Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 4/19/16 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, Mike Ford, Rhiannon Mulligan
Reclamation: Josh Israel, Peggy Manza, Towns Burgess
NMFS: Jeff Stuart, Kristin McCleery
CDFW: Bob Fujimura, Ken Kundargi, Duane Linander
SWRCB: Brittany Kammerer, Matt Holland
FWS: Craig Anderson

Agenda Items

1. Agenda review and introductions
2. RPA Implementation review
3. Current Operations
4. Smelt Working Group
5. Fish Monitoring: Salvage
6. Fish Monitoring: Hatchery winter-run Chinook acoustic-tracking
7. Fish Monitoring: RSTs/trawls/seines
8. Recent or Upcoming Hatchery Releases
9. DOSS Estimates of Fish Distribution and Entrainment Risk
10. DOSS Advice
11. Next DOSS meeting

Agenda Item 2.
RPA Implementation Review

Delta RPA Actions that may affect operations during April:

Action IV.1.2[1] (DCC gate operations):

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

Action IV.2.3[2] (OMR Flow Management)

- No triggers exceeded over past week.
- Current OMR limit of -5,000 cfs is in effect for NMFS' species under this RPA action.

[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

Action IV.2.1[3] (I:E ratio)

- Beginning 4/1/16, the inflow to export ratio (I:E) RPA action (*i.e.*,San Joaquin River inflow at Vernalis to combined CVP/SWP exports) is in effect.
- The current water yeartype is classified as a Dry[4] year, requiring an I:E ratio of 2:1. This action restricts combined exports to 50% of Vernalis flow, or 1,500 cfs, whichever is greater).
- On 4/14/16, NMFS concurred with Reclamation's request for flexibility in the I:E ratio which would allow additional water (up to 75 thousand acre feet [TAF]) released from New Melones reservoir by Oakdale Irrigation District and South San Joaquin Irrigation District (augmented water) to be diverted at a 1:1 ratio by the Projects and to move this water south of Delta. Remaining "unaugmented water" in the system, as measured at Vernalis, would be continued to be exported at the 2:1 ratio by the Projects, with a minimum export rate of 1,500 cfs for human health and safety.

<u>Agenda Item 3.</u>

Current Operations (4/12/16)

SWP		**CVP**	
Exports (cfs)			
Clifton Court Forebay	500*	Jones Pumping Plant	1,000
Reservoir Releases (cfs)			
Feather - Oroville	1,050**	American - Nimbus	3,000
		Sacramento - Keswick	5,000
		Stanislaus - Goodwin	1,005***
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	612	San Luis (CVP)	404
Oroville	3,296	Shasta	5,000
New Melones	1,000	Folsom	789
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	18,471
Outflow Index (cfs)	~19,910	San Joaquin River at Vernalis (cfs)	2,813
E:I	6% (14-day avg.)	X2	<69 km

* SWP plans to adjust inflows to CCFB to mirror changes in the San Joaquin River flows at Vernalis and pumping by the Byron-Bethany Irrigation District while complying with RPA Action IV.2.1.
**Oroville Reservoir releases are at their seasonal minimum of 1,050 cfs.
***Goodwin flows include the augmented flows as well as the required Schedule 2-e flows and will increase through the week to peak at 3,500 cfs on 4/20/16, before dropping to 2,000 cfs on 4/22/16. Scheduled pulses will occur through the remainder of the 31-day pulse flow period. .

[3] For details, see pages 68-70 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

[4] I:E Ratio in effect depends upon the San Joaquin basin yeartype. The yeartype is currently designated as Dry.

OMR as of 4/15/16:

	USGS gauges (cfs)	Index[5] (cfs)
5-day	-1,250	-1,890
14-day	-1,720	-1,890

The daily OMR Index on 4/18/16 was -1,840 cfs.

Review of factors controlling Delta exports for the period 4/1/16 to 4/19/16:

- Friday (4/1/16) through Tuesday (4/19/16) the NMFS RPA action IV.2.1 is controlling.
- FWS determination to protect Delta smelt larvae with an OMR no more negative than -2500 cfs remains in effect in addition to NMFS' RPA.

Weather forecast indicates some unsettled weather this weekend, precipitation possible in the Sierras. No organized systems on the forecast model.

Agenda Item 4.

Smelt Working Group

The SWG met on Monday, 4/18/16 at 10am. Bartoo (FWS) provided the following SWG meeting summary via e-mail:

The Working Group described the risk of entrainment under the Service-provided advice framework. Under this framework the relative risk of entrainment for OMR flow ranges is discussed and assessed. For the current week, the risk of entrainment of larval and juvenile Delta Smelt for each of the flow ranges is characterized as follows:

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

The Working Group is following guidance for entrainment protections from both Action 2 (adult Delta Smelt) and Action 3 (juvenile Delta Smelt). The Working Group will continue to monitor Delta Smelt survey and salvage data and Delta conditions, and will meet again on Monday, April 25, 2016 at 10 am.

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

[5] Beginning 2/16/16, the OMR Index values reported in the DOSS notes were calculated using an OMR Index equation that no longer includes (per the original intent of the index equation) the Contra Costa Water District's Rock Slough diversion in the export term. Beginning February 2016, the OMR Index values reported in the monthly OMR reports on the "CVO Reports" website (http://www.usbr.gov/mp/cvo/index.html) were calculated using this adjusted equation without the Rock Slough diversion.

<u>Agenda Item 5.</u>

Fish Monitoring: Salvage[6]

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.

[6] 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: April 11-April 17, 2016
Prepared by Bob Fujimura on April 18, 2016 14:30
Preliminary Results -Subject to Revision

Criteria	11-Apr	12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	Trend	
Loss Densities									
Wild older juvenile CS	0	0	0	0	0	0	0	→	0.00
Wild steelhead	0	0.24	0	0	0	0	0	↘	0.03
Exports									
SWP daily export	924	901	710	992	1,074	924	1,073	→	943
CVP daily export	1,983	1,979	1,977	1,979	1,976	1,969	1,970	→	1,976
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 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;

	Weekly Total			Season Total	
Category	Salvage	Loss	Trend	Salvage	Loss
Wild					
Winter Run	0	0	→	36	56
Spring Run	12	10	↗	82	121
Late Fall Run	0	0	→	44	166
Fall Run	0	0	→	82	92
Unclassified	0	0	→	14	NC
Total	**12**	**10**		**258**	**435**
Hatchery					
Winter Run	0	0	→	213	629
Spring Run	0	0	↘	650	560
Late Fall Run	0	0	→	93	298
Fall Run	0	0	→	5	7
Unclassified	0	0	→	0	0
Total	**0**	**0**		**961**	**1,494**

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	1	1	↘	113	267
Hatchery	20	50	↗	1,300	3,497
Total	**21**	**51**		**1,413**	**3,764**

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 4/11/16-4/17/16.

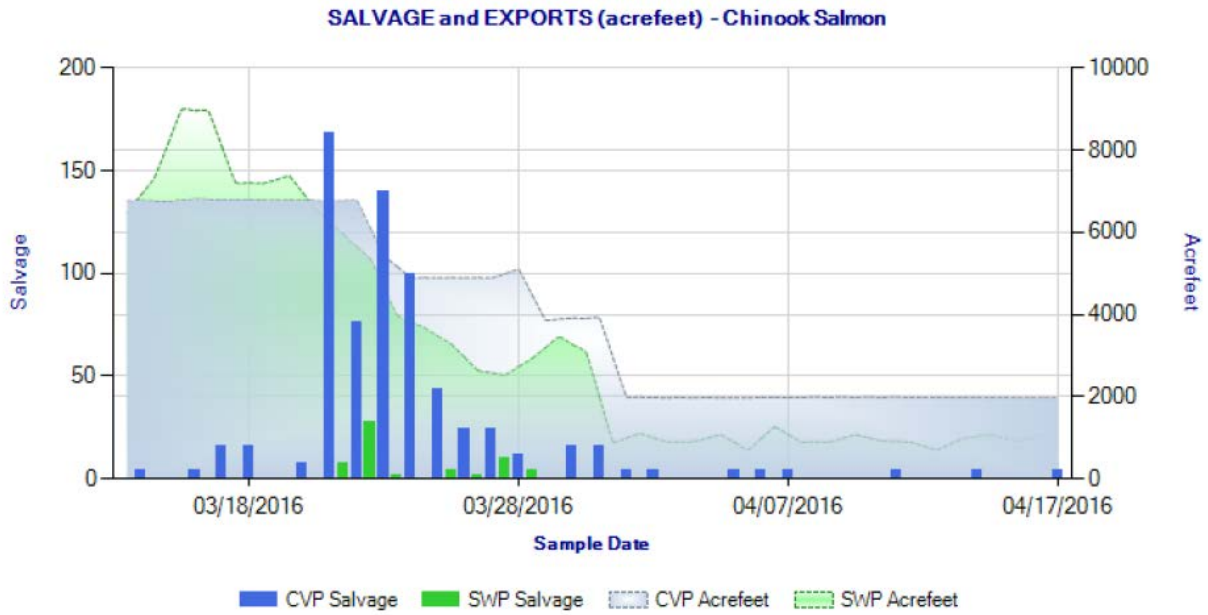


Figure 2. Daily salvage of Chinook salmon (all races) and water exports from the state and federal fish salvage facilities during March 14, 2016 through April 17, 2016.

