Annual Report of Activities
October 1, 2018, to
September 30, 2019

Delta Operations for Salmonids and Sturgeon (DOSS) Technical Working Group
November 2019

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Cover Photo: *Railroad bridge over Old River looking west towards Mount Diablo.*
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TABLE OF CONTENTS

Chapter 1 Background 7

1.1 Background 7
1.2 Participants 7
1.3 Summary of Key Delta RPA Actions 8

Chapter 2 Summary of DOSS Discussions and Advice/Recommendations 11

2.1 Weekly Discussion Topics 11
2.2 Other Discussion Topics 11
2.3 Summary of WY 2019 RPA Action Implementation 11
2.3.1 DCC Alerts (Action IV.1.1) 12
2.3.2 DCC Gate Operations (Action IV.1.2) 12
2.3.3 San Joaquin River Inflow-to-Export (I:E) Ratio (Action IV.2.1) 13
2.3.4 Old and Middle River Flow management (Action IV.2.3) 13
2.3.5 6-Year Acoustic Tag Experiment (Action IV.2.2) 13
2.3.6 Reduce Likelihood of Entrainment or Salvage at Export Facilities (Action IV.3) 14
2.4 Other Topics 14
2.4.1 Juvenile Production Estimate for Winter-Run Chinook Salmon 14
2.4.2 Genetic Monitoring Program 15
2.4.2.1 Rapid Genetic Testing Protocol 15
2.4.3 Spring-Run Surrogate Releases 16
2.4.4 Salvage Facility Operations 19
2.4.4.1 Large Chinook salmon salvaged at the DWR Skinner Delta Fish Protective Facility 19
2.4.4.2 High fall-run Chinook salmon salvage in February and March 19
2.4.4.3 Reduced counts and predator/debris flushes at the State Water Project Skinner Delta Fish Protective Facility 19
2.4.5 Water Infrastructure Improvement for the Nation Act 22
2.4.6 Smelt Working Group 22

Chapter 3 WY 2019 Operations Summary 23

3.1 Water Year 2019 23

Chapter 4 Monitoring Activities 27

4.1 WY 2019 Incidental Take Report 27
4.2 WY 2019 Monitoring summary 27
4.2.1 WY 2019 Overview 27
4.2.2 Acoustic tracking 32
4.2.3 Spring Kodiak Trawl Summary 35
4.2.4 WY 2019 Monitoring Gaps 37

DRAFT

4.2.4.1 Red Bluff Diversion Dam Rotary Screw Traps....37
4.2.4.2 Glenn Colusa Irrigation District Rotary Screw Trap....38
4.2.4.3 Tisdale Weir Rotary Screw Traps....39
4.2.4.4 Knights Landing Rotary Screw Traps....40
4.2.4.5 Delta Juvenile Fish Monitoring Program....41
4.2.4.6 Inaccurate salvage data at Tracy Fish Collection Facility....41
4.3 Review of DOSS's weekly distribution estimates....42
References Cited....51
Appendix A — Operations Summary Tables....52
Appendix B — Delta Cross Channel Alerts....53
Appendix C — Old and Middle River Flows....54
Appendix D — Salmon Loss-Density Table....55
Appendix E — Steelhead Loss-Density Table....56
Appendix F — 2018/2019 Salmonid and Green Sturgeon Incidental Take and Monitoring Report57
Appendix G — WY 2019 Fish Monitoring Figures from SacPAS....59
Appendix H— DOSS Weekly Estimates....60
Appendix I—Winter-run and Adjusted Spring-Run Catch Data....61
Appendix J — Coded Wire Tag (CWT) and Acoustic Tag (AT) Catch Data....62

DRAFT

Acronyms and Abbreviations

Term	Definition
BiOp	Biological Opinion
CDEC	California Data Exchange Center
CDFW	California Department of Fish & Wildlife
CNFH	Coleman National Fish Hatchery
CPUE	Catch Per Unit Effort
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWT	Coded Wire Tag
DAT	Data Assessment Team
DCC	Delta Cross Channel
DCT	Delta Conditions Team
DPS	Distinct Population Segment
DWR	California Department of Water Resources
EPA	Environmental Protection Agency
ePTM	Enhanced Particle Tracking Model
ESA	Endangered Species Act
FRH	Feather River Hatchery
I:E	Inflow-to-Export Ratio
IRP	Independent Review Panel
JPE	Juvenile Production Estimate
KLCI	Knights Landing Catch Index
LOBO	Long-term Operations of the CVP and SWP Biological Opinions
LSNFH	Livingston Stone National Fish Hatchery
MAF	Million Acre-Feet
NGO	Non-Governmental Organization
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OMR	Net Tidal Flow Measurement in Old and Middle Rivers Combined
PTM	Particle Tracking Model
RBDD	Red Bluff Diversion Dam
Reclamation	U.S. Bureau of Reclamation

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Term	Definition
RKM	River Kilometer
RPA	Reasonable and Prudent Alternative
RST	Rotary Screw Trap
SCI	Sacramento Catch Index
SWG	Smelt Working Group
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	Thousand Acre-Feet
TUCP	Temporary Urgency Change Petition
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey
VAMP	Vernalis Adaptive Management Program
WOMT	Water Operations Management Team
WY	Water Year

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CHAPTER 1 BACKGROUND

1.1 Background

On 6/4/09, the National Oceanic and Atmospheric Administration's (NOAA's) National Marine Fisheries Service (NMFS) issued its Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project (CVP) and State Water Project (SWP, NMFS BiOp). The NMFS BiOp's reasonable and prudent alternative (RPA) Action IV.5 called for the formation of the Delta Operations for Salmonids and Sturgeon (DOSS) Technical Working Group. DOSS is a technical team that includes biologists, hydrologists, and operators with relevant expertise from member state and federal agencies (listed in Section 1.2). This team provides advice to NMFS and to the Water Operations Management Team (WOMT) on issues related to fisheries and measures to reduce adverse effects of Delta operations of the CVP and SWP export facilities to salmonids and green sturgeon. Some key features in the DOSS "area of interest" are shown in Figure 1-1.

The purposes of DOSS are to:

1) Provide recommendations to WOMT and NMFS for real-time management of operations consistent with implementation procedures provided in the RPA.

2) Review annually CVP/SWP operations in the Delta and the collected data from the different ongoing fish monitoring programs.

3) Track the implementation of Delta RPA Actions IV.1 through IV.4.

4) Evaluate the effectiveness of RPA Actions IV.1 through IV.4 in reducing mortality or impairment of essential behaviors of listed species in the Delta.

5) Oversee implementation of the 6-year acoustic tag experiment for San Joaquin fish provided for in RPA Action IV.2.2.

6) Coordinate with the Smelt Working Group (SWG) to maximize benefits to all listed fish species within the Delta region.

7) Coordinate with the other technical teams identified in the NMFS BiOp to ensure consistent implementation of the RPA.

1.2 Participants

The DOSS technical team includes participants from the following member agencies:

- United States Bureau of Reclamation (Reclamation)
- United States Fish & Wildlife Service (USFWS)
- National Marine Fisheries Service (NMFS)
- California Department of Water Resources (DWR)
- California Department of Fish and Wildlife (CDFW)
- State Water Resources Control Board (SWRCB)
- United States Environmental Protection Agency (EPA)

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- United States Geological Survey (USGS)

1.3 Summary of Key Delta RPA Actions

Key RPA actions relating to Delta operations are summarized below:

Delta Cross Channel (DCC) Gate Operations (IV.1.1 - IV.1.2)

- **Action IV.1.1**: Monitor upstream environmental conditions in the Sacramento River watershed and provide alerts when conditions indicate that timely changes in DCC operations may be required in the near future that will reduce loss of emigrating Sacramento River winter-run Chinook salmon (winter-run Chinook salmon, *Oncorhynchus tshawytscha*), Central Valley spring-run Chinook salmon (spring-run Chinook salmon, *O. tshawytscha*), California Central Valley steelhead (CCV steelhead, *O. mykiss*), and southern distinct population segment (sDPS) of North American green sturgeon *(*green sturgeon, *Acipenser medirostris)*.
- **Action IV.1.2**: Modify DCC gate operations to reduce direct and indirect mortality of emigrating juvenile salmonids and green sturgeon from October through June based on fishery monitoring data from locations upstream of the Delta.

San Joaquin Inflow-to-Export (I:E) Ratio (Action IV.2.1)

Manage the inflow-to-export ratio to reduce the vulnerability of CCV steelhead emigration within the lower San Joaquin River. Vulnerability exists due to entrainment into the channels of the south Delta, and at the pumps, from diversion of water by the CVP and SWP export facilities in the south Delta. Enhance the likelihood of salmonids successful exit of the Delta at Chipps Island. Successful emigration increases with more suitable hydraulic conditions, including greater net downstream flows in the mainstem San Joaquin River.

6-Year Acoustic Tag Experiment (Action IV.2.2)

Reclamation and DWR shall fund a 6-year research-oriented action to assess the behavior and movement of salmonid outmigration in the lower San Joaquin River, and to evaluate causes of mortality. The DOSS group shall conduct annual reviews of the study results, and prepare a status review of the action at the end of the 6-year period. This review will assess the success of Action IV.2.1 survival increases for San Joaquin River basin salmonids (but in particular CCV steelhead), throughout the Delta. Based on the findings of the status review, DOSS will make recommendations to NMFS, Reclamation, CDFW, DWR, and USFWS on future actions to be undertaken in the San Joaquin River basin as part of an adaptive management approach to the basin's salmonid stocks.

Old and Middle River (OMR) Flow Management (Action IV.2.3)

Reduce the vulnerability of juvenile winter-run, yearling spring-run, and CCV steelhead emigration within the lower Sacramento and San Joaquin rivers to entrainment into the channels of the south Delta, and at the pumps, due to the diversion of water by the export facilities in the south Delta. Enhance the likelihood of salmonids successful exit of the Delta at Chipps Island with more suitable hydraulic conditions and greater net downstream flows in the mainstem of the San Joaquin River.

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Reduce Likelihood of Entrainment or Salvage at the Export Facilities (Action IV.3)

Reduce losses of winter-run and spring-run Chinook salmon, CCV steelhead, and green sturgeon by reducing exports when large numbers of juvenile Chinook salmon into the upper Delta region, at risk of entrainment into the central and south Delta, and then to the export facilities in the following weeks.

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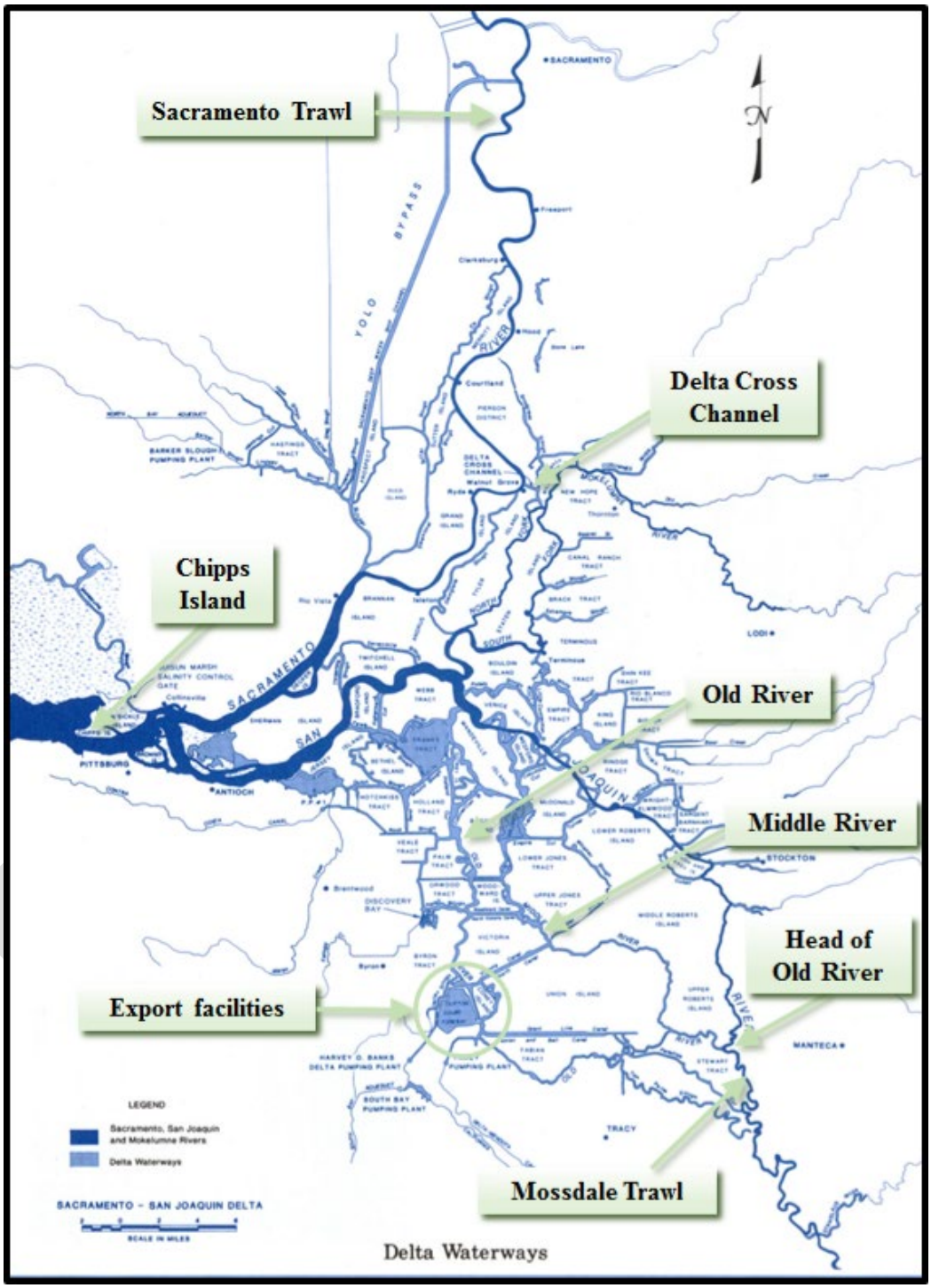

Figure 1-1. Delta map with DOSS-related points of interest including the locations of Chipps Island, the Delta Cross Channel, Old and Middle rivers, the Head of Old River, the State and Federal export facilities, and the Mossdale Trawl in the lower San Joaquin River.

Chapter 2 SUMMARY OF DOSS DISCUSSIONS AND ADVICE/RECOMMENDATIONS

2.1 Weekly Discussion Topics

- CVP and SWP operations
- Delta fish monitoring, salvage, loss, and loss densities
- Hatchery releases
- DCC operations
- OMR flow management
- I:E ratio
- Coordination with other technical teams (e.g., Smelt Working Group)
- DOSS estimates of fish distribution
- Assessments of entrainment risk

2.2 Other Discussion Topics

- Sampling effort at fish collection facilities
- Debris management at the fish collection facilities
- Interim winter-run juvenile production estimate (JPE) - based fish density triggers
- Tracking of acoustic-tagged Chinook salmon movement
- Coded wire tag (CWT) recoveries in Delta monitoring
- SacPAS website for migration modeling
- Genetic sampling at export facilities
- San Joaquin River Restoration Program (SJRRP) release of juvenile spring-run Chinook salmon

2.3 Summary of Water Year 2019 RPA Action Implementation

RPA Action implementation during Water Year (WY) 2019 is described below. A daily summary of the controlling factors for CVP and SWP exports and DCC gate operations is provided in Appendix A.

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2.3.1 DCC Alerts (Action IV.1.1)

RPA Action IV.1.1 describes two alerts that signal juvenile Chinook salmon may be migrating down the Sacramento River, and indicate that DCC gate operations may need to be altered in the near future per the triggers in Action IV.1.2. In the NMFS BiOp, the first component of the first alert was triggered when there was capture of yearling-sized (>70 mm) spring-run Chinook salmon at the rotary screw traps (RSTs) in Mill Creek or Deer Creek. In October 2014[1], NMFS approved a request from Reclamation and DWR that the first component of the first alert based on fish monitoring be replaced by a hydrologic criterion which triggers when mean daily flows are greater than 95 cfs in Deer Creek or Mill Creek[2]. The two alerts in effect during WY 2019 were the following:

> **First Alert:** Mean daily flow in Mill Creek or Deer Creek (a) greater than 95 cfs, or (b) more than 50 percent higher than observed on the previous day.
>
> **Second Alert:** Sacramento River flow greater than 7,500 cfs at Wilkins Slough, and water temperatures less than 56.3°F as measured at Knights Landing.

The alerts in Action IV.1.1 were tracked by DOSS from 10/1/18 through 4/30/19. The first alert was triggered for the majority of the season for flows greater than 95 cfs on Mill Creek and/or Deer Creek. 2018 summer baseline flows at Mill and Deer creeks were greater than the first component trigger of 95 cfs all summer, thus making this trigger less relevant going into this water year. The second alert was triggered on 12/1/18 and 12/2/18, 12/25/18 through 12/30/18, and 1/7/19 through 4/18/19, after which the temperature at Knights Landing was greater than 56.3°F. Note that the second alert is triggered only when both flow and water temperature components are satisfied. Appendix B summarizes the relevant daily flow and water temperature conditions during this period.

2.3.2 DCC Gate Operations (Action IV.1.2)

RPA Action IV.1.2 manages DCC gate operations to reduce the direct and indirect mortality of emigrating juvenile salmonids and green sturgeon. In October and November 2018, none of the criteria were met (based on water quality conditions and catch of older juvenile Chinook salmon at the Knights Landing RST, the Sacramento beach seines, or in the Sacramento Trawl) that require DCC gate closure for fish protection. RPA Action IV.1.2 required the DCC gates to be closed from 12/1/18 to 12/14/18 (an exception would have been made for Chinook salmon migration experiments or if water quality criteria were met), and closed from 12/15/18 through 1/31/19.

The operations table in Action IV.1.2 requires 14 days of gate closure for the May 21 to June 15 period each year. This usually occurs when gates are open on Friday morning and closed on Mondays at noon. This year, gates remained closed during this period due to flows above 20,000 cfs. High flows induce scour that could potentially cause structural integrity issues at the DCC gates. From June 15 to September 31, there are no RPA requirements for DCC gate operations and Reclamation usually has the gates open throughout this period. Appendix A summarizes DCC gate operations.

[1] Implementation of the first component of the first alert was first modified during WY 2014. In August 2013, NMFS approved a request from Reclamation and DWR that, for October and November 2013, the first component of the first alert based on fish monitoring be replaced by a hydrologic criterion which triggers when mean daily flows are greater than 110 cfs in Deer or Mill creeks. Subsequently revised to the current 95 cfs threshold.

[2] Based on the flow data reported for CDEC stations DCV (for Deer Creek) and MLM (for Mill Creek).

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2.3.3 San Joaquin River Inflow-to-Export (I:E) Ratio (Action IV.2.1)

Action IV.2.1 is in effect during April and May of each year. The year type for the San Joaquin River Basin at the onset of RPA Action IV.2.1 on 4/1/19 was initially designated as "Above Normal." This designation was based on the March 2019 forecast, which required a 4:1 ratio of Vernalis inflow to combined CVP and SWP exports (I:E ratio), or minimum health and safety combined CVP and SWP pumping of 1,500 cfs, whichever was greater. However, the classification of the water year type changed to "Wet" based on the April 2019 forecast, which also required a 4:1 ratio of Vernalis inflow to combined CVP and SWP exports (I:E ratio), or minimum health and safety combined CVP and SWP pumping of 1,500 cfs, whichever was greater.

2.3.4 Old and Middle River Flow Management (Action IV.2.3)

The objective of this action is to reduce the vulnerability of emigrating juvenile winter-run Chinook salmon, yearling spring run Chinook salmon, and CCV steelhead within the lower Sacramento and San Joaquin rivers to entrainment into the channels of the south Delta, and at the pumps, because of the diversion of water by the export facilities in the south Delta. The action to manage Old and Middle River (OMR) flow at no more negative than -5,000 cfs is in effect from January 1 through June 15, or until the average daily water temperature at Mossdale is >72°F for 7 consecutive days in June, whichever is earlier. In WY 2019, temperatures at Mossdale ("MSD" station data reported on CDEC) did not satisfy the temperature off-ramp, and OMR flow restrictions were in effect through 6/15/19.

During the January 1 through June 15 Action IV.2.3 implementation period, several preliminary loss density triggers were exceeded for older juvenile Chinook salmon. On 2/6/19, the first stage trigger (for spring-run surrogate release group 3) was exceeded, requiring OMR flow to be no more negative than -3,500 cfs for 5 consecutive days. The 5-day action response occurred from 2/8/19 to 2/12/19. On 4/4/19, the SWP salvaged 3 unclipped older juvenile Chinook salmon (loss of 4.09 older juvenile Chinook salmon), requiring OMR flow of -3,500 cfs for 5 consecutive days, beginning on 4/5, however, since the OMR was currently positive, no change in exports was required. Unmarked older juvenile Chinook salmon were salvaged on 4/19/19 and 4/20/19 (loss of 3.15 and 3.29 respectively). Due to OMR flows more positive than -3,500 cfs, no change in operations was necessary.

A summary of OMR limits in effect during WY 2019 and whether or not the limits were controlling exports is provided in Appendix A; a summary of observed OMR flows from December into June is provided in Appendix C. A summary of catch, salvage, loss at the CVP and SWP, and combined loss density during WY 2019 is provided in Appendix D (for Chinook salmon) and Appendix E (for CCV steelhead).

2.3.5 6-Year Acoustic Tag Experiment (Action IV.2.2)

The 2016 field season was the sixth and final year of the 6-year acoustic tag experiment. Action IV.2.2 requires that "at the end of the 6-year period, a status review of Action IV.2.1 shall be prepared by the DOSS group." Reclamation began releasing the final reports for the 6-year acoustic tag studies in 2018. The Six-Year Steelhead Acoustic Telemetry Study annual reports (2011 to 2016) and supplemental information have been posted to the following web page: Reclamation Six-year Acoustic Telemetry Steelhead Study. These reports will be used by DOSS to prepare a status review to assess the effectiveness of Action IV.2.1 (San Joaquin River Inflow to Export Ratio) to increase survival

through the Delta for San Joaquin River basin salmonids, and to make recommendations to NMFS, Reclamation, CDFW, DWR, and USFWS on future actions to be undertaken in the San Joaquin River basin.

2.3.6 Reduce Likelihood of Entrainment or Salvage at Export Facilities (Action IV.3)

The objective of RPA Action IV.3 is to reduce the loss of winter-run Chinook salmon, spring-run Chinook salmon, CCV steelhead, and green sturgeon by reducing CVP and SWP exports when large numbers of juvenile Chinook salmon migrate into the upper Delta region, and are at risk of entrainment into the central and south Delta. In conjunction with the two alerts for closure of the DCC (Action IV.1.1), the Third Alert is used to signal that export operations may need to be altered in the near future due to migration of large numbers of juvenile Chinook salmon into the upper Delta region.

The Third Alert is triggered if the Knights Landing Catch Index (KLCI) or Sacramento Catch Index (SCI) > 10 fish captured per day from November 1 to February 28, or > 15 fish captured per day from March 1 to April 30, from either the Knights Landing catch index or the Sacramento catch index. During November 1 to February 28, catch indices of greater than 10 fish were exceeded on 1/10/19, 1/11/19, 1/12/19, and 1/18/19 at Knights Landing RST. From March 1 to April 30, catch index of greater than 15 fish was not exceeded in the Knights Landing RST, or in the Sacramento beach seines, or trawl monitoring locations. Appendix B summarizes Knights Landing and Sacramento catch indices.

2.4 Other Topics

2.4.1 Juvenile Production Estimate for Winter-Run Chinook Salmon

Action IV.2.3 (OMR flow management) includes a loss-density trigger based on the winter-run Chinook salmon juvenile production estimate (JPE). Per the DOSS advice from 12/21/2018, the 2.5 fish/TAF and 5.0 fish/TAF minimum triggers were implemented on an interim basis and prior to NMFS' formal determination on the brood-year 2018 JPE.

NMFS issued the JPE for brood-year 2018 winter-run Chinook salmon on 2/13/2019[3]. The JPE letter was delayed this year due to the Federal shutdown which occurred from December 22 to January 28. The JPE for juvenile winter-run Chinook salmon estimated to enter the Delta in WY 2019 (juveniles from brood year 2018) was 433,176 natural-origin fish, and 86,699 juveniles from Livingston Stone National Fish Hatchery (LSNFH). An additional 82,366 juveniles released into Battle Creek are the progeny of the adult captive brood stock fish held at LSNFH.

The hatchery winter-run Chinook salmon juveniles had unique CWT codes and the Battle Creek releases had an additional external mark (clipped left pelvic fin) to be distinguished visually from other hatchery Chinook salmon releases. The authorized incidental take for juvenile winter-run Chinook salmon at the CVP and SWP fish collection facilities has been established in the NMFS BiOp as 2 percent of the JPE (based on length-at-date [LAD] criteria).

In WY 2019, Reclamation and DWR contracted with Cramer Fish Sciences to provide genetics-based run classification of unclipped juvenile Chinook salmon from the CVP and SWP fish collection

[3] NMFS brood year 2018 winter-run Chinook salmon JPE letter February 13, 2019

facilities (see Section 2.4.2, "Rapid Genetic Testing Protocol"). The use of genetic data to determine race of juvenile Chinook salmon observed at the CVP and SWP fish collection facilities eliminates the uncertainty of previous annual incidental take limits for winter-run Chinook salmon.

Therefore, the authorized level of incidental take (*i.e.,* reported as loss at the Delta fish facilities) under the ESA for the combined CVP and SWP pumping facilities for WY 2019 was set at **4,332 natural (non-clipped or wild)** winter-run Chinook salmon (1% of the JPE). The incidental take for hatchery winter-run Chinook salmon was set at **867 hatchery-produced** winter-run (1% of the LSNFH release expected to enter the Delta) and **824 hatchery-produced** winter-run Chinook salmon released into Battle Creek from the adult captive broodstock. As in WY 2016, WY 2017, and WY 2018, the two stages of the JPE-based OMR trigger for WY 2019 RPA implementation were 2.5 fish/TAF and 5.0 fish/TAF (minimum density if the JPE-based OMR trigger is less than these densities).

2.4.2 Genetic Monitoring Program

Reclamation, DWR, USFWS, CDFW, and Cramer Fish Sciences have been working to improve the effectiveness of CVP and SWP fish monitoring programs by identification of Chinook salmon runs utilizing genetic methods. Tissues have been collected from Red Bluff, Knights Landing, DJFMP, fish salvage facilities, Sacramento River fish stranding studies, and Mossdale monitoring stations. The Coordinated Genetic Monitoring Program began in 2015, but genetic results exist for earlier years (as early as 1996). The Rapid Genetic Protocol effort at the fish salvage facilities is one component of this Central Valley-Wide Genetic Monitoring Program.

2.4.2.1 Rapid Genetic Testing Protocol

Some of the action triggers in Actions IV.2.3 and IV.3 of the NMFS BiOp are based on loss or loss density of unclipped older juvenile Chinook salmon. Chinook salmon race classifications are made using LAD tables. Older juvenile Chinook salmon are those fish larger than the minimum winter-run Chinook salmon size classification that use the LAD criteria. Triggers for older juvenile Chinook salmon are primarily intended to protect natural-origin winter-run Chinook salmon, but also include natural-origin yearling spring-run Chinook salmon.

Because genetic identification of race (especially for winter-run Chinook salmon) is more accurate than the classification based on LAD tables (which often result in false positive assignments), a pilot rapid genetic testing protocol was implemented in WY 2015 by DWR and Reclamation. The objective of the protocol is to process genetic samples collected from older juvenile Chinook salmon as soon as feasible after a loss/loss density trigger for older juvenile Chinook salmon has been exceeded. Rapid genetic analysis was used to validate the race assignment based on the existing LAD table.

The rapid genetic testing protocol has the capability to quickly determine, with a high level of confidence, whether or not a salvaged fish is a winter-run Chinook salmon. This first probability selection tier is followed by establishment of second and third tier probabilities as to which race and watershed a Chinook salmon belongs to. Determination of the genetic identity of the fish could avoid or minimize the duration of export reductions triggered by the loss of fish falling within the older juvenile Chinook salmon size range that were not genetically winter-run or yearling spring-run Chinook salmon.

Reclamation and DWR more formally implemented this procedure again during WYs 2016-2019, in coordination with the CDFW, USFWS, and the NMFS. The procedure is intended to avoid (or minimize the duration of) export reductions resulting from loss of older juveniles that are not genetically ESA-listed Chinook salmon (i.e., winter-run or spring-run Chinook salmon). Actions at the CVP and SWP export facilities to meet OMR requirements are initiated, if needed, when the older juvenile Chinook salmon trigger threshold is exceeded. However, if results of tissue genetic analysis indicate that the loss or loss density of genetically-verified Chinook salmon did not exceed the trigger threshold, then changes in operations to comply with the OMR criteria required by the trigger exceedances will be cancelled.

NMFS supported the use of this protocol with two additional conditions: (1) all unclipped Chinook salmon have tissue samples collected for subsequent analysis to correctly determine annual incidental take of listed fish, and (2) clarification that the annual incidental take limit of natural winter-run Chinook salmon remains at 1% of the annual JPE. The NMFS 2009 BiOp value of 2% of the JPE for incidental take assumes that there is a 50% misclassification of winter-run Chinook salmon based on the LAD tables; the ability to genetically verify fish as winter-run Chinook salmon eliminates this uncertainty.

Rapid genetic analysis protocol was active from 12/17/2018 to 4/30/2019 during WY 2019. The older juvenile Chinook salmon trigger was exceeded on 4/4/2019 (4.61 fish per TAF), 4/19/2019 (3.15 fish per TAF), and 4/20/2019 (3.29 fish per TAF). Loss of greater than 2.5 fish per TAF, and less than 5 fish per TAF, requires exports to achieve an average net OMR flow of -3,500 cfs for a minimum of 5 consecutive days. However, due to OMR more positive than -3,500 cfs, no change in operations was necessary to meet the action response of operating to OMR no more negative than -3,500 cfs.

Therefore, it was not necessary to implement rapid genetic protocol. Nevertheless, genetic monitoring continued and genetic results were reported to DOSS throughout the operational season. Preliminary results were included in the weekly DOSS notes for: 2/12/2019, 3/5/2019, 3/19/2019, 4/2/2019, 5/7/2019, and 5/28/2019. Additionally, progress has been made to incorporate the genetic results into the publicly-accessible DFW FTP salvage database. A summary of genetic assignments from Chinook salmon collected in salvage during WY 2019 are provided in the 2019 Incidental Take Report (Appendix F).

2.4.3 Spring-Run Surrogate Releases

Coleman National Fish Hatchery (CNFH) juvenile late fall-run Chinook salmon are used as surrogates for natural yearling spring-run emigrating from Deer, Mill, and Antelope creeks. These fish are 100% marked with a clipped adipose fin and a unique CWT code before being released (Table 2-1). The CNFH late fall-run Chinook salmon are considered appropriate surrogates for yearling spring-run Chinook salmon because they are reared to a similar size to that of wild yearling spring-run Chinook salmon. To the extent possible, these salmon are released into the upper Sacramento River based on ambient turbidity and flow events that mimic natural storm events in spring-run Chinook salmon natal streams.

Table 2-1. Summary of all Water Year 2019 CNFH late fall-run Chinook salmon releases, including DOSS input to CNFH on the spring-run Chinook salmon surrogate release timing, the dates of hatchery releases, and the number of fish released per release date.

Release Type	DOSS Input	Date Released	Number of Fish Released
Production Release	No DOSS input. When possible, the production release occurs coincident with a rainfall event.	11/29/18	700,000
First Surrogate Release	~3 days after the production release and coincident with a rainfall event.	12/3/18	61,277
Second Surrogate Release	Late December, ideally preceding (by ~3-7 days) a precipitation event and at least a week after the previous surrogate release.	12/14/18	66,266
Third Surrogate Release	Ideally preceding (by ~3-7 days) a precipitation event and at least a week after the previous surrogate release.	1/4/19	73,952

After each release, DOSS tracked the cumulative loss of each spring-run Chinook salmon surrogate group at the CVP and SWP fish salvage facilities in the south Delta to ensure the cumulative percent loss did not exceed the incidental take limit of 1.0% for each individual release group. Cumulative loss exceeding 0.5% of each individual release group would trigger an action response of export reductions as specified in RPA Action IV.3 or more positive OMR flow as specified in RPA Action IV.2.3. In WY 2019, losses of 0.110%, 0.037%, and 0.618% were observed for the first, second, and third spring-run Chinook salmon surrogate release groups, respectively (Table 2-2). The percent loss of the third release group exceeded the 0.5% cumulative loss on 2/5/2019, triggering an action response requiring OMR flow to be no more negative than -3,500 cfs for 5 consecutive days. The 5-day action response occurred from 2/8/2019 through 2/12/2019.

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Table 2-2. Confirmed hatchery Chinook salmon loss at the SWP and CVP Delta fish salvage facilities.

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 Stage Trigg	Date of First Loss[4]	Date of Last Loss[4]
12/3/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	67.33	61,277	n/a	0.110	n/a	0.5%	12/27/2018	2/16/2019
12/14/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	24.57	66,266	n/a	0.037	n/a	0.5%	12/27/2018	2/10/2019
1/4/2019	LF	Coleman NFH	Battle Creek	Spring Surrogate	457.26	73,952	n/a	0.618	n/a	0.5%	1/16/2019	2/20/2019

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2018 through 6/18/2019.

[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

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2.4.4 Salvage Facility Operations

2.4.4.1 Large Chinook salmon salvaged at the DWR Skinner Delta Fish Protective Facility

High numbers (n = 103) of adult Chinook salmon (greater than 300 mm fork length [FL]) were salvaged at the Skinner Delta Fish Protective Facility in WY 2017. Repairs to the trash rack gratings to reduce overlarge gaps were conducted in March 2017 and a reduction in salvage of large Chinook salmon was noted in WY 2018 (n = 2). In WY 2019, a single Chinook salmon larger than 300 mm FL was salvaged in a routine count on 2/16/2019. This fish was 436 mm FL, with an adipose fin clip. It was expanded to a salvage of n = 4 because it was salvaged during a routine 30-minute count.

2.4.4.2 High fall-run Chinook salmon salvage in February and March

Beginning in February through roughly the end of March, the fish salvage facilities (primarily the federal salvage facility) collected large numbers of fry and smolt Chinook salmon, which were classified as natural origin fall-run Chinook salmon based on length-at-date criteria. The fish salvage facilities collected 1,080 individuals during February to March, which expanded to an estimated salvage of 3,629 Chinook salmon. The length range of these smaller juveniles were 27 to 65 mm FL (mean FL = 38 mm). The mean length increased slightly from February (mean FL = 37 mm) to March (mean FL = 41 mm), indicating similar hatching dates and subsequent rearing among this cohort during this period.

Discussion among the DOSS group suggested that due to the small size, implying short transport distances, these fish likely originated in the San Joaquin basin. Further, rivers in the San Joaquin basin were experiencing very high flows (February mean flow at Vernalis was 8,698 cfs, over four times the WY 2018 February average) and dams in the basin were conducting flood releases coincident with this salvage pulse. In the beginning of February, the Stanislaus Operations Group, with NMFS's concurrence, conducted a Winter Instability Flow action to inundate restoration areas and redistribute fall-run Chinook salmon fry.

These flow actions may have contributed to the pulse of fall-run Chinook salmon salvage at the fish salvage facilities. Juvenile salmon leave their natal rivers at different sizes, ages, and times of year. This life history diversity contributes to their population sustainability and recovery efforts. Furthermore, research indicates that salmon fry that outmigrate during wet years contribute relatively more to the spawning population than do salmon fry that outmigrate during dry years (Sturrock et al. 2015). The Stanislaus Operations Group pulse flow management actions aimed, among other objectives, to maintain this variation in salmonid life history.

2.4.4.3 Reduced counts and predator/debris flushes at the State Water Project Skinner Delta Fish Protective Facility

The Skinner Delta Fish Protective Facility (SDFPF) salvages fish diverted from the primary channel supplying water to the California Aqueduct. A system of louvers and bypasses guide fish into holding tanks where they are transported to release sites beyond the influence of the export pumps. To detect protected species and characterize populations of salvaged fish, the SDFPF conducts a systematic subsample of salvage by conducting periodic fish counts.

The NMFS BiOp mandated a sampling rate of "no less than 30 minutes every 2 hours (25 percent of operational time) year-round to increase the accuracy of salvage estimates used in the determination of trigger levels." Reductions in count times are noted on the salvage operations datasheets and included as a comment in the salvage database (available online at CDFW salvage database).

The Tracy Fish Collection Facility does not reduce counts for vegetation flow issues and high fish counts; unlike the SDFPF, maintenance-related salvage interruptions at TFCF have not previously been discussed in DOSS annual reports. Reduced counts (< 30 minutes) were reported on 30 days within the DOSS salvage monitoring period in WY 2019 (9/24/2018 – 6/15/2019; Table 2-3). This is a higher number than WY 2018 (n = 22 days), but fewer than the number reported for the prior water year (WY 2017, n = 41 days), which was a record-setting export year.

Early in WY 2019, the reasons noted for salvage time reductions were most commonly facility maintenance or high aquatic vegetation or debris flow; later in the year high fish numbers were noted more frequently. The operation of a mechanical harvester at the SWP and Clifton Court Forebay early in the water year may have contributed to higher volumes of vegetation debris entering the facility and impairing salvage counts.

In WY 2019 predator/debris flushes were typically scheduled for Tuesdays. There were predator/debris flushes 37 days from 10/1/2018 (start of WY 2019) 6/9/2019, lower than the number of days in WY 2018 (n = 52 days) and WY 2017 (n = 73 days). The weekly rate varied from 0 to 6 flushes per week, with October and March having the highest monthly rate (n = 12 flushes) followed by December and February (n = 9 flushes).

Table 2-3. SWP reduced counts. Proportion of export hours in which counts were less than 30 minutes.

Reporting Period	M	T	W	Th	F	S	Su	Avg.
9/24 - 9/30	8%	0	0	29%	67%	62%	79%	31%
10/1 - 10/7	100%	80%	75%	88%	67%	75%	83%	81%
10/8 - 10/14	88%	67%	0	0	0	0	0	22%
10/15 - 10/21	0	0	0	0	0	25%	0	4%
10/22 - 10/28	0	0	0	0	0	0	0	0
10/29 - 11/4	0	0	0	0	0	0	13%	2%
11/5 - 11/11	0	0	0	0	0	0	0	0
11/12 - 11/18	0	0	0	0	0	0	0	0
11/19 - 11/25	0	0	0	0	0	0	0	0
11/26 - 12/2	0	0	0	0	0	0	0	0
12/3 - 12/9	0	0	0	0	0	0	0	0
12/10 - 12/16	0	0	0	0	0	0	0	0
12/17 - 12/23	0	0	0	0	0	0	0	0

Reporting Period	M	T	W	Th	F	S	Su	Avg.
12/24 - 12/30	0	0	0	33%	54%	8%	0	14%
12/31 - 1/6/19	54%	29%	0	0	0	0	0	12%
1/7 - 1/13	47%	4%	0	0	0	0	0	7%
1/14 - 1/20	0	0	0	0	0	0	0	0
1/21 - 1/27	0	0	0	0	0	0	0	0
1/28 - 2/3	0	0	0	0	0	0	30%	4%
2/4 - 2/10	0	0	0	0	0	0	0	0
2/11 - 2/17	0	0	8%	0	0	0	0	1%
2/18 - 2/24	0	0	0	25%	0	0	0	4%
2/25 - 3/3	0	0	0	0	0	0	0	0
3/4 - 3/10	0	0	0	0	0	0	0	0
3/11 - 3/17	0	0	0	0	0	0	0	0
3/18 - 3/24	0	0	0	0	0	0	0	0
3/25 - 3/31	0	0	0	0	0	0	0	0
4/1 - 4/7	0	0	0	0	0	0	0	0
4/8 - 4/14	0	0	0	0	0	0	0	0
4/15 - 4/21	0	0	0	0	0	0	0	0
4/22 - 4/28	0	0	0	0	0	0	0	0
4/29 - 5/5	0	0	0	0	7%	0	0	1%
5/6 - 5/12	0	0	0	0	0	0	0	0
5/13 - 5/19	0	0	0	0	0	0	0	0
5/20 - 5/26	6%	0	0	0	0	0	0	1%
5/27 - 6/2	0	0	0	0	0	0	0	0
6/3 - 6/9	0	0	0	4%	13%	0	0	2%
6/10-6/16	0	8%	17%	0	0	33%	29%	12%

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2.4.5 Water Infrastructure Improvement for the Nation Act

In December 2016, Congress passed the Water Infrastructure Improvements for the Nation (WIIN) Act[4]. Subtitle J of the WIIN Act relates to California water issues and specifies certain operational changes to the way CVP and SWP water management occurs under the 2008 USFWS and 2009 NMFS BiOps on long-term operations of the CVP and SWP. Sections 4001 ("Operations and Reviews"), 4002 ("Scientifically Supported Implementation of OMR Flow Requirements"), and 4003 ("Temporary Operational Flexibility for Storm Events") have the provisions most likely to affect implementation of the Delta actions in the RPA.

No WIIN Act implementations occurred during WY 2019. OMR (NMFS RPA Action IV.2.3) was not a controlling regulatory factor when qualifying storms occurred this year. Hydrological conditions were such that the physical capacity of the CVP and SWP export facilities were limiting water exports during the time of year that Section 4003 was in effect.

2.4.6 Smelt Working Group

SWG participants who also participated in the DOSS calls provided updates each week from SWG meetings. Updates included status of existing or pending determinations from USFWS for delta smelt, and CDFW for longfin smelt. SWG meeting notes, advice, determinations, and other documentation can be found here: US Fish and Wildlife Service's Smelt Working Group weekly notes.

[4] Text of WIIN Act Bill - 114th Congress December 16, 2016. The "California Water" provisions are in Subtitle J, starting at Section 4001 (the "Enrolled Bill" version has a hotlinked table of contents).

Chapter 3 WY 2019 OPERATIONS SUMMARY

3.1 Water Year 2019

The final WY 2019 hydrologic year type in the Sacramento basin and San Joaquin river basin were both classified as "Wet" based on the May runoff forecast. Both basins, however, started WY 2019 as "Below Normal" (based on the previous year's year type). The Sacramento basin year type remained "Below Normal" (based on the January and February 2019 forecasts), to "Wet" (based on the March and April 2019 forecasts). The San Joaquin basin year type shifted to "Dry" (based on the January 2019 forecast), to "Above Normal" (based on the March 2019 forecast), and to "Wet" (based on the April 2019 forecast).

A summary of WY 2019 operations and controlling factors is provided in Appendix A; some summary operations charts are provided below in Figure 3-1, Figure 3-2, Figure 3-3, and Figure 3-4.

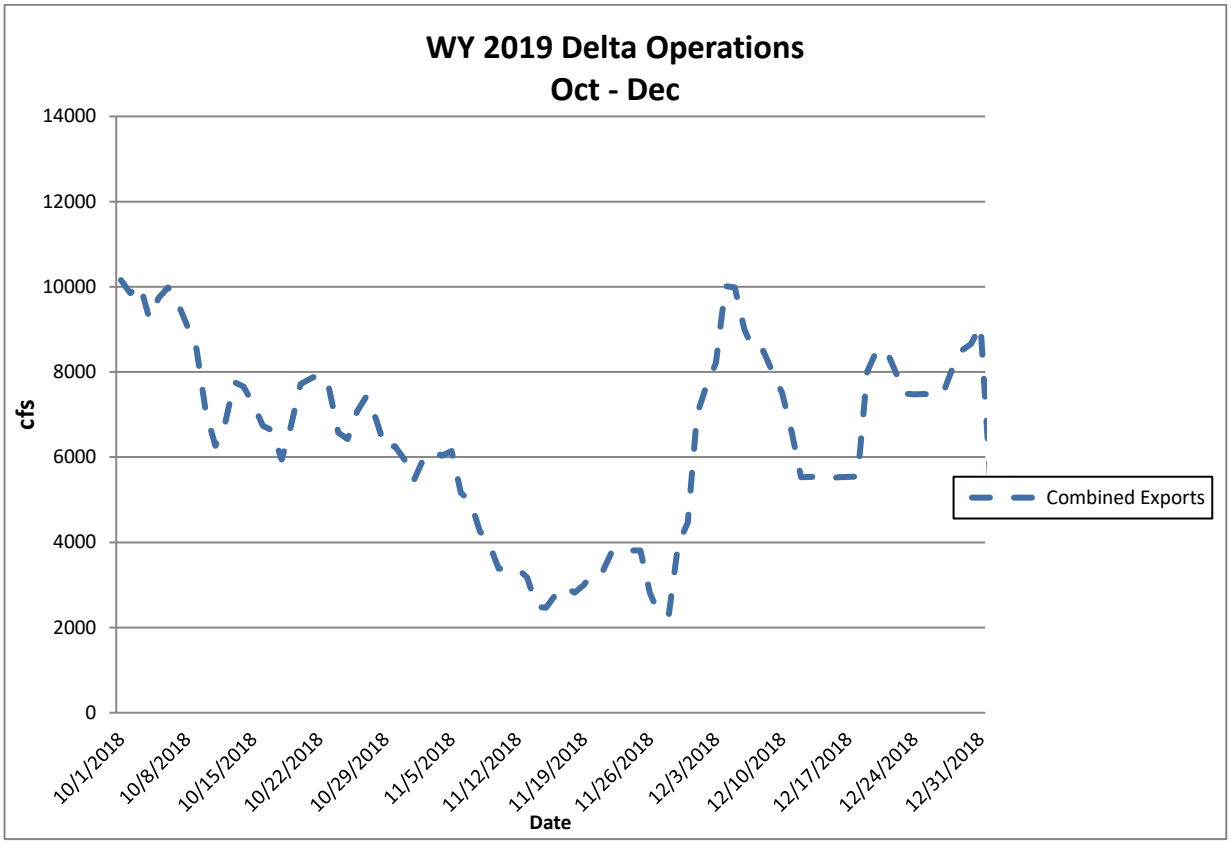

Figure 3-1. Combined exports at the CVP and SWP from October through December 2018.

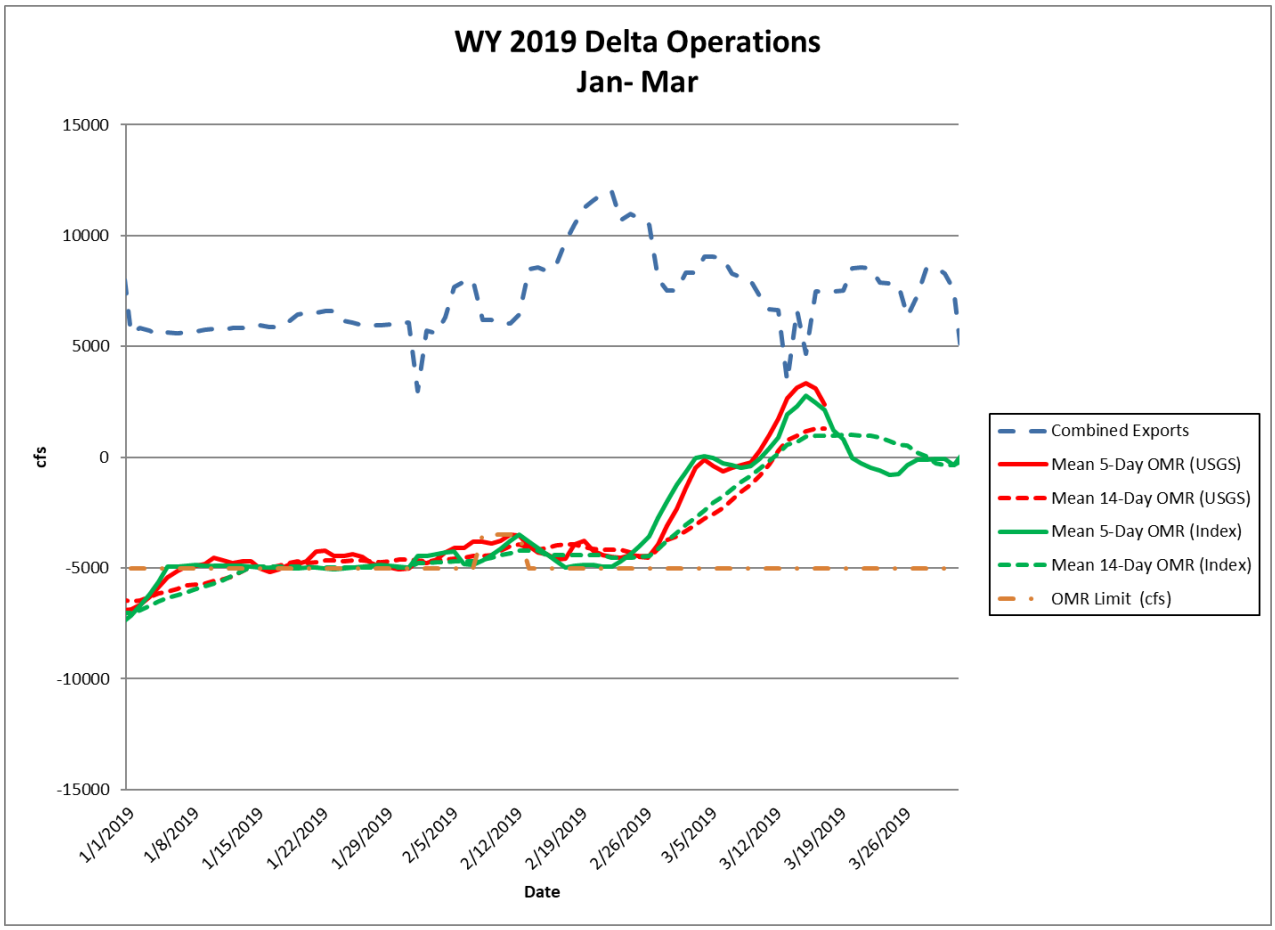

Figure 3-2. Combined exports at the CVP and SWP and Old and Middle river flows from January through March 2019.

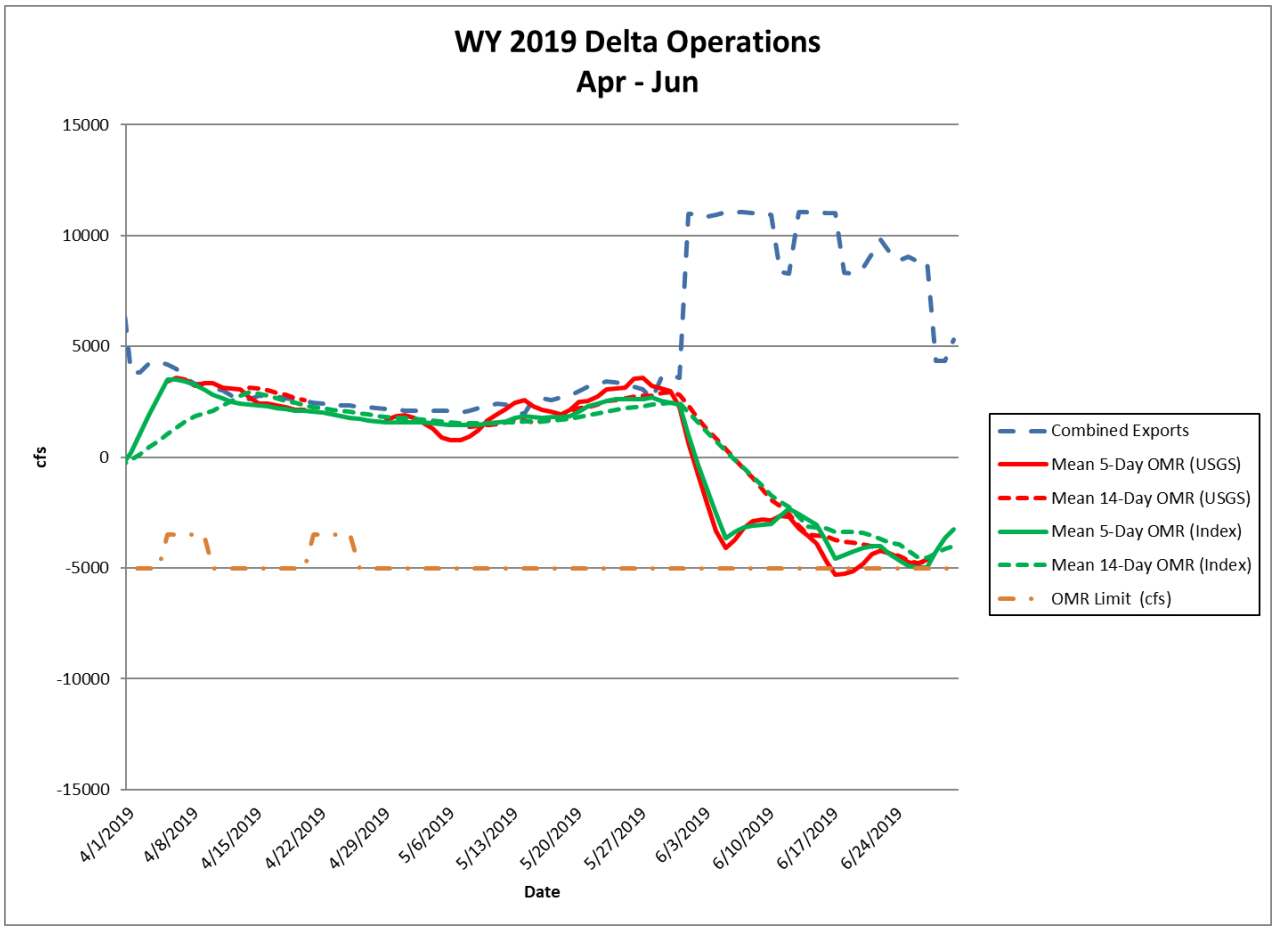

Figure 3-3. Combined exports at the CVP and SWP and Old and Middle river flows from April through June 2019.

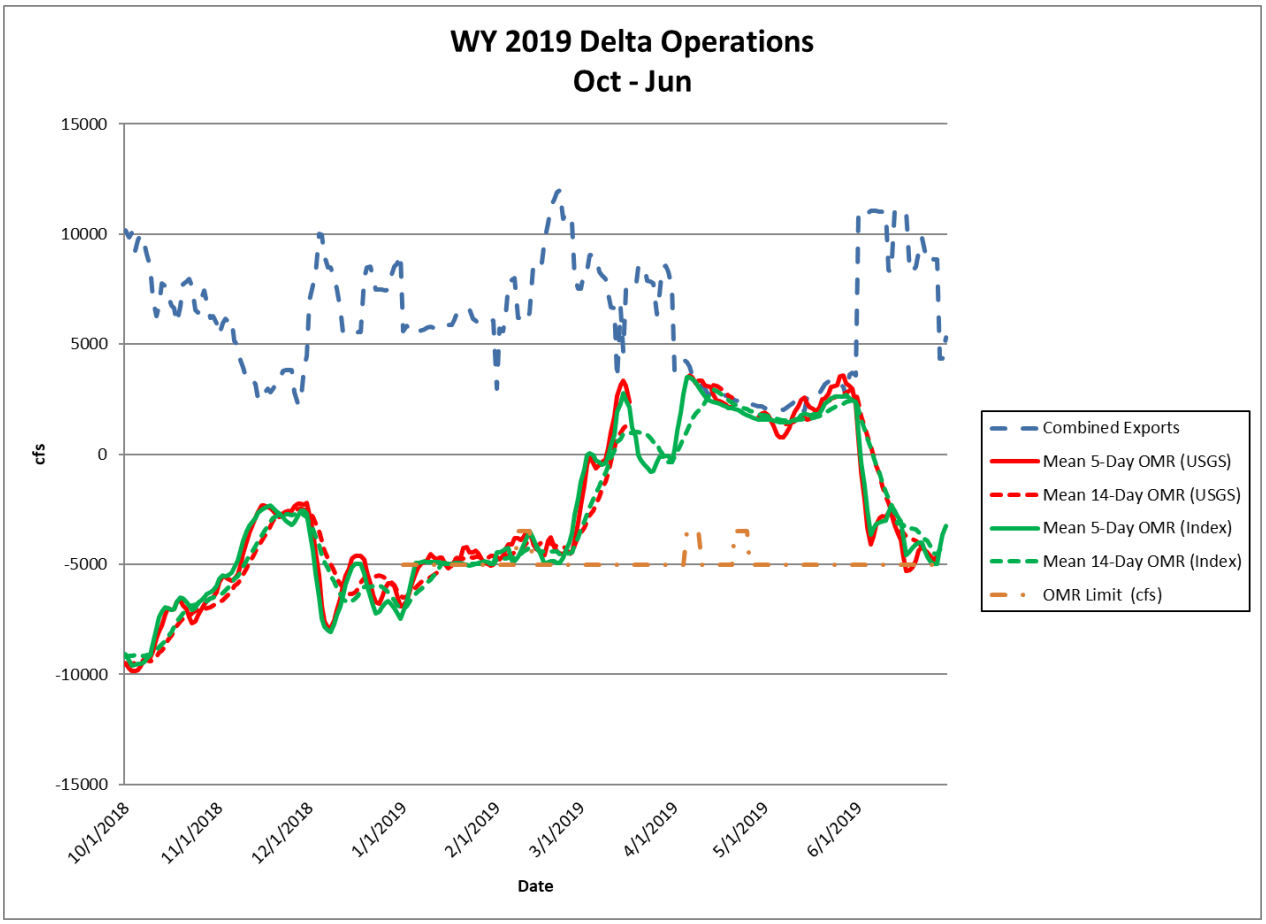

Figure 3-4. Combined exports at the CVP and SWP and Old and Middle river flows from October 2018 through June 2019.

Chapter 4 MONITORING ACTIVITIES

4.1 WY 2019 Incidental Take Report

The WY 2019 Incidental Take Report, included as Appendix F, is a NMFS 2009 BiOp requirement prepared by DWR and Reclamation that provides a detailed summary of incidental take during WY 2019 at the CVP and SWP export facilities in the south Delta.

4.2 WY 2019 Monitoring summary

4.2.1 WY 2019 Overview

Section 11.2.1.3., "Reporting and Monitoring," of the 2009 RPA with 2011 amendments, provides specific guidelines for fish monitoring and reporting. From October to mid-June, DOSS meets weekly and reviews a suite of fish monitoring information, which is summarized in the DOSS notes[5]. Some key monitoring data include:

- GCID rotary screw traps
- Tisdale rotary screw traps
- Knights Landing rotary screw traps
- Sacramento Regional beach seines
- Sacramento River Kodiak trawls
- Chipps Island Midwater trawls
- Mossdale Kodiak trawls
- Butte Creek Fyke and RST
- Feather River RST
- Lower American River RST

In WY 2019, in addition to the location-specific monitoring datasheets posted online or distributed via e-mail, DOSS used two web-based tools to support our review of fish monitoring and hydrologic data:

- Bay Delta Live: Bay Delta Live website
- SacPAS: Sacramento Prediction & Assessment of Salmon website available at: SacPas website

Bay Delta Live includes a "DOSS Dashboard" (click on the "Triggers and Indices" tab at the link given above) that summarizes monitoring catch and data over the past week, calculates and compiles recent catch indices and flow alerts relevant for DCC operations, and compiles recent

[5] WY 2019 DOSS notes are available at: NMFS Weekly DOSS Notes WY 2019

hydrologic and water operations data (including salvage) for convenient review by the DOSS group.

SacPAS is a web-based application that queries repositories of data from monitoring programs and integrates monitoring results in a single, publicly-accessible website. Real-time data were available for six out of the eight monitoring areas listed earlier in this section (RST data from GCID were not available in real-time).

Summary figures of winter-run Chinook salmon, spring-run Chinook salmon, and CCV steelhead cohort monitoring at the six real-time areas are presented in Figures 4-1 through 4-3 below. In addition, fish monitoring data at the six real-time areas were plotted to track three categories of fish: unmarked older juvenile Chinook salmon, unmarked fry/smolt Chinook salmon, and unmarked CCV steelhead. These figures plotted fish catch/passage from each monitoring area along with environmental variables associated with fish migration cues, including temperature (°C), flow (cfs), and turbidity (NTU/FTU). The additional figures can be found in Appendix G, Figure G-1 through Figure G-30. Collectively, the plots of data from the monitoring areas were used by DOSS members to assess movement, timing, and distribution of fish from the upper Sacramento River to the Delta, from the San Joaquin River to the Delta, and the number of fish exiting the Delta. These assessments, along with other available data, were used to produce DOSS' weekly distribution estimates of listed salmonids and to determine the entrainment risk for the interior Delta and CVP and SWP export facilities.

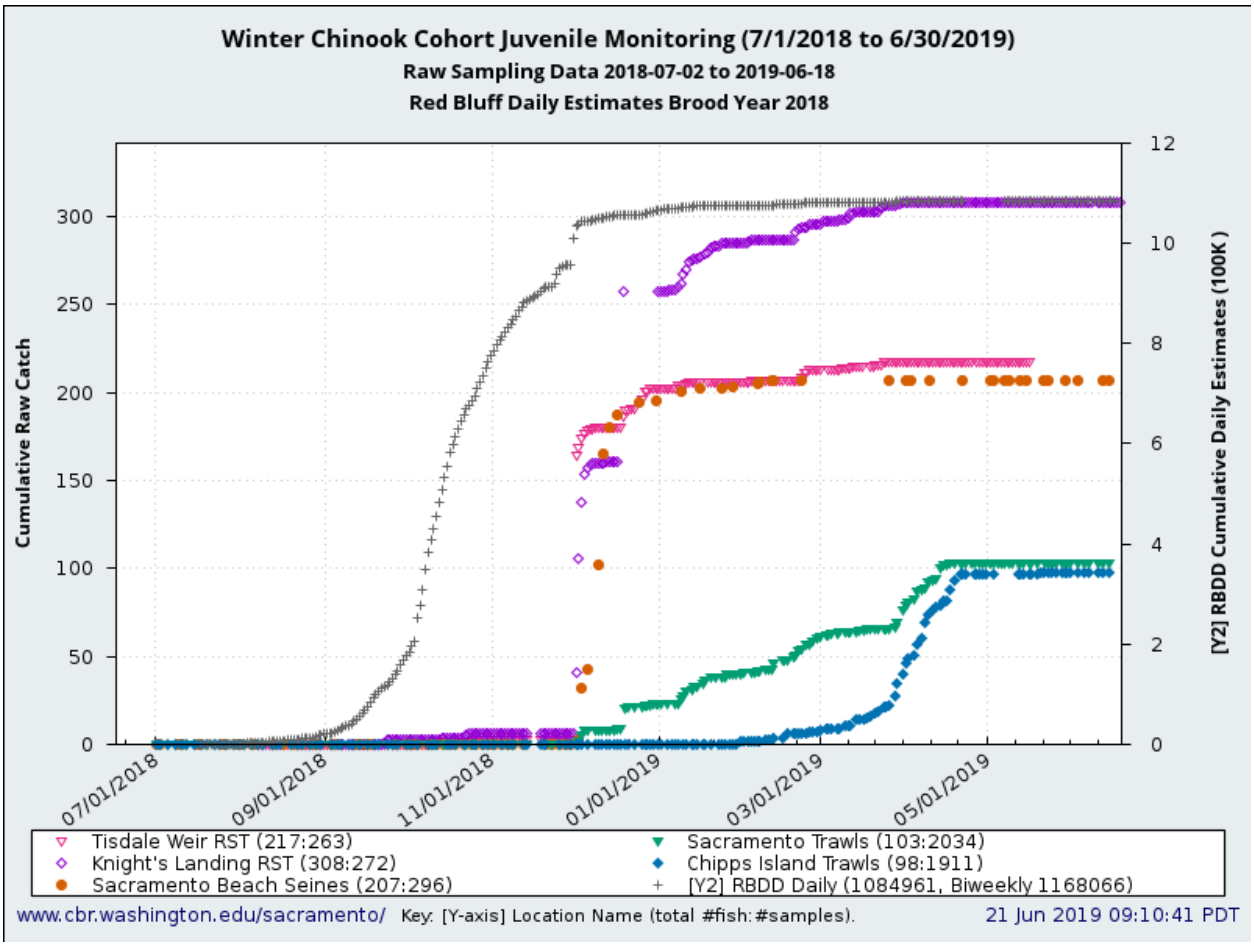

Figure 4-1. Cumulative catch of brood year 2018 juvenile winter-run Chinook salmon at six monitoring locations: Red Bluff Diversion Dam, Tisdale Weir, Knights Landing, Sacramento Beach Seine sites, Sacramento Trawl sites, and Chipps Island Trawl sites for Water Year 2019.

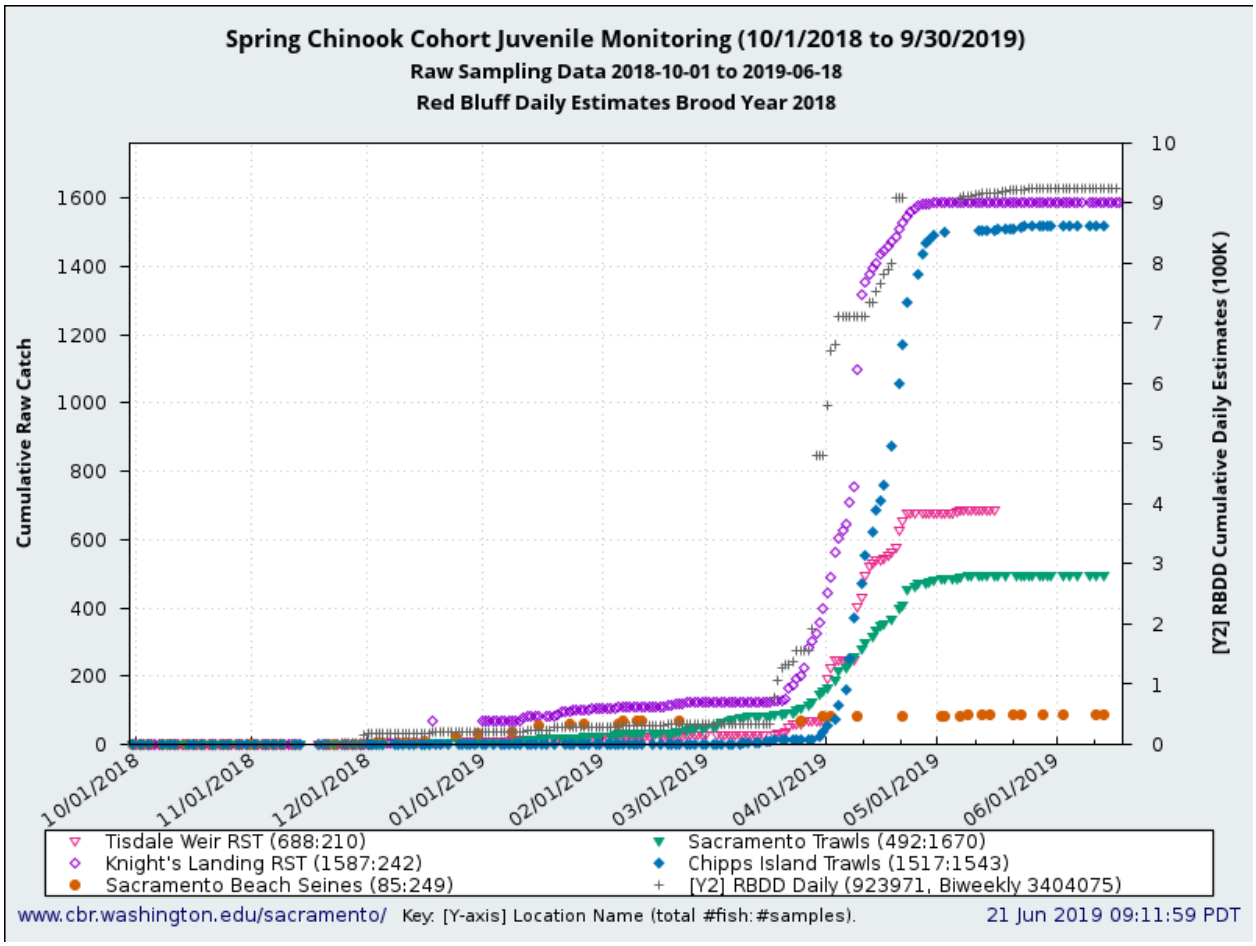

Figure 4-2. Cumulative catch of brood year 2018 juvenile spring-run Chinook at six monitoring locations: Red Bluff Diversion Dam, Tisdale Weir, Knights Landing, Sacramento Beach Seine sites, Sacramento Trawl sites, and Chipps Island Trawl sites for Water Year 2019.

