

Delta Operations for Salmonids and Sturgeon (DOSS) Group
4/15/14

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.

Attendees

DWR: James Gleim, Mike Ford, Farida Islam, Rhiannon Mulligan, Aaron Miller, Kevin Reece
FWS: Leigh Bartoo, Roger Guinee, Craig Anderson
NMFS: Barbara Rocco, Barb Byrne, Jeff Stuart
Reclamation: Josh Israel, Russ Yaworsky
DFW: Colin Purdy, Bob Fujimura, Krystal Acierto, Chris Mckibbin, Dan Yamanaka
EPA: Erin Foresman
SWRCB, USGS: not present

Agenda

1. Agenda review and introductions
2. Fish Monitoring
3. Drought Ops Plan
4. Current Ops
5. SWG
6. DOSS Advice?

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	Sacramento Trawls ¹	Mossdale Kodiak Trawl ²	GCID ³	Knights Landing RST ⁴	Tisdale RST	Beach Seines	Jersey Point
Sample Date	4/9, 11	4/9, 11	4/8–12	4/8–14	4/8–13	4/8–14	4/8–11	4/8–10
Total Catch	299	537	120	2978	338	1727	141	6
FR	53	286	106 (not identified)	1359	229	544	140	3
WR	4			1				
SR	205	213		1119	88	878	1	
LFR						1		
Ad-Clipped Chinook	36	37	10	499	20	304		
DS								3 (66–71 mm)
Splittail								

Longfin	1 (100 mm)							
SH (ad-clip)		1	2					
SH (wild)			2		1			
W. Temp. (avg. °F)	62.1	66.2		68.4	65.1	65.1	63.7	62.2
Flows (avg. cfs)					6477	5419		
Turbidity (avg. NTU)	36.0	12.8		5.16	15.3	14.1	16.2	11.2
WR/LFR Avg. CPUE				18.1		0.011		
FR/SR Avg. CPUE					2.11	4.32		

CPUE = catch per unit of effort reported as the average fish/hour over reported sampling dates; AC=ad-clipped; ACT = acoustic tag; GCID = Glenn-Colusa Irrigation District; RST = rotary screw trap

¹Sacramento Trawls changed gear type from a Kodiak trawl arrangement to a midwater trawl arrangement on 4/3.

²Mossdale Trawls to be conducted by CDFW between 4/1 and 6/30.

³4/11: Cone had a log jammed in it. Trap stopped overnight.

⁴Night sampling effort on 4/8.

Red Bluff Diversion Dam (RBDD): There was an increase in flows in late March and early April, which caused an increase in fall and some spring run coming down from RBDD. More than 70,000 fall run were estimated to have passed RBDD on the second day of the increased flow (3/31), and passage of slightly >13,000 spring run, and slightly >1,000 winter run was estimated. A few winter run are still migrating past RBDD, but not many appear to be above RBDD now. On 4/5, on a receding flow, ~163,000 spring and ~127,000 fall run were estimated to have passed the RBDD rotary screw traps; this spike of unmarked fish is largely from the unmarked component of the Coleman National Fish Hatchery fall-run production released at Battle Creek on 4/4. The average size of the released fish was 75 mm, which is right near the mid-April length-at-date boundary between spring and fall run and makes distinguishing these races more difficult.

Lower American River at Watt Ave.: At the Watt Avenue bridge trap from 4/8 through 4/11, 2,825 unmarked Chinook, of which 2,572 were fall run (2,552 live; 20 dead), 251 were live spring run, and 1 was a live winter run; 15 unmarked steelhead; and 6 ad-clipped steelhead were caught.

Fish Salvage: DFW provided an update on fish salvage at CVP's Tracy Fish Collection Facility (TFCF) and SWP's Skinner Fish Collection Facility (SFCF) from 4/7 through 4/14. Wild steelhead increased and hatchery steelhead decreased over the past week. There were 49 steelhead salvaged at both facilities for a daily combined loss-density range for the 5 non-zero salvage days of from 0.1 to .17 fish/TAF, which did not exceed the first-stage loss criterion. The season loss for wild steelhead is 254. Twenty-six hatchery steelhead were salvaged. The number of non-clipped chinook decreased at the fish collection facilities compared to last week. Twelve non-clipped winter run were salvaged over 2 days last week for a daily combined loss density ranging from 0.2 to 0.6 older juvenile/TAF on non-zero salvage days. Ninety-one non-clipped spring run and 8 fall run were salvaged; 4 ad-clipped spring run and 1 ad-clipped winter run were also salvaged last week.