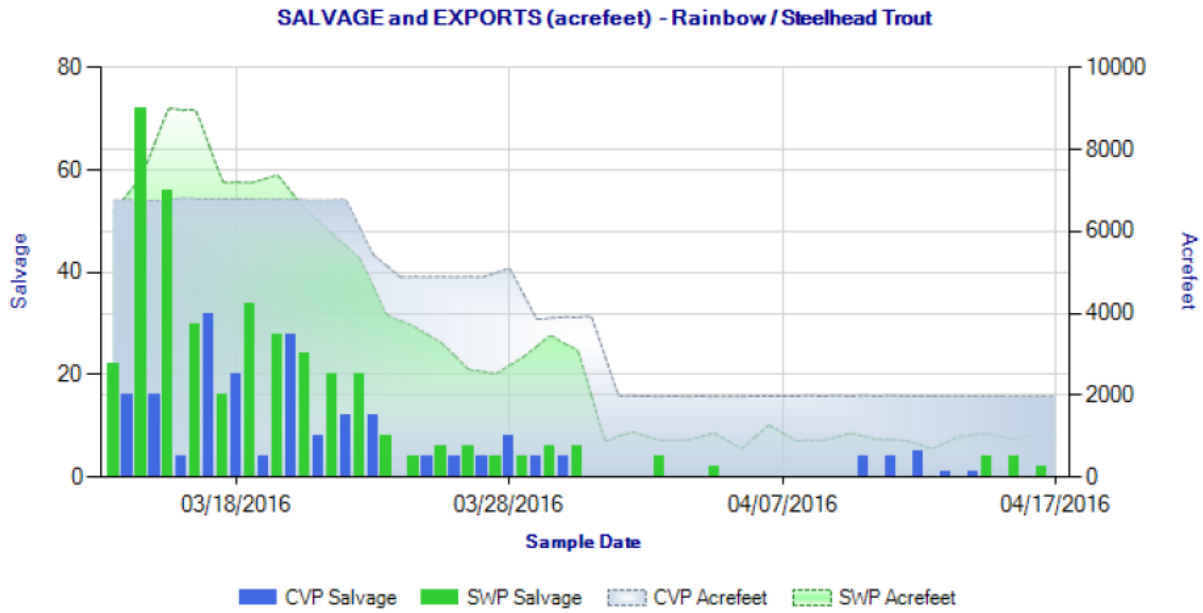


Figure 3. Daily salvage of steelhead and water exports from the state and federal fish salvage facilities during March 14, 2016 through April 17, 2016.

Preliminary salvage report for Monday, 4/18/16:

- Unclipped juvenile Chinook salvage increased this week and clipped decreased.
- The number of wild steelhead decreased and the number of hatchery steelhead increased.
- A few more spring-run sized non-clipped Chinook were observed.

Coded-wire-tag recoveries

Mulligan (DWR) provided the following summary of coded-wire-tag recoveries at the SWP and CVP fish collection facilities. The cumulative loss of the hatchery winter-run Chinook group (released by Livingston Stone National Fish Hatchery (LSNFH) on 2/17/16 to 2/18/16) is 11.19, 0.003% of the number released. The most recent salvage of LSNFH hatchery winter-run Chinook occurred on Monday, 3/14/16. The cumulative loss of the third spring-run Chinook surrogate group (released from Coleman National Fish Hatchery on 1/12/16) continues to hold at 0.412%, near the 0.5% OMR trigger threshold under Action IV.2.3. Loss of Chinook within any spring-run Chinook surrogate group has not occurred since 2/12/16.

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[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]
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	188.93	68,000	n/a	0.278	n/a	0.5%	1.0%	1/6/2016	3/29/2016
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
2/17/2016 to 2/18/2016	W	Livingstone NFH	Sacramento River	Winter Run Production	11.19	420,006	155400	0.003	0.00720	0.5%	1.0%	3/6/2016	3/14/2016
3/14/2016	F	Coleman NFH	Battle Creek	Fall run Production	0.00	864,486	n/a	0.000	n/a	n/a	n/a	*	*
3/18/2016	S	Feather River Hatchery	San Joaquin River	River restoration program	439.33	45,000	n/a	0.976	n/a	n/a	n/a	3/20/2016	4/6/2016
3/19/2016	S	Feather River Hatchery	San Joaquin River	special study	82.156	60000	n/a	0.136	n/a	n/a	n/a	3/21/2016	4/7/2016
2/1/2016	F	Coleman NFH	Yolo bypass inundated Rice fields at Knaggs Ranch	special study	0.00	6,145	n/a	0.000	n/a	n/a	n/a	*	*
3/1/2016	F	Feather River Hatchery	Yolo bypass at Toe drain and Sacramento river at Elkhorn	special study	0.00	94,000	n/a	0.000	n/a	n/a	n/a	*	*

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

Facility	Unknown CWT Loss[5]	Unread CWT Loss[6]	Unknown Hatchery Loss[7]	Acoustic Tag Loss[8]	Number of Unassigned CWTs[9]
SWP	35.30	0.00	0.00	0.00	0
CVP	7.95	0.00	0.00	0.00	0
TOTAL	**43.25**	**0.00**	**0.00**	**0.00**	**0**

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2015 through 6/21/2016.
[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 4/19/2016
Preliminary data from DFW, DWR, FWS, and Reclamation; subject to revision.

Agenda Item 6.

Fish Monitoring: Hatchery winter-run Chinook acoustic-tracking

LSNFH released approximately 420,000 hatchery winter-run Chinook at Bonnyview Bridge in Redding – one group on 2/17/16 and the other group on 2/18/16. 285 of each release group (for a total of 570) were acoustic-tagged with JSATS tags and NOAA's Southwest Fisheries Science Center (SWFSC) is tracking movement of these acoustic-tagged fish past eight "real-time" receiver locations from Redding to Middle River.

The summary update from March 28 is the final update for this year unless additional tagged fish are detected in the real-time array. As of the final update, 49% of the acoustic-tagged hatchery winter-run Chinook had passed the Tower Bridge receiver in Sacramento.

Agenda Item 7.

Fish Monitoring: RSTs/trawls/seines

The following table presents fish monitoring data. Unless otherwise noted, reported sizes are fork length and runs are based on length at date criteria. See also: http://www.water.ca.gov/swp/operationscontrol/calfed/calfedmonitoring.cfm.

Location	Chipps Is. Midwater Trawl[A]	Station 902/Jersey Pt./Prisoners Pt. Trawls[A]	Sacramento Trawl[A]	Beach Seines[A]	Knights Landing RST[B]	Tisdale RST[C]	GCID RST[D]	Mossdale Kodiak Trawl[E]
Sample Date	4/11, 4/13, 4/15	902: Jersey Pt: Pris. Pt: No data received	4/11, 4/13, 4/15	4/12-4/15	4/7-4/17	4/10-4/18	No data since 4/7	4/4-4/16
FR Chinook	12		111	94	337	1263		32
WR Chinook	1							
SR Chinook	174		92	2	252	534		
LFR Chinook				2				
Ad-Clipped Chinook	27		65	1	159	475		35
Chinook Adult								
Steelhead (wild)								1
Steelhead (ad-clip)	5				1			
Green Sturgeon								
Delta Smelt								
Splittail	1			532				
Longfin Smelt								

Flows (avg. cfs)					8704	9208		
W. Temp. (avg. °F)					64.0	61.5		
Turbidity (avg. NTU)					16.5	16.2		

[A] Data reported in the 4/10 to 4/16 DJFMP sampling summary. Sacramento trawls switched from Kodiak trawl net to mid-water trawl net April 1.

[B] Sampling period was from 4/7 at 10:45 am to 4/17 at 9:15 am. One orange VIE-marked fish recaptured on 4/9, 473 VIE-marked (pink) FRCS were released 1 mi up-river @ 9:48 on 4/13, and 82 BBY-stained FRCS were released 1 mi up-river @ 12:00 on 4/15.

[C] Sampling period was from 4/10 at 8:30 am to 4/18 at 9:00 am.

[D] The GCID trap has not been in use since 4/7 due to the high numbers of juvenile Chinook salmon caught and the increasing level of mortality in the live box.

[E] Mossdale trawl sampling being conducted by CDFW starting April 4 through end of June. Data does not distinguish runs, only total ad-clipped and no ad-clipped Chinook salmon. Assumed all were FR. 115 total trawl tows conducted this period.

Red Bluff Diversion Dam (RBDD) Monitoring

USFWS biweekly report (3/25/16-4/7/16) for preliminary daily estimates of passage, 90% confidence intervals, and fork length ranges of unmarked juvenile salmonids captured by rotary screw traps at RBDD included:

Run and Species	Biweekly Total	Brood Year Total
Winter-run Chinook (BY2015)	1,990	338,441

<u>Agenda Item 8.</u>

Recent or Upcoming Hatchery Releases

900,000 Mokelumne fall-run will be released at Sherman Island this week.

Merced hatchery fish are in the process of being clipped and tagged but a release date has not yet been provided.

<u>Agenda Item 9.</u>

DOSS Estimates of Fish Distribution and Entrainment Risk

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)
Young-of-year (YOY) winter-run Chinook salmon[1]	<1% (Last week: same)	5% - 20% (Last week: 15% - 30%)	80% - 95% (Last week: 70% - 85%)
*Young-of-year (YOY) spring-run Chinook salmon**	<5% (Last week: same)	10% - 20% (Last week: 20% - 30%)	75% - 85% (Last week: 65% - 75%)

Hatchery winter-run Chinook salmon	<1% (Last week: same)	<5% (Last week: <10%)	>95% (Last week: >90%)

*Once hatchery fall-run releases (75% of which are unmarked) occur upstream of a monitoring location, DOSS assumes that many of the unclipped spring-run-sized Chinook observed in monitoring may be unmarked fall-run Chinook that fall into the spring-run size range. Coleman National Fish Hatchery (CNFH) has released approximately 7 million hatchery production Fall-run Chinook salmon into the upper Sacramento River at Battle Creek since mid-March 2016. The average size for the released FRCS production fish were just slightly smaller than the size at date for the minimum size of SRCS.