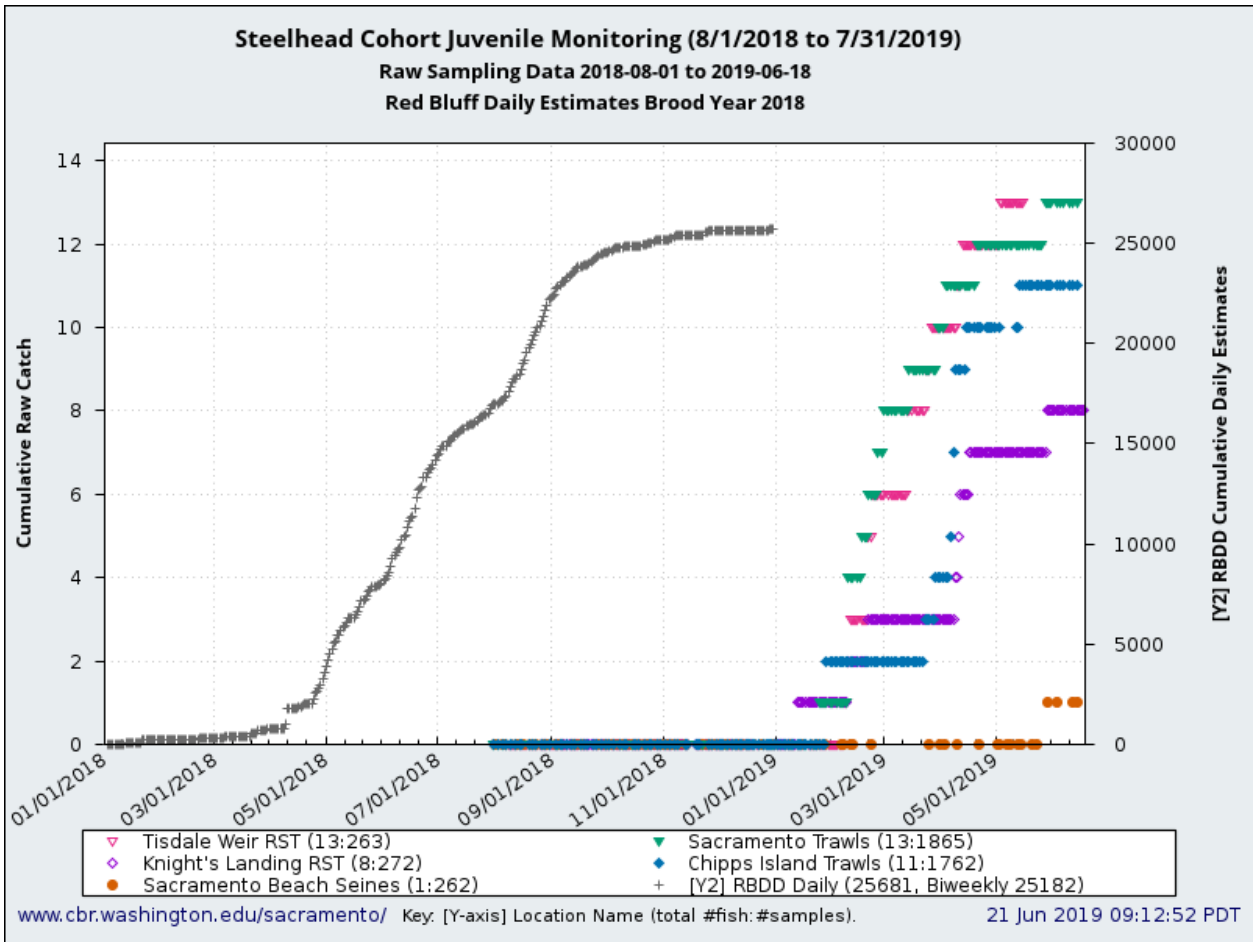

Figure 4-3. Cumulative catch of juvenile steelhead at six monitoring locations: Red Bluff Diversion Dam, Tisdale Weir, Knights Landing, Sacramento Beach Seine sites, Sacramento Trawl sites, and Chipps Island Trawl sites for Water Year 2019.

4.2.2 Acoustic tracking

During WY 2019, NMFS' Southwest Fisheries Science Center (SWFSC) shared with DOSS preliminary acoustic tracking results from a variety of releases of acoustic-tagged Chinook salmon in the Sacramento River watershed. The SWFSC, in conjunction with other State and Federal agencies, hosted a publicly-accessible website that provided preliminary information in both tabular and graphic formats. Website available at: Central Valley Enhanced Acoustic Tagging Project website.

DOSS tracked the LSNFH releases of acoustic-tagged hatchery winter-run Chinook salmon closely, since those fish served as "tracers" for the hatchery winter-run Chinook salmon production release, which is one of the loss-density triggers in Action IV.2.3. Information on other releases was of interest mainly for information on travel times from the release point.

Unless noted otherwise, the preliminary results reported below represent daily tag detections at the telemetered acoustic receivers in the Sacramento River at the Tower Bridge and I-80/Hwy 50 Bridge in Sacramento and receivers farther downstream within Georgiana Slough. Approximately 650 hatchery winter-run Chinook salmon were released into the Sacramento River at Caldwell Park on 2/14/2019 in Redding, California. Approximately 500 hatchery winter-run Chinook salmon were released into the north fork Battle Creek on 3/26/2019. See Table 4-1 through Table 4-4, and Figure 4-4 and Figure 4-5 for details of detections in the lower Sacramento River near the City of Sacramento. Data are preliminary and the tabulated results may change in light of future analysis of the acoustic tag receiver data.

Table 4-1. Summary data for acoustically-tagged hatchery origin winter-run Chinook salmon.

Release Time	Number of Fish Released	Release Location	Release river kilometer (rkm)	Mean Length (mm)	Mean Weight (gms)
2019-02-14 18:30:00	650	Caldwell Park Release site	551.288	93.9	9
2019-03-26 09:30:00	500	NF Battle Creek	536.234	88.5	7.3

Table 4-2. Minimum survival of acoustically-tagged hatchery origin winter-run Chinook salmon to Tower Bridge (using CJS survival model).

Release Group	Survival %	SE	95% lower C.I.	95% upper C.I.	Detection Efficiency (%)
All	24.4	2.2	20.5	28.9	57.0

Release Group	Survival %	SE	95% lower C.I.	95% upper C.I.	Detection Efficiency (%)
Caldwell Park Release Group	25.4	1.9	22	29.3	67.7
NF Battle Creek Release Group	23.3	2.4	18.9	28.4	46.3

Table 4-3. Detections for the Caldwell Park release group of acoustically-tagged hatchery origin winter-run Chinook salmon.

General Location	First Arrival	Mean Arrival	Fish Count	Percent Arrived	rkm
Tower Bridge	2019-02-20 23:57:58	2019-03-14 22:35:13	112	17.23	172.000
I80-US 50 Bridge	2019-02-20 03:41:36	2019-03-16 10:30:06	127	19.54	170.748
Georgiana Slough	2019-02-20 22:25:02	2019-03-15 15:32:46	21	3.23	119.208

Table 4-4. Detections for the Battle Creek release group of acoustically-tagged hatchery origin winter-run Chinook salmon.

General Location	First Arrival	Mean Arrival	Fish Count	Percent Arrived	rkm
Tower Bridge	2019-04-02 21:20:43	2019-04-10 21:42:20	54	10.8	172.000
I80-US 50 Bridge	2019-04-02 04:03:44	2019-04-13 22:28:43	82	16.4	170.748
Georgiana Slough	2019-04-03 07:13:19	2019-04-09 22:25:55	22	4.4	119.208

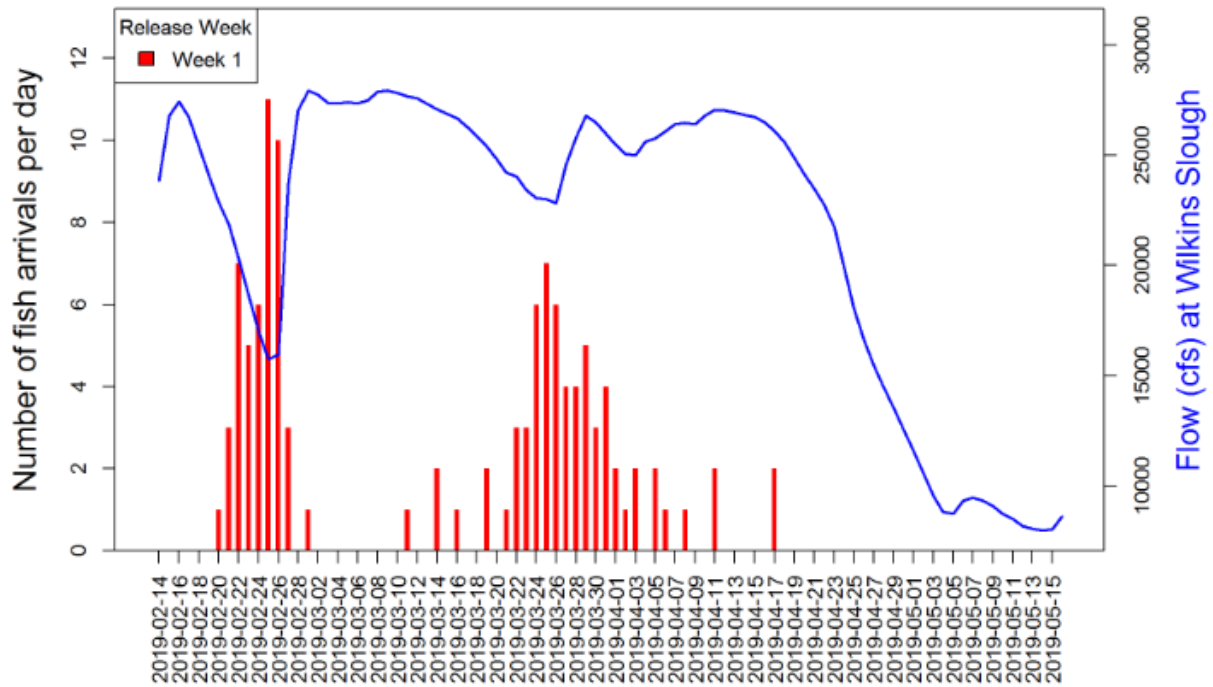

Figure 4-4. Detections of acoustically-tagged hatchery origin winter-run Chinook salmon (Caldwell Park release) at Tower Bridge (downtown Sacramento) versus Sacramento River flows at Wilkins Slough.

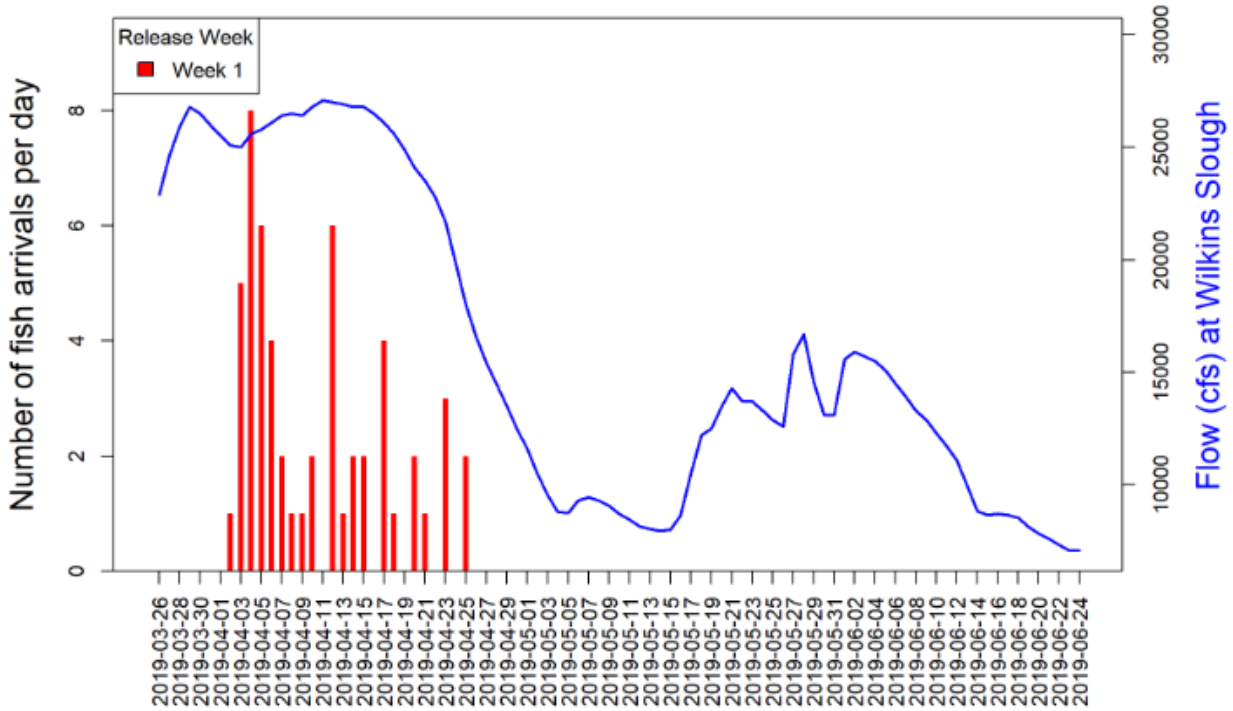

Figure 4-5. Detections of acoustically-tagged hatchery origin winter-run Chinook salmon (Battle Creek release) at Tower Bridge (downtown Sacramento) versus Sacramento River flows at Wilkins Slough.

4.2.3 Spring Kodiak Trawl Summary

The California Department of Fish and Wildlife (CDFW) conducts the Spring Kodiak Trawl Survey (SKT) annually to determine the distribution and relative abundance of adult Delta Smelt (*Hypomesus transpacificus*), which is endemic to the San Francisco Estuary, and is listed under the California and United States Endangered Species Acts. The SKT is routinely conducted from January to May but was expanded into December starting in 2014. The SKT conducts one survey each month, which consists of sampling 40 stations throughout the upper San Francisco Estuary (example below, Figure 4-6). Each station is sampled using a Kodiak Trawl, which is towed between two boats at the water's surface for 10 minutes.

Data from the SKT is reported weekly to the SWG, DOSS, and the Data Assessment Team (DAT) to help inform adaptive management decisions. SKT catch summaries are publicly available through the SKT webpage, typically within a week of sampling efforts. The webpage provides catch distribution maps for all species collected (example below, Figure 4-7), along with information on Delta Smelt gender and reproductive maturity, and Chinook salmon adipose fin status and race information based on length-at-date and CWT results.

Preliminary Spring Kodiak Trawl Chinook Salmon and Steelhead Catch Survey 4, 2019

Survey Conducted 4/15/2019 – 4/18/2019. Table prepared by Trishelle Tempel on 4/23/2019.
Race determined using Delta Model length at date.

Station	# of Fish	Fall Run Chinook		Spring Run Chinook		Winter Run Chinook		Late Fall Run Chinook		Steelhead		
		Clipped	Not Clipped	Clipped	Not Clipped	Clipped	Not Clipped	Clipped	Not Clipped	Clipped	Not Clipped	
340	7			1	6							Suisun Bay & West
405	4	1		1	2							
411	1			1								
418	28		2	7	19							
501	1				1							
504	2		1	1								
519	5	1		3	1							
602	4			1	3							
606	0											
609	1				1							
610	1		1									
508	5	1		1	3							Confluence
513	6	1	1	1	3							
520	16			6	10							
801	7	1	1	1	4							
804	1			1								
704	2			1	1							Sac River System
706	3		2		1							
707	7		2	2	3							
711	5	1		1	3							
712	3			1	2							
713	3				3							
715	2				2							
716	1			1								
719	3			2	1							
724	2		1		1							
809	8			1	7							South & Central Delta
812	9		4	2	3							
815	3			1	2							
902	0											
906	0											
910	4				4							
912	0											
914	0											
915	0											
919	6		1	1	4							
920	0											
921	3		2		1							
922	3		1		2							
923	0											
Totals:	156	6	19	38	93	0	0	0	0	0	0	
Range of FL (mm):		77-80	66-81	81-106	82-116							

Figure 4-6. Example of SKT data report to DOSS.

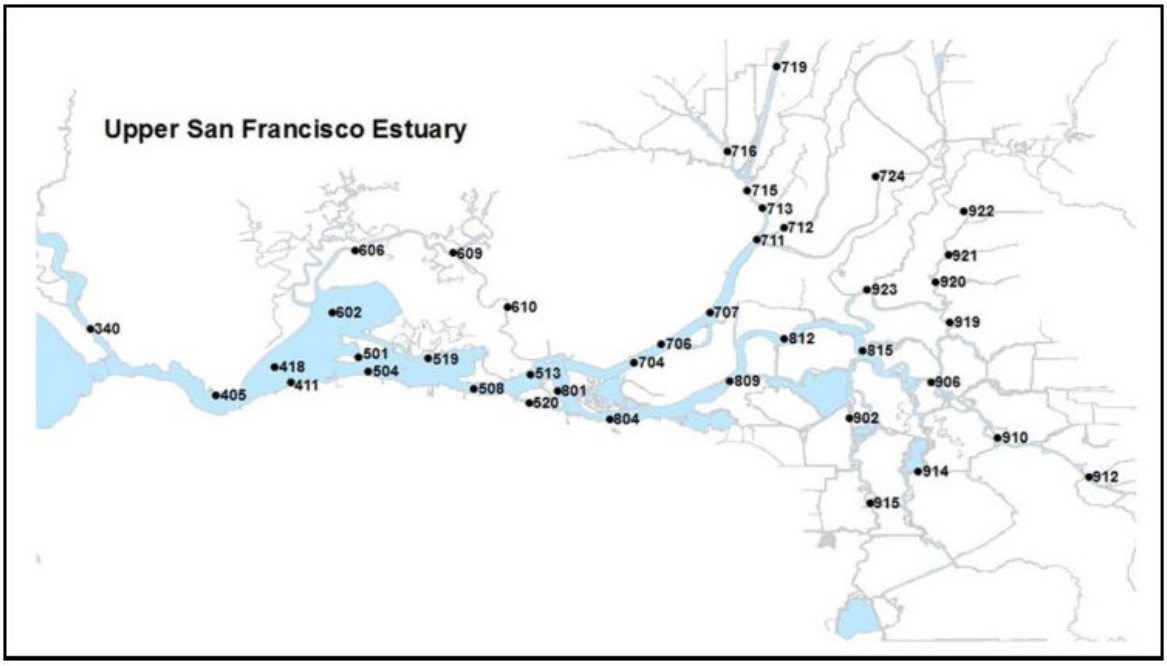

Figure 4-7. CDFW's Spring Kodiak Trawl Stations Locations.

4.2.4 WY 2019 Monitoring Gaps

4.2.4.1 Red Bluff Diversion Dam Rotary Screw Traps

The majority of monitoring gaps at the RBDD RSTs during WY 2019 were due to high runoff events with concurrent heavy debris loading on the screens of the RSTs, high catches of hatchery Chinook salmon following upstream hatchery releases, or holidays. Table 4-5 lists the gaps in sampling at the RBDD RSTs.

Table 4-5. Biweekly sampling history during WY 2019 at the Red Bluff Diversion Dam Rotary Screw Traps during the period of weekly DOSS calls.

Biweekly Sampling Dates	Gap in Sampling (days)	Date(s) of No Sampling	Primary Reason for No Sampling
9/24 – 10/7	No gap		
10/8 – 10/21	No gap		
10/22 – 11/4	No gap		
11/5 – 11/18	No gap		
11/19 – 12/2	4 days	11/22-23, 29-30	11/22-23: Holiday; 11/29-30: Storm debris
12/3 – 12/16	2 days	12/5/2006	
12/17 – 12/31	4 days	12/17-18, 25-26	12/25-26: Holiday
1/1 – 1/14	3 days	1/7-8, 10	
1/15 – 1/28	5 days	1/16-18, 21-22	

Biweekly Sampling Dates	Gap in Sampling (days)	Date(s) of No Sampling	Primary Reason for No Sampling
1/29 – 2/11	6 days	1/30, 2/2-5, 10	
2/12 – 2/25	4 days	2/14/2017	2/14-17: Storm debris
2/26 – 3/11	14 days	2/26-3/11	2/26-3/11: High flows
3/12 – 3/25	8 days	3/12-18, 23	3/12-18: High flows
3/26 – 4/8	8 days	3/26-28, 3/31-4/1, 6-8	
4/9 – 4/22	7 days	4/9-12, 14, 21-22	
4/23 – 5/6	3 days	5/4/2006	
5/7 – 5/20	2 days	5/17, 19	
5/21 – 6/3	5 days	5/27-28, 31, 6/2-3	
6/4 – 6/17	1 day	10-Jun	

For the purposes of DOSS, RBDD RST data are used in conjunction with other downstream sampling sites to track movement of juvenile salmonids through the Sacramento River. While the monitoring gaps at RBDD occurred during the emigration period of ESA-listed salmonids, DOSS generally had information from RSTs downstream (GCID, Tisdale, or Knights Landing) and so had information to assess distribution of ESA-listed species in the Sacramento River. Since RBDD data are not used solely as the basis for any alert or trigger in the NMFS BiOp, no RPA implementation was impacted by sampling gaps at RBDD.

4.2.4.2 Glenn Colusa Irrigation District Rotary Screw Trap

Sampling at the GCID RST was suspended relatively frequently for much of WY 2019 (Table 4-6). The initial sampling gap beginning October 6 was due to an unanticipated spike in turbidity and debris following rain events along with a high level of winter-run Chinook salmon mortality in the live well. The additional mortalities exceeded the annual incidental take level permitted by CDFW for juvenile winter-run Chinook salmon for the GCID monitoring program. GCID resumed sampling November 20. The majority of sampling gaps from December through June were primarily due to heavy debris or log jams in the RST. Sampling gaps in December and May were due to debris and hatchery releases of Chinook salmon.

Table 4-6. Number of days per month during WY 2019 that sampling was suspended at the GCID rotary screw trap.

Month	Gap in Sampling (days)	Date(s) of No Sampling	Primary Reason for No Sampling
October	25	10/6-10/31	Unanticipated spike in turbidity and debris following rain events concurrent with a high level of winter run Chinook salmon mortality; additional mortalities exceeded the annual incidental take level permitted by CDFW

Month	Gap in Sampling (days)	Date(s) of No Sampling	Primary Reason for No Sampling
November	22	11/1-11/20, 11/29-11/30	11/1-20: Unanticipated spike in turbidity and debris following rain events concurrent with a high level of winter run Chinook salmon mortality; additional mortalities exceeded the annual incidental take level permitted by CDFW; 11/29-30: Predicted high flows and release of hatchery late-fall run Chinook salmon
December	13	12/1-12/3, 12/17-12/22, 12/25-12/28	12/1-3: Predicted high flows and release of hatchery late-fall run Chinook salmon; 12/17-22: Predicted high flows and debris; 12/25-28: Predicted high flows and debris
January	17	1/5-1/12, 1/16-1/24, 1/29-1/30	1/5-12: Predicted high flows and heavy debris; 1/16-1/24: Predicted high flows and heavy debris; 1/29-30: Large tree caught on debris deflector
February	19	2/2-2/7, 2/14-2/20, 2/22-2/28	2/2-7: Predicted high flows; 2/14-20: Tree jammed in cone, high debris, and predicted high flows; 2/22-28: Predicted high flows
March	31	3/1-3/31	High flows
April	25	4/1-4/25	High flows
May	15	5/4-5/9, 5/16-5/22, 5/27, 5/31	5/4-9: Hatchery fall run Chinook salmon release; 5/16-22: Predicted high winds and heavy rain; 5/27: High flow and heavy debris; 5/31: High flow and heavy debris
June	1	1-Jun	6/1: High flow and heavy debris

For the purposes of DOSS, GCID is used in conjunction with other sampling sites, both upstream and downstream, to track presence/absence of juvenile fish through the Sacramento River. While the monitoring gaps at GCID occurred during the emigration period of ESA-listed salmonids, DOSS generally had some information from RSTs upstream (RBDD) or downstream (Tisdale and Knights Landing) during at least part of the time the GCID RSTs were not sampling and therefore had information to assess distribution of ESA-listed species in the Sacramento River. Because GCID data are not used solely as the basis for any alert or trigger in the NMFS BiOp, no RPA implementation was impacted throughout this period.

4.2.4.3 Tisdale Weir Rotary Screw Traps

Sampling at the Tisdale Weir RSTs was suspended on occasion for short periods of time during WY 2019 leading to gaps in the monitoring data (Table 4-7). During the month of November, sampling was suspended due to unhealthy air conditions caused by smoke from the Camp Fire near Chico, California. In December monitoring was suspended due to limited crew availability during the holiday. The remaining data gaps were a result of high levels of in river debris associated with high flow events.

Table 4-7. Number of days per month during WY 2019 that sampling was suspended at the Tisdale Weir rotary screw traps.

Month	Gap in Sampling (days)	Date(s) of no Sampling	Primary Reason for No Sampling
November	5	11/15 - 11/19	Monitoring suspended due to unhealthy air quality attributed to smoke from the Camp Fire
December	2	12/24 - 12/26	Limited availability of staff during holiday
January	2	1/17 - 1/19	High flow and heavy debris
March	2	3/17 - 3/19	Equipment failure associated with high flow and heavy debris
May	1	5/28 - 5/29	Equipment failure associated with high flow and heavy debris

For the purposes of DOSS, monitoring data from the Tisdale Weir RSTs are used in conjunction with other sampling sites, both upstream and downstream, to track presence/absence of juvenile fish through the Sacramento River. While the monitoring gaps at Tisdale Weir RSTs occurred during the emigration period of ESA-listed salmonids, DOSS generally had some information from RSTs upstream (RBDD and GCID) or downstream (Knights Landing) during at least part of the time the Tisdale Weir RST was not sampling and therefore had information to assess distribution of ESA-listed species in the Sacramento River. Because Tisdale Weir RST data are not used solely as the basis for any alert or trigger in the NMFS BiOp, no RPA implementation was impacted throughout this period.

4.2.4.4 Knights Landing Rotary Screw Traps

Sampling at the Knights Landing RSTs was suspended twice during WY 2019 leading to gaps in the monitoring data (Table 4-8). During the month of November sampling was suspended due to unhealthy air conditions caused by smoke from the Camp Fire near Chico, California. In December, monitoring was suspended due to an exceedance of the Federal ESA permitted annual take limitation of winter-run Chinook salmon. Sampling resumed with the new permitting year on January 1.

Table 4-8. Number of days per month during WY 2019 that sampling was suspended at the Knights Landing rotary screw traps.

Month	Gap in Sampling (days)	Date(s) of no Sampling	Primary Reason for No Sampling
November	5	11/15 - 11/19	Monitoring suspended due to unhealthy air quality attributed to smoke from the Camp Fire
December	11	12/20 - 1/1	Exceeded annual take limitations of ESA Section 10 Incidental Take Permit

For the purposes of DOSS, monitoring data from the Knights Landing RSTs is used in conjunction with other sampling sites, both upstream and downstream, to track presence/absence of juvenile fish through the Sacramento River. While the monitoring gaps at Knights Landing RSTs occurred during the emigration period of ESA-listed salmonids, DOSS generally had some information from RSTs upstream (RBDD, GCID, and Tisdale) during at least part of the time the Knights Landing

RST was not sampling and, therefore, had information to assess distribution of ESA-listed species in the Sacramento River. Knights Landing RST data, and associated Knights Landing Catch Index (KLCI), are used for the basis of an action trigger in RPA Action IV.1.2 (DCC gate operation) from October 1st through December 14th of each year.

The KLCI is also the basis of one component of a third alert for RPA Action IV.3 (reduce entrainment at the export facilities) from November 1st through February 28th and March 1st to April 30th of each year. Although gaps in data collection occurred during the RPA Action windows, it does not appear that RPA implementation was impacted. During the November data gap, environmental conditions and catch prior to and following the period of no sampling suggesting ESA-listed species were present in levels below the threshold of any RPA IV.1.2 trigger.

During the December data gap, it is likely portion of ESA-listed species emigrating from the upper Sacramento River moved past the sampling site undetected. However, DCC gates were already closed during the month of December.

4.2.4.5 Delta Juvenile Fish Monitoring Program

USFWS's Delta Juvenile Fish Monitoring Program (DJFMP) includes the Sacramento Trawl, Mossdale Trawl, Chipps Island Trawl, and beach seine sampling. For the purposes of DOSS, during October and November, the Sacramento Trawl and Sacramento beach seine data are used to calculate two of the catch indices that may trigger DCC gate closures under RPA Action IV.1.2 of the NMFS BiOp. From December 1 through 15, the catch indices related to the Sacramento beach seines and the Sacramento trawl are used in determining whether the DCC gates should remain closed or potentially opened to alleviate water quality concerns as described under RPA Action IV.1.2 of the NMFS BiOp. In WY 2019, the DCC gates remained closed during this period.

DJFMP data are used throughout the year in conjunction with other upstream monitoring sites, to track the presence/absence of juvenile fish emigration through the Delta. DOSS utilizes this information to help inform the discussion of the weekly fish distribution estimates. During WY 2019, there were few instances in which DJFMP monitoring efforts were cancelled. These gaps in sampling typically were due to unsafe weather or river conditions that placed crews at risk or mechanical issues with vessels.

4.2.4.6 Inaccurate salvage data at Tracy Fish Collection Facility

In June 2019, CDFW's Salvage Unit was alerted by Reclamation to concerns with fish salvage data generated at the Tracy Fish Collection Facility. Chinook salmon loss and salvage estimates from at least April 2019 were the most likely affected data, but the full extent of the issue is currently under investigation by Reclamation (Reclamation 2019). DOSS advice would not have been affected since DOSS did not make any recommendations based on salvage during this time, however, portions of the daily salvage and loss data from at least April through July 2019 should be interpreted with caution. Following release of additional information, DOSS will address this issue as necessary.

4.3 Review of DOSS's weekly distribution estimates

Since WY 2014, DOSS has provided weekly estimates of the distribution of ESA-listed salmonids based on review of the weekly fish monitoring data and other related data (*e.g.,* hydrology, water temperatures, hatchery releases). These estimates, in combination with information provided from regional monitoring programs, are intended to give managers and stakeholders[6] an overview of salmonid distribution, and particularly to note when ESA-listed salmonids are present in the Delta.

The assessment of salmonid distribution was categorized in three following geographic "bins" that add up to 100%: *Yet to enter the Delta (roughly above Knights Landing on the Sacramento River), In Delta,* and *Exited the Delta (past Chipps Island in the western Delta).* During each weekly call, members discussed the various factors influencing fish migration and reviewed monitoring data to estimate the percentage for each category. DOSS weekly estimates for the proportion of salmonids in each of the three geographic bins are provided in Appendix H. Details about each week's estimates can be found in the associated DOSS notes[7].

DOSS has generated comparisons of the weekly DOSS estimates to comparable monitoring data. DOSS acknowledges that monitoring data are estimates of the fractional population passage at each monitoring location, and these comparisons have some complications based on the LAD run identification used to assign individuals to Chinook salmon run (*e.g.,* potential misclassifications of unmarked hatchery fall-run Chinook salmon as wild YOY spring-run Chinook salmon). Acknowledging those uncertainties, Figure 4-8 through Figure 4-10 provide a visual comparison of the full season of DOSS weekly estimates and monitoring trends.

DOSS agreed to adjust high catch numbers (of natural-origin Chinook salmon) in monitoring data that are likely (in part) due to fall-run Chinook salmon hatchery releases around that time. The average FL of Coleman National Fish Hatchery fall-run Chinook salmon production releases in March fell within the LAD range for natural-origin spring-run Chinook salmon. Other fall-run Chinook salmon hatchery production releases in April and May were near the size range of YOY spring-run Chinook salmon, so many of the larger-than-average individuals in the releases would fall into the spring-run Chinook salmon size class (Table 4-9). High catch numbers were adjusted (see adjustment details in Appendix I) for natural-origin spring-run Chinook salmon in all data sets (Knights Landing, Sacramento trawl, beach seines, Chipps Island trawl).

DOSS agreed that adjusting catch numbers for natural-origin winter-run Chinook salmon was not necessary, since the average FL of fall-run hatchery production was far enough from the size range of YOY winter-run Chinook salmon that few of the larger-than-average individuals in the release should fall into the winter-run Chinook salmon size class. In addition, no anomalously high winter-run Chinook salmon catches were observed after large fall-run Chinook salmon hatchery releases occurred. Adjustment was also not needed for the hatchery-origin winter-run Chinook salmon data, since those fish were identified based on the CWT or acoustic-tag (AT) codes, not the LAD criteria.

[6] For example, these weekly estimates were shared with both the Data Assessment Team (DAT) and Delta Conditions Team (DCT) stakeholder groups.

[7] DOSS notes available at: DOSS Meeting Notes.

Table 4-9. Summary of releases of hatchery-origin fall-run Chinook salmon during WY 2019. Yellow highlighted releases had the greatest potential to cause "apparent" spring-run Chinook salmon catch because they (a) occurred at a location upstream of at least one of the key monitoring locations (Knights Landing RSTs, Sacramento trawl, Sacramento beach seines, Chipps Island trawl), and (b) included unmarked fish. For multiple-day releases, the spring-run Chinook salmon LAD range listed is based on the first day of the release.

Release Date	Hatchery	Release Location	Total Release	Percent Marked	Number unmarked fish	Average Fork Length (mm)	Spring-run LAD Range at Knights Landing (mm)
10/24/2018	CNFH	Knights Landing	562	100%	0		
10/24/2018	CNFH	Knights Landing	611	100%	0		
10/31/2018	CNFH	Tisdale Weir	549	100%	0		
11/1/2018	CNFH	Tisdale Weir	535	100%	0		
11/7/2018	CNFH	Knights Landing	1,006	100%	0		
11/29/2018	CNFH	Battle Creek	48,983	100%	0		
11/29/2018	CNFH	Battle Creek	51,334	100%	0		
11/29/2018	CNFH	Battle Creek	58,156	100%	0		
11/29/2018	CNFH	Battle Creek	66,445	100%	0		
11/29/2018	CNFH	Battle Creek	56,572	100%	0		
11/29/2018	CNFH	Battle Creek	71,933	100%	0		
11/29/2018	CNFH	Battle Creek	70,952	100%	0		
11/29/2018	CNFH	Battle Creek	69,417	100%	0		
11/29/2018	CNFH	Battle Creek	67,575	100%	0		
11/29/2018	CNFH	Battle Creek	73,831	100%	0		
11/29/2018	CNFH	Battle Creek	64,608	100%	0		
12/3/2018	CNFH	Battle Creek	61,277	100%	0		
12/6/2018	SCARF	SJR at Hwy 140	1,800	100%	0		
12/6/2018	SCARF	SJR at Hwy 140	1,600	100%	0		
12/6/2018	SCARF	SJR at Hwy 140	1,800	100%	0		
12/14/2018	CNFH	Battle Creek	66,266	100%	0		
1/4/2019	CNFH	Battle Creek	73,952	100%	0		
1/29/2019-5/30/2019	SCARF	Owl Hollow, Sycamore Island, SR-99, San Mateo Rd.	40,000	100%	0		
1/31/2019	SCARF	SJR at Hwy 140	50,000	100%	0		
2/8/2019	SCARF	SJR at Hwy 140	31,295	100%	0		
2/14/2019	LSNFH	Sacramento R., Caldwell Park	50,334	100%	0		
2/14/2019	LSNFH	Sacramento R., Caldwell Park	50,091	100%	0		

Release Date	Hatchery	Release Location	Total Release	Percent Marked	Number unmarked fish	Average Fork Length (mm)	Spring-run LAD Range at Knights Landing (mm)
2/14/2019	LSNFH	Sacramento R., Caldwell Park	51,304	100%	0		
2/14/2019	LSNFH	Sacramento R., Caldwell Park	50,465	100%	0		
2/14/2019	LSNFH	Sacramento R., Caldwell Park	22,823	100%	0		
2/28/2019	SCARF	SJR at Hwy 140	87,200	100%	0		
3/13/2019	FRH	Boyd's Pump	336,753	100%	0		
3/13/2019	FRH	Live Oak boat ramp	333,444	100%	0		
3/14/2019	CNFH	Battle Creek	490,620	25%	367,965	75mm	65mm-87mm
3/14/2019	CNFH	Battle Creek	455,623	25%	341,717	75mm	65mm-87mm
3/14/2019	CNFH	Battle Creek	460,733	25%	345,550	75mm	65mm-87mm
3/25/2019	CNFH	Battle Creek	453,220	25%	339,915	75mm	70mm-94mm
3/25/2019	CNFH	Battle Creek	469,184	25%	351,888	75mm	70mm-94mm
3/25/2019	CNFH	Battle Creek	506,268	25%	379,701	75mm	70mm-94mm
3/26/2019	LSNFH	North Fork Battle Creek, Manton, CA.	45,609	100%	0		
3/26/2019	LSNFH	North Fork Battle Creek, Manton, CA.	80,604	100%	0		
3/28/2019	LSNFH	North Fork Battle Creek, Manton, CA.	57,702	100%	0		
3/28/2019	SCARF	SJR at Hwy 140	1,451	100%	0		
3/29/2019	CNFH	Battle Creek	455,556	25%	341,667	75mm	72mm-96mm
3/29/2019	CNFH	Battle Creek	469,822	25%	352,367	75mm	72mm-96mm
3/29/2019	CNFH	Battle Creek	374,099	25%	280,574	75mm	72mm-96mm
3/29/2019	CNFH	Battle Creek	450,621	25%	337,966	75mm	72mm-96mm
3/29/2019	CNFH	Battle Creek	382,561	25%	286,921	75mm	72mm-96mm
4/5/2019	FRH	Gridley Boat Ramp	333,442	100%	0		
4/5/2019	FRH	Boyd's Pump	332,629	100%	0		
4/5/2019	SCARF	Owl Hollow, San Joaquin River	2,530	100%	0		
4/8/2019	CNFH	Battle Creek	87,200	25%	65,400	75mm	77mm-103mm
4/8/2019	CNFH	Battle Creek	497,265	25%	372,949	75mm	77mm-103mm
4/8/2019	CNFH	Battle Creek	395,281	25%	296,461	75mm	77mm-103mm
4/8/2019	CNFH	Battle Creek	477,150	25%	357,863	75mm	77mm-103mm

Release Date	Hatchery	Release Location	Total Release	Percent Marked	Number unmarked fish	Average Fork Length (mm)	Spring-run LAD Range at Knights Landing (mm)
4/8/2019	CNFH	Battle Creek	428,731	25%	321,548	75mm	77mm-103mm
4/8/2019	CNFH	Battle Creek	476,811	25%	357,608	75mm	77mm-103mm
4/8/2019	CNFH	Battle Creek	463,035	25%	347,276	75mm	77mm-103mm
4/8/2019	CNFH	Battle Creek	474,861	25%	356,146	75mm	77mm-103mm
4/11/2019	CNFH	Battle Creek	89,594	100%	0	75mm	78mm-105mm
4/11/2019	CNFH	Battle Creek	84,444	100%	0	75mm	78mm-105mm
4/12/2019	NFH	Sunrise Boat Ramp	199,965	100%	0		
4/13/2019	CNFH	Sacramento River	88,022	100%	0	75mm	79mm-106mm
4/13/2019	CNFH	Sacramento River	88,106	100%	0	75mm	79mm-106mm
4/17/2019	MOK	Sherman Island	450,000	25%	337,500	95mm	82mm-109mm
4/18/2019	MER	Sherman Island	400,000	25%	300,000	100mm	82mm-110mm
4/22/2019	FRH	Gridley Boat Ramp	142,340	100%	0		
4/22/2019	FRH	Gridley Boat Ramp	11,445	100%	0		
4/22/2019	FRH	Gridley Boat Ramp	22,890	100%	0		
4/22/2019	FRH	Gridley Boat Ramp	7,709	100%	0		
4/22/2019	FRH	Boyd's Pump	332,425	100%	0		
4/24/2019	MOK	Sherman Island	450,000	25%	337,500	93mm	85mm-114mm
4/26/2019	MOK	Sherman Island	450,000	25%	337,500	98mm	87mm-116mm
5/1/2019	MER	Sherman Island	210,000	25%	157,500	105mm	89mm-120mm
5/1/2019	MER	Sherman Island	90,000	25%	67,500	75mm	89mm-120mm
5/3/2019	CNFH	Battle Creek	415,228	25%	311,421	75mm	92mm-123mm
5/3/2019	CNFH	Battle Creek	496,429	25%	372,322	75mm	92mm-123mm
5/3/2019	CNFH	Battle Creek	470,581	25%	352,936	75mm	92mm-123mm
5/3/2019	CNFH	Battle Creek	471,478	25%	353,609	75mm	92mm-123mm
5/3/2019	CNFH	Battle Creek	497,000	25%	372,750	75mm	92mm-123mm
5/3/2019	FRH	Mare Island	501,730	25%	376,298		
5/4/2019	FRH	Mare Island	501,730	25%	376,298		
5/6/2019	NFH	Sunrise Boat Ramp	802,292	25%	601,719	80mm	92mm-124mm
5/8/2019	FRH	Boyd's Pump	1,005,135	25%	753,851	74mm	94mm-126mm
5/8/2019	MOK	Sherman Island	450,000	25%	337,500	93mm	94mm-126mm
5/9/2019	MOK	Sherman Island	450,000	25%	337,500	90mm	94mm-126mm
5/10/2019	MOK	Fort Baker	450,000	25%	337,500		
5/13/2019	FRH	Conoco Net Pen	335,059	25%	251,294		

Release Date	Hatchery	Release Location	Total Release	Percent Marked	Number unmarked fish	Average Fork Length (mm)	Spring-run LAD Range at Knights Landing (mm)
5/13/2019	FRH	Conoco Net Pen	333,702	25%	250,277		
5/14/2019	NIM	Conoco Net Pen	560,040	25%	420,030		
5/14/2019	NIM	Conoco Net Pen	47,653	25%	35,740		
5/15/2019	NIM	Sunrise Boat Ramp	801,695	25%	601,271	82mm	98mm-132mm
5/15/2019	MOK	Woodbridge Dam	200,000	100%	0		
5/15/2019	MOK	Mokelumne River Hatchery	200,000	100%	0		
5/16/2019	NIM	Sunrise Boat Ramp	801,152	25%	600,864	79mm	99mm-132mm
5/17/2019	MOK	Sherman Island	100,000	100%	0		
5/17/2019	MOK	Sherman Island	100,000	100%	0		
5/17/2019	MOK	Sherman Island	100,000	100%	0		
5/17/2019	MOK	Sherman Island	100,000	100%	0		
5/18/2019	MOK	Pillar Point Harbor	240,000	100%	0		
5/19/2019	FRH	Mare Island	331,323	25%	248,492		
5/19/2019	FRH	Mare Island	334,688	25%	251,016		
5/20/2019	FRH	Mare Island	330,845	25%	248,134		
5/20/2019	FRH	Mare Island	335,624	25%	251,718		
5/21/2019	MOK	Santa Cruz	120,000	100%	0		
5/23/2019	MOK	Sherman Island	450,000	25%	337,500	93mm	103mm-139mm
5/24/2019	MOK	Sherman Island	450,000	25%	337,500	90mm	104mm-140mm
5/25/2019	MOK	Pillar Point Harbor	240,000	100%	0		
5/26/2019	MOK	Fort Baker	450,000	25%	337,500		
5/28/2019	FRH	Conoco Net Pen	333,394	25%	250,046		
5/28/2019	FRH	Conoco Net Pen	333,140	25%	249,855		
5/29/2019	FRH	Mare Island	334,010	25%	250,508		
5/29/2019	FRH	Mare Island	333,728	25%	250,296		
5/30/2019	MOK	Sherman Island	450,000	25%	337,500	95mm	108mm-145mm
5/31/2019	MOK	Sherman Island	310,000	25%	232,500	93mm	109mm-146mm
5/31/2019	MOK	Sherman Island	100,000	25%	75,000	93mm	109mm-146mm
6/1/2019	MOK	Pillar Point Harbor	240,000	100%	0		
6/3/2019	NIM	Mare Island	561,845	25%	421,384		
6/4/2019	NIM	Mare Island	559,118	25%	419,339		
6/4/2019	NIM	Mare Island	36,558	25%	27,419		
6/6/2019	FRH	Mare Island	333,476	25%	250,107		

Release Date	Hatchery	Release Location	Total Release	Percent Marked	Number unmarked fish	Average Fork Length (mm)	Spring-run LAD Range at Knights Landing (mm)
6/6/2019	FRH	Mare Island	335,533	25%	251,650		
6/7/2019	FRH	Mare Island	214,718	25%	161,039		
6/8/2019-6/9/2019	FRH	Fort Baker	1,003,460	25%	752,595		

The weekly DOSS estimates of fish distribution based on monitoring data were determined as described in Table 4-10.

Table 4-10. Calculations and data sources used to generate estimates of population distributions based on monitoring data for comparison with the weekly DOSS estimates.

	Natural-origin spring-run Chinook	Natural-origin winter-run Chinook	Hatchery-origin winter-run Chinook (CWT data)	Hatchery-origin winter-run Chinook (AT data)
Yet to Enter the Delta	100% minus cumulative % Knights Landing RST catch		100% minus cumulative % Sacramento Trawl catch	100% minus cumulative % AT detection at Tower Bridge array
In Delta	Cumulative % combined Sacramento Trawl & beach seines catch minus cumulative % Chipps Trawl catch			Cumulative % AT detection at Tower Bridge array minus cumulative % AT detection at Chipps array
Exited the Delta	Cumulative % Chipps Trawl catch			Cumulative % AT detection at Chipps array

Figure 4-8 below provides three ways to compare data to weekly DOSS estimates, based on (a) raw data, (b) adjusted data (high catch values adjusted only) , or (c) adjusted data (all catch values adjusted during the entire date range when hatchery releases occurred). Panels B and C for the spring-run Chinook salmon comparisons look reasonably similar, since the highest values were removed in both. As mentioned earlier, winter-run Chinook salmon data (Figure 4-9) showed no anomalously high values and, therefore, were not adjusted. Further details on the adjustments are described in Appendix I.

Figure 4-10 shows hatchery winter-run Chinook salmon data in comparison to weekly DOSS estimates. Approximately 225,017 hatchery winter-run Chinook salmon were released in Redding in mid-February (see Section 4.3 for details); all were marked with CWTs and clipped adipose fins

and a total of 650 were also acoustic-tagged. Data tables for CWT and acoustic-tagged are provided in Appendix J.

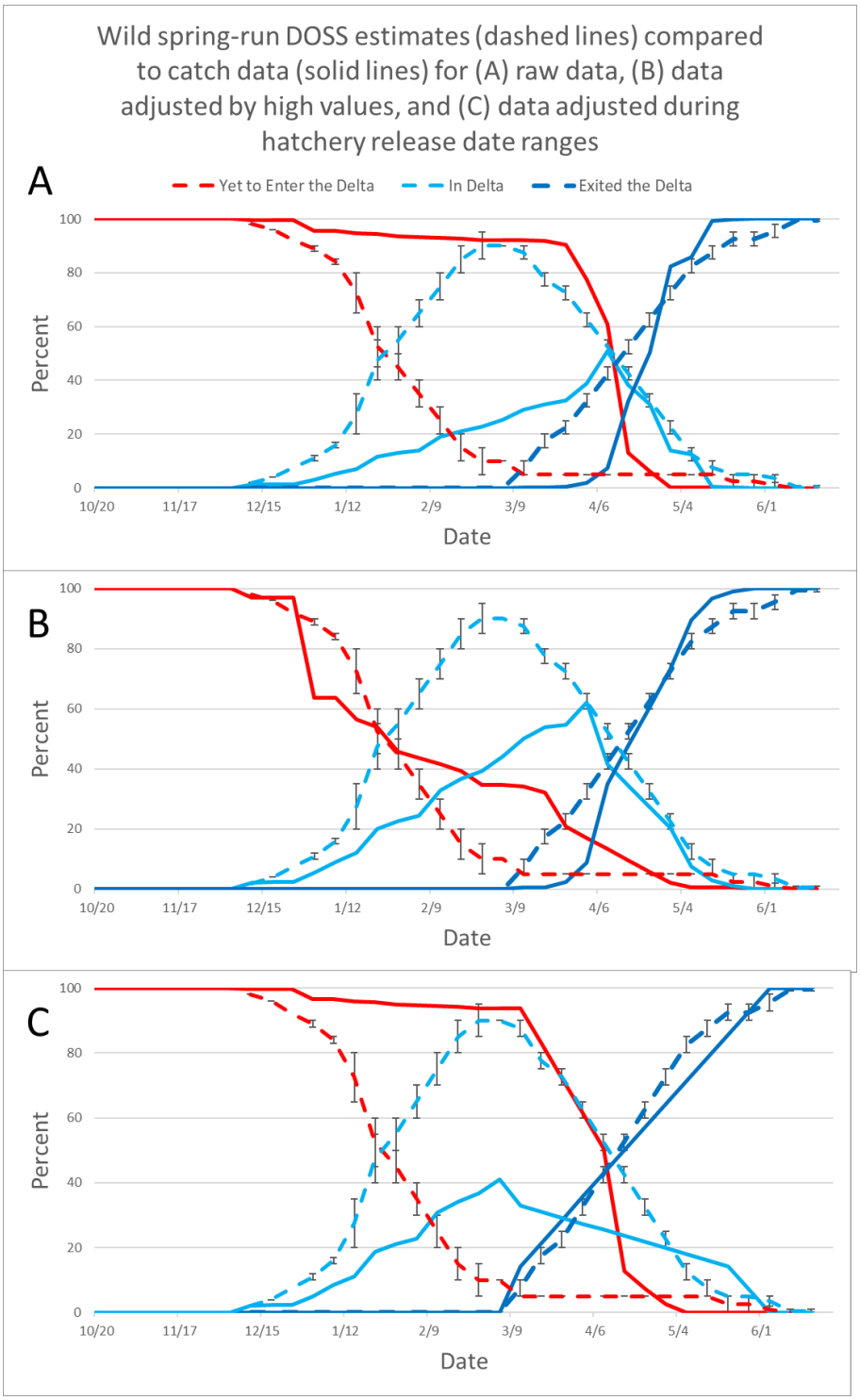

Figure 4-8. Spring-run Chinook salmon weekly DOSS estimates compared to (A) raw data, (B) adjusted high values, and (C) adjusted hatchery release date range. Red lines indicate

"Yet to Enter the Delta", light blue lines indicate "In Delta", and dark blue lines indicate "Exited the Delta." Dashed lines are weekly DOSS estimates and solid lines are catch data.

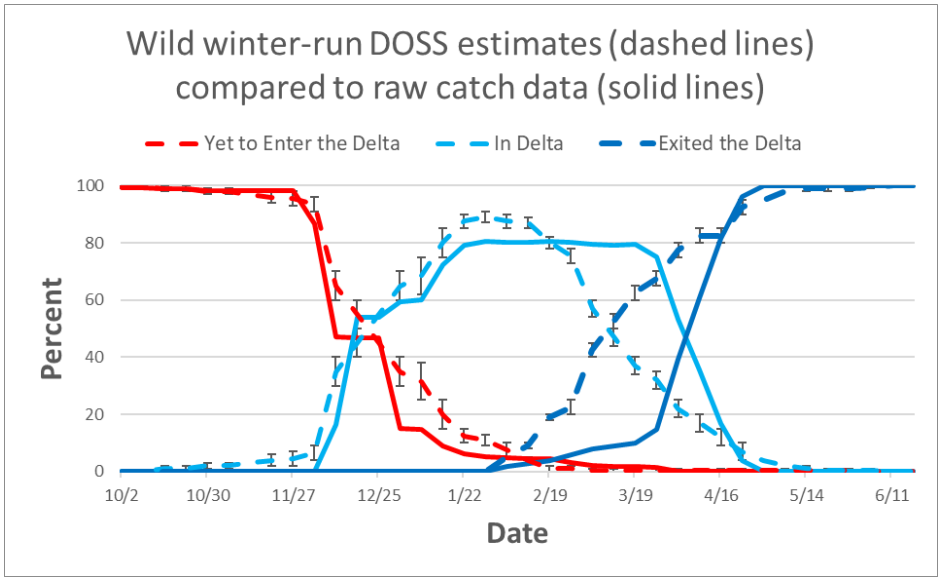

Figure 4-9. Winter-run Chinook salmon weekly DOSS estimates compared to raw data. Data were not adjusted for hatchery influence since no high data numbers were observed. Red lines indicate "Yet to Enter the Delta", light blue lines indicate "In Delta", and dark blue lines indicate "Exited the Delta." Dashed lines are weekly DOSS estimates and solid lines are catch data.

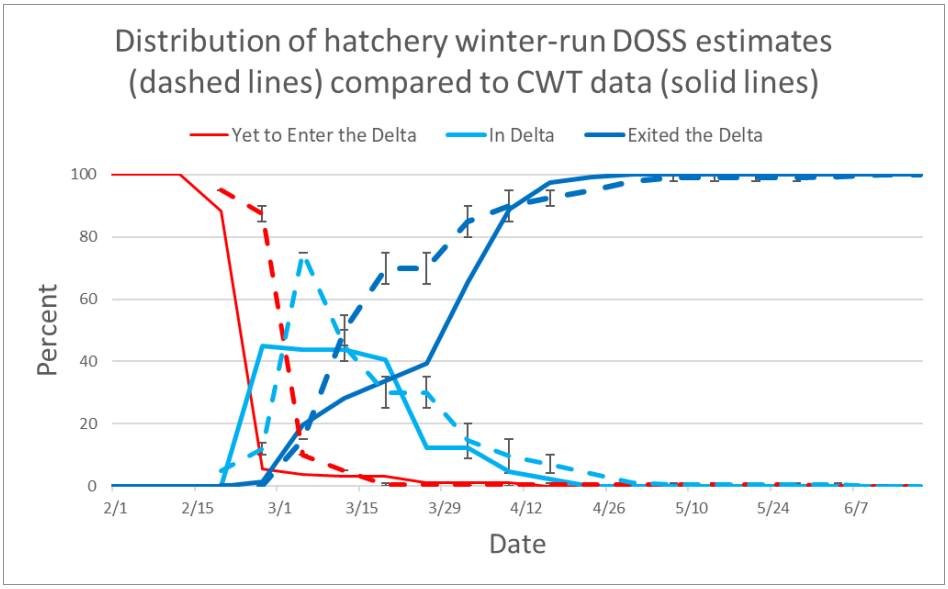

Figure 4-10. Hatchery winter-run Chinook salmon weekly DOSS estimates compared to coded wire tag (CWT) data. Data were not adjusted since no high data numbers were observed and runs were identified by tag. Red lines indicate "Yet to Enter the Delta", light

blue lines indicate "In Delta", and dark blue lines indicate "Exited the Delta". Dashed lines are weekly DOSS estimates and solid lines are based on weekly detection data.

REFERENCES CITED

NMFS. 2009. Final Biological Opinion and Conference Opinion on the Long-term Operations of the Central Valley Project and State Water Project. U.S. Department of Commerce National Marine Fisheries Service. 844 pages plus appendices. 4 June 2009. Available at: 2009 NMFS OCAP Biological Opinion

NMFS. 2011. 2009 RPA with 2011 Amendments. U.S. Department of Commerce National Marine Fisheries Service. 7 April 2011. Available at: 2011 Clarifications and amendments to the 2009 NMFS OCAP RPAs

Sturrock, A.M, J.D. Wikert, T. Heyne, C. Mesick, A.E. Hubbard, T. M. Hinkelman, P.K. Weber, G.E. Whitman, J.J. Glessner, R.C. Johnson. 2015. Reconstructing the Migratory Behavior of Long-term Survivorship of Juvenile Chinook Salmon under Contrasting Hydrologic Regimes. PLoS One 10(5).

U.S. Bureau of Reclamation. 2019. Letter from Donald Bader, U.S. Bureau of Reclamation, to Gregg Erickson, CDFW in response to a CDFW letter. Subject: Data Collection at the Tracy Fish Collection Facility- Central Valley Project. July 5, 2019.

Appendix A – Operations Summary Tables

GUIDE TO THE WY 2019 OPERATIONS TABLE

• The controlling factor in any blank cell is the same as the most recently listed controlling factor; factors are listed only when there is a change

• Controlling factors for DCC operations are listed in regular text, within brackets.

• Controlling factors for Delta exports are listed in regular text.

• Conditions or requirements of note, but not controlling Delta operations (for example, D-1641 or NMFS BiOp requirements that go into effect at the beginning of a month), are listed in *italicized text* for informative purposes.

• The "Delta WQ" controlling factor generally refers to seasonal salinity management rather than a specific water quality compliance location.

Date	Balance/Excess	Jones PP (cfs)	Clifton Court Inflow (cfs)	DCC Gate Status	USGS Tidally Filtered Mean 5-Day OMR (cfs)	USGS Tidally Filtered Mean 14-Day OMR (cfs)	Mean 5-Day OMR Index Calculation (cfs)	Mean 14-Day OMR Index Calculation (cfs)	Factor(s) Controlling Delta Operations
10/1/2018	B	3490	6670	O	-9482	-9550	-9059	-9181	Delta WQ; D-1641 *Delta Outflow (4,000 cfs)*
10/2/2018	B	3316	6536	O	-9732	-9534	-9376	-9164	
10/3/2018	B	4268	5795	O	-9840	-9518	-9604	-9166	
10/4/2018	B	4273	4988	O	-9846	-9479	-9567	-9121	
10/5/2018	B	4245	5498	O	-9790	-9434	-9499	-9109	
10/6/2018	B	4193	5791	O	-9652	-9414	-9507	-9138	
10/7/2018	B	4235	5385	O	-9324	-9365	-9452	-9144	
10/8/2018	B	4216	4884	O	-9154	-9353	-9258	-9131	
10/9/2018	B	4245	4288	O	-9226	-9391	-9103	-9116	
10/10/2018	B	4267	2790	O	-8942	-9349	-8599	-9013	
10/11/2018	B	4273	1992	O	-8372	-9186	-7910	-8883	
10/12/2018	B	4262	2495	O	-8038	-9009	-7380	-8741	
10/13/2018	B	4258	3499	O	-7800	-8910	-7129	-8623	
10/14/2018	B	4265	3394	O	-7284	-8719	-6964	-8457	
10/15/2018	B	4246	2996	O	-6974	-8453	-6993	-8275	
10/16/2018	B	4249	2492	O	-7064	-8234	-7071	-8060	
10/17/2018	B	4255	2370	O	-7020	-8001	-7042	-7826	
10/18/2018	B	4257	1683	O	-6686	-7781	-6702	-7599	
10/19/2018	B	4248	2481	O	-6630	-7590	-6514	-7391	
10/20/2018	B	4244	3470	O	-6846	-7451	-6555	-7220	
10/21/2018	B	4245	3594	O	-7046	-7420	-6697	-7076	
10/22/2018	B	4252	3699	O	-7376	-7366	-6847	-6965	
10/23/2018	B	4248	3398	O	-7666	-7224	-7068	-6873	
10/24/2018	B	3585	2992	O	-7580	-7104	-6985	-6814	
10/25/2018	B	3543	2883	O	-7292	-7065	-6745	-6804	
10/26/2018	B	3787	3291	O	-7018	-7056	-6605	-6800	
10/27/2018	B	4249	3184	O	-6836	-7022	-6502	-6741	
10/28/2018	B	4266	2626	O	-6666	-7004	-6357	-6656	
10/29/2018	B	3700	2499	O	-6550	-6952	-6247	-6548	
10/30/2018	B	3462	2796	O	-6510	-6867	-6179	-6485	
10/31/2018	B	3460	2492	O	-6254	-6782	-5968	-6416	
11/1/2018	B	3456	1995	O	-5808	-6709	-5650	-6365	D-1641 Delta Outflow (4,500 cfs)
11/2/2018	B	3456	2490	O	-5538	-6614	-5511	-6298	
11/3/2018	B	3451	2690	O	-5572	-6497	-5526	-6181	
11/4/2018	B	3458	2577	O	-5642	-6366	-5493	-6055	
11/5/2018	B	3460	2689	O	-5758	-6204	-5380	-5892	[DCC Gates - D-1641 Rio Vista Flows]
11/6/2018	B	3468	1695	C	-5678	-5999	-5143	-5678	
11/7/2018	B	3469	1492	C	-5468	-5859	-4823	-5526	
11/8/2018	B	3472	795	C	-5048	-5696	-4390	-5340	
11/9/2018	B	3469	492	O	-4502	-5467	-3934	-5101	[DCC Gates - Weekend operations]
11/10/2018	B	2593	792	O	-3982	-5185	-3497	-4819	
11/11/2018	B	2592	796	O	-3564	-4891	-3268	-4575	
11/12/2018	B	2587	792	O	-3163	-4650	-3048	-4383	
11/13/2018	B	2583	594	O	-2886	-4401	-2897	-4168	[DCC Gates - D-1641 Rio Vista Flows]
11/14/2018	B	1991	500	C	-2616	-4168	-2661	-3920	
11/15/2018	B	1778	689	C	-2344	-3948	-2522	-3702	
11/16/2018	B	1778	991	O	-2320	-3741	-2438	-3477	[DCC Gates - Weekend operations]
11/17/2018	B	1775	1196	O	-2391	-3514	-2383	-3261	
11/18/2018	B	1619	1195	O	-2426	-3253	-2331	-3038	

Date	Balance/Excess	Jones PP (cfs)	Clifton Court Inflow (cfs)	DCC Gate Status	USGS Tidally Filtered Mean 5-Day OMR (cfs)	USGS Tidally Filtered Mean 14-Day OMR (cfs)	Mean 5-Day OMR Index Calculation (cfs)	Mean 14-Day OMR Index Calculation (cfs)	Factor(s) Controlling Delta Operations
11/19/2018	B	1802	1195	O	-2563	-3027	-2435	-2869	[DCC Gates - D-1641 Rio Vista Flows]
11/20/2018	B	1806	1492	C	-2754	-2903	-2592	-2791	Delta WQ
11/21/2018	B	1814	1496	O	-2835	-2801	-2687	-2714	[DCC Gates - Weekend operations]
11/22/2018	B	1809	1989	O	-2782	-2704	-2836	-2705	
11/23/2018	B	1814	1996	O	-2662	-2596	-3006	-2707	
11/24/2018	B	1814	1997	O	-2644	-2549	-3136	-2740	
11/25/2018	B	1811	1999	O	-2576	-2551	-3211	-2770	
11/26/2018	B	1810	995	O	-2348	-2510	-3106	-2735	
11/27/2018	B	1812	492	O	-2252	-2478	-2822	-2679	
11/28/2018	B	1824	493	O	-2237	-2460	-2551	-2667	
11/29/2018	B	3459	492	O	-2292	-2531	-2580	-2761	
11/30/2018	B	3472	994	O	-2211	-2512	-2696	-2862	
12/1/2018	B	3505	3496	C	-2750	-2638	-3432	-3110	[DCC Gates - NMFS BO Action IV.1.2]
12/2/2018	B	4215	3481	C	-3510	-2865	-4381	-3411	
12/3/2018	B	4217	3991	C	-4438	-3130	-5419	-3733	
12/4/2018	B	4028	5984	C	-5480	-3504	-6487	-4151	
12/5/2018	B	3988	5995	C	-6854	-3947	-7463	-4568	
12/6/2018	B	4014	4990	C	-7590	-4355	-7824	-4891	
12/7/2018	B	4009	4486	C	-7852	-4718	-7984	-5189	
12/8/2018	B	4002	4492	C	-7862	-4993	-8059	-5492	
12/9/2018	B	3998	3993	C	-7548	-5280	-7726	-5764	
12/10/2018	B	4008	3499	C	-7082	-5638	-7317	-6072	
12/11/2018	B	4093	2490	C	-6526	-5882	-6917	-6354	
12/12/2018	B	3540	1992	C	-5942	-6041	-6411	-6567	
12/13/2018	B	3544	1992	C	-5498	-6138	-5900	-6677	
12/14/2018	B	3551	1987	C	-5184	-6341	-5478	-6758	
12/15/2018	B	3512	1988	C	-4746	-6351	-5134	-6680	
12/16/2018	B	3534	1996	C	-4612	-6276	-4963	-6562	
12/17/2018	B	3541	1994	C	-4618	-6106	-4980	-6410	
12/18/2018	B	3546	1996	C	-4618	-5831	-4978	-6139	
12/19/2018	B	4019	3992	C	-4794	-5606	-5414	-6026	
12/20/2018	B	4010	4485	C	-5324	-5541	-5939	-6006	
12/21/2018	B	4022	4494	C	-5880	-5571	-6455	-6015	
12/22/2018	B	4022	3987	C	-6380	-5576	-6878	-5989	
12/23/2018	B	3996	3493	C	-6716	-5534	-7222	-5959	
12/24/2018	B	3980	3498	C	-6790	-5501	-7128	-5958	
12/25/2018	B	4005	3481	C	-6514	-5537	-6947	-6017	
12/26/2018	B	3971	3489	C	-6066	-5616	-6763	-6141	
12/27/2018	B	3986	3494	C	-5866	-5708	-6673	-6265	
12/28/2018	B	4068	3995	C	-5880	-5782	-6785	-6425	
12/29/2018	B	4011	4498	C	-5984	-5944	-6974	-6615	
12/30/2018	B	4045	4609	C	-6380	-6169	-7185	-6810	
12/31/2018	B	4095	4993	C	-6886	-6426	-7478	-7033	
1/1/2019	B	3398	2193	C	-6864	-6510	-7129	-7033	D-1641 Delta Outflow (6,000 cfs); *NMFS Action IV.2.3 (OMR -5000 cfs)*
1/2/2019	B	3630	2189	C	-6670	-6452	-6711	-6889	
1/3/2019	B	3520	2190	C	-6316	-6298	-6188	-6704	
1/4/2019	B	3528	1991	C	-5852	-6159	-5603	-6506	
1/5/2019	B	3532	2091	C	-5410	-6079	-4956	-6347	

Date	Balance/Excess	Jones PP (cfs)	Clifton Court Inflow (cfs)	DCC Gate Status	USGS Tidally Filtered Mean 5-Day OMR (cfs)	USGS Tidally Filtered Mean 14-Day OMR (cfs)	Mean 5-Day OMR Index Calculation (cfs)	Mean 14-Day OMR Index Calculation (cfs)	Factor(s) Controlling Delta Operations
1/6/2019	B	3520	2091	C	-5150	-5951	-4945	-6219	
1/7/2019	B	3535	2089	C	-4932	-5789	-4891	-6090	
1/8/2019	E	3572	2096	C	-4912	-5726	-4864	-5960	NMFS Action IV.2.3 (OMR -5000 cfs)
1/9/2019	E	3471	2290	C	-4800	-5706	-4885	-5836	
1/10/2019	E	3505	2294	C	-4522	-5599	-4893	-5711	
1/11/2019	E	3480	2289	C	-4662	-5516	-4894	-5544	
1/12/2019	E	3437	2392	C	-4792	-5363	-4903	-5350	
1/13/2019	E	3433	2394	C	-4696	-5124	-4915	-5150	
1/14/2019	E	3427	2499	C	-4712	-4930	-4936	-4928	
1/15/2019	E	3451	2500	C	-5024	-4942	-4959	-4937	
1/16/2019	E	3360	2495	C	-5186	-4986	-4974	-4923	
1/17/2019	E	3400	2488	C	-5052	-4911	-4977	-4918	
1/18/2019	E	3536	2591	C	-4848	-4766	-5001	-4935	
1/19/2019	E	4047	2389	C	-4796	-4711	-4997	-4943	
1/20/2019	E	4032	2491	C	-4676	-4773	-4971	-4946	
1/21/2019	E	4036	2498	C	-4272	-4750	-4996	-4961	
1/22/2019	E	3995	2597	C	-4220	-4664	-5033	-4978	
1/23/2019	E	4188	2393	C	-4448	-4640	-5045	-4992	
1/24/2019	E	3460	2694	C	-4466	-4691	-5006	-4983	
1/25/2019	E	3476	2592	C	-4366	-4667	-4988	-4980	
1/26/2019	E	3463	2495	C	-4508	-4649	-4936	-4973	
1/27/2019	E	3464	2494	C	-4764	-4689	-4886	-4968	
1/28/2019	E	3470	2495	C	-4928	-4717	-4847	-4960	
1/29/2019	E	3479	2496	C	-4982	-4676	-4879	-4954	
1/30/2019	E	3502	2591	C	-5062	-4623	-4937	-4966	
1/31/2019	E	3493	2589	C	-4998	-4629	-4992	-4978	
2/1/2019	E	979	1992	C	-4710	-4639	-4467	-4777	
2/2/2019	E	3309	2391	C	-4756	-4703	-4441	-4761	
2/3/2019	E	3211	2390	C	-4606	-4651	-4367	-4738	
2/4/2019	E	3326	2993	C	-4300	-4633	-4303	-4719	
2/5/2019	E	3386	4298	C	-4076	-4578	-4269	-4705	
2/6/2019	E	3430	4485	C	-4104	-4516	-4819	-4697	NMFS Action IV.2.3 and FWS Action 3 (OMR -5000 cfs)
2/7/2019	E	3995	3994	C	-3814	-4470	-4862	-4710	
2/8/2019	E	3517	2685	C	-3798	-4448	-4635	-4612	NMFS Action IV.2.3 (OMR -3500 cfs)
2/9/2019	E	3498	2696	C	-3902	-4416	-4398	-4527	
2/10/2019	E	3531	2491	C	-3783	-4227	-4121	-4432	
2/11/2019	E	3529	2493	C	-3496	-4005	-3781	-4316	
2/12/2019	E	3540	2895	C	-3518	-3947	-3470	-4207	
2/13/2019	E	4313	4190	C	-4028	-4079	-3798	-4205	NMFS Action IV.2.3 and FWS Action 3 (OMR -5000 cfs)
2/14/2019	E	4360	4193	C	-4300	-4167	-4108	-4211	
2/15/2019	E	4229	4188	C	-4374	-4107	-4391	-4405	
2/16/2019	E	4127	4594	C	-4630	-3960	-4693	-4406	
2/17/2019	E	4126	5594	C	-4570	-3934	-4972	-4423	
2/18/2019	E	4115	6395	C	-3941	-3950	-4900	-4419	
2/19/2019	E	4096	7168	C	-3759	-4054	-4867	-4424	
2/20/2019	E	4182	7389	C	-4204	-4143	-4873	-4424	
2/21/2019	E	4207	7690	C	-4429	-4180	-4927	-4429	