On 4/11, TFCF performed a secondary channel predator removal using carbon dioxide. Salvage was continuous during the predator removal (120-minute salvage period). In addition to an increased number of salvaged predatory fish, the treatment also resulted in salvage of a fair number of non-clipped winter run and ad-clipped, sutured steelhead. It is presumed that the ad-

clipped, sutured steelhead were from the 6-year study releases from a few weeks ago.

DOSS Weekly Salvage Update
Reporting Period: April 7-13, 2014
Prepared by Bob Fujimura on April 14, 2014 2200
Preliminary Results -Subject to Revision

Criteria	7-Apr	8-Apr	9-Apr	10-Apr	11-Apr	12-Apr	13-Apr	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	0.20	0.64	0	0	↘	0.12
Wild steelhead	1.69	0.97	0	0.28	0.07	0	0.35	↘	0.48
Exports									
SWP daily export	2,919	0	90	1,304	744	744	744	↘	935
CVP daily export	8,317	8,381	8,343	8,292	8,341	8,365	7,112	↘	8,164

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)
 *Value includes the latest interpretation of a NMFS/USBR interim procedure to estimate loss due to secondary channel construction outage.

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	8	↘	193	338*
Spring Run	91	52	↘	280	198
Late Fall Run	0	0	↘	0	0
Fall Run	8	4	↘	32	21
Unclassified	0	0	↘	0	0
Total	111	64		505	557*
Hatchery					
Winter Run	1	1	↘	7	13
Spring Run	4	2	↘	8	5
Late Fall Run	0	0	↘	0	0
Fall Run	0	0	↘	0	0
Unclassified	0	0	↘	0	0
Total	5	3		15	18

Trend = weekly loss per race; Salvage = estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time
 *Value includes the latest interpretation of a NMFS/USBR interim procedure to estimate loss due to secondary channel construction outage.

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	49	33	↘	175	254
Hatchery	26	25	↘	214	299
Total	75	58		389	553

State Water Project loss = salvage x 4.33; Central Valley Project loss = salvage x 0.68

Generated by Bob Fujimura on April 14, 2014

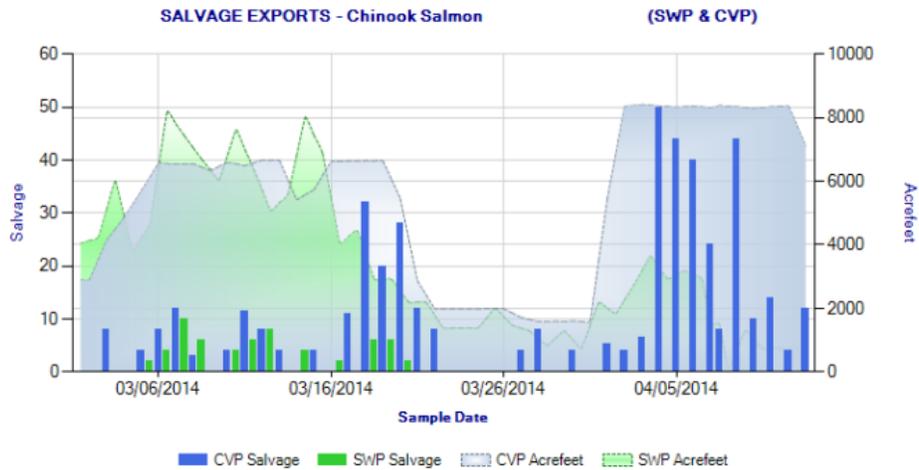


Figure 1. Daily salvage of Chinook salmon (all races) and water exports from the state and federal fish salvage facilities during March 2 through April 13, 2014. Graph obtained from the DFG salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

