Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 02/10/2015 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: Farida Islam, Kevin Reece, Harry Spanglet, Rhiannon Mulligan, Aaron Miller, Dan Yamanaka, Bryant Giorgi, Mike Ford
Reclamation: Michelle Palmer, Josh Israel, Peggy Manza
NMFS: Barb Byrne, Jeff Stuart, Meiling Roddam
USFWS: Craig Anderson, Roger Guinee, Leigh Bartoo, Kevin Niemela
CDFW: Bob Fujimura, Duane Linander, Ken Kundargi
SWRCB: Scott Ligare

Agenda Items
1. Agenda review and introductions
2. Fish Monitoring
3. Current Operations
4. Update on drought planning
5. Smelt Working Group
6. RPA Implementation review
7. ePTM scenarios
8. DOSS Advice

Agenda Item 2.

Acoustic-tagged Hatchery Winter-Run Chinook Tracking with Real-Time Receivers:

- Sacramento (I80/I50 bridge): 22 tag detections between 3am on Monday, 2/9 and 4:50am on Tuesday, 2/10.
- "Near DCC" and "Old or Middle River" real-time receivers to go in this week
- Preliminary screening done to remove false positives (tag frequency must be received multiple times over several minutes to ensure is not just random background noise that happens to be a tag frequency); no predator filter is/can be applied.
- Release location in Redding is ~379 river km (~200 river miles) from Sacramento.
- Speed of fish is faster than Southwest Fisheries Science Center researchers and agency biologists expected.

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	Chipps Is. Midwater Trawl	Prisoners Pt/ Jersey Pt.	Sacramento Trawl	Mossdale Kodiak Trawl	GCID RST[A]	Knights Landing RST[B]	Tisdale RST[C]	Beach Seines
Sample Date	2/1-2/7	2/1-2/7	2/1-2/7	2/1-2/7	2/1-2/5	2/2-2/9	2/2-2/9	2/1-2/7
Total Catch	**7**	**9**	**0**	**0**	**59**	**2,198 (33mm-111mm)**	**1,764**	**50**
FR Chinook					55	2,076	1,673	17
WR Chinook	1				1	2	2	3
SR Chinook						20	20	30
LFR Chinook								
Ad-Clipped Chinook					1	66[D]	63 (63-118mm)	
Delta Smelt	1 (60mm)	9 (60-69mm)						
Splittail	1							
Longfin Smelt	4 (68-75mm)							
Steelhead (ad-clip)					2	34	6	
Steelhead (wild)								
Green Sturgeon								
W. Temp. (avg. °F)					52	55	51	
Flows (avg. cfs)					860	12,519	10,294	
Turbidity (avg. NTU)					7.18	138	29	

[A] Trap pulled on 2/5 and may not be re-set until next week.

[B] Sampling period was from 2/2 at 9:30 am to 2/9 at 4:00pm. RST sampled during daylight hours only on 2/8-2/9.

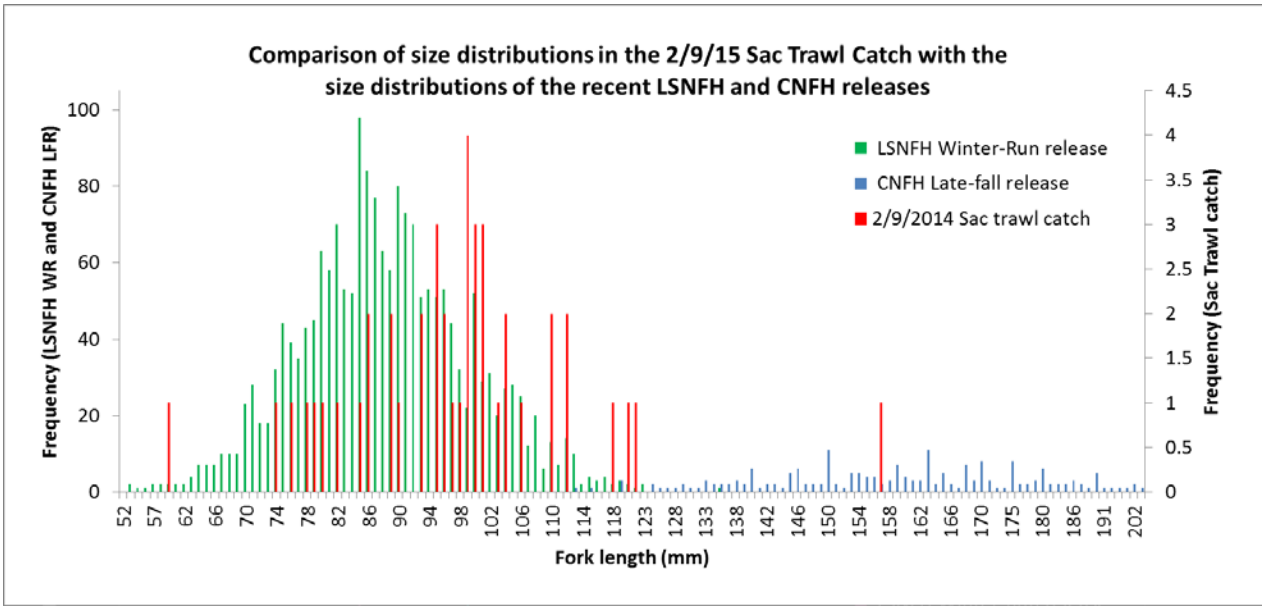
[C] Sampling period was from 2/2 at 7:45 am to 2/9 at 4:00 pm. RST cones modified to 50% efficiency on 2/7 over-night and 100% efficiency during the day.

[D] Of these 66, 4 were late fall-run sized, 57 were winter-run sized and 5 were spring-run sized based on length at capture date criteria. The 5 marked salmon that were spring-run sized (55 - 70 millimeters fork length) were assumed to be smaller individuals from hatchery winter-run production (no hatchery spring-run Chinook have been released yet); with this assumption, there were 62 marked winter-run captured on 2/8 and 2/9.

Preliminary Prisoner's Point/Jersey Pt. Data

2/7: Prisoner's Point – No species of management concern
2/8: Jersey Point- 18 Delta smelt
2/9: Prisoner's Point- 1 ad-clipped steelhead
2/9: Sacramento Trawl- 13 fall run, 5 spring run, 44 ad-clipped Chinook

Based on observed fork lengths, the 2/9 catch of ad-clipped Chinook at the Sacramento trawl includes individuals from both the Livingston Stone National Fish Hatchery (LSNFH) releases of winter-run Chinook salmon on 2/4-2/6, and the Coleman National Fish Hatchery (CNFH) release of genetic late-fall-run Chinook salmon (which served as the third and final spring-run Chinook surrogate release) on 2/5:



Fish Salvage[1]:

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

[1]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 2-8, 2015

Prepared by Bob Fujimura on February 9, 2015 1830

Preliminary Results -Subject to Revision

Criteria	2-Feb	3-Feb	4-Feb	5-Feb	6-Feb	7-Feb	8-Feb	Trend	
Loss Densities									
Wild older juvenile CS	0	2.56	0	0	0	0	0	↗	0.37
Wild steelhead	0	0	0	0	0	0	0	→	0.00
Exports									
SWP daily export	5,208	5,208	3,155	2,671	3,187	5,891	7,852	↘	4,739
CVP daily export	1,962	1,963	1,965	1,973	1,979	1,967	1,958	↗	1,967
SWP reduced counts	0%	0%	0%	0%	0%	0%	0%	↘	0%
CVP reduced counts	67%	67%	75%	75%	58%	0%	0%	→	49%

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

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;

	Weekly Total			Season Total	
Category	Salvage	Loss	Trend	Salvage	Loss
Wild					
Winter Run	4	18	↗	52	101
Spring Run	0	0	→	0	0
Late Fall Run	0	0	→	6	26
Fall Run	0	0	→	0	0
Unclassified	0	0	→	24	NC
Total	**4**	**18**		**82**	**128**
Hatchery					
Winter Run	0	0	→	52	170
Spring Run	0	0	→	0	0
Late Fall Run	0	0	→	136	340
Fall Run	0	0	→	41	180
Unclassified	0	0	→	12	NC
Total	**0**	**0**		**241**	**691**

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

	Weekly Total			Season Total	
Category	Salvage	Loss	Trend	Salvage	Loss
Wild	0	0	→	4	17
Hatchery	4	17	↘	32	138
Total	**4**	**17**		**36**	**155**

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 02/02/15-02/08/15.