Date	Balance/Excess	Jones PP (cfs)	Clifton Court Inflow (cfs)	DCC Gate Status	USGS Tidally Filtered Mean 5-Day OMR (cfs)	USGS Tidally Filtered Mean 14-Day OMR (cfs)	Mean 5-Day OMR Index Calculation (cfs)	Mean 14-Day OMR Index Calculation (cfs)	Factor(s) Controlling Delta Operations
2/22/2019	E	4208	7791	C	-4499	-4185	-4942	-4533	
2/23/2019	E	4211	6490	C	-4524	-4172	-4683	-4521	Available Operational Capacity
2/24/2019	E	4210	6788	C	-4430	-4285	-4375	-4515	
2/25/2019	E	4278	6494	C	-4460	-4488	-4012	-4506	
2/26/2019	E	4319	6188	C	-4460	-4516	-3585	-4470	
2/27/2019	E	4348	3690	C	-3931	-4150	-2734	-4153	
2/28/2019	E	4338	3198	C	-3100	-3744	-2019	-3775	
3/1/2019	E	4336	3197	C	-2338	-3558	-1247	-3392	
3/2/2019	E	4343	3990	C	-1407	-3336	-656	-3065	
3/3/2019	E	4351	3994	C	-468	-3051	-43	-2710	
3/4/2019	E	4344	4694	C	-113	-2783	34	-2390	
3/5/2019	E	4340	4691	C	-406	-2546	-41	-2051	
3/6/2019	E	4257	4696	C	-645	-2287	-272	-1749	
3/7/2019	E	4090	4190	C	-492	-1930	-346	-1429	
3/8/2019	E	3142	4995	C	-367	-1575	-457	-1108	
3/9/2019	E	2757	5191	C	-238	-1252	-380	-853	
3/10/2019	E	1458	5834	C	300	-857	-93	-522	
3/11/2019	E	996	5690	C	1017	-331	425	-165	
3/12/2019	E	958	5688	C	1719	277	899	173	
3/13/2019	E	947	2492	C	2669	782	1943	562	
3/14/2019	E	926	5696	C	3144	978	2302	690	
3/15/2019	E	852	3798	C	3334	1168	2765	911	
3/16/2019	E	816	6679	C	3093	1277	2470	952	
3/17/2019	E	817	6676	C	2378	1293	2144	954	
3/18/2019	E	818	6680	C	No Data	No Data	1193	976	
3/19/2019	E	847	6672	C	No Data	No Data	820	998	
3/20/2019	E	1860	6670	C	No Data	No Data	-40	994	
3/21/2019	E	1880	6679	C	No Data	No Data	-269	980	
3/22/2019	E	1875	6670	C	No Data	No Data	-464	951	
3/23/2019	E	1874	5993	C	No Data	No Data	-604	896	
3/24/2019	E	1871	5991	C	No Data	No Data	-795	747	
3/25/2019	E	1873	5890	C	No Data	No Data	-747	576	
3/26/2019	E	1878	4490	C	No Data	No Data	-371	526	
3/27/2019	E	1811	5490	C	No Data	No Data	-111	218	
3/28/2019	E	1828	6674	C	No Data	No Data	-98	39	
3/29/2019	E	1873	6676	C	No Data	No Data	-72	-266	
3/30/2019	E	1871	6399	C	No Data	No Data	-92	-339	
3/31/2019	E	1872	5699	C	No Data	No Data	-336	-360	
4/1/2019	E	835	2999	C	No Data	No Data	221	-129	NMFS Action IV.2.1 (I:E Ratio 4:1)
4/2/2019	E	818	2998	C	No Data	No Data	1037	116	
4/3/2019	E	819	3392	C	No Data	No Data	1908	429	
4/4/2019	E	816	3491	C	No Data	No Data	2757	741	
4/5/2019	E	1810	2388	C	3416	No Data	3510	1059	*NMFS Action IV.2.3 (OMR -3500 cfs)*
4/6/2019	E	1811	2168	C	3596	No Data	3509	1340	
4/7/2019	E	1811	1784	C	3488	No Data	3426	1623	
4/8/2019	E	1808	1495	C	3236	No Data	3282	1868	
4/9/2019	E	1813	1485	C	3342	No Data	3065	1968	
4/10/2019	E	1916	1194	C	3334	No Data	2827	2109	*NMFS Action IV.2.3 and FWS Action 3 (OMR -5000 cfs)*

Date	Balance/Excess	Jones PP (cfs)	Clifton Court Inflow (cfs)	DCC Gate Status	USGS Tidally Filtered Mean 5-Day OMR (cfs)	USGS Tidally Filtered Mean 14-Day OMR (cfs)	Mean 5-Day OMR Index Calculation (cfs)	Mean 14-Day OMR Index Calculation (cfs)	Factor(s) Controlling Delta Operations
4/11/2019	E	1931	1097	C	3152	No Data	2644	2319	
4/12/2019	E	1908	889	C	3100	No Data	2510	2545	
4/13/2019	E	1916	790	C	3058	No Data	2410	2762	
4/14/2019	E	1918	686	C	2696	3122	2379	2938	
4/15/2019	E	1785	978	C	2426	3090	2322	2859	
4/16/2019	E	1747	993	C	2430	3023	2282	2764	
4/17/2019	E	1750	993	C	2358	2913	2218	2656	
4/18/2019	E	1746	895	C	2249	2810	2171	2553	
4/19/2019	E	1736	897	C	2155	2672	2116	2440	
4/20/2019	E	1736	793	C	2154	2575	2086	2351	
4/21/2019	E	1747	692	C	No Data	No Data	2044	2271	*NMFS Action IV.2.3 (OMR -3500 cfs)*
4/22/2019	E	1728	693	C	No Data	No Data	2003	2199	
4/23/2019	E	1766	685	C	No Data	No Data	1933	2149	
4/24/2019	E	1749	589	C	No Data	No Data	1868	2098	
4/25/2019	E	1742	598	C	No Data	No Data	1791	2046	
4/26/2019	E	1758	493	C	No Data	No Data	1724	1990	*NMFS Action IV.2.3 and FWS Action 3 (OMR -5000 cfs)*
4/27/2019	E	1749	492	C	No Data	No Data	1662	1932	
4/28/2019	E	1740	492	C	No Data	No Data	1605	1872	
4/29/2019	E	995	1192	C	1683	No Data	1578	1832	
4/30/2019	E	992	1195	C	1872	No Data	1569	1791	
5/1/2019	E	992	1093	C	1886	No Data	1576	1760	
5/2/2019	E	991	1095	C	1762	No Data	1568	1717	
5/3/2019	E	814	1294	C	1522	No Data	1571	1678	
5/4/2019	E	813	1293	C	1294	No Data	1546	1639	
5/5/2019	E	816	1290	C	910	No Data	1510	1601	
5/6/2019	E	815	1297	C	753	No Data	1464	1568	
5/7/2019	E	818	1189	C	786	No Data	1465	1550	
5/8/2019	E	815	1295	C	932	1376	1447	1527	
5/9/2019	E	816	1393	C	1207	1397	1461	1521	
5/10/2019	E	816	1472	C	1669	1449	1523	1529	
5/11/2019	E	814	1593	C	1919	1491	1589	1542	
5/12/2019	E	812	1570	C	2171	1560	1625	1557	
5/13/2019	E	1972	0	C	2465	1655	1759	1592	
5/14/2019	E	1980	0	C	2562	1644	1870	1629	
5/15/2019	E	2622	1	C	2286	1592	1814	1614	
5/16/2019	E	2618	41	C	2131	1623	1770	1614	
5/17/2019	E	2610	-16	C	2059	1752	1806	1641	
5/18/2019	E	990	1693	C	1947	1888	1802	1683	
5/19/2019	E	989	1799	C	2138	2083	1845	1748	
5/20/2019	E	987	1996	C	2490	2212	2066	1829	
5/21/2019	E	987	2197	C	2541	2250	2288	1908	
5/22/2019	E	987	2297	C	2735	2396	2434	1993	
5/23/2019	E	2733	691	C	3055	2549	2542	2069	
5/24/2019	E	2684	698	C	3099	2594	2608	2136	
5/25/2019	E	2712	591	C	3135	2646	2627	2200	
5/26/2019	E	2700	499	C	3562	2746	2629	2267	
5/27/2019	E	2687	389	C	3596	2800	2624	2303	
5/28/2019	E	809	1792	C	3231	2788	2689	2362	

Date	Balance/Excess	Jones PP (cfs)	Clifton Court Inflow (cfs)	DCC Gate Status	USGS Tidally Filtered Mean 5-Day OMR (cfs)	USGS Tidally Filtered Mean 14-Day OMR (cfs)	Mean 5-Day OMR Index Calculation (cfs)	Mean 14-Day OMR Index Calculation (cfs)	Factor(s) Controlling Delta Operations
5/29/2019	E	811	2795	C	3109	2888	2555	2400	
5/30/2019	E	811	2891	C	2985	2952	2441	2439	
5/31/2019	E	814	2783	C	2271	2822	2374	2469	*Last Day of NMFS Action IV.2.1 (I:E Ratio)*
6/1/2019	E	4311	6661	C	641	2334	997	2015	Available Operational Capacity
6/2/2019	E	4290	6675	C	-780	1745	-366	1572	
6/3/2019	E	4201	6672	C	-2102	1247	-1434	1150	
6/4/2019	E	4270	6677	C	-3324	857	-2505	727	
6/5/2019	E	4378	6667	C	-4086	386	-3635	302	
6/6/2019	E	4382	6674	C	-3724	-87	-3372	-97	
6/7/2019	E	4375	6677	C	-3195	-503	-3167	-490	
6/8/2019	E	4364	6674	C	-2884	-902	-3071	-885	
6/9/2019	E	4352	6667	C	-2824	-1424	-3028	-1293	
6/10/2019	E	4259	6668	C	-2858	-1919	-3011	-1711	
6/11/2019	E	1737	6649	C	-2657	-2190	-2651	-2004	
6/12/2019	E	1613	6673	C	-2696	-2576	-2342	-2239	
6/13/2019	E	4370	6674	C	-3189	-3108	-2570	-2675	
6/14/2019	E	4377	6671	C	-3511	-3489	-2804	-3142	
6/15/2019	E	4369	6672	C	-3901	-3541	-3057	-3159	*NMFS IV.2.3 OMR flow management requirements end after calendar date-based offramp (June 15) [No more DCC restrictions per NMFS BiOp or D-1641]*
6/16/2019	E	4365	6673	C	-4682	-3584	-3794	-3228	
6/17/2019	E	4363	6670	C	-5292	-3715	-4591	-3367	
6/18/2019	E	1635	6673	C	-5264	-3800	-4416	-3357	
6/19/2019	E	1632	6671	C	-5140	-3865	-4235	-3356	
6/20/2019	E	1868	6675	O	-4800	-3925	-4076	-3410	[DCC Gates - Weekend operations]
6/21/2019	E	2497	6671	O	-4392	-4011	-4009	-3529	
6/22/2019	E	3200	6594	O	-4228	-4195	-3994	-3697	FWS Action 3 (OMR -5000 cfs)
6/23/2019	E	4370	4899	O	-4320	-4335	-4358	-3832	
6/24/2019	E	4374	4498	O	-4520	-4459	-4645	-3940	
6/25/2019	E	4364	4694	O	-4730	-4666	-4899	-4213	
6/26/2019	E	4354	4484	O	-4806	-4765	-4995	-4477	
6/27/2019	E	4346	4491	O	-4600	-4699	-4970	-4554	
6/28/2019	E	4353	0	O	No Data	No Data	-4249	-4348	Available Operational Capacity
6/29/2019	E	4355	0	O	No Data	No Data	-3641	-4148	
6/30/2019	E	4310	990	O	No Data	No Data	-3239	-4015	*FWS Action 3 OMR flow management requirements end after calendar date-based offramp (June 30)*

Appendix B – Delta Cross Channel Alerts

First Alert in Action IV.1.1: Mill & Deer Creek flows

The first alert is triggered if the mean daily flow in Mill Creek or Deer Creek is (a) greater than 95 cfs, or (b) more than 50 percent higher than observed on the previous day. The first alert was triggered every day this water year. All flow data are from CDEC; station MLM for Mill Creek and station DCV for Deer Creek. Yellow-highlighted cells indicate conditions that triggered an alert.

	Mill Creek (MLM)		Deer Creek (DCV)	
Date	mean daily flow (cfs)	change in mean daily flow	mean daily flow (cfs)	change in mean daily flow
10/1/2018	109	0%	88	2%
10/2/2018	112	3%	90	2%
10/3/2018	108	-4%	89	-1%
10/4/2018	112	4%	103	16%
10/5/2018	120	7%	111	8%
10/6/2018	109	-9%	99	-11%
10/7/2018	107	-2%	95	-4%
10/8/2018	104	-3%	92	-3%
10/9/2018	103	-1%	92	0%
10/10/2018	103	0%	92	-1%
10/11/2018	103	0%	92	0%
10/12/2018	102	-1%	91	-1%
10/13/2018	102	0%	91	0%
10/14/2018	101	-1%	90	-1%
10/15/2018	100	-1%	89	-1%
10/16/2018	101	1%	90	1%
10/17/2018	101	0%	90	0%
10/18/2018	102	1%	91	1%
10/19/2018	101	-1%	91	0%
10/20/2018	101	0%	91	0%
10/21/2018	101	0%	91	0%
10/22/2018	101	0%	92	1%
10/23/2018	102	1%	92	1%
10/24/2018	102	0%	93	0%
10/25/2018	102	0%	93	0%
10/26/2018	102	0%	93	0%
10/27/2018	103	1%	94	1%
10/28/2018	102	-1%	94	1%
10/29/2018	103	1%	95	1%
10/30/2018	103	0%	95	0%
10/31/2018	103	0%	94.9	0%

	Mill Creek (MLM)		Deer Creek (DCV)	
Date	mean daily flow (cfs)	change in mean daily flow	mean daily flow (cfs)	change in mean daily flow
11/1/2018	103	0%	95.2	0%
11/2/2018	104	1%	95.2	0%
11/3/2018	103	-1%	95.2	0%
11/4/2018	104	1%	95	0%
11/5/2018	104	0%	95.4	0%
11/6/2018	104	0%	95.5	0%
11/7/2018	103	-1%	95.6	0%
11/8/2018	103	0%	95.3	0%
11/9/2018	103	0%	95.4	0%
11/10/2018	104	1%	96.3	1%
11/11/2018	104	0%	96.6	0%
11/12/2018	103	-1%	96	-1%
11/13/2018	104	1%	96.4	0%
11/14/2018	104	0%	97.1	1%
11/15/2018	105	1%	97.7	1%
11/16/2018	104	-1%	98.3	1%
11/17/2018	105	1%	98.7	0%
11/18/2018	104	-1%	98.5	0%
11/19/2018	104	0%	98.3	0%
11/20/2018	104	0%	96	-2%
11/21/2018	109	5%	94	-3%
11/22/2018	125	15%	118	26%
11/23/2018	151	21%	139	18%
11/24/2018	196	30%	193	39%
11/25/2018	135	-31%	134	-31%
11/26/2018	121	-10%	105	-21%
11/27/2018	122	1%	104	-2%
11/28/2018	168	38%	139	34%
11/29/2018	224	33%	209	50.40%
11/30/2018	203	-9%	211	1%
12/1/2018	151	-26%	149	-29%
12/2/2018	141	-7%	136	-9%
12/3/2018	128	-9%	117	-14%
12/4/2018	122	-5%	109	-7%
12/5/2018	123	1%	109	1%
12/6/2018	121	-2%	107	-2%
12/7/2018	118	-2%	103	-3%
12/8/2018	117	-1%	100	-3%
12/9/2018	116	-1%	99	-1%

	Mill Creek (MLM)		Deer Creek (DCV)	
Date	mean daily flow (cfs)	change in mean daily flow	mean daily flow (cfs)	change in mean daily flow
12/10/2018	116	0%	99	-1%
12/11/2018	116	0%	99	0%
12/12/2018	116	0%	99	0%
12/13/2018	117	1%	100	1%
12/14/2018	117	0%	101	1%
12/15/2018	188	61%	175	73%
12/16/2018	250	33%	250	44%
12/17/2018	876	250%	863	244%
12/18/2018	267	-70%	320	-63%
12/19/2018	214	-20%	231	-28%
12/20/2018	178	-17%	197	-15%
12/21/2018	210	18%	212	8%
12/22/2018	193	-8%	217	3%
12/23/2018	175	-9%	183	-16%
12/24/2018	582	233%	312	71%
12/25/2018	116	-80%	600	92%
12/26/2018	116	0%	326	-46%
12/27/2018	117	1%	242	-26%
12/28/2018	117	0%	199	-18%
12/29/2018	188	61%	173	-13%
12/30/2018	250	33%	160	-8%
12/31/2018	876	250%	150	-6%
1/1/2019	136	-6%	139	-7%
1/2/2019	132	-3%	131	-6%
1/3/2019	129	-2%	128	-3%
1/4/2019	128	-1%	125	-2%
1/5/2019	133	4%	133	6%
1/6/2019	553	316%	617	363%
1/7/2019	555	0%	620	0%
1/8/2019	404	-27%	415	-33%
1/9/2019	1,812	349%	2,000	382%
1/10/2019	739	-59%	996	-50%
1/11/2019	409	-45%	564	-43%
1/12/2019	302	-26%	408	-28%
1/13/2019	248	-18%	329	-20%
1/14/2019	215	-13%	281	-15%
1/15/2019	206	-4%	261	-7%
1/16/2019	1,895	820%	2,072	693%
1/17/2019	2,918	54%	3,321	60%

	Mill Creek (MLM)		Deer Creek (DCV)	
Date	mean daily flow (cfs)	change in mean daily flow	mean daily flow (cfs)	change in mean daily flow
1/18/2019	1,007	-65%	1,275	-62%
1/19/2019	702	-30%	865	-32%
1/20/2019	1,261	80%	1,119	29%
1/21/2019	1,551	23%	1,532	37%
1/22/2019	788	-49%	973	-37%
1/23/2019	538	-32%	696	-28%
1/24/2019	422	-22%	550	-21%
1/25/2019	352	-17%	454	-17%
1/26/2019	307	-13%	387	-15%
1/27/2019	279	-9%	343	-11%
1/28/2019	260	-7%	315	-8%
1/29/2019	248	-5%	293	-7%
1/30/2019	242	-2%	282	-4%
1/31/2019	237	-2%	268	-5%
2/1/2019	238	0%	262	-2%
2/2/2019	1,283	439%	1,211	363%
2/3/2019	1,199	-7%	1,231	2%
2/4/2019	1,927	61%	1,876	52%
2/5/2019	795	-59%	1,021	-46%
2/6/2019	517	-35%	696	-32%
2/7/2019	403	-22%	538	-23%
2/8/2019	350	-13%	458	-15%
2/9/2019	334	-5%	423	-8%
2/10/2019	348	4%	392	-7%
2/11/2019	307	-12%	343	-12%
2/12/2019	290	-6%	318	-8%
2/13/2019	2,600	797%	1,620	410%
2/14/2019	5,126	97%	5,407	234%
2/15/2019	1,709	-67%	2,229	-59%
2/16/2019	1,000	-41%	1,343	-40%
2/17/2019	730	-27%	976	-27%
2/18/2019	570	-22%	778	-20%
2/19/2019	475	-17%	623	-20%
2/20/2019	424	-11%	550	-12%
2/21/2019	382	-10%	489	-11%
2/22/2019	342	-10%	427	-13%
2/23/2019	316	-8%	386	-9%
2/24/2019	301	-5%	355	-8%
2/25/2019	442	47%	662	86%

	Mill Creek (MLM)		Deer Creek (DCV)	
Date	mean daily flow (cfs)	change in mean daily flow	mean daily flow (cfs)	change in mean daily flow
2/26/2019	1,925	336%	3,707	460%
2/27/2019	2,892	50%	5,512	49%
2/28/2019	1,277	-56%	2,168	-61%
3/1/2019	825	-35%	1,372	-37%
3/2/2019	813	-1%	1,156	-16%
3/3/2019	848	4%	1,126	-3%
3/4/2019	1,318	55%	1,538	37%
3/5/2019	934	-29%	1,263	-18%
3/6/2019	2,197	135%	2,607	106%
3/7/2019	1,529	-30%	2,280	-13%
3/8/2019	1,308	-14%	1,685	-26%
3/9/2019	992	-24%	1,281	-24%
3/10/2019	745	-25%	1,008	-21%
3/11/2019	593	-20%	822	-19%
3/12/2019	511	-14%	732	-11%
3/13/2019	445	-13%	747	2%
3/14/2019	396	-11%	669	-10%
3/15/2019	364	-8%	610	-9%
3/16/2019	349	-4%	580	-5%
3/17/2019	346	-1%	569	-2%
3/18/2019	353	2%	576	1%
3/19/2019	371	5%	593	3%
3/20/2019	409	10%	643	8%
3/21/2019	422	3%	666	4%
3/22/2019	404	-4%	651	-2%
3/23/2019	427	6%	677	4%
3/24/2019	407	-5%	654	-4%
3/25/2019	585	44%	833	27%
3/26/2019	699	19%	1,140	37%
3/27/2019	1,363	95%	1,819	60%
3/28/2019	1,147	-16%	1,788	-2%
3/29/2019	798	-30%	1,361	-24%
3/30/2019	632	-21%	1,122	-18%
3/31/2019	550	-13%	982	-12%
4/1/2019	516	-6%	911	-7%
4/2/2019	696	35%	1,131	24%
4/3/2019	804	16%	1,341	19%
4/4/2019	724	-10%	1,215	-9%
4/5/2019	696	-4%	1,174	-3%

	Mill Creek (MLM)		Deer Creek (DCV)	
Date	mean daily flow (cfs)	change in mean daily flow	mean daily flow (cfs)	change in mean daily flow
4/6/2019	727	4%	1,203	2%
4/7/2019	667	-8%	1,148	-5%
4/8/2019	786	18%	1,243	8%
4/9/2019	1361	73%	1,712	38%
4/10/2019	941	-31%	1,384	-19%
4/11/2019	757	-20%	1,182	-15%
4/12/2019	640	-15%	1,038	-12%
4/13/2019	598	-7%	965	-7%
4/14/2019	601	1%	934	-3%
4/15/2019	603	0%	928	-1%
4/16/2019	612	1%	935	1%
4/17/2019	583	-5%	891	-5%
4/18/2019	593	2%	867	-3%
4/19/2019	702	18%	940	8%
4/20/2019	775	10%	992	6%
4/21/2019	781	1%	1,005	1%
4/22/2019	699	-10%	930	-7%
4/23/2019	699	16%	910	-2%
4/24/2019	830	19%	977	7%
4/25/2019	929	12%	1,033	6%
4/26/2019	979	5%	1,050	2%
4/27/2019	944	-4%	1,018	-3%
4/28/2019	885	-6%	970	-5%
4/29/2019	816	-8%	912	-6%
4/30/2019	774	-25%	861	-6%

Second Alert in Action IV.1.1: Wilkins Slough flows and water temperature at Knights Landing

The second alert is triggered only if both components are met (Knights Landing water temperature less than 56.3°F and Wilkins Slough flows greater than 7,500 cfs). Wilkins Slough flow data are from CDEC station WLK. Knights Landing water temperature data are from the Knights Landing rotary screw trap datasheet posted by CDFW on the data access tab at: CalFish Middle Sacramento River Salmon and Steelhead Monitoring; the water temperature reported on each row was measured at the "Stop" time and date listed in that row. Yellow-highlighted cells indicate conditions that triggered an alert.

	Wilkins Slough (WLK)	**Knights Landing (KL)**
Date	Mean Daily Flow (cfs)	Daily water temperature (°F)
10/1-10/2	6,363	64
10/3-10/9	6,341-6,877	62.8
10/10-10/16	5,962-6,589	62.8
10/17-10/23	5,036-5,763	58-60
10/24-10/30	3,484-4,931	58.8-60.3
10/31-11/6	3,855-4,401	57.9-58.5
11/7-11/13	3,370-3,854	49.9-57.8
11/14-11/20	3,395-4,240	49.7-50.3
11/21-11/27	4,449-6,231	50.0-54.3
11/27/2018	6,048	54.1
11/28/2018	5,777	54
11/29/2018	6,077	54.3
11/30/2018	7,395	54
12/1/2018	11,027	53.8
12/2/2018	9,032	52.7
12/3/2018	7,240	51.6
12/4/2018	6,591	50
12/5/2018	6,124	50
12/6/2018	5,775	50
12/7/2018	5,526	49
12/8/2018	5,182	49
12/9/2018	4,866	49
12/10/2018	4,810	49
12/11/2018	4,740	49.8
12/12/2018	4,553	49.8
12/13/2018	4,465	49
12/14/2018	4,439	50
12/15/2018	4,469	50.1
12/16/2018	4,581	50.2

	Wilkins Slough (WLK)	Knights Landing (KL)
Date	Mean Daily Flow (cfs)	Daily water temperature (°F)
12/17/2018	5,372	50.9
12/18/2018	14,945	50
12/19/2018	14,993	51.8
12/20/2018	10,222	*
12/21/2018	8,366	*
12/22/2018	7,768	*
12/23/2018	8,241	*
12/24/2018	7,621	*
12/25/2018	7,622	*
12/26/2018	13,855	50.1
12/27/2018	12,776	*
12/28/2018	9,820	48.1
12/29/2018	8,194	*
12/30/2018	7,317	*
12/31/2018	6,738	46.7
1/1/2019	6,338	*
1/2/2019	6,048	44.9
1/3/2019	5,931	44.6
1/4/2019	5,896	45
1/5/2019	5,861	45.1
1/6/2019	5,993	45.5
1/7/2019	8,604	46
1/8/2019	17,225	47.1
1/9/2019	15,935	47.2
1/10/2019	22,480	47.9
1/11/2019	23,165	51.1
1/12/2019	18,425	50.8
1/13/2019	14,271	50.6
1/14/2019	12,123	50.4
1/15/2019	10,870	50.1
1/16/2019	10,333	50
1/17/2019	18,254	50.2
1/18/2019	26,167	50.5
1/19/2019	26,290	50.7
1/20/2019	24,860	50.4
1/21/2019	24,653	50
1/22/2019	25,662	50.3
1/23/2019	24,396	49.3
1/24/2019	22,403	48.3

	Wilkins Slough (WLK)	Knights Landing (KL)
Date	Mean Daily Flow (cfs)	Daily water temperature (°F)
1/25/2019	20,062	48.4
1/26/2019	17,549	48.9
1/27/2019	15,302	49.3
1/28/2019	13,716	*
1/29/2019	12,513	50.8
1/30/2019	11,791	51.7
1/31/2019	11,267	52.5
2/1/2019	10,874	53.2
2/2/2019	10,762	53.5
2/3/2019	19,677	53.2
2/4/2019	25,635	51.9
2/5/2019	25,761	50.4
2/6/2019	25,173	49
2/7/2019	23,198	47.7
2/8/2019	21,154	47.5
2/9/2019	18,968	47.4
2/10/2019	17,463	47.4
2/11/2019	16,646	47.7
2/12/2019	15,948	47.4
2/13/2019	15,604	47.2
2/14/2019	23,854	47.4
2/15/2019	26,816	44
2/16/2019	27,444	44.6
2/17/2019	26,751	45.1
2/18/2019	25,384	46.1
2/19/2019	24,115	46.5
2/20/2019	22,904	46.6
2/21/2019	21,870	47.1
2/22/2019	20,329	47.3
2/23/2019	18,590	47.5
2/24/2019	17,006	47.8
2/25/2019	15,739	48.3
2/26/2019	15,971	48.7
2/27/2019	23,750	48.8
2/28/2019	27,052	49
3/1/2019	27,948	49.5
3/2/2019	27,754	50.1
3/3/2019	27,389	50
3/4/2019	27,359	49.9
3/5/2019	27,415	50.6

	Wilkins Slough (WLK)	Knights Landing (KL)
Date	Mean Daily Flow (cfs)	Daily water temperature (°F)
3/6/2019	27,365	50.9
3/7/2019	27,503	50.9
3/8/2019	27,889	51.5
3/9/2019	27,945	51.5
3/10/2019	27,837	50.1
3/11/2019	27,681	49.7
3/12/2019	27,594	49.8
3/13/2019	27,326	50.4
3/14/2019	27,099	50.3
3/15/2019	26,890	50.5
3/16/2019	26,695	50.7
3/17/2019	26,305	51.3
3/18/2019	25,886	52.1
3/19/2019	25,388	52.8
3/20/2019	24,838	53.3
3/21/2019	24,230	53.5
3/22/2019	24,043	53.4
3/23/2019	23,439	53
3/24/2019	23,067	52.8
3/25/2019	23,000	52.1
3/26/2019	22,847	52.9
3/27/2019	24,581	53.1
3/28/2019	25,836	53
3/29/2019	26,810	53.8
3/30/2019	26,515	52.9
3/31/2019	25,969	53.7
4/1/2019	25,470	54.8
4/2/2019	25,079	55.3
4/3/2019	25,013	55.5
4/4/2019	25,625	55
4/5/2019	25,769	54.7
4/6/2019	26,109	54.6
4/7/2019	26,435	53.6
4/8/2019	26,484	53.6
4/9/2019	26,411	54.3
4/10/2019	26,821	53.9
4/11/2019	27,067	54.5
4/12/2019	27,048	53.2
4/13/2019	26,943	54.1
4/14/2019	26,825	53.9

	Wilkins Slough (WLK)	**Knights Landing (KL)**
Date	Mean Daily Flow (cfs)	Daily water temperature (°F)
4/15/2019	26,751	54.5
4/16/2019	26,509	53.0
4/17/2019	26,105	54.2
4/18/2019	25,600	56.3
4/19/2019	24,904	58.0
4/20/2019	24,117	60.4
4/21/2019	23,488	60.4
4/22/2019	22,782	59.1
4/23/2019	21,759	59.4
4/24/2019	19,941	60.5
4/25/2019	18,055	62.6
4/26/2019	16,617	65
4/27/2019	15,459	66.6
4/28/2019	14,496	66.7
4/29/2019	13,511	66.5
4/30/2019	12,537	65.6

*Data not available.

Action IV.3: Knights Landing Catch Index (KLCI) and Sacramento Catch Index (SCI)

The third alert is triggered when KLCI or SCI >10 fish per day (November 1-February 28) or when KLCI or SCI >15 fish per day (March 1-April 30), per Action IV.3, to reduce the likelihood of entrainment or salvage at the export facilities. In the table below, red-highlighted cells indicate catch indices >10 fish per day (November 1-February 28) and gray-highlighted cells indicate catch indices <10 fish per day. Catch indices were not exceeded after 1/21/2019.

Date	KLCI	Seine SCI	Trawl SCI
12/20/2018	No sampling	0	0
1/8/2019	4.4*	no sampling	0
1/9/2019	5.5*	9.6	2.6
1/10/2019	60.9*	0	0.9
1/11/2019	52.8*	no sampling	0.4
1/12/2019	11.6*	no sampling	no sampling
1/13/2019	3.9*	no sampling	0.2
1/14/2019	1.5*	no sampling	0.6
1/15/2019	1.1*	no sampling	0
1/16/2019	0	0.1	no sampling
1/17/2019	1	no sampling	2
1/18/2019	32	no sampling	1
1/20/2019	1.3	no sampling	0.4
1/21/2019	2.4	no sampling	no sampling

* KLCI was doubled to account for Knights Landing RST fishing at 50% cone effort.

Appendix C – Old and Middle River Flows

Old and Middle River Flow (OMR)

Preliminary Data - Subject to Change

December 2018

(*** Computed from available USGS Tidally Filtered Data)

Date	USGS Tidally Filtered OMR*** (cfs)		OMR Index Calculation (cfs)		
	Mean 5-Day	Mean 14-Day	Mean Daily	Mean 5-Day	Mean 14-Day
12/1/2018	-2750	-2640	-6070	-3440	-3,120
12/2/2018	-3510	-2870	-6660	-4390	-3,420
12/3/2018	-4440	-3130	-7140	-5430	-3,740
12/4/2018	-5480	-3500	-8750	-6500	-4,160
12/5/2018	-6850	-3950	-8730	-7470	-4,580
12/6/2018	-7590	-4360	-7850	-7830	-4,900
12/7/2018	-7850	-4720	-7440	-7980	-5,190
12/8/2018	-7860	-4990	-7500	-8050	-5,500
12/9/2018	-7550	-5280	-7080	-7720	-5,770
12/10/2018	-7080	-5640	-6680	-7310	-6,080
12/11/2018	-6530	-5880	-5860	-6910	-6,360
12/12/2018	-5940	-6040	-4920	-6410	-6,570
12/13/2018	-5500	-6140	-4950	-5900	-6,680
12/14/2018	-5180	-6340	-4970	-5480	-6,760
12/15/2018	-4750	-6350	-4960	-5130	-6,680
12/16/2018	-4610	-6280	-5000	-4960	-6,560
12/17/2018	-4620	-6110	-5020	-4980	-6,410
12/18/2018	-4620	-5830	-4970	-4980	-6,140
12/19/2018	-4790	-5610	-7150	-5420	-6,030
12/20/2018	-5320	-5540	-7590	-5950	-6,010
12/21/2018	-5880	-5570	-7590	-6460	-6,020
12/22/2018	-6380	-5580	-7130	-6890	-5,990
12/23/2018	-6720	-5530	-6660	-7220	-5,960
12/24/2018	-6790	-5500	-6670	-7130	-5,960
12/25/2018	-6510	-5540	-6680	-6950	-6,020
12/26/2018	-6070	-5620	-6660	-6760	-6,140
12/27/2018	-5870	-5710	-6680	-6670	-6,270
12/28/2018	-5880	-5780	-7220	-6780	-6,430
12/29/2018	-5980	-5940	-7620	-6970	-6,620
12/30/2018	-6380	-6170	-7740	-7180	-6810
12/31/2018	-6890	-6430	-8130	-7480	-7040

Old and Middle River Flow (OMR)

Preliminary Data - Subject to Change

January 2019

(*** Computed from available USGS Tidally Filtered Data)

Date	USGS Tidally Filtered OMR*** (cfs)		OMR Index Calculation (cfs)		
	Mean 5-Day	Mean 14-Day	Mean Daily	Mean 5-Day	Mean 14-Day
1/1/2019	-6860	-6510	-4930	-7130	-7030
1/2/2019	-6670	-6450	-5130	-6710	-6890
1/3/2019	-6320	-6300	-5010	-6190	-6700
1/4/2019	-5850	-6160	-4810	-5600	-6510
1/5/2019	-5410	-6080	-4900	-4960	-6350
1/6/2019	-5150	-5950	-4870	-4940	-6220
1/7/2019	-4930	-5790	-4870	-4890	-6090
1/8/2019	-4910	-5730	-4870	-4860	-5960
1/9/2019	-4800	-5710	-4920	-4890	-5840
1/10/2019	-4520	-5600	-4940	-4890	-5710
1/11/2019	-4660	-5520	-4880	-4900	-5540
1/12/2019	-4790	-5360	-4910	-4900	-5350
1/13/2019	-4700	-5120	-4930	-4920	-5150
1/14/2019	-4710	-4930	-5030	-4940	-4930
1/15/2019	-5020	-4940	-5050	-4960	-4940
1/16/2019	-5190	-4990	-4950	-4970	-4920
1/17/2019	-5050	-4910	-4930	-4980	-4920
1/18/2019	-4850	-4770	-5050	-5000	-4940
1/19/2019	-4800	-4710	-5010	-5000	-4940
1/20/2019	-4680	-4770	-4920	-4970	-4950
1/21/2019	-4270	-4750	-5080	-5000	-4960
1/22/2019	-4220	-4660	-5110	-5030	-4980
1/23/2019	-4450	-4640	-5110	-5050	-4990
1/24/2019	-4470	-4690	-4810	-5010	-4980
1/25/2019	-4370	-4670	-4830	-4990	-4980
1/26/2019	-4510	-4650	-4820	-4940	-4970
1/27/2019	-4760	-4690	-4860	-4890	-4970
1/28/2019	-4930	-4720	-4910	-4850	-4960
1/29/2019	-4980	-4680	-4970	-4880	-4950
1/30/2019	-5060	-4620	-5130	-4940	-4970
1/31/2019	-5000	-4630	-5090	-4990	-4980

Old and Middle River Flow (OMR)

Preliminary Data - Subject to Change

February 2019

(*** Computed from available USGS Tidally Filtered Data)

Date	USGS Tidally Filtered OMR*** (cfs)		OMR Index Calculation (cfs)		
	Mean 5-Day	Mean 14-Day	Mean Daily	Mean 5-Day	Mean 14-Day
2/1/2019	-4710	-4640	-2240	-4470	-4780
2/2/2019	-4760	-4700	-4780	-4440	-4760
2/3/2019	-4610	-4650	-4600	-4370	-4740
2/4/2019	-4300	-4630	-4810	-4300	-4720
2/5/2019	-4080	-4580	-4920	-4270	-4710
2/6/2019	-4100	-4520	-4990	-4820	-4700
2/7/2019	-3810	-4470	-5000	-4860	-4710
2/8/2019	-3800	-4450	-3460	-4640	-4610
2/9/2019	-3900	-4420	-3620	-4400	-4530
2/10/2019	-3780	-4230	-3540	-4120	-4430
2/11/2019	-3500	-4010	-3290	-3780	-4320
2/12/2019	-3520	-3950	-3440	-3470	-4210
2/13/2019	-4030	-4080	-5110	-3800	-4210
2/14/2019	-4300	-4170	-5170	-4110	-4210
2/15/2019	-4380	-4110	-4950	-4390	-4410
2/16/2019	-4630	-3960	-4800	-4690	-4410
2/17/2019	-4570	-3940	-4840	-4970	-4420
2/18/2019	-3940	-3950	-4750	-4900	-4420
2/19/2019	-3760	-4050	-5000	-4870	-4430
2/20/2019	-4200	-4140	-4990	-4880	-4430
2/21/2019	-4430	-4180	-5060	-4930	-4430
2/22/2019	-4500	-4190	-4920	-4940	-4530
2/23/2019	-4520	-4170	-3450	-4680	-4520
2/24/2019	-4430	-4290	-3460	-4380	-4520
2/25/2019	-4460	-4490	-3170	-4010	-4510
2/26/2019	-4460	-4520	-2930	-3590	-4470
2/27/2019	-3930	-4150	-660	-2730	-4150
2/28/2019	-3100	-3740	120	-2020	-3780

Old and Middle River Flow (OMR)

Preliminary Data - Subject to Change

March 2019

(*** Computed from available USGS Tidally Filtered Data)

Date	USGS Tidally Filtered OMR*** (cfs)		OMR Index Calculation (cfs)		
	Mean 5-Day	Mean 14-Day	Mean Daily	Mean 5-Day	Mean 14-Day
3/1/2019	-2340	-3560	400	-1250	-3390
3/2/2019	-1410	-3340	-210	-660	-3070
3/3/2019	-470	-3050	130	-40	-2710
3/4/2019	-110	-2780	-270	30	-2390
3/5/2019	-410	-2550	-250	-40	-2050
3/6/2019	-640	-2290	-760	-270	-1750
3/7/2019	-490	-1930	-580	-350	-1430
3/8/2019	-370	-1580	-430	-460	-1110
3/9/2019	-240	-1250	120	-380	-850
3/10/2019	300	-860	1470	-40	-500
3/11/2019	1020	-330	1830	480	-140
3/12/2019	1720	280	1790	960	190
3/13/2019	2670	780	4790	2000	580
3/14/2019	3140	980	1920	2360	710
3/15/2019	3330	1170	3490	2760	930
3/16/2019	3090	1280	360	2470	970
3/17/2019	2380	1290	160	2140	970
3/18/2019			40	1190	1000
3/19/2019			50	820	1020
3/20/2019			-800	-40	1020
3/21/2019			-790	-270	1000
3/22/2019			-820	-460	970
3/23/2019			-660	-600	920
3/24/2019			-910	-800	750
3/25/2019			-560	-750	580
3/26/2019			1090	-370	530
3/27/2019			480	-110	220
3/28/2019			-590	-100	40
3/29/2019			-780	-70	-270
3/30/2019			-660	-90	-340
3/31/2019			-130	-340	-360

Old and Middle River Flow (OMR)

Preliminary Data - Subject to Change

April 2019

(*** Computed from available USGS Tidally Filtered Data)

Date	USGS Tidally Filtered OMR*** (cfs)		OMR Index Calculation (cfs)		
	Mean 5-Day	Mean 14-Day	Mean Daily	Mean 5-Day	Mean 14-Day
4/1/2019			3270	220	-130
4/2/2019			3480	1040	120
4/3/2019			3580	1910	430
4/4/2019			3580	2760	740
4/5/2019	3420		3640	3510	1060
4/6/2019	3600		3260	3510	1340
4/7/2019	3490		3060	3420	1620
4/8/2019	3240		2860	3280	1870
4/9/2019	3340		2490	3060	1970
4/10/2019	3330		2450	2820	2110
4/11/2019	3150		2350	2640	2320
4/12/2019	3100		2390	2510	2540
4/13/2019	3060		2360	2410	2760
4/14/2019	2700	3120	2340	2380	2940
4/15/2019	2430	3090	2160	2320	2860
4/16/2019	2430	3020	2160	2280	2760
4/17/2019	2360	2910	2070	2220	2660
4/18/2019	2250	2810	2130	2170	2550
4/19/2019	2160	2670	2060	2120	2440
4/20/2019	2150	2580	2010	2090	2350
4/21/2019			1950	2040	2270
4/22/2019			1870	2000	2200
4/23/2019			1780	1930	2150
4/24/2019			1730	1870	2100
4/25/2019			1630	1790	2050
4/26/2019			1610	1720	1990
4/27/2019			1550	1660	1930
4/28/2019			1500	1600	1870
4/29/2019	1680		1600	1580	1830
4/30/2019	1870		1590	1570	1790

Old and Middle River Flow (OMR)

Preliminary Data - Subject to Change

May 2019

(*** Computed from available USGS Tidally Filtered Data)

Date	USGS Tidally Filtered OMR*** (cfs)		OMR Index Calculation (cfs)		
	Mean 5-Day	Mean 14-Day	Mean Daily	Mean 5-Day	Mean 14-Day
5/1/2019	1890		1640	1580	1760
5/2/2019	1760		1520	1570	1720
5/3/2019	1520		1510	1570	1680
5/4/2019	1290		1470	1550	1640
5/5/2019	910		1410	1510	1600
5/6/2019	750		1410	1460	1570
5/7/2019	790		1520	1460	1550
5/8/2019	930	1380	1420	1450	1530
5/9/2019	1210	1400	1540	1460	1520
5/10/2019	1670	1450	1720	1520	1530
5/11/2019	1920	1490	1740	1590	1540
5/12/2019	2170	1560	1700	1620	1560
5/13/2019	2460	1660	2090	1760	1590
5/14/2019	2560	1640	2100	1870	1630
5/15/2019	2290	1590	1450	1820	1610
5/16/2019	2130	1620	1520	1770	1610
5/17/2019	2060	1750	1880	1810	1640
5/18/2019	1950	1890	2070	1800	1680
5/19/2019	2140	2080	2320	1850	1750
5/20/2019	2490	2210	2540	2070	1830
5/21/2019	2540	2250	2630	2290	1910
5/22/2019	2740	2400	2620	2440	1990
5/23/2019	3060	2550	2600	2540	2070
5/24/2019	3100	2590	2650	2610	2140
5/25/2019	3140	2650	2640	2630	2200
5/26/2019	3560	2750	2640	2630	2270
5/27/2019	3600	2800	2590	2620	2300
5/28/2019	3230	2790	2930	2690	2360
5/29/2019	3110	2890	1970	2550	2400
5/30/2019	2990	2950	2070	2440	2440
5/31/2019	2250	2820	2300	2370	2470

Old and Middle River Flow (OMR)

Preliminary Data - Subject to Change

June 2019

(*** Computed from available USGS Tidally Filtered Data)

Date	USGS Tidally Filtered OMR*** (cfs)		OMR Index Calculation (cfs)		
	Mean 5-Day	Mean 14-Day	Mean Daily	Mean 5-Day	Mean 14-Day
6/1/2019	620	2330	-4290	1000	2020
6/2/2019	-800	1740	-3890	-370	1570
6/3/2019	-2120	1240	-3360	-1430	1150
6/4/2019	-3340	850	-3290	-2510	730
6/5/2019	-4090	380	-3340	-3630	300
6/6/2019	-3720	-90	-2980	-3370	-100
6/7/2019	-3190	-510	-2860	-3170	-490
6/8/2019	-2880	-910	-2880	-3070	-890
6/9/2019	-2820	-1430	-3070	-3030	-1290
6/10/2019	-2860	-1930	-3260	-3010	-1710
6/11/2019	-2660	-2200	-1180	-2650	-2000
6/12/2019	-2700	-2580	-1320	-2340	-2240
6/13/2019	-3190	-3110	-4030	-2570	-2680
6/14/2019	-3510	-3490	-4240	-2810	-3140
6/15/2019	-3900	-3540	-4530	-3060	-3160
6/16/2019	-4680	-3580	-4860	-3800	-3230
6/17/2019	-5290	-3720	-5300	-4590	-3370
6/18/2019	-5260	-3800	-3150	-4420	-3360
6/19/2019	-5140	-3870	-3340	-4240	-3360
6/20/2019	-4800	-3930	-3730	-4080	-3410
6/21/2019	-4390	-4010	-4520	-4010	-3530
6/22/2019	-4230	-4200	-5230	-3990	-3700
6/23/2019	-4320	-4330	-4970	-4360	-3830
6/24/2019	-4520	-4460	-4770	-4640	-3940
6/25/2019	-4730	-4670	-5000	-4900	-4210
6/26/2019	-4810	-4770	-5000	-4990	-4480
6/27/2019	-4600	-4700	-5100	-4970	-4550
6/28/2019	-4130	-4560	-1360	-4250	-4350
6/29/2019	-3750	-4410	-1730	-3640	-4150
6/30/2019	-3180	-4130	-2990	-3240	-4010

Appendix D - Salmon Loss-Density Table

Chinook Salmon - Daily Summary Table

California Department of Fish and Wildlife - Results Subject to Revision

Prepared by: Geir Aasen **Report Date: 6/24/2019** **Report Time: 2:26 PM**

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT									OLDER JUV LOSS DENSITY (FL mm)
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH	RACE	DNA RACE	
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS				
12/04/2018							1	4	2.60				132	LF	F	0.14
12/17/2018										1	4	2.88	155	S		
12/19/2018										1	4	2.60	142	S		
12/20/2018										1	4	2.60	150	S		
12/21/2018										2	8	5.21	150 - 161	S		
12/23/2018	1	2	8.83	1	4	17.36							146 - 183	LF		0.61
12/24/2018										2	8	5.21	140 - 173	LF,S		
12/26/2018										1	4	2.60	159	LF		
12/27/2018										6	24	15.62	149 - 170	LF,S		
12/28/2018										3	12	7.81	139 - 173	LF		
12/29/2018							1	4	2.60	5	20	13.01	140 - 192	LF,W		0.16
12/30/2018										5	20	13.01	138 - 170	LF		
12/31/2018							1	4	2.60	2	8	5.21	122 - 173	LF,W	F	
01/01/2019				3	6	26.06				1	4	2.88	126 - 157	LF		
01/02/2019	1	4	17.31				1	4	2.88	1	4	2.88	143 - 169	LF,W	F	
01/03/2019				2	8	34.73	1	4	2.88				138 - 160	LF,W	F	
01/04/2019				1	4	17.41				1	4	2.88	135 - 147	LF		
01/06/2019							1	4	2.88				138	W	F	

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT									
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH	RACE	DNA RACE	OLDER JUV LOSS DENSITY (FL mm)
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS				
01/07/2019										1	4	2.88	145	LF		
01/08/2019										2	8	5.76	114 - 140	LF		
01/09/2019										1	4	2.88	140	LF		
01/10/2019										1	4	2.88	132	LF		
01/16/2019				2	8	35.30							132 - 136	LF		
01/17/2019				4	13	56.72	1	4	2.88	1	4	2.88	131 - 205	LF,W		0.25
01/18/2019				4	11	47.84	1	4	2.88	3	12	8.65	116 - 183	LF,W		0.23
01/19/2019										7	28	18.22	139 - 185	LF		
01/20/2019	1	4	17.45	1	4	17.39				4	16	10.41	123 - 196	LF,W		1.35
01/21/2019				12	21	91.62				1	4	2.60	141 - 189	LF		
01/22/2019	1	4	17.44	4	14	60.43				2	8	5.21	136 - 191	LF,W		1.35
01/23/2019	1	1	4.33	6	9	38.85				2	8	5.21	140 - 203	LF		0.32
01/24/2019				1	1	4.33							157	LF		
01/25/2019							1	4	2.54	1	4	2.88	39 - 168	F,LF		
01/26/2019				1	4	17.66							156	LF		
01/28/2019							2	8	5.76				152 - 155	W		0.45
01/29/2019				2	2	8.67	1	4	2.88				130 - 164	LF,W		0.26
02/02/2019	1	2	8.94	2	5	21.82							148 - 182	LF,W		0.81
02/03/2019	1	2	8.72	1	2	8.72	2	8	5.42				90 - 138	LF,W		1.25
02/05/2019				1	2	8.78							164	LF		

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT									
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH	RACE	DNA RACE	OLDER JUV LOSS DENSITY (FL mm)
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS				
02/06/2019							82	328	208.39	1	4	2.88	33 - 180	F,LF,W		0.19
02/07/2019	3	8	33.20	3	9	38.48	85	340	198.22	3	12	7.25	29 - 194	F,LF,S,W		0.33
02/08/2019	6	22	91.82	1	4	17.50	79	316	200.43	1	4	2.54	28 - 184	F,LF,S,W		0.70
02/09/2019	3	10.8	45.07	2	5	21.06	37	148	93.87	2	8	5.07	29 - 88	F,S		
02/10/2019				2	3	13.03	25	100	63.43				34 - 179	F,LF		
02/11/2019	10	28	115.85	1	1	4.33	26	104	63.43				32 - 86	F,S,U		
02/12/2019	4	12	50.42				29	116	73.58	2	8	5.07	29 - 113	F,S,W		1.39
02/13/2019	4	14	59.49	1	4	16.72	4	16	9.30				28 - 175	F,S,W		1.03
02/14/2019	1	4	16.65				1	4	2.33				38 - 100	F,W		1.01
02/15/2019	1	4	16.87				16	64	37.49	1	4	2.33	35 - 138	F,S,W		1.11
02/16/2019	2	8	34.06	3	12	34.35	5	20	11.63				32 - 436	F,LF,S,W,U		1.04
02/17/2019	2	8	34.57	1	4	16.95	16	64	37.49	3	12	7.25	32 - 191	F,LF,S,W		1.23
02/18/2019	7	26	109.38				28	112	65.39	1	4	2.33	32 - 105	F,S,W		0.12
02/19/2019	21	77.3	323.51	1	4	17.24	38	152	88.37				27 - 193	F,LF,S		
02/20/2019	16	64	268.48	1	4	17.65	39	147	85.43	2	8	4.65	30 - 163	F,LF,S		
02/21/2019	13	52	215.74				20	79.7	46.59	1	4	2.33	31 - 210	F,S,W		0.11
02/22/2019							19	76	44.18	2	8	4.65	31 - 82	F,S		
02/23/2019	8	26	110.35				1	4	2.33				29 - 140	F,W		2.01
02/24/2019	11	44	182.98	2	8	33.08	4	16	9.30	1	4	2.33	30 - 170	F,S,W		0.82
02/25/2019	6	24	99.44				13	52	30.23				30 - 53	F		

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT									
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH	RACE	DNA RACE	OLDER JUV LOSS DENSITY (FL mm)
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS				
02/26/2019				2	2	8.67	16	64	37.21				34 - 184	F,W		
02/27/2019	2	4	16.66				26	104	60.46				33 - 50	F		
02/28/2019	2	6	26.03				23	92	53.49				33 - 115	F,W		1.33
03/01/2019	3	10	42.42	2	8	35.42	36	144	83.72				32 - 178	F,W		1.14
03/02/2019	7	28	115.97	2	8	35.39	19	76	44.18				31 - 197	F,W		
03/03/2019	1	4	16.40	3	12	52.76	12	48	27.91				34 - 161	F,S,W		
03/04/2019	4	14	58.75				14	56	32.55				33 - 142	F,W		0.50
03/05/2019							20	68	39.48				32 - 48	F		
03/06/2019	4	14	58.19				21	84	48.84				31 - 195	F,W		0.99
03/07/2019	2	8	33.37	2	8	35.28	14	56	32.56	2	8	4.93	34 - 161	F,LF,S		
03/08/2019	4	14	58.97	1	4	16.08	9	36	22.68				31 - 82	F,S		
03/09/2019	2	6	25.52				4	16	11.05	1	4	2.76	34 - 151	F,S,W		0.55
03/10/2019				5	20	87.77	5	20	15.33				37 - 109	F,S		
03/11/2019	1	4	17.60	6	22	98.23	2	8	6.54				36 - 179	F,S,W		1.36
03/12/2019				5	14	61.59	2	8	6.54				34 - 115	F,S,W		
03/13/2019				6	16	70.28	1	4	3.88	1	4	3.27	100 - 123	S,W		0.47
03/14/2019				5	20	87.46	2	8	6.54				38 - 117	F,S		
03/15/2019	1	4	16.63	5	14	60.34	3	12	9.80				38 - 109	F,S,W		
03/16/2019	1	4	17.44	2	8	34.53	1	4	3.88				89 - 137	S,W		1.19
03/17/2019				1	4	16.80							98	S		

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT									
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH	RACE	DNA RACE	OLDER JUV LOSS DENSITY (FL mm)
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS				
03/18/2019				2	8	35.53							115	S,W		
03/19/2019	1	2	8.41	5	13	56.90				1	4	3.88	98 - 229	S,W		
03/20/2019	2	4	16.99	12	34	148.52	1	2.7	2.00	1	2.7	2.00	34 - 141	F,S,W		0.53
03/21/2019				15	49.0	214.55	4	16	12.03				42 - 116	F,S,W		
03/22/2019				13	36	159.36	1	4	3.01				50 - 121	F,S,W		
03/23/2019	2	8	34.67	4	14	62.31				2	8	6.53	96 - 145	S,W		1.11
03/24/2019				14	52	228.99				1	4	3.52	94 - 122	S		
03/25/2019	2	8	35.62	13	44	190.59	1	4	3.52	1	4	3.52	91 - 130	S		
03/26/2019	1	4	16.48	40	145	619.96							86 - 117	S,W		
03/27/2019	2	6	25.78	16	40	175.34							99 - 122	S,W		1.77
03/28/2019	3	12	49.46	26	78	338.07							84 - 222	S,W		1.02
03/29/2019	1	1	4.33	18	54.5	232.38				1	4	3.01	95 - 132	S		
03/30/2019	2	8	35.14	14	56	246.98	2	5	3.58				65 - 135	F,S,W		1.11
03/31/2019	1	4	16.90	8	27	115.63				2	8	6.53	89 - 117	S		
04/01/2019				1	4	16.54							98	S		
04/02/2019	1	4	16.77	1	3.2	14.09				4	16	14.92	84 - 118	S		
04/03/2019	1	4	16.67	8	30	128.35	1	4	3.27				53 - 120	F,S		
04/04/2019	5	13	56.56	8	25	108.95							105 - 214	S,W		4.09
04/05/2019				3	10	43.52	2	8	6.01	4	16	13.56	95 - 105	S		
04/06/2019	8	17	70.85	1	2	9.17	1	4	3.01	7	28	24.12	41 - 125	F,S		

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT									
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH	RACE	DNA RACE	OLDER JUV LOSS DENSITY (FL mm)
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS				
04/07/2019	1	4	16.50	3	10	43.45	1	4	3.01	2	8	6.53	65 - 117	F,S		
04/08/2019				1	2	8.36				3	12	10.56	99 - 123	S		
04/09/2019	1	2	8.86	3	10	43.65	2	8	6.01	3	12	10.04	75 - 123	F,S		
04/10/2019				1	4	17.34	4	16	12.03	2	8	7.04	83 - 112	S		
04/11/2019	4	9	37.31	4	7	29.57				1	4	3.01	86 - 130	S		
04/12/2019				2	6	26.30	1	4	3.01	1	4	3.52	82 - 118	S		
04/13/2019	2	2	8.67	1	2	8.80							81 - 116	S		
04/14/2019	1	4	17.45	2	6	26.29							113 - 132	S		
04/15/2019	8	8	34.66	9	12	52.30							81 - 126	S		
04/16/2019	4	8	32.89	2	5	21.36	1	4	3.01	2	8	7.04	75 - 117	F,S		
04/17/2019	1	1	4.33	1	2	8.43	2	8	6.53				73 - 116	F,S		
04/18/2019							5	20	15.03	2	8	6.53	57 - 102	F,S		
04/19/2019	1	4	16.73	1	4	16.65	1	4	3.01				62 - 177	F,S,W		3.15
04/20/2019	4	13	53.86	6	21	87.51	2	8	6.01				61 - 223	F,S,W		3.29
04/21/2019	3	7	28.46	3	9	38.07							91 - 114	S		
04/22/2019	35	99	402.22	11	34	142.61	2	8	6.01	1	4	3.52	83 - 132	F,S		
04/23/2019	1	1	4.33				9	36	27.06	1	4	3.52	76 - 110	F,S		
04/24/2019							6	24	18.04				85 - 98	S		
04/25/2019							15	60	45.10				78 - 96	F,S		
04/26/2019	26	50	209.72				14	56	42.61				80 - 111	F,S		

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT									OLDER JUV LOSS DENSITY (FL mm)
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH	RACE	DNA RACE	
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS				
04/27/2019	6	12	50.13							1	4	3.01	84 - 100	F,S		
04/28/2019							2	8	6.01				90 - 92	S		
04/29/2019	1	4	16.62										96	S		
04/30/2019	67	226	941.68	5	5	21.67	3	12	9.80				77 - 121	F,S		
05/01/2019							5	20	17.57				83 - 103	F,S		
05/02/2019	3	6	25.74				1	4	3.27				87 - 111	F,S		
05/03/2019	25	61	254.53										81 - 103	F,S		
05/04/2019	30	100	427.62										84 - 103	F,S		
05/05/2019	23	68	288.29										86 - 111	F,S		
05/06/2019	100	249	1029.59				1	3.8	3.13				81 - 119	F,S		
05/07/2019	48	134	546.01				6	24	19.61				70 - 103	F,S		
05/08/2019	29	94	383.66				66	264	218.15				82 - 112	F,S		
05/09/2019	15	38	156.73				9	36	29.41				85 - 128	F,S		
05/10/2019	12	40	163.38				11	44	36.56				80 - 110	F,S		
05/11/2019	13	37	154.10				6	24	20.22				82 - 109	F,S		
05/12/2019	5	12	49.01				2	8	6.54				88 - 102	F,S		
05/13/2019							36	144	110.29				75 - 108	F,S		
05/14/2019							46	184	140.36				80 - 105	F,S		
05/15/2019							184	736	519.51				76 - 111	F,S		
05/16/2019							136	544	380.09				74 - 113	F,S		

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT									
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH	RACE	DNA RACE	OLDER JUV LOSS DENSITY (FL mm)
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS				
05/17/2019							26	104	73.97				82 - 117	F,S		
05/18/2019							4	16	14.92				95 - 104	F,S		
05/19/2019	15	30	142.91				8	32	27.38				82 - 111	F,S		
05/20/2019	51	387	1904.24				17	68	59.25				81 - 116	F,S		
05/21/2019	42	72	320.45				34	130	112.48				81 - 112	F,S		
05/22/2019	41	66	314.58				31	96	80.28				80 - 114	F,S		
05/23/2019	38	116	559.25				142	568	398.79				78 - 121	F,S		
05/24/2019	6	9	41.07				117	468	331.81				77 - 118	F,S		
05/25/2019							85	340	241.26				73 - 110	F,S		
05/26/2019	5	8	36.87				30	120	84.60				81 - 110	F,S		
05/27/2019	2	2	8.67				37	148	105.22	1	4	3.19	80 - 133	F,S		
05/28/2019	79	158	748.26				3	12	10.42				68 - 117	F,S		
05/29/2019	46	108	510.35				5	20	16.96				82 - 120	F,S		
05/30/2019	13	15	67.12				17	68	56.17				84 - 112	F,S		
05/31/2019	26	39	177.32				1	4	3.27				75 - 107	F		
06/01/2019							46	184	110.58				80 - 117	F,S		
06/02/2019	2	4	18.07				9	36	21.76				84 - 108	F		
06/03/2019	10	32	148.15				21	84	50.78				80 - 110	F		
06/04/2019	3	12	55.50				14	56	33.67				85 - 114	F,S		
06/05/2019							9	36	20.93				87 - 98	F		

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT									OLDER JUV LOSS DENSITY (FL mm)
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH	RACE	DNA RACE	
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS				
06/06/2019	5	20	89.99				25	100	59.25				85 - 124	F,S		
06/07/2019	4	16	71.76				18	72	42.41				82 - 112	F		
06/08/2019							9	36	22.04				82 - 110	F		
06/09/2019							6	24	14.23				81 - 118	F,S		
06/10/2019							3	12	7.53				89 - 103	F		
06/11/2019							4	16	12.03				90 - 93	F		
06/13/2019							9	36	22.04				89 - 120	F,S		
06/14/2019							4	16	9.86				93 - 107	F		
06/15/2019							6	24	15.06				90 - 111	F		
06/16/2019							2	8	4.65				89 - 96	F		
06/21/2019							4	16	11.48				84 - 103	F		
06/22/2019							3	12	8.29				84 - 99	F		
06/23/2019							2	8	4.93				98 - 122	F		
Season total	**3053.1**	**13377.11**		**1199.7**	**5182.79**		**8556.2**	**5798.54**		**502.7**	**363.57**					
Weekly total	**0.0**	**0.00**		**0.0**	**0.00**		**36.0**	**24.70**		**0.0**	**0.00**					

* Sum of all Salmon salvage at both facilities **13311.67**

Disclaimer: * includes clipped salvage, non-clipped salvage, and unmeasured salmon salvage

The table will only be updated with catch, salvage, loss, length, race, and loss density on dates when salmon were salvaged, although the report and "report date" will be updated each week day to

Non-clipped = adipose fin present; Clipped = adipose fin removed; Race: S = spring run, F = fall run, LF = late fall run, W = winter run.

U = Unknown race; fish was larger than any established race by length of the fish at date criteria (> 300 mm).