Rationale for changes in distribution

Wild winter-run Chinook: The fraction of wild winter-run upstream of the Delta stayed the same since DOSS thinks a few stragglers may still remain upstream, but that this fraction is very small relative to the entire population. The increase in the fraction of wild winter-run having exited the Delta is based on lengthening days, warming weather, seasonal timing (historical peak winter-run outmigration from the Delta is in March), and only 1 winter-run was reported this week in the Chipps Island trawls compared to 29 last week. The decrease in the Delta is due to seasonal timing, potential precipitation this weekend, and the majority having left the system.

Wild spring-run Chinook: The fraction of wild spring-run upstream of the Delta stayed the same since there are still spring-run entering the Delta, although tributaries temperatures are beginning to increase so this fraction will decrease soon. The increase in the fraction of wild spring-run having exited the Delta is based on the 174 spring-run-sized wild Chinook reported in the Chipps Trawl; some of which are assumed to be true spring-run Chinook salmon and not just larger hatchery fall-run Chinook salmon from the CNFH releases, warming temperatures, and seasonal timing. Therefore the DOSS group believes that the majority of spring-run have exited the Delta.

Hatchery winter-run Chinook: The fraction of hatchery winter-run upstream of the Delta stayed the same since DOSS thinks a few stragglers may still remain upstream. The decrease in the fraction of hatchery winter-run in the Delta was due to DOSS's estimate that most hatchery winter-run have exited the Delta by this time of the year, based on not seeing many hatchery fish at the salvage facilities in the past several weeks or Delta monitoring studies. The fraction having exited the Delta increased based on the on historical movement, increased temperatures and seeing no winter-run at the monitoring location in or above the Delta.

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: Most winter-run and spring-run are out of the system, only 5%-20% winter-run and 10%-20% spring-run in the Delta.

- **Exposure Risk:** LOW *(last week: same)*
  - Flow and turbidities have decreased which are cues for salmonid movement, and most fish are likely to have moved downstream and into the Delta at this time.
- **Routing Risk:** LOW *(last week: same)*
  - Continued elevated river flows (~19,000 cfs) are expected to mute the tidal effects at Georgiana Slough and maintain positive downstream flows during all tidal phases (reducing the risk of routing into Georgiana Slough) for those fish remaining upstream of this divergence.
- **Overall Entrainment Risk:** LOW *(last week: same)*

CVP/SWP Facilities Entrainment Risk for listed salmonids in the Interior Delta over the next week: Most fish have moved through the Delta, the DCC barrier is in place, and export levels are low, which is a cue for salmonids to move downstream and out of the Delta.

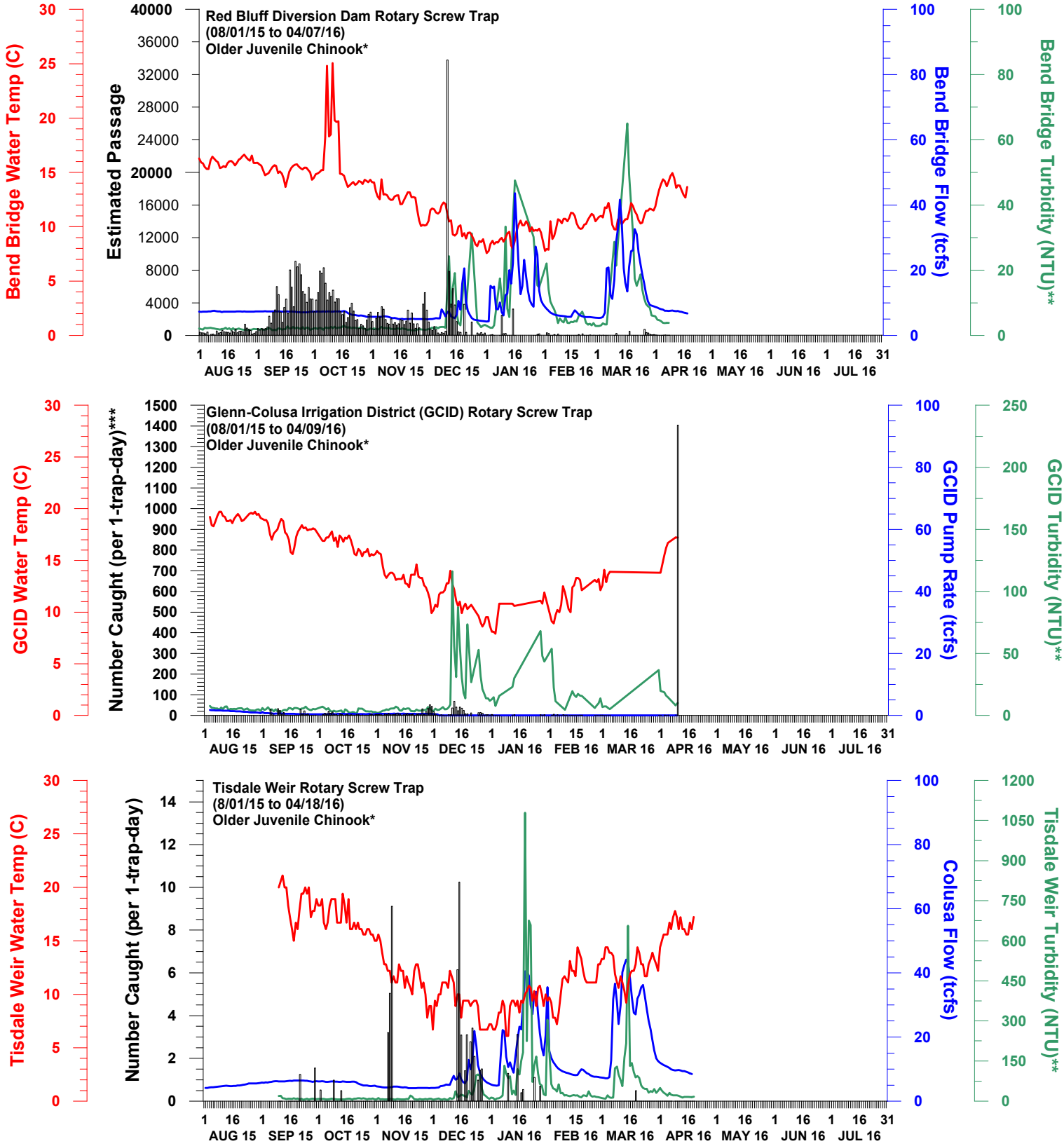
- **Exposure Risk:** LOW *(last week: same)*
- **OMR/Export Risk:**
  - OMR -2,500 cfs to -3,500 cfs: LOW *(last week: same)*
  - OMR -3,500 cfs to -5,000 cfs: MEDIUM *(last week: same)*
- **Overall Entrainment Risk:**
  - OMR -2,500 cfs to -3,500 cfs: LOW *(last week: same)*
  - OMR -3,500 cfs to -5,000 cfs: LOW *(last week: same)*,
    - LOW to MEDIUM (*last week: same*) if steelhead are observed in the Mossdale trawls since more negative OMR will enhance entrainment risk.

Agenda Item 10.
DOSS Advice to WOMT and NMFS: None

Agenda Item 11.
Next Meeting: The next DOSS conference call will be on 4/26/16 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 SACRAMENTO RIVER