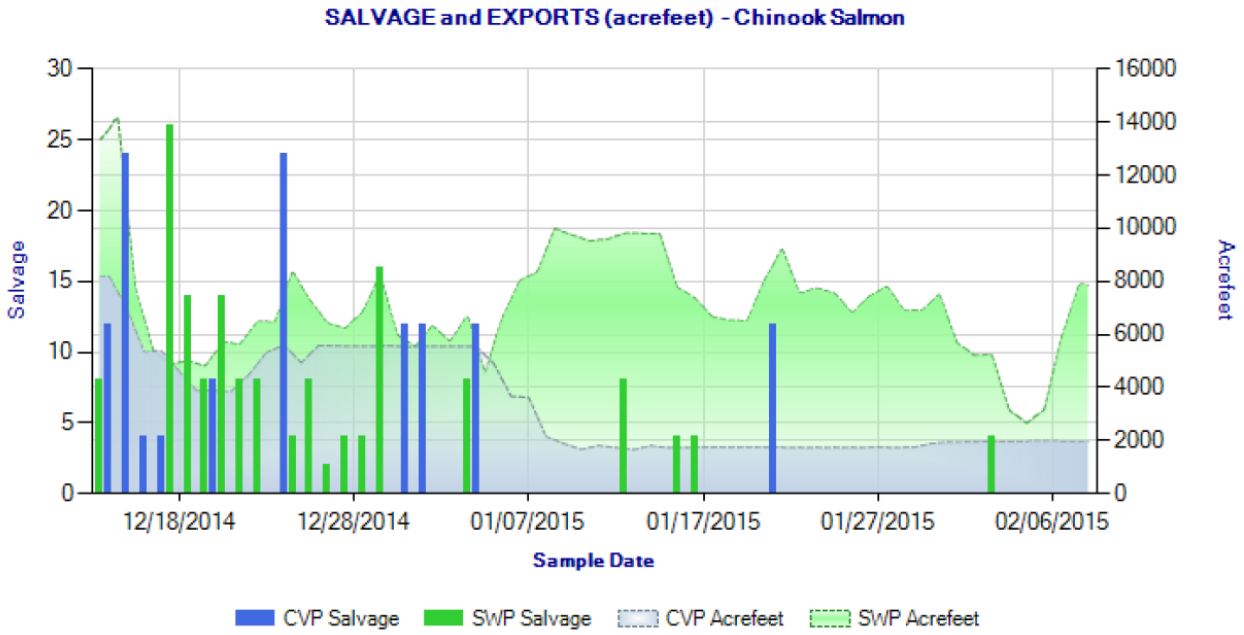


Figure 2. Daily salvage of Chinook salmon (all races) and water exports from the state and federal fish salvage facilities during 12/14/14 through 02/08/15.

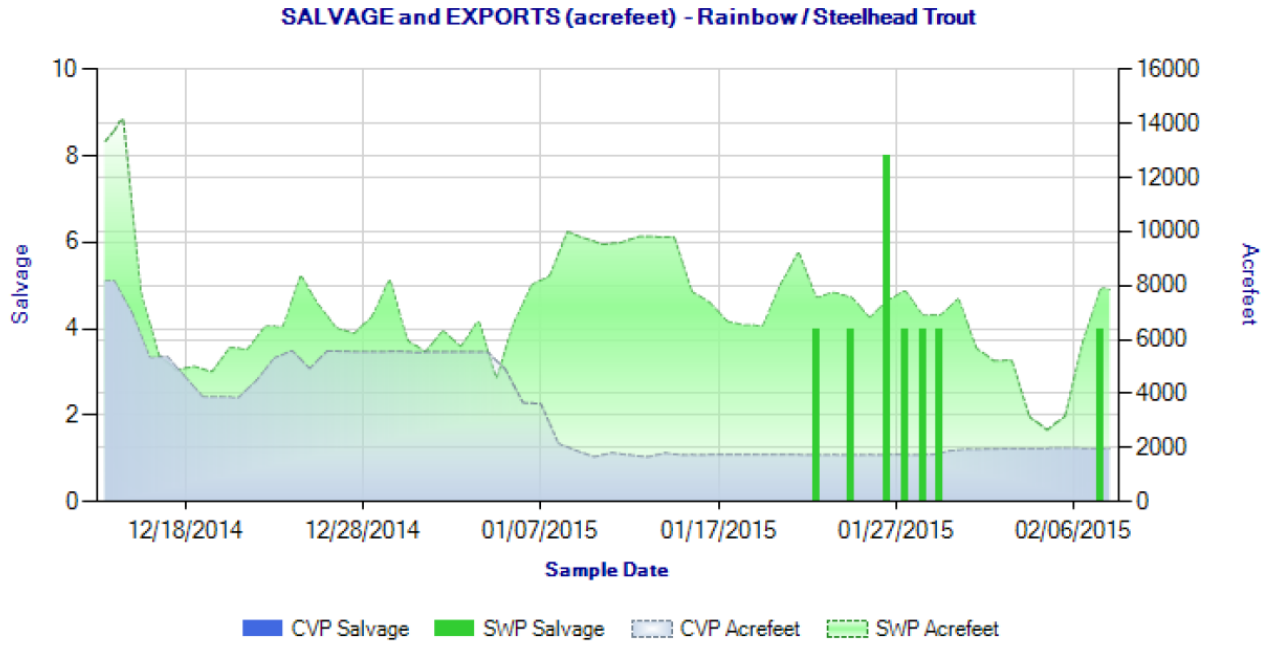


Figure 3. Daily salvage of steelhead and water exports from the state and federal fish salvage facilities during 12/14/14 through 02/08/15.

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

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES, 2014/2015

Release Date	CWT Race	Hatchery	Release Site	Release Type	Confirmed Loss	Number Released[1]	Total Entering Delta	% Loss of Number Released[2]	% Loss of Total Entering Delta[3]	First Concern Level	Second Concern Level	Date of First Loss[4]	Date of Last Loss[4]
12/1/2014	LF	Coleman NFH	Battle Creek	Production	574.59	853,100	n/a	0.067	n/a	n/a	n/a	12/12/2014	1/16/2015
12/4/2014	LF	Coleman NFH	Battle Creek	Spring Surrogate	34.98	77,000	n/a	0.045	n/a	0.5%	1.0%	12/25/2014	12/29/2014
12/18/2014	LF	Coleman NFH	Battle Creek	Spring Surrogate	45.42	78,000	n/a	0.058	n/a	0.5%	1.0%	1/1/2015	1/17/2015
2/5/2015	LF	Coleman NFH	Battle Creek	Spring Surrogate	0.00	83,100	n/a	0.000	n/a	0.5%	1.0%	*	*
2/4 - 2/6/2015	W	Livingstone NFH	Sacramento River	Production	0.00	612,056	188500	0.000	0	0.5%	1.0%	*	*

UNCONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES, 2014/2015

Facility	Unknown CWT Loss[5]	Unread CWT Loss[6]	Unknown Hatchery Loss[7]	Acoustic Tag Loss[8]	Number of Unassigned CWTs[9]
SWP	0.00	0.00	0.00	0.00	0
CVP	26.62	0.00	0.00	0.00	0
TOTAL	26.62	0.00	0.00	0.00	0

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2014 through 2/8/2015.
[1]Number released with the adipose-fin clipped and a coded-wire tag (CWT).
[2]% Loss of Number Released = (Confirmed Loss/Number Released)*100.
[3]% Loss of Total Entering Delta= (Confirmed Loss/Total Entering Delta)*100.
[4]Date of first and last loss accounts for all CWT loss even those from special studies where salvage and loss=0.
[5]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 released).
[6]Adipose-fin clipped Chinook was collected during fish count and has not been processed yet.
[7]CWT has been read, but hatchery release information not yet available.
[8]Adipose-fin clipped Chinook released due to presence of sutures.
[9]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.
[10]Chinook outside of the length-at-date criteria (Delta model) are not reported.
** Information not yet available.

DWR-DES Revised 2/9/2015
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. The recent storm triggered significant movement of fish. The table below reflects current distribution; fish migration is expected to continue during this period of higher flows and turbidity.

Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chipps Island)
Young-of-year (YOY) winter-run Chinook salmon(naturally produced)	Few stragglers only (last week: < 5%)	> 95% (last week: same)	< 5% (last week: same)
YOY winter-run Chinook salmon (hatchery-produced)	95%	5%	0%
YOY spring-run Chinook salmon	< 25% (last week: 50% - 75%)	>75% (last week: 25% - 50%)	< 5% (last week: same)
*Yearling spring-run Chinook salmon**	Few stragglers only (last week: < 5%)	75% - 85% (last week: 80% - 90%)	15% - 25% (last week: < 15%)
*Hatchery Steelhead***	10% - 20% (CNFH & Feather River fish only, since Mokelumne fish are released into the Delta) (last week: 40% - 60% of CNFH steelhead)	80% - 90% (Includes all hatchery fish) (last week: 40% - 60% of CNFH steelhead)	Few to <5% (Includes all hatchery fish) (last week: ~5% of CNFH steelhead)
Sacramento River Steelhead (naturally-produced)	Limited catch data; will review historical data for next week		
*San Joaquin River Steelhead****	~80% (last week: same)	~20% (last week: same)	0% (last week: same)

***** No yearling spring-run Chinook salmon have been caught in 2014 monitoring. In general, very few yearling spring-run Chinook salmon are observed because of their relatively large size and strong swimming (and associated gear avoidance) abilities.

**Difficult to assess now that three hatchery releases are in the system (CNFH, Feather River Fish Hatchery, and Mokelumne Fish Hatchery). After the DOSS call, CDFW provided details on the Mokelumne Fish Hatchery release schedule: 28,000 steelhead were released on 2/2-2/3; 37,000 more were released on 2/9-2/10; and the remaining 45,000 will be released on 2/17-2/18.

***Have not observed juvenile steelhead in monitoring data; Distribution estimates are based on 10 years of historical data from Mossdale Trawls, and RST data from Caswell Park on the Stanislaus River

Agenda Item 3.

Current Operations (02/10/2014)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	5,000*	Jones Pumping Plant	800**
Reservoir Releases (cfs)			
Feather - Oroville	950	American - Nimbus	900
		Sacramento - Keswick	3,250
		Stanislaus - Goodwin	275***
		Trinity – Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	791	San Luis (CVP)	358
Oroville	1,576	Shasta	2,312
New Melones	589	Folsom	500
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	~31,000
Outflow Index (cfs)	~11,000 (7-day average)	San Joaquin River at Vernalis (cfs)	~1,000
E:I	27% (3-day Avg.); 41% (14-day Avg.)	X2	> 81 km

*May increase depending on flows at Vernalis.
**Will be maintained for 8 days.
***Will be reduced to 200 cfs on 2/11/15.