** Loss for large unknown race salmon is not included in this report.

***Since NON clipped salmon was not released, but kept for a study, a “1” was added to loss.

Older Juvenile Loss Density = daily combined (SWP+CVP) losses of older non-clipped juveniles /1000AF (SWP+CVP exports)

Appendix E - Steelhead Loss-Density Table

Steelhead - Daily Summary Table

California Department of Fish and Wildlife - Results Subject to Revision

Prepared by: Geir Aasen **Report Date: 6/24/2019** **Report Time: 3:02 PM**

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT							
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH (FL mm)	LOSS
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS		DENSITY
12/06/2018	1	4	17.32							1	4	2.72	412 - 431	0.97
01/10/2019				1	4	17.32							658	
01/15/2019							1	1	0.68				262	0.06
01/17/2019				1	4	17.32				1	4	2.72	268 - 270	
01/18/2019										2	8	5.44	217 - 227	
01/19/2019							1	4	2.72	2	8	5.44	172 - 245	0.21
01/20/2019				2	8	34.64							215 - 253	
01/21/2019				1	4	17.32				2	8	5.44	205 - 226	
01/22/2019	1	2	8.66	4	8	34.64	1	4	2.72	1	4	2.72	205 - 257	0.88
01/23/2019				3	4	17.32	1	4	2.72	4	16	10.88	210 - 243	0.20
01/24/2019				6	15	64.95	2	8	5.44	1	4	2.72	225 - 380	0.46
01/25/2019	1	4	17.32				1	4	2.72	5	20	13.60	187 - 234	1.69
01/26/2019				1	4	17.32	1	4	2.72				215 - 275	0.24
01/27/2019				1	2	8.66							203	
01/29/2019	2	4	17.32	1	1	4.33				3	12	8.16	190 - 260	1.58
01/30/2019	1	1	4.33							3	12	8.16	209 - 246	0.36
01/31/2019				1	2	8.66				2	8	5.44	218 - 235	

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT							
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH (FL mm)	LOSS DENSITY
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS		
02/02/2019										1	4	2.72	213	
02/03/2019				2	8	34.64				8	32	21.76	196 - 270	
02/04/2019				8	17	73.61				10	40	27.20	213 - 389	
02/05/2019	1	4	17.32	8	26	112.58				1	4	2.72	189 - 281	1.06
02/06/2019	3	5	21.65	7	23	99.59				2	8	5.44	214 - 626	1.46
02/07/2019				5	14	60.62	1	4	2.72	8	32	21.76	202 - 269	0.17
02/08/2019				3	10	43.30				8	32	21.76	183 - 270	
02/09/2019	3	12	51.96	11	23.7	102.48				4	16	10.88	215 - 312	4.27
02/10/2019	1	2	8.66	5	12	51.96	2	8	5.44	8	32	21.76	198 - 266	1.18
02/11/2019	1	4	17.32	6	15	64.95	1	4	2.72	5	20	13.60	204 - 270	1.65
02/12/2019	1	4	17.32	3	4	17.32	1	4	2.72	8	32	21.76	197 - 264	1.61
02/13/2019	3	10	43.30	12	28	121.24	2	8	5.44	3	10	6.80	178 - 295	2.78
02/14/2019	1	1	4.33	11	35	151.55	1	4	2.72	4	16	10.88	172 - 276	0.43
02/15/2019	3	12	51.96	10	36	155.88				7	28	19.04	103 - 515	2.95
02/16/2019	1	4	17.32	15	54	233.82				6	24	16.32	183 - 286	1.03
02/17/2019				26	88	381.04				9	36	24.48	180 - 487	
02/18/2019				13	52	225.16				1	4	2.72	190 - 263	
02/19/2019	3	9	38.97	16	49.5	214.34				4	16	10.88	190 - 318	1.83
02/20/2019	1	4	17.32	19	76	329.08				11	14	9.52	190 - 297	0.74

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT							
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH (FL mm)	LOSS DENSITY
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS		
02/21/2019	1	4	17.32	17	70	303.10				1	4	2.72	185 - 274	0.74
02/22/2019				18	54	233.82				2	8	5.44	199 - 264	
02/23/2019	3	12	51.96	3	10	43.30				2	8	5.44	192 - 282	2.40
02/24/2019	2	8	34.64	11	44	190.52							214 - 470	1.62
02/25/2019	1	4	17.32	12	48	207.84				4	16	10.88	182 - 368	0.81
02/26/2019				4	13	56.29				5	20	13.60	220 - 290	
02/27/2019	2	6	25.98	10	30	129.90	2	8	5.44				216 - 422	1.98
02/28/2019				5	14	60.62	2	8	5.44				217 - 256	0.36
03/01/2019				7	18	77.94	1	4	2.72	2	8	5.44	193 - 410	0.18
03/02/2019				3	12	51.96							218 - 244	
03/03/2019	3	12	51.96	1	4	17.32				1	4	2.72	221 - 299	3.10
03/04/2019				3	10	43.30				1	4	2.72	219 - 260	
03/05/2019	1	4	17.32	6	20	86.60				2	2	1.36	216 - 278	0.98
03/06/2019	2	6	25.98	11	38	164.54				1	4	2.72	184 - 405	1.48
03/07/2019				1	4	17.32	1	4	2.72	1	4	2.72	231 - 270	0.17
03/08/2019	1	4	17.32	1	4	17.32							204 - 244	1.06
03/09/2019	1	2	8.66	1	2	8.66							215 - 266	0.54
03/10/2019				1	4	17.32							272	
03/11/2019	1	2	8.66	1	2	8.66							230 - 263	0.67

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT							
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH (FL mm)	LOSS
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS		DENSITY
03/12/2019				1	4	17.32				1	4	2.72	242 - 415	
03/13/2019	1	2	8.66	1	4	17.32				1	4	2.72	212 - 283	1.05
03/14/2019				1	2	8.66							240	
03/16/2019	1	2	8.66										237	0.59
03/17/2019	2	8	34.64	2	8	34.64							228 - 290	2.36
03/18/2019				1	4	17.32							239	
03/19/2019	1	2	8.66	1	1	4.33							238 - 243	0.56
03/20/2019	1	2	8.66	1	2	8.66							254 - 278	0.53
03/21/2019	1	2	8.66	2	8	34.64							247 - 315	0.51
03/22/2019	1	4	17.32										290	1.00
03/23/2019				1	4	17.32							251	
03/24/2019	1	2	8.66										251	0.58
03/25/2019				3	10	43.30							255 - 295	
03/26/2019	1	4	17.32	2	8	34.64							246 - 273	1.34
03/27/2019	1	2	8.66										223	0.60
03/28/2019	1	4	17.32	6	16	69.28	1	4	2.72				230 - 286	1.19
03/29/2019	1	4	17.32	1	1	4.33							265 - 348	0.98
03/30/2019	4	16	69.28	3	12	51.96							217 - 284	4.25
03/31/2019	3	12	51.96	6	22	95.26							199 - 296	3.53

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT							
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH (FL mm)	LOSS
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS		DENSITY
04/02/2019				3	9	38.97							258 - 443	
04/03/2019	3	10	43.30	1	4	17.32							197 - 340	4.81
04/04/2019	1	2	8.66										251	1.02
04/05/2019	1	4	17.32	3	8	34.64							243 - 287	2.06
04/06/2019	2	5	21.65	1	1	4.33							228 - 291	2.93
04/07/2019				1	1	4.33							415	
04/08/2019	1	2	8.66	1	2	8.66							280 - 420	1.33
04/09/2019	2	2	8.66										326 - 340	1.33
04/11/2019				3	3	12.99							234 - 304	
04/12/2019	1	2	8.66										256	1.66
04/13/2019	1	1	4.33										304	0.83
04/14/2019				2	2	8.66							237 - 275	
04/15/2019	1	4	17.32	3	7	30.31	1	4	2.72				196 - 535	3.83
04/16/2019	1	4	17.32										265	3.14
04/17/2019	2	4	17.32	3	8	34.64	1	4	2.72				238 - 305	3.82
04/18/2019	1	1	4.33	2	2	8.66							234 - 273	0.78
04/19/2019				1	4	17.32	1	2	1.36				244 - 305	0.26
04/20/2019	1	2	8.66										251	1.70
04/21/2019				1	4	17.32							285	

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT							
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH (FL mm)	LOSS
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS		DENSITY
04/22/2019				2	4	17.32	1	4	2.72				237 - 420	0.60
04/23/2019	2	8	34.64	3	9	38.97				1	4	2.72	240 - 401	7.04
04/24/2019							1	4	2.72				257	0.58
04/25/2019				2	3	12.99							287 - 293	
04/26/2019	1	4	17.32	3	6	25.98							249 - 281	3.67
04/28/2019				2	5	21.65							415 - 463	
04/29/2019	1	4	17.32	3	6	25.98							234 - 270	3.72
04/30/2019	2	8	34.64	3	6	25.98							237 - 271	6.08
05/03/2019	2	5	21.65										252 - 510	4.08
05/06/2019				1	1	4.33							289	
05/09/2019	3	7	30.31										232 - 261	7.14
05/11/2019	1	4	17.32										301	3.53
05/13/2019							1	4	2.72				220	0.70
05/17/2019							1	4	2.72				410	0.53
05/27/2019							1	4	2.72				310	0.45
05/28/2019	1	2	8.66							1	4	2.72	251 - 320	1.68
05/29/2019	2	4	17.32				1	4	2.72				236 - 314	2.94
05/31/2019	2	4	17.32	2	5	21.65							239 - 327	2.10
06/03/2019	2	6	25.98										197 - 223	1.23

	STATE WATER PROJECT						CENTRAL VALLEY PROJECT							
	NON-CLIPPED			CLIPPED			NON-CLIPPED			CLIPPED			LENGTH (FL mm)	LOSS DENSITY
DATE	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS	CATCH	SALVAGE	LOSS		
06/04/2019				1	1	4.33							286	
06/07/2019				1	4	17.32							248	
06/10/2019	1	4	17.32										197	0.81
06/21/2019	1	4	17.32										216	0.98
Season total		**323.0**	**1398.59**		**1239.2**	**5365.59**		**123.0**	**83.64**		**606.0**	**412.08**		
Weekly total		**4.0**	**17.32**		**0.0**	**0.00**		**0.0**	**0.00**		**0.0**	**0.00**		

* Sum of all Steelhead salvage at both facilities **2291.17**

Disclaimer: * includes clipped salvage, non-clipped salvage, and unmeasured Steelhead salvage

The table will only be updated with catch, salvage, loss, length, and loss density on dates when steelhead were salvaged, although the report and "report date" will be updated each

Non-clipped = adipose fin present; Clipped = adipose fin removed

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

Steelhead Loss Density = daily combined (SWP+CVP) losses of non adipose clipped steelhead /1000AF (SWP+CVP exports)

Appendix F— WY 2019 Salmonid and Green Sturgeon Incidental Take and Monitoring Report

2018/2019
SALMONID AND GREEN STURGEON
INCIDENTAL TAKE AND MONITORING REPORT

October 24, 2019

Prepared By

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2018/2019 SALMONID AND GREEN STURGEON INCIDENTAL TAKE AND MONITORING REPORT

TABLE OF CONTENTS **Page**

Data Acquisition 1

Methods for Measuring Incidental Take 2

Observed Chinook Salmon Salvage 3

Rapid Genetic Testing Protocol……4
Observed Chinook Salmon Genetic Run Assignment 5

CVP Salvage Monitoring Gaps…….. 6
Winter-Run Chinook Salmon 7

Winter-Run Chinook Salmon Incidental Take 7

Hatchery Winter-Run Chinook Salmon Incidental Take 8

Spring-Run Chinook Salmon 9

Measuring Incidental Take 9

First Surrogate Release Group and Incidental Take 9

Second Surrogate Release Group and Incidental Take 10

Third Surrogate Release Group and Incidental Take 10

Fry/Smolt Chinook Salmon Loss 10

Chinook Salmon Monitoring in the Sacramento River and the Delta 10

Spring-Run Chinook Salmon Surrogate Monitoring 11

Hatchery Winter-Run Chinook Salmon Monitoring 122

Central Valley Steelhead 12

Steelhead Incidental Take 12

Green Sturgeon Incidental Take 13

Delta Hydrology 13

References 15

LIST OF FIGURES **Page**

Figure 1. Map of monitoring sites used in this report..... 17

Figure 2. Observed Chinook salvage at the Delta fish facilities, with Delta hydrology. August 1, 2018, through July 31, 2019. Race designation based on Delta model length-at-date criteria and CWT's..... 18

Figure 3. Daily Loss and loss density of non-clipped Winter-run length and older juvenile Chinook Salmon at the Delta fish facilities using the current loss equation (DFW 2013), October 1, 2018 through July 31, 2019. 19

Figure 4. Non-clipped Winter-run length Chinook Salmon loss at the Delta fish facilities from October to June using the current loss equation (DFW 2013), water years 2009 through 2019……...20

Figure 5. Daily loss and loss density of non-clipped fry/smolt Chinook Salmon at the Delta fish facilities using the current loss equation (DFW 2013), October 1, 2018, through July 31, 2019……21

Figure 6. Non-clipped fry/smolt Chinook Salmon loss at the Delta fish facilities from October to July using the current loss equation (DFW 2013), water years 2009 through 2019.. 22

Figure 7. Older juvenile Chinook Salmon and CNFH Late-Fall Chinook Salmon (Spring-run surrogate) recoveries from the Delta monitoring program and loss at the Delta fish facilities, October 1, 2018, through July 31, 2019. 23-25

Figure 8. Older juvenile Chinook Salmon and LSNFH Winter-run Chinook Salmon recoveries from the Delta monitoring program and loss at the Delta fish facilities, October 1, 2018, through July 31, 2019.. 26

Figure 9. Non-Clipped steelhead salvage at the Delta fish facilities, October 2018 through July 2019..... 27

Figure 10. Total steelhead salvage (adipose fin clipped & non-clipped) at the Delta fish facilities, October 2018 through July 2019.
.. .. 28

Figure 11. Non-Clipped steelhead salvage at the Delta fish facilities from October to July, water years 2008 through 2019.....29

Figure 12. Hatchery (adipose fin clipped) steelhead salvage at the Delta fish facilities from October to July, water years 2008 through 2019…….30

Figure 13. Daily loss and loss density of non-clipped steelhead at the Delta fish facilities using the current loss equation (DFW 2013), October 1, 2018, through July 31, 2019..31

Figure 14. Green Sturgeon salvage at the Delta fish facilities from October to July, water years 2008 though 2019..... 32

Figure 15. Monthly averages of Delta hydrology from October to July, water years 2013 through 2019.. 33

Figure 16. Modeled volumetric water fingerprint for the Clifton Court Forebay (SWP) as derived from DSM2, October 2018 though August 2019..... 35

Figure 17. Modeled volumetric water fingerprint for the Jones Pumping Plant (CVP) as derived from DSM2, October 2018 though July 2019. 35

LIST OF TABLES **Page**

Table 1. Unknown hatchery (adipose fin clipped) Chinook Salmon loss at the Delta fish facilities using the current loss equation (DFW 2014), October 2018 through June 2019. 36

Table 2. Hatchery (adipose fin clipped) Chinook Salmon loss at the Delta fish facilities using the current loss equation (DFW 2014), October 2018 through June 2019..... 37

Table 3. Monthly averages of hydrologic parameters in the Sacramento-San Joaquin River Delta, October 2018 through July 2019. 38

Table 4. Rapid genetic analyses results for Chinook samples collected during 2019…….....39

2018/2019 SALMONID AND GREEN STURGEON INCIDENTAL TAKE AND MONITORING REPORT

This annual report is required under the Terms and Conditions of the 2009 National Marine Fisheries Service (NMFS) Biological Opinion and Conference Opinion on the Proposed Long-Term Operations of the Central Valley Project and State Water Project (2009 NMFS Biological Opinion). This report summarizes the incidental take of Winter-run Chinook salmon (*Oncorhynchus tshawytscha*), Spring-run Chinook salmon (*O. tshawytscha*) surrogates, Central Valley steelhead (*O. mykiss*), and green sturgeon (*Acipenser medirostris*) at the State Water Project's (SWP) John E. Skinner Delta Fish Protective Facility and the Central Valley Project's (CVP) Tracy Fish Collection Facility (Delta fish facilities) for 2018/2019. This report also includes data from a wide geographic area including the salmonid monitoring program for the lower Sacramento River and the Delta (Figure 1), and the hydrologic conditions in the Delta.

In addition to this annual report, the California Department of Water Resources (DWR) also conducted Data Assessment Team (DAT) meetings and reported the relevant data updates to the Delta Operations for Salmonids and Sturgeon technical working group (DOSS) during the 2018/2019 incidental take season. Preliminary analysis of the weekly data reports can be found in the weekly meeting notes that are posted on the DAT and DOSS websites:

DAT:
https://water.ca.gov/Programs/State-Water-Project/Operations-and-Maintenance/CALFED-Operations

DOSS:
http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/doss.html

In addition to those sites, during 2018/2019 season, fish monitoring data were reviewed from SacPAS website:
http://www.cbr.washington.edu/sacramento

Data Acquisition

DWR acquired data from the California Department of Fish and Wildlife (DFW), the United States Fish and Wildlife Service (USFWS), and other internal DWR and United States Bureau of Reclamation (Reclamation) divisions. At the time of the data acquisition, many of the agencies were still in the process of finalizing their data, therefore the data presented in this report are preliminary and subject to revision. DWR will add an addendum to this report if analysis of the finalized data leads to substantial changes to the results.

Methods for Measuring Incidental Take

Reclamation is required to improve fish loss estimates by developing an alternative technique to quantify incidental take of listed anadromous species at the Delta fish facilities in compliance with Term and Condition 2a (T&C 2a) of the 2009 NMFS Biological Opinion. In the summer of 2013, Reclamation and DWR, with guidance from the interagency T&C 2a Technical Work Team (technical team), drafted Anonymous (2013) to describe the proposed modifications to the current methods for estimating loss. Anonymous (2013) was submitted for independent review and consideration at the 2013 Long-Term Operations Biological Opinions (LOBO) Annual Review and was based on various documents prepared for the T&C 2a process. These documents include:

1) Jahn (2011), which describes an alternative technique for estimating point and confidence interval estimates of loss;
2) CFS (2013), which describes the most important terms in the modified Jahn (2011) loss equation for estimating loss and the contribution each term makes to the overall variance of loss; and
3) a two-year comparison of the Jahn (2011) method with the current methods for estimating incidental take, which is documented in the 2011/2012 and 2012/2013 incidental take and monitoring reports (see DWR and Reclamation 2012; DWR and Reclamation 2013).

The Independent Review Panel (IRP) for the 2013 LOBO review expressed concerns in their final report on the Jahn (2011) model for calculating point and confidence interval estimates of loss, which would also apply to the Anonymous (2013) IRP's concerns include using fixed survival values in the equation, not accounting for probable losses from zero salvage, and using the error propagation method for characterizing uncertainty (Anderson et al. 2013). To address these concerns, the IRP provided recommendations on how to improve the loss and uncertainty estimates, including using a Bayesian method to account for probable losses from zero salvage and using a Monte Carlo simulation for estimating loss and its uncertainty (see Anderson et al. 2013 for recommendations).

To move forward with some of these approaches from the IRP, technical team members considered the IRP's suggestion to develop a different framework for calculating loss, which incorporates essential terms as random variables. Team members have also reviewed the various conceptual models for the SWP and CVP fish collection facilities that were presented by different agencies with technical expertise. Per the guidance of the technical team, DWR initiated a task order for the Contractor to complete various tasks to help DWR and Reclamation move forward with the 2013 recommendations from the IRP on T&C 2a. This task order included development of a new loss method and tool. This tool and associated manual, report, and other associated information are posted online at: https://fishsciences.shinyapps.io/loss-calculator/.

Reclamation will provide CVP fish loss estimates using both the alternative loss and current loss method by applying both the LAD and genetic Chinook identification methods for the WY 2020 Take Report. For more information on the activities related to T&C 2a, please see the detailed information attached at the end of this report.

Observed Chinook Salmon Salvage

Figure 2 describes the observed Chinook salmon salvage at the Delta fish facilities in 2018/2019 from normal salvage counts, special studies, and secondary flushes. However, Figure 2 does not include any Chinook salmon whose run cannot be classified using the Delta model length-at-date criteria (LAD) (https://water.ca.gov/LegacyFiles/aes/docs/ValidatingLength-at-DateRunassignments.pdf) . This includes Chinook salmon that are larger than the length-at-date criteria considered in the model, and any Chinook salmon that were not measured for length. In 2018/2019, fork lengths were obtained for all Chinook salmon salvaged at the SWP Delta fish facilities that met the minimum size threshold for tissue collection of 35mm forklength. Discrepancies related to counts at the CVP can be found in the section entitled "CVP Salvage Monitoring Gaps". Total juvenile Chinook salmon expanded salvage was 13,311 fish with an expanded combined loss of 24,722 fish. The numbers of sub-adults observed at the Delta fish facilities were similar at the SWP and significantly lower at the CVP compared to the previous year. At the CVP, no sub-adults of an undetermined run of Chinook salmon were observed that fell outside of the length-at-date criteria (greater than 500 mm fork length) during 2018/2019 season and no sub-adults were observed during 2017/2018 season. At the SWP, 4 sub-adults of an undetermined run of Chinook were observed during the 2018/2019 season and 4 sub-adults were observed during 2017/2018 season. All observed sub-adults were greater than 500 mm of fork length and therefore no loss was calculated for those fish.

Based on clarifications in DOSS (2013), DWR and Reclamation defined naturally-produced older juvenile Chinook salmon as all Chinook salmon with non-clipped adipose fins (non-clipped) greater than or equal to the minimum Winter-run length-at-date criteria using the Delta Model, and less than the maximum length-at-date criteria in the Delta Model. The Delta Model length-at-date criteria categorizes two different brood years of Winter-run Chinook salmon in July, and for that month DWR and Reclamation used the minimum Winter-run length-at-date criteria for the older brood year.

Overall, the number of observed non-clipped older juvenile Chinook salmon in 2018/2019 was substantially higher than in 2017/2018. In 2018/2019, the observed non-clipped older juvenile Chinook salmon were salvaged between February and June, with most of salvage occurring during late May 2019 (Figure 3). This is a departure from previous years when salvage generally occurred between April and May. There was no noticeable correlation between the number of non-clipped older juvenile salvage and

export levels.

Interestingly, the overall number of observed hatchery Chinook salmon at the Delta fish facilities was higher in 2018/2019 than in 2017/2018 and the number of unclipped juvenile Chinook salmon of Winter-run size was higher than in the previous year. Similar to the 2017/2018 season, the Coleman Hatchery Late-Fall-run brood year 2018 releases comprised a significant proportion of all the hatchery fish observed in salvage in 2018/2019. During 2018/2019, the number of observed Spring-run Chinook salmon from the San Joaquin River Restoration Program (SJRRP) comprised the highest proportion of hatchery fish observed in salvage among all of the hatchery release groups. This was also the case in 2017/2018 and 2016/2017.

Rapid Genetic Testing Protocol

Some of the action triggers in Actions IV.2.3 and IV.3 of the NMFS BiOp are based on loss or loss density of unclipped older juvenile Chinook salmon Chinook salmon race classifications are made using LAD tables. Older juvenile Chinook salmon are those fish larger than the minimum Winter-run size classification using the LAD criteria. Triggers for older juvenile Chinook salmon are primarily intended to protect natural-origin Winter-run Chinook salmon, but also include natural-origin yearling Spring-run Chinook salmon. Because genetic identification of race (especially for Winter-run Chinook salmon) is more accurate than the classification based on LAD tables (which often result in false positive assignments), a pilot rapid genetic testing protocol was implemented in WY 2015 by DWR and Reclamation. The objective of the protocol is to process genetic samples collected from older juvenile salmonids as soon as feasible after a loss/loss density trigger for older juvenile Chinook salmon has been exceeded. Rapid genetic analysis was used to validate the race assignment based on the existing LAD table. The rapid genetic testing protocol has the capability of quickly determining, with a high level of confidence, whether a salvaged fish is a Winter-run Chinook salmon or not (first probability selection tier) and then establishing a second and third tier of probabilities as to which race and watershed (not all watersheds are included in the baseline) a Chinook salmon from the “non-Winter-run” category belongs to. Determining the genetic identity of the fish could avoid or minimize the duration of export reductions triggered by the loss of fish falling within the older juvenile Chinook salmon size range that were not genetically Winter-run or yearling Spring-run Chinook salmon.

Reclamation and DWR more formally implemented this procedure again during WYs 2016-2019, in coordination with the CDFW, FWS, and the NMFS. The procedure is intended to avoid (or minimize the duration of) export reductions resulting from loss of older juveniles that are not genetically ESA-listed Chinook salmon (i.e., Winter-run or Spring-run Chinook salmon). Actions at the CVP and SWP export facilities to meet OMR requirements are initiated, if needed, when the older juvenile Chinook salmon trigger threshold is exceeded. However, if results of tissue genetic analysis indicate that

the loss or loss density of genetically-verified Winter-run Chinook salmon did not exceed the trigger threshold, then changes in operations to comply with the OMR criteria required by the trigger exceedances will be cancelled. NMFS supported the use of this protocol with two additional conditions: 1) all unclipped Chinook salmon have tissue samples collected for subsequent analysis to correctly determine annual incidental take of listed fish, and 2) clarification that the annual incidental take limit of natural Winter-run remains at 1% of the annual JPE (the original value of 2% of the JPE for incidental take assumes that there is a 50% misclassification of Winter-run Chinook salmon based on the LAD tables; the ability to genetically verify fish as Winter-run eliminates this uncertainty).[1]

The older juvenile trigger was exceeded on April 4th (4.61 fish per TAF), April 19th (3.15 fish per TAF), and April 20th (3.29 fish per TAF). Loss of greater than 2.5 fish per TAF, and less than 5 fish per TAF, requires an average OMR flow of -3,500 cfs for 5 consecutive days. However, due to OMR flows that were more positive than -3,500 cfs, no change in operations was necessary to meet the action response of operating to an OMR of no more negative than -3,500 cfs. Therefore, it was not necessary to implement the rapid genetic protocol. Nevertheless, genetic monitoring continued, and genetic results were reported to DOSS throughout the operational season. Preliminary results of genetic run assignments were included in the weekly DOSS notes for: 2/12/2019, 3/5/2019, 3/19/2019, 4/2/2019, 5/7/2019, and 5/28/2019. Additionally, progress has been made to incorporate the genetic results into the publicly-accessible DFW FTP salvage database.

Observed Chinook Salmon Genetic Run Assignment

A total of 2,000 chinook samples were collected from the CVP's Tracy Fish Collection Facility during Water Year 2019. These samples were routed through the California Department of Fish and Wildlife Central Valley Tissue Archive (CDFW-CVTA) and delivered to the contracted genetic laboratory. Of those 2,000 CVP samples, a total of 1,884 samples were assigned genotypes using the greater than 80% assignment probability cutoff for genotyping. A majority of samples that were categorized as "unassigned" resulted from an insufficient number of loci present for genotyping. Other samples may be unassigned due mishandling during sample preparation or collection.

22 CVP Chinook were classified as unclipped Winter-run Chinook based on LAD. Of these winter-run LAD samples: 9 were genetically winter-run, 12 were genetically fall-run, and 1 was unassigned. Assuming that the LAD winter-run that was unassigned a genotype was actually Winter-run Chinook, then the CVP Winter-run loss is estimated at

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1 https://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Delta%20Operations%20for%20Salmonids%20and%20Sturgeon/DOSS%20WY%202019/nmfs_response_to_reclamation_s_request_to_implement_rapid_genetic_analysis_in_wy_2018_-_december_17__2018.pdf

27.8. All genetically verified winter-run samples collected at the CVP's Tracy Fish Collection Facility were LAD winter-run.

A total of 1,048 juvenile Chinook were sampled at the SWP Skinner Fish Facility. Applying a minimum size criteria of 35mm forklength or greater resulted in 957 chinook sampled for genetic analysis. All salvaged Chinook below 35mm in forklength were classified as Fall run by LAD. Tissue samples were routed through the California Department of Fish and Wildlife Central Valley Tissue Archive (CDFW-CVTA) and delivered to the genetic laboratory during Water Year 2019. Of these 957 SWP samples, a total of 920 samples were assigned genotypes. A greater than 80% assignment probability cutoff was applied when genotyping the data, and of the 920 assigned genotypes, 917 met this criteria.

At the SWP, 34 unclipped Chinook were classified as Winter-run Chinook based on LAD. Of these winter-run LAD samples: 9 were genetically Winter-run, 23 were genetically fall-run, and 2 were unassigned. 3 Chinook identified as Spring-run by the LAD were genetically identified as Winter-run. Assuming that the LAD winter-run that were unassigned a genotype were true Winter-run Chinook the SWP Winter-run loss is estimated at **222.29 (187.17 confirmed)**. 3 Chinook that were classified as Spring run by the LAD, and were unassigned due to the assignment probability cutoff, were likely Fall run/Spring run hybrids as they each had probability scores of approximately 40% or greater for both Fall run and Spring run assignments.

Genetically-corrected combined CVP/SWP wild Winter-run loss was estimated at **250.1** for Water Year 2019. CVP loss and combined CVP/SWP loss may be updated upon completion of the CVP salvage data integrity investigation described in the next section. Genetics results for the season are summarized in table 4 and details are included in the detailed genetic result document (soft copy attached).

The backlog of CVP genetic samples collected during WY2017 and WY2018 are anticipated to be complete by the end of Water Year 2020. These genetic results will be shared with DOSS and reported when they become available.

CVP Salvage Monitoring Gaps

In June of 2019, CDFW's Salvage Monitoring Unit was alerted to potential problems with the Chinook salmon salvage data generated at the CVP beginning in April 2019, with the potential to affect Chinook salvage and loss estimates. In response to a letter expressing concern from CDFW, the Bureau of Reclamation issued a letter on July 5 outlining the steps the Bureau was undertaking to investigate and correct this data-collection issue. After the investigation is closed, Reclamation may append this year's take estimates if application of an additional correction/expansion loss factor is

necessary.

Winter-run Chinook Salmon

Winter-run Chinook Salmon Incidental Take

National Marine Fisheries Service (NMFS) provided the U.S. Bureau of Reclamation with the 2019 Juvenile Production Estimate (JPE) pursuant to the 2009 Biological Opinion on the long-term operations of the Central Valley Project (CVP) and the State Water Project (SWP) (Rea, 2019). The JPE is calculated each year to determine the authorized level of incidental take for Winter-run Chinook salmon, under section 7 of the Endangered Species Act (ESA), while operating the CVP/SWP Delta pumping facilities in each water year (NMFS 2009). In 2018, DFW estimated a total adult escapement of 2,458 Winter-run spawners to the upper Sacramento River, which is significantly higher (213% increase) than the returns estimated in 2017 (1,155), but still lower than the 10-year average of 2,802 adults. The methodology used in 2018 to calculate the annual Winter-run escapement (Cormack-Jolly-Seber Model) was the same as was used in 2017. The Cormack-Jolly-Seber model allowed for an estimation of a 90% confidence interval, which ranged from 2,235 to 3,029 fish. Based on the point estimate of escapement, NMFS calculated the JPE of natural (non-clipped) Winter-run Chinook salmon entering the Delta in 2018/2019. NMFS took into consideration the recommendations of the Independent Review Panel (IRP) and the advice of the Winter-run Project Work Team (WRPWT) in calculating the number from the Winter-run 2018 brood year. The WRPWT identified four factors (more detail available in the JPE letter referenced below) in calculating the JPE. They have advised continuing or updating those factors also for BY 2018. Similar to previous years, the group preferred the JPI method as it gives a more accurate estimation of the egg-to-fry survival rate which is an important factor in calculating the JPE. According to the 2019 JPE letter, NMFS recommended the continuation of funding for acoustic tag studies on winter-run for BY 2019 and beyond to provide data on survival rates for a various types of hydrologic conditions.

For the water year 2019, NMFS estimated that 433,176 natural-origin juvenile Winter-run Chinook salmon would enter the Delta. Based on this JPE, the incidental take level from October 1, 2018, through June 30, 2019, for the Delta fish facilities was 4,332 non-clipped Winter-run Chinook salmon, which is equal to 1% of the natural Winter-run production entering the Delta. For tracking incidental take, Winter-run Chinook salmon are classified by genetic run assignment, following initial identification according to the Delta Model length-at-date criteria and the measurement of Winter-run Chinook salmon incidental take is based on loss using the current loss equation from DFW (2013).

More detailed information on rationales provided by NMFS for this year's JPE

estimation can be found at:
https://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Delta%20Operations%20for%20Salmonids%20and%20Sturgeon/DOSS%20WY%202019/winter-run_juvenile_production_estimate__jpe__for_brood_year_2018_-_february_13__2019.pdf

Loss of Winter-run Chinook salmon, based on the Delta Model length-at-date criteria, occurred at both Delta fish facilities for an expanded loss of approximately 488 fish at the SWP and approximately 49 fish at the CVP. The combined expanded loss of Winter-run sized Chinook salmon was 537 for the season, approximately 13% of the permitted incidental take. Overall, the combined annual Winter-run sized Chinook salmon loss, based on length-at-date criteria, was lower than in the previous water year. The lowest loss in the past nine water years occurred in Water Year 2014/2015 (Figure 4). In 2018/2019, the daily combined older juvenile Chinook salmon loss density trigger (NMFS RPA Action IV.2.3) was exceeded multiple times during the month of April but no action was taken in response as the OMR flows were more positive than the required -3,500 cfs flow in all cases.

Hatchery Winter-run Chinook Salmon Incidental Take

On February 14, 2019, an estimated 225,017 Winter-run smolts (BY2018) from Livingston Stone National Fish Hatchery (LSNFH) were released into the Sacramento River at Caldwell Park near Redding, California, which was a little higher than the release group of 212,270 hatchery Winter-run during the previous year (from BY 2017). Based on preliminary release information and an updated survival term, NMFS estimated that 86,669 hatchery fish would enter the Delta. NMFS set the incidental take level at 1% of the total hatchery production entering the Delta, or 867 hatchery Winter-run Chinook salmon from October 1, 2018, through June 30, 2019. NMFS estimated that 82,366 hatchery produced Winter-run Chinook salmon from the additional Battle Creek release would survive to the Delta during WY 2019, with an incidental take level of 824 fish. The 2019 hatchery Winter-run take level was a little lower than in 2017/2018 (909 winter-run), which was the first year of an additional Batlle Creek release. There was no salvage from the LSNFH hatchery Winter-run Chinook salmon at the Delta fish facilities and no loss occurred from the additional Battle Creek release group and therefore no loss triggers were exceeded for these groups.

Coded Wire Tagged (CWT) fish have been used for many years for investigating the fish behavior and survival rate of Chinook salmon following release from a hatchery. CWT fish that are identified during salvage at the Delta Fish Facilities (SWP and CVP) are carefully recovered and handled, in accordance with the Standard Operations Protocol, so that the tags can be removed and read. On occasion, tag loss or damage does occur, and some tags are unreadable due to tag imperfections. On these occasions, the fork lengths of the CWT fish are recorded, and the loss is calculated and

recorded under the 'Unknown' category. For the 2018/2019 year, the Unknown loss was estimated at 33.26 fish at the CVP and reported as 'Unknown CWT Loss' (Table 1). At the SWP, the Unknown loss for 2018/2019 was estimated at 350.16 fish (Table 1). The combined Unknown CWT loss at both facilities for the 2018/2019 season was 383.42 fish (Table 1).

Spring-Run Chinook Salmon

Under the 2009 NMFS Biological Opinion, NMFS uses hatchery-produced subyearling Late Fall-run Chinook salmon as surrogates for naturally produced yearling Spring-run Chinook salmon emigrating from the upper Sacramento River and tributaries into the Delta. According to NMFS, these late Fall-run Chinook salmon are used as surrogates because they are generally released and begin their smoltification and emigration and passage through the Delta at approximately the same time, and at a similar size, as wild yearling Spring-run Chinook salmon. The Coleman National Fish Hatchery (CNFH) releases a percentage of the total CNFH Late Fall-run Chinook salmon production as these surrogate release groups.

In 2018/2019, CNFH released three groups of Late Fall-run Chinook salmon marked with unique CWT codes as Spring-run Chinook salmon surrogates into Battle Creek: 1) 61,277 on 12/3/2018, 2) 66,266 on 12/14/18, and 3) 73,952 on 1/4/19. In addition to these surrogate releases, CNFH also released 699,806 Late Fall-run hatchery production fish into Battle Creek on 11/29/18. Prior to these releases, DOSS provided input to the CNFH on the release schedule of the surrogate Spring-run Chinook salmon based on the information that the production release would occur concurrently with a precipitation event sometime between November and late December. However, DOSS also noted that the 1st surrogate release should occur about 3 days after the production release and should coincide with a rainfall event. DOSS provided the guidance to release the second surrogate group during late December, at least a week after the previous surrogate group and ideally preceding a precipitation event, and to release the third surrogate group after a similar number of days between the first and second releases. A summary of more specific inputs provided from DOSS to CNFH is described in the annual DOSS report (2019).

Measuring Incidental Take

The incidental take level for the combined operation of the Delta pumping plants is equal to 1% of any individual CNFH Late-Fall Chinook salmon surrogate release group. Measurement of incidental take for each surrogate release group is based on loss using the current loss equation from DFW (2013). However, there are occasions when the hatchery of origin for the CWT Chinook salmon could not be confirmed due to lost, missing, or damaged tags, or due to the accidental release of CWT fish during salvage. For this reason, the actual loss could be higher than what is confirmed in Table 2. For

the 2018/2019 season, the total Unknown loss due to Damaged Tags or Tags Not Found was 357 (Table 1). As mentioned previously, the Unknown loss is for the entire season and was not necessarily correlated with any one released group.

First Surrogate Release Group and Incidental Take

The first Spring-run Chinook salmon surrogate hatchery group of approximately 61,277 CNFH Late Fall-run Chinook salmon was released on December 3, 2018. A total confirmed loss of 67.33 fish was estimated from this group from the fish salvaged at the Delta fish facilities (Table 2). The percent loss from the first release group was calculated to be 0.0110%, which was well below the exceedance level according to NMFS BiOp.

Second Surrogate Release Group and Incidental Take

On December 14, 2018, CNFH released the second Spring-run Chinook salmon surrogate hatchery group of approximately 66,266 Late Fall-run Chinook salmon into Battle Creek. The confirmed loss from this group was 24.57 fish. The percent loss was calculated to be 0.037%, which was obviously well below the exceedance level according to NMFS BiOp.

Third Surrogate Release Group and Incidental Take

On January 4, 2019, CNFH released the third Spring-run Chinook salmon surrogate hatchery group of approximately 73,952 Late Fall-run Chinook salmon into Battle Creek (Table 2). A total confirmed loss of 457.26 fish was estimated from this group from the fish salvaged at the Delta fish facilities (Table 2). The percent loss was calculated to be 0.618%, which was above the 0.5% exceedance level for adjusting OMR fows according to the NMFS BiOp. On February 5, 2019, an action response of adjusting OMR flows to no more negative than -3,500 cfs for 5 consecutive days was taken in response to this trigger exceedance.

Fry/Smolt Chinook Salmon Loss

Most of the fry/smolt Chinook salmon loss occurred during April and May, unlike in the previous few years when fry/smolt Chinook salmon were salvaged earlier in the season, starting in mid-December (Figure 5). The annual loss in 2018/2019 was significantly lower than the 2017/2018 season.

The combined expanded loss of fry/smolt Chinook salmon between October 2018 and July 2019 was approximately 18,570 fsih, which is much lower than the previous few years' losses (Figure 6). Using the Delta Model length-at-date criteria, DWR and Reclamation defined fry/smolts as all non-clipped Chinook salmon smaller than the

minimum Winter-run length-at-date criteria. The Delta Model length-at-date criteria categorizes two different brood years of Winter-run Chinook salmon in July. For this month, DWR and Reclamation used the minimum Winter-run length-at-date criteria for the older brood year.

Chinook Salmon Monitoring in the Sacramento River and the Delta

The Delta Juvenile Fish Monitoring Program (DJFMP) conducted by USFWS operates under the auspices of the Interagency Ecological Program (IEP). The DJFMP has been conducting juvenile salmon monitoring in the Delta since the early 1970s with the goals of gaining information on potential management actions that could improve the survival of juvenile salmon rearing and migrating through the Delta, and to document non-salmonid temporal and spatial distributions. For the USFWS Sacramento River and Delta surveys, DWR and Reclamation separated non-clipped older juvenile Chinook salmon from fry/smolts using the Frank-Fisher Model (Fisher, F.W, CDFW) which categorizes two different brood years of Winter-run Chinook salmon in July and August. DWR and Reclamation used the minimum length of the dominant brood year of a reporting period for categorizing older juveniles and fry/smolts.

Spring-Run Chinook Salmon Surrogate Monitoring

The USFWS conducted a midwater and Kodiak trawl survey on the Sacramento River at Sherwood Harbor to gauge the relative abundance and timing of juvenile Chinook salmon entering the Delta. Based on the preliminary data summary received in early September, 2019, USFWS recovered 2 surrogate spring-run Chinook salmon from the first surrogate release, 16 spring-run Chinook salmon surrogates from the second release group, and 5 spring-run Chinook salmon surrogates from the third release group (Figure 7). The number of recovered spring-run Chinook salmon surrogates was similar to the previous year. Similar to the previous year, the surrogate catch occurred during December of 2018 to early January 2019, which coincided with the time period of catch of older juvenile Chinook salmon at the Sacramento trawl location.

In addition, a midwater trawl survey was conducted at Chipps Island, which is the most downstream trawl survey location in the legal Delta. USFWS recovered surrogates at Chipps Island for a catch of 8 spring-run Chinook salmon surrogates from the first surrogate release, 11 fish in February from the second spring-run Chinook salmon surrogate release, and 16 spring-run Chinook salmon surrogates for the third surrogate release. The total numbers of recovered surrogates were higher in 2018/2019 compared to the previous year. The timing of recoveries at Chipps Island for all three surrogate releases was consistent with the timing of older juvenile Chinook salmon catch at Chipps Island.

Due to a staff shortage at the USFWS, the catch data from FY 2019 was still awaiting the final QA/QC read at the time this report was being prepared and these results should be considered preliminary.

Hatchery Winter-Run Chinook Salmon Monitoring

Recoveries of hatchery Winter-run Chinook salmon from LSNFH in the Delta monitoring trawls were similar in 2018/2019 to that of 2017/2018. Between late-February and late April of 2019, the USFWS recovered 61 hatchery Winter-run Chinook salmon from LSNFH. A total of 20 hatchery Winter-run Chinook salmon from LSNFH were recovered in the Kodiak trawl and 42 hatchery Winter-run Chinook salmon from LSNFH were recovered in the Chipps Island midwater trawl (Figure 8). The Number of recovered LSNFH Winter-run at Sacramento Trawl includes one Winter-run with tagcode that belongs to the release group of April, 2018.

Overall recoveries were similar to the total number of 63 fish (20 hatchery Winter-run Chinook salmon in the Sacramento Trawls and 43 hatchery Winter-run from LSNFH in the Chipps Island trawl) recovered by USFWS in 2017/2018. Additionally, 4 hatchery Winter-run from LSNFH were recovered from Enhanced Delta Smelt Monitoring Survey based on the data received at the time of this report.

Central Valley Steelhead

Steelhead Incidental Take

The daily steelhead loss triggers for unclipped steelhead were calculated by multiplying combined exports in TAF on a given day by either 8 fish/TAF or 12 fish/TAF. During the 2018/2019 year, there was no occurrence of the exceedance of steelhead daily loss triggers based on the expanded salvage and calculated daily loss and therefore no action was needed for more restrictive Old and Middle River flow limits (Figure 9,13).

Between October 2018 and July 2019, the CVP had a total catch (non-expanded) of 32 non-clipped steelhead, and the SWP a total of 105 (non-expanded) steelhead. In 2018/2019, the catch number for the SWP was thrice the number of catch at the CVP. Interestingly, in 2017/2018 , the SWP catch number was almost twice that of the CVP. The total catch of non-clipped steelhead from both facilities were lower than the total catch of non-clipped steelhead in 2017/2018.

The SWP and CVP expanded salvage of non-clipped steelhead was approximately 323 fish and 123 fish respectively, a total of 446 fish for the year of 2018/2019(Figure10,11). The expanded salvage was well below the incidental take level of 3,000 fish for the water year (Figure 9,10,11). The annual expanded salvage of non-clipped steelhead for 2018/2019 greatly decreased from 2017/2018, when it was 1,118 (Figure 11)). Even though, the overall seasonal salvage for unclipped steelhead for 2018/2019 was lower

than the previous year, it was close to the average number for the previous twelve years (Figure 11).

The SWP and CVP salvage of hatchery (adipose fin clipped) steelhead significantly increased in 2018/2019 compared to the previous year (Figure 10,12). From October 2018 to July 2019, the CVP salvaged a total of 606 hatchery fish and the SWP salvaged a total of 1,239 hatchery fish for a combined total annual salvage of 1,845 hatchery steelhead (Figure 10,12), which is significantly higher than the total of 732 in 2017/2018(Figure 10,12).

Green Sturgeon Incidental Take

The incidental take level for green sturgeon remained at 74 fish for water year 2019 and is based on historical salvage. In the 2018/2019 water year, no Green Sturgeon was observed at either Facility. The last Green Sturgeon was observed at SWP in the water year 2015/2016, and the last Green Sturgeon were observed at the Federal Facility in the water year 2011/2012.

Delta Hydrology

In California, higher-than-average precipitation and snowpack have been observed during Water Year 2019. According to the California Data Exchange Center, precipitation data as of March 1, 2019 measured 134% of the normal for this date in the Sacramento River Valley, 131% for San Joaquin River Valley, and 130% for Statewide. More information on current hydrology of California for the year 2018/2019 can be found at https://water.ca.gov/News/Current-Conditions .

Overall, average exports for Sacramento River and San Joaquin River were both higher during October to December 2018 and lower during January to July 2019 than they were in 2017/2018. Water year 2018/2019 was classified as a “wet” water year type for the Sacramento Valley, and for San Joaquin Valley. Table 3 shows a monthly average summary of SWP and CVP exports, Sacramento and San Joaquin River flows, and Delta outflow. Figure 15 shows the monthly averages of Delta hydrology for the water years 2013 through 2019.

Modeled volumetric water fingerprints derived from the Delta Simulation Model 2 (DSM2) at Clifton Court Forebay (SWP) and at the Jones Pumping Plant (CVP) are presented in Figures 16 and 17(DWR Division of Operations and Maintenance). Overall, these fingerprints show similar trend observed in the year 2016/2017 when the majority of SWP water came from the San Joaquin River. Most of the water from the SWP during the 2017/2018 year was split between the San Joaquin River and the Sacramento River. In 2017/2018, water at CVP was split between the Sacramento and the San Joaquin Rivers (Fig 17) but in 2018/2019, the majority of CVP water came from

the San Joaquin River.

References

Anderson, J.J., J.A. Gore, R.T. Kneib, M.S. Lorang, J.M. Nestler, and J. Van Sickle. 2013. Report of the 2013 Independent Review Panel on the Long-term Operations Biological Opinions (LOBO) Annual Review. Prepared for the Delta Science Program.

[DFW] California Department of Fish and Wildlife. 2013. Chinook Salmon Loss Estimation for Skinner Delta Fish Protective Facility and Tracy Fish Collection Facility. Protocol. Stockton, California.

[DWR and Reclamation] California Department of Water Resources and U.S. Bureau of Reclamation. 2012. 2011/2012 Salmonid and Green Sturgeon Incidental Take and Monitoring Report. West Sacramento, California.

[DWR and Reclamation] California Department of Water Resources and U.S. Bureau of Reclamation. 2013. 2012/2013 Salmonid and Green Sturgeon Incidental Take and Monitoring Report. West Sacramento, California.

[DWR and Reclamation] California Department of Water Resources and U.S. Bureau of Reclamation. 2013. 2013/2014 Salmonid and Green Sturgeon Incidental Take and Monitoring Report. West Sacramento, California.

[DWR and Reclamation] California Department of Water Resources and U.S. Bureau of Reclamation. 2014. 2014/2015 Salmonid and Green Sturgeon Incidental Take and Monitoring Report. West Sacramento, California.

[CFS] Cramer Fish Sciences. 2013. Alternative Loss Calculation: Sensitivity Analysis. Lacey, Washington.

Dekar, M., P. Brandes, J. Kirsch, L. Smith, J. Speegle, P. Cadrett, and M. Marshall. 2013. Background Report Prepared for Review by the IEP Science Advisory Group, June 2013. U.S. Fish and Wildlife Service. Lodi, California.

[DOSS] Delta Operations for Salmonids and Sturgeon Technical Working Group. 2017. Annual Report of Activities October 1, 2016, to September 30, 2017.

[DOSS] Delta Operations for Salmonids and Sturgeon Technical Working Group. 2018. Annual Report of Activities October 1, 2017, to September 30, 2018.

Fisher, F. W. 1992. Chinook Salmon, Oncorhynchus tshawytscha, growth and occurrence in the Sacramento-San Joaquin River system. California Department Fish and Game.

Harvey, Brett. N., David P. Jacobson, and Michael A. Banks (2014) Quantifying the uncertainty of a juvenile Chinook Salmon Race Identification Method for a Mixed-

Race Stock, North American Journal of Fisheries Management, 34:6, 1177-1186.

Hassrick, J., and S. Hayes. Unpublished Data. Survival of Migratory Patterns of Juvenile Winter-run Chinook Salmon in the Sacramento River, Delta, and San Francisco Bay. Results of the first-year acoustic tag study.

Jahn, A., and P. Smith. 1987. Effects of sample size and contagion on estimating fish egg abundance. CalCOFI Reports 28:171-177.

Jahn, A. 2011. An Alternative Technique to Quantify the Incidental Take of Listed Anadromous Fishes at the Federal and State Water Export Facilities in the San Francisco Bay-Delta Estuary. Ukiah, California.

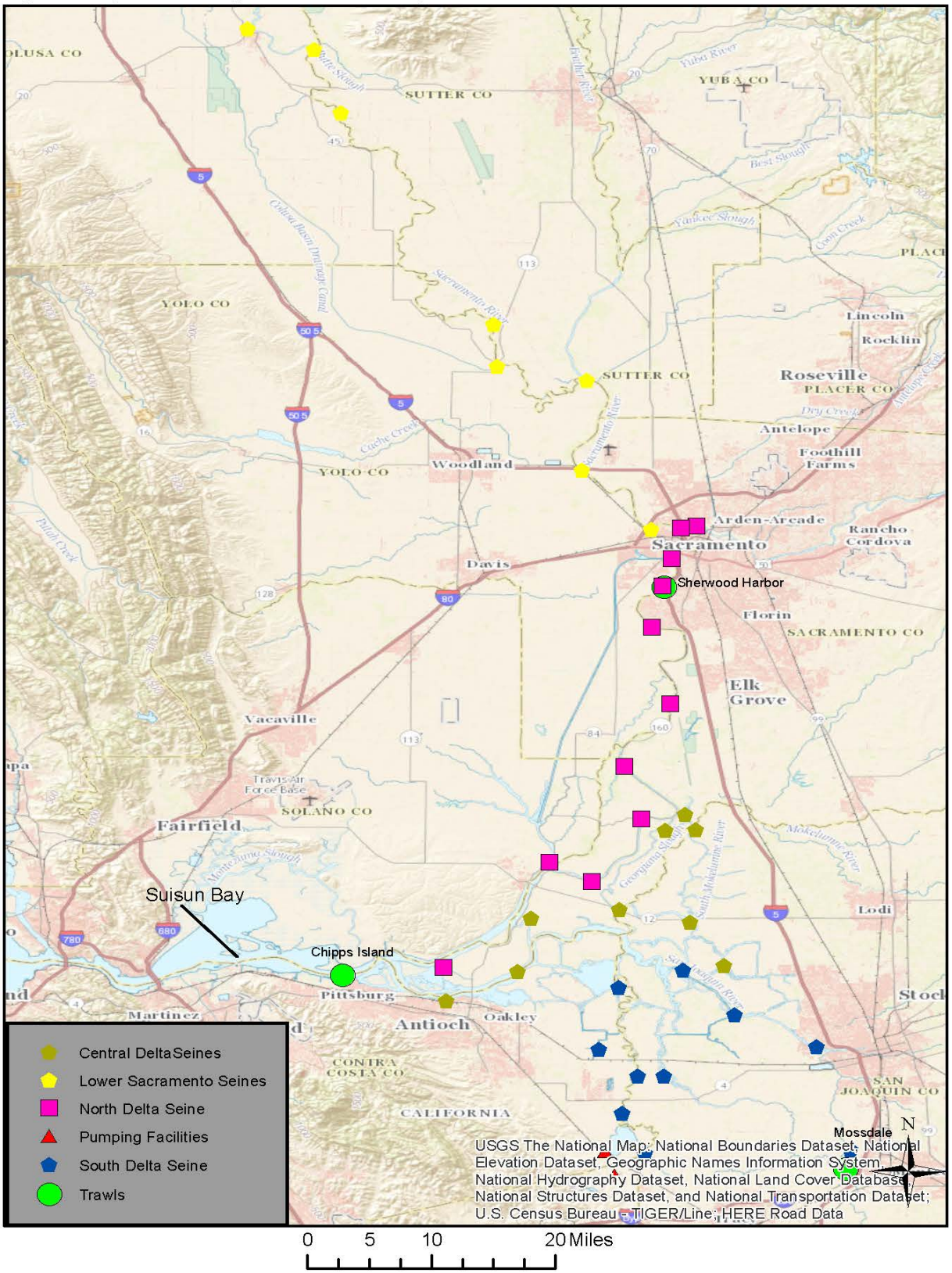
Michel, C.J., A.J. Ammann, S.T. Lindley, P.T. Sandstrom, E.D. Chapman, H.E. Fish, M.J. Thomas, G.P. Singer, P. Klimley, and B. MacFarlane. Unpublished Draft. Chinook Salmon (Oncorhynchus tshawytscha) Outmigration Survival between Wet and Dry Years in California's Sacramento River.

[NMFS] National Marine Fisheries Service. 2009. Biological Opinion and Conference Opinion on the Proposed Long-term Operations of the Central Valley Project and State Water Project. Long Beach, California.

Rea, M. 2019. Letter to Mr. Ron Milligan of the Bureau of Reclamation on the juvenile Winter-run Chinook Salmon production estimate during water year 2019. February13, 2019. National Marine Fisheries Service. Sacramento, California.

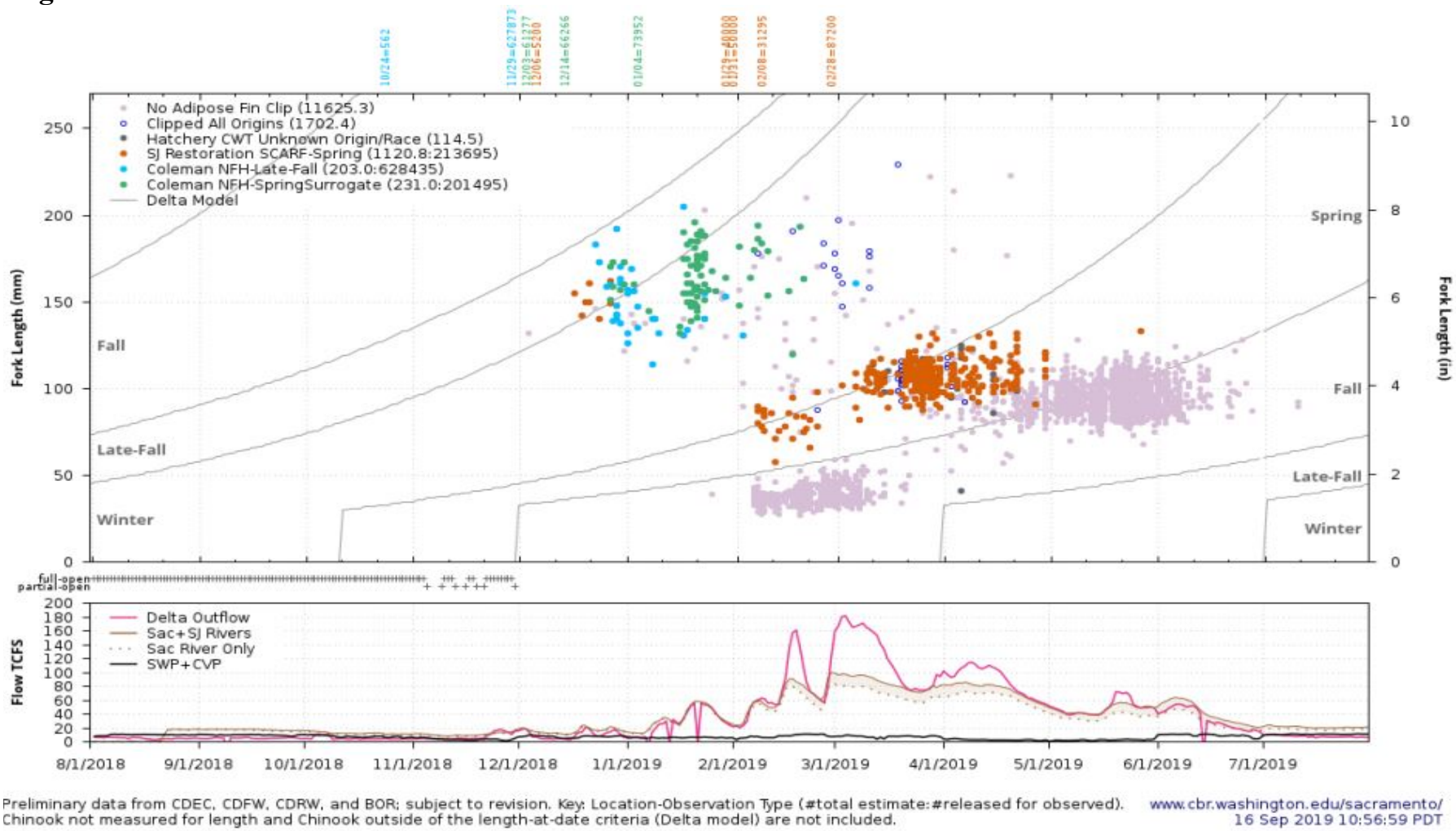
List of Figures

Figure 1. Map of monitoring sites used in this report.



Base map from ESRI and GPS coordinates provided by USFWS. Only seine sites that have been active since August 2004 are presented.

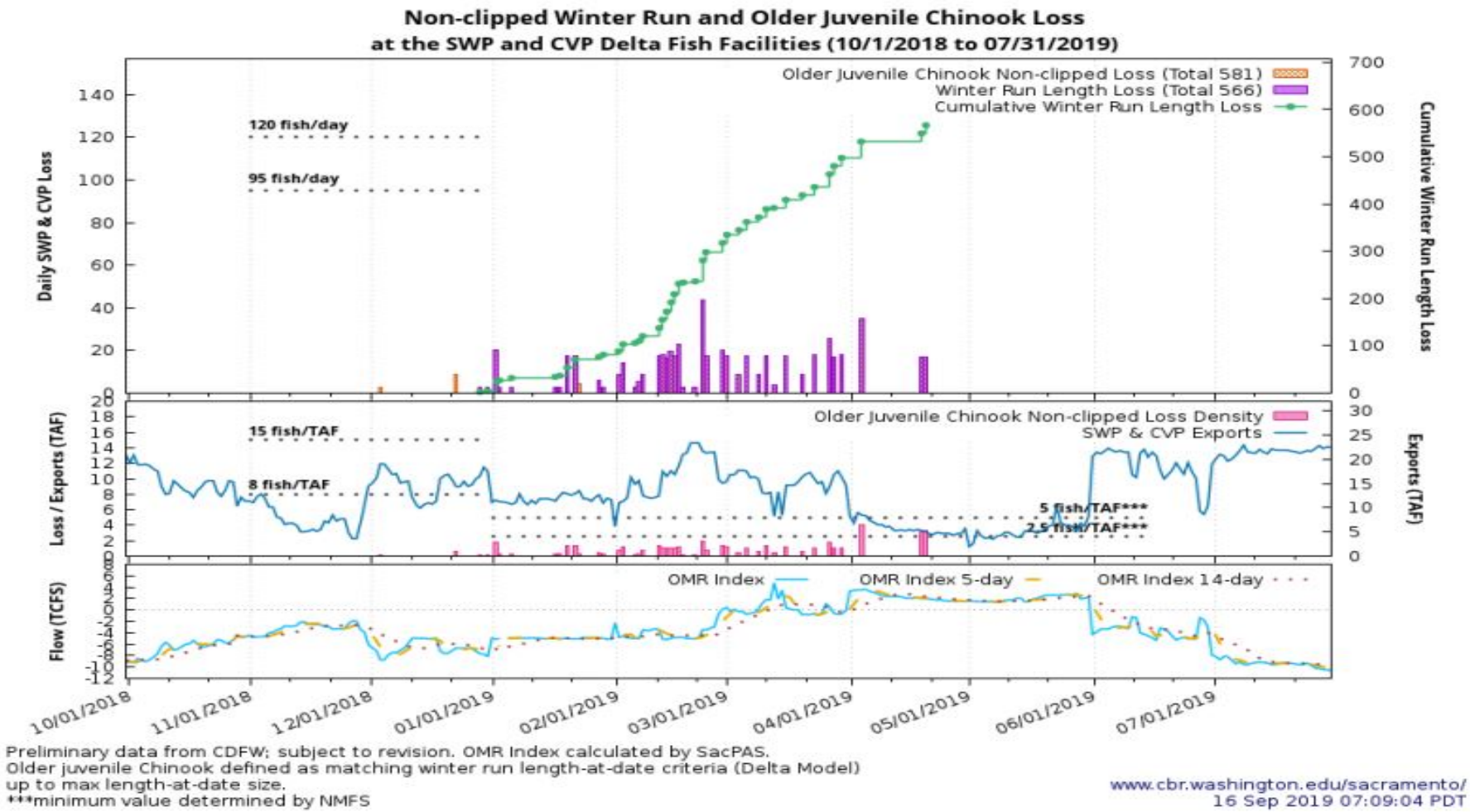
Figure 2. Observed Chinook Salmon salvage at the Delta fish facilities, with Delta hydrology, August 1, 2018, through July 31, 2019. Chinook Salmon race/run designation is based on Delta model length-at-date criteria and Coded Wire Tag recoveries.



Preliminary data from CDEC, CDFW, CDRW, and BOR; subject to revision. Key: Location-Observation Type (#total estimate:#released for observed). Chinook not measured for length and Chinook outside of the length-at-date criteria (Delta model) are not included.

www.cbr.washington.edu/sacramento/
16 Sep 2019 10:56:59 PDT

Figure 3. Daily loss and loss density of non-clipped Winter-run length and older juvenile Chinook Salmon at the Delta fish facilities using the current loss equation (DFW 2013), October 1, 2018, through July 31, 2019.



Preliminary data from CDFW; subject to revision. OMR Index calculated by SacPAS.
Older juvenile Chinook defined as matching winter run length-at-date criteria (Delta Model) up to max length-at-date size.
***minimum value determined by NMFS

www.cbr.washington.edu/sacramento/
16 Sep 2019 07:09:04 PDT

Figure 4. Non-clipped Winter-run length Chinook Salmon loss at the Delta fish facilities from October to June using the current loss equation (DFW 2013), water years 2009 through 2019.

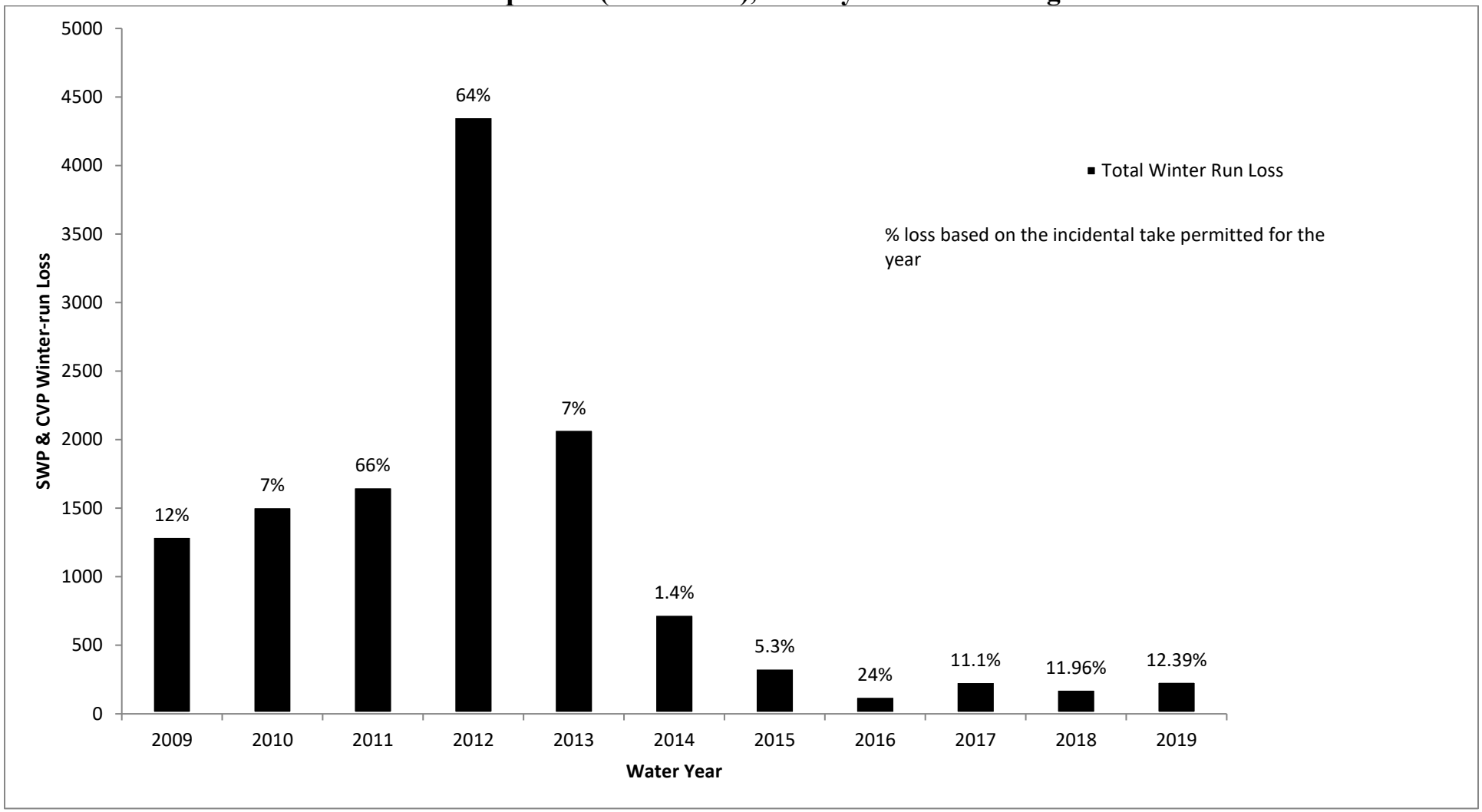


Figure 5. Daily loss and loss density of non-clipped fry/smolt Chinook Salmon at the Delta fish facilities using the current loss equation (DFW 2013), October 1, 2018 through July 31, 2019.

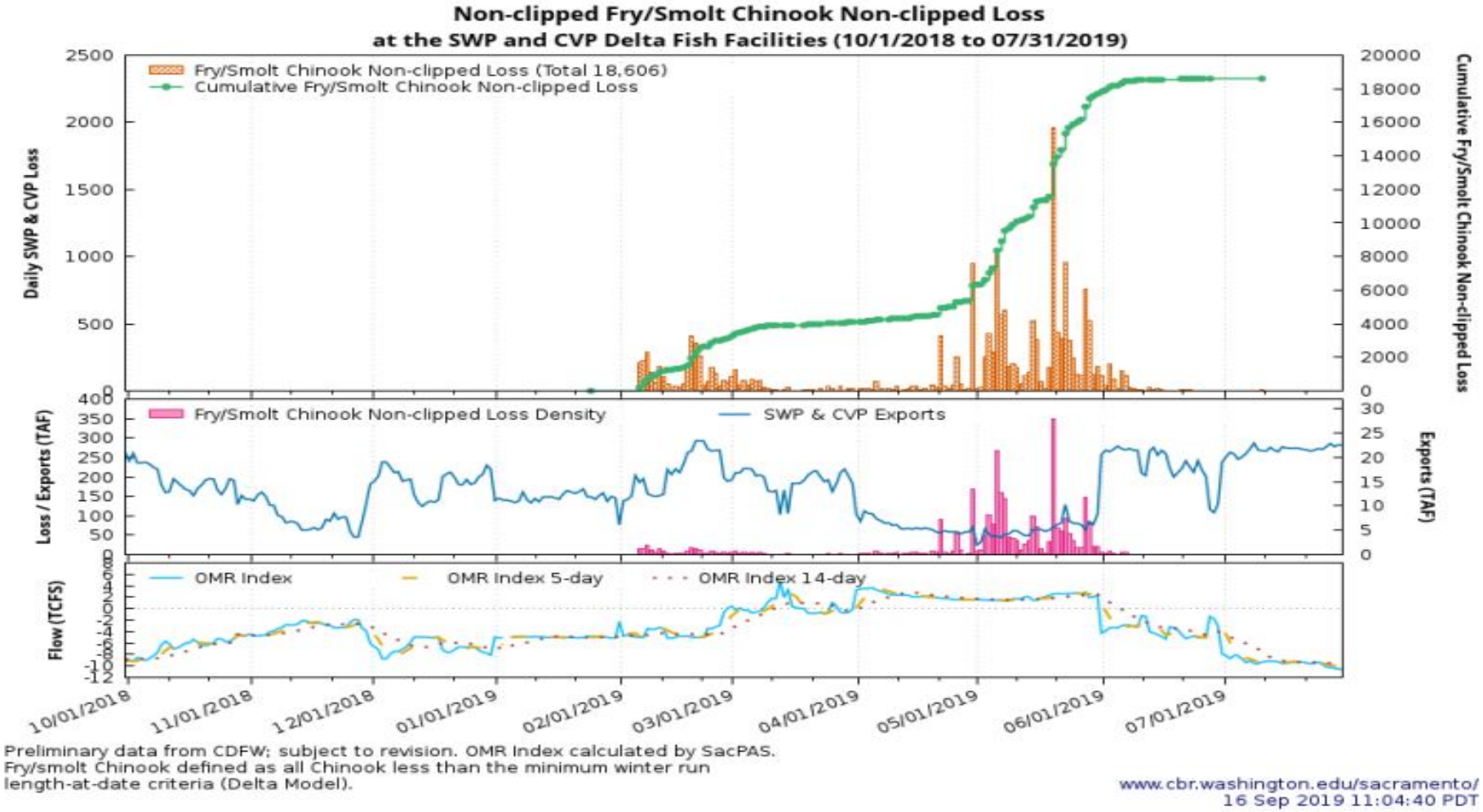


Figure 6. Non-clipped fry/smolt Chinook Salmon loss at the Delta fish facilities from October to July using the current loss equation (DFW 2013), water years 2009 through 2019.

