

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 5/30/2017 at 9:00 a.m.

Objective: Provide advice to the Water Operations Management Team (WOMT) and National Marine Fisheries Service (NMFS) on measures to reduce adverse effects from Delta operations of the Central Valley Project and the State Water Project on salmonids and green sturgeon. DOSS will work with other technical teams. DOSS notes and advice can be found at: http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/doss.html.

CDFW: Bob Fujimura, Jason Julienne, Jerry Morinaka

DWR: Bryant Giorgi, Farida Islam, Kevin Reece

NMFS: Barb Byrne, Kristin McCleery

Reclamation: Tom Patton, Elissa Buttermore, Josh Israel, Mike Hendrick

SWRCB: Chris Kwan, Chris Carr

USFWS: Craig Anderson, Felipe Carrillo

Agenda Items

1. Agenda review and introductions
2. RPA Implementation Review (For the DOSS Dashboard, click on the "Triggers & Indices" tab at: www.baydeltalive.com/djfmj)
3. Smelt Working Group Update
4. Current Operations
5. Hatchery Releases
6. Fish Monitoring: Tracking of acoustic-tagged Chinook salmon
7. Fish Monitoring: Salvage
8. Fish Monitoring: RSTs/trawls/seines
9. DOSS Estimates of Fish Distribution and Assessments of Entrainment Risk
10. DOSS Advice
11. Next DOSS Meeting

Agenda Item 2.

RPA Implementation Review

Delta RPA Actions in effect during May:

Action IV.1.2¹ (DCC gate operations):

- From May 21 to June 15, the gates will be closed for up to 14 days.

Action IV.2.3² (OMR Management)

¹ For details, see pages 62-66 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

² For details, see pages 74-79 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

- Implementation of this action in WY 2017 began 1/1/17, and requires that Old and Middle River (OMR) flow be no more negative than -5,000 cfs.
- Since the action went into effect on 1/1/17, no salvage-based triggers that would require OMR to be more positive than -5,000 cfs have been exceeded.
- Action IV.2.3 is in effect until 6/15/17, unless the water temperature offramp is satisfied.
- **Water temperature offramp:** Seven consecutive days, in June, of Mossdale³ daily average temperature >72°F.

Action IV.2.1⁴ (I:E ratio)

- Implementation of this action in WY 2017 began 4/1/17, and requires a specific Vernalis flow-to-combined export ratio based on the San Joaquin Basin yeartype.
- The I:E ratio associated with the current “Wet” San Joaquin Basin yeartype is 4:1. Once the flood condition offramp was no longer satisfied, project operations transitioned into I:E ratio implementation (beginning 5/15).
- **Flood condition offramp⁵:** Exports are not restricted by the I:E ratio requirements of Action IV.2.1 when mean daily stage at Vernalis flow is equal to or greater than the flood monitor stage of 24.5 feet.

Agenda Item 3.

Smelt Working Group update

The Smelt Working Group (SWG) meeting was scheduled for after the DOSS call so no update was available for DOSS.

Agenda Item 4.

Current Operations

| SWP | | CVP | |
|-----------------------------------|--------------------|----------------------|--------------------|
| Exports (cfs) | | | |
| Clifton Court Forebay | 1,900 ^A | Jones Pumping Plant | 1,800 ^B |
| Reservoir Releases (cfs) | | | |
| Feather - Oroville | 12,000 | American - Nimbus | 6,400 |
| | | Sacramento - Keswick | 11,000 |
| | | Stanislaus - Goodwin | 4,750 ^C |
| | | Trinity – Lewiston | 4,500 ^D |
| Reservoir Storage (in TAF) | | | |
| San Luis (SWP) | 989 | San Luis (CVP) | 936 |
| Oroville | 2,483 | Shasta | 4,362 |
| New Melones | 2,072 | Folsom | 912 |
| Delta Operations (cfs) | | | |

³ See "MSD" CDEC station: <http://cdec.water.ca.gov/cgi-progs/queryDaily?s=msd&d=today>

⁴ For details, see pages 68-70 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