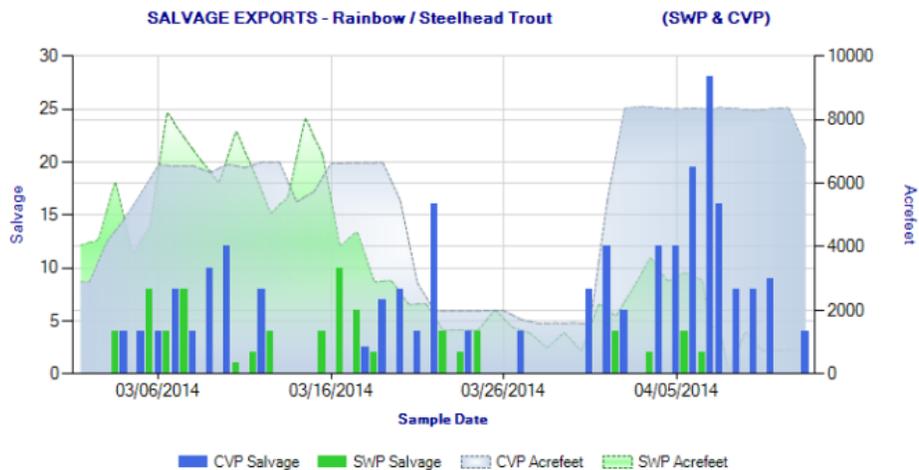


Figure 2. Daily salvage of steelhead and water exports from the state and federal fish salvage facilities during March 2 through April 13, 2014. Graph obtained from the DFG salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>

Planned Fish Releases for 6-Year Steelhead Study: The next planned release of acoustic-tagged steelhead for the 6-Year Steelhead Study is scheduled for 4/22–4/24. Fish will be tagged at the Mokelumne Fish Hatchery then trucked to and released at Durham Ferry, on the San Joaquin River just upstream of Vernalis. Anyone interested in observing the fish release should contact Israel (Reclamation) for more information.

Fish Distribution: Israel forwarded to DOSS last week the following table from NMFS that looked at winter-run abundance in the Chipps Island trawl from 1995 through 2013. In most years, winter-run abundance at Chipps peaked in March; however, in some years, abundance peaked in April.

Winter-run catch in the Chipps Island trawl from 1995 through 2013.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
	W	W	W	W	W	AN	D	D	AN	BN	AN	W	D	C	D	BN	W	BN	D	
Dec		4	1	6	12			5	25	6	3	4								2
Jan	10	38	11	14	7	5	5	10	41	6	13	4	2	14		2	1	1	1	3
Feb	38	33	33	4	18	25	21	6	33	8	25	14	12		12	11	6		0	
Mar	109	239	72	54	64	97	69	38	106	90	54	129	93	22	45	39	19	13	37	
Apr	151	39	44	29	55	48	14	56	35	5	28	171	8	6	13	17	38	31	23	
May	4	3	2	2		2	1	1	4		1	1			3					
Totals	312	356	163	109	156	177	110	116	244	115	124	323	115	42	73	69	64	45	65	

Highlighted cells indicate peak monthly catch within that year. The second row lists the year type based on the Sacramento Valley Index: W = Wet; AN = Above Normal; BN = Below Normal; D = Dry; C = Critical.

DOSS discussed the current estimated distribution upstream, in, or downstream of the Delta for young-of-year (YOY) winter run, yearling spring run, and YOY spring run based on the monitoring data available to DOSS this week, summarized above. YOY winter-run and YOY spring-run distributions were updated based on the monitoring data summarized below.

Winter-run Chinook: On 2 out of 9 days of sampling at the RBDD, no winter-run were caught and no winter run were seen over the past week at the Knights Landing or Tisdale RST sites. There was 1 winter run observed on 4/8 at the Glenn–Colusa Irrigation District monitoring station but none observed since then. DOSS expected that rain in late March and early April would have moved the rest of the winter run downstream into the Delta; the few winter run showing up in sampling upstream of the Delta suggests that not many winter run are left upstream of the Delta at this point. The remaining winter run will most likely be moving past Chipps Island over the next few weeks. The cumulative sum based on 1995 to 2013 indicates that ~70% pass through the Delta in March and about 29% in April, so given that we are halfway through April, we could assume that at least 85% ($\sim 70\% + [1/2 * \sim 29\%] = \sim 85\%$) of the winter-run population may have passed Chipps by now.

Spring-run Chinook: Many fish that are classified as spring run based on length at date are most likely not actually spring run but rather spring-run-sized fall run from the Coleman national Fish Hatchery fall-run release. That said, at RBDD, there was a big spike in spring-run observed in late March and continuing into early April (>77,000 spring-run-sized fish estimated to pass RBDD on 3/31; nearly 50,000 on both 4/1 and 4/2) before the hatchery fall run were released into Battle Creek, a tributary of the Sacramento upstream of RBDD. We typically see a spike of YOY spring run entering the Delta, and that has most likely happened now and could represent the majority of the spring run.