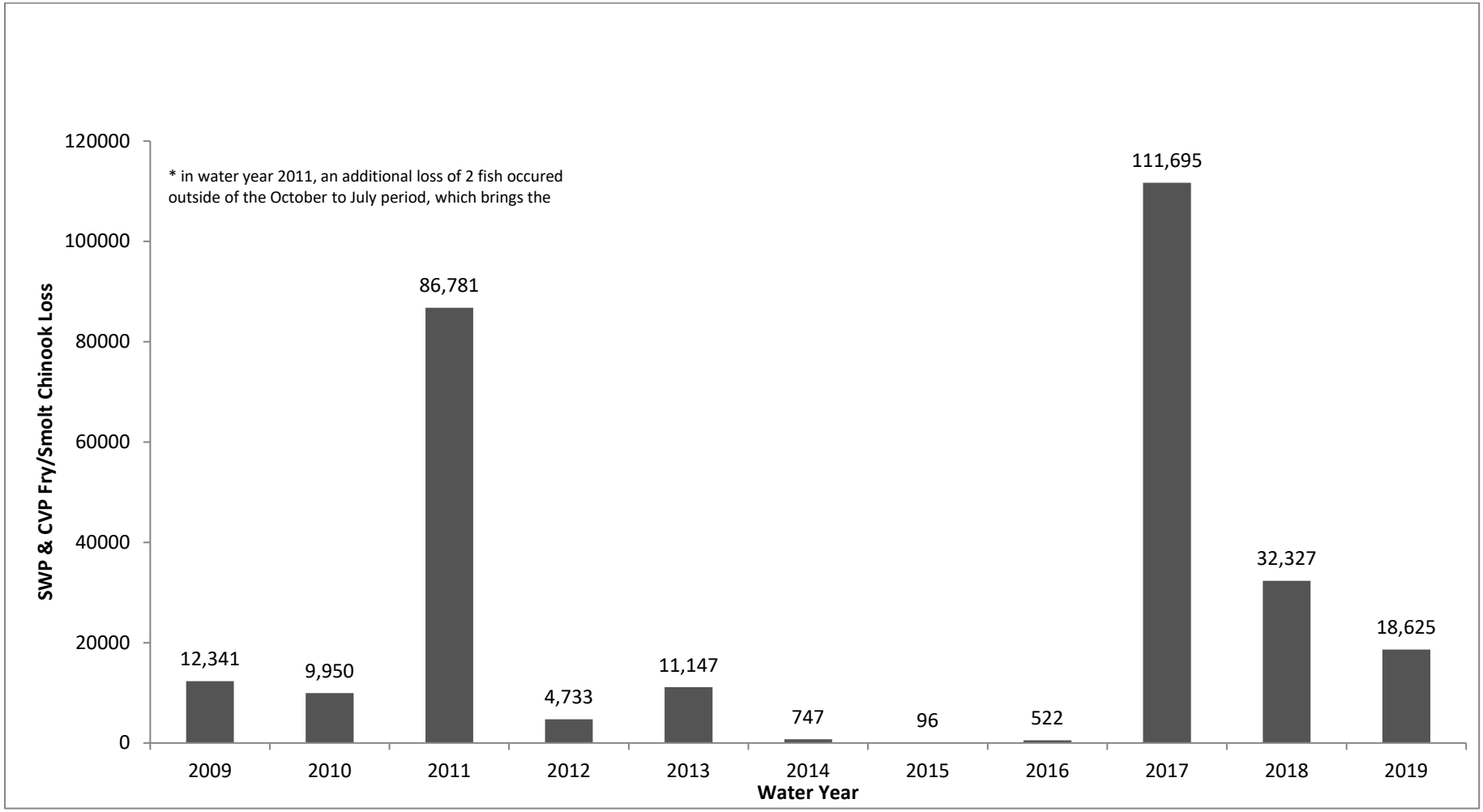
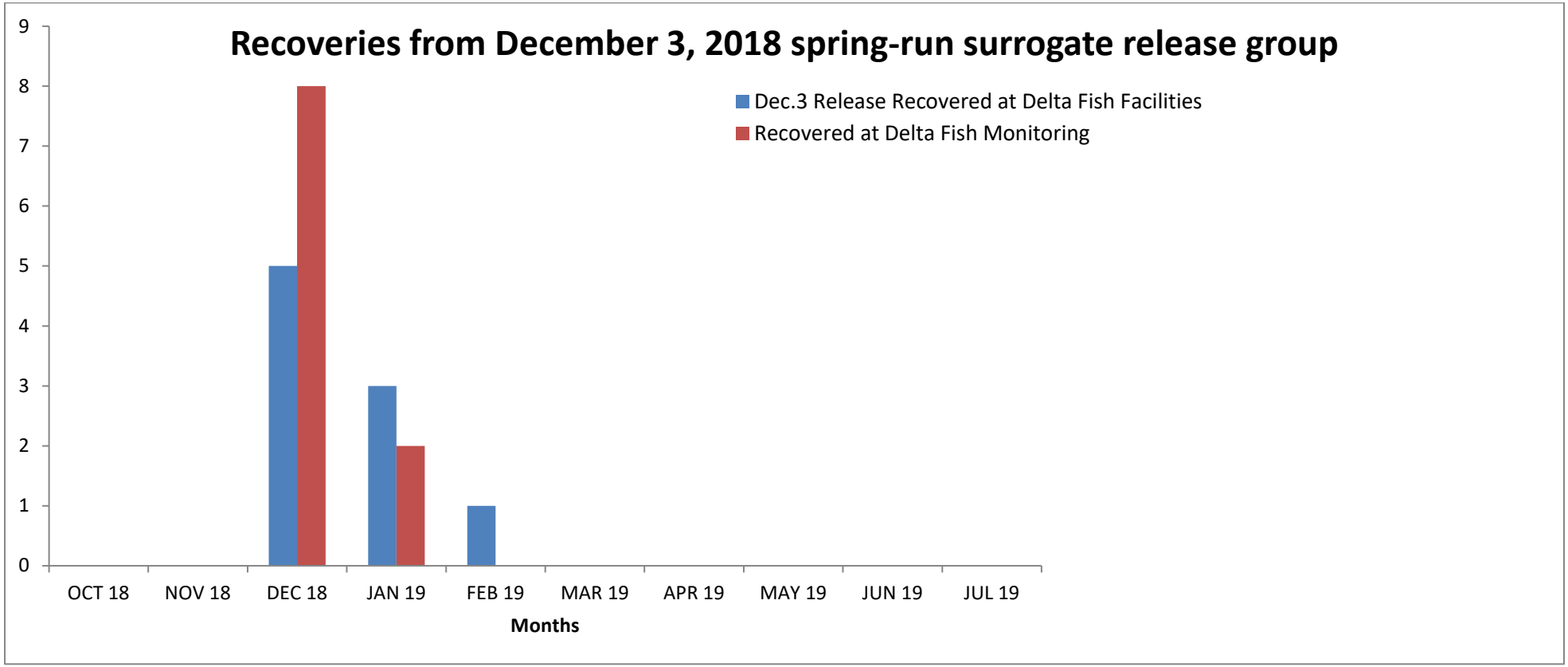
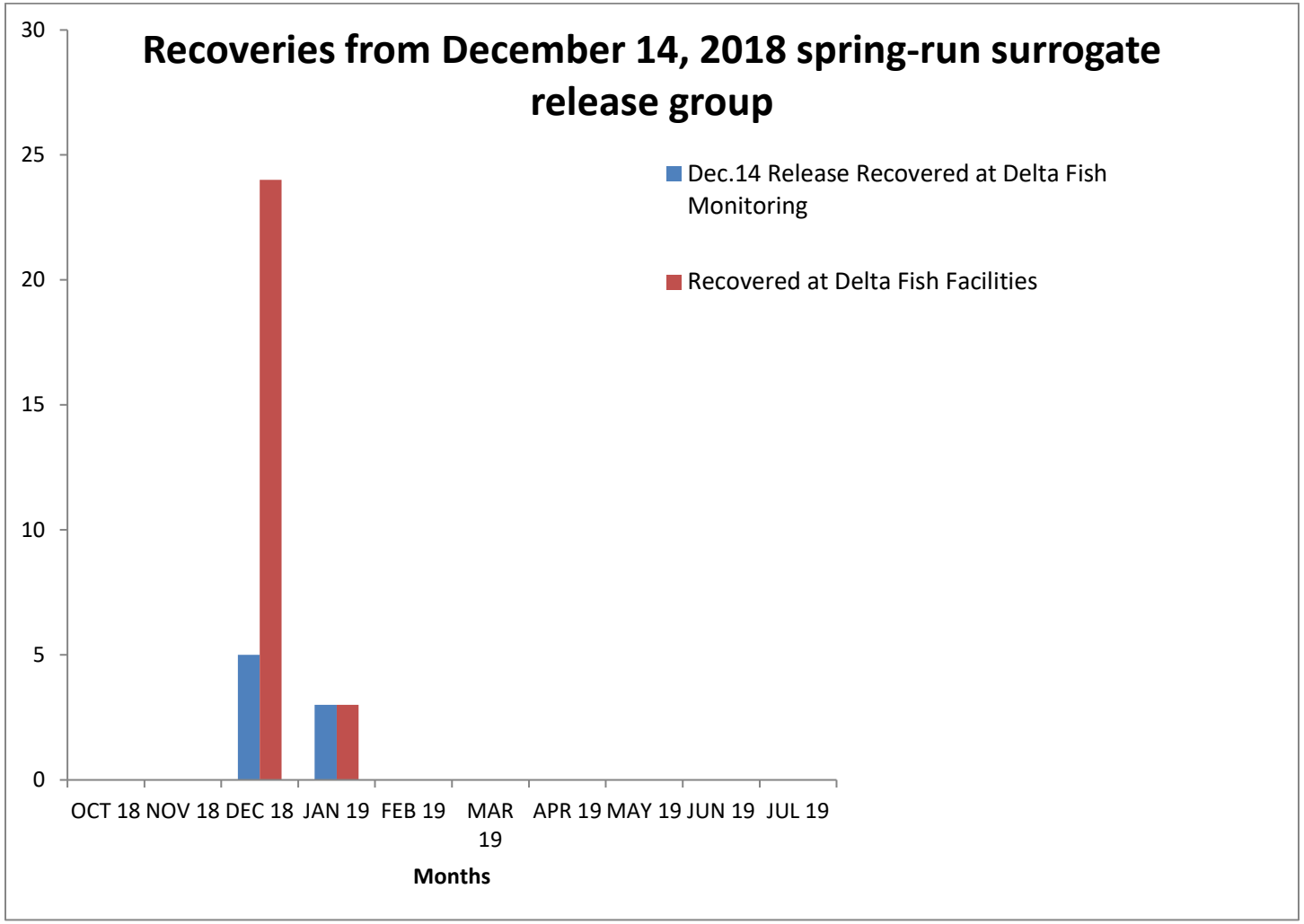


Figure 7. Older juvenile Chinook Salmon and CNFH late-fall Chinook Salmon (spring-run surrogate) recoveries from the Delta monitoring program and loss at the Delta fish facilities, October 1, 2018 through June 30, 2019.




Recoveries from December 14, 2018 spring-run surrogate release group
30
25
20
15
10
5
0
Dec.14 Release Recovered at Delta Fish Monitoring
Recovered at Delta Fish Facilities
OCT 18
NOV 18
DEC 18
JAN 19
FEB 19
MAR 19
APR 19
MAY 19
JUN 19
JUL 19
Months

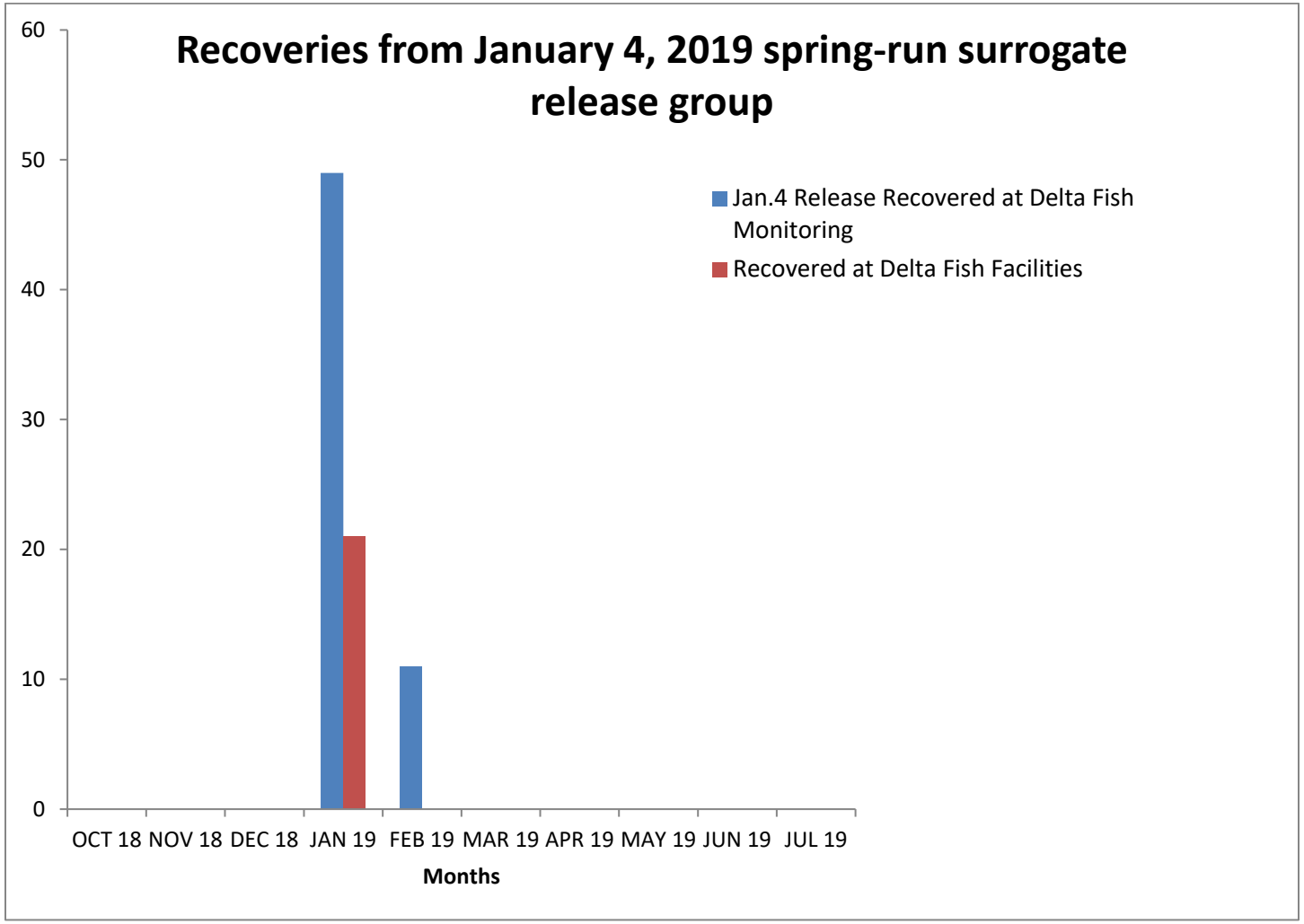

Recoveries from January 4, 2019 spring-run surrogate release group
60
50
40
30
20
10
0
Jan.4 Release Recovered at Delta Fish Monitoring
Recovered at Delta Fish Facilities
OCT 18
NOV 18
DEC 18
JAN 19
FEB 19
MAR 19
APR 19
MAY 19
JUN 19
JUL 19
Months

Figure 8. LSNFH Winter-run Chinook Salmon recoveries from the Delta monitoring program and loss at the Delta fish facilities, October 1, 2018 through July 31, 2019.

*Numbers of recovered LSNFH Winter-run at Sac Trawl presented in the graph below includes one Winter-run with tagcode that belongs to the release group of April, 2018.

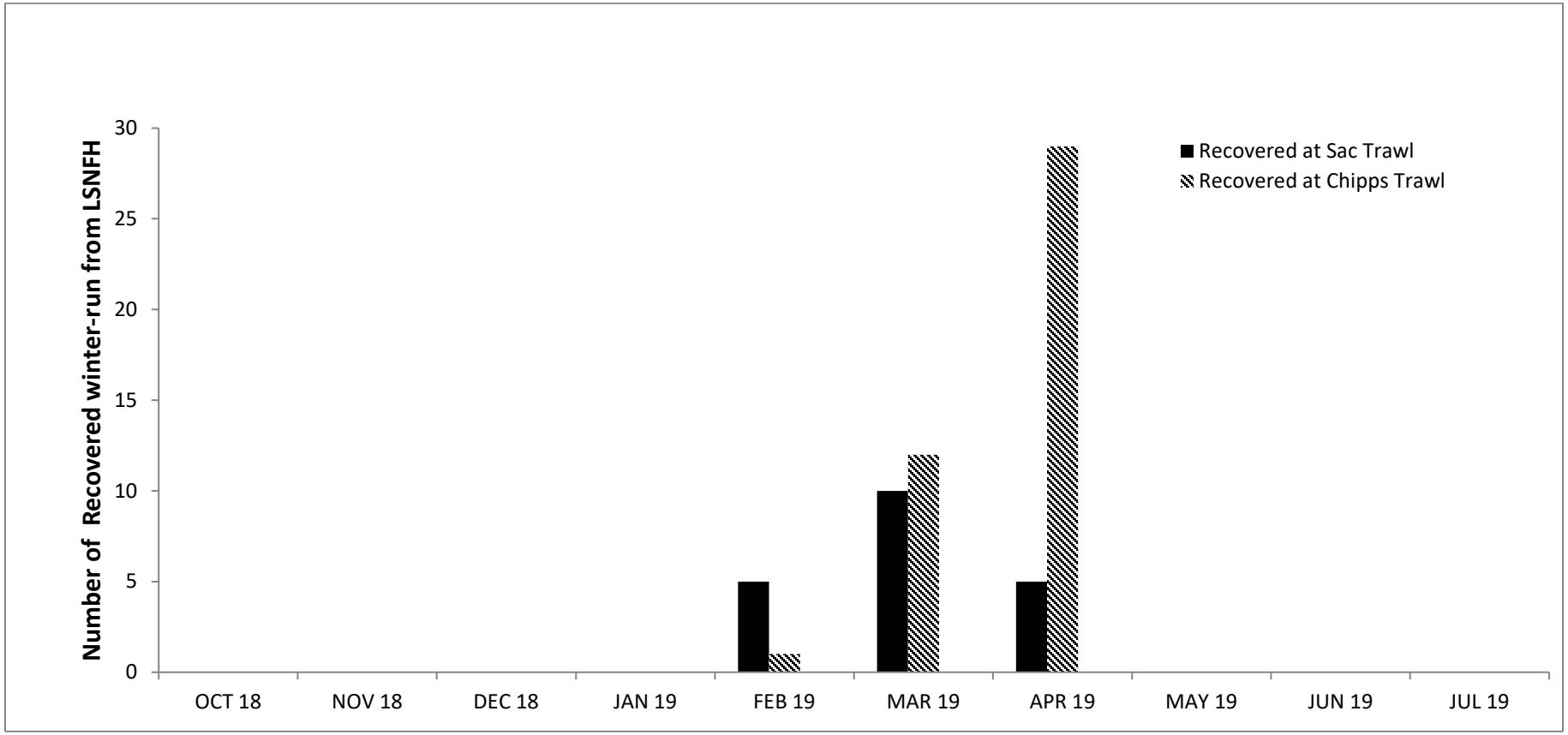


Figure 9. Non-clipped steelhead salvage at the Delta fish facilities, October 2018 through July 2019.

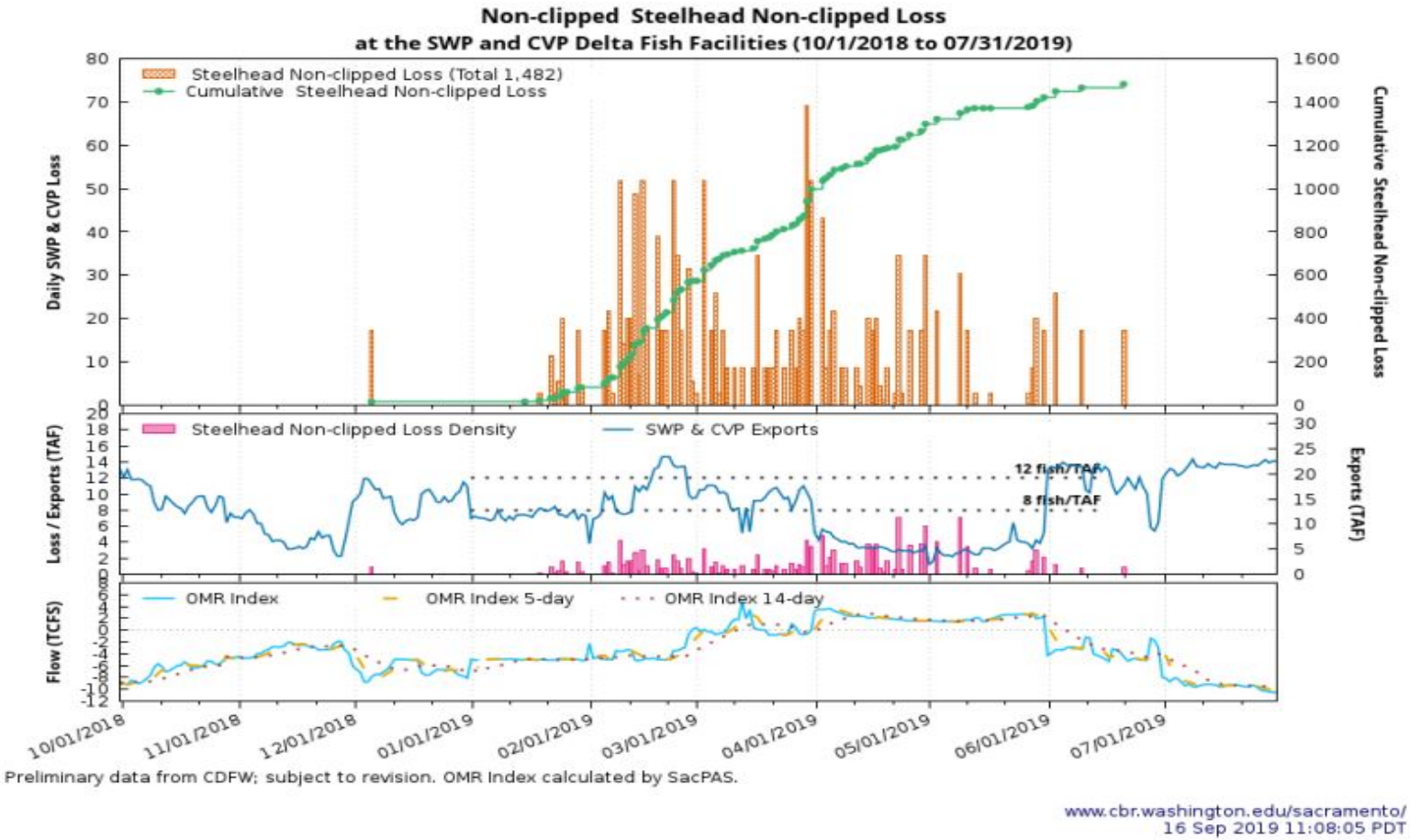


Figure 10. Total steelhead salvage (adipose fin clipped & non-clipped) at the Delta fish facilities, October 2018 through July 2019.

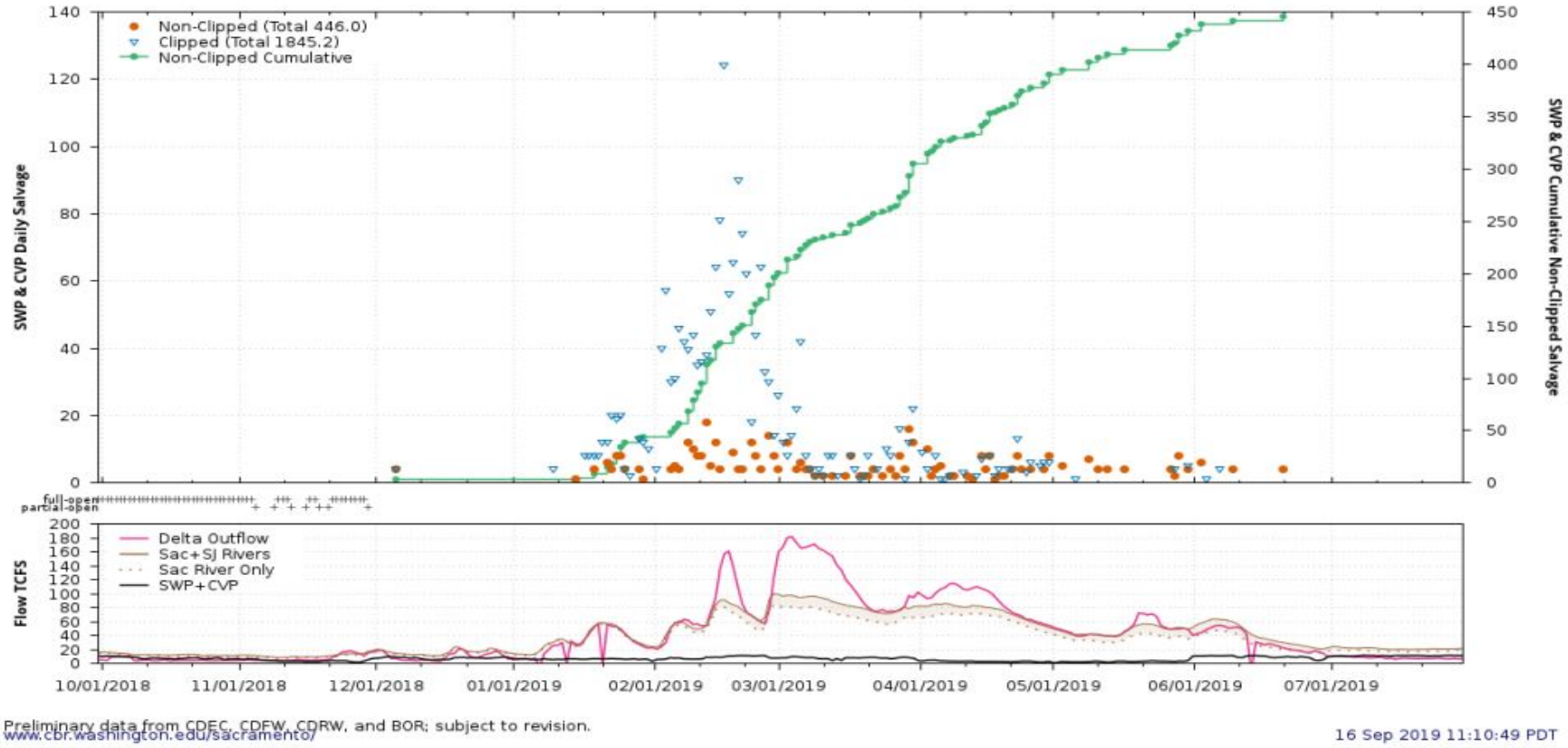


Figure 11. Non-clipped steelhead salvage at the Delta fish facilities from October to July, water years 2007 through 2019.

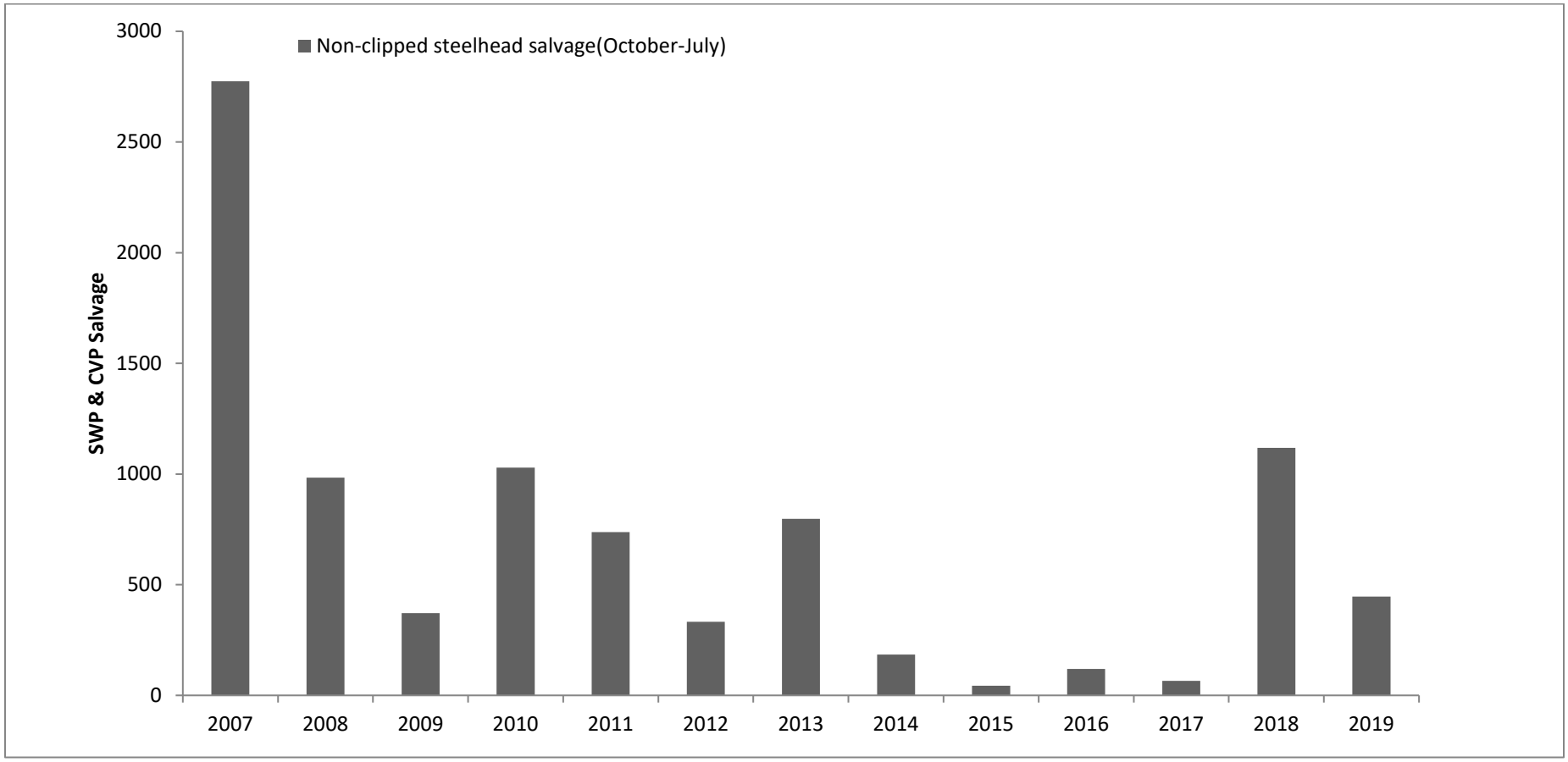


Figure 12. Hatchery (adipose fin clipped) steelhead salvage at the Delta fish facilities from October to July, water years 2007 through 2019.

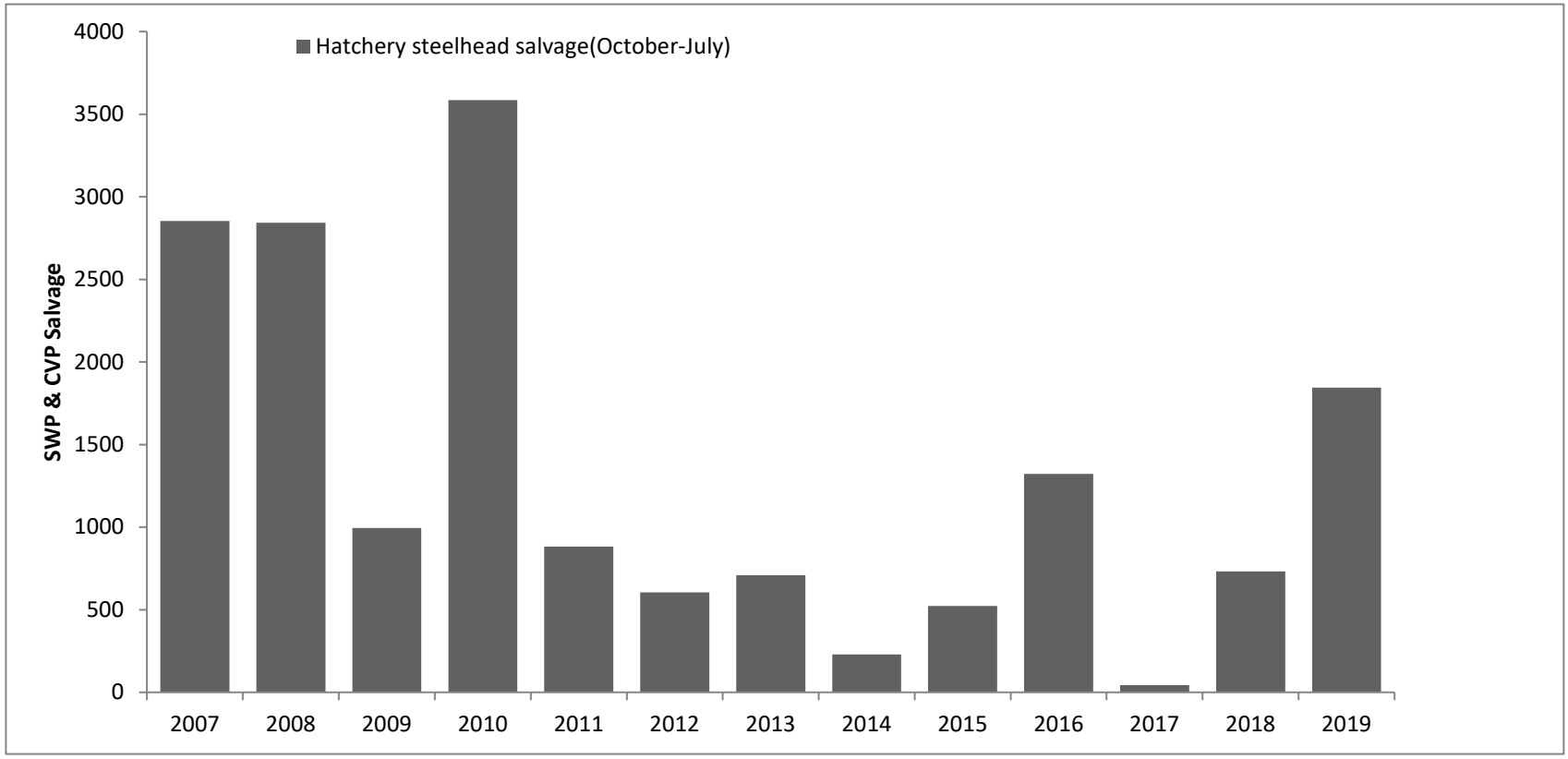


Figure 13. Daily loss and loss density of non-clipped steelhead at the Delta fish facilities using the current loss equation (DFW 2013), October 1, 2018 through July 31, 2019.

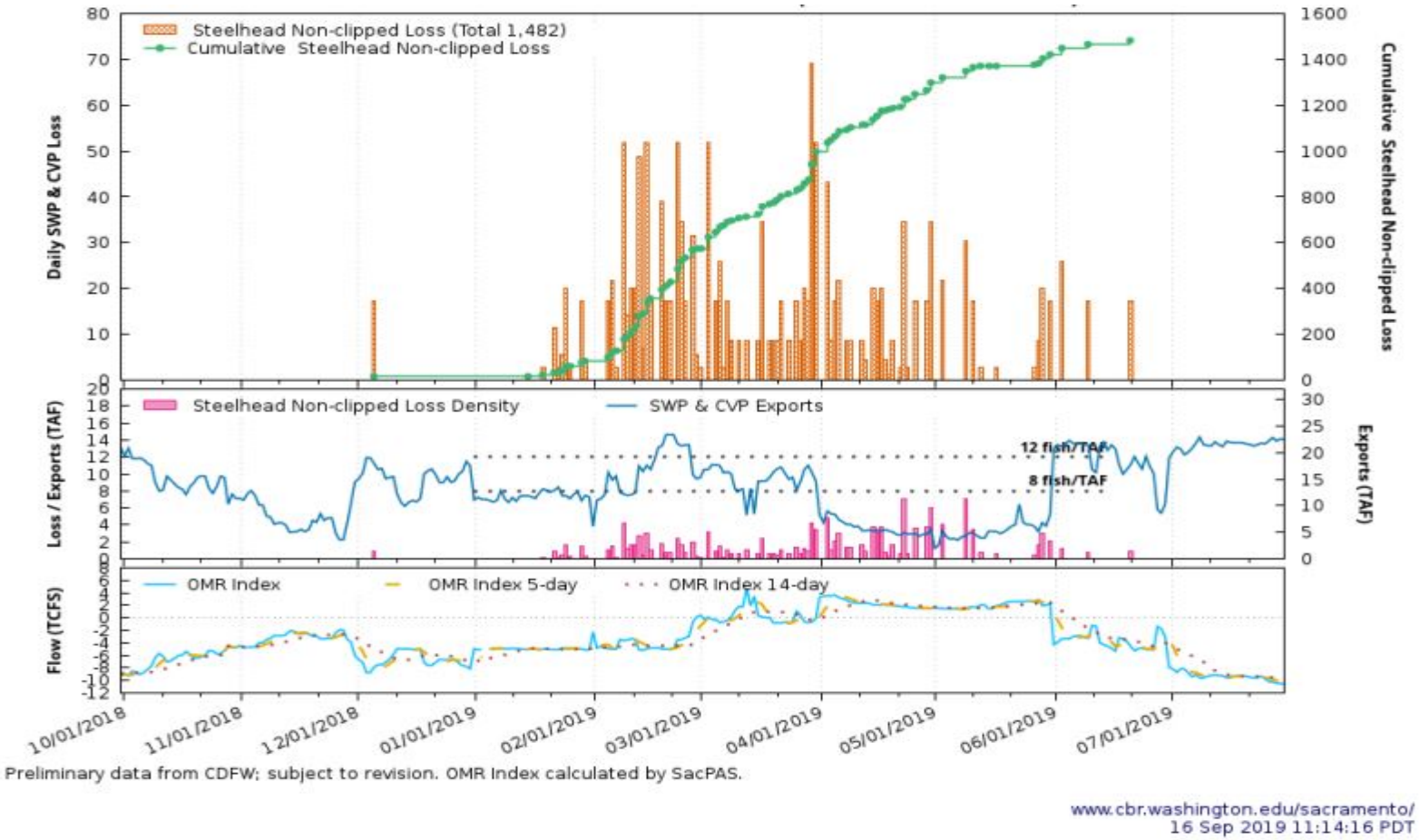


Figure 14. Green sturgeon salvage at the Delta fish facilities from October to July, water years 2008 through 2019.

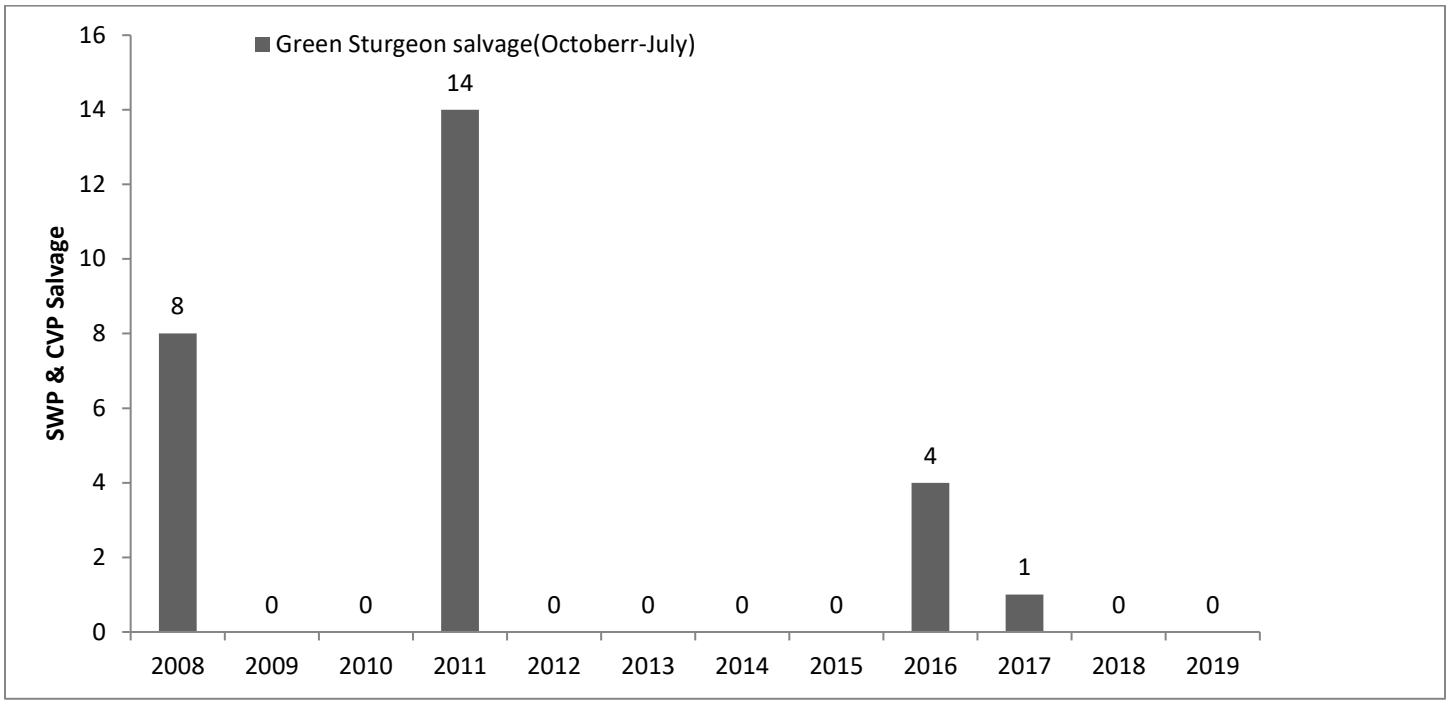
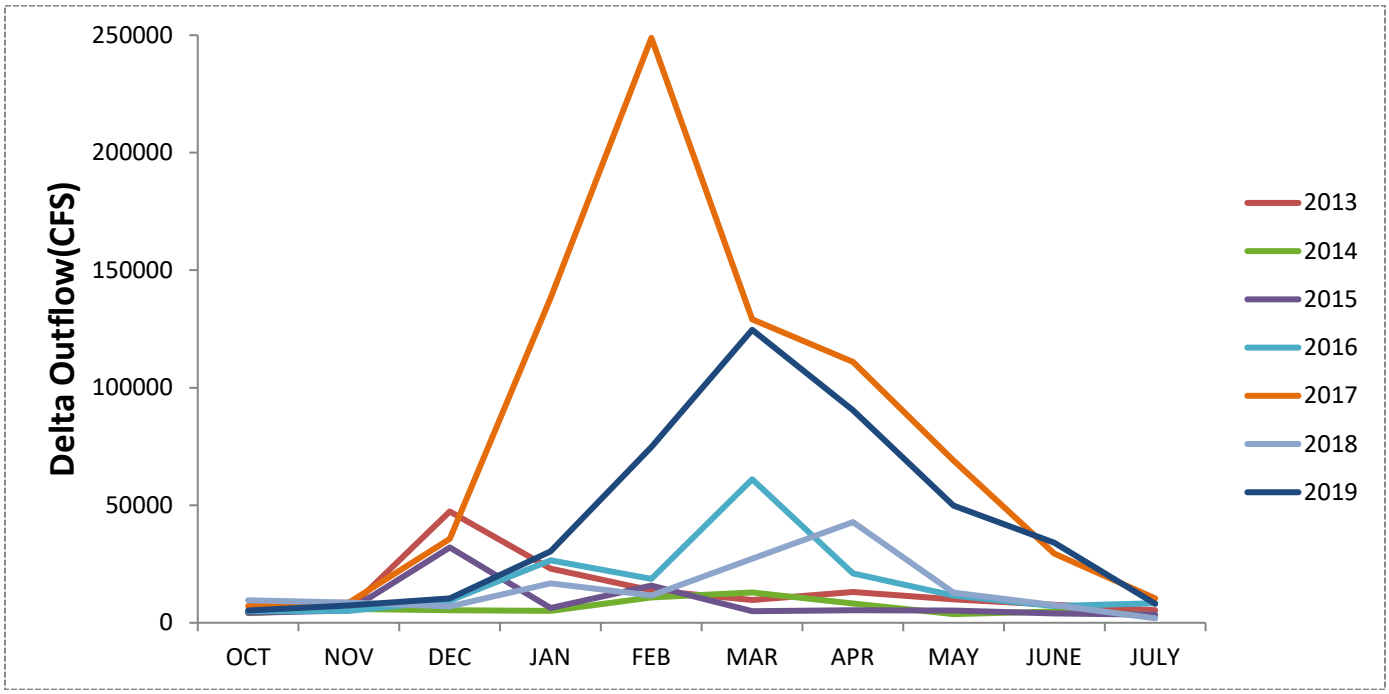
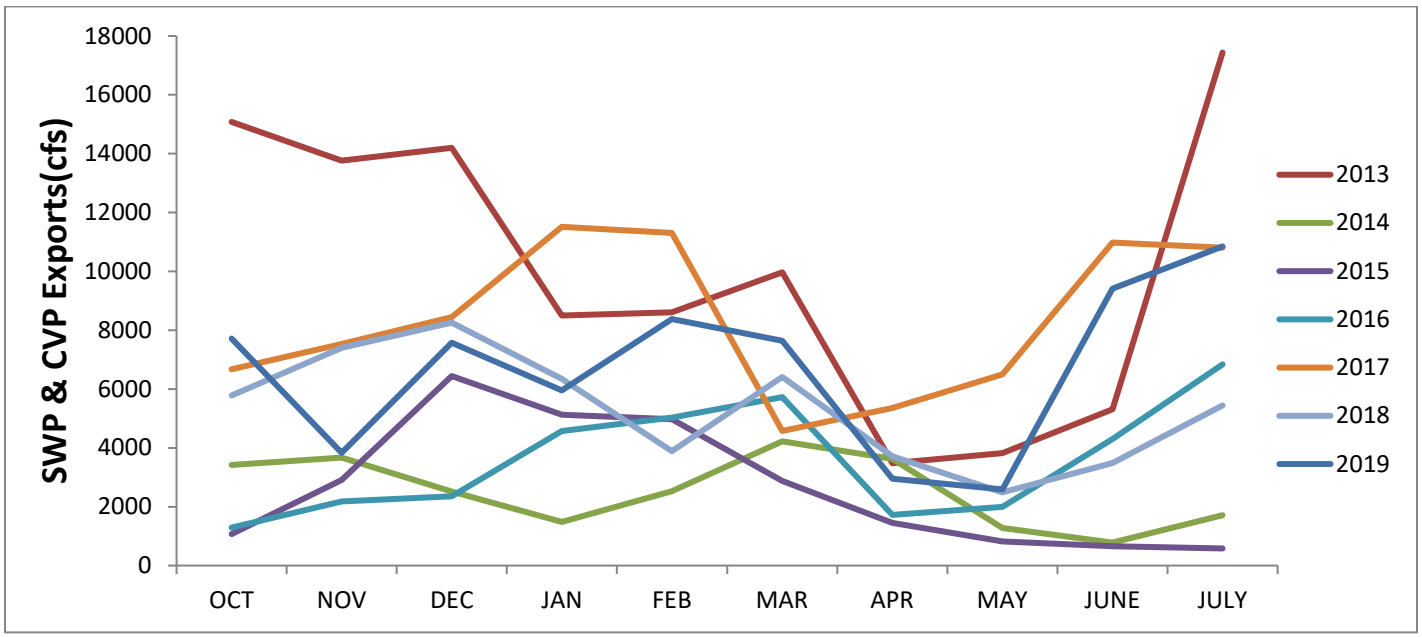
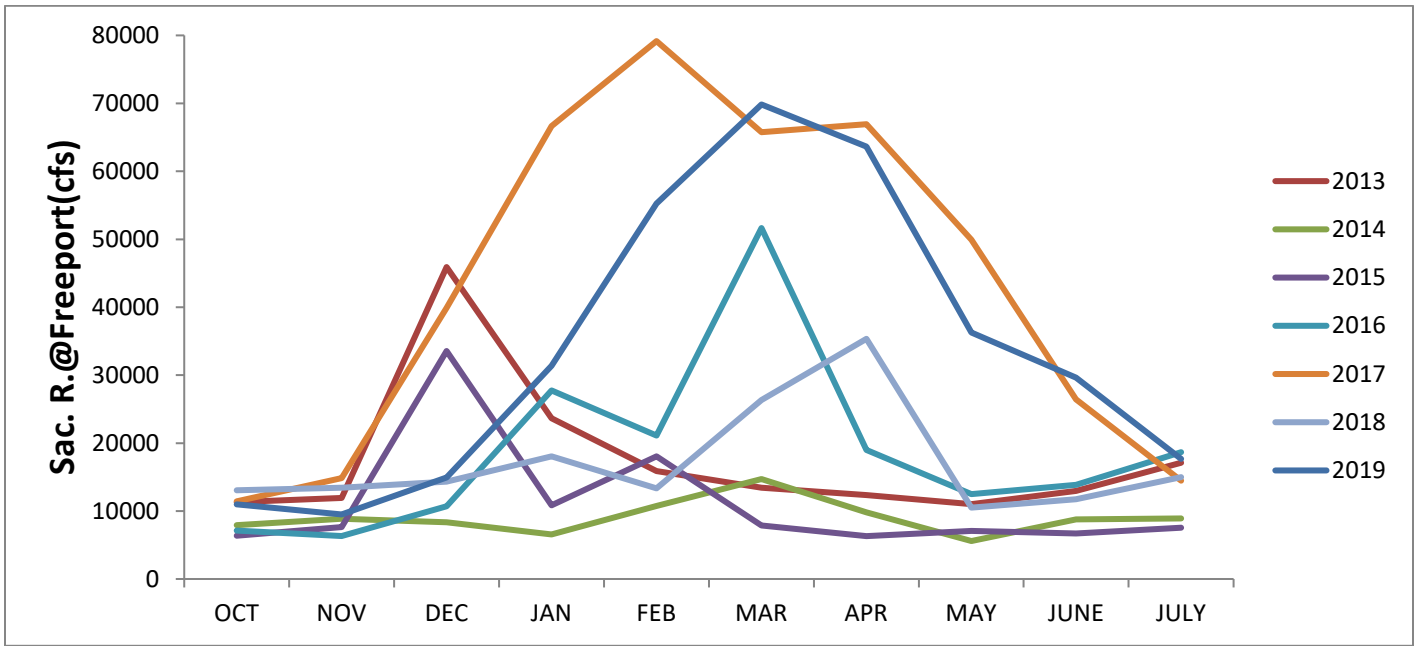


Figure15. Monthly averages of Delta hydrology from October to July, water years 2013 through 2019.






Sac. R.@Freeport(cfs)
80000
70000
60000
50000
40000
30000
20000
10000
0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
2013
2014
2015
2016
2017
2018
2019

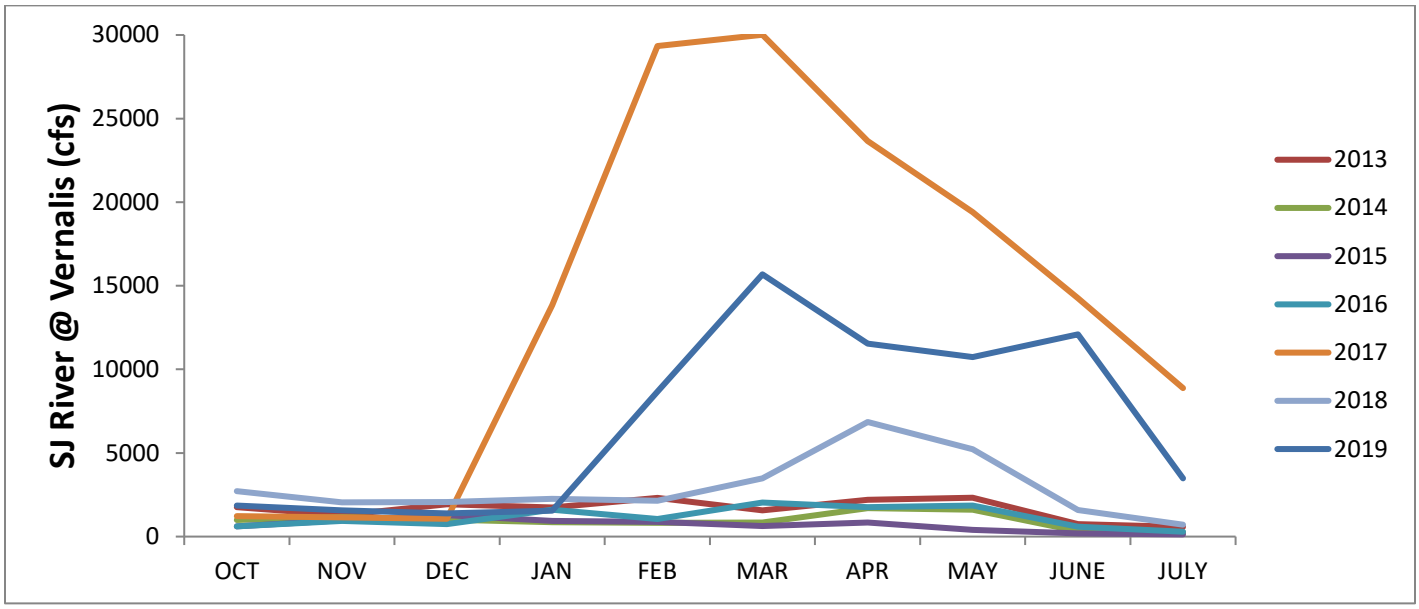

SJ River @ Vernalis (cfs)
30000
25000
20000
15000
10000
5000
0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
2013
2014
2015
2016
2017
2018
2019

Figure 16. Modeled volumetric water fingerprint for the Clifton Court Forebay (SWP) as derived from DSM2, October 2018 through August 2019.

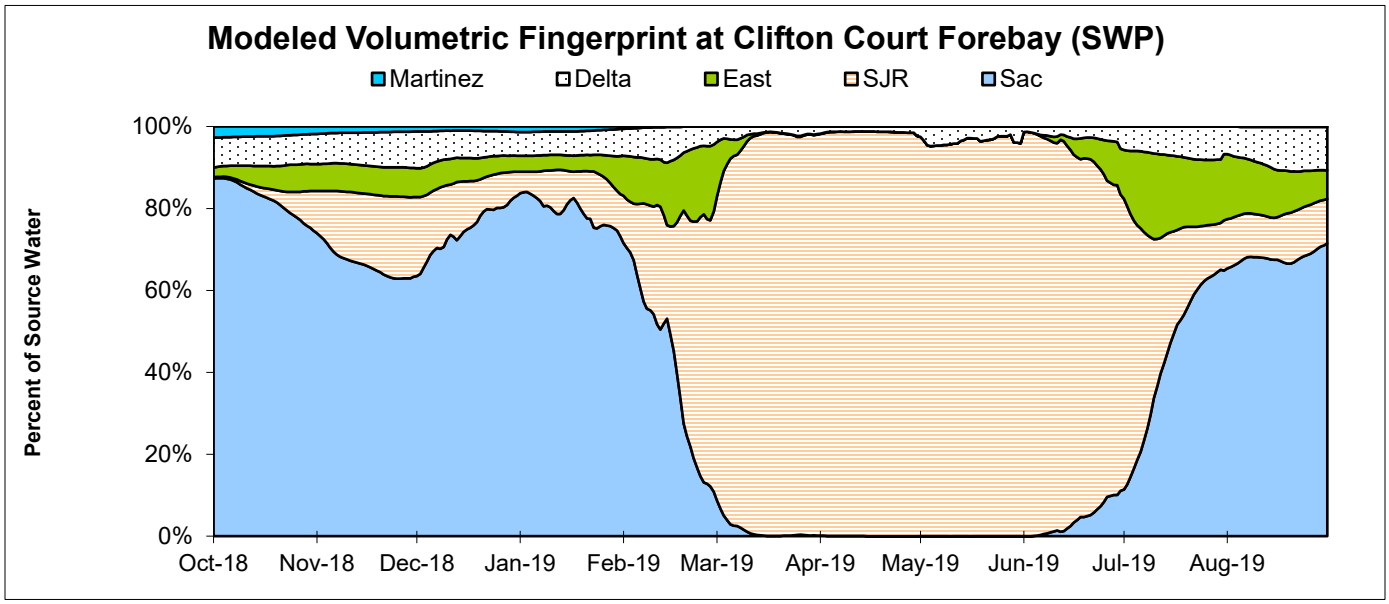
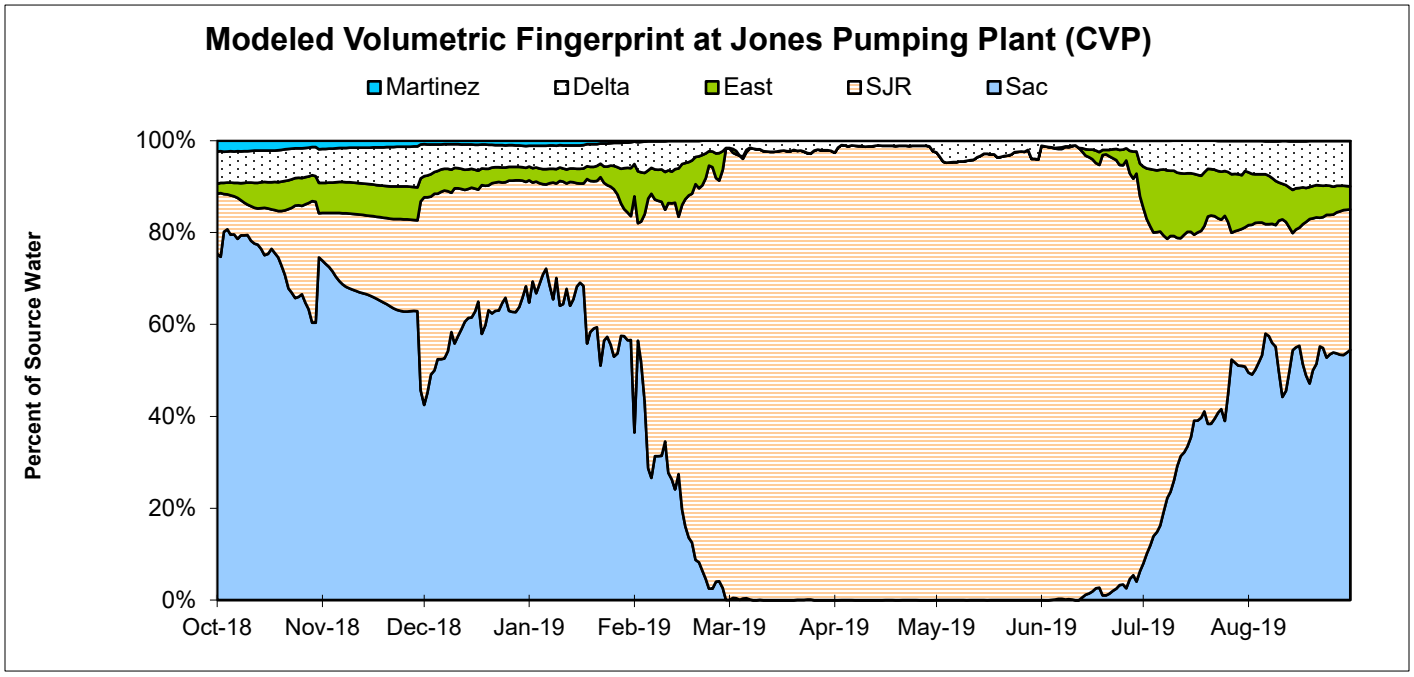


Figure 17. Modeled volumetric water fingerprint for the Jones Pumping Plant (CVP) as derived from DSM2, October 2018 through August 2019.



Delta fingerprint figures from DWR-Operations Control Office

Table 1. Unknown hatchery (adipose fin clipped) Chinook Salmon loss at the Delta fish facilities using the current loss equation (DFW 2014), October 2018 through June 2019.

Facility	Unknown CWT Loss[5]	Unread CWT Loss[6]	Unknown Hatchery Loss[7]	Acoustic Tag Loss[8]	Number of Unassigned CWTs[9]
SWP	350.16				
CVP	33.26				
TOTAL	**383.42**				

[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.

Table 2. Hatchery (adipose fin clipped) Chinook Salmon loss at the Delta fish facilities using the current loss equation (DFW 2014), October 2018 through June 2019.

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 Stage Trigger	Date of First Loss[4]	Date of Last Loss[4]
12/3/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	67.33	61,277	n/a	0.110	n/a	0.5%	12/27/2018	2/16/2019
12/14/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	24.57	66,266	n/a	0.037	n/a	0.5%	12/27/2018	2/10/2019
1/4/2019	LF	Coleman NFH	Battle Creek	Spring Surrogate	457.26	73,952	n/a	0.618	n/a	0.5%	1/16/2019	2/20/2019

[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.

Table 3. Monthly averages of hydrologic parameters in the Sacramento-San Joaquin River Delta, October 2018 through July 2019.

	SWP(banks) Average Exports		CVP(Jones) Average Exports		Sacramento River Average Flow	San Joaquin River Average Flow	Delta Outflow Average Flow
Month	taf	cfs	taf	cfs	cfs	cfs	cfs
Oct	224	3645	250	4068	10998	1847	5236
Nov	79	1319	150	2517	9498	1563	7439
Dec	225	3665	240	3906	14920	1387	10320
Jan	146	2381	220	3576	31383	1544	30373
Feb	253	4557	212	3819	55267	8671	74787
Mar	335	5451	134	2186	69835	15685	124648
Apr	80	1343	96	1613	63642	11543	90496
May	73	1180	87	1407	36290	10732	49873
Jun	334	5612	226	3801	29649	12091	34055
Jul	411	6685	256	4162	17650	3486	8104

Table 4. Rapid genetic analyses results for Chinook samples collected during 2019.

CVP Salvage	LAD Winter	LAD Spring	LAD Fall/Late-fall
Genetic Winter-run	41% (9/22)	0	0
Genetic Spring-run	0	0.5% (1/201)	0
Genetic Fall/Late-fall run	55% (12/22)	99.5% (200/201)	96% (1,597/1,662)
SWP Salvage			
Genetic Winter-run	26% (9/34)	1% (3/430)	0
Genetic Spring-run	0	0	0
Genetic Fall/Late-fall run	68% (23/34)	96% (414/430)	80% (468/584)
Unassigned	6% (2/34)	3% (13/430)	4% (25/584)
No Sample (<35mm FL)			16 % (91/584)

NMFS 2009 BiOp Terms and Condition 2A Activities

- Currently used loss estimation method described in Chinook Salmon Loss Estimation for Skinner Delta Fish Protective Facility and Tracy Fish" (DFW 2013). It is posted to the DFW FTP site.
- July 9, 2011: Kier Associates submitted a final report titled, "An alternative technique to quantify the incidental take limit of listed salmonids at the Federal and State Water export facilities in the San-Francisco Bay-Delta Estuary" (Jahn 2011).
- December 5, 2011: Reclamation sent a letter to NMFS responding to the Term and Condition 2a BiOp requirements. This letter described intent to conduct a study during Water Years 2012 and 2013, and evaluations of the chinook loss estimation and steelhead expanded salvage compared to alternate loss calculations (Jahn 2011).
- January 30, 2012: NMFS responded to Reclamation's Terms and Condition 2a letter. Describing that NMFS had granted an extension of the Terms and Conditions 2a reported deadline. NMFS generally agreed with Reclamation's recommendations on process and timeline for adapting the loss equations.
- 2012 Annual DOSS Report (Take Report - Appendix A): provided a comparison of loss estimation between the current and alternative loss equations and summarized progress of Terms and Condition 2A.
- September 7, 2012 and December 7, 2012: Technical Workshops held to discuss loss estimation methods
- April 2013: Cramer Fish Sciences submitted a report titled "Alternative Loss Calculation: Sensitivity Analysis". The report described uncertainties of the currently-used (DFW 2013) and the Jahn 2011 alternative method. These uncertainties were associated with survival through the SWP facility and the Delta model classification.
- 2016 to present: Reclamation and DWR in collaboration with DFW, FWS, and Cramer Fish Sciences implement an extensive chinook genetic monitoring program throughout the Central Valley. Intensive genetic monitoring of chinook salmon occurs at the Delta Fish Collection Facilities.
- 2013 Delta Science Program Independent Review Panel reviewed new approaches to loss estimation of Chinook salmon, steelhead, and green sturgeon, and provided a report of their evaluation of these methods (see Delta Science Program website).
- 2013 Annual DOSS report (Take Report - Appendix A): provided a comparison of loss estimation between the current and alternative loss equations and summarized progress Terms and Condition 2A.
- Cramer Shiny app created to calculate loss. https://fishsciences.shinyapps.io/loss-calculator/
- Many studies conducted and continue to be pursued at the Tracy Fish Collection Facility and Skinner Fish Facility to determine louver efficiency and predation risk to inform loss estimates.
- Tracy Fish Collection Facility Reports posted to:
  https://www.usbr.gov/mp/TFFIP/technical-bulletins.html
  https://www.usbr.gov/mp/TFFIP/technical-reports.html

https://www.usbr.gov/mp/TFFIP/docs/study-plan/fy20-tffip-proposal-package-final.pdf

- Skinner Fish Facility Information posted to:
  https://water.ca.gov/Programs/Bay-Delta/Bay-Delta-Environmental-Compliance/Green-Sturgeon-Laboratory-Study
  https://water.ca.gov/Programs/Bay-Delta/Bay-Delta-Environmental-Compliance/Clifton-Court-Forebay-Predatory-Fish-Relocation-Study
  https://water.ca.gov/Programs/Bay-Delta/Bay-Delta-Environmental-Compliance

  https://water.ca.gov/Programs/Bay-Delta/Water-Quality-And-Supply/Copy-of-Salmon-Survaval-Decision-Making-Software

Tracy Fish Collection Facility Recent Reports:

Zachary A. Sutphin, Rene C. Reyes, and Brandon J. Wu. 2014. *Predatory Fishes in the Tracy Fish Collection Facility Secondary System: An Analysis of Density, Distribution Re-colonization Rates, and Impact on Salvageable Fishes.* 69 pp. View Abstract (DOCX - 79 KB) | View Full Report (PDF - 1.6 MB

Rene Reyes, Brent Bridges, Brandon Wu, Zachary Sutphin, Damon Goodman, Stewart Reid, Scott Porter, and Michael Trask. 2017. *Pacific Lamprey Macrophthalmia Louver Efficiency at the Tracy Fish Collection Facility*. Tracy Fish Collection Facility Studies. Tracy Series Report Volume 54. U.S. Bureau of Reclamation, Mid-Pacific Region and Denver Technical Service Center. 29 pp. View Full Report (PDF - 1.3 MB)

Brandon J. Wu and Brent B. Bridges. 2014. *Evaluating the Use of Carbon Dioxide as an Alternative Predator Removal Technique to Decrease Tracy Fish Collection Facility Predator Numbers and Improve Facility Operations.* 61 pp. View Abstract (DOCX - 79 KB) | View Full Report (PDF - 2.8 MB)

Svoboda, Connie and M. Horn. 2013. *Laboratory Design and Testing of an Electrical Crowder for Predator Reduction at the Tracy Fish Collection Facility*. Volume 48. U.S. Bureau of Reclamation, Mid-Pacific Region and Denver Technical Service Center. 45 pp. View Abstract (DOCX - 82 KB) | View Full Report (PDF - 1.3 MB)

Michael J. Horn. 2019. Nighttime Light Levels near the Proposed Brannan Island Fish Release Site. Tracy Fish Collection Facility Studies. Tracy Technical Bulletin 2019-1. Bureau of Reclamation, Mid-Pacific Region. 16 pp. View Abstract (DOCX - 78 KB) | View Full Report (PDF - 772 KB)

Cathy Karp, Brandon J. Wu, and Kevin Kumagai. 2017. Juvenile Chinook Salmon, Steelhead, and Adult Striped Bass Movements and Facility Efficiency at the Tracy Fish Collection Facility. Tracy Technical Bulletin 2017-1. Bureau of Reclamation, Mid-Pacific Region, 81 pp. View Abstract (DOCX - 81 KB) | View Full Report (PDF - 6.8 MB)

Cathy Karp and Brent Bridges. 2016. *A Review of Fish Release Methods at the Tracy Fish Collection Facility with Recommendations for Future Operations.* April 2016. Tracy Fish Collection Facility Studies. Technical Bulletin 2016-1. U.S. Bureau of Reclamation, Mid-Pacific Region and Denver Technical Service Center. 32 pp.View Abstract (DOCX - 79 KB) | View Full Report (PDF - 2 MB)

Tracy B. Vermeyen and Bryan Heiner. 2016. *Hydraulic Evaluation of Hydrolox Traveling Screen in the Secondary Channel of the Tracy Fish Collection Facility*. June 2016. Tracy Fish Collection Facility Studies. Technical Bulletin 2015-5. U.S. Bureau of Reclamation, Mid-Pacific Region and Denver Technical Service Center. 28 pp. View Abstract (DOCX - 81 KB) View Full Report (PDF - 1.3 MB)

Cathy Karp and Judy Lyons. 2015. *Evaluation of Fish Behavior Upstream and Downstream of the Mitten Crab Traveling Screen at the Tracy Fish Collection Facility.* May 2015. 25pp. View Abstract (DOCX - 80 KB) | View Full Report (PDF - 1.1 MB)

Reyes, R., Z. Sutphin, and B. Bridges. 2012. *Effectiveness of Fine Mesh Screening a Holding Tank in Retaining Larval and Juvenile Fish at the Tracy Fish Collection Facility*. December 2012. Tracy Fish Collection Facility Studies. Tracy Technical Bulletin 2012-1. U.S. Bureau of Reclamation, Mid-Pacific Region and Denver Technical Service Center. 20 pp. View Abstract (DOCX - 81KB) | View Full Report (PDF - 692 KB)

Skinner Fish Facility Recent Reports:

- Behavior of Green Sturgeon Near a Model Louver System in a Laboratory Flume, and an Assessment of Predation Risk: Annual Report 2015
- Behavior of Green Sturgeon Near a Model Louver System in a Laboratory Flume, and an Assessment of Predation Risk: Annual Report 2016
- Behavior of Green Sturgeon Near a Model Louver System in a Laboratory Flume, and an Assessment of Predation Risk: Annual Report 2017

Appendix B. Genetic results for Chinook Salmon collected from the CVP and SWP Delta Fish Collection Facilities during Water Year 2019.