⁵ 5/1/17 clarification of San Joaquin I:E ratio flood condition offramp available under "Biological Opinion Actions" heading at: http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/

| | | | |
|---------------------|-------------------------------------|-------------------------------------|--------|
| DCC | Closed ^E | Sacramento River at Freeport (cfs) | 37,400 |
| Outflow Index (cfs) | ~50,700 | San Joaquin River at Vernalis (cfs) | 14,400 |
| E:I | 6% (3-day avg.) 5% (14-day avg.) | X2 | <57 km |

^A SWP exports are scheduled to increase tomorrow (5/31) to 2,100 cfs and on Thursday (6/1) to 6,680 cfs.

^B CVP exports are scheduled to increase on 6/1 to 4,200 cfs.

^C Goodwin releases are scheduled to decrease to 4,500 cfs on 6/1.

^D Lewiston releases are scheduled to decrease tomorrow (5/31) to 4,200 cfs.

^E *Non-BiOp-related DCC operational considerations:* While Sacramento River flows near the DCC remain greater than ~20,000 cfs, the DCC may remain closed to avoid scouring around the gate structure.

OMR flows as of 5/29/17:

| | Index (cfs) |
|--------|-------------|
| Daily | 2,990 |
| 5-day | 3,100 |
| 14-day | 4,220 |

Approximate OMR flows as of 5/27/17:

| | USGS gauges (cfs) | Index (cfs) |
|--------|-------------------|-------------|
| Daily | 4,000 | 3,080 |
| 5-day | 3,960 | 3,410 |
| 14-day | 4,150 | 4,260 |

Factors controlling Delta exports:

- 5/23 – 5/30 Delta exports limited by Action IV.2.1 (I:E ratio).

The weather forecast indicates cooler temperatures over the next couple days, warming up into the weekend. Light precipitation is expected in the north over the next day or two.

Agenda Item 5.

Hatchery Releases

See tables summarizing hatchery releases at:

http://www.cbr.washington.edu/sacramento/data/delta_cwt_tables.html. Note that releases are listed in different tables based on whether or not confirmed loss at the SWP and CVP Delta Fish Facilities has been reported; check all tables to review recent releases.