OMR flow management has been controlling exports since Saturday, 2/7. Prior to that, delta outflow (per D-1641) was controlling exports.

The daily OMR index for 2/9 was -3,430 cfs. On 2/7, the 5-day OMR index was -2,520 cfs, and the 5-day OMR based on the USGS gauges was -2,180 cfs.

Agenda Item 4.

Update on drought planning

On 2/9, NMFS and USFWS received a request from Reclamation for OMR flexibilities[2].

Agenda Item 5.

Smelt Working Group (SWG)

Bartoo (FWS) provided the following update:

[2] The 2/9/15 letter from Reclamation is available at http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/ (see linked document titled, "Bureau of Reclamation's February 9, 2015, request for NMFS concurrence on OMR flexibilities" under the heading "Biological Opinion Actions")

The Working Group described the risk of entrainment under the Service-provided advice framework. Under this framework the relative risk of entrainment for each of the three flow ranges is ranked and discussed:

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

These flow ranges have the potential for a higher level of relative risk.

Agenda Item 6.

RPA Implementation Review

Delta RPA Actions affecting operations during December/January/February:

Action IV.1.2 (DCC gate operations):

- Default DCC gate closure started Monday, December 1.

Action IV.2.3 (OMR Management)

- The first stage action response of an -3,500 OMR limit went into effect on 2/4 (Day 1), based on a 2/3 older juvenile loss density of 2.56 fish/TAF.
- On 2/9, NMFS notified WOMT that the action response was satisfied.
- Since that notification, an OMR limit of -5,000 cfs has been in effect.
- The current request for OMR flexibilities proposes adjustments to the implementation of Action IV.2.3 during the remainder of February.

Agenda Item 7.

ePTM scenarios

DOSS briefly discussed some ePTM options proposed by Byrne (NMFS) as a starting point for the discussion:

- Approach 1: Insert particles at Sherwood Harbor, Mossdale, Prisoners Point, and Old or Middle River.
- Approach 2: Match insertion points/timing with "traditional" PTM runs done for OMR flex request

Approach 1 provides predictions for fish movement from locations of interest (especially Sherwood Harbor, Prisoners Point, and Old or Middle River). Approach 2 allows a comparison between the ePTM and traditional ePTM. DOSS agreed that both approaches have value in learning about the model during this pilot effort. Byrne (NMFS) will follow-up with DWR to get the details of the “traditional” PTM runs needed for Approach 2.

DOSS ran out of time to discuss further.

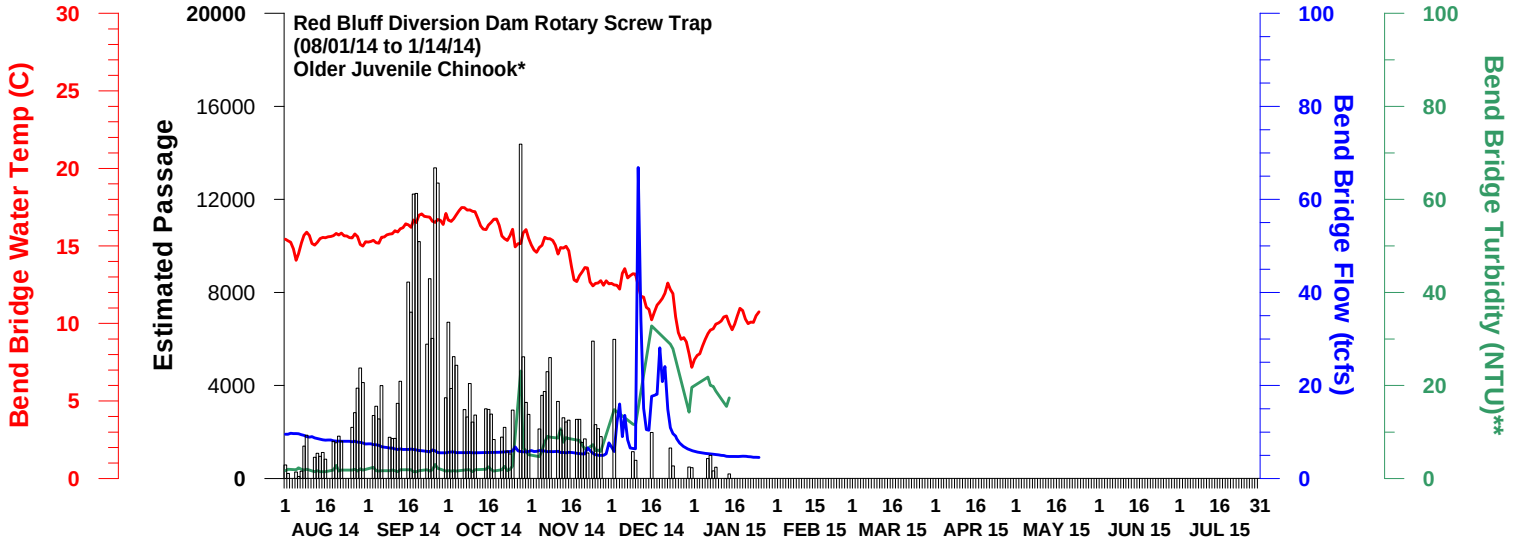
Agenda Item 8.

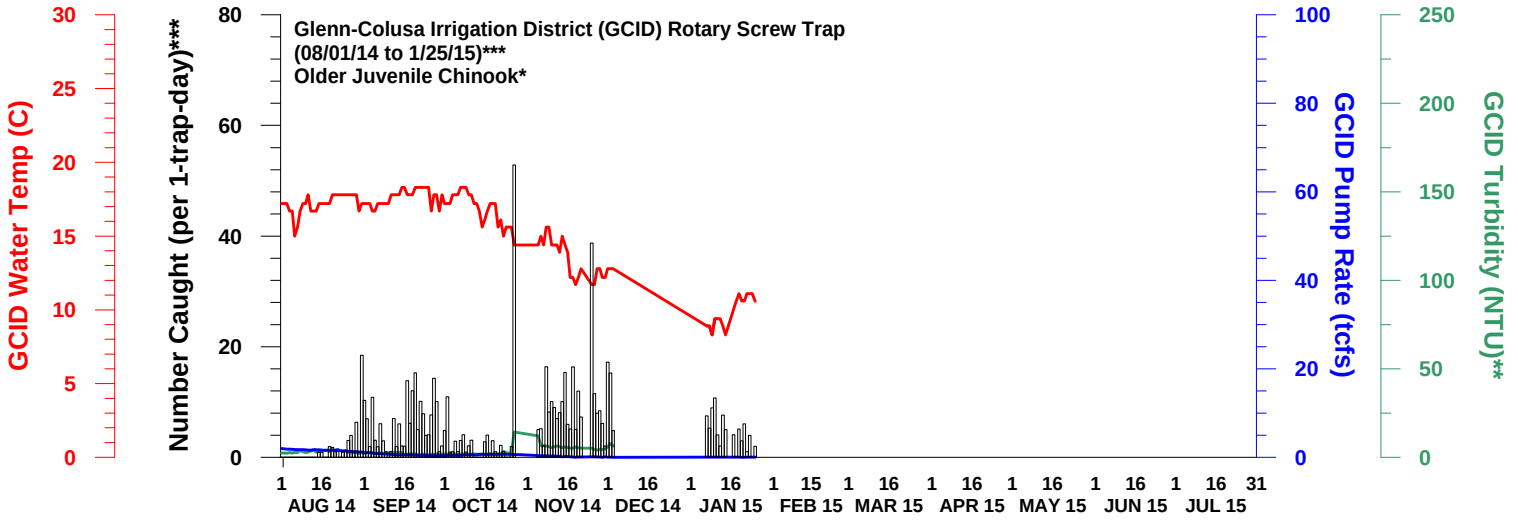
DOSS Advice to WOMT and NMFS: None.

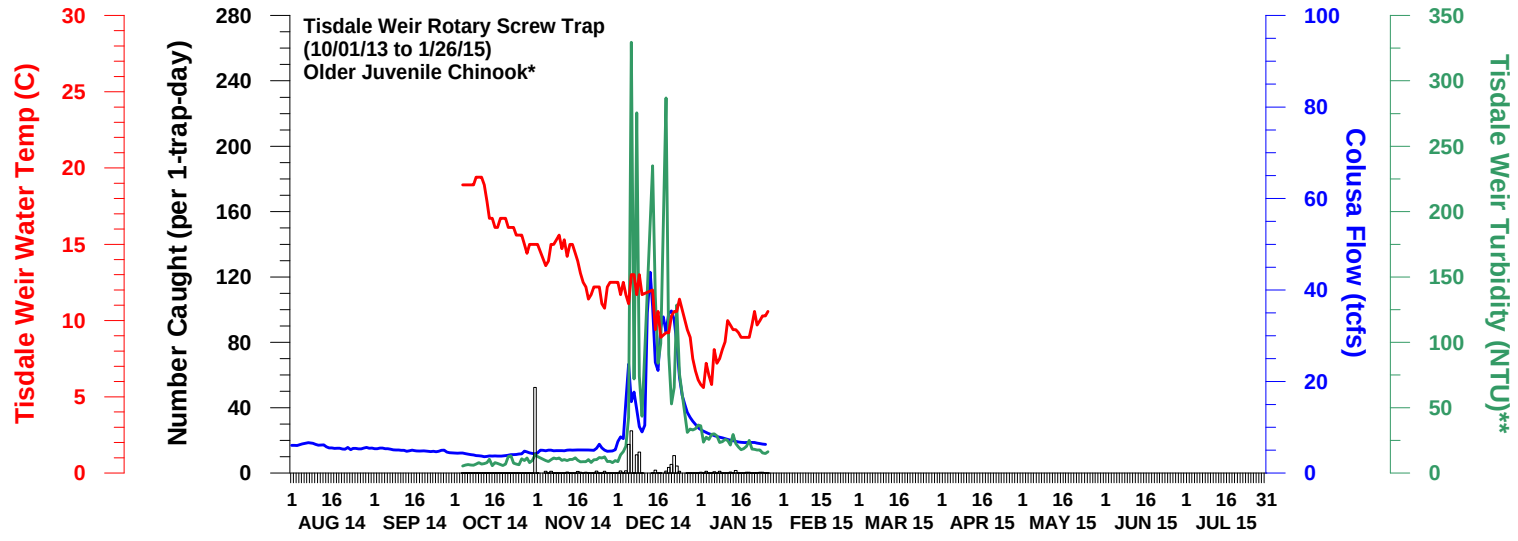
Next Meeting: The next DOSS conference call will be on 02/17/15 at 9am.