	Yet to Enter Delta	In the Delta	Exited the Delta Past Chipps Island
<i>Young-of-year (YOY) winter-run Chinook salmon</i>	<5% (last week: ~5–10%)	~20–50% (last week: ~60–70%)	~50–75% (last week: ~25–35%)
<i>Yearling spring-run Chinook salmon</i>	Most yearling spring run have most likely exited the Delta.		
<i>YOY spring-run Chinook salmon</i>	~15–30% (last week: ~30–50%)	~40–75% (last week: ~40–60%)	~5–25%* (last week: ~5–10%)

*DOSS thinks many of spring-run sized Chinook in the monitoring data are from the millions of fall-run hatchery fish in the system -- hatchery releases of fall-run (25% with adipose fin clips and CWTs, 75% unmarked) have occurred at Rio Vista and in Battle Creek. Estimates of the YOY spring-run Chinook distribution take this "spillover" into consideration. For example, the range estimated for the fraction of the YOY spring-run population having passed Chipps Island is lower than would have been the case had DOSS believed that all spring-run-sized fish reported at Chipps were actually genetic spring run; however, because DOSS cannot "correct" for the hatchery fish spillover effect exactly, the ranges for the YOY spring-run distribution are rather wide.

Operations (4/15/14)

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	500	Jones Pumping Plant	1,500 (will decrease to 1,000 on 4/17 and might increase to 2,000 on 4/18)
Reservoir Releases (cfs)			
Feather - Oroville	800	American - Nimbus	500
		Sacramento - Keswick	3,250 (will increase to 4,250 on 4/16)
		Stanislaus - Goodwin	2,500
Reservoir Storage (in TAF, % of capacity)			
San Luis (SWP)	395	San Luis (CVP)	551 (57)
Oroville	1,829	Shasta	2,381
New Melones		Folsom	510
Delta Operations			
DCC	Closed (expected to remain closed through end of April)	Sacramento River at Freeport (cfs)	8,834
Outflow Index (cfs)	~6,300	San Joaquin River (cfs) at Vernalis	833
Total Delta Inflow (cfs)	10,378	OMR (daily) (cfs)	
Water Temperature (°F)		OMR 5-day avg (cfs index method)	-4,700
X2 (km)	>81	OMR 14-day avg (cfs, index method)	-4,800 (should become more positive as flows increase at Vernalis and pumping decreases)
E/I (%)	22.1 (14-d avg)		

Controlling Operations: EC at Collinsville , is currently controlling exports. Outflow is currently being met at Collinsville based on the 14-day EC measure¹, but the operators project being able to meet outflow at Collinsville only for another day or two. Under the current SWRCB Order, exports are limited to 1,500 cfs if the Collinsville outflow standard is not being met.

Drought Ops Plan (DOP) Overview: Byrne provided the links to the drought plan and to NMFS' responses to the plan for DOSS to review. Pages 18 through 24 of the DOP summarize the proposed Delta (or Delta-related) operations through 11/14; the NMFS response also provides a good summary of the DOP.

Drought Operations Plan: <http://www.ca.gov/Drought/2014-Operations-Plan.pdf>

NMFS response:

http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/2014_04_08_nmfs_drought_operations_plan_letter_enclosure.pdf

Broad Compilation of drought actions:

- http://www.usbr.gov/mp/BayDeltaOffice/Documents/Current_Implementation/index.html
- http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/index.shtml
- <http://www.ca.gov/drought/>

Byrne summarized the actions in the DOP on pages 18-24, focusing on Action IV.2.1, pertaining to the NMFS BiOp.

Drought Barriers: There is a chance that the drought barriers might not need to be installed; a decision is expected this week.