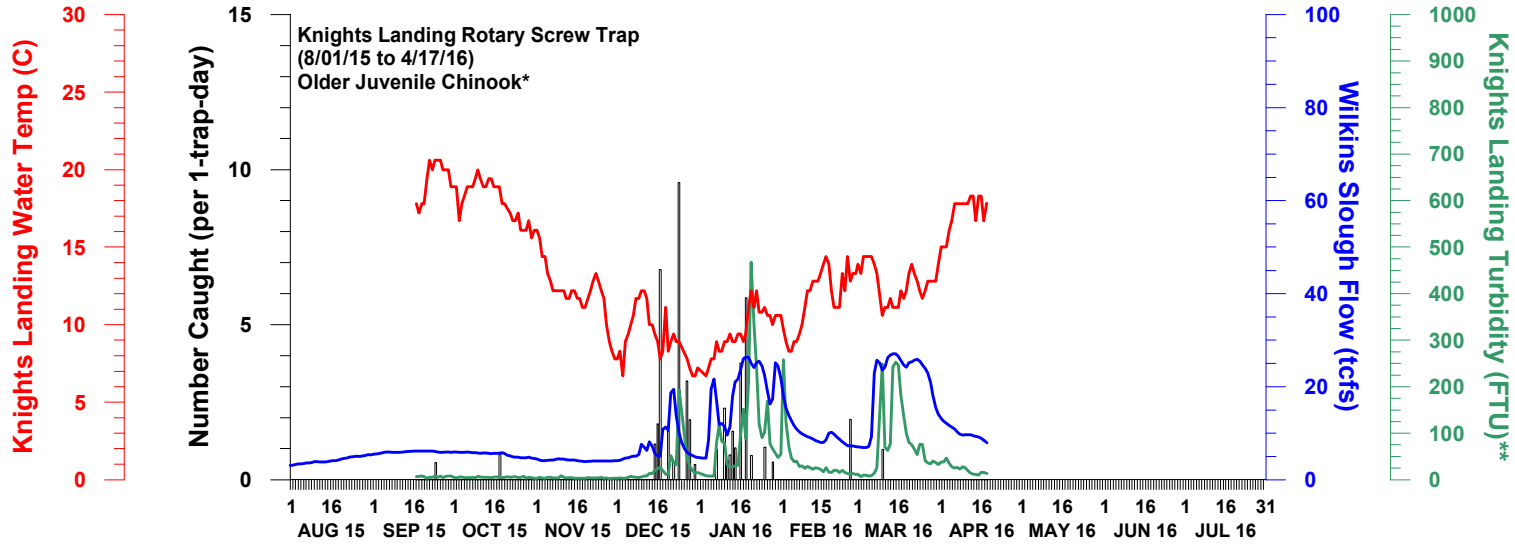


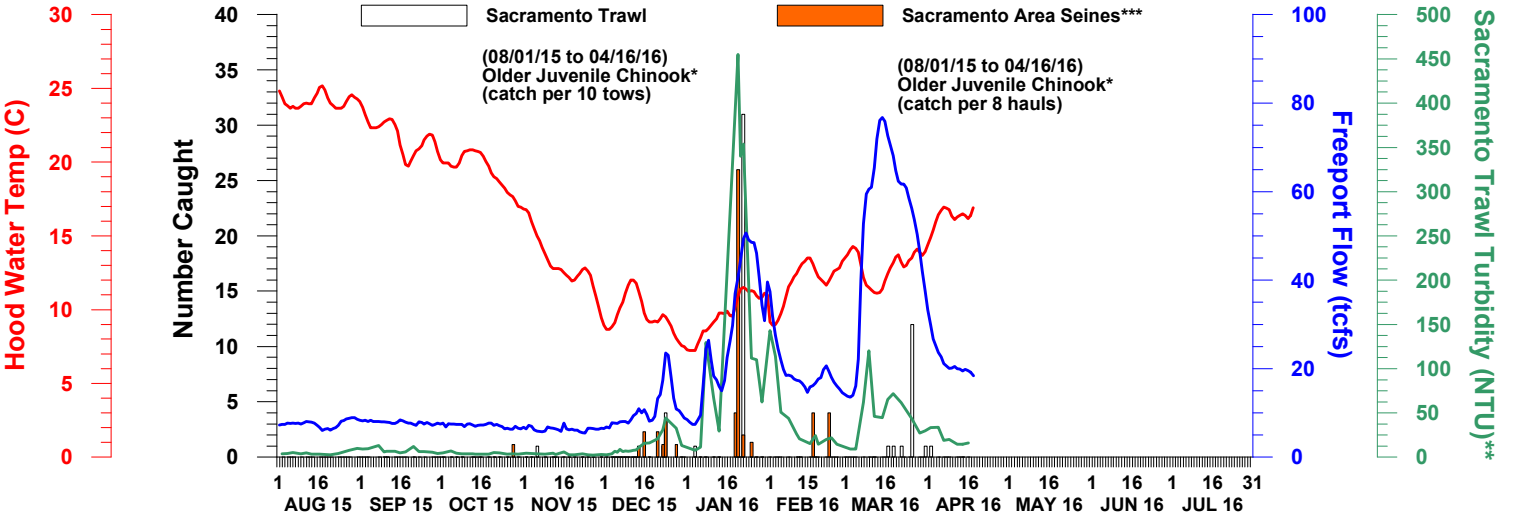
DWR-DES 19 APRIL 2016
Preliminary data from DFW, FWS, GCID, and CDEC; subject to revision.

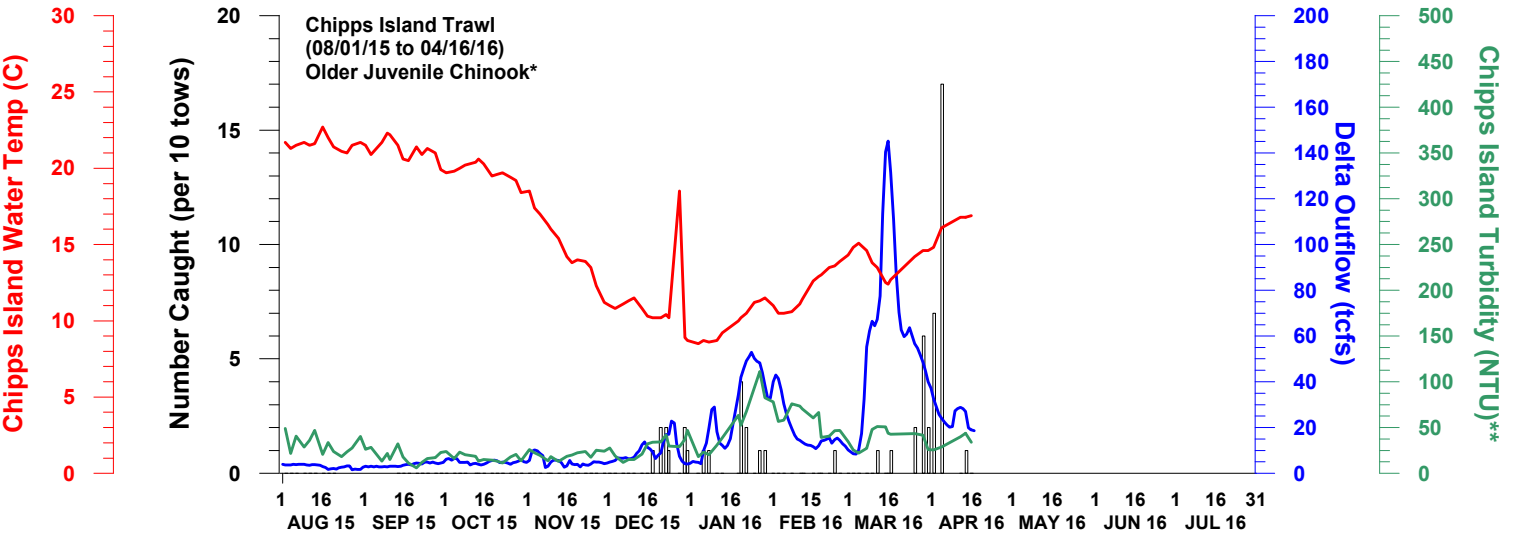
*Older juvenile Chinook defined as all Chinook greater than or equal to the minimum winter run length-at-date criteria and less than the maximum size included in the length-at-date criteria (Frank Fisher model) for which a race is assigned on a given sampling date.

-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



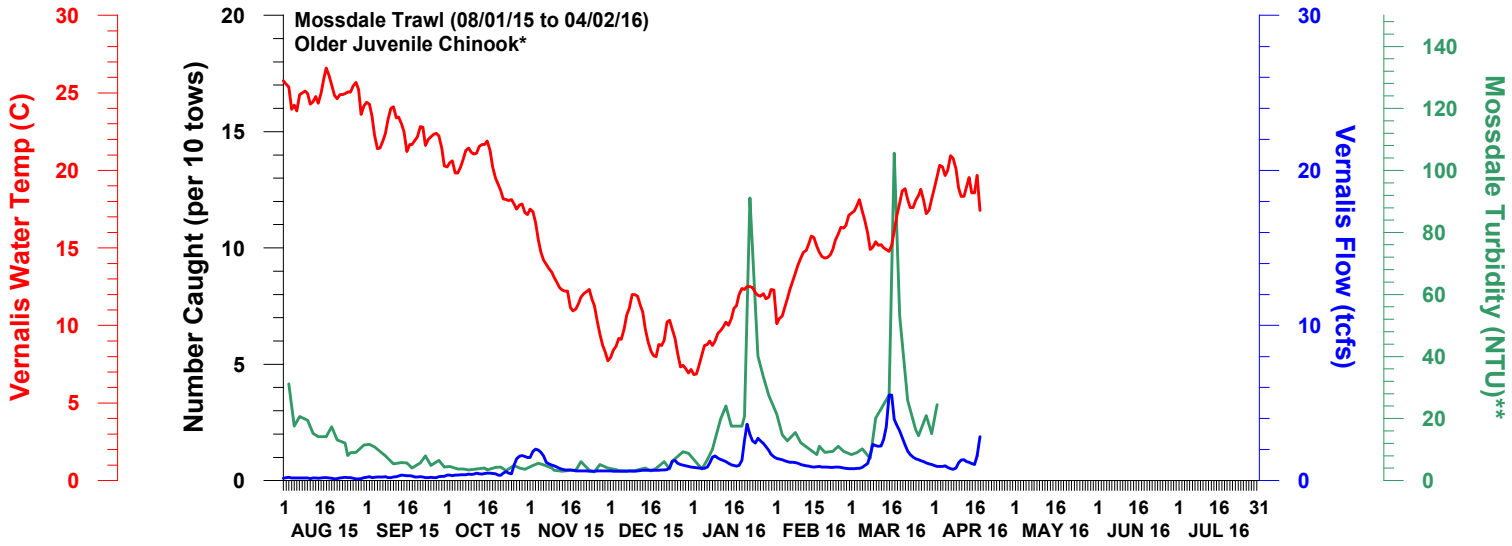


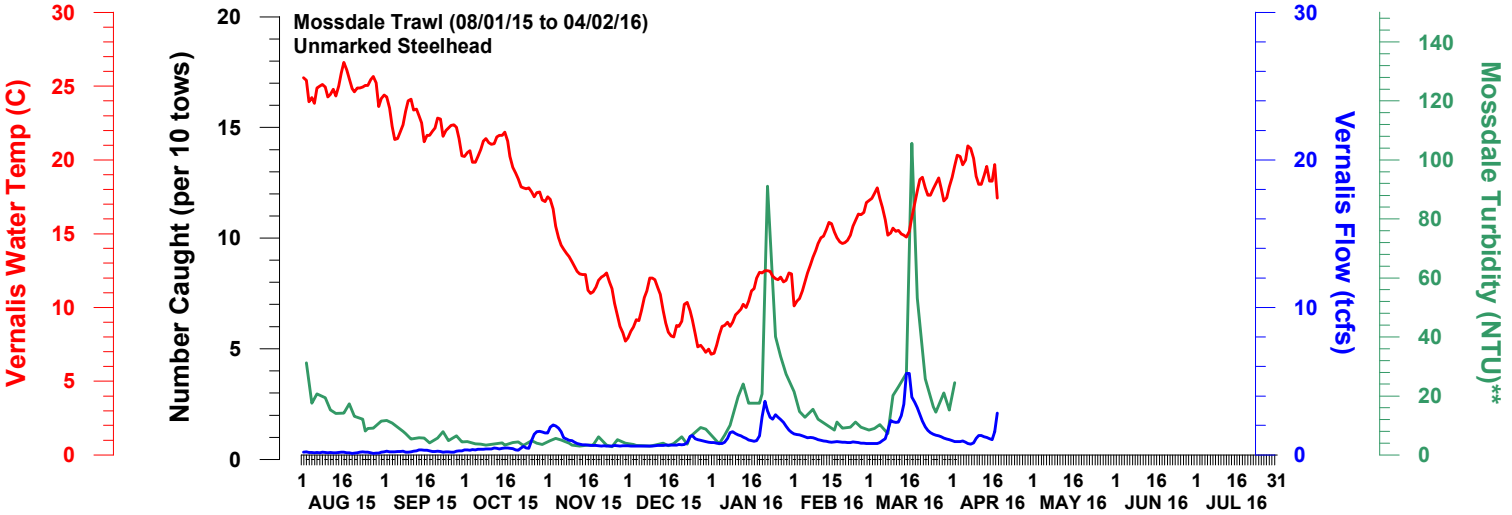


DWR-DES 19 APRIL 2016
Preliminary data from DFW, FWS, and CDEC; subject to revision.