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. For additional graphs, please visit the DWR website at:
http://www.water.ca.gov/swp/operationscontrol/calfed/calfedmonitoring.cfm

NUMBER OF UNMARKED OLDER JUVENILE CHINOOK MEASURED IN THE SACRAMENTO RIVER







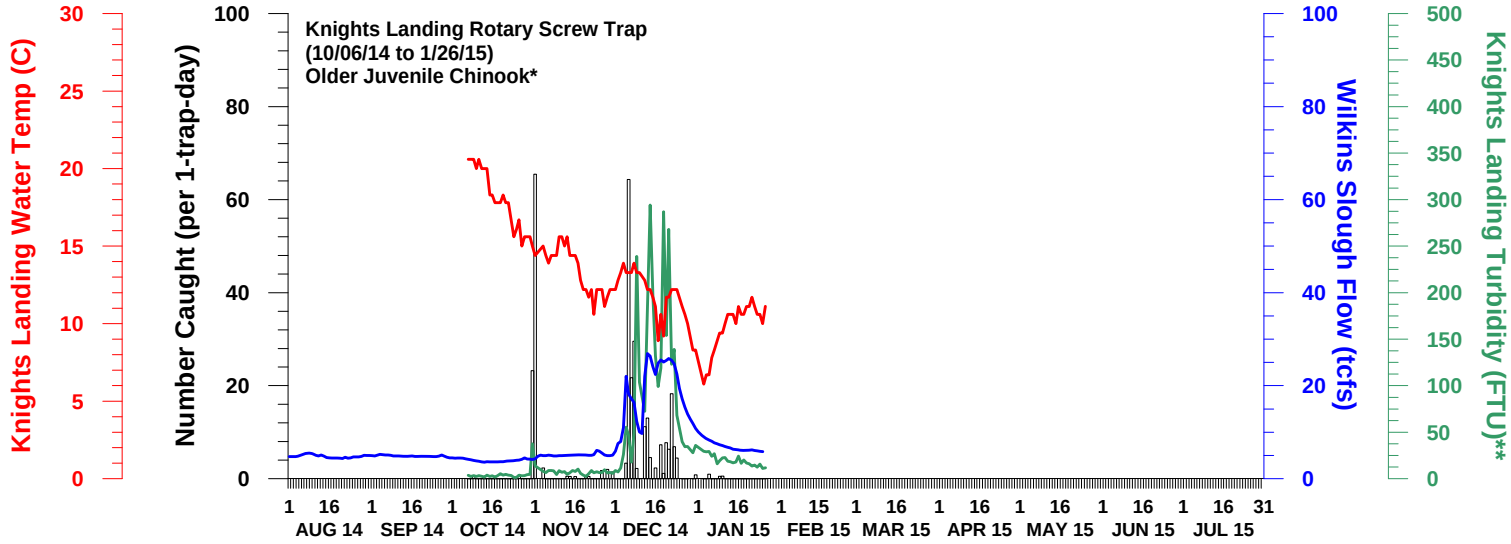
DWR-DES 26 JANUARY 2015
Preliminary data from DFW, FWS, GCID, and CDEC; subject to revision.

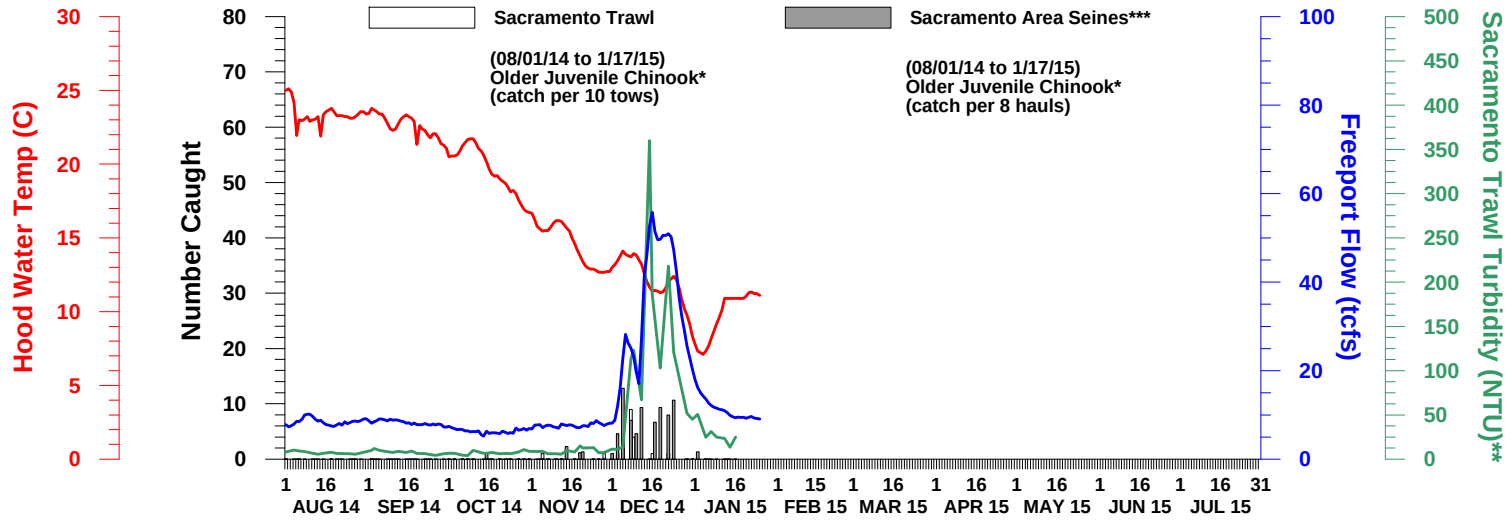
*Older juvenile Chinook defined as all Chinook greater than or equal to the minimum winter run length-at-date criteria and less than the maximum size included in the length-at-date criteria (Frank Fisher model) for which a race is assigned on a given sampling date.

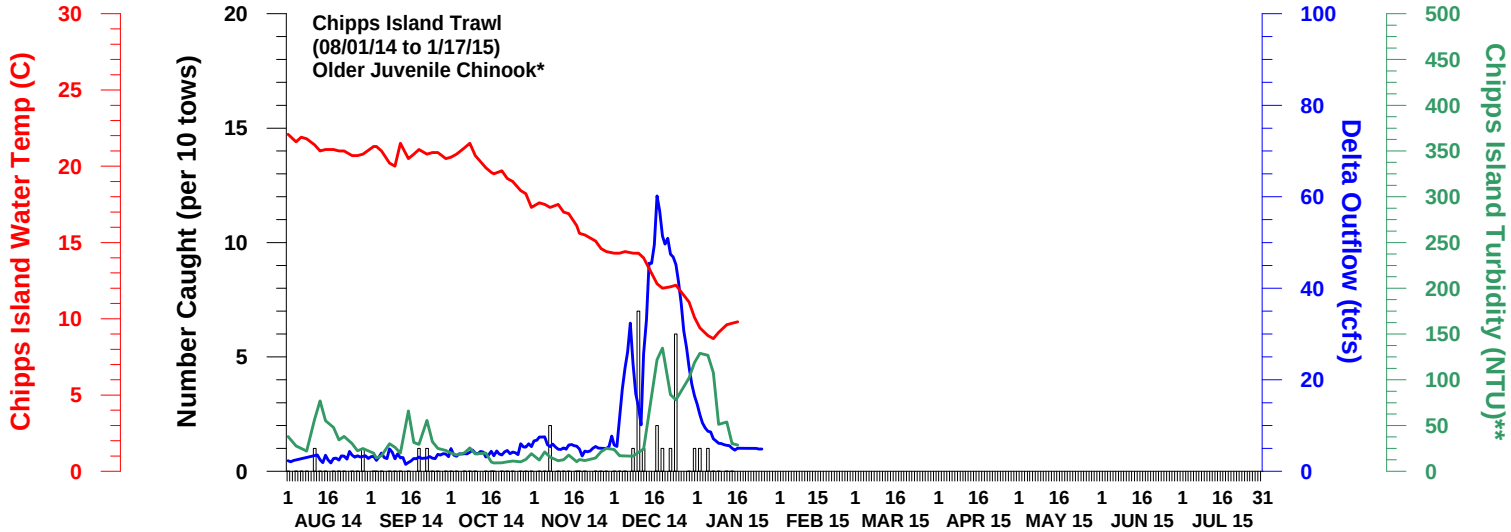
**Turbidity is a discrete measurement and is not measured continuously. Therefore, data are interpolated on days when turbidity was not measured unless data are missing for more than five days.