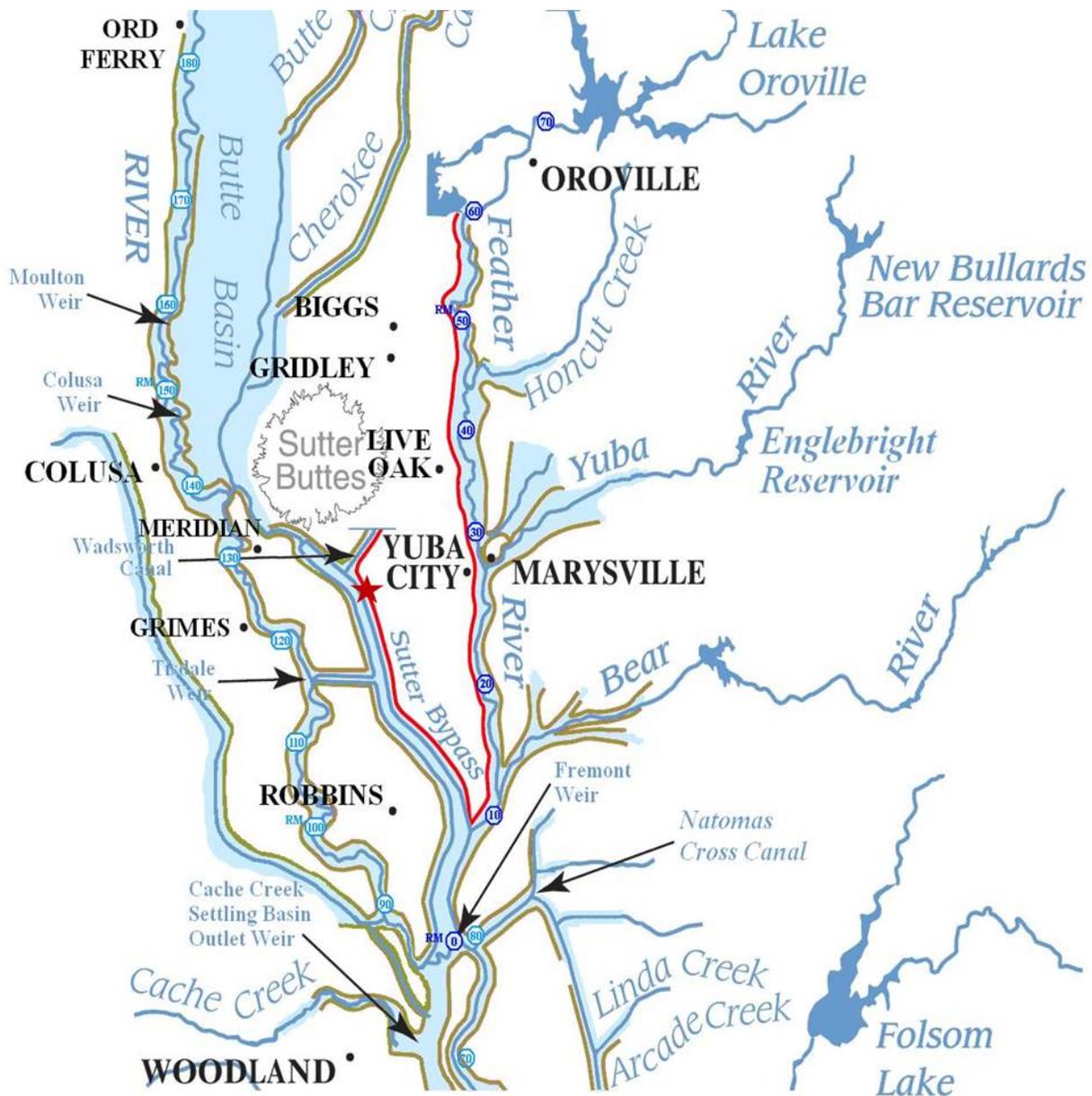
DOSS noted that the extremely high catch of Chinook salmon in the Sacramento Trawl over the past week (>3,000 Chinook) was driven by very high catch on 5/25/17, which was likely related to the release of ~1.2 million fish from Nimbus hatchery on the American River on 5/24/17

(approximately 600,000 fish were released at each of two locations -- the Sunrise boat ramp and the Jibboom St. boat ramp).

Agenda Item 6.

Fish Monitoring: Tracking of acoustic-tagged Chinook salmon

The Sutter Bypass acoustic tagging project used a rotary screw trap (RST) installed at Weir 2 in the East Borrow of the Sutter Bypass (RST location shown by red star on map below) to collect outmigrating Chinook salmon (expected to be a mix of spring-run and fall-run Chinook salmon). 190 Chinook salmon were collected, tagged with JSATS, and released below Weir 2 from 5/5 to 5/12. Last week (5/23-5/25), 0 fish were detected by realtime receivers at the Sacramento I80/50 Bridge. The cumulative detections since the earliest release is 40 (11% of released fish).



CDFW released 146 acoustic tagged brood year 2016 fall-run Chinook salmon from Nimbus Hatchery at the Sunrise Boat Ramp on the American River on 5/24/17 along with a production release of approximately 600,000 brood year 2016 fall-run Chinook salmon from Nimbus Hatchery. 111 fish were detected at the Sacramento I-80/50 Bridge over the reporting period of 5/24-5/28. The cumulative detections since release is 111 (76% of released fish).

RSTs installed in Mill Creek and Deer Creek are being used to collect outmigrating Chinook salmon (expected to be a mix of spring-run and fall-run Chinook salmon). Since 5/15/17, 34 Chinook have been acoustic-tagged and released. Two fish were detected at the Sacramento I-80/50 Bridge over the reporting period of 5/15-5/27. The cumulative detections since the earliest release is 2 (6% of released fish).

Agenda Item 7.