*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

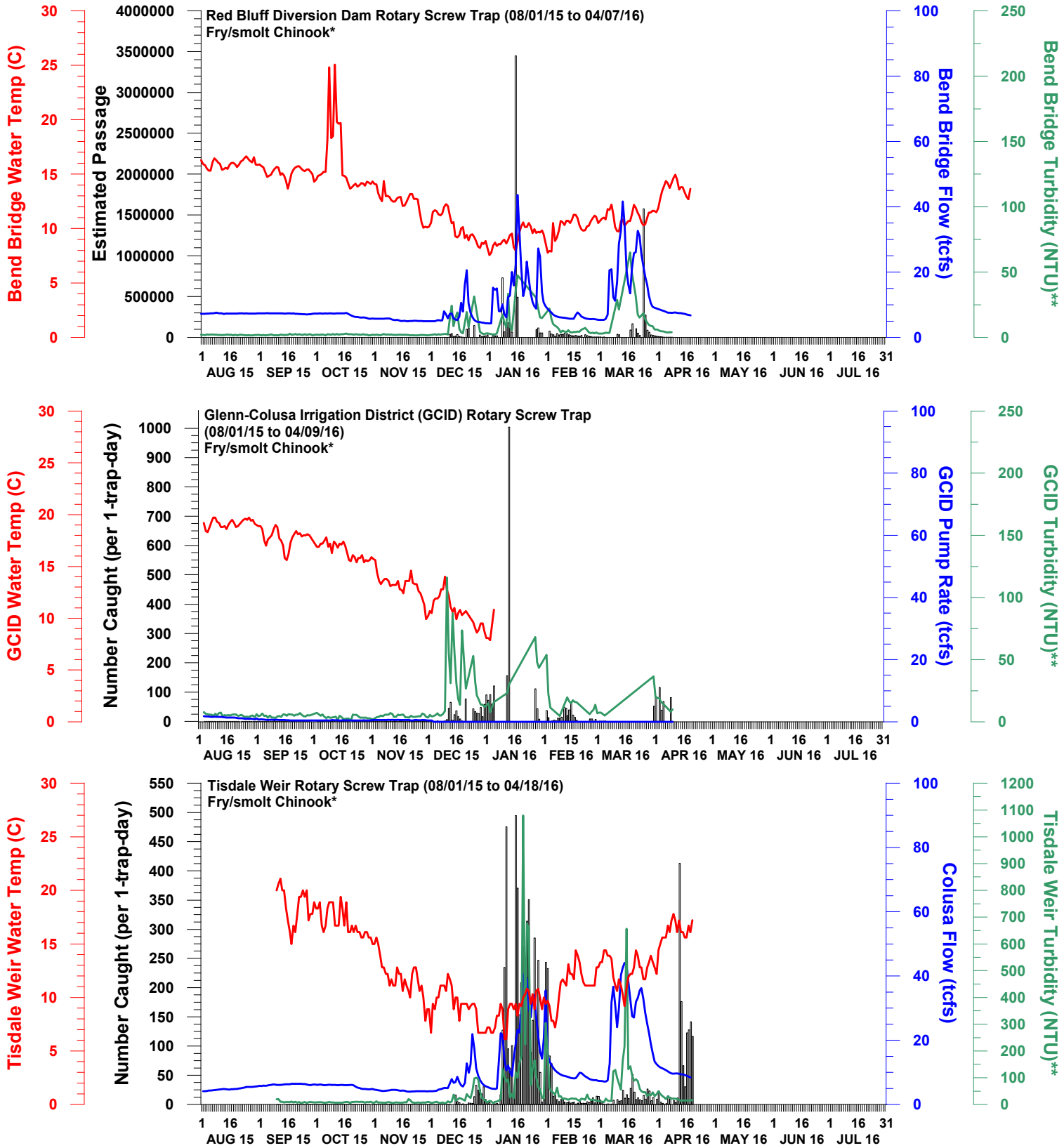




DWR-DES 17 APRIL 2016
Preliminary data from FWS and CDEC; subject to revision.

*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.

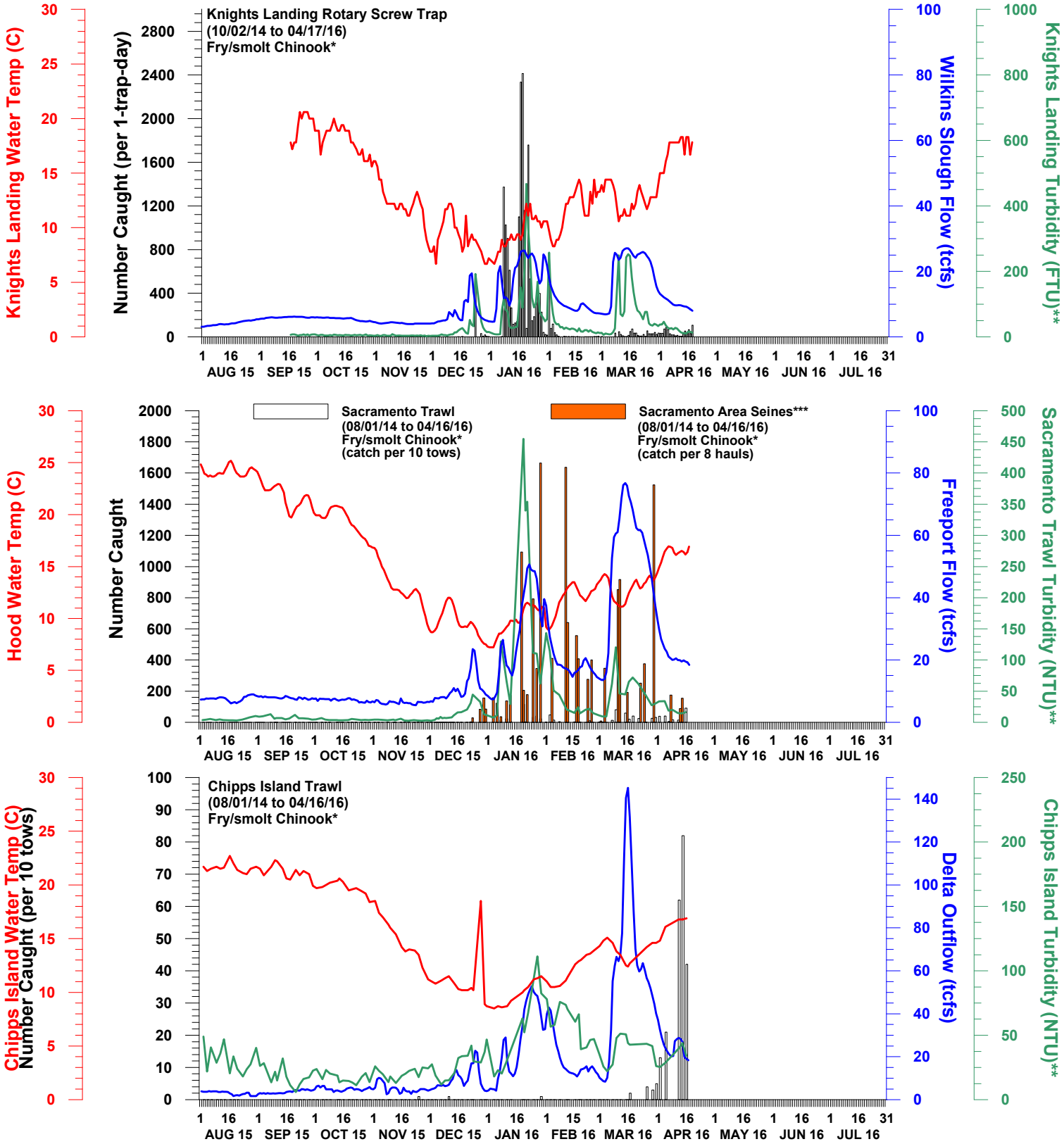
NUMBER OF UNMARKED FRY/SMOLT CHINOOK MEASURED IN THE SACRAMENTO RIVER



DWR-DES 19 APRIL 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.