Sample Date	Fork Length	Assignment	PosProb1	Group	PosProb2	DeltaModel	Facility
12/4/2018 10:00	132	Non-winter	1.000	Fall	1.000	LateFall	CVP
12/23/2018 13:00	146	Non-winter	1.000	Fall	0.992	LateFall	SWP
12/31/2018 14:00	122	Non-winter	1.000	Fall	0.993	Winter	CVP
1/2/2019 13:00	156	Non-winter	1.000	Fall	0.936	Winter	SWP
1/2/2019 14:00	143	Non-winter	1.000	Fall	0.991	Winter	CVP
1/3/2019 16:00	138	Non-winter	1.000	Fall	0.997	Winter	CVP
1/6/2019 16:00	138	Non-winter	1.000	Fall	0.995	Winter	CVP
1/17/2019 8:00	140	Non-winter	1.000	Fall	1.000	Winter	CVP
1/18/2019 16:00	116	Winter	1.000	Winter	1.000	Winter	CVP
1/20/2019 15:00	123	Non-winter	1.000	Fall	1.000	Winter	SWP
1/22/2019 11:00	136	Non-winter	1.000	Fall	0.999	Winter	SWP
1/23/2019 17:40	203	Non-winter	1.000	Fall	1.000	Latefall	SWP
1/25/2019 8:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
1/28/2019 18:00	152	Winter	0.999	Winter	0.999	Winter	CVP
1/28/2019 18:00	155	Non-winter	1.000	Fall	1.000	Winter	CVP
1/29/2019 20:00	130	Winter	0.996	Winter	0.996	Winter	CVP
2/2/2019 8:00	157	Non-winter	1.000	Fall	1.000	Winter	SWP
2/3/2019 14:00	138	Non-winter	1.000	Fall	1.000	Winter	SWP
2/3/2019 16:00	90	Winter	1.000	Winter	1.000	Winter	CVP
2/3/2019 18:00	103	Winter	1.000	Winter	1.000	Winter	CVP
2/6/2019 8:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 10:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 10:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 10:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 10:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 10:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 10:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 10:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP

2/6/2019 10:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 12:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 14:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 14:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 14:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 14:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 14:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 14:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 14:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 14:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 14:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 16:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 16:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 16:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 16:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 16:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 16:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 16:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 16:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 16:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 18:00	170	Non-winter	1.000	Fall	1.000	Winter	CVP
2/6/2019 18:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 18:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 18:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 18:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 18:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 20:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 20:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 20:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 23:59	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/6/2019 23:59	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 2:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 2:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP

2/7/2019 8:00	48	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	32	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	32	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	32	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 10:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 10:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 10:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 10:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 10:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	44	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 14:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 14:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 14:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 14:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 14:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 14:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP

2/7/2019 14:00	32	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 14:00	32	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 14:00	41	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 14:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 16:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 16:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 16:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 16:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 16:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 16:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 16:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 20:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 20:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 22:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 22:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/7/2019 23:59	141	Non-winter	1.000	Fall	1.000	Winter	CVP
2/7/2019 23:59	146	Non-winter	1.000	Fall	1.000	Winter	CVP
2/8/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 2:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 2:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 2:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 3:00	36	Non-winter	1.000	Fall	1.000	Fall	SWP
2/8/2019 4:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 4:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 4:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 6:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 6:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 6:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP

2/8/2019 10:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 12:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 12:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 12:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 12:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 14:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 14:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 14:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 14:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 14:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 14:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 14:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 14:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 14:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 16:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 16:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 16:00	31	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 16:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 16:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 16:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 16:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 16:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 16:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 16:00	176	Non-winter	1.000	Fall	1.000	Winter	SWP
2/8/2019 18:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 18:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 18:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 18:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 20:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 20:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 20:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 20:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 20:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 23:59	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/8/2019 23:59	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 2:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 2:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 2:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 2:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 2:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 4:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 4:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 4:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 4:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP

2/9/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 6:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 6:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 6:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 8:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 8:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 8:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 10:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 10:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 10:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 12:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 12:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 14:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 18:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 18:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 22:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 22:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/9/2019 22:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 4:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 4:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 6:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 6:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 6:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 6:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 6:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 8:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 10:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 10:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 16:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 18:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 18:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 22:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 22:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/10/2019 23:59	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 3:00	37	Non-winter	1.000	Fall	1.000	Fall	SWP
2/11/2019 3:00	35	Non-winter	1.000	Fall	1.000	Fall	SWP

2/11/2019 3:00	35	Non-winter	1.000	Fall	1.000	Fall	SWP
2/11/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 4:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 4:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 4:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 4:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 6:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 6:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 6:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 6:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 6:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 8:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 9:00	38	Non-winter	1.000	Fall	1.000	Fall	SWP
2/11/2019 9:00	37	Non-winter	1.000	Fall	1.000	Fall	SWP
2/11/2019 16:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 20:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 20:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 20:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 22:00	36	Non-winter	1.000	Fall	0.966	Fall	CVP
2/11/2019 22:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 23:59	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/11/2019 23:59	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 2:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 4:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 4:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 4:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 6:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 6:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 6:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 10:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 10:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 12:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 12:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 16:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 20:00	46	Non-winter	1.000	Fall	0.999	Fall	CVP
2/12/2019 20:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 20:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 20:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 20:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 20:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP

2/12/2019 20:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 22:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 22:00	37	Non-winter	1.000	Fall	0.999	Fall	CVP
2/12/2019 23:59	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 23:59	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/12/2019 23:59	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/13/2019 2:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/13/2019 2:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/13/2019 13:00	175	Non-winter	1.000	Fall	1.000	Winter	SWP
2/13/2019 22:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/13/2019 22:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/14/2019 17:00	100	Winter	1.000	Winter	1.000	Winter	SWP
2/15/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/15/2019 2:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/15/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/15/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/15/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/15/2019 8:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/15/2019 10:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/15/2019 10:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/15/2019 10:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/15/2019 10:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/15/2019 12:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/15/2019 12:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/15/2019 14:00	128	Non-winter	1.000	Fall	1.000	Winter	CVP
2/15/2019 15:00	138	Non-winter	1.000	Fall	1.000	Winter	SWP
2/15/2019 22:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/16/2019 10:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/16/2019 10:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/16/2019 10:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/16/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/16/2019 14:00	41	Non-winter	1.000	Fall	1.000	Fall	CVP
2/16/2019 15:00	107	Winter	1.000	Winter	1.000	Winter	SWP
2/17/2019 6:00	34	Non-winter	1.000	Fall	0.999	Fall	CVP
2/17/2019 6:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/17/2019 9:00	121	Winter	1.000	Winter	1.000	Winter	SWP
2/17/2019 12:00	32	Non-winter	1.000	Fall	1.000	Fall	CVP
2/17/2019 12:00	37	Non-winter	1.000	Fall	0.999	Fall	CVP
2/17/2019 12:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/17/2019 12:00	40	Non-winter	1.000	Fall	0.979	Fall	CVP
2/17/2019 14:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/17/2019 14:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/17/2019 16:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/17/2019 17:00	40	Non-winter	1.000	Fall	1.000	Fall	SWP
2/17/2019 20:00	102	Winter	1.000	Winter	1.000	Winter	CVP
2/17/2019 20:00	98	Winter	1.000	Winter	1.000	Winter	CVP
2/17/2019 20:00	41	Non-winter	1.000	Fall	1.000	Fall	CVP

2/17/2019 20:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/17/2019 20:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/17/2019 20:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 7:00	43	Non-winter	1.000	Fall	1.000	Fall	SWP
2/18/2019 7:00	37	Non-winter	1.000	Fall	1.000	Fall	SWP
2/18/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 8:00	42	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 8:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 8:00	105	Non-winter	1.000	Fall	1.000	Winter	CVP
2/18/2019 10:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 10:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 10:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 12:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 14:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 14:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 14:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 14:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 16:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/18/2019 17:00	40	Non-winter	1.000	Fall	0.999	Fall	SWP
2/18/2019 18:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 4:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 7:00	38	Non-winter	1.000	Fall	1.000	Fall	SWP
2/19/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 8:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 8:00	36	Non-winter	1.000	Fall	0.999	Fall	CVP
2/19/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 8:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 8:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 8:00	41	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 9:00	41	Non-winter	1.000	Fall	0.999	Fall	SWP
2/19/2019 10:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 10:00	44	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 10:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 10:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP

2/19/2019 10:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 10:00	41	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 10:00	31	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 12:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 12:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 13:00	46	Non-winter	1.000	Fall	1.000	Fall	SWP
2/19/2019 16:00	45	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 16:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 16:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 16:00	42	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 16:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 20:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 22:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/19/2019 23:00	42	Non-winter	1.000	Fall	1.000	Fall	SWP
2/19/2019 23:59	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 2:00	30	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 4:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 4:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 6:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 6:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 6:00	41	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 8:00	35	Non-winter	1.000	Fall	0.990	Fall	CVP
2/20/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 8:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 8:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 9:30	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 9:30	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 9:30	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 10:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 10:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 10:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 10:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 10:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 10:00	44	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 10:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 10:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 11:00	38	Non-winter	1.000	Fall	1.000	Fall	SWP
2/20/2019 12:00	42	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 12:00	42	Non-winter	1.000	Fall	0.960	Fall	CVP
2/20/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 12:00	46	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	SWP

2/20/2019 14:00	46	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 14:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 14:00	45	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 14:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 16:00	46	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 16:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/20/2019 18:00	42	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 2:00	210	Non-winter	1.000	Fall	1.000	Winter	CVP
2/21/2019 2:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 2:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 2:00	31	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 4:00	45	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 4:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 4:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 4:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 4:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 5:00	37	Non-winter	1.000	Fall	1.000	Fall	SWP
2/21/2019 5:00	40	Non-winter	1.000	Fall	0.999	Fall	SWP
2/21/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 8:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 9:00	42	Non-winter	1.000	Fall	1.000	Fall	SWP
2/21/2019 10:00	48	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 10:18	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 10:18	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 10:18	34	Non-winter	1.000	Fall	0.998	Fall	CVP
2/21/2019 10:48	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 11:00	44	Non-winter	1.000	Fall	1.000	Fall	SWP
2/21/2019 12:00	42	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 17:00	36	Non-winter	1.000	Fall	1.000	Fall	SWP
2/21/2019 23:59	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/21/2019 23:59	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 2:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 2:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 6:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 8:00	32	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 8:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 10:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 12:00	42	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 12:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 12:00	43	Non-winter	1.000	Fall	0.999	Fall	CVP
2/22/2019 12:00	45	Non-winter	1.000	Fall	0.995	Fall	CVP
2/22/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP

2/22/2019 12:00	31	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 14:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/22/2019 20:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/23/2019 3:00	40	Non-winter	1.000	Fall	1.000	Fall	SWP
2/23/2019 4:00	98	Winter	1.000	Winter	1.000	Winter	SWP
2/23/2019 4:00	45	Non-winter	1.000	Fall	0.989	Fall	SWP
2/23/2019 11:00	40	Non-winter	1.000	Fall	1.000	Fall	SWP
2/23/2019 13:00	128	Non-winter	1.000	Fall	1.000	Winter	SWP
2/23/2019 21:00	140	Winter	0.998	Winter	0.998	Winter	SWP
2/24/2019 4:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/24/2019 10:00	45	Non-winter	1.000	Fall	1.000	Fall	CVP
2/24/2019 12:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/24/2019 17:00	44	Non-winter	1.000	Fall	1.000	Fall	SWP
2/24/2019 19:00	170	Non-winter	1.000	Fall	0.999	Winter	SWP
2/25/2019 7:00	53	Non-winter	1.000	Fall	1.000	Fall	SWP
2/25/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/25/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/25/2019 8:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/25/2019 12:00	41	Non-winter	1.000	Fall	0.999	Fall	CVP
2/25/2019 14:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/25/2019 14:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/25/2019 23:59	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/25/2019 23:59	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/25/2019 23:59	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/25/2019 23:59	36	Non-winter	1.000	Fall	0.998	Fall	CVP
2/26/2019 2:00	40	Non-winter	1.000	Fall	0.997	Fall	CVP
2/26/2019 2:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 2:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 2:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 2:00	34	Non-winter	1.000	Fall	0.999	Fall	CVP
2/26/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 6:00	45	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 6:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 6:00	42	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 6:00	48	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 6:00	41	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 6:00	54	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 8:00	46	Non-winter	1.000	Fall	1.000	Fall	CVP
2/26/2019 23:59	35	Non-winter	1.000	Fall	0.981	Fall	CVP
2/27/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 2:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 4:00	50	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 4:00	38	Non-winter	1.000	Fall	0.898	Fall	CVP
2/27/2019 4:00	35	Non-winter	1.000	Fall	0.999	Fall	CVP

2/27/2019 4:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 4:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 6:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 6:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 8:00	46	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 8:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 12:00	48	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 22:00	42	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 23:59	48	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 23:59	45	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 23:59	47	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 23:59	45	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 23:59	45	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 23:59	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 23:59	35	Non-winter	1.000	Fall	0.986	Fall	CVP
2/27/2019 23:59	48	Non-winter	1.000	Fall	1.000	Fall	CVP
2/27/2019 23:59	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 4:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 4:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 4:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 4:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 4:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 4:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 4:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 4:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 4:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 6:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 6:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 12:00	99	Winter	1.000	Winter	1.000	Winter	CVP
2/28/2019 15:00	115	Winter	1.000	Winter	1.000	Winter	SWP
2/28/2019 20:00	46	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 20:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 22:00	47	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 22:00	47	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 23:59	40	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 23:59	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 23:59	36	Non-winter	1.000	Fall	1.000	Fall	CVP
2/28/2019 23:59	33	Non-winter	1.000	Fall	0.988	Fall	CVP
3/1/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 2:00	59	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 2:00	47	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 2:00	42	Non-winter	1.000	Fall	1.000	Fall	CVP

3/1/2019 4:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 4:00	43	Non-winter	1.000	Fall	0.999	Fall	CVP
3/1/2019 4:00	44	Non-winter	1.000	Fall	0.999	Fall	CVP
3/1/2019 4:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 4:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 4:00	41	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 6:00	51	Non-winter	1.000	Fall	0.999	Fall	CVP
3/1/2019 6:00	42	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 6:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 6:00	42	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 6:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 8:00	42	Non-winter	1.000	Fall	0.999	Fall	CVP
3/1/2019 10:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 10:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 10:00	44	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 10:00	43	Non-winter	1.000	Fall	0.988	Fall	CVP
3/1/2019 10:00	41	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 10:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 10:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 12:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 14:00	50	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 14:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 20:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 20:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 21:00	155	Non-winter	1.000	Fall	1.000	Winter	SWP
3/1/2019 22:00	52	Non-winter	1.000	Fall	1.000	Fall	CVP
3/1/2019 22:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 2:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 2:00	41	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 2:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 4:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 4:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 4:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 4:00	45	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 4:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 4:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 6:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 6:00	44	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 6:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 6:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 16:00	45	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 17:00	51	Non-winter	1.000	Fall	1.000	Fall	SWP
3/2/2019 17:00	46	Non-winter	1.000	Fall	1.000	Fall	SWP
3/2/2019 20:00	46	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 20:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP

3/2/2019 21:00	41	Non-winter	1.000	Fall	1.000	Fall	SWP
3/2/2019 22:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 22:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
3/2/2019 23:00	46	Non-winter	1.000	Fall	1.000	Fall	SWP
3/3/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/3/2019 2:00	48	Non-winter	1.000	Fall	1.000	Fall	CVP
3/3/2019 3:00	49	Non-winter	1.000	Fall	0.998	Fall	SWP
3/3/2019 4:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
3/3/2019 4:00	45	Non-winter	1.000	Fall	1.000	Fall	CVP
3/3/2019 4:00	35	Non-winter	1.000	Fall	0.993	Fall	CVP
3/3/2019 4:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
3/3/2019 4:00	37	Non-winter	1.000	Fall	0.996	Fall	CVP
3/3/2019 6:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
3/3/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/3/2019 8:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
3/3/2019 10:00	46	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 4:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 7:00	45	Non-winter	1.000	Fall	1.000	Fall	SWP
3/4/2019 7:00	59	Non-winter	1.000	Fall	1.000	Fall	SWP
3/4/2019 7:00	50	Non-winter	1.000	Fall	1.000	Fall	SWP
3/4/2019 8:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 8:00	46	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 10:00	142	Non-winter	1.000	Fall	1.000	Winter	SWP
3/4/2019 12:00	45	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 16:00	33	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 18:00	52	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 18:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 18:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 20:00	46	Non-winter	1.000	Fall	1.000	Fall	CVP
3/4/2019 20:00	48	Non-winter	1.000	Fall	0.999	Fall	CVP
3/5/2019 2:00	38	Non-winter	1.000	Fall	0.999	Fall	CVP
3/5/2019 2:00	46	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 2:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 6:00	48	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 6:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 9:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 9:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 9:30	47	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 9:30	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 10:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 10:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 12:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP

3/5/2019 16:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 16:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 18:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 20:00	43	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 20:00	47	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 22:00	32	Non-winter	1.000	Fall	1.000	Fall	CVP
3/5/2019 22:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
3/6/2019 2:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
3/6/2019 2:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/6/2019 2:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
3/6/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/6/2019 4:00	45	Non-winter	1.000	Fall	1.000	Fall	CVP
3/6/2019 4:00	44	Non-winter	1.000	Fall	1.000	Fall	CVP
3/6/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/6/2019 16:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/6/2019 18:00	37	Non-winter	1.000	Fall	0.999	Fall	CVP
3/6/2019 20:00	41	Non-winter	1.000	Fall	1.000	Fall	CVP
3/6/2019 20:00	44	Non-winter	1.000	Fall	0.999	Fall	CVP
3/6/2019 20:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
3/6/2019 21:00	195	Non-winter	1.000	Fall	1.000	Winter	SWP
3/6/2019 22:00	41	Non-winter	1.000	Fall	0.999	Fall	CVP
3/6/2019 22:00	32	Non-winter	1.000	Fall	1.000	Fall	CVP
3/6/2019 22:00	40	Non-winter	1.000	Fall	0.999	Fall	CVP
3/7/2019 2:00	50	Non-winter	1.000	Fall	1.000	Fall	CVP
3/7/2019 4:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
3/7/2019 4:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/7/2019 6:00	37	Non-winter	1.000	Fall	0.999	Fall	CVP
3/7/2019 6:00	34	Non-winter	1.000	Fall	1.000	Fall	CVP
3/7/2019 6:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/7/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/7/2019 8:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/7/2019 12:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
3/7/2019 12:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/7/2019 17:00	43	Non-winter	1.000	Fall	0.998	Fall	SWP
3/7/2019 17:00	37	Non-winter	1.000	Fall	1.000	Fall	SWP
3/7/2019 18:00	36	Non-winter	1.000	Fall	1.000	Fall	CVP
3/7/2019 22:00	49	Non-winter	1.000	Fall	1.000	Fall	CVP
3/7/2019 23:59	47	Non-winter	1.000	Fall	1.000	Fall	CVP
3/8/2019 2:00	44	Non-winter	1.000	Fall	1.000	Fall	CVP
3/8/2019 2:00	41	Non-winter	1.000	Fall	1.000	Fall	CVP
3/8/2019 4:00	46	Non-winter	1.000	Fall	1.000	Fall	CVP
3/8/2019 4:00	47	Non-winter	1.000	Fall	1.000	Fall	CVP
3/8/2019 6:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/8/2019 8:00	39	Non-winter	1.000	Fall	1.000	Fall	CVP
3/8/2019 12:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
3/8/2019 13:00	53	Non-winter	1.000	Fall	1.000	Fall	SWP
3/8/2019 16:00	33	Non-winter	1.000	Fall	0.998	Fall	CVP

3/8/2019 22:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/9/2019 8:00	55	Non-winter	1.000	Fall	1.000	Fall	CVP
3/9/2019 8:00	50	Non-winter	1.000	Fall	1.000	Fall	CVP
3/9/2019 8:00	35	Non-winter	1.000	Fall	1.000	Fall	CVP
3/9/2019 12:00	52	Non-winter	1.000	Fall	1.000	Fall	CVP
3/9/2019 13:00	151	Non-winter	1.000	Fall	1.000	Winter	SWP
3/10/2019 6:00	37	Non-winter	1.000	Fall	1.000	Fall	CVP
3/10/2019 6:00	53	Non-winter	1.000	Fall	1.000	Fall	CVP
3/10/2019 8:00	42	Non-winter	1.000	Fall	1.000	Fall	CVP
3/10/2019 10:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
3/10/2019 10:00	40	Non-winter	1.000	Fall	1.000	Fall	CVP
3/11/2019 2:00	36	Non-winter	1.000	Fall	0.999	Fall	CVP
3/11/2019 6:00	38	Non-winter	1.000	Fall	1.000	Fall	CVP
3/11/2019 19:00	168	Non-winter	1.000	Fall	0.999	Winter	SWP
3/12/2019 8:00	34	Non-winter	1.000	Fall	0.968	Fall	CVP
3/12/2019 23:59	40	Non-winter	1.000	Fall	0.995	Fall	CVP
3/13/2019 8:00	123	Winter	1.000	Winter	1.000	Winter	CVP
3/14/2019 23:59	52	Non-winter	1.000	Fall	0.994	Fall	CVP
3/15/2019 6:00	40	Non-winter	1.000	Fall	0.972	Fall	CVP
3/15/2019 6:00	45	Non-winter	1.000	Fall	0.993	Fall	CVP
3/15/2019 8:00	38	Non-winter	1.000	Fall	0.982	Fall	CVP
3/15/2019 11:00	53	Non-winter	1.000	Fall	0.980	Fall	SWP
3/16/2019 10:00	105	Non-winter	1.000	Spring	0.727	Spring	CVP
3/16/2019 23:00	132	Non-winter	1.000	Fall	0.979	Winter	SWP
3/19/2019 16:00	98	Non-winter	1.000	Fall	0.961	Spring	SWP
3/20/2019 8:00	141	Non-winter	1.000	Fall	0.993	Winter	SWP
3/20/2019 10:00	44	Non-winter	1.000	Fall	0.993	Fall	CVP
3/21/2019 8:00	71	Non-winter	1.000	Fall	1.000	Spring	CVP
3/21/2019 16:00	42	Non-winter	1.000	Fall	0.998	Fall	CVP
3/21/2019 16:00	45	Non-winter	1.000	Fall	1.000	Fall	CVP
3/22/2019 8:00	50	Non-winter	1.000	Unassigned	0.500	Fall	CVP
3/23/2019 13:00	96	Non-winter	1.000	Spring	0.558	Spring	SWP
3/25/2019 5:00	111	Non-winter	1.000	Fall	0.894	Spring	SWP
3/25/2019 5:00	112	Winter	1.000	Winter	1.000	Spring	SWP
3/26/2019 23:00	86	Non-winter	1.000	Fall	0.986	Spring	SWP
3/27/2019 1:00	122	Non-winter	1.000	Fall	0.949	Winter	SWP
3/27/2019 13:00	117	Winter	1.000	Winter	1.000	Winter	SWP
3/28/2019 3:00	84	Non-winter	1.000	Fall	0.999	Spring	SWP
3/28/2019 3:00	88	Non-winter	1.000	Fall	0.962	Spring	SWP
3/28/2019 5:00	222	Non-winter	1.000	Fall	0.870	Winter	SWP
3/28/2019 10:48	41	Non-winter	1.000	Fall	0.765	Fall	CVP
3/29/2019 0:00	111	Non-winter	1.000	Fall	0.990	Spring	SWP
3/30/2019 10:00	65	Non-winter	1.000	Fall	0.812	Fall	CVP
3/30/2019 11:00	135	Winter	1.000	Winter	1.000	Winter	SWP
3/30/2019 15:00	86	Non-winter	1.000	Fall	0.944	Spring	SWP
3/31/2019 15:00	112	Non-winter	1.000	Fall	0.935	Spring	SWP
4/2/2019 11:00	84	Non-winter	1.000	Fall	0.992	Spring	SWP

4/2/2019 11:30	51	Non-winter	1.000	Fall	0.984	Fall	CVP
4/2/2019 11:30	63	Non-winter	1.000	Fall	0.962	Fall	CVP
4/2/2019 11:59	57	Non-winter	1.000	Fall	0.993	Fall	CVP
4/3/2019 10:00	53	Non-winter	1.000	Fall	0.990	Fall	CVP
4/3/2019 11:00	73	Non-winter	1.000	Fall	0.849	Fall	SWP
4/4/2019 7:00	214	Non-winter	1.000	Fall	0.991	Winter	SWP
4/4/2019 7:50	180	Non-winter	1.000	Fall	0.993	Winter	SWP
4/4/2019 9:00	133	Winter	1.000	Winter	1.000	Winter	SWP
4/4/2019 9:00	117	Non-winter	1.000	Fall	0.619	Spring	SWP
4/4/2019 14:00	109	Winter	1.000	Winter	1.000	Spring	SWP
4/5/2019 6:00	95	Non-winter	1.000	Fall	0.905	Spring	CVP
4/6/2019 7:00	77	Non-winter	1.000	Fall	1.000	Spring	SWP
4/6/2019 7:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
4/6/2019 15:00	83	Non-winter	1.000	Fall	0.999	Spring	SWP
4/6/2019 17:50	88	Non-winter	1.000	Fall	1.000	Spring	SWP
4/6/2019 17:50	77	Non-winter	1.000	Fall	0.998	Spring	SWP
4/6/2019 17:50	96	Non-winter	1.000	Fall	1.000	Spring	SWP
4/6/2019 17:50	67	Non-winter	1.000	Fall	1.000	Fall	SWP
4/6/2019 17:50	87	Non-winter	1.000	Fall	0.999	Spring	SWP
4/7/2019 4:00	65	Non-winter	1.000	Fall	0.987	Fall	CVP
4/7/2019 11:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
4/9/2019 7:00	121	Non-winter	1.000	Fall	0.990	Spring	SWP
4/9/2019 8:00	75	Non-winter	1.000	Fall	1.000	Fall	CVP
4/9/2019 10:00	87	Non-winter	1.000	Fall	0.986	Spring	CVP
4/10/2019 8:00	93	Non-winter	1.000	Fall	1.000	Spring	CVP
4/10/2019 8:00	91	Non-winter	1.000	Fall	1.000	Spring	CVP
4/10/2019 8:00	83	Non-winter	1.000	Fall	1.000	Spring	CVP
4/10/2019 10:00	90	Non-winter	1.000	Fall	0.999	Spring	CVP
4/11/2019 5:00	86	Non-winter	1.000	Fall	0.998	Spring	SWP
4/11/2019 7:00	90	Non-winter	1.000	Fall	1.000	Spring	SWP
4/11/2019 8:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
4/11/2019 8:45	100	Non-winter	1.000	Fall	1.000	Spring	SWP
4/12/2019 8:00	82	Non-winter	1.000	Fall	1.000	Spring	CVP
4/13/2019 16:45	81	Non-winter	1.000	Fall	1.000	Spring	SWP
4/13/2019 16:45	89	Non-winter	1.000	Fall	1.000	Spring	SWP
4/14/2019 15:00	115	Non-winter	1.000	Fall	0.999	Spring	SWP
4/15/2019 17:15	88	Non-winter	1.000	Fall	0.994	Spring	SWP
4/15/2019 17:15	102	Non-winter	1.000	Fall	1.000	Spring	SWP
4/15/2019 17:15	88	Non-winter	1.000	Fall	1.000	Spring	SWP
4/15/2019 17:15	81	Non-winter	1.000	Fall	1.000	Spring	SWP
4/15/2019 17:15	92	Non-winter	1.000	Fall	0.993	Spring	SWP
4/15/2019 17:15	108	Non-winter	1.000	Fall	0.995	Spring	SWP
4/15/2019 17:15	97	Non-winter	1.000	Fall	1.000	Spring	SWP
4/15/2019 17:15	92	Non-winter	1.000	Fall	1.000	Spring	SWP
4/16/2019 9:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
4/16/2019 14:00	75	Non-winter	1.000	Fall	1.000	Fall	CVP
4/16/2019 17:00	100	Non-winter	1.000	Fall	0.998	Spring	SWP

4/16/2019 17:40	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/16/2019 17:40	93	Non-winter	1.000	Fall	1.000	Spring	SWP
4/17/2019 7:15	85	Non-winter	1.000	Fall	1.000	Spring	SWP
4/17/2019 14:00	106	Non-winter	1.000	Fall	0.999	Spring	CVP
4/17/2019 14:00	73	Non-winter	1.000	Fall	0.971	Fall	CVP
4/18/2019 8:00	93	Non-winter	1.000	Fall	1.000	Spring	CVP
4/18/2019 8:00	92	Non-winter	1.000	Fall	1.000	Spring	CVP
4/18/2019 10:00	57	Non-winter	1.000	Fall	1.000	Fall	CVP
4/18/2019 10:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
4/19/2019 5:00	177	Non-winter	1.000	Fall	1.000	Winter	SWP
4/19/2019 18:00	62	Non-winter	1.000	Fall	0.994	Fall	CVP
4/20/2019 17:00	223	Non-winter	1.000	Fall	1.000	Winter	SWP
4/20/2019 17:00	85	Non-winter	1.000	Fall	1.000	Spring	SWP
4/20/2019 17:00	116	Non-winter	1.000	Fall	1.000	Spring	SWP
4/20/2019 17:30	86	Non-winter	1.000	Fall	1.000	Spring	SWP
4/20/2019 18:00	98	Non-winter	1.000	Fall	1.000	Spring	CVP
4/21/2019 15:00	91	Non-winter	1.000	Fall	0.999	Spring	SWP
4/21/2019 16:00	96	Non-winter	1.000	Fall	0.998	Spring	SWP
4/21/2019 16:30	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 8:00	89	Non-winter	1.000	Fall	1.000	Spring	CVP
4/22/2019 12:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
4/22/2019 12:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	99	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	99	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	86	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	111	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	99	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 12:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 15:00	103	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 15:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 15:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 15:00	109	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 15:00	124	Winter	1.000	Winter	1.000	Spring	SWP
4/22/2019 15:00	97	Non-winter	1.000	Fall	0.998	Spring	SWP
4/22/2019 15:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 15:00	98	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 15:00	115	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 15:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 15:00	90	Non-winter	1.000	Fall	1.000	Spring	SWP

4/22/2019 15:00	85	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 15:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 15:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 15:00	85	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 16:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 16:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 16:00	89	Non-winter	1.000	Fall	1.000	Spring	SWP
4/22/2019 16:00	95	Non-winter	1.000	Fall	0.999	Spring	SWP
4/22/2019 16:40	95	Non-winter	1.000	Fall	1.000	Spring	SWP
4/23/2019 8:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
4/23/2019 8:00	76	Non-winter	1.000	Fall	1.000	Fall	CVP
4/23/2019 10:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP
4/23/2019 10:00	95	Non-winter	1.000	Fall	1.000	Spring	CVP
4/23/2019 10:00	78	Non-winter	1.000	Fall	1.000	Fall	CVP
4/23/2019 12:00	85	Non-winter	1.000	Fall	1.000	Spring	CVP
4/23/2019 12:00	93	Non-winter	1.000	Fall	1.000	Spring	CVP
4/23/2019 12:00	87	Non-winter	1.000	Fall	1.000	Spring	CVP
4/23/2019 12:00	83	Non-winter	1.000	Fall	0.999	Fall	CVP
4/23/2019 16:45	92	Non-winter	1.000	Fall	1.000	Spring	SWP
4/24/2019 6:00	92	Non-winter	1.000	Fall	1.000	Spring	CVP
4/24/2019 6:00	91	Non-winter	1.000	Fall	1.000	Spring	CVP
4/24/2019 8:00	90	Non-winter	1.000	Fall	1.000	Spring	CVP
4/24/2019 8:00	89	Non-winter	1.000	Fall	1.000	Spring	CVP
4/24/2019 10:00	85	Non-winter	1.000	Fall	1.000	Spring	CVP
4/24/2019 10:00	98	Non-winter	1.000	Fall	1.000	Spring	CVP
4/25/2019 8:00	78	Non-winter	1.000	Fall	1.000	Fall	CVP
4/25/2019 8:00	96	Non-winter	1.000	Fall	1.000	Spring	CVP
4/25/2019 8:00	92	Non-winter	1.000	Fall	1.000	Spring	CVP
4/25/2019 8:00	92	Non-winter	1.000	Fall	1.000	Spring	CVP
4/25/2019 8:00	88	Non-winter	1.000	Fall	1.000	Spring	CVP
4/25/2019 10:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
4/25/2019 10:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
4/25/2019 10:00	89	Non-winter	1.000	Fall	1.000	Spring	CVP
4/25/2019 10:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
4/25/2019 16:00	88	Non-winter	1.000	Fall	1.000	Spring	CVP
4/25/2019 16:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
4/25/2019 16:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
4/25/2019 18:00	94	Non-winter	1.000	Fall	1.000	Spring	CVP
4/25/2019 18:00	94	Non-winter	1.000	Fall	1.000	Spring	CVP
4/25/2019 20:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
4/26/2019 4:00	91	Non-winter	1.000	Fall	1.000	Spring	CVP
4/26/2019 6:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
4/26/2019 6:00	90	Non-winter	1.000	Fall	1.000	Spring	CVP
4/26/2019 6:00	111	Non-winter	1.000	Fall	1.000	Spring	CVP
4/26/2019 8:00	95	Non-winter	1.000	Fall	1.000	Spring	CVP
4/26/2019 8:00	93	Non-winter	1.000	Fall	1.000	Spring	CVP
4/26/2019 8:00	90	Non-winter	1.000	Fall	1.000	Spring	CVP

4/26/2019 10:00	95	Non-winter	1.000	Fall	1.000	Spring	CVP
4/26/2019 13:00	83	Non-winter	1.000	Fall	1.000	Fall	SWP
4/26/2019 14:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
4/26/2019 15:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 15:00	91	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 15:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 15:00	90	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
4/26/2019 16:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:00	80	Non-winter	1.000	Fall	1.000	Fall	SWP
4/26/2019 16:00	89	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:00	87	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:00	98	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:00	98	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:00	88	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:00	83	Non-winter	1.000	Fall	1.000	Fall	SWP
4/26/2019 16:40	103	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:40	95	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:40	90	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:40	86	Non-winter	1.000	Fall	1.000	Fall	SWP
4/26/2019 16:40	87	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:40	101	Non-winter	1.000	Fall	0.998	Spring	SWP
4/26/2019 16:40	93	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:40	82	Non-winter	1.000	Fall	1.000	Fall	SWP
4/26/2019 16:40	81	Non-winter	1.000	Fall	1.000	Fall	SWP
4/26/2019 16:40	87	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:40	90	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 16:40	92	Non-winter	1.000	Fall	1.000	Spring	SWP
4/26/2019 18:00	87	Non-winter	1.000	Fall	1.000	Spring	CVP
4/26/2019 18:00	91	Non-winter	1.000	Fall	1.000	Spring	CVP
4/26/2019 20:00	85	Non-winter	1.000	Fall	0.998	Fall	CVP
4/27/2019 13:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
4/27/2019 14:00	84	Non-winter	1.000	Fall	1.000	Fall	SWP
4/27/2019 14:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/27/2019 14:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
4/27/2019 14:30	98	Non-winter	1.000	Fall	1.000	Spring	SWP
4/27/2019 14:30	100	Non-winter	1.000	Fall	1.000	Spring	SWP
4/28/2019 10:00	92	Non-winter	1.000	Fall	1.000	Spring	CVP
4/28/2019 10:00	90	Non-winter	1.000	Fall	1.000	Spring	CVP
4/29/2019 9:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 5:00	83	Non-winter	1.000	Fall	1.000	Fall	SWP
4/30/2019 5:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 5:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 5:00	95	Non-winter	1.000	Fall	0.999	Spring	SWP
4/30/2019 5:00	89	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 5:00	98	Non-winter	1.000	Fall	1.000	Spring	SWP

4/30/2019 5:00	108	Non-winter	1.000	Fall	0.994	Spring	SWP
4/30/2019 5:00	77	Non-winter	1.000	Fall	1.000	Fall	SWP
4/30/2019 5:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 7:00	90	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 7:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 8:00	90	Non-winter	1.000	Fall	1.000	Spring	CVP
4/30/2019 8:00	94	Non-winter	1.000	Fall	1.000	Spring	CVP
4/30/2019 11:00	89	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 11:00	90	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 11:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 11:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 11:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	89	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	98	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	85	Non-winter	1.000	Fall	1.000	Fall	SWP
4/30/2019 13:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	80	Non-winter	1.000	Fall	1.000	Fall	SWP
4/30/2019 13:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	106	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 13:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
4/30/2019 13:00	98	Non-winter	1.000	Fall	0.998	Spring	SWP
4/30/2019 13:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 15:00	108	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 15:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 15:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 15:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 15:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 17:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
4/30/2019 17:00	111	Non-winter	1.000	Unassigned	0.503	Spring	SWP
4/30/2019 17:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
4/30/2019 17:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 19:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
4/30/2019 19:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 19:00	89	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 21:00	91	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 21:00	81	Non-winter	1.000	Fall	1.000	Fall	SWP
4/30/2019 21:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 21:00	98	Non-winter	1.000	Fall	1.000	Spring	SWP

4/30/2019 21:00	84	Non-winter	1.000	Fall	1.000	Fall	SWP
4/30/2019 21:00	89	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 21:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
4/30/2019 21:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 21:00	89	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 21:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 21:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 22:20	98	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 22:20	89	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 22:20	101	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 22:20	90	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 22:20	85	Non-winter	1.000	Fall	1.000	Fall	SWP
4/30/2019 22:20	91	Non-winter	1.000	Fall	0.999	Spring	SWP
4/30/2019 22:20	90	Non-winter	1.000	Fall	1.000	Spring	SWP
4/30/2019 22:20	99	Non-winter	1.000	Fall	1.000	Spring	SWP
5/1/2019 4:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/1/2019 4:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/1/2019 6:00	92	Non-winter	1.000	Fall	1.000	Spring	CVP
5/1/2019 6:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/1/2019 22:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/2/2019 4:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/2/2019 22:00	111	Non-winter	1.000	Fall	1.000	Spring	SWP
5/2/2019 22:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/2/2019 22:00	91	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 9:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/3/2019 9:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 9:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 9:00	91	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 9:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/3/2019 9:00	81	Non-winter	1.000	Fall	1.000	Fall	SWP
5/3/2019 11:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 11:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/3/2019 11:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 11:00	103	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 11:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 13:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 14:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 14:00	86	Non-winter	1.000	Fall	0.999	Fall	SWP
5/3/2019 14:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/3/2019 14:00	98	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 14:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 14:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 14:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/3/2019 14:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/3/2019 14:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 14:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 14:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP

5/3/2019 14:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/3/2019 15:10	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 1:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/4/2019 5:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/4/2019 5:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/4/2019 7:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/4/2019 7:00	103	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 7:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/4/2019 7:00	84	Non-winter	1.000	Fall	1.000	Fall	SWP
5/4/2019 7:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 7:00	99	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 7:00	91	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 7:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 7:00	94	Non-winter	1.000	Fall	0.999	Spring	SWP
5/4/2019 7:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 7:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 9:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 9:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/4/2019 9:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/4/2019 9:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 9:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/4/2019 9:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 9:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 9:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/4/2019 9:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 10:50	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 10:50	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 10:50	100	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 10:50	102	Non-winter	1.000	Fall	0.999	Spring	SWP
5/4/2019 10:50	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/4/2019 10:50	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 7:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 7:00	111	Non-winter	1.000	Fall	0.916	Spring	SWP
5/5/2019 7:00	106	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 7:00	105	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 9:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/5/2019 9:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 9:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 9:00	107	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 9:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/5/2019 11:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 11:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 11:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 11:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/5/2019 13:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 13:00	98	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 13:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP

5/5/2019 15:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 16:00	98	Non-winter	1.000	Fall	1.000	Spring	SWP
5/5/2019 16:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/5/2019 16:30	92	Non-winter	1.000	Fall	0.999	Spring	SWP
5/5/2019 16:30	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/5/2019 16:30	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/5/2019 16:30	87	Non-winter	1.000	Fall	0.998	Fall	SWP
5/6/2019 0:00	84	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 0:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 9:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 9:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 9:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 10:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/6/2019 11:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 11:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 11:00	99	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 11:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 11:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 11:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 11:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 11:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 11:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 11:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 11:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 11:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 11:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 11:00	82	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 11:00	98	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 11:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 11:00	108	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 12:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	102	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 12:00	107	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	81	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 12:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	109	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 12:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 12:00	92	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 12:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 12:00	82	Non-winter	1.000	Fall	1.000	Fall	SWP

5/6/2019 12:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	99	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 12:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 12:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 12:00	103	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 13:00	102	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 13:00	98	Non-winter	1.000	Fall	0.999	Spring	SWP
5/6/2019 13:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 13:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 13:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 13:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 13:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 13:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 13:00	103	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 13:00	107	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 13:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 15:00	105	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 15:00	85	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 15:00	116	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 15:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 15:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 15:00	83	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 15:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 15:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 15:00	102	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 15:00	107	Non-winter	1.000	Fall	0.999	Spring	SWP
5/6/2019 15:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 15:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 15:00	112	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 15:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 16:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 16:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 16:00	98	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 16:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 16:00	105	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 16:00	92	Non-winter	1.000	Fall	0.993	Spring	SWP
5/6/2019 16:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 16:00	107	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 16:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 16:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 16:00	111	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 16:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 16:00	119	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 16:00	103	Non-winter	1.000	Fall	0.999	Spring	SWP
5/6/2019 16:00	85	Non-winter	1.000	Fall	1.000	Fall	SWP

5/6/2019 16:00	109	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 16:00	98	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 17:00	99	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 17:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 17:00	102	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 17:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 17:00	85	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 17:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 17:00	99	Non-winter	1.000	Fall	1.000	Spring	SWP
5/6/2019 17:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 17:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 17:00	85	Non-winter	1.000	Fall	1.000	Fall	SWP
5/6/2019 17:00	105	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 8:00	70	Non-winter	1.000	Fall	1.000	Fall	CVP
5/7/2019 9:00	91	Non-winter	1.000	Fall	0.999	Fall	SWP
5/7/2019 9:00	103	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 9:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 9:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 9:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 10:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/7/2019 10:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/7/2019 10:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/7/2019 10:00	97	Non-winter	1.000	Fall	1.000	Spring	CVP
5/7/2019 11:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 11:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 11:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 11:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 11:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 11:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 11:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 11:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 11:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 11:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 11:00	85	Non-winter	1.000	Fall	0.999	Fall	SWP
5/7/2019 11:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 13:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 13:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 13:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 13:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 15:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 15:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 15:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 15:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 15:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 15:00	93	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 15:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 15:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP

5/7/2019 15:00	93	Non-winter	1.000	Fall	0.999	Spring	SWP
5/7/2019 16:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/7/2019 16:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 16:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 16:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 16:30	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 16:30	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 16:30	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 16:30	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 16:30	99	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 16:30	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 16:30	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 16:30	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/7/2019 16:30	88	Non-winter	1.000	Fall	0.999	Fall	SWP
5/7/2019 16:30	102	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 16:30	102	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 16:30	97	Non-winter	1.000	Fall	1.000	Spring	SWP
5/7/2019 16:30	99	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 4:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 8:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 8:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 8:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 8:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 8:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 8:00	98	Non-winter	1.000	Fall	1.000	Spring	CVP
5/8/2019 8:00	95	Non-winter	1.000	Fall	0.999	Spring	CVP
5/8/2019 8:00	97	Non-winter	1.000	Fall	1.000	Spring	CVP
5/8/2019 9:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 9:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 9:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/8/2019 10:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 10:00	94	Non-winter	1.000	Fall	1.000	Spring	CVP
5/8/2019 10:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 10:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 10:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 10:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 10:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 10:00	101	Non-winter	1.000	Fall	1.000	Spring	CVP
5/8/2019 10:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP
5/8/2019 10:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 10:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 10:00	96	Non-winter	1.000	Fall	1.000	Spring	CVP
5/8/2019 10:00	94	Non-winter	1.000	Fall	1.000	Spring	CVP
5/8/2019 10:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 10:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 10:00	98	Non-winter	1.000	Fall	1.000	Spring	CVP
5/8/2019 10:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP

5/8/2019 10:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 11:00	85	Non-winter	1.000	Fall	1.000	Fall	SWP
5/8/2019 11:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/8/2019 11:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 11:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 11:00	105	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 11:00	112	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 11:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/8/2019 11:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/8/2019 11:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/8/2019 11:00	90	Non-winter	1.000	Fall	0.999	Fall	SWP
5/8/2019 11:00	97	Non-winter	1.000	Fall	0.999	Spring	SWP
5/8/2019 11:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 11:00	99	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 11:00	103	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 13:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 13:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 15:00	88	Non-winter	1.000	Fall	0.999	Fall	SWP
5/8/2019 15:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 15:00	83	Non-winter	1.000	Fall	1.000	Fall	SWP
5/8/2019 16:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP
5/8/2019 16:00	94	Non-winter	1.000	Fall	1.000	Spring	CVP
5/8/2019 16:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 16:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 16:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/8/2019 16:00	96	Non-winter	1.000	Fall	1.000	Spring	CVP
5/8/2019 16:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 16:00	105	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 16:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 16:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 16:00	105	Non-winter	1.000	Fall	1.000	Spring	SWP
5/8/2019 16:30	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/8/2019 16:30	92	Non-winter	1.000	Fall	0.999	Fall	SWP
5/8/2019 18:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/9/2019 4:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/9/2019 6:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/9/2019 6:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/9/2019 8:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/9/2019 8:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/9/2019 11:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/9/2019 11:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/9/2019 13:00	100	Non-winter	1.000	Fall	1.000	Spring	SWP
5/9/2019 13:00	105	Non-winter	1.000	Fall	0.999	Spring	SWP
5/9/2019 13:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/9/2019 14:00	95	Non-winter	1.000	Fall	1.000	Spring	CVP
5/9/2019 14:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/9/2019 14:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP

5/9/2019 14:00	85	Non-winter	1.000	Fall	1.000	Fall	SWP
5/9/2019 14:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
5/9/2019 14:00	94	Non-winter	1.000	Fall	1.000	Spring	SWP
5/9/2019 15:00	128	Non-winter	1.000	Fall	1.000	Spring	SWP
5/9/2019 15:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
5/9/2019 15:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/9/2019 15:00	99	Non-winter	1.000	Fall	1.000	Spring	SWP
5/9/2019 16:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/9/2019 20:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/10/2019 3:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/10/2019 7:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/10/2019 7:00	93	Non-winter	1.000	Fall	1.000	Fall	SWP
5/10/2019 8:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/10/2019 8:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/10/2019 8:00	110	Non-winter	1.000	Fall	1.000	Spring	CVP
5/10/2019 9:00	106	Non-winter	1.000	Fall	1.000	Spring	SWP
5/10/2019 9:00	102	Non-winter	1.000	Fall	1.000	Spring	SWP
5/10/2019 10:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/10/2019 10:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/10/2019 10:00	98	Non-winter	1.000	Fall	1.000	Spring	CVP
5/10/2019 13:00	105	Non-winter	1.000	Fall	1.000	Spring	SWP
5/10/2019 13:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/10/2019 15:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/10/2019 15:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/10/2019 15:00	85	Non-winter	1.000	Fall	1.000	Fall	SWP
5/10/2019 16:00	95	Non-winter	1.000	Fall	1.000	Spring	CVP
5/10/2019 16:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/10/2019 16:25	98	Non-winter	1.000	Fall	1.000	Spring	SWP
5/10/2019 16:25	102	Non-winter	1.000	Fall	1.000	Spring	SWP
5/10/2019 18:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/10/2019 18:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/10/2019 20:00	92	Non-winter	1.000	Fall	0.999	Fall	CVP
5/11/2019 11:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/11/2019 11:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/11/2019 11:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/11/2019 13:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/11/2019 13:00	95	Non-winter	1.000	Fall	1.000	Spring	SWP
5/11/2019 13:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP
5/11/2019 13:00	82	Non-winter	1.000	Fall	1.000	Fall	SWP
5/11/2019 15:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
5/11/2019 15:00	109	Non-winter	1.000	Fall	0.992	Spring	SWP
5/11/2019 15:00	91	Non-winter	1.000	Fall	0.999	Fall	SWP
5/11/2019 16:00	104	Non-winter	1.000	Fall	1.000	Spring	CVP
5/11/2019 18:30	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/11/2019 18:30	103	Non-winter	1.000	Fall	0.993	Spring	SWP
5/11/2019 18:30	99	Non-winter	1.000	Fall	1.000	Spring	SWP
5/12/2019 7:00	96	Non-winter	1.000	Fall	1.000	Spring	SWP

5/12/2019 7:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/12/2019 15:00	102	Non-winter	1.000	Fall	1.000	Spring	SWP
5/12/2019 18:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/12/2019 18:00	97	Non-winter	1.000	Fall	1.000	Spring	SWP
5/12/2019 22:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/12/2019 22:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 8:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 8:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 8:00	89	Non-winter	1.000	Fall	0.998	Fall	CVP
5/13/2019 12:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 12:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 12:00	101	Non-winter	1.000	Fall	1.000	Spring	CVP
5/13/2019 12:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 12:00	98	Non-winter	1.000	Fall	1.000	Spring	CVP
5/13/2019 12:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 12:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 12:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 14:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 14:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 14:00	75	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 14:00	98	Non-winter	1.000	Fall	1.000	Spring	CVP
5/13/2019 14:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 14:00	108	Non-winter	1.000	Fall	1.000	Spring	CVP
5/13/2019 14:00	95	Non-winter	1.000	Fall	0.999	Fall	CVP
5/13/2019 14:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 14:00	102	Non-winter	1.000	Fall	1.000	Spring	CVP
5/13/2019 14:00	99	Non-winter	1.000	Fall	1.000	Spring	CVP
5/13/2019 14:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 14:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 14:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP
5/13/2019 14:00	101	Non-winter	1.000	Fall	1.000	Spring	CVP
5/13/2019 14:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 14:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 16:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 16:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 16:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 18:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 18:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/13/2019 18:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 12:00	96	Non-winter	1.000	Fall	0.997	Fall	CVP
5/14/2019 12:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 12:00	104	Non-winter	1.000	Fall	0.979	Spring	CVP
5/14/2019 12:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 12:00	98	Non-winter	1.000	Fall	1.000	Spring	CVP
5/14/2019 12:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 12:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 14:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP

5/14/2019 14:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 14:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 14:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 14:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 14:00	105	Non-winter	1.000	Fall	1.000	Spring	CVP
5/14/2019 14:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 16:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 20:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 20:00	89	Non-winter	1.000	Fall	0.998	Fall	CVP
5/14/2019 22:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 22:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 22:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 22:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 22:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 22:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 22:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	93	Non-winter	1.000	Fall	0.999	Fall	CVP
5/14/2019 23:59	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	102	Non-winter	1.000	Fall	1.000	Spring	CVP
5/14/2019 23:59	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/14/2019 23:59	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/14/2019 23:59	88	Non-winter	1.000	Fall	0.999	Fall	CVP
5/14/2019 23:59	90	Non-winter	1.000	Fall	0.998	Fall	CVP
5/15/2019 2:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 2:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	102	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 2:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	98	Non-winter	1.000	Fall	0.993	Spring	CVP
5/15/2019 2:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	98	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 2:00	76	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	107	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 2:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP

5/15/2019 2:00	76	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	78	Non-winter	1.000	Fall	0.997	Fall	CVP
5/15/2019 2:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 2:00	98	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 2:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 4:00	105	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 4:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 4:00	91	Non-winter	1.000	Fall	0.999	Fall	CVP
5/15/2019 4:00	106	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 4:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 4:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 4:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 4:00	111	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 4:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 4:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 4:00	93	Non-winter	1.000	Fall	0.999	Fall	CVP
5/15/2019 4:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 4:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 4:00	98	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 4:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 4:00	93	Non-winter	1.000	Fall	0.996	Fall	CVP
5/15/2019 4:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 4:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 4:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 4:00	77	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 4:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	99	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 6:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	104	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 6:00	99	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 6:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	106	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 6:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	89	Non-winter	1.000	Fall	0.999	Fall	CVP
5/15/2019 6:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP

5/15/2019 6:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 6:00	90	Non-winter	1.000	Fall	0.958	Fall	CVP
5/15/2019 6:00	83	Non-winter	1.000	Fall	0.999	Fall	CVP
5/15/2019 8:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 8:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 9:27	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 9:27	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 9:27	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 9:27	74	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 10:00	104	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 10:27	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 10:27	95	Non-winter	1.000	Fall	0.974	Fall	CVP
5/15/2019 10:27	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 10:27	87	Non-winter	1.000	Fall	0.998	Fall	CVP
5/15/2019 10:27	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 10:27	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 10:57	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 10:57	77	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 10:57	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 12:00	99	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 14:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 14:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 14:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 14:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 14:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 14:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 14:00	86	Non-winter	1.000	Fall	0.999	Fall	CVP
5/15/2019 14:00	91	Non-winter	1.000	Fall	0.999	Fall	CVP
5/15/2019 14:00	98	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 16:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 16:00	90	Non-winter	1.000	Fall	0.999	Fall	CVP
5/15/2019 20:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 20:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 20:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 20:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 22:00	104	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 22:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 22:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 22:00	107	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 22:00	102	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 22:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 22:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP

5/15/2019 22:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 22:00	93	Non-winter	1.000	Fall	0.999	Fall	CVP
5/15/2019 22:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 22:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 22:00	103	Non-winter	1.000	Fall	0.998	Spring	CVP
5/15/2019 22:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 22:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 22:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 22:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 22:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 22:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	98	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 23:59	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	100	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 23:59	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	99	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 23:59	106	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 23:59	99	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 23:59	101	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 23:59	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/15/2019 23:59	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/15/2019 23:59	101	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 2:00	103	Non-winter	1.000	Fall	0.998	Spring	CVP
5/16/2019 2:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP

5/16/2019 2:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	101	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 2:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 2:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	79	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 2:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 4:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 4:00	99	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 4:00	98	Non-winter	1.000	Fall	0.999	Fall	CVP
5/16/2019 4:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 4:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 4:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 4:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 4:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 4:00	75	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 4:00	88	Non-winter	1.000	Fall	0.999	Fall	CVP
5/16/2019 4:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 4:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 4:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 4:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 4:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 6:00	98	Non-winter	1.000	Fall	0.997	Fall	CVP
5/16/2019 6:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 6:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 6:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 6:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 6:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 6:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 6:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 6:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 6:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 6:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 6:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 6:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 8:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 10:00	92	Non-winter	1.000	Fall	0.998	Fall	CVP
5/16/2019 10:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP

5/16/2019 10:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 10:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 10:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 10:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 12:00	74	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 12:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 12:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 12:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 12:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 12:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 12:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 12:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 14:00	113	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 14:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 14:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 14:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 14:00	108	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 14:00	104	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 14:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 14:00	100	Non-winter	1.000	Fall	0.999	Spring	CVP
5/16/2019 14:00	100	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 14:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 16:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 16:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 16:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 16:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 16:00	78	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 18:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 18:00	104	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 18:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 18:00	112	Non-winter	1.000	Fall	1.000	Spring	CVP
5/16/2019 20:00	84	Non-winter	1.000	Fall	0.999	Fall	CVP
5/16/2019 20:00	86	Non-winter	1.000	Fall	0.999	Fall	CVP
5/16/2019 20:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 22:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 22:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/16/2019 22:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 10:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/17/2019 10:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 10:00	105	Non-winter	1.000	Fall	1.000	Spring	CVP
5/17/2019 10:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 10:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 10:00	117	Non-winter	1.000	Fall	1.000	Spring	CVP
5/17/2019 10:00	102	Non-winter	1.000	Fall	1.000	Spring	CVP
5/17/2019 12:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 12:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 12:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP

5/17/2019 14:00	87	Non-winter	1.000	Fall	0.997	Fall	CVP
5/17/2019 14:00	90	Non-winter	1.000	Fall	0.999	Fall	CVP
5/17/2019 14:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 14:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 16:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 16:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 16:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 16:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 16:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 18:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 18:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 18:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 22:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 22:00	115	Non-winter	1.000	Fall	1.000	Spring	CVP
5/17/2019 22:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/17/2019 22:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/18/2019 10:00	95	Non-winter	1.000	Fall	0.999	Fall	CVP
5/18/2019 10:00	101	Non-winter	1.000	Fall	1.000	Spring	CVP
5/18/2019 10:00	102	Non-winter	1.000	Fall	1.000	Spring	CVP
5/18/2019 10:00	104	Non-winter	1.000	Fall	0.999	Spring	CVP
5/19/2019 2:00	109	Non-winter	1.000	Fall	0.879	Spring	CVP
5/19/2019 4:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/19/2019 4:00	107	Non-winter	1.000	Fall	1.000	Spring	CVP
5/19/2019 9:00	105	Non-winter	1.000	Fall	0.999	Spring	SWP
5/19/2019 9:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/19/2019 13:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/19/2019 13:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/19/2019 13:00	97	Non-winter	1.000	Fall	0.993	Fall	SWP
5/19/2019 13:00	111	Non-winter	1.000	Fall	1.000	Spring	SWP
5/19/2019 17:00	93	Non-winter	1.000	Fall	1.000	Fall	SWP
5/19/2019 18:30	84	Non-winter	1.000	Fall	1.000	Fall	SWP
5/19/2019 18:30	103	Non-winter	1.000	Fall	1.000	Spring	SWP
5/19/2019 18:30	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/19/2019 18:30	109	Non-winter	1.000	Fall	0.999	Spring	SWP
5/19/2019 18:30	96	Non-winter	1.000	Fall	1.000	Fall	SWP
5/19/2019 18:30	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/19/2019 18:45	82	Non-winter	1.000	Fall	1.000	Fall	SWP
5/19/2019 18:45	92	Non-winter	1.000	Fall	0.999	Fall	SWP
5/19/2019 22:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/19/2019 22:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/19/2019 22:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/19/2019 22:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/19/2019 22:00	89	Non-winter	1.000	Fall	0.999	Fall	CVP
5/20/2019 12:00	85	Non-winter	1.000	Fall	0.999	Fall	CVP
5/20/2019 12:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/20/2019 12:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/20/2019 20:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP

5/20/2019 20:00	102	Non-winter	1.000	Fall	1.000	Spring	CVP
5/20/2019 20:00	89	Non-winter	1.000	Fall	0.999	Fall	CVP
5/20/2019 22:00	105	Non-winter	1.000	Fall	1.000	Spring	CVP
5/20/2019 22:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/20/2019 22:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/20/2019 11:45	83	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 11:45	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 11:45	115	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 11:45	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 11:45	93	Non-winter	1.000	Fall	0.997	Fall	SWP
5/20/2019 11:45	110	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 11:45	96	Non-winter	1.000	Fall	0.991	Fall	SWP
5/20/2019 11:45	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 11:45	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 11:45	100	Non-winter	1.000	Fall	0.999	Fall	SWP
5/20/2019 11:45	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 11:45	111	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 11:45	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 23:59	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 23:59	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 10:25	89	Non-winter	1.000	Fall	0.999	Fall	SWP
5/20/2019 10:50	113	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 10:50	100	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 10:50	107	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 10:50	114	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 10:50	98	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 10:50	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 10:50	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 10:50	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 10:50	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 10:50	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 10:50	113	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 10:50	106	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 10:50	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 10:50	94	Non-winter	1.000	Fall	0.999	Fall	SWP
5/20/2019 10:50	116	Non-winter	1.000	Fall	0.999	Spring	SWP
5/20/2019 10:50	98	Non-winter	1.000	Fall	0.995	Fall	SWP
5/20/2019 10:50	113	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 21:00	105	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 21:00	107	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 21:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 23:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 23:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 2:00	106	Non-winter	1.000	Fall	1.000	Spring	CVP
5/20/2019 2:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/20/2019 2:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/20/2019 2:00	81	Non-winter	1.000	Fall	0.999	Fall	CVP

5/20/2019 4:00	104	Non-winter	1.000	Fall	1.000	Spring	CVP
5/20/2019 4:00	102	Non-winter	1.000	Fall	0.987	Spring	CVP
5/20/2019 7:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 7:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 7:00	103	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 7:00	100	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 7:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 7:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 7:00	98	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 7:00	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 8:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/20/2019 8:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/20/2019 10:00	100	Non-winter	1.000	Fall	1.000	Fall	SWP
5/20/2019 10:00	103	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 10:00	101	Non-winter	1.000	Fall	1.000	Spring	SWP
5/20/2019 22:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 2:00	97	Non-winter	1.000	Fall	0.999	Fall	CVP
5/21/2019 2:00	105	Non-winter	1.000	Fall	0.993	Spring	CVP
5/21/2019 2:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 2:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 2:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 4:00	108	Non-winter	1.000	Fall	1.000	Spring	CVP
5/21/2019 4:00	106	Non-winter	1.000	Fall	1.000	Spring	CVP
5/21/2019 4:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 9:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 9:30	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 10:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 10:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 10:00	86	Non-winter	1.000	Fall	0.999	Fall	CVP
5/21/2019 10:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 10:00	92	Non-winter	1.000	Fall	0.998	Fall	CVP
5/21/2019 10:00	110	Non-winter	1.000	Fall	0.998	Spring	CVP
5/21/2019 10:00	104	Non-winter	1.000	Fall	1.000	Spring	CVP
5/21/2019 10:00	107	Non-winter	1.000	Fall	1.000	Spring	CVP
5/21/2019 10:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 10:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 10:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 10:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/21/2019 10:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 10:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 10:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 10:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 10:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 16:00	105	Non-winter	1.000	Fall	1.000	Spring	CVP
5/21/2019 16:00	102	Non-winter	1.000	Fall	1.000	Spring	CVP
5/21/2019 16:00	97	Non-winter	1.000	Fall	0.997	Fall	CVP
5/21/2019 16:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP

5/21/2019 22:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 22:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 23:59	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/21/2019 3:00	112	Non-winter	1.000	Fall	1.000	Spring	SWP
5/21/2019 3:00	83	Non-winter	1.000	Fall	0.999	Fall	SWP
5/21/2019 3:00	96	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 3:00	81	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 4:00	82	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 4:00	85	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 7:50	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 7:50	102	Non-winter	1.000	Fall	0.994	Spring	SWP
5/21/2019 7:50	98	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 7:50	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 7:50	84	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 7:50	101	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 7:50	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 1:00	109	Non-winter	1.000	Fall	1.000	Spring	SWP
5/21/2019 1:00	107	Non-winter	1.000	Fall	1.000	Spring	SWP
5/21/2019 1:00	99	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 1:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 3:00	84	Non-winter	1.000	Fall	0.999	Fall	SWP
5/21/2019 3:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 4:00	101	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 4:00	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	100	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	109	Non-winter	1.000	Fall	1.000	Spring	SWP
5/21/2019 6:55	105	Non-winter	1.000	Fall	1.000	Spring	SWP
5/21/2019 6:55	106	Non-winter	1.000	Fall	1.000	Spring	SWP
5/21/2019 6:55	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	102	Non-winter	1.000	Fall	1.000	Spring	SWP
5/21/2019 6:55	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	96	Non-winter	1.000	Fall	0.997	Fall	SWP
5/21/2019 6:55	93	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	101	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/21/2019 6:55	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 2:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 2:00	107	Non-winter	1.000	Fall	1.000	Spring	CVP
5/22/2019 2:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 4:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP

5/22/2019 4:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 6:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 12:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 12:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 12:00	105	Non-winter	1.000	Fall	0.998	Spring	CVP
5/22/2019 12:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 12:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/22/2019 12:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 12:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 12:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 12:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 12:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 12:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 12:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 12:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 12:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 14:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 22:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 22:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 22:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 22:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 23:59	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 23:59	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 23:59	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 23:59	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/22/2019 23:59	109	Non-winter	1.000	Fall	1.000	Spring	CVP
5/22/2019 7:00	102	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 7:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 10:00	103	Non-winter	1.000	Fall	1.000	Spring	SWP
5/22/2019 10:25	93	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 10:25	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 10:25	103	Non-winter	1.000	Fall	1.000	Spring	SWP
5/22/2019 10:25	96	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 10:25	106	Non-winter	1.000	Fall	1.000	Spring	SWP
5/22/2019 10:25	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 10:25	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 10:25	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 10:25	102	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 10:25	102	Non-winter	1.000	Fall	0.999	Fall	SWP
5/22/2019 10:25	109	Non-winter	1.000	Fall	1.000	Spring	SWP
5/22/2019 10:25	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/22/2019 10:25	102	Non-winter	1.000	Fall	0.998	Fall	SWP
5/22/2019 10:25	82	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 10:25	105	Non-winter	1.000	Fall	1.000	Spring	SWP
5/22/2019 10:25	105	Non-winter	1.000	Fall	1.000	Spring	SWP
5/22/2019 10:25	83	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 10:25	84	Non-winter	1.000	Fall	1.000	Fall	SWP

5/22/2019 10:25	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 10:25	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 10:25	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 7:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/22/2019 7:00	100	Non-winter	1.000	Fall	0.998	Fall	SWP
5/22/2019 7:00	85	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 7:00	114	Non-winter	1.000	Fall	1.000	Spring	SWP
5/22/2019 7:00	101	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 9:00	106	Non-winter	1.000	Fall	1.000	Spring	SWP
5/22/2019 11:20	100	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 11:20	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 11:20	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 11:20	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 11:20	89	Non-winter	1.000	Fall	0.999	Fall	SWP
5/22/2019 11:20	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/22/2019 11:20	98	Non-winter	1.000	Fall	0.997	Fall	SWP
5/22/2019 11:20	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 2:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 2:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 2:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 2:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 2:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 2:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 2:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 2:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 4:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 4:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 4:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 4:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 4:00	117	Non-winter	1.000	Fall	1.000	Spring	CVP
5/23/2019 4:00	109	Non-winter	1.000	Fall	1.000	Spring	CVP
5/23/2019 6:00	108	Non-winter	1.000	Fall	1.000	Spring	CVP
5/23/2019 6:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	86	Non-winter	1.000	Fall	0.999	Fall	CVP
5/23/2019 8:00	88	Non-winter	1.000	Fall	0.998	Fall	CVP
5/23/2019 8:00	78	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	109	Non-winter	1.000	Fall	1.000	Spring	CVP
5/23/2019 8:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/23/2019 8:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP

5/23/2019 8:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 8:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 9:33	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 9:33	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 9:33	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 9:33	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 9:33	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 9:33	76	Non-winter	1.000	Fall	0.996	Fall	CVP
5/23/2019 9:33	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 10:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 10:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 10:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 11:03	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 12:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 12:00	96	Non-winter	1.000	Fall	0.999	Fall	CVP
5/23/2019 12:00	84	Non-winter	1.000	Fall	0.999	Fall	CVP
5/23/2019 12:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 12:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 12:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 12:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 12:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 12:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 14:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 14:00	105	Non-winter	1.000	Fall	1.000	Spring	CVP
5/23/2019 14:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 14:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 14:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 14:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 14:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 14:00	94	Non-winter	1.000	Fall	0.994	Fall	CVP
5/23/2019 14:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 14:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 14:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/23/2019 16:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP

5/23/2019 16:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	102	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 16:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	87	Non-winter	1.000	Fall	0.999	Fall	CVP
5/23/2019 18:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	103	Non-winter	1.000	Fall	1.000	Spring	CVP
5/23/2019 18:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 18:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	92	Non-winter	1.000	Fall	0.930	Fall	CVP
5/23/2019 20:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	94	Non-winter	1.000	Fall	0.999	Fall	CVP
5/23/2019 20:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 20:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 22:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP

5/23/2019 22:00	102	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 22:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 22:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 22:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 22:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 22:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 22:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 22:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 22:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 22:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 22:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 23:59	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 23:59	104	Non-winter	1.000	Fall	1.000	Spring	CVP
5/23/2019 23:59	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 23:59	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 23:59	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 23:59	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 23:59	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 23:59	110	Non-winter	1.000	Fall	1.000	Spring	CVP
5/23/2019 23:59	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 23:59	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/23/2019 1:00	96	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 1:00	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 1:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 1:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 1:00	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 1:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 1:00	101	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 2:00	121	Non-winter	1.000	Fall	1.000	Spring	SWP
5/23/2019 2:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 2:00	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 2:00	103	Non-winter	1.000	Fall	1.000	Spring	SWP
5/23/2019 1:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 1:00	99	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 1:00	97	Non-winter	1.000	Fall	0.998	Fall	SWP
5/23/2019 1:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 1:00	87	Non-winter	1.000	Fall	0.968	Fall	SWP
5/23/2019 1:00	102	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 1:00	93	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 1:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 1:00	82	Non-winter	1.000	Fall	0.999	Fall	SWP
5/23/2019 1:00	104	Non-winter	1.000	Fall	1.000	Spring	SWP
5/23/2019 2:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 2:00	84	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 2:00	93	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 15:00	100	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 15:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP

5/23/2019 16:00	111	Non-winter	1.000	Fall	1.000	Spring	SWP
5/23/2019 16:40	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 2:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 2:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 4:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 5:00	106	Non-winter	1.000	Fall	1.000	Spring	SWP
5/23/2019 5:00	112	Non-winter	1.000	Fall	1.000	Spring	SWP
5/23/2019 5:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/23/2019 7:45	98	Non-winter	1.000	Fall	1.000	Fall	SWP
5/24/2019 2:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 2:00	83	Non-winter	1.000	Fall	0.999	Fall	CVP
5/24/2019 2:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 2:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 2:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 2:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 2:00	110	Non-winter	1.000	Fall	1.000	Spring	CVP
5/24/2019 2:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 2:00	106	Non-winter	1.000	Fall	1.000	Spring	CVP
5/24/2019 4:00	91	Non-winter	1.000	Fall	0.999	Fall	CVP
5/24/2019 4:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 4:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 4:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 4:00	102	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 4:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 4:00	110	Non-winter	1.000	Fall	1.000	Spring	CVP
5/24/2019 6:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 6:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 6:00	85	Non-winter	1.000	Fall	0.983	Fall	CVP
5/24/2019 6:00	77	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 6:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 6:00	105	Non-winter	1.000	Fall	1.000	Spring	CVP
5/24/2019 6:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 6:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	91	Non-winter	1.000	Fall	0.999	Fall	CVP
5/24/2019 8:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	79	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP

5/24/2019 8:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 8:00	78	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 10:00	94	Non-winter	1.000	Fall	0.997	Fall	CVP
5/24/2019 10:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 10:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 10:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 10:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 10:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 10:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 10:00	102	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 10:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 10:00	98	Non-winter	1.000	Fall	0.997	Fall	CVP
5/24/2019 10:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 10:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 10:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 12:00	118	Non-winter	1.000	Fall	1.000	Spring	CVP
5/24/2019 12:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	107	Non-winter	1.000	Fall	1.000	Spring	CVP
5/24/2019 14:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	104	Non-winter	1.000	Fall	1.000	Spring	CVP
5/24/2019 14:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	92	Non-winter	1.000	Fall	0.997	Fall	CVP
5/24/2019 14:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	92	Non-winter	1.000	Fall	0.998	Fall	CVP
5/24/2019 14:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	84	Non-winter	1.000	Fall	0.999	Fall	CVP
5/24/2019 14:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	90	Non-winter	1.000	Fall	0.998	Fall	CVP
5/24/2019 14:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	106	Non-winter	1.000	Fall	1.000	Spring	CVP
5/24/2019 14:00	104	Non-winter	1.000	Fall	1.000	Spring	CVP
5/24/2019 14:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 14:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 16:00	104	Non-winter	1.000	Fall	1.000	Spring	CVP
5/24/2019 16:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 16:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 16:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 16:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 16:00	95	Non-winter	1.000	Fall	0.999	Fall	CVP
5/24/2019 16:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP

5/24/2019 16:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 18:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 18:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 18:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 18:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 18:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 18:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 18:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 20:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 20:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 20:00	91	Non-winter	1.000	Fall	0.999	Fall	CVP
5/24/2019 20:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 20:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 20:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 20:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 22:00	103	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 23:59	115	Non-winter	1.000	Fall	1.000	Spring	CVP
5/24/2019 23:59	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 23:59	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 23:59	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 23:59	98	Non-winter	1.000	Fall	0.999	Fall	CVP
5/24/2019 23:59	111	Non-winter	1.000	Fall	1.000	Spring	CVP
5/24/2019 23:59	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 23:59	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 23:59	93	Non-winter	1.000	Fall	0.996	Fall	CVP
5/24/2019 23:59	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 23:59	103	Non-winter	1.000	Fall	1.000	Fall	CVP
5/24/2019 17:15	113	Non-winter	1.000	Fall	1.000	Spring	SWP
5/24/2019 17:15	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/24/2019 16:50	103	Non-winter	1.000	Fall	1.000	Fall	SWP
5/24/2019 16:50	84	Non-winter	1.000	Fall	1.000	Fall	SWP
5/24/2019 16:50	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/25/2019 2:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 2:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 2:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 2:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 2:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 2:00	103	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 2:00	105	Non-winter	1.000	Fall	1.000	Spring	CVP
5/25/2019 2:00	110	Non-winter	1.000	Fall	1.000	Spring	CVP
5/25/2019 2:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 2:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 4:00	109	Non-winter	1.000	Fall	1.000	Spring	CVP
5/25/2019 4:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 4:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 4:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 4:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP

5/25/2019 4:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 4:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 4:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 4:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 4:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 4:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 4:00	100	Non-winter	1.000	Fall	0.999	Fall	CVP
5/25/2019 10:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 10:00	93	Non-winter	1.000	Fall	0.999	Fall	CVP
5/25/2019 10:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 12:00	105	Non-winter	1.000	Fall	0.999	Spring	CVP
5/25/2019 12:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 12:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 12:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 12:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 14:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 14:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 14:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 14:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 14:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 14:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 14:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 16:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 16:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 16:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 16:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 16:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 16:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 16:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 16:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 16:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 18:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 18:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 18:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 18:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 18:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 18:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 20:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 20:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 20:00	73	Non-winter	1.000	Fall	0.960	Fall	CVP
5/25/2019 22:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 22:00	105	Non-winter	1.000	Fall	1.000	Spring	CVP
5/25/2019 22:00	102	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 22:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/25/2019 22:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 8:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 8:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP

5/26/2019 8:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 8:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 8:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 10:00	107	Non-winter	1.000	Fall	1.000	Spring	CVP
5/26/2019 10:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 12:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 12:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 14:00	110	Non-winter	1.000	Fall	1.000	Spring	CVP
5/26/2019 14:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 14:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 14:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 16:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 16:00	99	Non-winter	1.000	Fall	0.988	Fall	CVP
5/26/2019 16:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 16:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 16:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 16:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 16:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 18:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 18:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 18:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 18:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 20:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 20:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 20:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 22:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 22:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/26/2019 15:00	99	Non-winter	1.000	Fall	1.000	Fall	SWP
5/26/2019 17:00	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/26/2019 17:00	104	Non-winter	1.000	Fall	1.000	Fall	SWP
5/26/2019 16:50	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/26/2019 16:50	101	Non-winter	1.000	Fall	1.000	Fall	SWP
5/27/2019 8:00	89	Non-winter	1.000	Fall	0.981	Fall	CVP
5/27/2019 10:00	105	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 10:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 10:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 10:00	111	Non-winter	1.000	Fall	1.000	Spring	CVP
5/27/2019 10:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 12:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 12:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 12:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 12:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 12:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 12:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 12:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 12:00	90	Non-winter	1.000	Fall	0.997	Fall	CVP
5/27/2019 14:00	108	Non-winter	1.000	Fall	1.000	Spring	CVP

5/27/2019 14:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 14:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 14:00	103	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 14:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 14:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 14:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 14:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 16:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 16:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 16:00	98	Non-winter	1.000	Fall	0.994	Fall	CVP
5/27/2019 16:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 16:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 18:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 18:00	107	Non-winter	1.000	Fall	1.000	Spring	CVP
5/27/2019 18:00	113	Non-winter	1.000	Fall	1.000	Spring	CVP
5/27/2019 20:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 22:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 22:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 22:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 22:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 22:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 22:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
5/27/2019 16:30	105	Non-winter	1.000	Fall	1.000	Fall	SWP
5/27/2019 16:30	109	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 18:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
5/28/2019 18:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
5/28/2019 18:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
5/28/2019 1:00	108	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 1:00	85	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 1:00	104	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 1:00	68	Non-winter	1.000	Fall	0.999	Fall	SWP
5/28/2019 1:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 3:00	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 3:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 3:00	102	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 3:00	104	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 7:00	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 11:00	104	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 13:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 13:00	96	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 13:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 13:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 13:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 13:00	85	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 13:00	104	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 13:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 15:00	81	Non-winter	1.000	Fall	1.000	Fall	SWP

5/28/2019 15:00	93	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	102	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	104	Non-winter	1.000	Fall	0.999	Fall	SWP
5/28/2019 16:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	96	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	83	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	105	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 17:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:40	85	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:40	103	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:40	99	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:40	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:40	103	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:40	109	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 16:40	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:40	111	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 16:40	93	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:40	105	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:40	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:40	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 9:00	96	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 13:00	110	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 15:00	103	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 15:00	93	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 16:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 17:20	87	Non-winter	1.000	Fall	0.999	Fall	SWP
5/28/2019 17:20	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 17:20	91	Non-winter	1.000	Fall	0.999	Fall	SWP
5/28/2019 17:20	117	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 17:20	105	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 17:20	111	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 17:20	96	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 17:20	93	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 17:20	101	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 17:20	97	Non-winter	1.000	Fall	0.999	Fall	SWP
5/28/2019 17:20	108	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 17:20	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 17:20	99	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 17:20	110	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 17:20	104	Non-winter	1.000	Fall	1.000	Fall	SWP

5/28/2019 17:20	108	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 17:20	110	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 17:20	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/28/2019 17:20	111	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 17:20	107	Non-winter	1.000	Fall	1.000	Spring	SWP
5/28/2019 17:20	98	Non-winter	1.000	Fall	0.996	Fall	SWP
5/29/2019 2:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/29/2019 4:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/29/2019 4:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
5/29/2019 8:00	105	Non-winter	1.000	Fall	1.000	Fall	CVP
5/29/2019 20:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
5/29/2019 1:00	94	Non-winter	1.000	Fall	0.999	Fall	SWP
5/29/2019 1:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 1:00	103	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 1:00	99	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 1:00	87	Non-winter	1.000	Fall	0.999	Fall	SWP
5/29/2019 3:00	105	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 1:00	89	Non-winter	1.000	Fall	0.999	Fall	SWP
5/29/2019 1:00	82	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 8:00	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 8:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 11:00	100	Non-winter	1.000	Fall	0.996	Fall	SWP
5/29/2019 11:00	91	Non-winter	1.000	Fall	0.949	Fall	SWP
5/29/2019 15:00	110	Non-winter	1.000	Fall	0.999	Spring	SWP
5/29/2019 15:00	99	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 15:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 15:00	102	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 15:00	98	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 15:00	104	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 15:00	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 19:45	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 19:45	107	Non-winter	1.000	Fall	1.000	Spring	SWP
5/29/2019 19:45	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 19:45	98	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 19:45	101	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 3:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 3:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 15:00	98	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 15:00	100	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 15:00	99	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 15:00	106	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 15:00	99	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 15:00	94	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 19:10	103	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 19:10	110	Non-winter	1.000	Fall	1.000	Spring	SWP
5/29/2019 19:10	102	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 19:10	109	Non-winter	1.000	Fall	1.000	Spring	SWP

5/29/2019 19:10	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 19:10	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 19:10	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/29/2019 19:10	116	Non-winter	1.000	Fall	1.000	Spring	SWP
5/29/2019 19:10	110	Non-winter	1.000	Fall	1.000	Spring	SWP
5/29/2019 19:10	112	Non-winter	1.000	Fall	1.000	Spring	SWP
5/30/2019 4:00	99	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 4:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 4:00	108	Non-winter	1.000	Fall	1.000	Spring	CVP
5/30/2019 6:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 6:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 8:00	94	Non-winter	1.000	Fall	0.998	Fall	CVP
5/30/2019 8:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 10:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 10:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 12:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 12:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 12:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 18:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 18:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 22:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 22:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
5/30/2019 17:00	104	Non-winter	1.000	Fall	1.000	Fall	SWP
5/30/2019 17:00	93	Non-winter	1.000	Fall	1.000	Fall	SWP
5/30/2019 17:00	104	Non-winter	1.000	Fall	0.996	Fall	SWP
5/30/2019 23:59	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/30/2019 17:50	97	Non-winter	1.000	Fall	1.000	Fall	SWP
5/30/2019 17:50	103	Non-winter	1.000	Fall	1.000	Fall	SWP
5/30/2019 17:50	101	Non-winter	1.000	Fall	1.000	Fall	SWP
5/30/2019 17:50	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/30/2019 17:50	112	Non-winter	1.000	Fall	1.000	Spring	SWP
5/30/2019 17:50	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/30/2019 17:50	103	Non-winter	1.000	Fall	1.000	Fall	SWP
5/30/2019 23:00	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 14:00	75	Non-winter	1.000	Fall	1.000	Fall	CVP
5/31/2019 20:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
5/31/2019 11:00	96	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 11:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 11:00	92	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 15:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 16:55	95	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 16:55	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 16:55	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 16:55	107	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 16:55	104	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 16:55	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 15:00	95	Non-winter	1.000	Fall	1.000	Fall	SWP

5/31/2019 15:00	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 15:00	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 17:40	87	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 17:40	93	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 17:40	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 17:40	91	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 17:40	89	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 17:40	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 17:40	79	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 17:40	90	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 17:40	83	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 17:40	86	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 17:40	85	Non-winter	1.000	Fall	1.000	Fall	SWP
5/31/2019 17:40	84	Non-winter	1.000	Fall	1.000	Fall	SWP
6/1/2019 8:00	111	Non-winter	1.000	Fall	1.000	Spring	CVP
6/1/2019 8:00	88	Non-winter	1.000	Fall	0.994	Fall	CVP
6/1/2019 8:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 8:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 8:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 8:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 8:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 8:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 8:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 8:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 8:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 8:00	110	Non-winter	1.000	Fall	1.000	Spring	CVP
6/1/2019 8:00	101	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 8:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 8:00	89	Non-winter	1.000	Fall	0.999	Fall	CVP
6/1/2019 8:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 8:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 12:00	106	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 12:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 12:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 14:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 14:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 14:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 14:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 16:00	81	Non-winter	1.000	Fall	0.993	Fall	CVP
6/1/2019 16:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 16:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 16:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 16:00	105	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 16:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 16:00	106	Non-winter	1.000	Fall	0.993	Fall	CVP
6/1/2019 16:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 16:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP

6/1/2019 16:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 18:00	117	Non-winter	1.000	Fall	0.999	Spring	CVP
6/1/2019 18:00	115	Non-winter	1.000	Fall	1.000	Spring	CVP
6/1/2019 18:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 18:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 20:00	104	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 20:00	104	Non-winter	1.000	Fall	0.992	Fall	CVP
6/1/2019 20:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 20:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
6/1/2019 22:00	116	Non-winter	1.000	Fall	1.000	Spring	CVP
6/1/2019 22:00	109	Non-winter	1.000	Fall	0.998	Fall	CVP
6/1/2019 22:00	102	Non-winter	1.000	Fall	1.000	Fall	CVP
6/2/2019 8:00	104	Non-winter	1.000	Fall	1.000	Fall	CVP
6/2/2019 14:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
6/2/2019 14:00	97	Non-winter	1.000	Fall	0.999	Fall	CVP
6/2/2019 16:00	102	Non-winter	1.000	Fall	1.000	Fall	CVP
6/2/2019 16:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
6/2/2019 16:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
6/2/2019 16:00	108	Non-winter	1.000	Fall	1.000	Fall	CVP
6/2/2019 22:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
6/2/2019 22:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
6/2/2019 17:00	100	Non-winter	1.000	Fall	1.000	Fall	SWP
6/2/2019 17:00	88	Non-winter	1.000	Fall	1.000	Fall	SWP
6/3/2019 8:00	102	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 8:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 10:00	87	Non-winter	1.000	Fall	0.999	Fall	CVP
6/3/2019 10:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 10:00	80	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 12:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 12:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 14:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 16:00	110	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 16:00	103	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 20:00	102	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 20:00	102	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 20:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 20:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 22:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 22:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 22:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 23:59	97	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 23:59	103	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 23:59	106	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 23:59	87	Non-winter	1.000	Fall	1.000	Fall	CVP
6/3/2019 17:00	87	Non-winter	1.000	Fall	1.000	Fall	SWP
6/3/2019 15:00	105	Non-winter	1.000	Fall	0.999	Fall	SWP
6/3/2019 17:00	98	Non-winter	1.000	Fall	1.000	Fall	SWP

6/3/2019 11:00	98	Non-winter	1.000	Fall	0.988	Fall	SWP
6/3/2019 11:00	103	Non-winter	1.000	Fall	0.757	Fall	SWP
6/3/2019 14:00	86	Non-winter	1.000	Fall	0.998	Fall	SWP
6/3/2019 11:00	106	Non-winter	1.000	Fall	0.999	Fall	SWP
6/3/2019 15:00	107	Non-winter	1.000	Fall	1.000	Fall	SWP
6/3/2019 11:00	104	Non-winter	1.000	Fall	0.999	Fall	SWP
6/3/2019 15:00	98	Non-winter	1.000	Fall	0.996	Fall	SWP
6/4/2019 2:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
6/4/2019 4:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
6/4/2019 4:00	105	Non-winter	1.000	Fall	1.000	Fall	CVP
6/4/2019 6:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
6/4/2019 12:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
6/4/2019 14:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
6/4/2019 16:00	114	Non-winter	1.000	Fall	1.000	Spring	CVP
6/4/2019 16:00	100	Non-winter	1.000	Fall	0.999	Fall	CVP
6/4/2019 18:00	92	Non-winter	1.000	Fall	0.983	Fall	CVP
6/4/2019 18:00	103	Non-winter	1.000	Fall	1.000	Fall	CVP
6/4/2019 18:00	86	Non-winter	1.000	Fall	1.000	Fall	CVP
6/4/2019 23:59	104	Non-winter	1.000	Fall	1.000	Fall	CVP
6/4/2019 11:00	91	Non-winter	1.000	Fall	0.980	Fall	SWP
6/4/2019 11:00	102	Non-winter	1.000	Fall	0.996	Fall	SWP
6/4/2019 17:00	109	Non-winter	1.000	Fall	0.997	Fall	SWP
6/5/2019 6:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
6/5/2019 6:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
6/5/2019 10:00	96	Non-winter	1.000	Fall	0.994	Fall	CVP
6/5/2019 10:00	92	Non-winter	1.000	Fall	0.999	Fall	CVP
6/5/2019 10:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
6/5/2019 10:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
6/5/2019 10:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
6/5/2019 10:00	87	Non-winter	1.000	Fall	0.999	Fall	CVP
6/5/2019 14:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 8:00	115	Non-winter	1.000	Fall	1.000	Spring	CVP
6/6/2019 8:00	106	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 8:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 8:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 10:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 10:00	91	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 10:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 10:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 12:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 12:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 16:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 16:00	104	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 20:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 22:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 22:00	92	Non-winter	1.000	Fall	0.998	Fall	CVP
6/6/2019 22:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP

6/6/2019 22:00	124	Non-winter	1.000	Fall	1.000	Spring	CVP
6/6/2019 22:00	89	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 23:59	100	Non-winter	1.000	Fall	0.999	Fall	CVP
6/6/2019 23:59	85	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 23:59	92	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 23:59	94	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 23:59	100	Non-winter	1.000	Fall	1.000	Fall	CVP
6/6/2019 15:00	94	Non-winter	1.000	Fall	0.988	Fall	SWP
6/6/2019 15:00	93	Non-winter	1.000	Fall	0.649	Fall	SWP
6/6/2019 15:00	88	Non-winter	1.000	Fall	0.938	Fall	SWP
6/6/2019 15:00	109	Non-winter	1.000	Fall	0.965	Fall	SWP
6/6/2019 21:00	94	Non-winter	1.000	Fall	0.998	Fall	SWP
6/7/2019 2:00	104	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 4:00	88	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 4:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 4:00	94	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 8:00	98	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 8:00	96	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 8:00	81	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 8:00	100	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 8:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 8:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 8:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 8:00	87	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 8:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 8:00	83	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 23:59	112	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 23:59	82	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 23:59	91	Non-winter	1.000	Fall	1.000	Fall	CVP
6/7/2019 11:00	101	Non-winter	1.000	Fall	1.000	Fall	SWP
6/7/2019 11:00	85	Non-winter	1.000	Fall	0.993	Fall	SWP
6/7/2019 11:00	86	Non-winter	1.000	Fall	0.999	Fall	SWP
6/7/2019 11:00	85	Non-winter	1.000	Fall	0.992	Fall	SWP
6/8/2019 8:00	82	Non-winter	1.000	Fall	1.000	Fall	CVP
6/8/2019 8:00	84	Non-winter	1.000	Fall	0.990	Fall	CVP
6/8/2019 10:00	106	Non-winter	1.000	Fall	1.000	Fall	CVP
6/8/2019 10:00	110	Non-winter	1.000	Fall	1.000	Fall	CVP
6/8/2019 10:00	106	Non-winter	1.000	Fall	1.000	Fall	CVP
6/8/2019 12:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
6/8/2019 12:00	92	Non-winter	1.000	Fall	1.000	Fall	CVP
6/8/2019 16:00	110	Non-winter	1.000	Fall	1.000	Fall	CVP
6/8/2019 22:00	85	Non-winter	1.000	Fall	1.000	Fall	CVP
6/9/2019 8:00	96	Non-winter	1.000	Fall	0.996	Fall	CVP
6/9/2019 8:00	81	Non-winter	1.000	Fall	0.985	Fall	CVP
6/9/2019 16:00	97	Non-winter	1.000	Fall	0.906	Fall	CVP
6/9/2019 16:00	92	Non-winter	1.000	Fall	0.998	Fall	CVP
6/10/2019 10:00	89	Non-winter	1.000	Fall	0.999	Fall	CVP

6/11/2019 22:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
6/11/2019 22:00	93	Non-winter	1.000	Fall	1.000	Fall	CVP
6/11/2019 22:00	90	Non-Winter	1.000	Late Fall	0.808	Fall	CVP
6/13/2019 2:00	89	Non-winter	1.000	Fall	0.996	Fall	CVP
6/13/2019 2:00	100	Non-winter	1.000	Fall	0.998	Fall	CVP
6/13/2019 14:00	95	Non-winter	1.000	Fall	1.000	Fall	CVP
6/13/2019 14:00	97	Non-winter	1.000	Fall	0.998	Fall	CVP
6/13/2019 20:00	95	Non-winter	1.000	Fall	0.603	Fall	CVP
6/13/2019 22:00	113	Non-winter	1.000	Fall	1.000	Fall	CVP
6/13/2019 22:00	105	Non-winter	1.000	Fall	0.998	Fall	CVP
6/14/2019 10:00	95	Non-winter	1.000	Fall	0.999	Fall	CVP
6/14/2019 22:00	105	Non-winter	1.000	Fall	0.998	Fall	CVP
6/15/2019 2:00	107	Non-winter	1.000	Fall	0.999	Fall	CVP
6/15/2019 2:00	111	Non-winter	1.000	Fall	0.999	Fall	CVP
6/15/2019 2:00	97	Non-winter	1.000	Fall	1.000	Fall	CVP
6/15/2019 2:00	90	Non-winter	1.000	Fall	0.678	Fall	CVP
6/15/2019 4:00	110	Non-winter	1.000	Fall	0.957	Fall	CVP
6/15/2019 16:00	105	Non-winter	1.000	Fall	0.972	Fall	CVP
6/16/2019 4:00	96	Non-winter	1.000	Fall	0.998	Fall	CVP
6/16/2019 22:00	89	Non-Winter	1.000	Late Fall	0.719	Fall	CVP
6/21/2019 22:00	84	Non-winter	1.000	Fall	0.943	Fall	CVP
6/21/2019 22:00	103	Non-winter	1.000	Fall	0.999	Fall	CVP
6/21/2019 22:00	92	Non-winter	1.000	Fall	0.765	Fall	CVP
6/21/2019 23:59	95	Non-winter	1.000	Fall	0.998	Fall	CVP
6/22/2019 6:00	90	Non-winter	1.000	Fall	1.000	Fall	CVP
6/22/2019 8:00	99	Non-winter	1.000	Fall	0.962	Fall	CVP
6/22/2019 8:00	84	Non-winter	1.000	Fall	1.000	Fall	CVP
6/23/2019 2:00	122	Non-winter	1.000	Fall	0.999	Fall	CVP
6/23/2019 22:00	98	Non-winter	1.000	Fall	0.999	Fall	CVP
6/24/2019 8:00	97	Non-Winter	1.000	Late Fall	0.532	Fall	CVP
6/25/2019 2:00	128	Non-winter	1.000	Fall	0.849	Fall	CVP
6/26/2019 23:59	103	Non-winter	1.000	Fall	0.993	Fall	CVP
6/28/2019 14:00	87	Non-winter	1.000	Fall	0.983	Fall	CVP
7/22/2019 8:00	92	Non-winter	1.000	Fall	0.868	Fall	CVP
7/22/2019 14:00	90	Non-winter	1.000	Fall	0.975	Fall	CVP

Appendix G – WY 2019 Fish Monitoring Figures from SacPAS

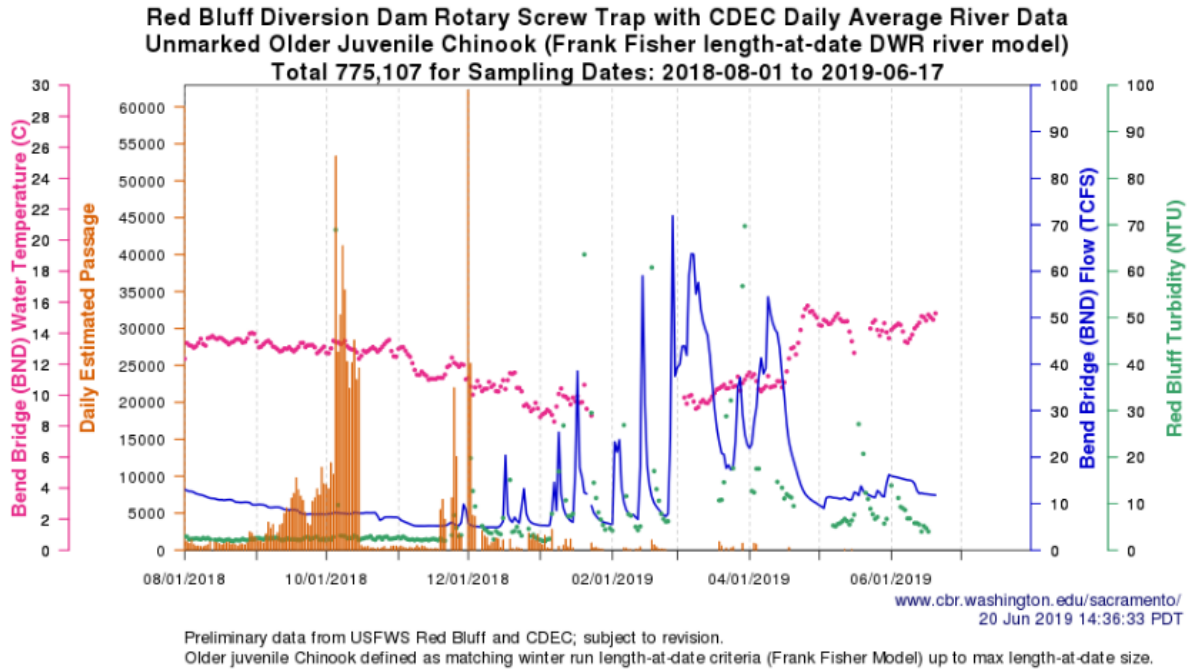


Figure G-1 Daily passage of unmarked older juvenile Chinook (orange bars) captured in rotary screw traps at Red Bluff Diversion Dam compared to water temperature (°C; pink line) and flow (TCFS; blue line) at Bend Bridge and turbidity (NTU; green points) at Red Bluff Diversion Dam.

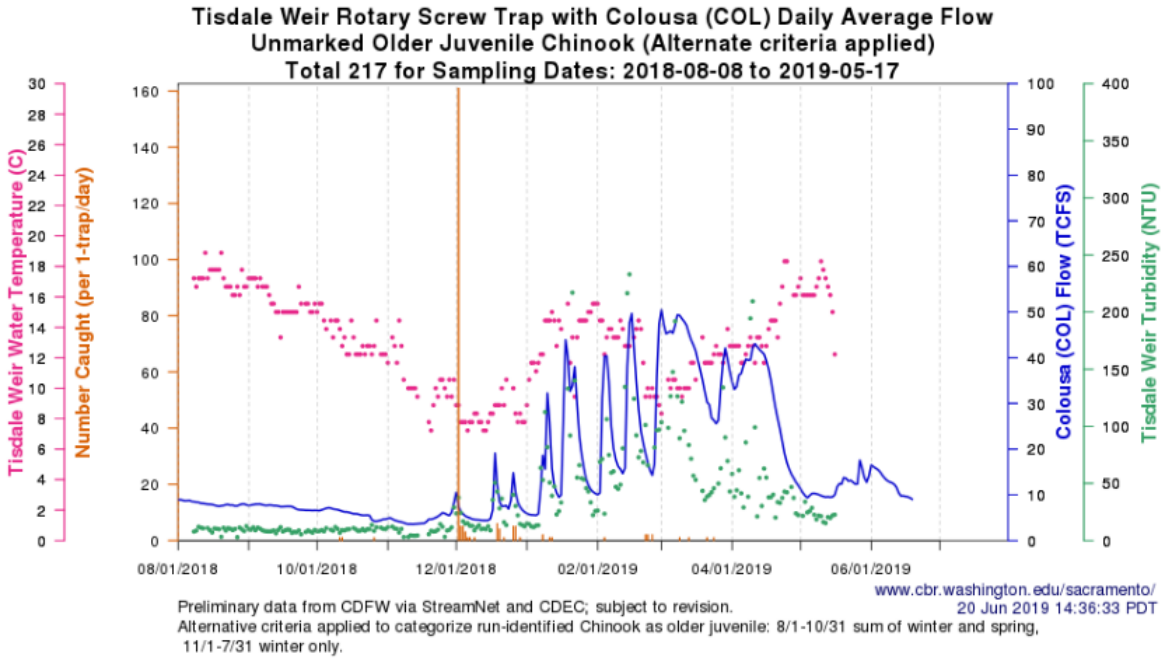


Figure G-2 Daily passage of unmarked older juvenile Chinook (orange bars) captured in rotary screw traps at Tisdale Weir compared to water temperature (°C; pink line) at Tisdale Weir, flow (TCFS; blue line) at Colusa, and turbidity (NTU; green points) at Tisdale Weir.

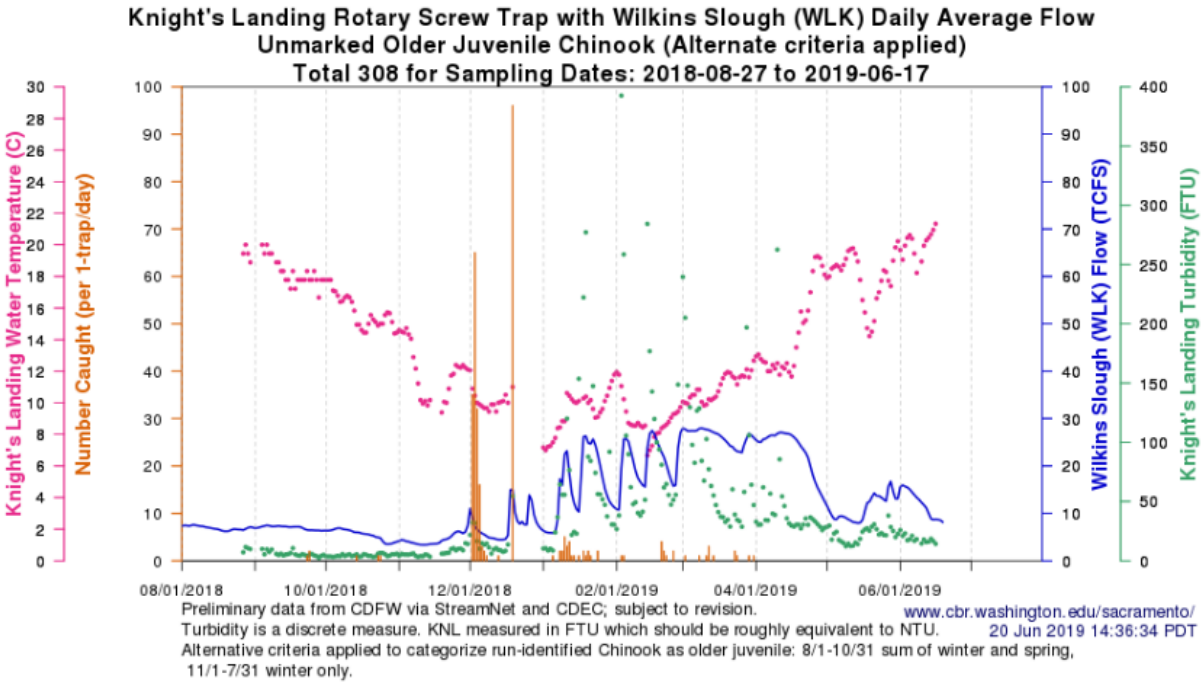


Figure G-3 Daily passage of unmarked older juvenile Chinook (orange bars) captured in rotary screw traps and water temperatures at Knights Landing (°C; pink line), flow (TCFS; blue line) at Wilkins Slough, and turbidity (NTU; green points) at Knights Landing.

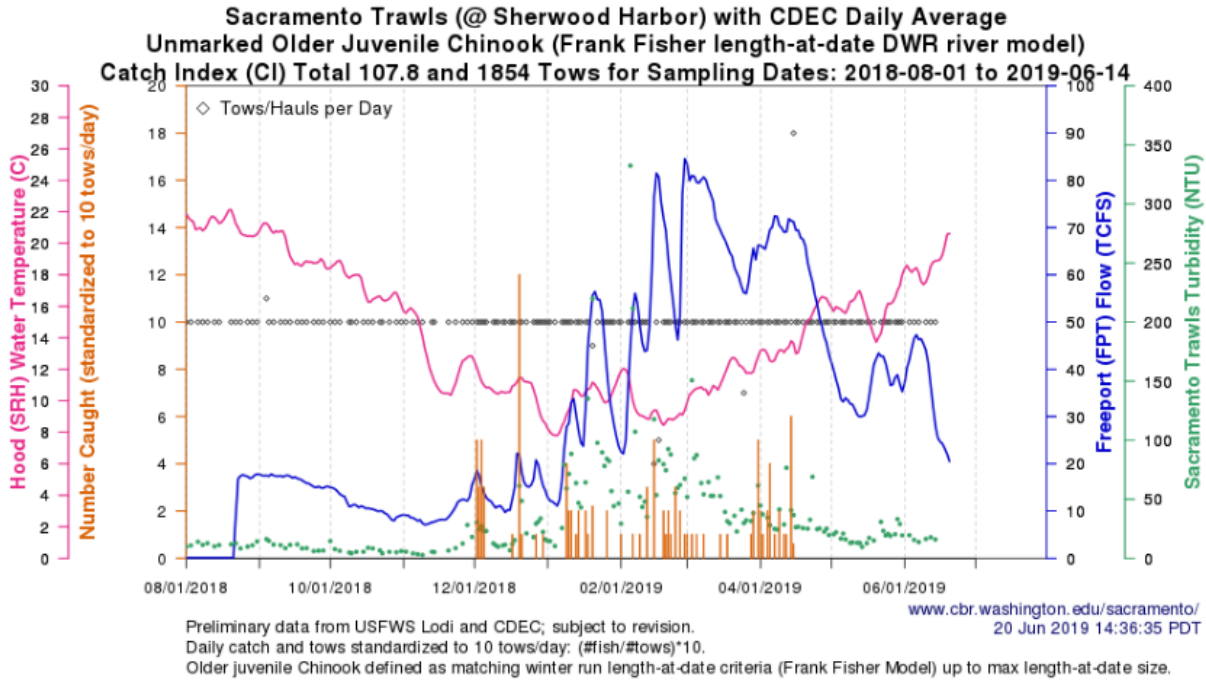


Figure G-4 Daily capture of unmarked older juvenile Chinook (orange bars) with trawls at Sherwood Harbor compared to water temperature (°C; pink line) at Hood, flow (TCFS; blue line) at Freeport, and turbidity (NTU; green points) at Sherwood Harbor.

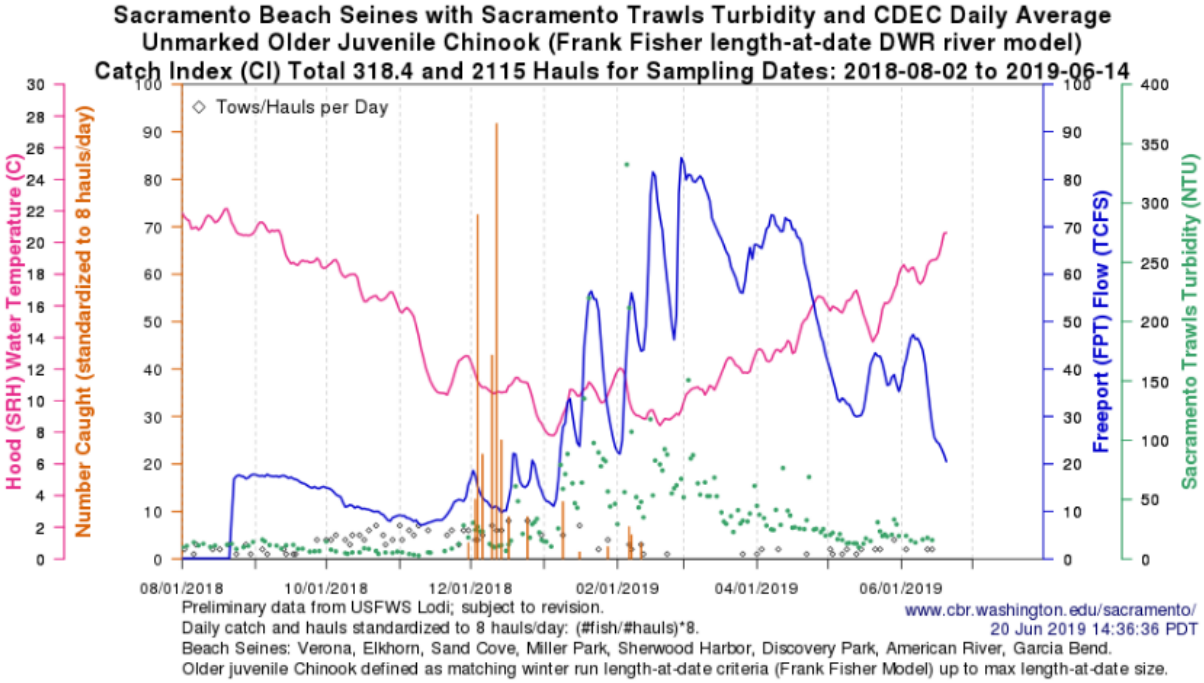


Figure G-5 Daily capture of unmarked older juvenile Chinook (orange bars) with beach seines at Sherwood Harbor compared to water temperature (°C; pink line) at Hood, flow (TCFS; blue line) at Freeport, and turbidity (NTU; green points) at Sherwood Harbor.

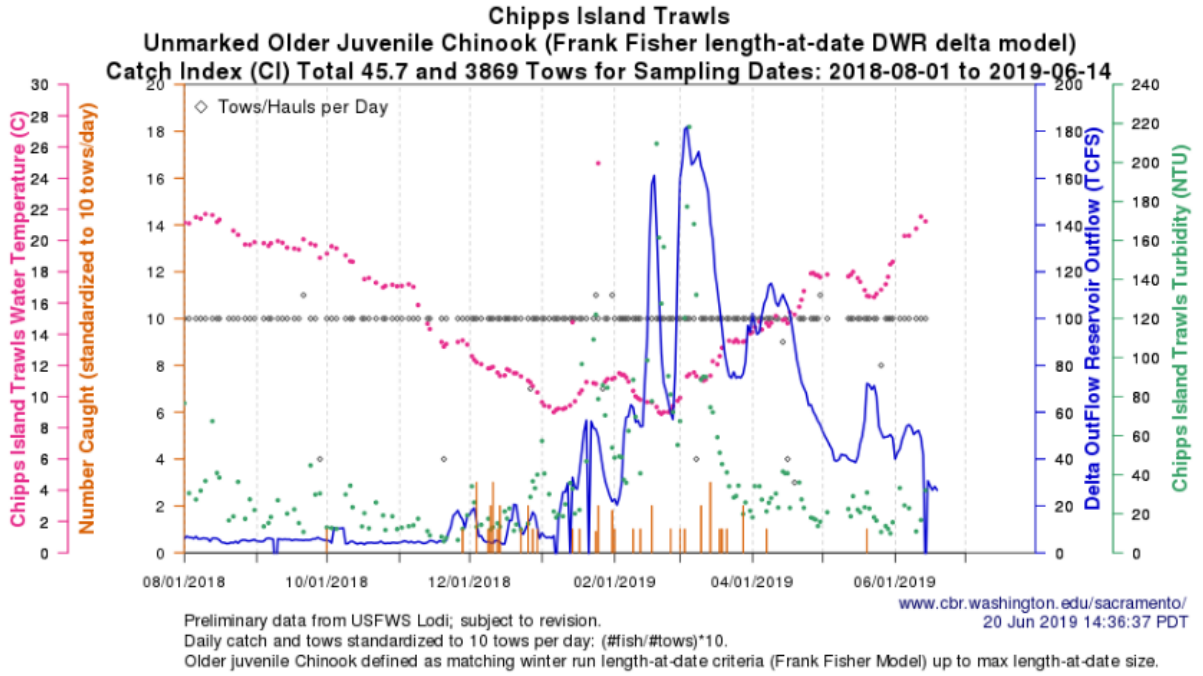


Figure G-6 Daily capture of unmarked older juvenile Chinook (orange bars) with trawls at Chipps Island compared to water temperature (°C; pink line) at Chipps Island, Delta outflow (TCFS; blue line), and turbidity (NTU; green points) at Chipps Island.

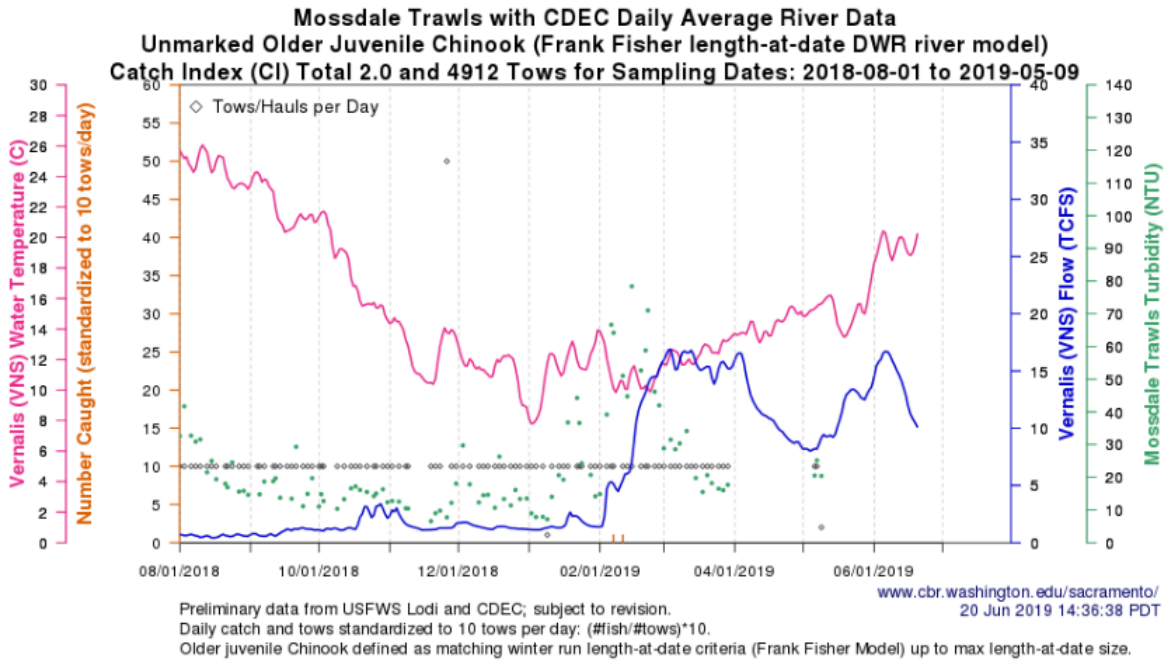


Figure G-7 Daily capture of unmarked older juvenile Chinook (orange bars) with trawls at Mossdale compared to water temperature (°C; pink line) and flow (TCFS; blue line) at Vernalis, and turbidity (NTU; green points) at Mossdale.

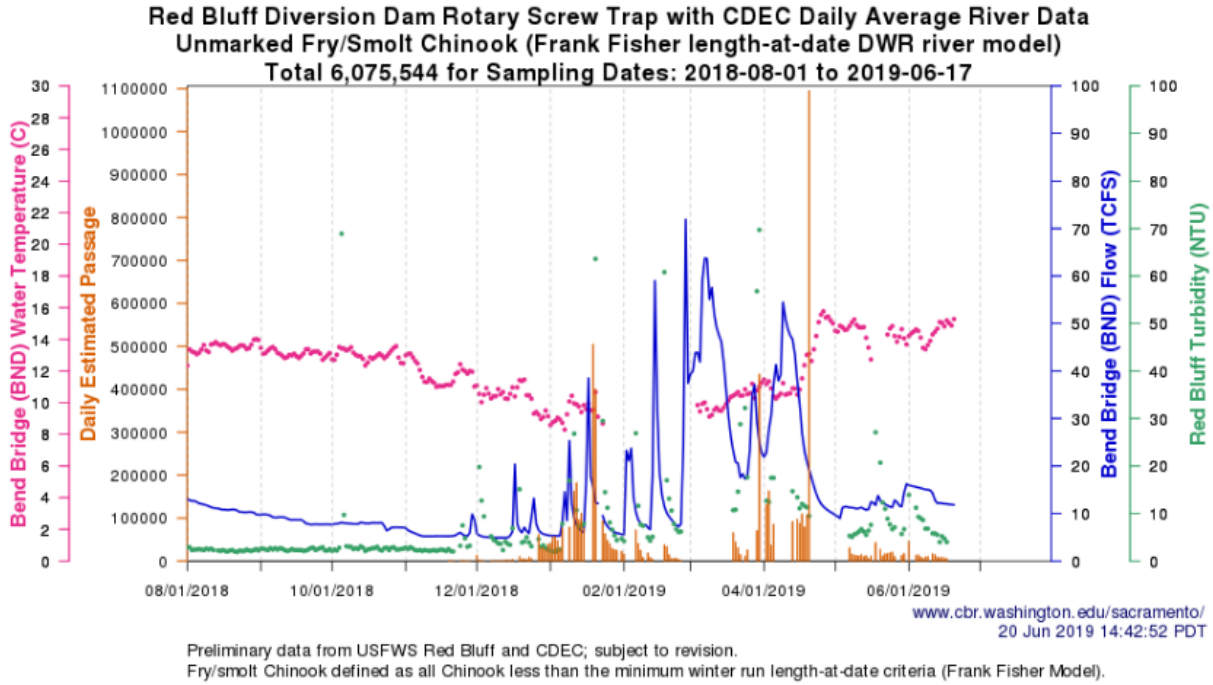


Figure G-8 Daily passage of unmarked Fry/Smolt Chinook (orange bars) captured in rotary screw traps at Red Bluff Diversion Dam compared to water temperature (°C; pink line) and flow (TCFS; blue line) at Bend Bridge, and turbidity (NTU; green points) at Red Bluff.

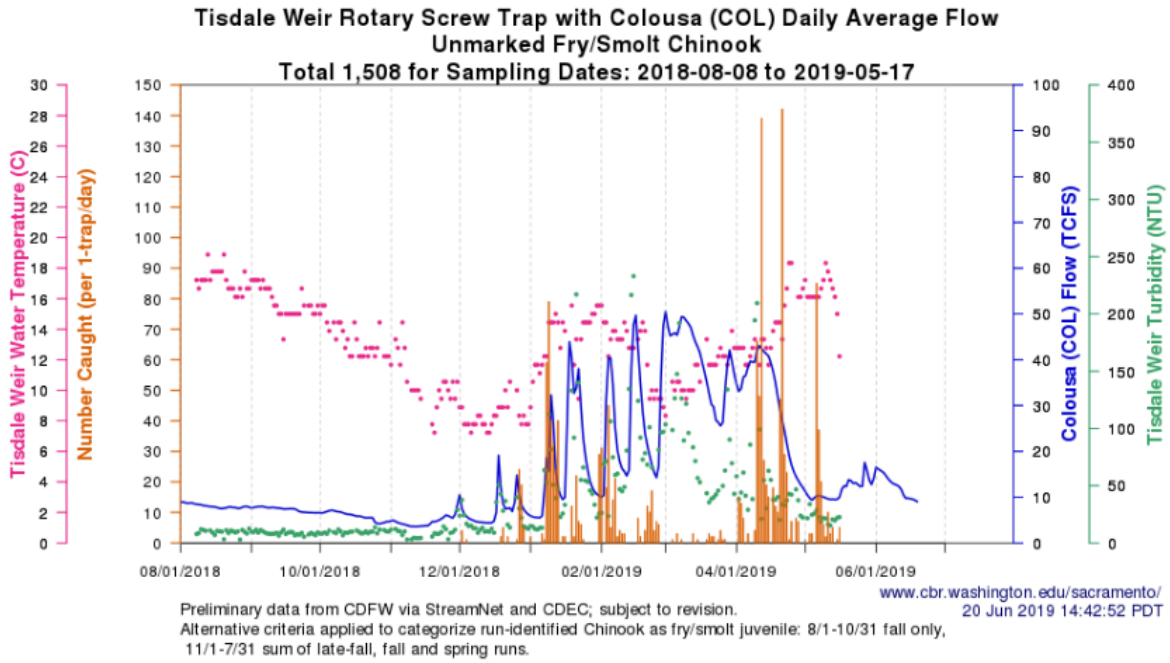


Figure G-9 Daily passage of unmarked Fry/Smolt Chinook (orange bars) captured in rotary screw traps at Tisdale Weir compared to water temperature (°C; pink line) at Tisdale Weir, flow (TCFS; blue line) at Colusa, and turbidity (NTU; green points) at Tisdale Weir.

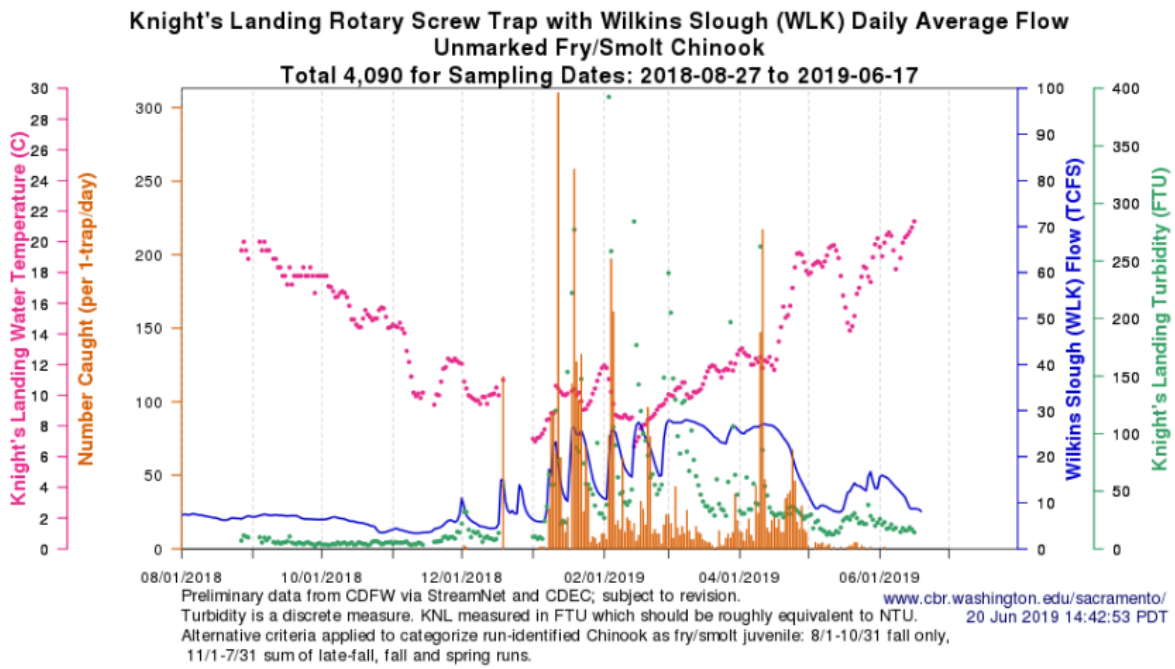


Figure G-10 Daily passage of unmarked Fry/Smolt Chinook (orange bars) captured in rotary screw traps at Knights Landing compared to water temperature (°C; pink line) at Knights Landing, flow (TCFS; blue line) at Wilkins Slough, and turbidity (NTU; green points) at Knights Landing.

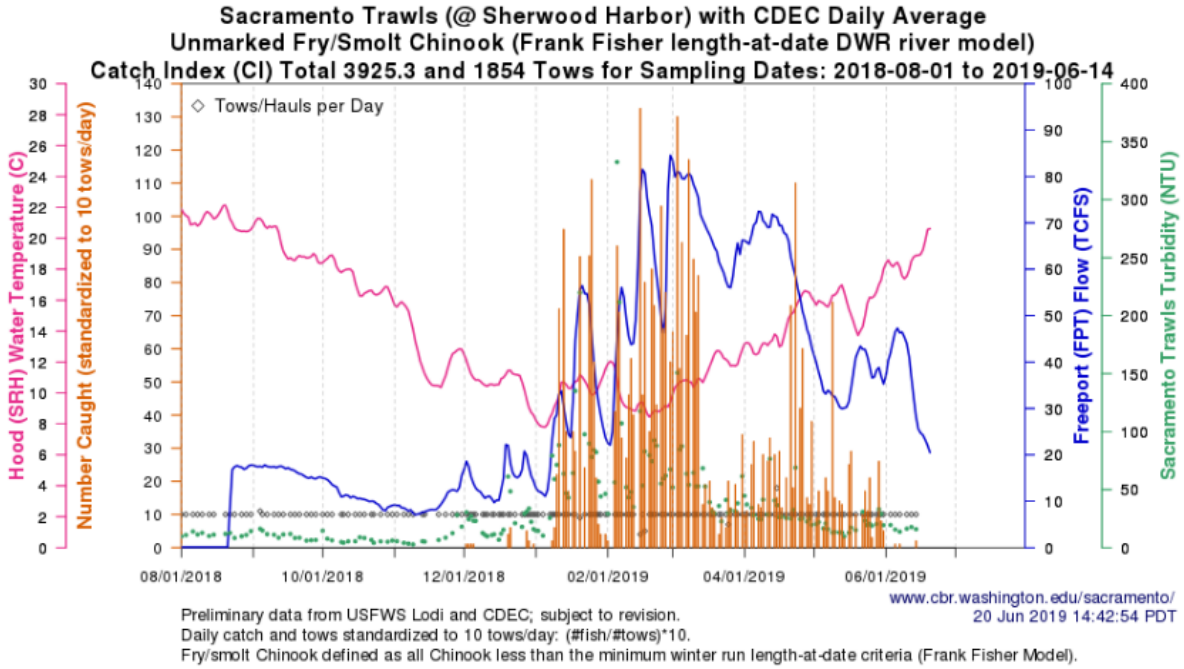


Figure G-11 Daily capture of unmarked Fry/Smolt Chinook (orange bars) trawls at Sherwood Harbor compared to water temperature (°C; pink line) at Hood, flow (TCFS; blue line) at Freeport, and turbidity (NTU; green points) at Sherwood Harbor.

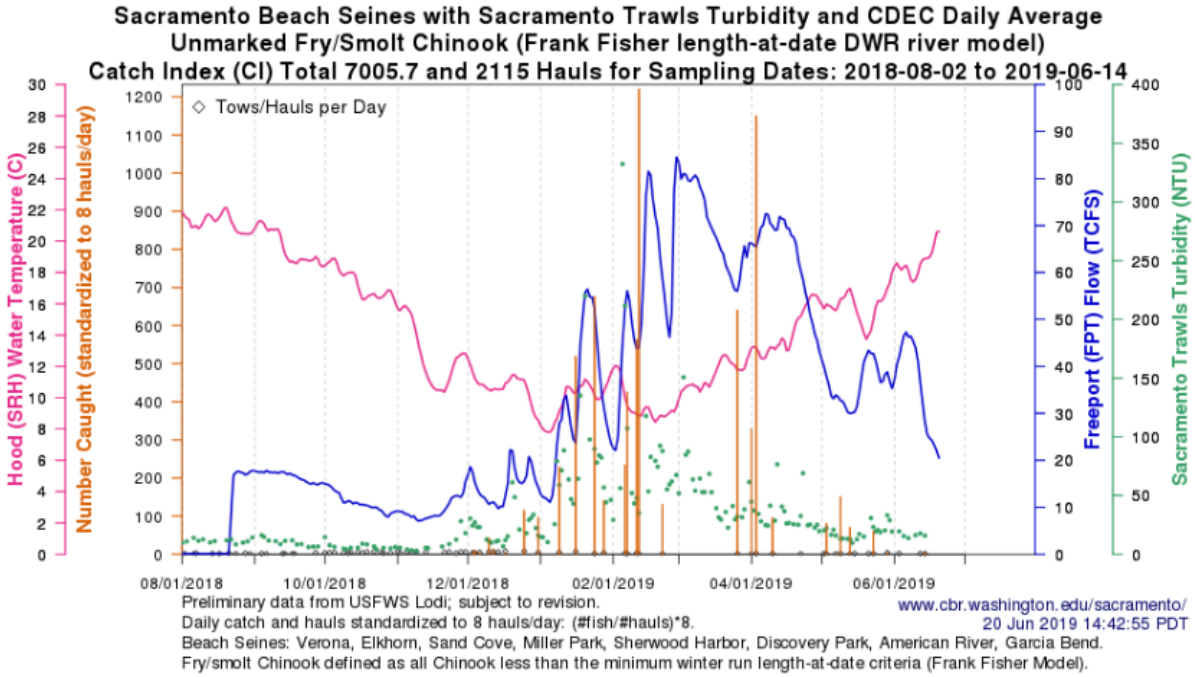


Figure G-12 Daily capture of unmarked Fry/Smolt Chinook (orange bars) trawls in Sacramento beach seines compared to water temperature (°C; pink line) at Hood, flow (TCFS; blue line) at Freeport, and turbidity (NTU; green points) at Sherwood Harbor.

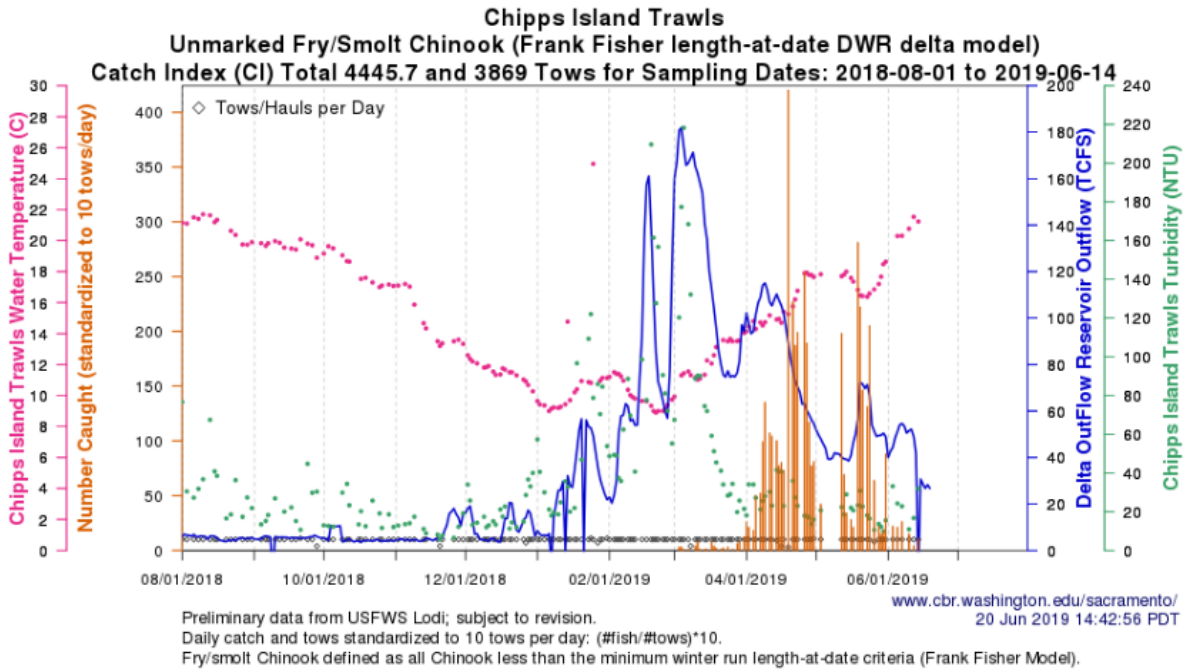


Figure G-13 Daily capture of unmarked Fry/Smolt Chinook (orange bars) trawls at Chipps Island compared to water temperature (°C; pink line) at Chipps Island, Delta outflow (TCFS; blue line), and turbidity (NTU; green points) at Chipps Island.

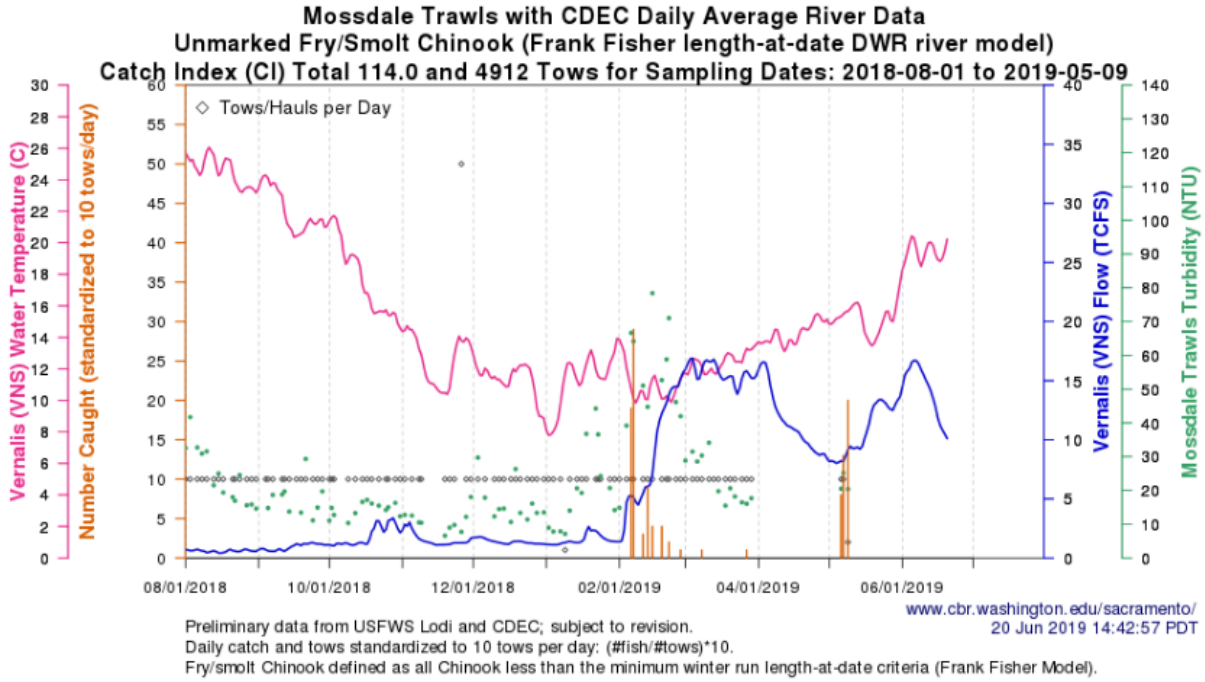


Figure G-14 Daily capture of unmarked Fry/Smolt Chinook (orange bars) in trawls at Mossdale compared to water temperature (°C; pink line) and flow (TCFS; blue line) at Vernalis and turbidity (NTU; green points) at Mossdale.

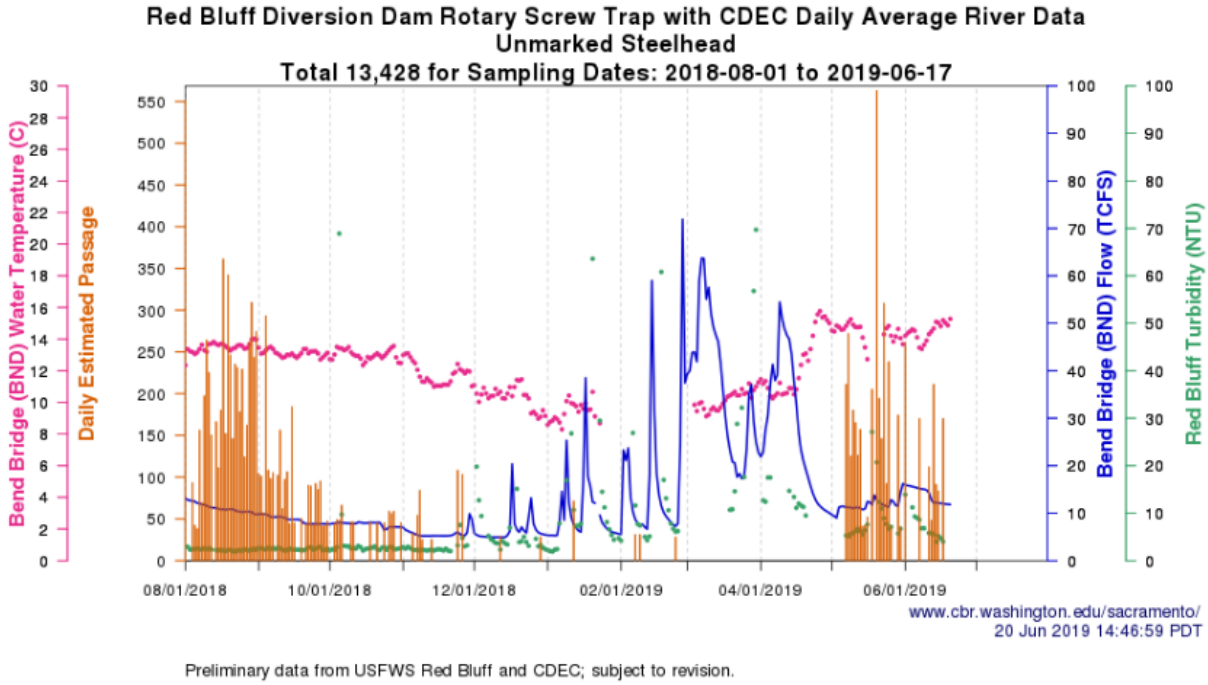


Figure G-15 Daily passage of unmarked Steelhead (orange bars) captured in rotary screw traps at Red Bluff Diversion Dam compared to water temperature (°C; pink line) and flow (TCFS; blue line) at Bend Bridge and turbidity (NTU; green points) at Red Bluff.

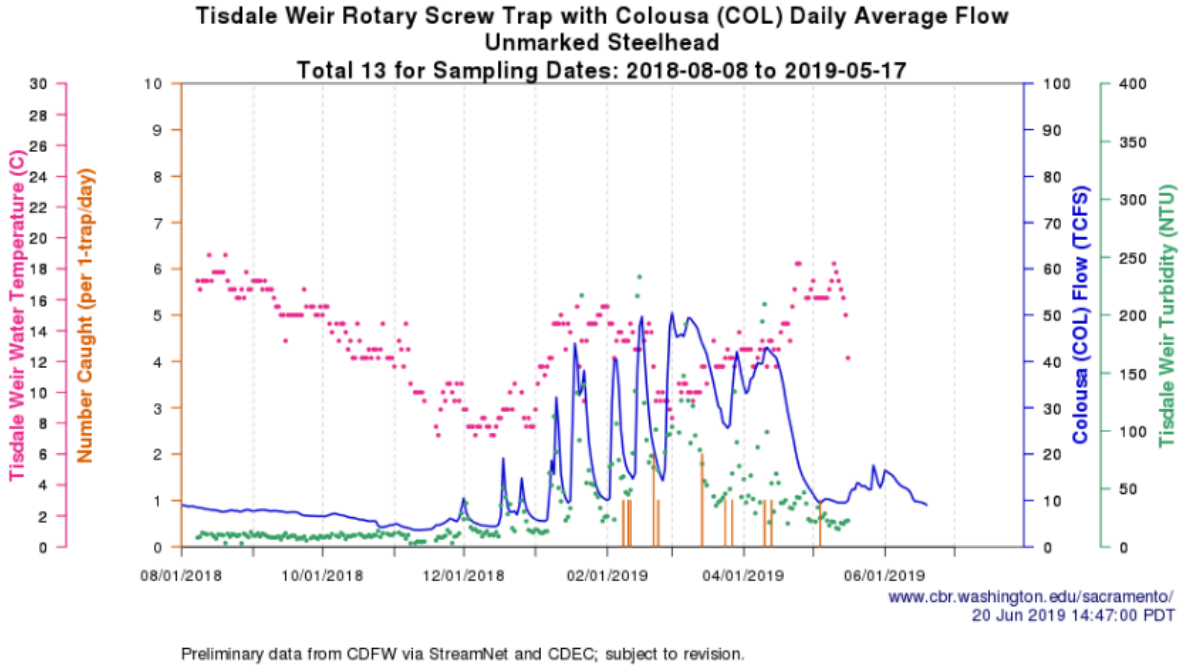


Figure G-16 Daily passage of unmarked Steelhead (orange bars) captured in rotary screw traps at Tisdale Weir compared to water temperature (°C; pink line) at Tisdale Weir, flow (TCFS; blue line) at Colusa, and turbidity (NTU; green points) at Tisdale Weir.

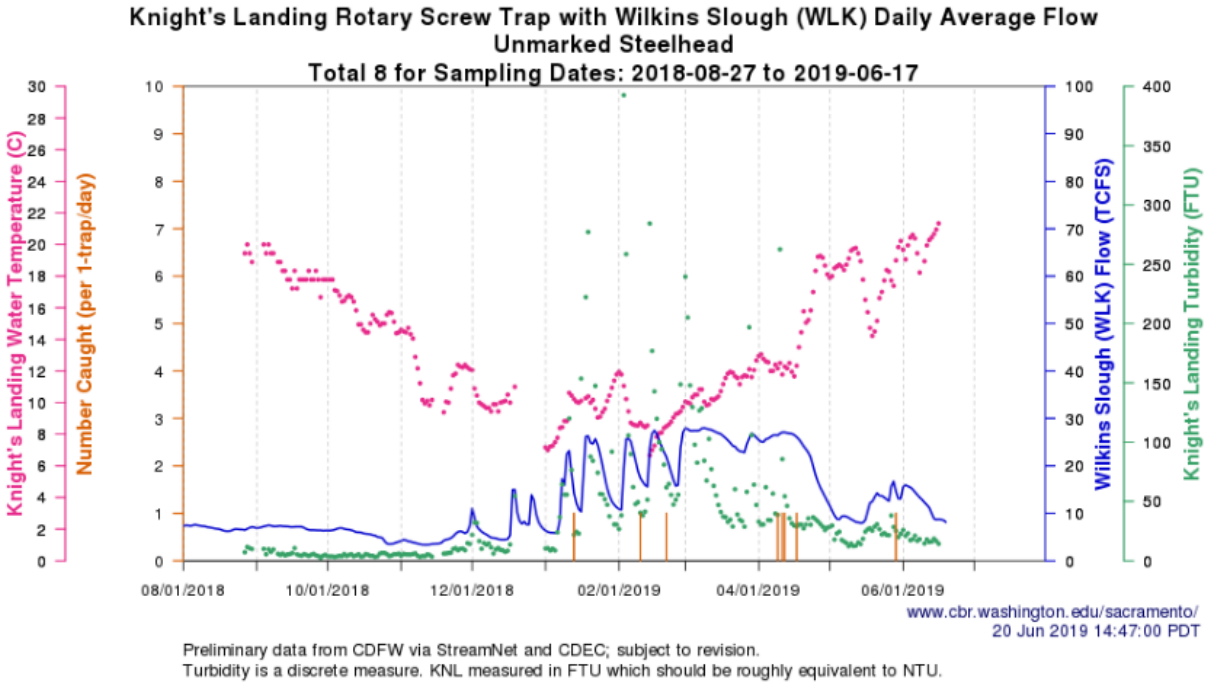


Figure G-17 Daily passage of unmarked Steelhead (orange bars) captured in rotary screw traps at Knights Landing compared to water temperature (°C; pink line) at Knights Landing, flow (TCFS; blue line) at Wilkins Slough, and turbidity (NTU; green points) at Knights Landing.