***Trap was pulled on 10/28/14 due to extremely turbid conditions, heavy debris, and high number of listed winter run Chinook and has resumed since 11/5/14. Trap was not in operation on 12/2/14-1/6/15 due to forecasted increase in flow and subsequent elevation change.

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







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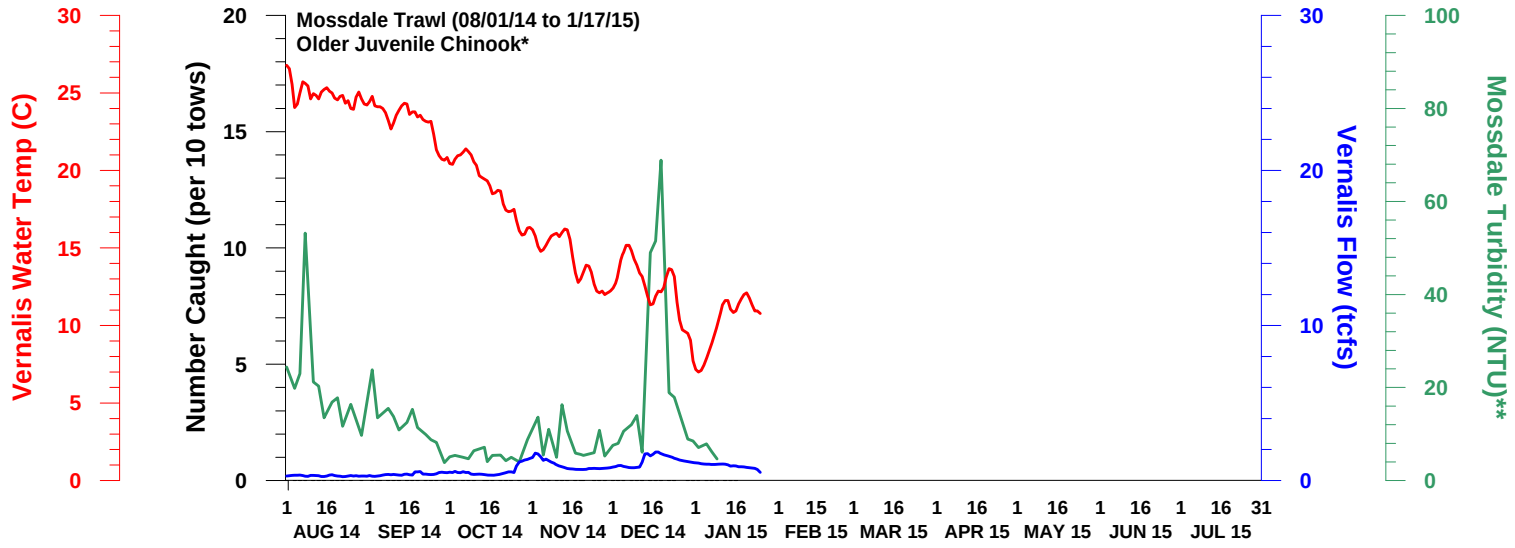
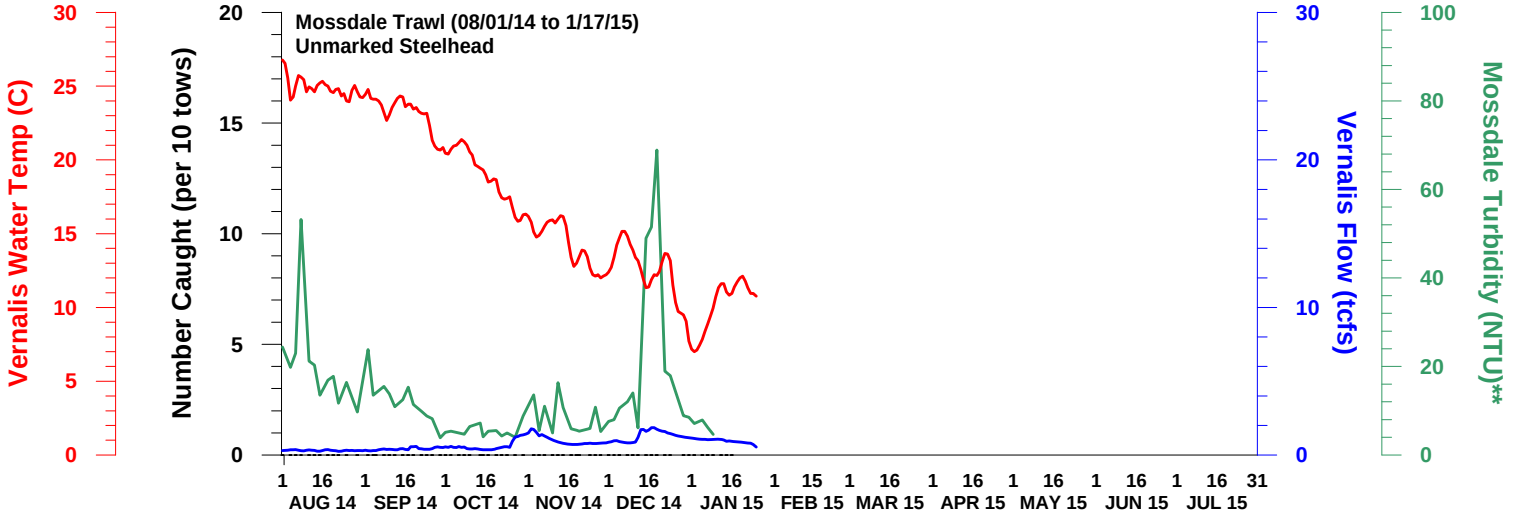
**Turbidity is a discrete measurement and is not measured continuously. Therefore, data are interpolated on days when turbidity was not measured unless data are missing for more than five days. Knights Landing turbidity measured in FTU, which should be roughly equivalent to NTU.
***Sacramento area seine 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 26 JANUARY 2015
Preliminary data from FWS and CDEC; subject to revision.