RPA Actions:

- IV.1.2 (DCC gate operations): DCC gates are closed.
- IV.2.1 (I:E ratio): Implemented per the DOP (see A.1 on p. 18):
<http://www.ca.gov/Drought/2014-Operations-Plan.pdf>
- IV.2.3 (OMR flow management): The current requirement is that OMR be no more negative than -5,000 cfs, as measured on a 14-day average using the index method. OMR data are available on the Reclamation CVO website:
<https://www.usbr.gov/mp/cvo/index.html>

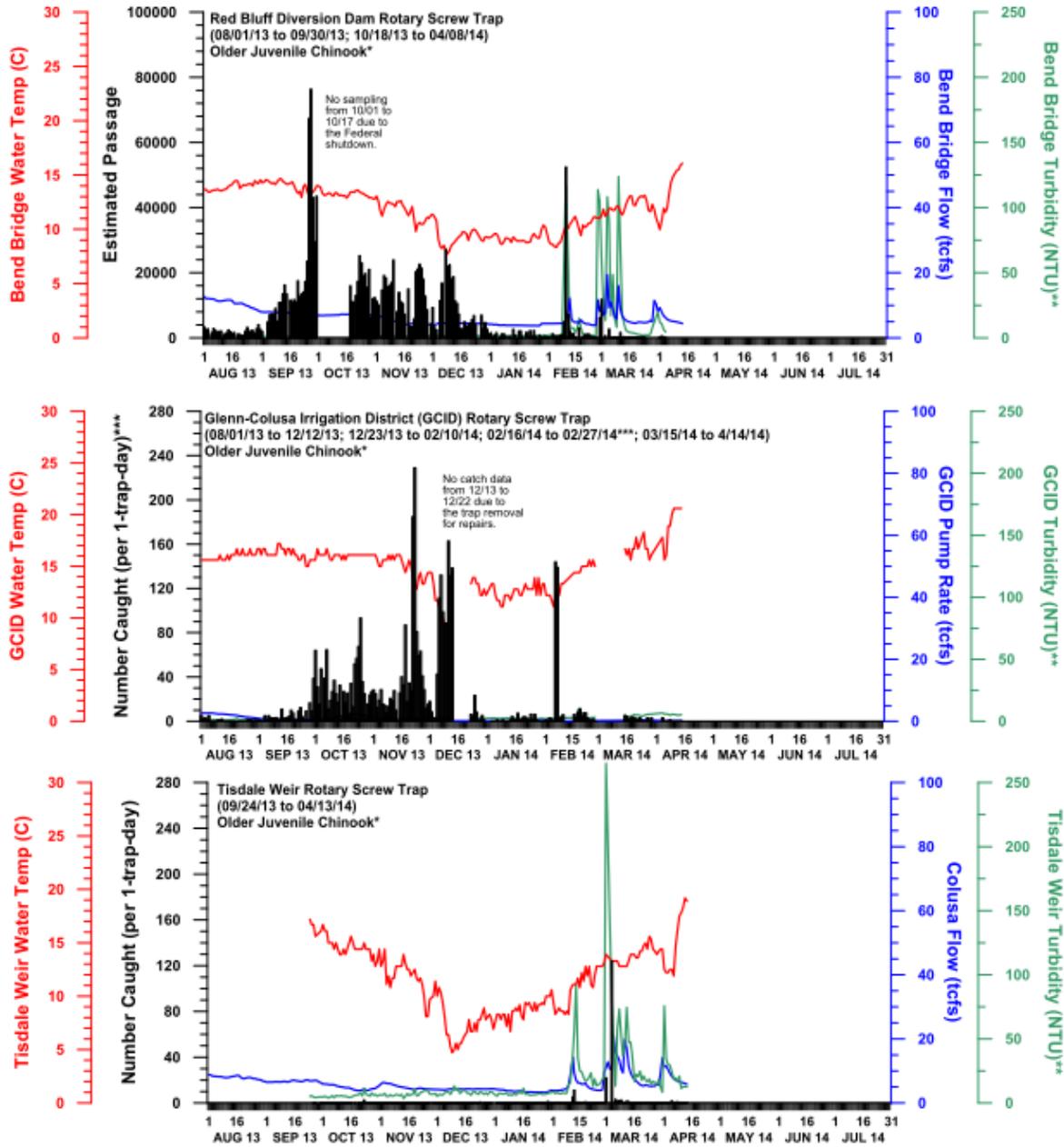
Smelt Working Group (SWG): SWG met on 4/14. With current operations, there is no need to change the planned operations for protection of delta smelt, and Bartoo (FWS) presumed that there will be no determination by FWS for delta smelt. In addition, current conditions were sufficiently protective of longfin smelt. Previous SWG meeting notes are available at:
http://www.fws.gov/sfbaydelta/cvp-swp/smelt_working_group.cfm.

DOSS Advice to WOMT and NMFS: None.

¹The Collinsville outflow standard can be met in three ways: 3-day average Delta outflow of 7,100 cfs, an EC of 2.64 mmhos/cm on a daily basis, or a 14-day running average at Collinsville.