Fish Monitoring: Salvage⁶

⁶ Salvage data reported in this section represent the total estimated and expanded salvage based on the number of fish observed at the fish collection facility. For example, if one steelhead is observed in the typical ½-hour sampling period within a 2-hour operation period, the single steelhead is expanded to a salvage of four.

DOSS Weekly Salvage Update

Reporting Period: May 22-May 28, 2017

Prepared by Bob Fujimura on May 30, 2017 15:10 - Updated

Preliminary Results -Subject to Revision

| Criteria | 22-May | 23-May | 24-May | 25-May | 26-May | 27-May | 28-May | Trend | |
|------------------------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| Loss Densities | | | | | | | | | |
| Wild older juvenile CS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | → | 0 |
| Wild steelhead | 0 | 0 | 1.98 | 0.60 | 0 | 0 | 0 | ↘ | 0.37 |
| Exports | | | | | | | | | |
| SWP daily export | 5,136 | 5,295 | 5,138 | 3,633 | 3,619 | 3,442 | 3,432 | ↘ | 4,242 |
| CVP daily export | 3,678 | 3,694 | 3,622 | 3,627 | 3,700 | 3,585 | 3,650 | ↘ | 3,651 |
| SWP reduced counts | 0% | 11% | 0% | 8% | 8% | 0% | 0% | ↘ | 4% |
| CVP reduced counts | 0% | 0% | 0% | 0% | 0% | 0% | 0% | → | 0% |

Loss Density = fish lost/TAF; water export = AF; Trend = compared to previous week; wild = adipose fin present

Loss = estimated number of fish lost at the CVP and SWP Delta export facilities based on estimated salvage (see below)

Reduced counts = percentage of time that routine salvage sample time were less than 30 min per 2 hours of salvage and export operations

Yellow highlighted dates indicate brief fish salvage outages occurred

Chinook Salmon Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities

Race determined by size at date of capture; hatchery = adipose fin missing;

| Category | Weekly Total | | | Season Total | |
|-----------------|--------------|--------------|-------|---------------|---------------|
| | Salvage | Loss | Trend | Salvage | Loss |
| Wild | | | | | |
| Winter Run | 0 | 0 | → | 46 | 111 |
| Spring Run | 709 | 1,476 | ↘ | 24,687 | 65,763 |
| Late Fall Run | 0 | 0 | → | 20 | 73 |
| Fall Run | 1,156 | 1,525 | ↘ | 11,363 | 24,640 |
| Unclassified | 0 | 0 | → | 97 | NC |
| Total | 1,865 | 3,001 | | 36,213 | 90,586 |
| Hatchery | | | | | |
| Winter Run | 0 | 0 | → | 368 | 1,009 |
| Spring Run | 21 | 87 | ↘ | 952 | 1,753 |
| Late Fall Run | 0 | 0 | → | 639 | 1,387 |
| Fall Run | 154 | 155 | ↘ | 338 | 444 |
| Unclassified | 0 | 0 | → | 6 | NC |
| Total | 175 | 242 | | 2,303 | 4,593 |

Trend = weekly loss per race; Salvage = estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time

NC = can not be calculated

Steelhead Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities

| Category | Weekly Total | | | Season Total | |
|--------------|--------------|-----------|-------|--------------|------------|
| | Salvage | Loss | Trend | Salvage | Loss |
| Wild | 5 | 22 | ↘ | 53 | 171 |
| Hatchery | 0 | 0 | → | 39 | 162 |
| Total | 5 | 22 | | 92 | 333 |