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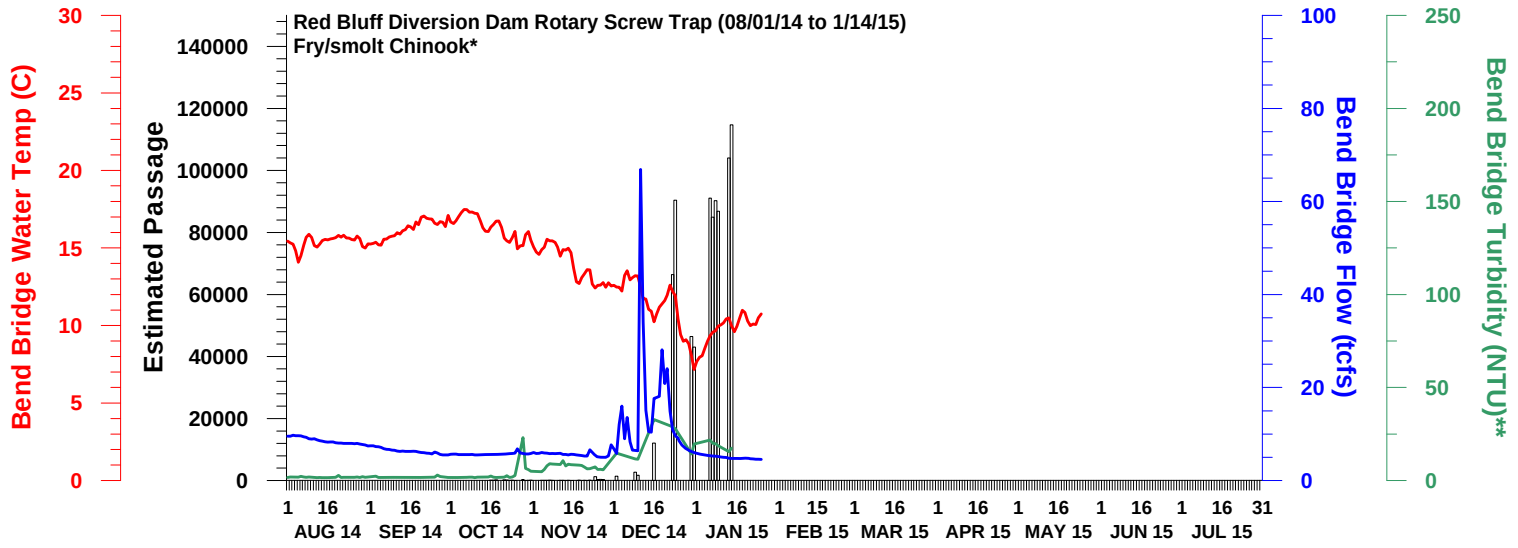
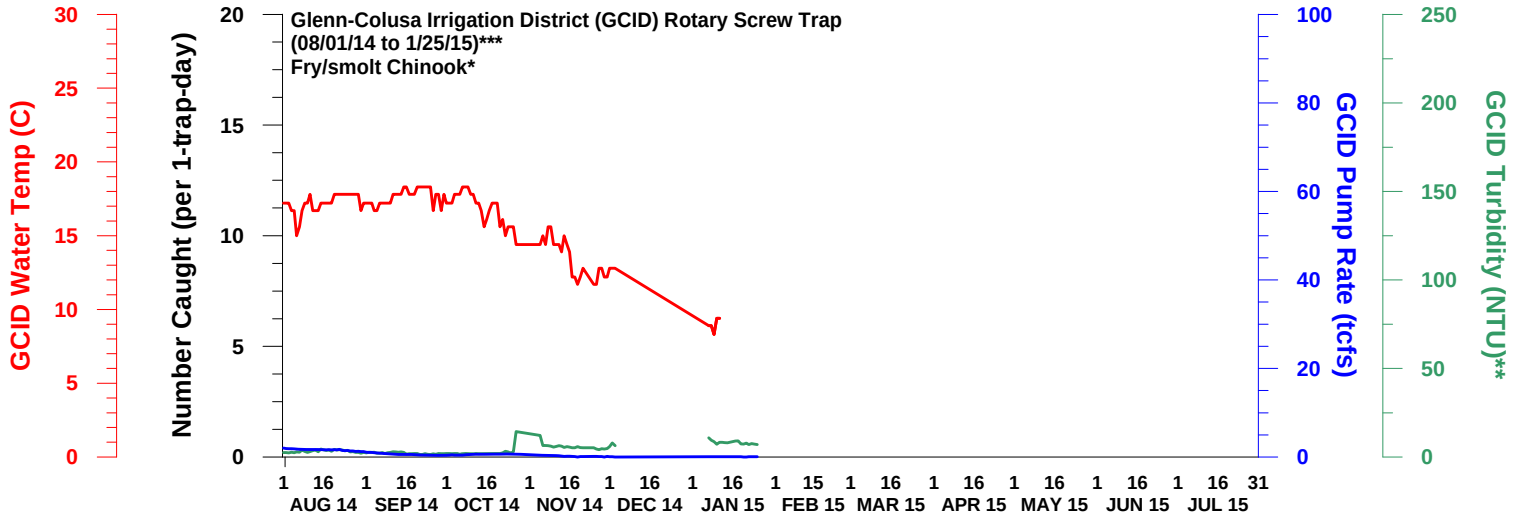
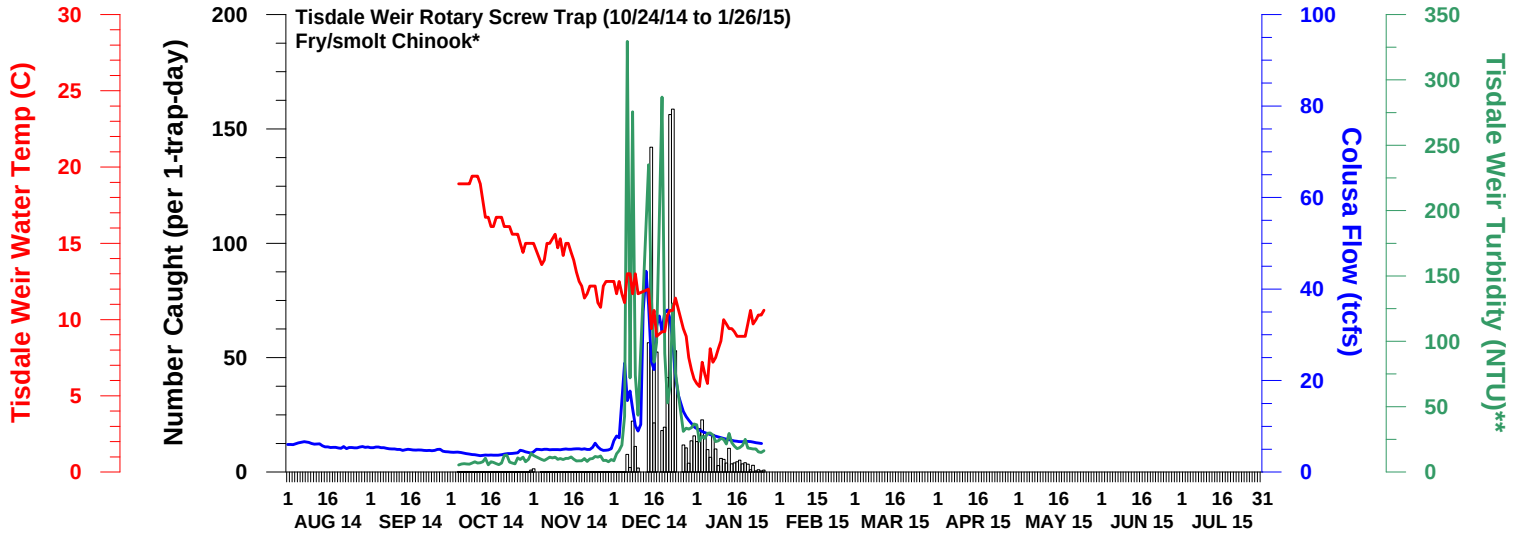
NUMBER OF UNMARKED FRY/SMOLT CHINOOK MEASURED IN THE SACRAMENTO RIVER







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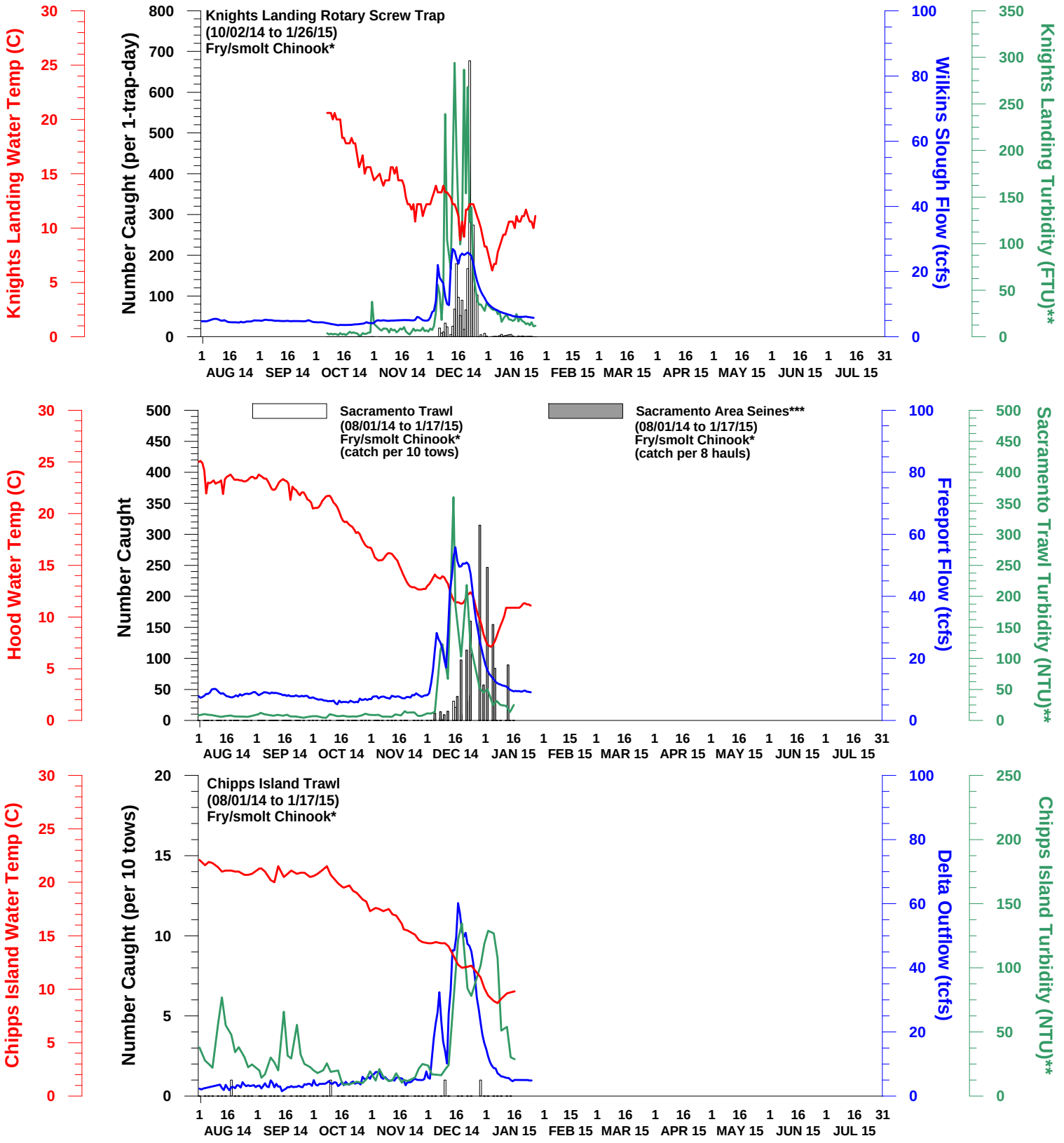
NUMBER OF UNMARKED FRY/SMOLT CHINOOK MEASURED IN THE LOWER SACRAMENTO RIVER AND CHIPPS ISLAND



