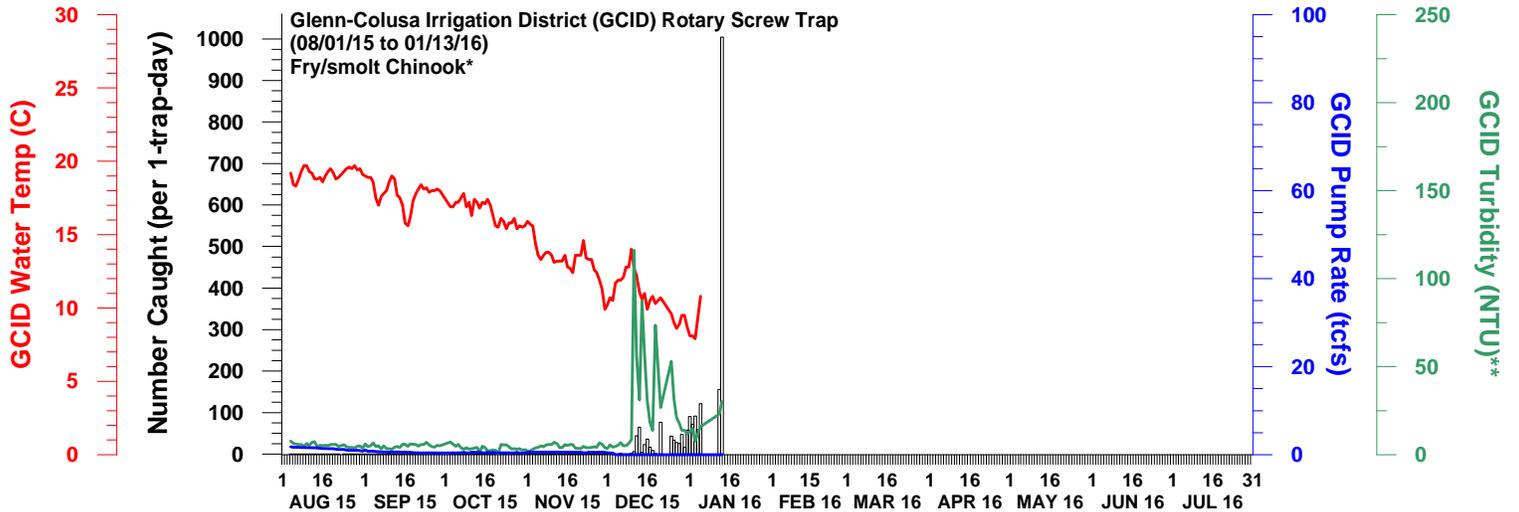
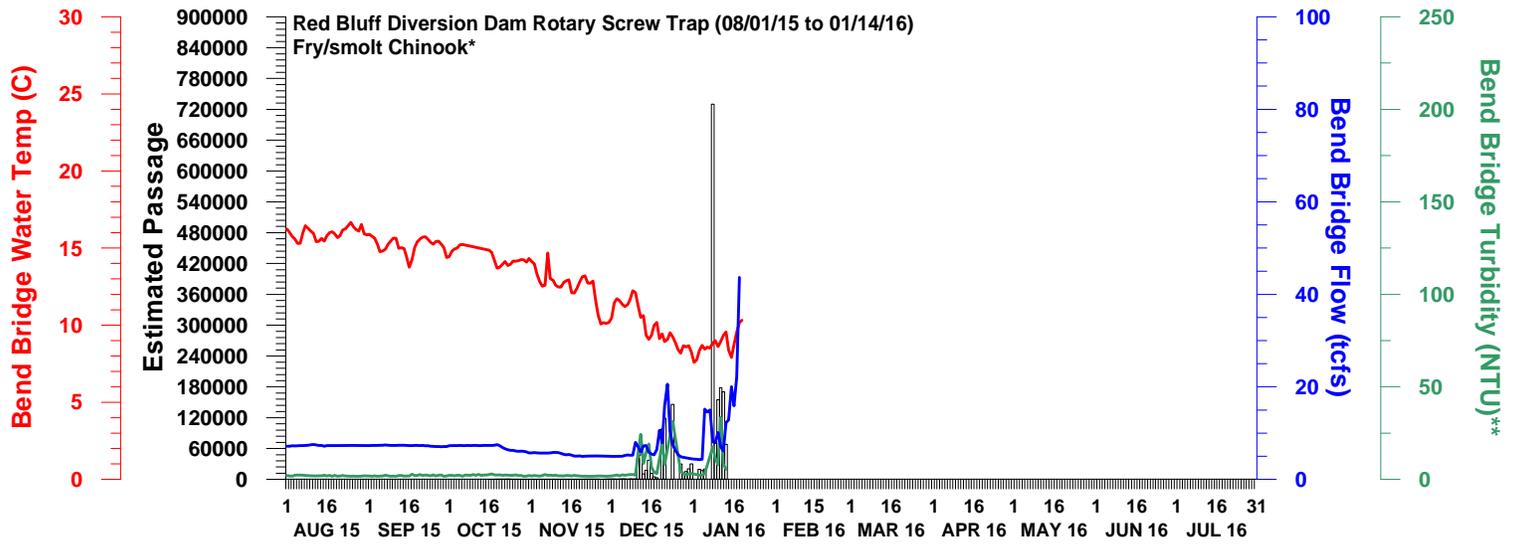