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

Generated by Bob Fujimura on May 30, 2017

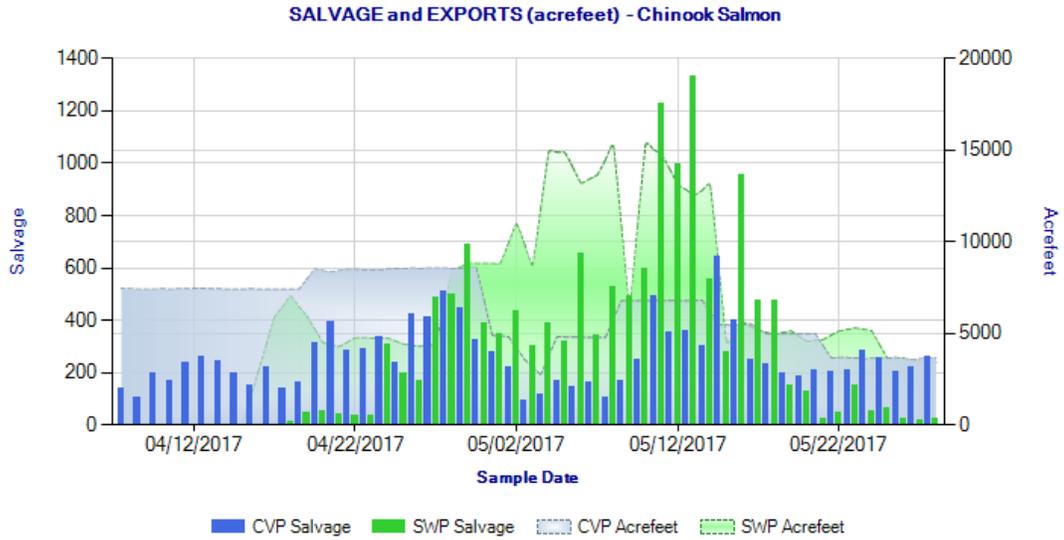


Figure 1. Daily salvage of Chinook Salmon (all races) and water exports from the state and federal fish salvage facilities during April 8 through May 28, 2017. Graph obtained from the DFG salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

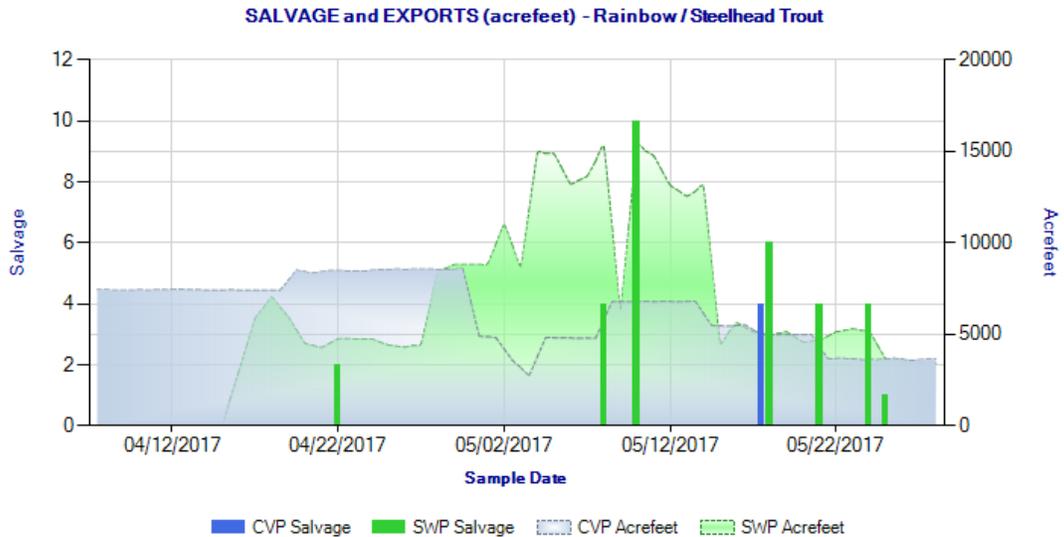


Figure 2. Daily salvage of Steelhead and water exports from the state and federal fish salvage facilities during April 8 through May 28, 2017. Graph obtained from the DFG salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>.