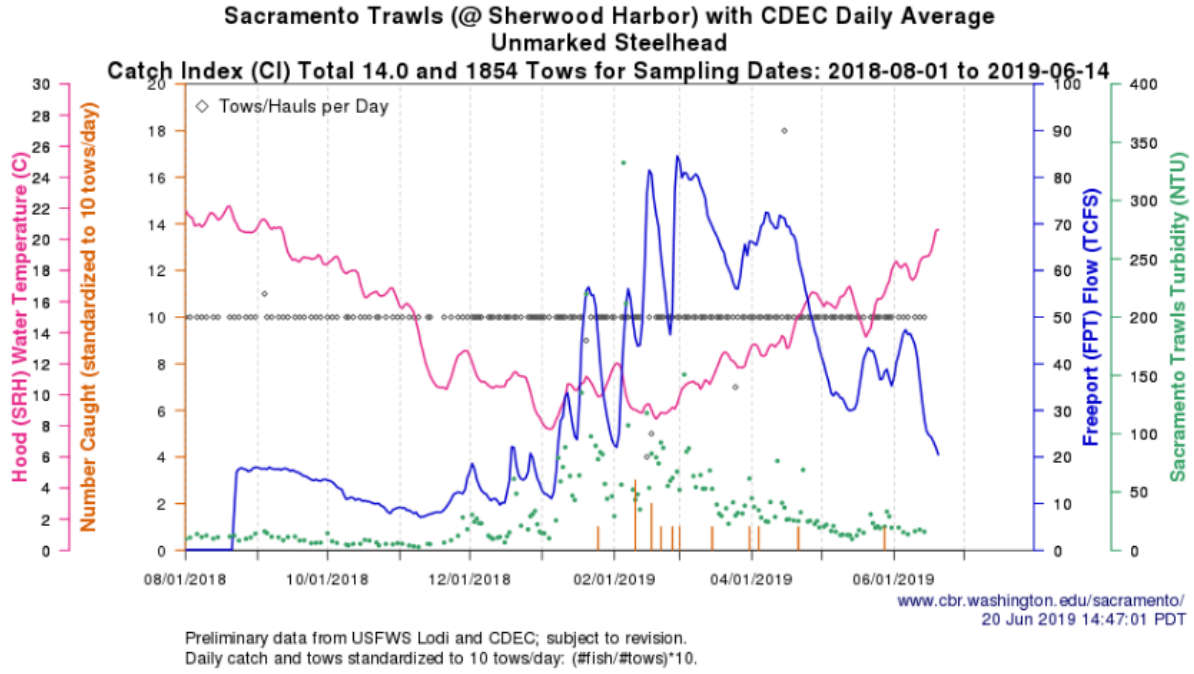


Figure G-18 Daily capture of unmarked Steelhead (orange bars) in trawls at Sherwood Harbor compared to water temperature (°C; pink line) at Hood, flow (TCFS; blue line) at Freeport, and turbidity (NTU; green points) at Sherwood Harbor.

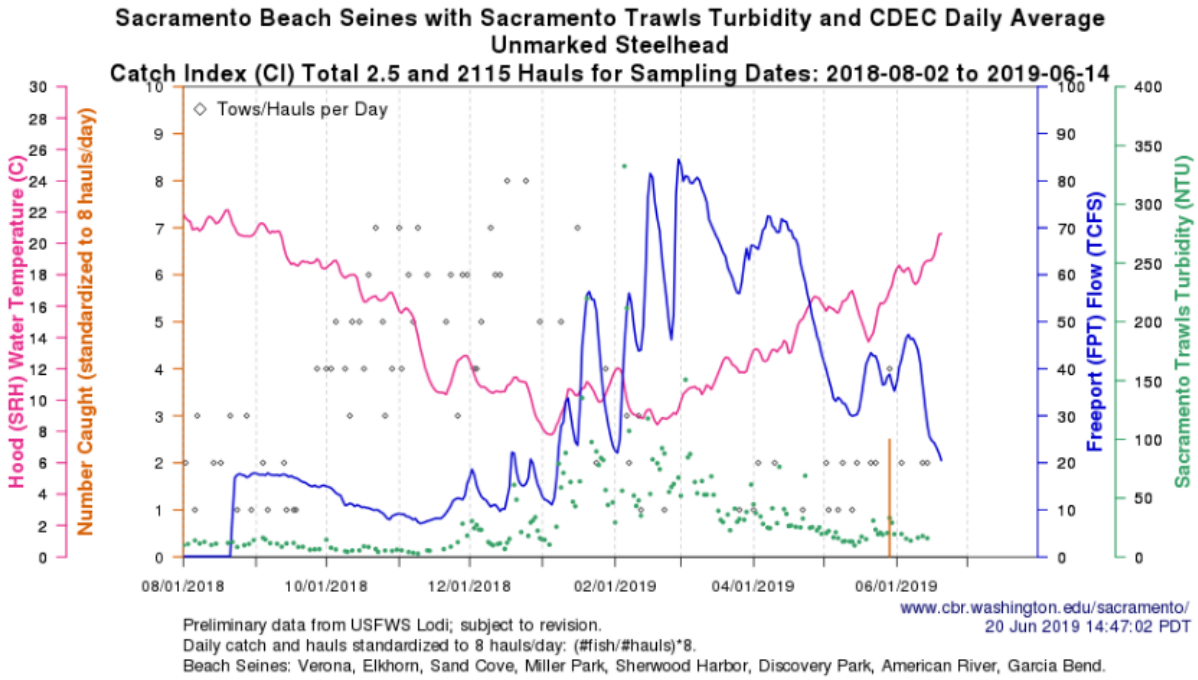


Figure G-19 Daily capture of unmarked Steelhead (orange bars) in beach seines at Sherwood Harbor compared to water temperature (°C; pink line) at Hood, flow (TCFS; blue line) at Freeport, and turbidity (NTU; green points) at Sherwood Harbor.

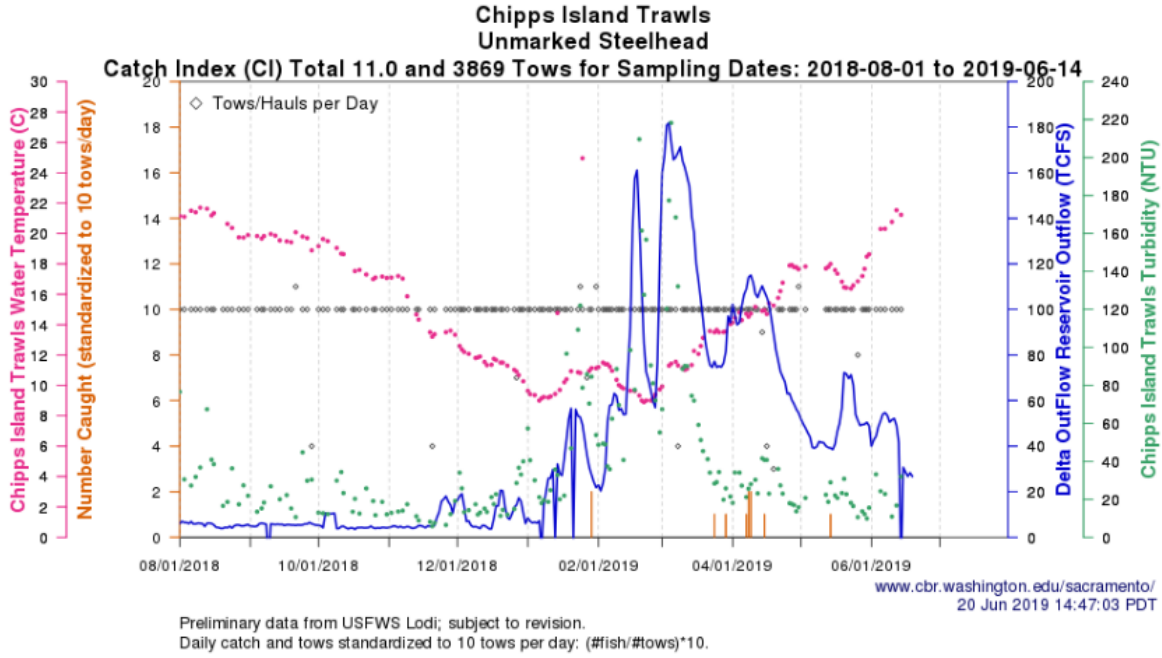


Figure G-20 Daily capture of unmarked Steelhead (orange bars) in trawls at Chipps Island compared to water temperature (°C; pink line) at Chipps Island, Delta outflow (TCFS; blue line), and turbidity (NTU; green points) at Chipps Island.

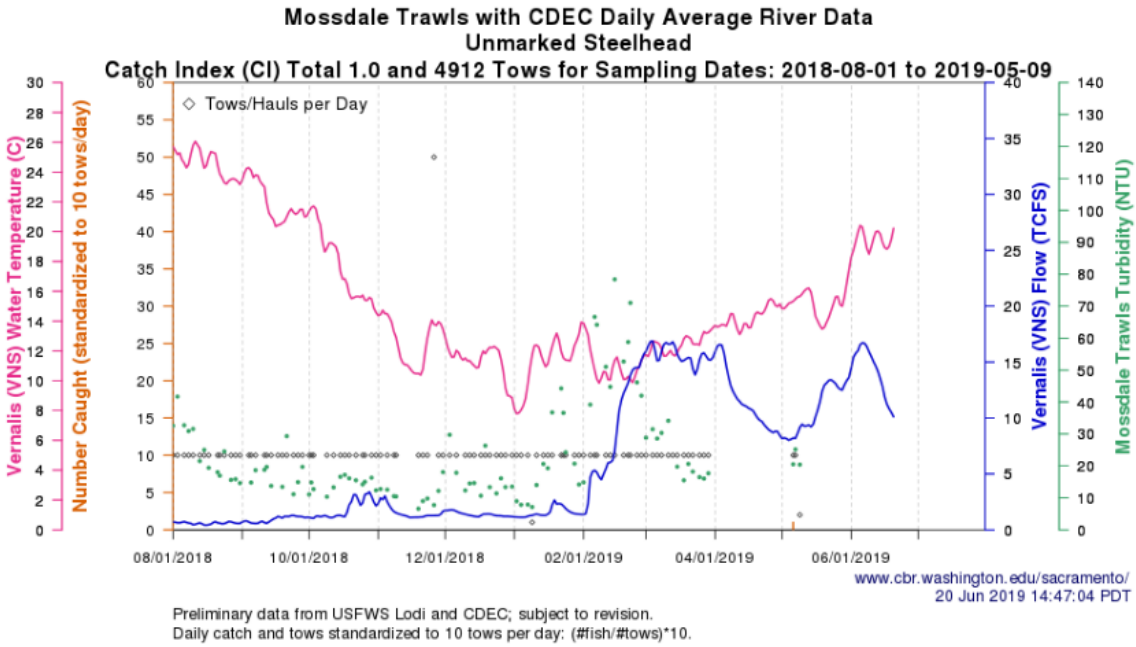


Figure G-21 Daily capture of unmarked Steelhead (orange bars) in trawls at Mossdale compared to water temperature (°C; pink line) and flow (TCFS; blue line) at Vernalis and turbidity (NTU; green points) at Mossdale.

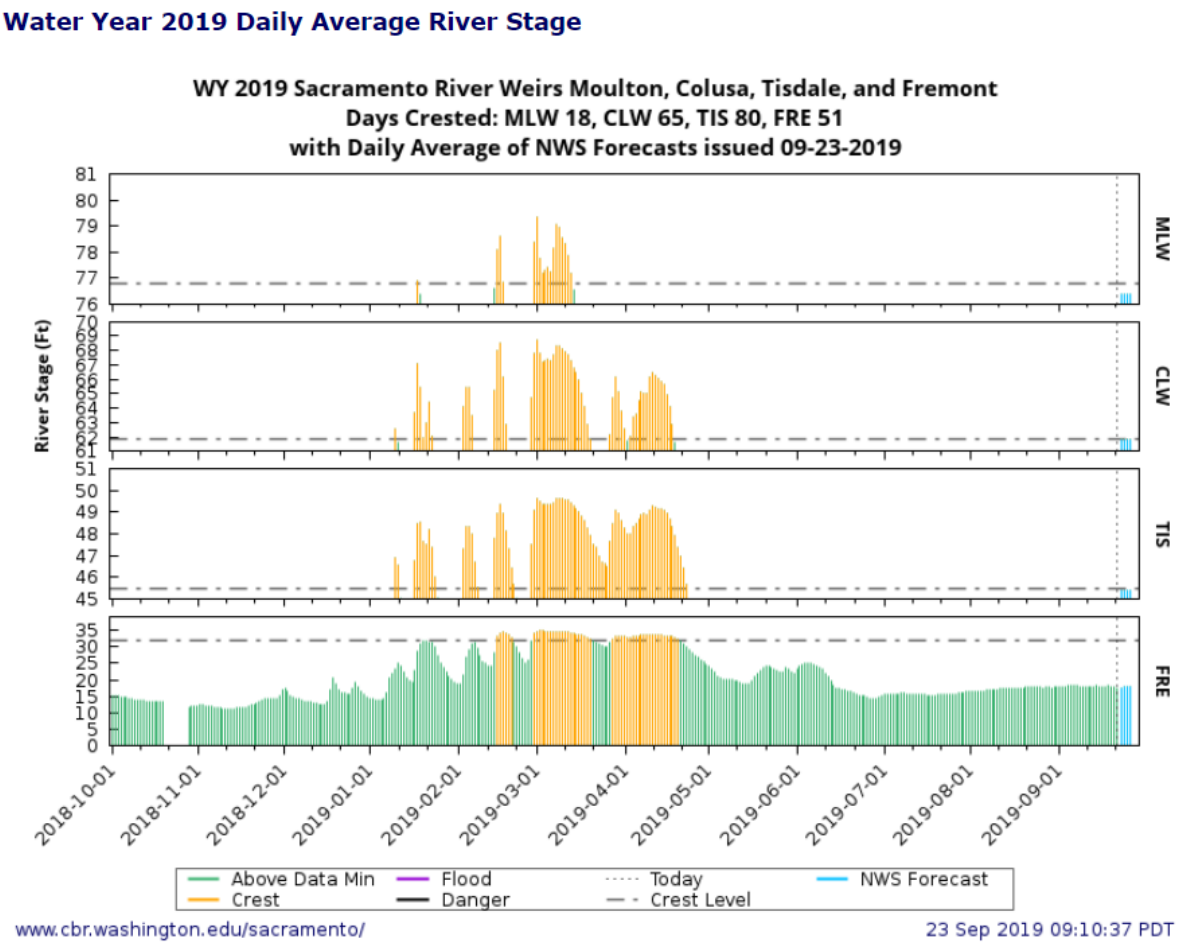


Figure G-22 Sacramento River weirs with river stage (in green if below the crest of the weir; or in orange if river is overtopping weir).

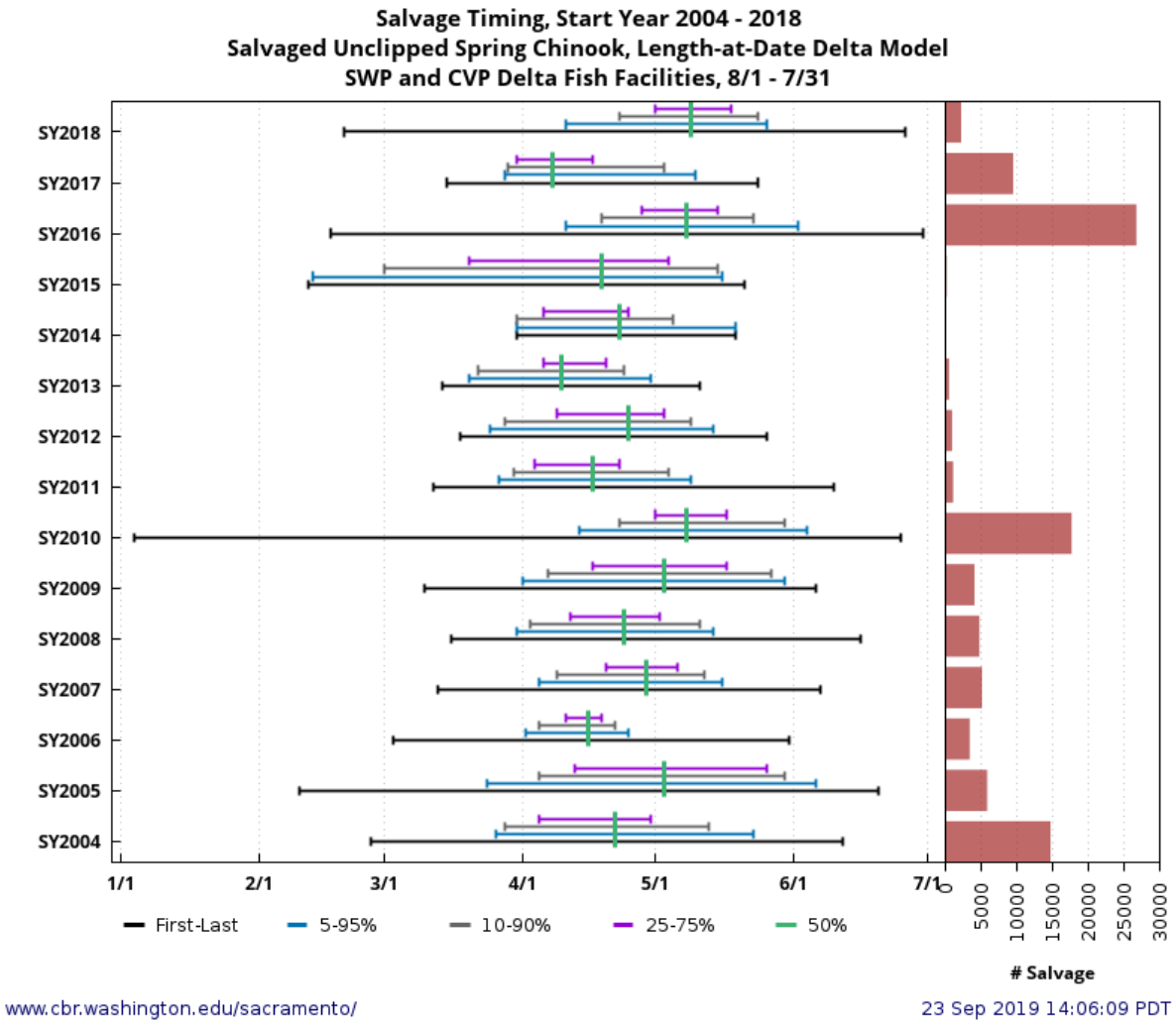


Figure G-23 Timing and abundance (indicated by red-brown bars) of unmarked spring-run Chinook (length-at-date) salvaged at the Delta Fish Collection Facilities for Water Years 2005 to 2019.

Salvage timing of unclipped winter-run shown for the years 2004 through 2017. Horizontal bars showing timing to occur from around mid-December through March or early April, but primarily in April to early

May.

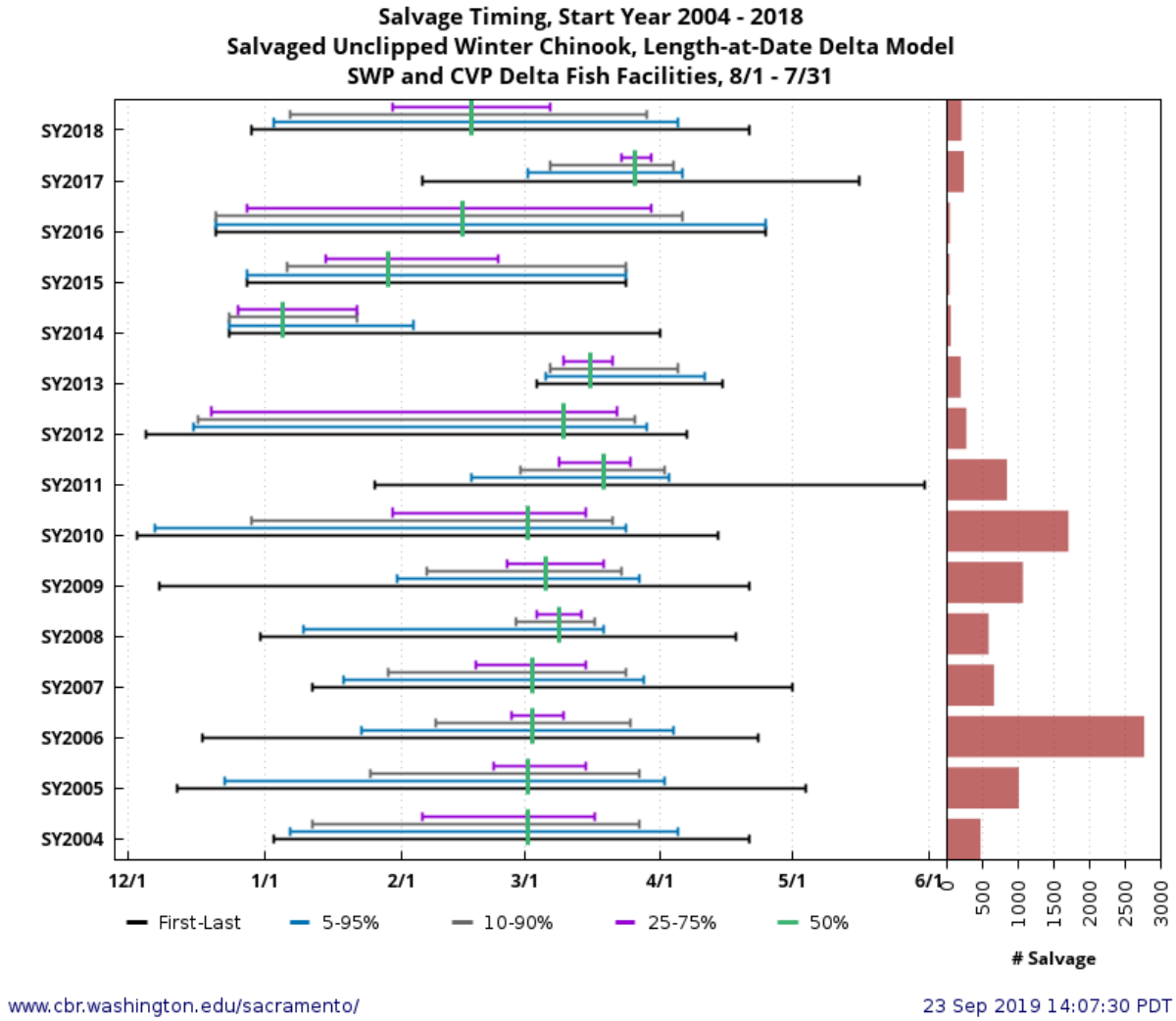


Figure G-24 Timing and abundance (indicated by red-brown bars) of unmarked winter-run Chinook (length-at-date) salvaged at the Delta Fish Collection Facilities for Water Years 2005 to 2019.

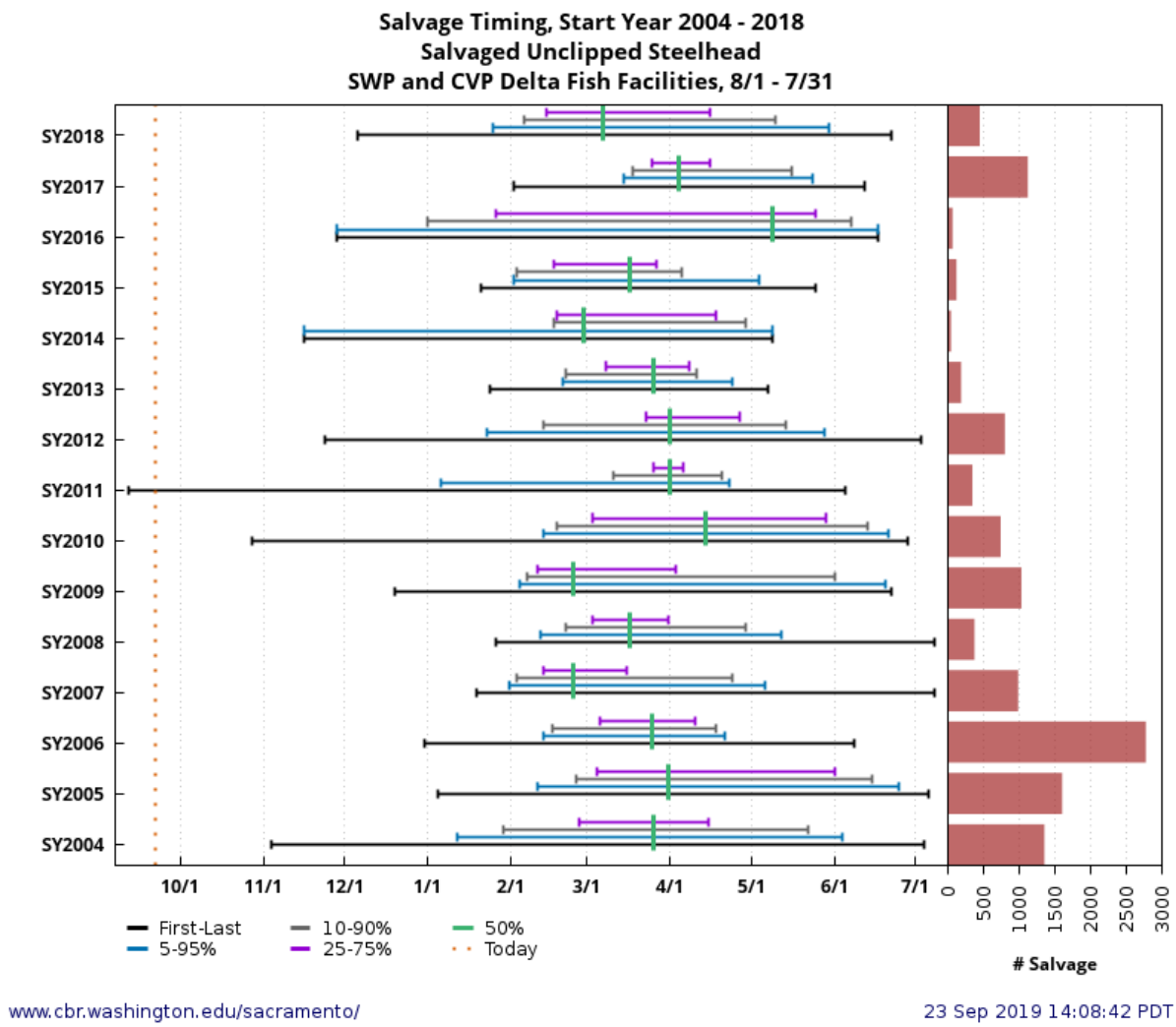


Figure G-25 Timing and abundance (indicated by red-brown bars) of unmarked steelhead salvaged at the Delta Fish Collection Facilities for Water Years 2005 to 2019.

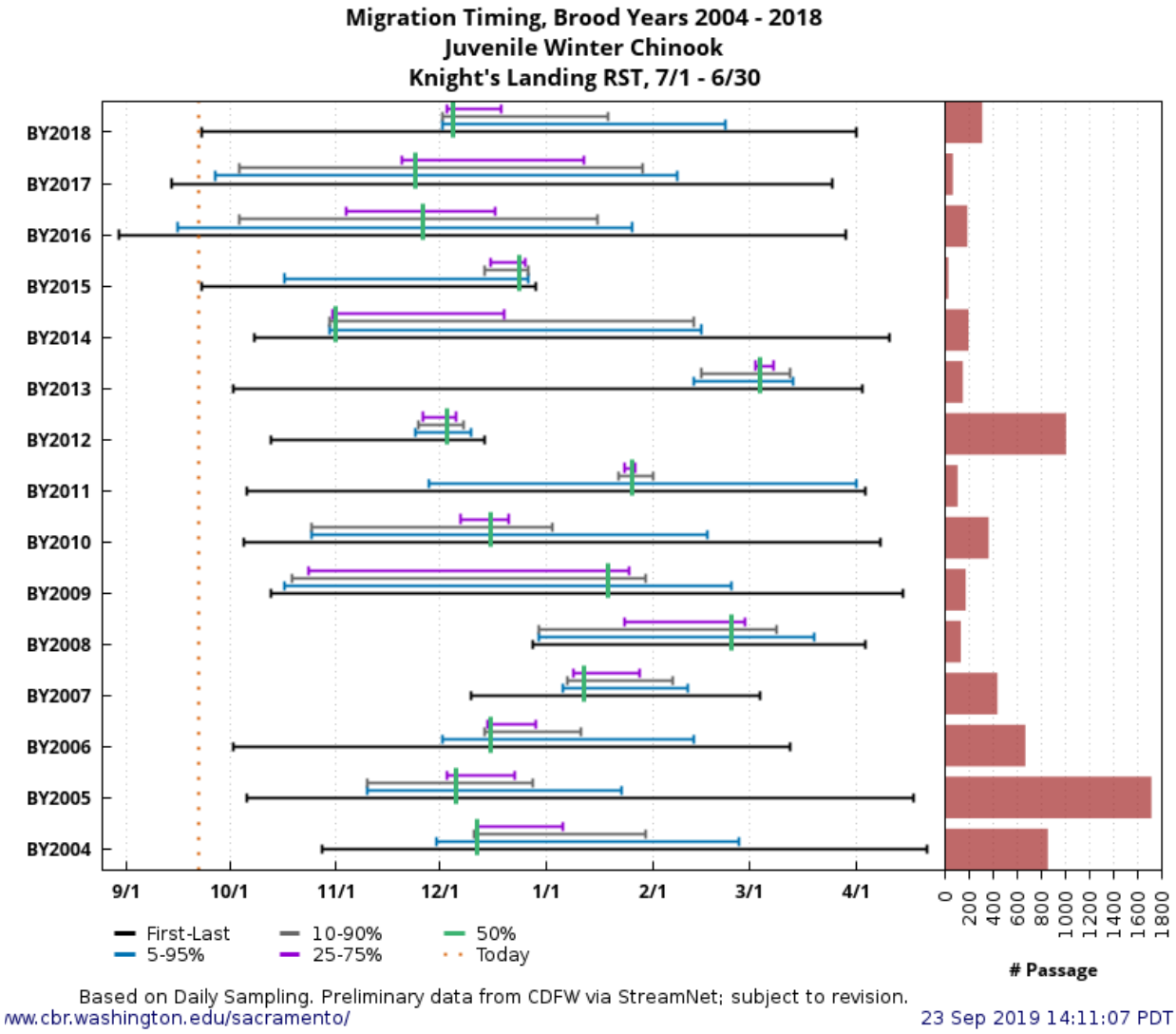


Figure G-26 Timing and abundance (indicated by red-brown bars) of winter-run Chinook (length-at-date) collected in Knight's Landing rotary screw traps for Water Years 2005 to 2019.

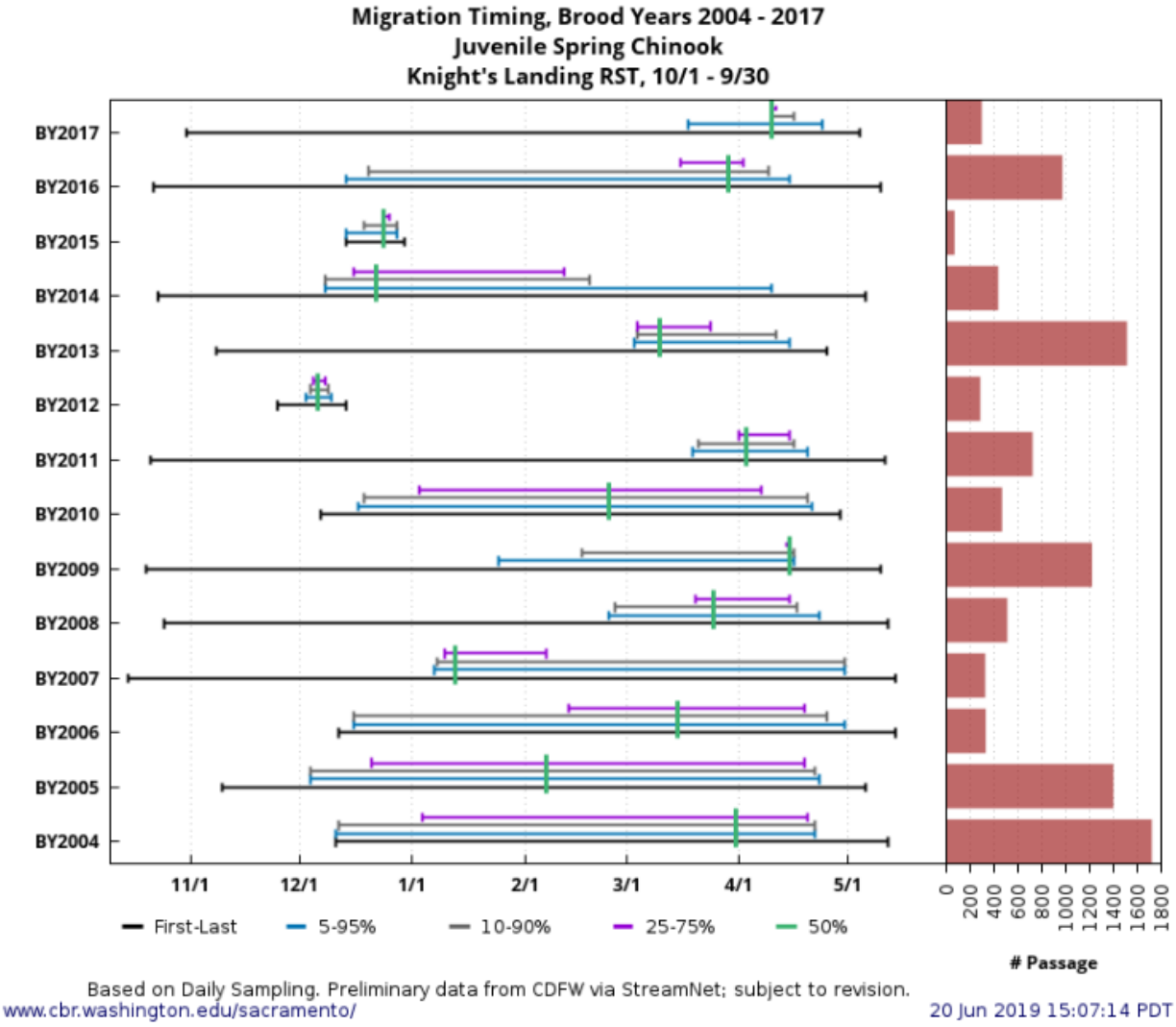


Figure G-27 Timing and abundance (indicated by red-brown bars) of spring-run Chinook (length-at-date) collected in Knight's Landing rotary screw traps for Water Years 2005 to 2018.

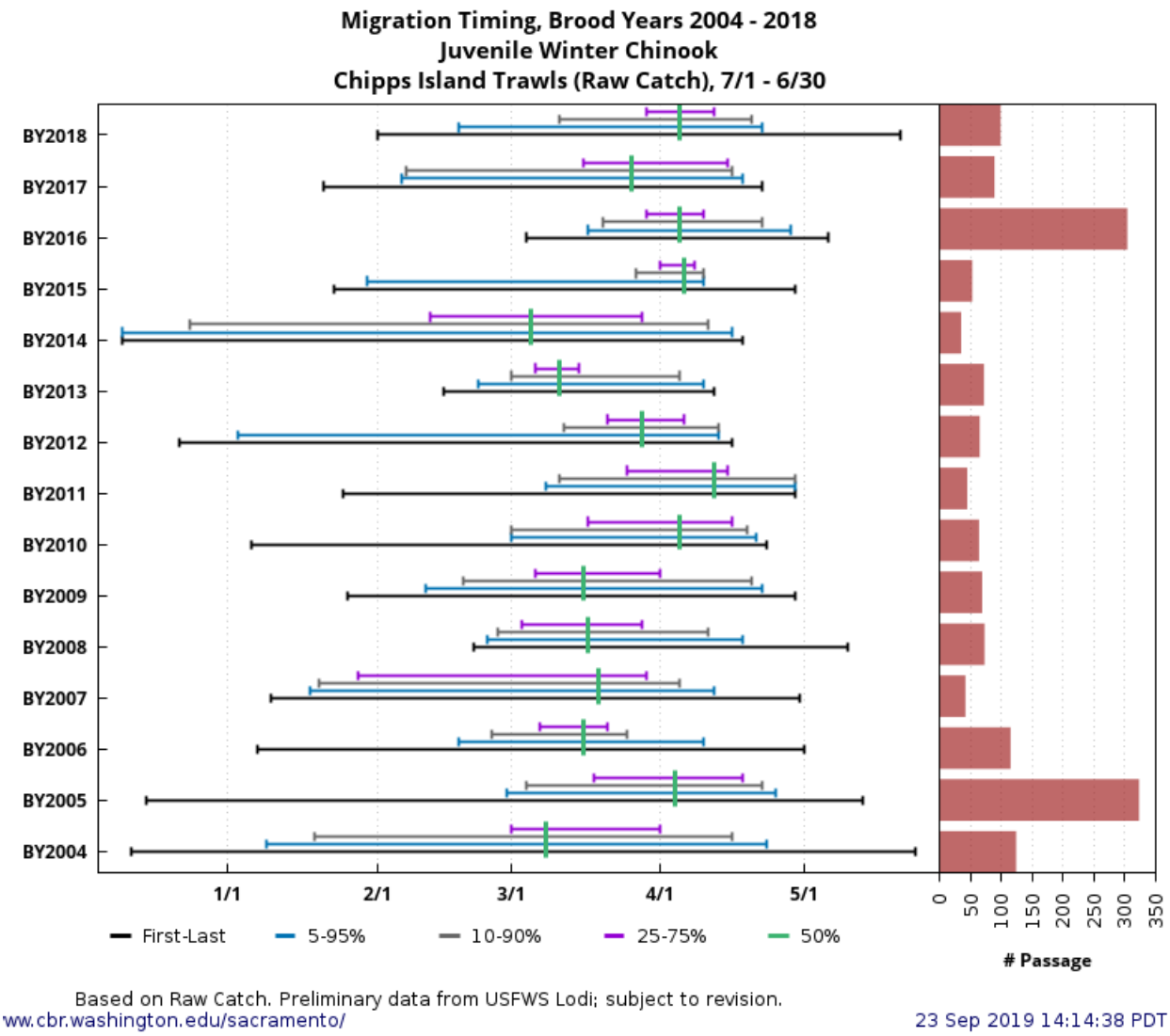


Figure G-28 Timing and abundance (indicated by red-brown bars) of winter-run Chinook (length-at-date) collected in Chipps Island trawl for Water Years 2005 to 2019.

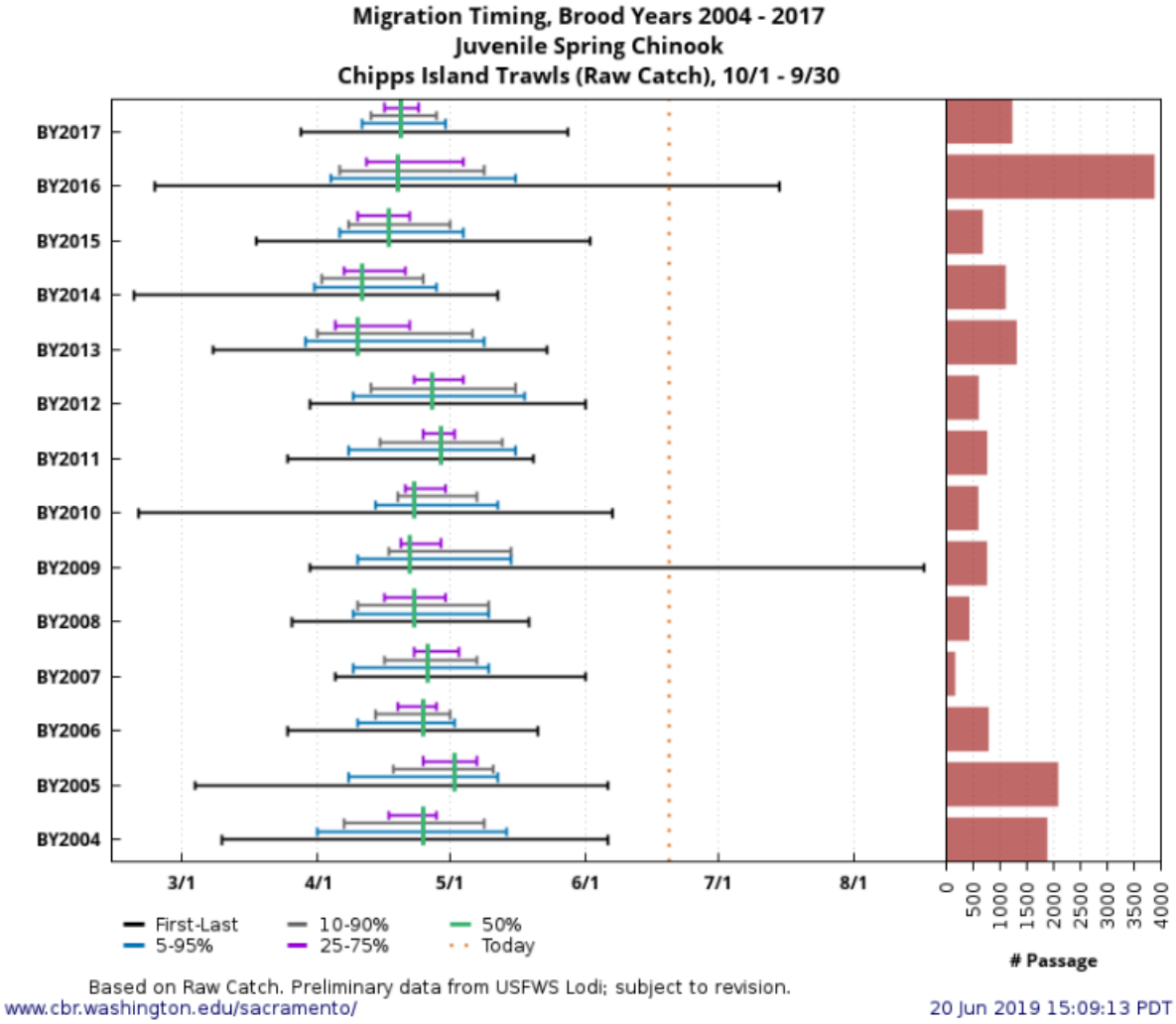


Figure G-29 Timing and abundance (indicated by red-brown bars) of spring-run Chinook (length-at-date) collected in Chipps Island trawl for Water Years 2005 to 2018.

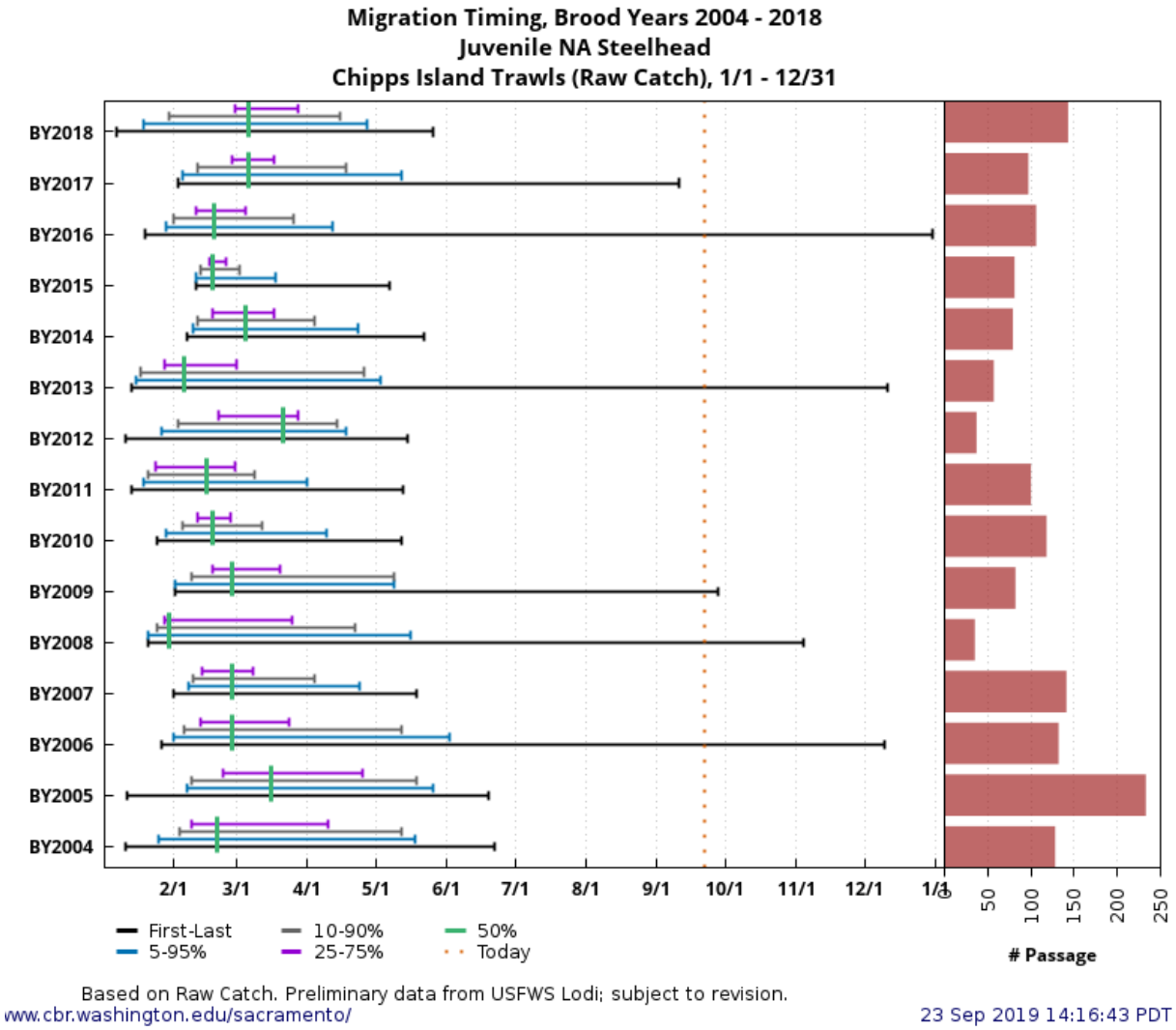


Figure G-30 Timing and abundance (indicated by red-brown bars) of unmarked steelhead collected in Chipps Island trawl for Water Years 2005 to 2019.

Appendix H—DOSS Weekly Estimates

Weekly estimates of the proportion of the annual cohort of ESA-listed salmonids yet to enter the Delta (still upstream of the Delta in the Sacramento basin). Blank cells represent weeks in which DOSS made no quantitative estimate.

Yet to Enter the Delta				
		(above Knights Landing)		
Month	**Meeting Date**	**wild winter-run (%)**	**hatchery winter-run (%)**	**wild spring-run (%)**
October	10/2	99-100		
	10/9	99-100		
	10/16	98-100		
	10/23	98-100		
	10/30	97-99		
November	11/6	97-99		
	11/13	no meeting		
	11/20	94-98		
	11/27	93-98		
December	12/4	91-96		
	12/11	60-70		98
	12/18	50-60		96
	12/25	no meeting		no meeting
January	1/1	30-40		88-90
	1/8	25-38		83-85
	1/15	15-25		65-80
	1/22	10-15		45-60
	1/29	9-13		40-50
February	2/5	5-10		30-40
	2/12	3-5		20-30
	2/19	0-2	95	10-20
	2/26	0-2	85-90	5-15
March	3/5	0-1	10	10
	3/12	0-1	5	5-15
	3/19	0-1	0-1	5
	3/26	0-1	0-1	5
April	4/2	0-1	0-1	5
	4/9	0-1	0-1	5
	4/16	0-1	0-1	5
	4/23	0-1	0-1%	5
	4/30	0-1	0-1%	5
May	5/7	0-1	0-1%	5
	5/14	0-1%	0-1%	5
	5/21	0-1%	0-1%	0-5
	5/28	0-1%	0-1%	0-5
June	6/4	0%	0%	0-2
	6/11	0%	0%	0
	6/18	0%	0%	0

Weekly estimates of the proportion of the annual cohort of ESA-listed salmonids in the Delta. Blank cells represent weeks in which DOSS made no quantitative estimate.

In Delta				
		(Knights Landing to Chipps Island)		
Month	**Meeting Date**	**wild winter-run (%)**	**hatchery winter-run (%)**	**wild spring-run (%)**
October	10/2	0		
	10/9	0		
	10/16	0-2		
	10/23	0-2		
	10/30	1-3		
November	11/6	1-3		
	11/13	no meeting		
	11/20	2-6		
	11/27	2-7		
December	12/4	4-9		
	12/11	30-40		2
	12/18	40-50		4
	12/25	no meeting		no meeting
January	1/1	60-70		10-20
	1/8	62-75		15-17
	1/15	75-85		20-35
	1/22	85-90		40-55
	1/29	87-91		50-60
February	2/5	85-90		60-70
	2/12	85-89		70-80
	2/19	78-82	5	80-90
	2/26	73-78	10-14	85-95
March	3/5	54-60	75	90
	3/12	44-50	40-50	85-90
	3/19	34-40	25-35	75-80
	3/26	29-35	25-35	70-75
April	4/2	19-25	9-20	60-65
	4/9	14-20	4-15	50-55
	4/16	9-15	4-10	40-45
	4/23	4-10	4	30-35
	4/30	4	1	20-25
May	5/7	2	0-1	10-15
	5/14	0-2	0-1	5-10
	5/21	0-1	0-1	5
	5/28	0-1	0-1	5
June	6/4	0-1	0-1	2-5
	6/11	0	0	0-1
	6/18	0	0	0-1

Weekly estimates of the proportion of the annual cohort of ESA-listed salmonids that have exited the Delta past Chipps Island. Blank cells represent weeks in which DOSS made no quantitative estimate.

Exited the Delta				
		(Exited past Chipps Island)		
Month	Meeting Date	wild winter-run (%)	hatchery winter-run (%)	wild spring-run (%)
October	10/2	0		
	10/9	0		
	10/16	0		
	10/23	0		
	10/30	0		
November	11/6	0		
	11/13	no meeting		
	11/20	0		
	11/27	0		
December	12/4	0		
	12/11	0		0
	12/18	0		0
	12/25	no meeting		no meeting
January	1/1	0		0
	1/8	0		0
	1/15	0		0
	1/22	0		0
	1/29	0		0
February	2/5	5		0
	2/12	8-10		0
	2/19	18-20	0	0
	2/26	20-25	0	0
March	3/5	40-45	15	0
	3/12	50-55	45-55	5-10
	3/19	60-65	65-75	15-20
	3/26	65-70	65-75	20-25
April	4/2	75-80	80-90	30-35
	4/9	80-85	85-95	40-45
	4/16	85-90	90-95	50-55
	4/23	90-95	95	60-65
	4/30	95	98	70-75
May	5/7	97-98	98-100	80-85
	5/14	98-100	98-100	85-90
	5/21	98-100	98-100	90-95
	5/28	98-100	98-100	90-95
June	6/4	99-100	99-100	93-98
	6/11	100	100	99-100
	6/18	100	100	99-100

Appendix I—Spring-run Raw and Adjusted Catch Data and Winter-run Raw Catch

Raw data for spring-run and winter-run catch are provided for all three locations: Knights Landing, in-Delta monitoring sites, and Chipps Island. Large catch numbers were observed at all three locations for spring-run. These anomalies were adjusted either by adjusting just the high catch numbers or by adjusting the catch numbers within the entire date range which was likely affected by the fall-run hatchery releases. Adjusted numbers (shown in bold in the tables) were derived by averaging the data two weeks before and two weeks after either the high catch numbers or the hatchery release date range.

Spring-run raw and adjusted data at Knights Landing and associated calculation of the percent of spring-run "Yet to Enter the Delta." Adjusted data are indicated in yellow highlighted cells.

Knight's Landing (Spring-Run)						
Date of DOSS Notes	Spring-Run Raw Data	Spring-Run Adjusted high values*	Spring-Run Adjusted release range**	100% minus cumulative raw data	100% minus Cumulative (adjusted high values)	100% minus Cumulative (adjusted release range)
10/2				100	100	100
10/9				100	100	100
10/16				100	100	100
10/23				100	100	100
10/30				100	100	100
11/6				100	100	100
11/13				100	100	100
11/20				100	100	100
11/27				100	100	100
12/4				100	100	100
12/11	6	6	6	100	97	100
12/18				100	97	100
12/25				100	97	100
1/1	64	64	64	96	64	97
1/8				96	64	97
1/15	14	14	14	95	57	96
1/22	5	5	5	94	54	96
1/29	16	16	16	93	46	95
2/5	4	4	4	93	44	95
2/12	4	4	4	93	42	94
2/19	4	4	4	93	39	94
2/26	9	9	9	92	35	94
3/5				92	35	94
3/12	1	1	1	92	34	94
3/19	4	4	220.5	92	32	83
3/26	22	22	220.5	91	21	72
4/2	211	7.25	220.5	77	17	61
4/9	268	7.25	220.5	61	13	51
4/16	770	7.25	770	13	10	13
4/23	111	7.25	111	6	6	7
4/30	97	7.25	97	0	2	3
5/7	3	3	52	0	1	0
5/14				0	1	0
5/21				0	1	0
5/28	1	1	1	0	0	0
6/4				0	0	0
6/11				0	0	0
6/18				0	0	0

Spring-run raw and adjusted data from beach seine and Sacramento trawl monitoring locations, and associated calculation of the percent of spring-run "In-Delta." Raw and adjusted data cumulative percent minus Chipps Island cumulative percent represents an estimate of the percent of fish present in the Delta each week. Adjusted data are indicated in yellow highlighted cells.

Combined Beach Seine and Sacramento Trawl (Spring-Run)						
Date of DOSS Notes	Spring-Run Raw Data	Spring-Run (adjusted high values only)*	Spring-Run (adjusted release range)**	Combined Beach Seine and Sac Trawl % minus Chipps Island (raw data) %	Combined Beach Seine and Sac Trawl minus Chipps Island (adjusted high value)	Combined Beach Seine and Sac Trawl minus Chipps Island (adjusted release range)
10/2				0	0	0
10/9				0	0	0
10/16				0	0	0
10/23				0	0	0
10/30				0	0	0
11/6				0	0	0
11/13				0	0	0
11/20				0	0	0
11/27				0	0	0
12/4				0	0	0
12/11	9	9	9	1	2	2
12/18	1	1	1	1	2	2
12/25				1	2	2
1/1	12	12	12	3	5	5
1/8	15	15	15	5	9	8
1/15	12	12	12	7	12	11
1/22	33	33	33	12	20	19
1/29	10	10	10	13	23	21
2/5	7	7	7	14	24	23
2/12	35	35	35	19	33	31
2/19	15	15	15	21	37	34
2/26	11	11	11	23	39	37
3/5	19	19	19	25	44	41
3/12	27	27	27	29	50	33
3/19	15	15	23	31	54	31
3/26	11	11	23	32	55	29
4/2	56	56	23	39	62	27
4/9	122	23	23	51	42	25
4/16	88	23	23	38	34	24
4/23	76	23	23	31	27	22
4/30	105	23	23	14	20	20
5/7	14	14	23	13	7	18
5/14	11	11	23	1	3	16
5/21	1	1	23	0	1	14
5/28				0	0	7
6/4				0	0	0
6/11				0	0	0
6/18				0	0	0

Spring-run raw and adjusted data at Chipps Island, and associated calculation of the percent of spring-run that have "Exited the Delta." The cumulative percent of total catch represents the percentage of fish that have passed the Chipps Island monitoring station. Adjusted data are indicated in yellow highlighted cells.

Chipps Island Trawl (Spring-Run)						
Date of DOSS Notes	Spring-Run Raw Data	Spring-Run (adjusted high values)*	Spring-Run (adjusted release range)**	Cumulative % raw data	Cumulative Spring-Run (adjusted high values)	Cumulative Spring-Run (adjusted release range)
10/2				0	0	0
10/9				0	0	0
10/16				0	0	0
10/23				0	0	0
10/30				0	0	0
11/6				0	0	0
11/13				0	0	0
11/20				0	0	0
11/27				0	0	0
12/4				0	0	0
12/11				0	0	0
12/18				0	0	0
12/25				0	0	0
1/1				0	0	0
1/8				0	0	0
1/15				0	0	0
1/22				0	0	0
1/29				0	0	0
2/5				0	0	0
2/12				0	0	0
2/19				0	0	0
2/26				0.00	0	0
3/5				0.00	0	0
3/12	2	2	2	0.11	1	14
3/19			1	0.11	1	21
3/26	7	7	1	0.51	2	29
4/2	24	24	1	1.87	9	36
4/9	98	98	1	7.41	35	43
4/16	441	47.75	1	32.37	48	50
4/23	317	47.75	1	50.31	61	57
4/30	566	47.75	1	82.34	73	64
5/7	61	61	1	85.80	90	71
5/14	239	26.875	1	99.32	97	79
5/21	8	8	1	99.77	99	86
5/28	4	4	1	100.00	100	93
6/4			1	100.00	100	100
6/11				100.00	100	100
6/18				100.00	100	100

Winter-run raw catch data at Knights Landing and associated calculation of the percent of spring-run "Yet to Enter the Delta." Raw data were converted into percent of total, cumulative percent, and 100% minus cumulative percent to show proportion of total which had passed by the Knights Landing monitoring station. Data were not adjusted for hatchery influence since no high data numbers were observed at times when hatchery releases occurred.

Knight's Landing (Winter-Run)				
Date of DOSS Notes	Winter-Run Raw Data	Winter-Run Percent	Cumulative Percent	100% minus cumulative raw data
10/2	2	0.66	0.66	99.34
10/9		0.00	0.66	99.34
10/16	1	0.33	1.00	99.00
10/23		0.00	1.00	99.00
10/30	2	0.66	1.66	98.34
11/6		0.00	1.66	98.34
11/13		0.00	1.66	98.34
11/20		0.00	1.66	98.34
11/27		0.00	1.66	98.34
12/4	35	11.63	13.29	86.71
12/11	119	39.53	52.82	47.18
12/18	1	0.33	53.16	46.84
12/25		0.00	53.16	46.84
1/1	96	31.89	85.05	14.95
1/8	1	0.33	85.38	14.62
1/15	17	5.65	91.03	8.97
1/22	8	2.66	93.69	6.31
1/29	3	1.00	94.68	5.32
2/5	1	0.33	95.02	4.98
2/12	1	0.33	95.35	4.65
2/19		0.00	95.35	4.65
2/26	5	1.66	97.01	2.99
3/5	3	1.00	98.01	1.99
3/12	1	0.33	98.34	1.66
3/19		0.00	98.34	1.66
3/26	1	0.33	98.67	1.33
4/2	4	1.33	100.00	0.00
4/9		0.00	100.00	0.00
4/16		0.00	100.00	0.00
4/23		0.00	100.00	0.00
4/30		0.00	100.00	0.00
5/7		0.00	100.00	0.00
5/14		0.00	100.00	0.00
5/21		0.00	100.00	0.00
5/28		0.00	100.00	0.00
6/4		0.00	100.00	0.00
6/11		0.00	100.00	0.00
6/18		0.00	100.00	0.00

Winter-run raw catch data from beach seine and Sacramento trawl monitoring locations and associated calculation of the percent of winter-run "In-Delta." Raw data were converted into percent of total, cumulative percent, and cumulative percent minus Chipps Island raw data. Data were not adjusted for hatchery influence since no high data numbers were observed.

Combined Beach Seine and Sacramento Trawl (Winter-Run)				
Date of DOSS Notes	Winter-Run Raw Data	Winter-Run Percent	Winter-Run Cumulative Percent	Combined Beach Seine and Sac Trawl minus Chipps Island (% raw data)
10/2		0.00	0.00	0.00
10/9		0.00	0.00	0.00
10/16		0.00	0.00	0.00
10/23		0.00	0.00	0.00
10/30		0.00	0.00	0.00
11/6		0.00	0.00	0.00
11/13		0.00	0.00	0.00
11/20		0.00	0.00	0.00
11/27		0.00	0.00	0.00
12/4	1	0.22	0.22	0.22
12/11	73	16.08	16.30	16.30
12/18	171	37.67	53.96	53.96
12/25		0.00	53.96	53.96
1/1	25	5.51	59.47	59.47
1/8	2	0.44	59.91	59.91
1/15	57	12.56	72.47	72.47
1/22	30	6.61	79.07	79.07
1/29	6	1.32	80.40	80.40
2/5	8	1.76	82.16	80.20
2/12	5	1.10	83.26	80.32
2/19	6	1.32	84.58	80.66
2/26	6	1.32	85.90	80.02
3/5	7	1.54	87.44	79.60
3/12	3	0.66	88.11	79.28
3/19	6	1.32	89.43	79.62
3/26	1	0.22	89.65	74.94
4/2	13	2.86	92.51	53.30
4/9	18	3.96	96.48	35.69
4/16	7	1.54	98.02	16.65
4/23	9	1.98	100.00	3.92
4/30		0.00	100.00	0.00
5/7		0.00	100.00	0.00
5/14		0.00	100.00	0.00
5/21		0.00	100.00	0.00
5/28		0.00	100.00	0.00
6/4		0.00	100.00	0.00
6/11		0.00	100.00	0.00
6/18		0.00	100.00	0.00

Winter-run raw catch data and adjusted data at Chipps Island and associated calculation of the percent of winter-run "Exited the Delta." The cumulative percent of total catch represents the percentage of fish that have passed the Chipps Island monitoring station. Data were not adjusted for hatchery influence since no high data numbers were observed.

Chipps Island Trawl (Winter-Run)			
Date of DOSS Notes	Winter-Run Raw Data	Winter-Run Percent	Cumulative Percent
10/2		0.00	0.00
10/9		0.00	0.00
10/16		0.00	0.00
10/23		0.00	0.00
10/30		0.00	0.00
11/6		0.00	0.00
11/13		0.00	0.00
11/20		0.00	0.00
11/27		0.00	0.00
12/4		0.00	0.00
12/11		0.00	0.00
12/18		0.00	0.00
12/25		0.00	0.00
1/1		0.00	0.00
1/8		0.00	0.00
1/15		0.00	0.00
1/22		0.00	0.00
1/29		0.00	0.00
2/5	2	1.96	1.96
2/12	1	0.98	2.94
2/19	1	0.98	3.92
2/26	2	1.96	5.88
3/5	2	1.96	7.84
3/12	1	0.98	8.82
3/19	1	0.98	9.80
3/26	5	4.90	14.71
4/2	25	24.51	39.22
4/9	22	21.57	60.78
4/16	21	20.59	81.37
4/23	15	14.71	96.08
4/30	4	3.92	100.00
5/7		0.00	100.00
5/14		0.00	100.00
5/21		0.00	100.00
5/28		0.00	100.00
6/4		0.00	100.00
6/11		0.00	100.00
6/18		0.00	100.00

Appendix J—Hatchery Winter-run CWT and Acoustic Tag Catch Data

Table J-1: Raw catch, percent weekly passage, and cumulative weekly passage of hatchery winter-run Chinook from Livingston Stone National Fish Hatchery for the Sacramento trawl and Chipps trawl sampling, based on coded wire tagged fish. The three colored headers match the region-specific color coding in Figure 4-8 of the report. Calculated data-based distribution estimates used to compare to the weekly DOSS estimates. "Yet to enter the Delta" was calculated by taking 100 percent minus the Sacramento trawl cumulative percent. "In the Delta" equals Sacramento trawl cumulative percent minus Chipps trawl cumulative percent. "Exited the Delta" equals Chipps trawl cumulative percent. Catch is summarized for the week prior to each weekly DOSS call. Raw catch data are from the "DatCall" file downloaded from: https://www.fws.gov/lodi/juvenile_fish_monitoring_program/jfmp_index.htm

Coded Wire Tagged (CWT) Winter-Run Catch Data							
	Yet to Enter the Delta	Sacramento Trawl (In Delta)			Chipps Trawl (Exited)		
Date of DOSS Notes	100% minus cumulative % Sacramento Trawl	Raw Catch	Cumulative %	Cumulative Sacramento Trawl % minus Chipps	Raw Catch	% CWT WR	Cumulative %
1/22	100		0	0		0	0
1/29	100		0	0		0	0
2/5	100		0	0		0	0
2/12	100		0	0		0	0
2/19	100		0	0		0	0
2/26	77	3	23.1	23.1		0	0
3/5	62	2	38.5	38.5		0	0
3/12	54	1	46.2	46.2		0	0
3/19	46	1	53.8	53.8		0	0
3/26	46		53.8	49.1	1	4.8	4.8
4/2	8	5	92.3	44.7	9	42.9	47.6
4/9	8		92.3	20.9	5	23.8	71.4
4/16	0	1	100	14.3	3	14.3	85.7
4/23	0		100	0	3	14.3	100
4/30	0		100	0		0	100
5/7	0		100	0		0	100
5/14	0		100	0		0	100
5/21	0		100	0		0	100
5/28	0		100	0		0	100
6/4	0		100	0		0	100
6/11	0		100	0		0	100
6/18	0		100	0		0	100

Table J-2: On February 14, 2019, 650 JSATS acoustic tagged winter-run Chinook salmon juveniles from Livingston Stone National Fish Hatchery were released. Raw catch, percent weekly passage, and cumulative weekly passage of detected acoustic tagged fish are provided in the table below. These results are based on preliminary results and are not final. Catch is summarized for the week prior to each weekly DOSS call.

Butte City Bridge				Tower Bridge			Benicia Bridge	
Date of DOSS Notes	Winter-Run Raw Data	Cumulative Percent	100% minus cumulative raw data	Winter-Run Raw Data	Winter-Run Cumulative Percent	Raw Data Cum % (after 50%, 100% minus Cum %)	Winter-Run Raw Data	Cumulative Percent
10/2		0.00	100.00		0.00	0.00		0.00
10/9		0.00	100.00		0.00	0.00		0.00
10/16		0.00	100.00		0.00	0.00		0.00
10/23		0.00	100.00		0.00	0.00		0.00
10/30		0.00	100.00		0.00	0.00		0.00
11/6		0.00	100.00		0.00	0.00		0.00
11/13		0.00	100.00		0.00	0.00		0.00
11/20		0.00	100.00		0.00	0.00		0.00
11/27		0.00	100.00		0.00	0.00		0.00
12/4		0.00	100.00		0.00	0.00		0.00
12/11		0.00	100.00		0.00	0.00		0.00
12/18		0.00	100.00		0.00	0.00		0.00
12/25		0.00	100.00		0.00	0.00		0.00
1/1		0.00	100.00		0.00	0.00		0.00
1/8		0.00	100.00		0.00	0.00		0.00
1/15		0.00	100.00		0.00	0.00		0.00
1/22		0.00	100.00		0.00	0.00		0.00
1/29		0.00	100.00		0.00	0.00		0.00
2/5		0.00	100.00		0.00	0.00		0.00
2/12		0.00	100.00		0.00	0.00		0.00
2/19	26	11.71	88.29		0.00	0.00		0.00
2/26	184	94.59	5.41	40	44.94	44.94	2	1.23
3/5	4	96.40	3.60	10	56.18	43.82	30	19.63
3/12	1	96.85	3.15	0	56.18	43.82	14	28.22
3/19	0	96.85	3.15	3	59.55	40.45	9	33.74
3/26	5	99.10	0.90	25	87.64	12.36	9	39.26
4/2	0	99.10	0.90	0	87.64	12.36	43	65.64
4/9	0	99.10	0.90	7	95.51	4.49	38	88.96
4/16	2	100.00	0.00	2	97.75	2.25	14	97.55
4/23	0	100.00	0.00	2	100.00	0.00	3	99.39
4/30	0	100.00	0.00	0	100.00	0.00	1	100.00
5/7	0	100.00	0.00	0	100.00	0.00	0	100.00
5/14		100.00	0.00		100.00	0.00		100.00
5/21		100.00	0.00		100.00	0.00		100.00
5/28		100.00	0.00		100.00	0.00		100.00
6/4		100.00	0.00		100.00	0.00		100.00
6/11		100.00	0.00		100.00	0.00		100.00
6/18		100.00	0.00		100.00	0.00		100.00