DWR-DES 20 January 2016
Preliminary data from FWS and CDEC; subject to revision.

*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



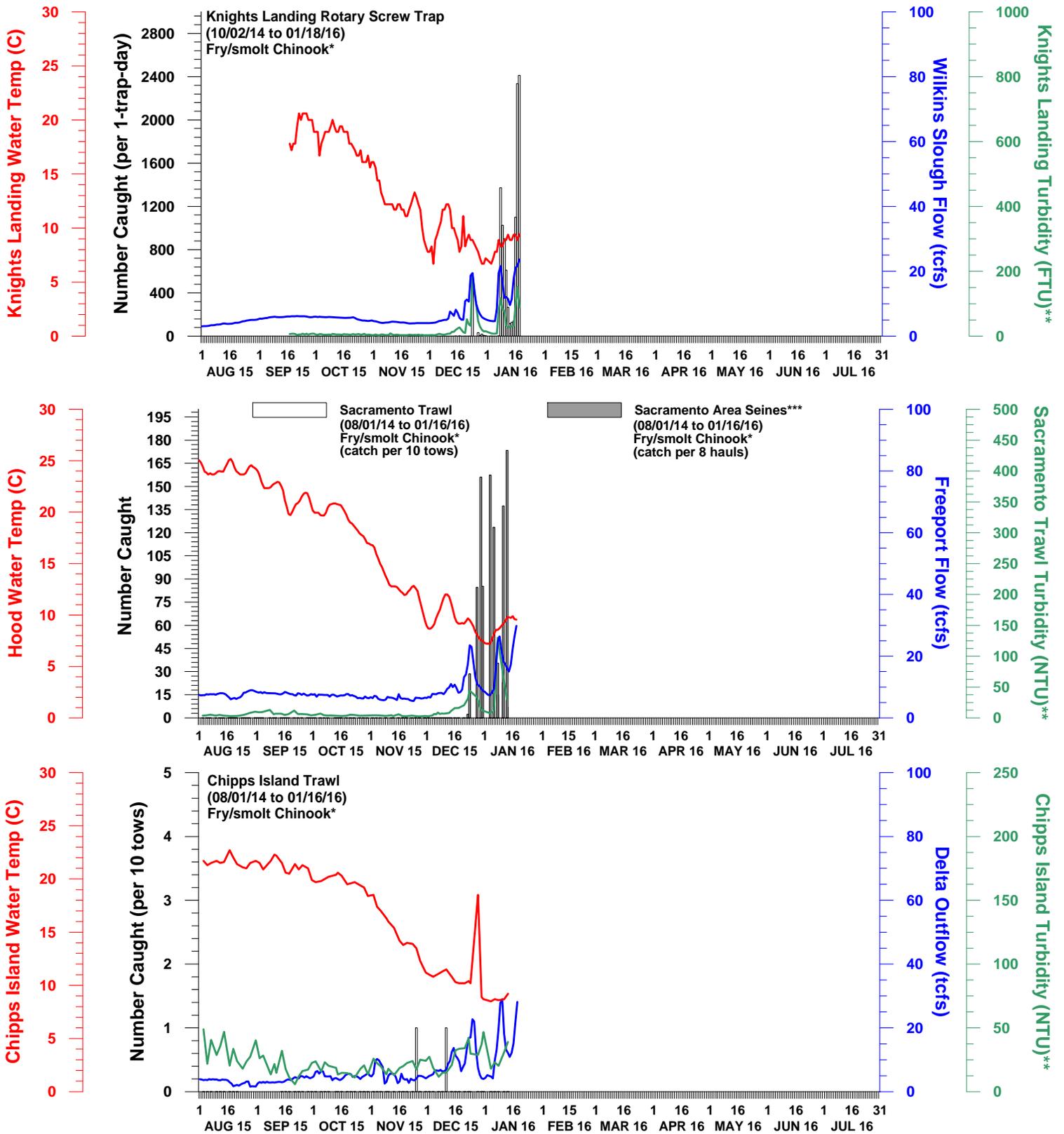
DWR-DES 20 January 2016

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 20 January 2016

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

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***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.

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).