Next Meeting: The next scheduled conference call will be on 4/22 at 9:00 a.m.
Below are graphs 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 14 APRIL 2014

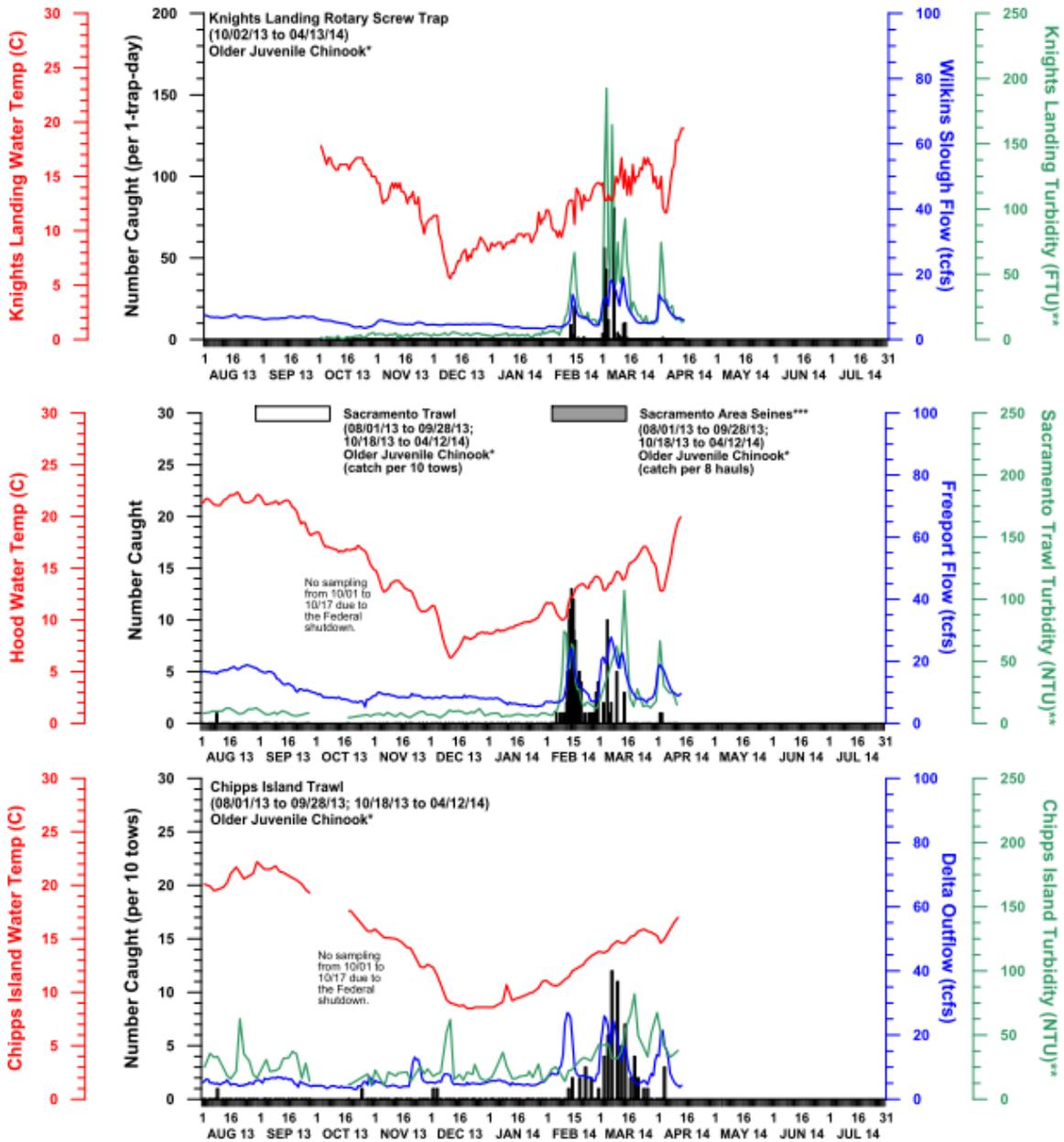
Preliminary data from DFW, FWS, GCID, and CDEC; subject to revision.

*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.

***No catch data at GCID from 2/28 to 3/14 since trap cone was raised due to high flow and debris.

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



DWR-DES 14 APRIL 2014

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.