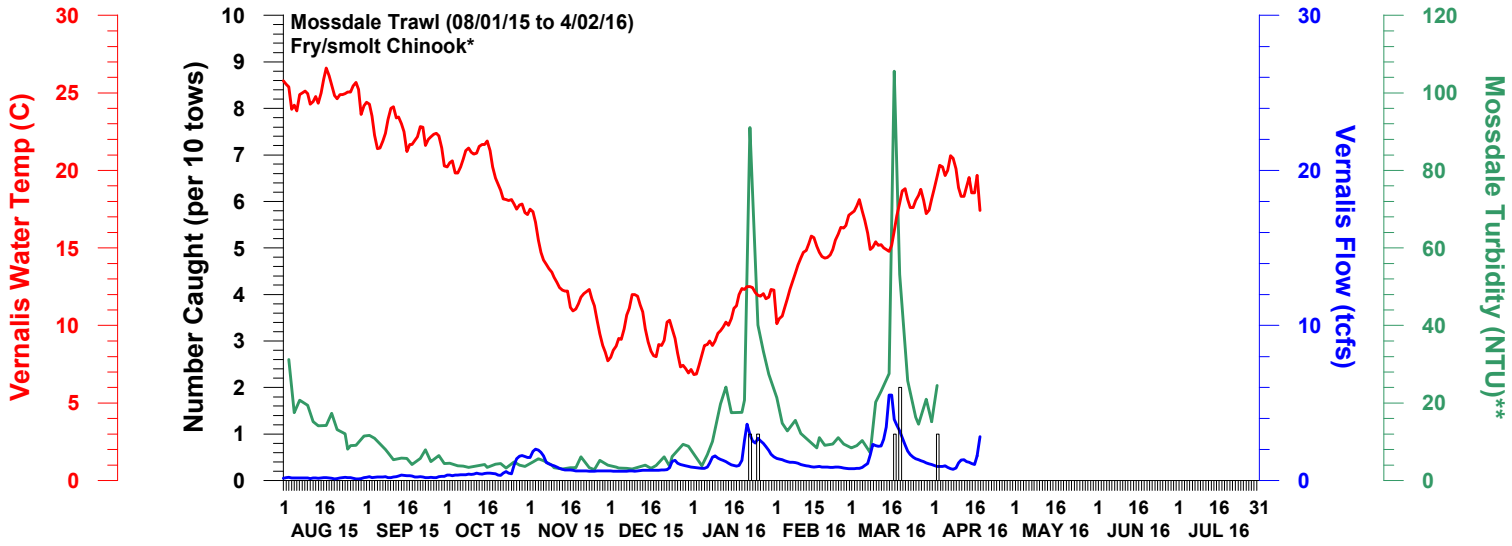
NUMBER OF UNMARKED FRY/SMOLT CHINOOK MEASURED IN THE LOWER SACRAMENTO RIVER AND CHIPPS ISLAND



DWR-DES 19 APRIL 2016
Preliminary data from DFW, FWS, and CDEC; subject to revision.

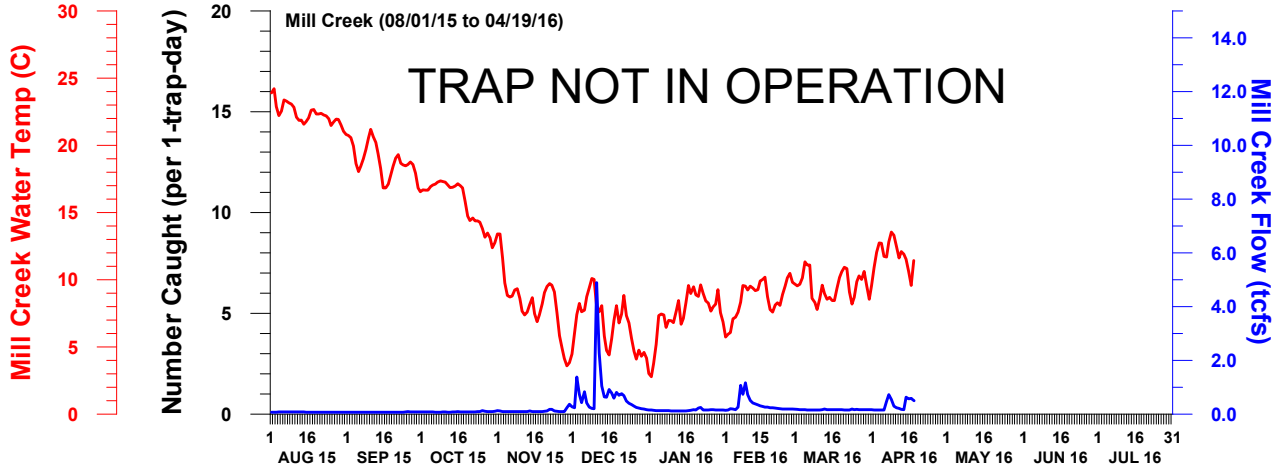
*Fry/smolt Chinook defined as all Chinook less than the minimum winter run length-at-date criteria (Frank Fisher model).
**Turbidity is a discrete measurement and is not measured continuously. Therefore, data are interpolated on days when turbidity was not measured unless data are missing for more than 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.

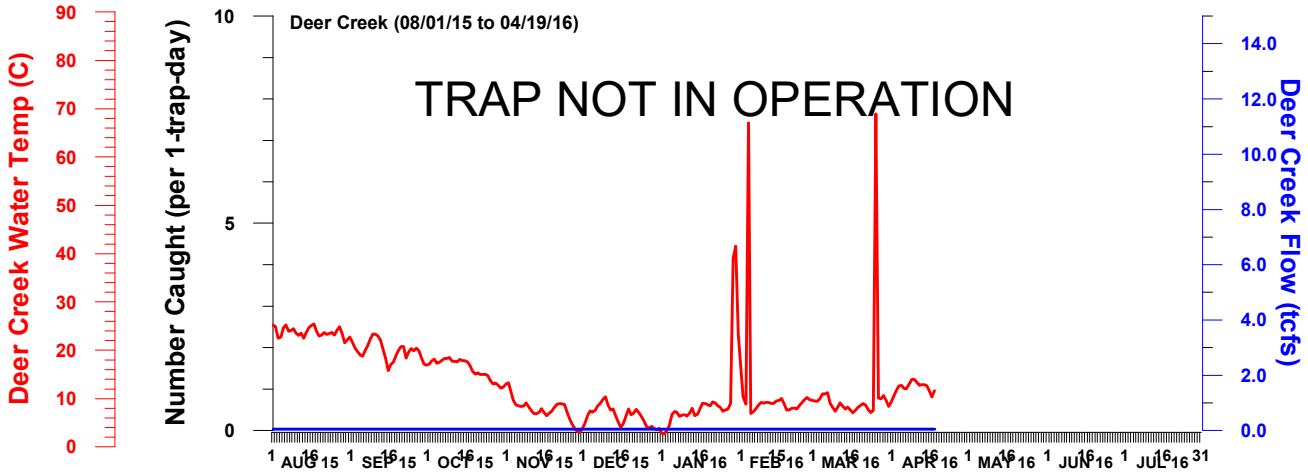
NUMBER OF UNMARKED FRY/SMOLT CHINOOK MEASURED IN THE SAN JOAQUIN RIVER



DWR-DES 19 APRIL 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.