DWR-DES 26 JANUARY 2015

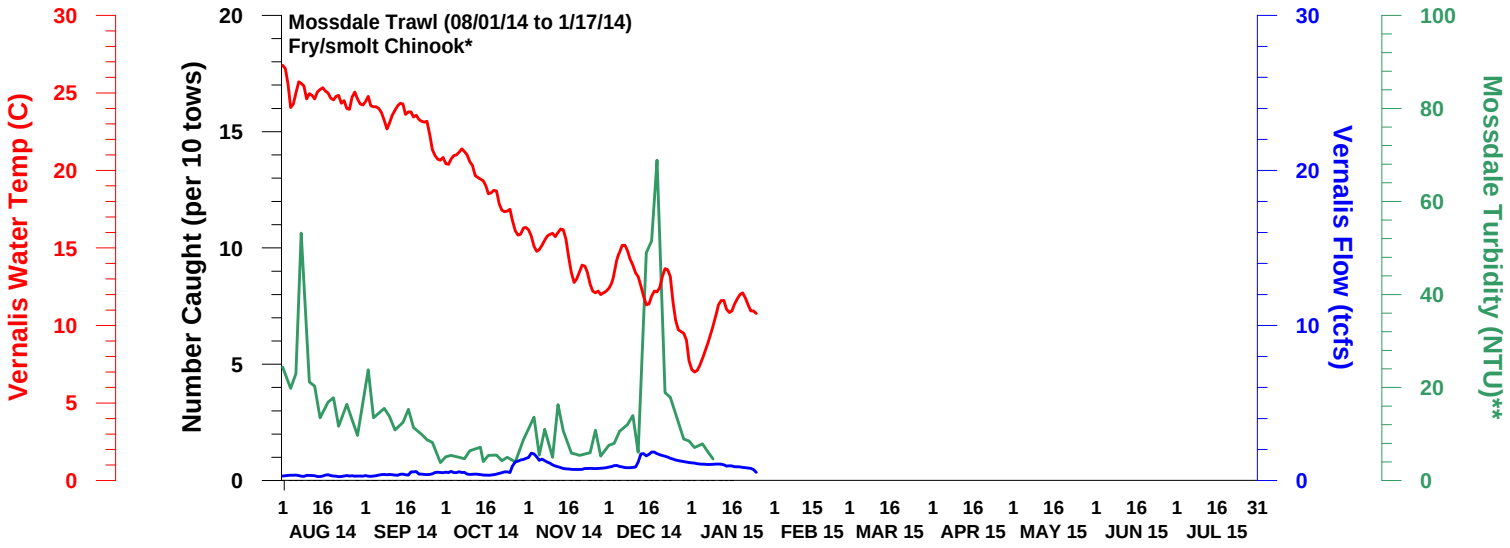
Preliminary data from DFW, FWS, and CDEC; subject to revision.

*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.

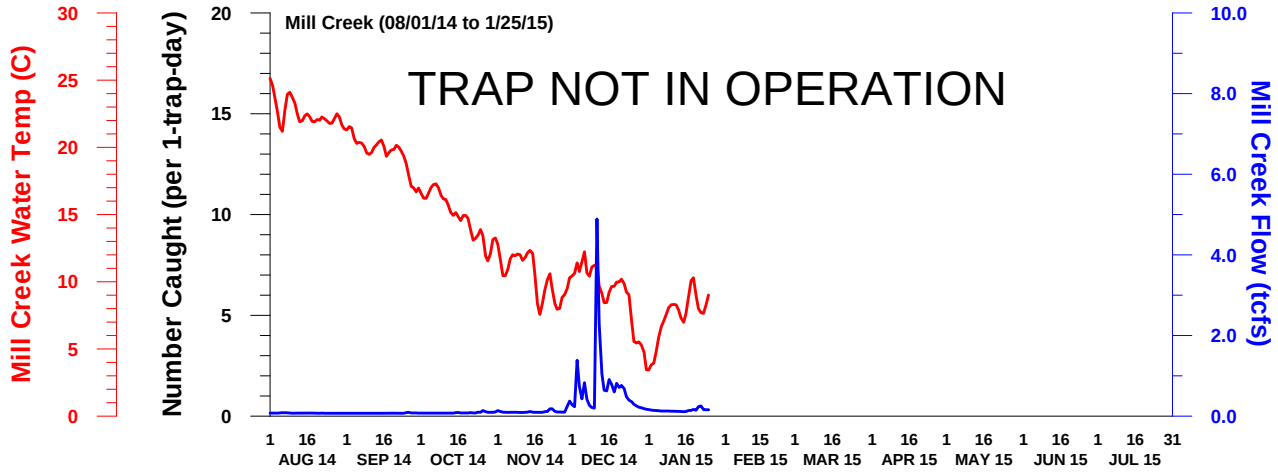
***Sacramento area seine route consists of the following seine sites: Verona, Elkhorn, Sand Cove, Discovery Park, American River, Miller Park, Sherwood Harbor, and Garcia Bend. Bars are stacked if Chinook caught from the trawl and seines are from the same day.

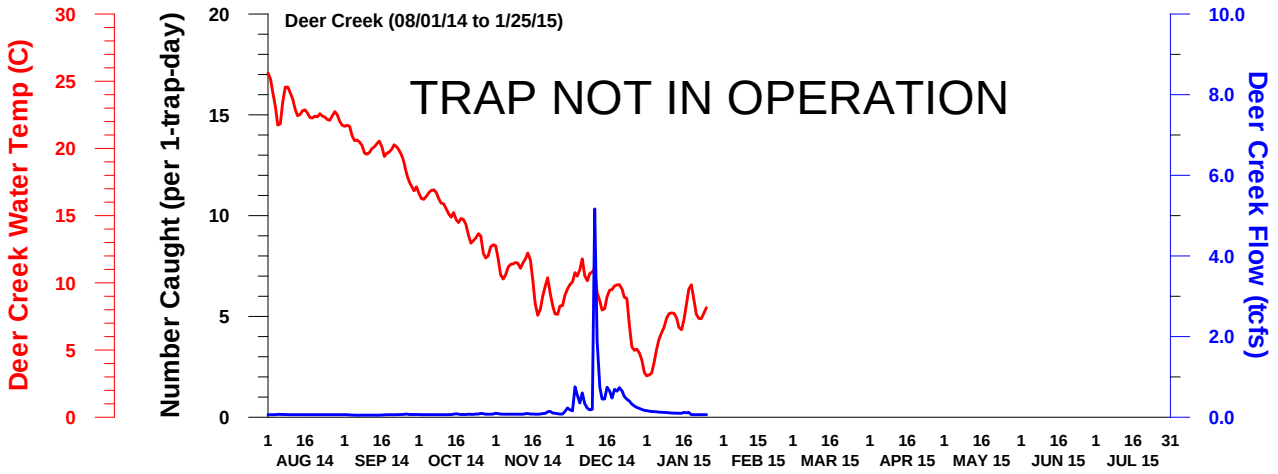
NUMBER OF UNMARKED FRY/SMOLT CHINOOK MEASURED IN THE SAN JOAQUIN RIVER



DWR-DES 26 JANUARY 2015
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





DWR-DES 26 JANUARY 2015
Preliminary data from CDEC; subject to revision.

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.aspx).

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.

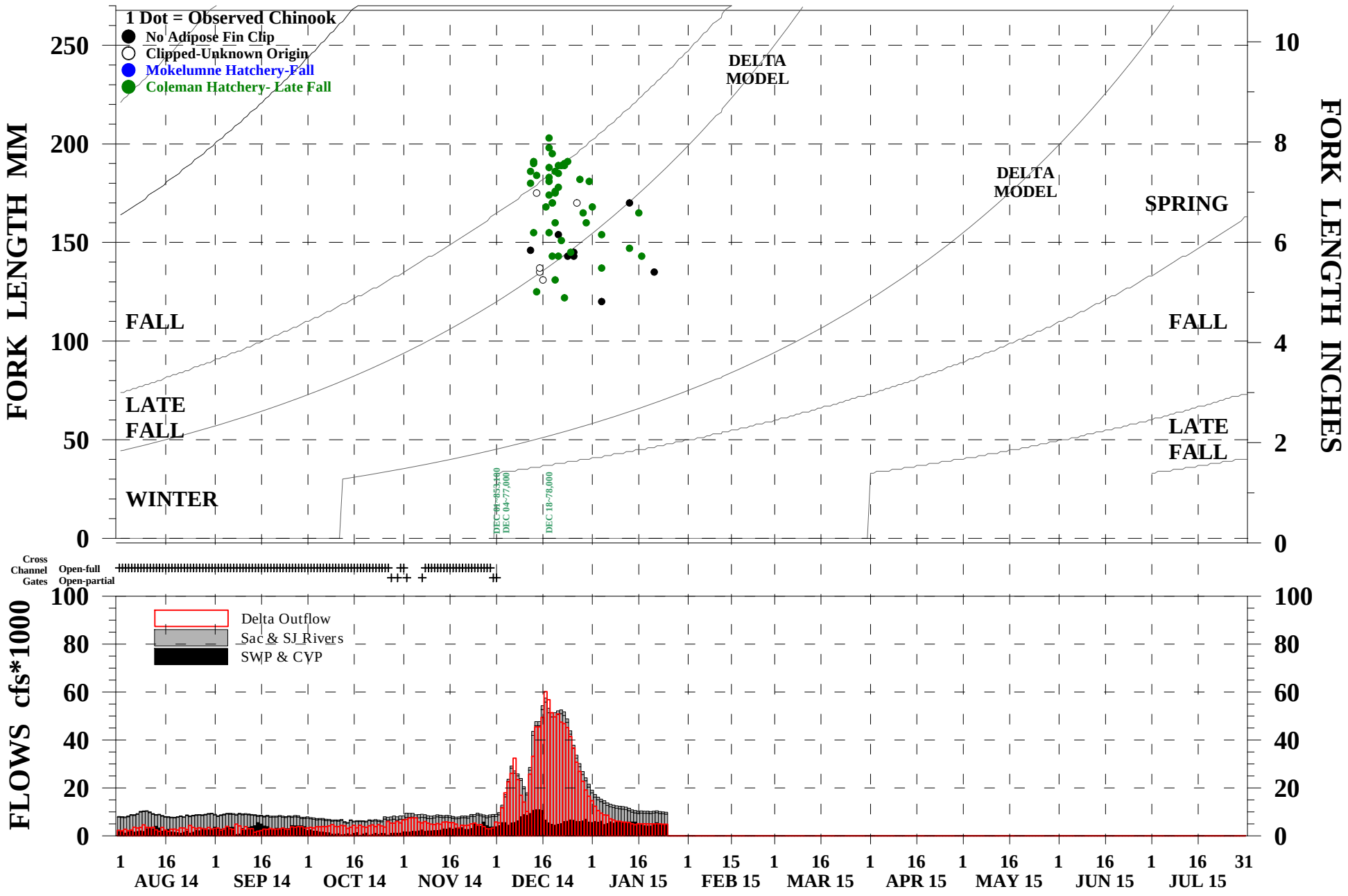
Sacramento River Trawl, Sacramento Area Beach Seine, and Chipps Island Trawl data were obtained directly from FWS, Stockton Fish and Wildlife Office (http://www.fws.gov/stockton/jfmp/).