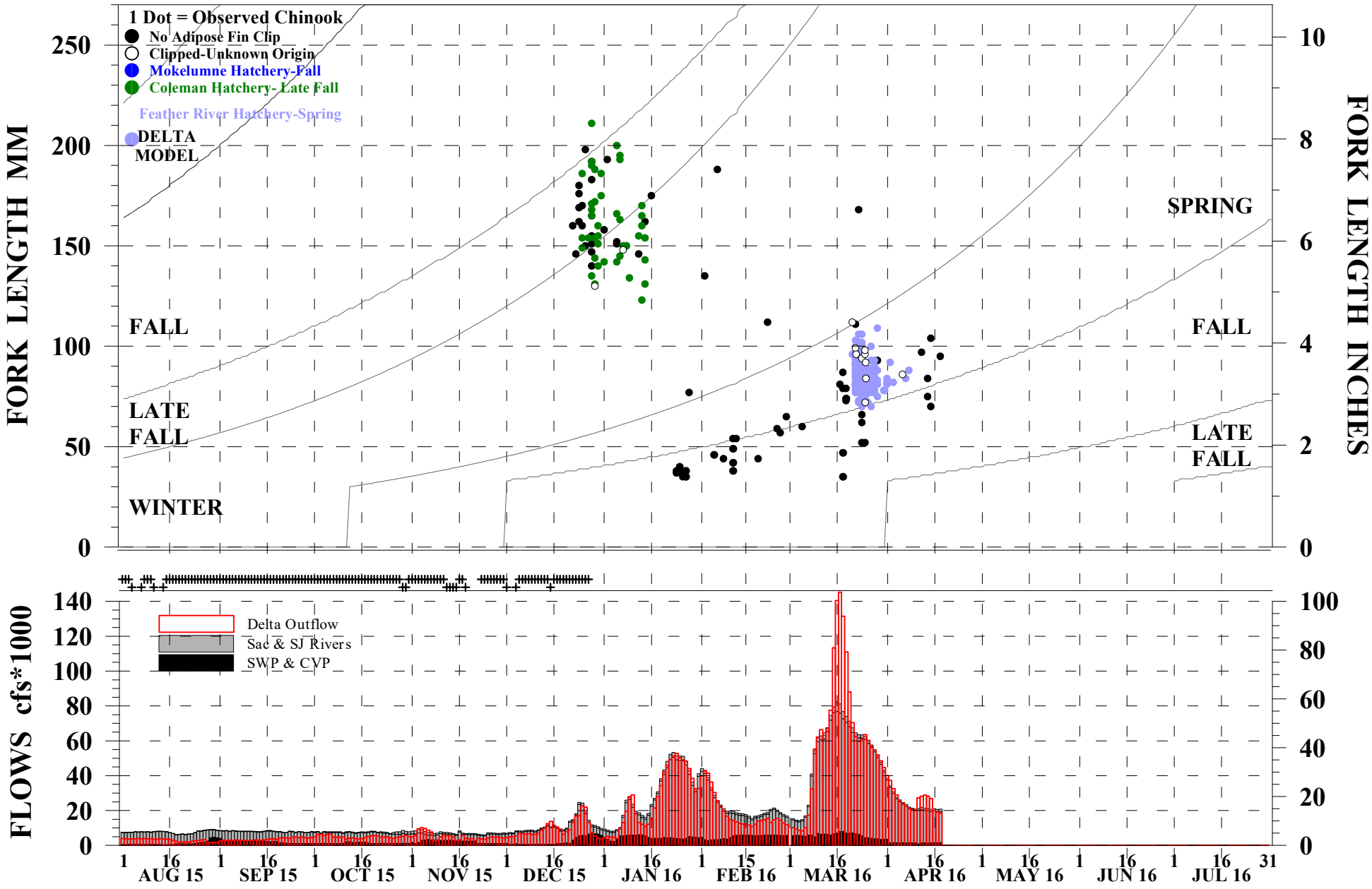
WATER TEMPERATURE AND FLOW MEASURED AT MILL AND DEER CREEK





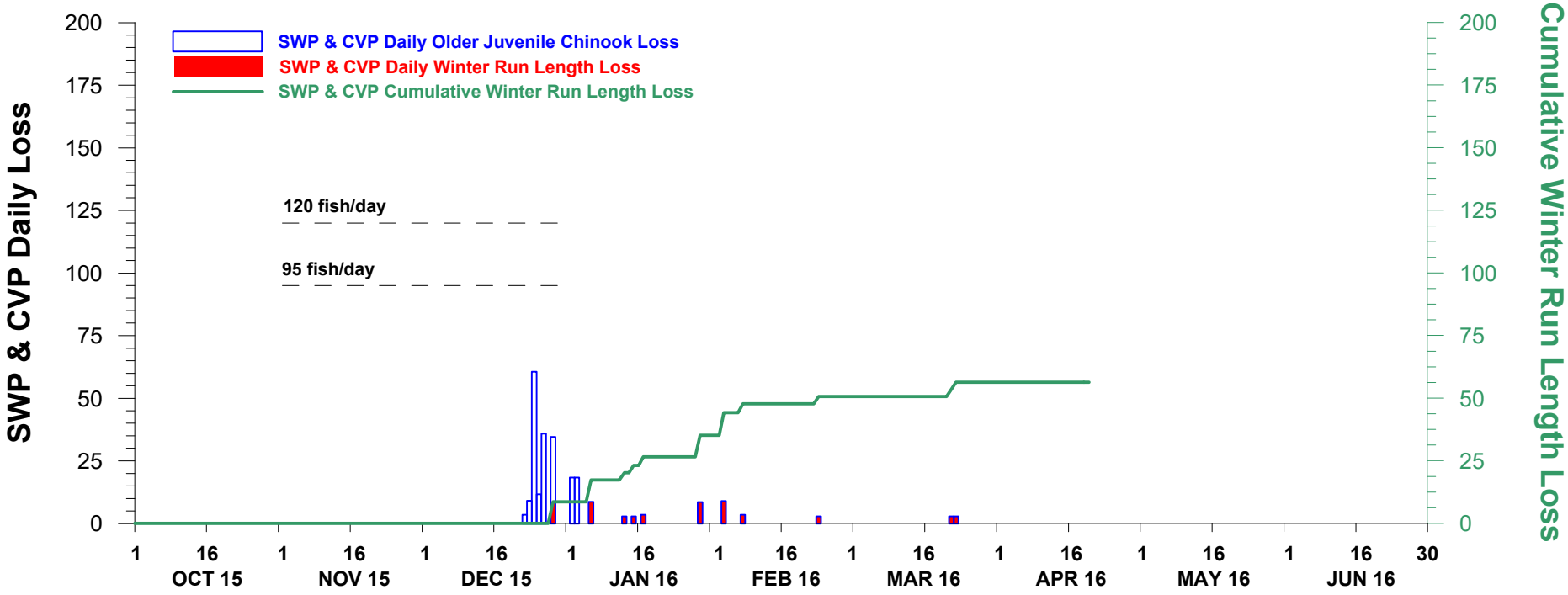
DWR-DES 19 APRIL 2016
Preliminary data from CDEC; subject to revision.

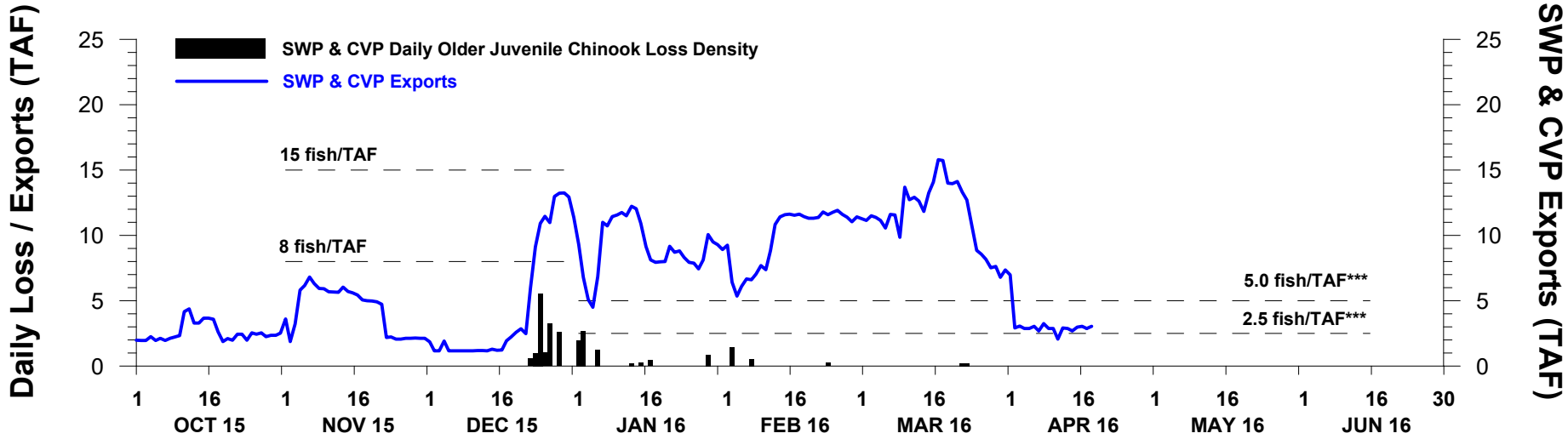
OBSERVED CHINOOK SALVAGE AT THE SWP & CVP DELTA FISH FACILITIES 08/01/2015 THROUGH 04/19/2016



DWR-DES 19 APRIL 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.

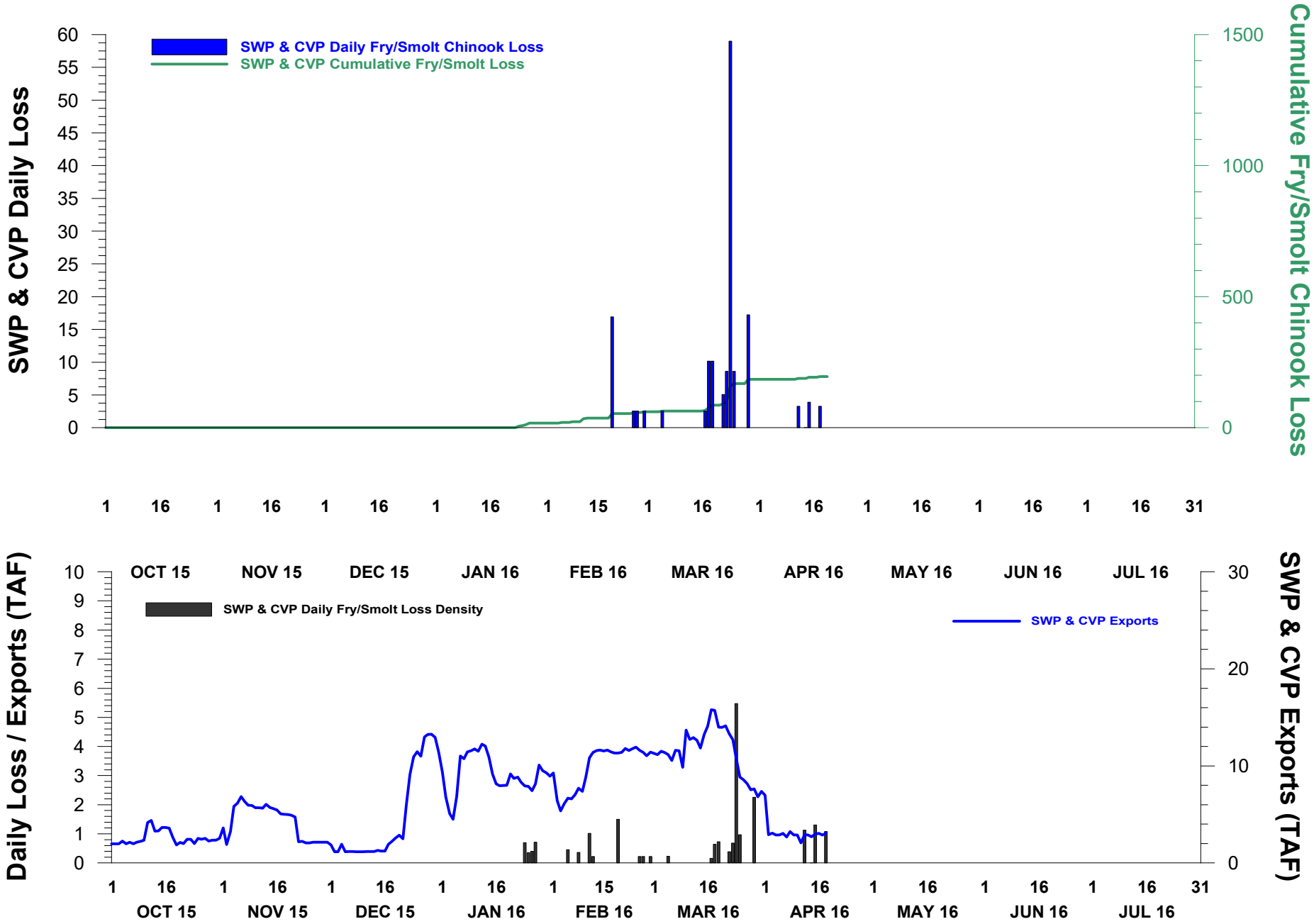
NON-CLIPPED WINTER RUN & OLDER JUVENILE CHINOOK LOSS AT THE DELTA FISH FACILITIES 01 OCT 2015 THROUGH 19 APRIL 2016





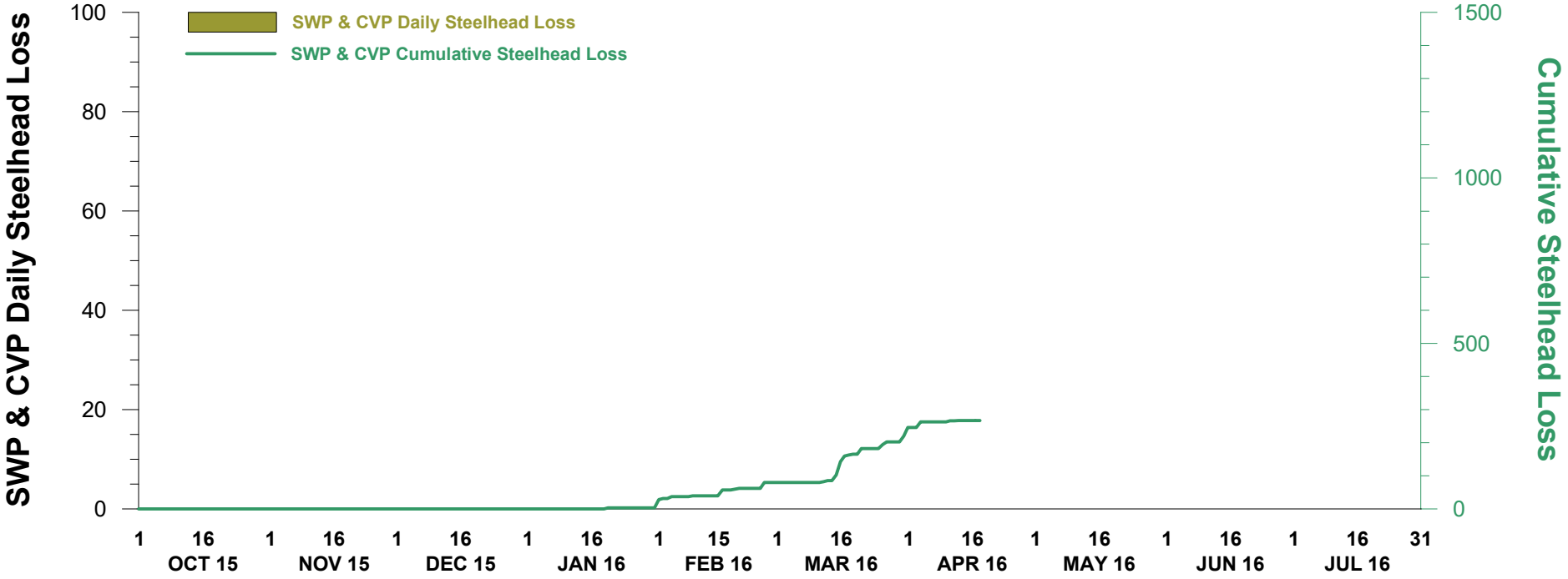
DWR-DES 19 APRIL 2016
Preliminary data from DFW; subject to revision.
*Older juvenile Chinook defined as all Chinook greater than or equal to the minimum winter run length-at-date criteria and less than the maximum size included in the length-at-date criteria (Delta model) for which a race is assigned on a given sampling date.
**ITL(Incidental Take Limit) is based on the JPE, which is not yet available.
***minimum value determined by NMFS

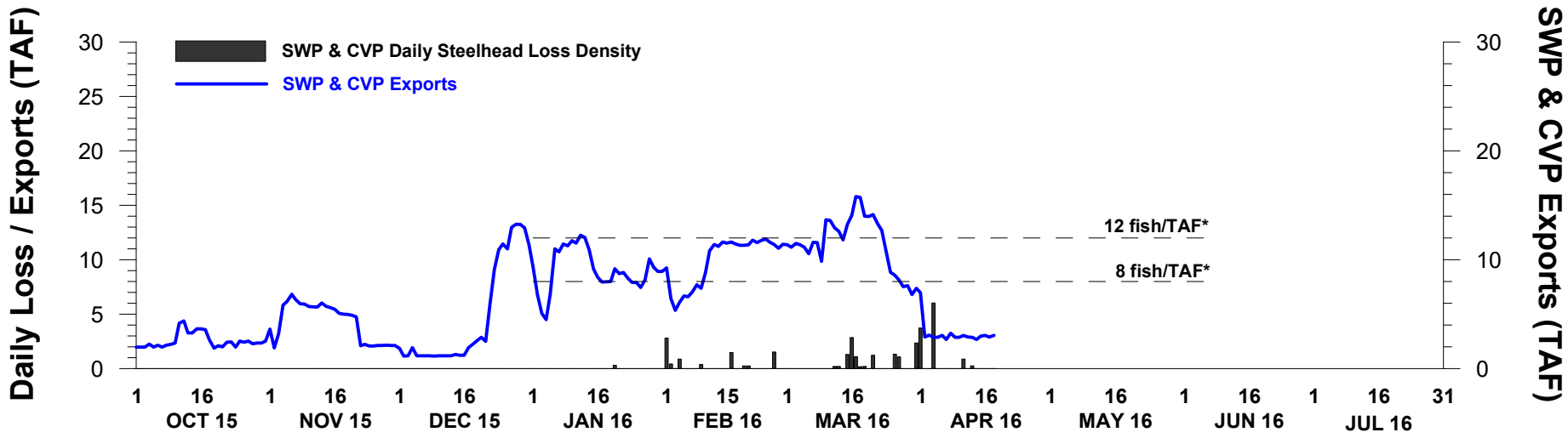
NON-CLIPPED FRY/SMOLT CHINOOK LOSS AT THE DELTA FISH FACILITIES 01 OCT 2014 THROUGH 19 APRIL 2016



DWR-DES 19 APRIL 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).

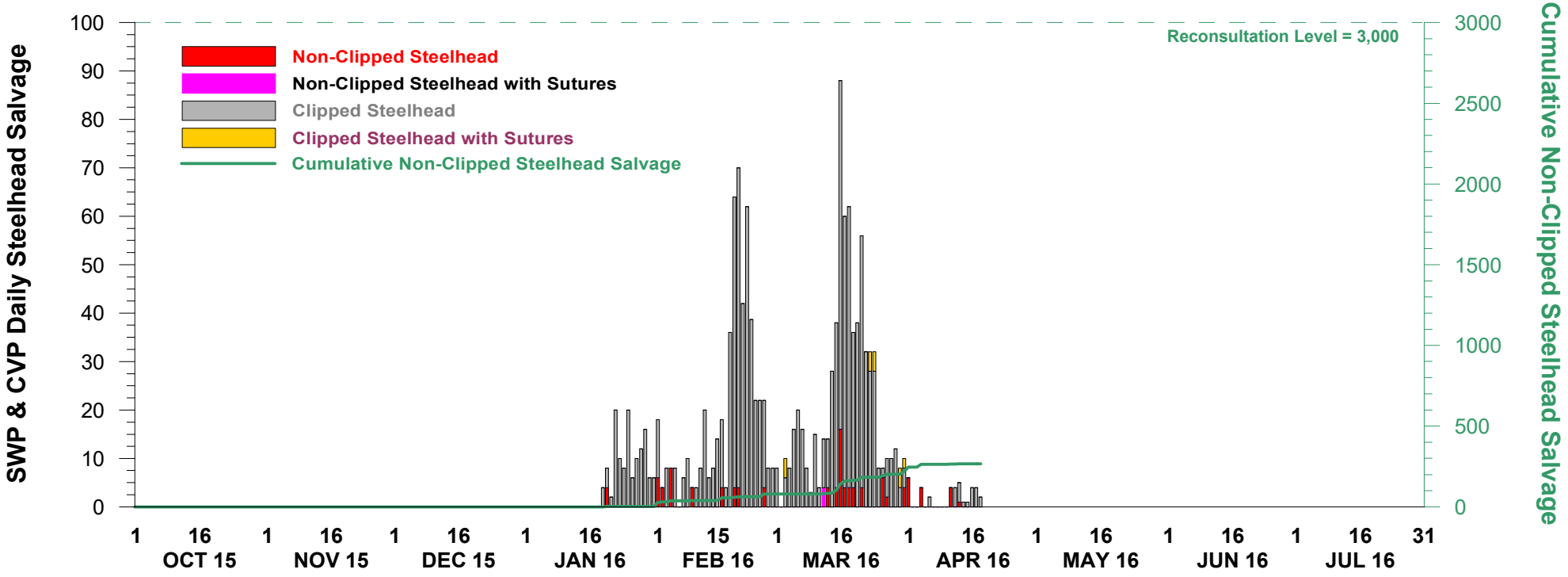
NON-CLIPPED STEELHEAD LOSS AT THE DELTA FISH FACILITIES 01 OCT 2015 THROUGH 19 APRIL 2016





DWR-DES 19 APRIL 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 19 APRIL 2016



DWR-DES 19 APRIL 2016
Preliminary data from DFW; subject to revision.