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.

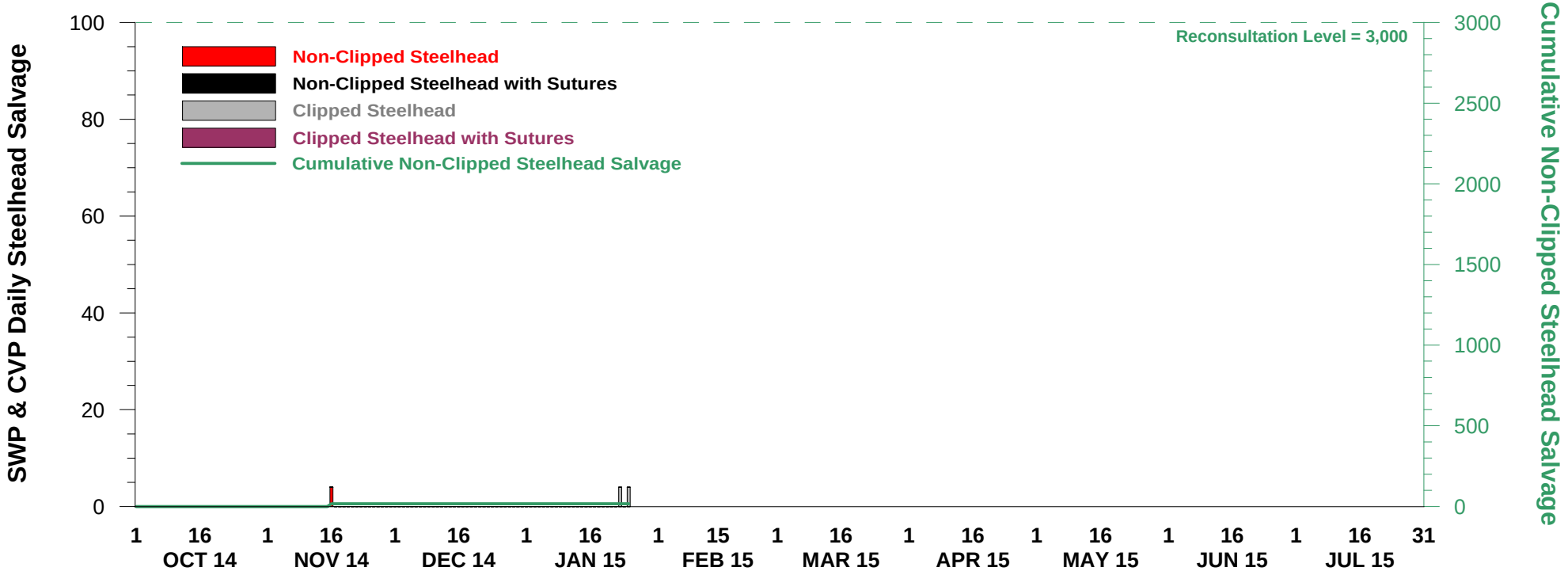
[1] Formerly known as the California Department of Fish and Game (DFG).

OBSERVED CHINOOK SALVAGE AT THE SWP & CVP
DELTA FISH FACILITIES 08/01/2014 THROUGH 1/25/2015



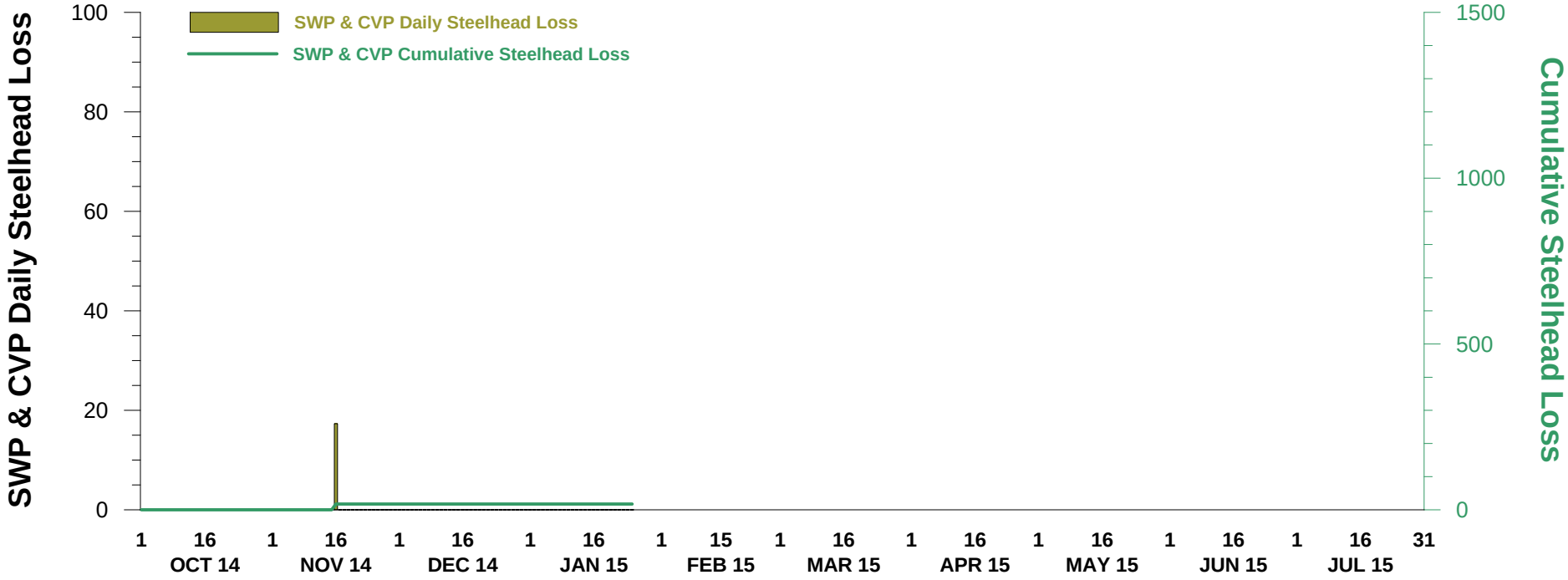
DWR-DES 26 JAN 2015
Preliminary data from DFW, DWR, FWS, Reclamation, and CDEC; subject to revision.
*Chinook not measured for length and Chinook outside of the length-at-date criteria (Delta model) are not reported.

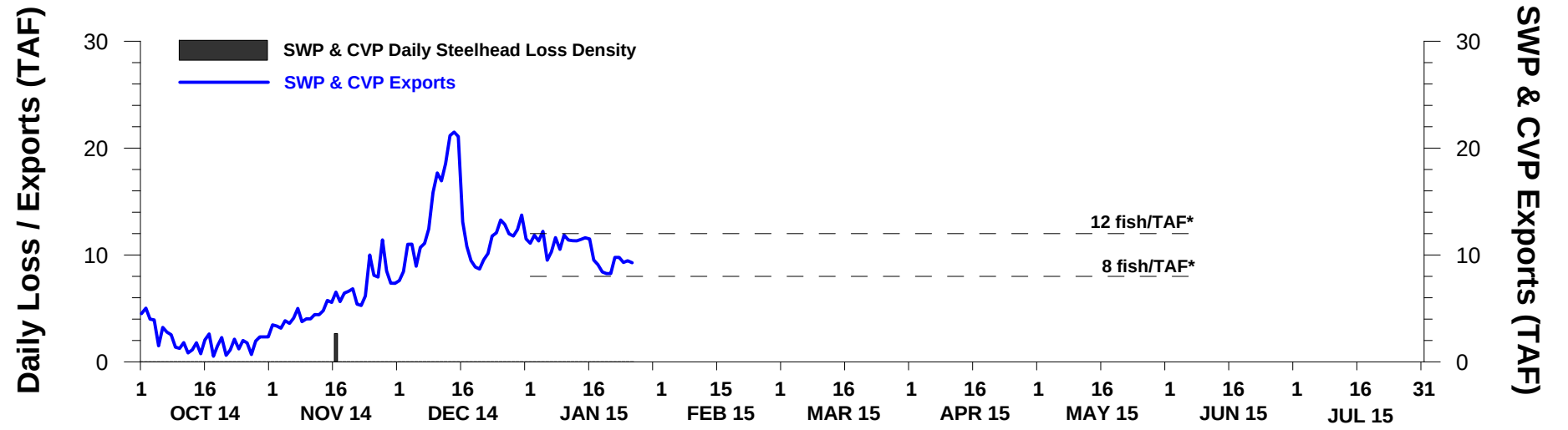
STEELHEAD SALVAGE AT THE DELTA
FISH FACILITIES 01 OCT 2014 THROUGH 25 JANUARY 2014



DWR-DES 26 JANUARY 2015
Preliminary data from DFW; subject to revision.

NON-CLIPPED STEELHEAD LOSS AT THE DELTA FISH FACILITIES 01 OCT 2014 THROUGH 25 JANUARY 2015





DWR-DES 26 JANUARY 2015
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.