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES through 5/26/17

| 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 |
|--------------|----------|-----------------|-------------------|------------------|----------------|------------------------------|----------------------|--|---|---------------------|---------------------------------|--------------------------------|
| 12/9/2016 | LF | Coleman NFH | Battle Creek | Production | 1642.62 | 861,966 | n/a | 0.191 | n/a | n/a | 12/18/2016 | 1/23/2017 |
| 12/12/2016 | LF | Coleman NFH | Battle Creek | Spring Surrogate | 181.82 | 75,000 | n/a | 0.242 | n/a | 0.5% | 12/22/2016 | 1/19/2017 |
| 12/21/2016 | LF | Coleman NFH | Battle Creek | Spring Surrogate | 346.73 | 81,279 | n/a | 0.427 | n/a | 0.5% | 12/30/2016 | 1/29/2017 |
| 1/9/2017 | LF | Coleman NFH | Battle Creek | Spring Surrogate | 0.00 | 75,000 | n/a | 0.000 | n/a | 0.5% | * | * |
| 2/2/2017 | W | Livingstone NFH | Sacramento River | WR | 0.00 | 141,388 | n/a | 0.000 | n/a | 0.5% | * | * |
| 11/29/2016 | S | SJRRP | San Joaquin River | Experimental | 175.35 | 1200 | n/a | 14.613 | n/a | n/a | 12/23/2017 | 1/25/2017 |
| 11/29/2016 | F | SJRRP | San Joaquin River | Experimental | 6.05 | 544 | n/a | 1.112 | n/a | n/a | 12/27/2016 | 1/14/2017 |
| 3/6/2017 | S | SCARF | San Joaquin River | Experimental | 762.54 | 60,108 | n/a | 1.269 | n/a | n/a | 3/29/2017 | 5/15/2017 |
| 3/6/2017 | S | SIRF | San Joaquin River | Experimental | 448.77 | 38,106 | n/a | 1.178 | n/a | n/a | 4/2/2017 | 5/17/2017 |
| 4/24/2017 | F | MRH | Merced River | Experimental | 173.84 | 70,591 | n/a | 0.246 | n/a | n/a | 5/2/2017 | 5/25/2017 |

UNCONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES, 2016/2017

| Facility | Unknown CWT Loss ⁵ | Unread CWT Loss ⁶ | Unknown Hatchery Loss ⁷ | Acoustic Tag Loss ⁸ | Number of Unassigned CWTs ⁹ |
|--------------|-------------------------------|------------------------------|------------------------------------|--------------------------------|--|
| SWP | 266.47 | | | | |
| CVP | 32.88 | | | | |
| TOTAL | 299.35 | | | | |

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2016 through 5/26/2017.

¹Number 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.

⁴Date of first and last loss accounts for all CWT loss even those from special studies where salvage and loss=0.

⁵Adipose-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).

⁶Adipose-fin clipped Chinook was collected during fish count and has not been processed yet.

⁷CWT has been read, but hatchery release information not yet available.

⁸Adipose-fin clipped Chinook released due to presence of sutures.

⁹CWT 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.

¹⁰Chinook outside of the length-at-date criteria (Delta model) are not reported.

** Information not yet available.

DWR-DES Revised 5/30/2017

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

Agenda Item 8.

Fish Monitoring: The following table presents fish monitoring data summarized over the identified sampling dates. Unless otherwise noted, any reported sizes are fork length. Chinook run assignments are based on length-at-date criteria. DOSS acknowledges the limitations of the length-at-date criteria, particularly in distinguishing between young-of-year spring run Chinook and young-of-year fall-run Chinook. Additionally, once hatchery fall-run releases (75% of which are unmarked) occur upstream of a monitoring location (the first of which occurred on 3/22/17 for the current outmigration season), DOSS assumes that many of the unclipped spring-run-sized Chinook (and perhaps some of the winter-run-sized Chinook) observed in monitoring may be unmarked hatchery fall-run Chinook that fall into the spring-run or winter-run size ranges.

***Due to the holiday, DOSS did not receive all data at the time of the call. An updated table is included in Appendix A.**

| Location | Chippis Is. Midwater Trawl ^A | Sacramento Trawl ^A | Beach Seines ^A | Knights Landing RST ^B | Tisdale RST ^C | GCID RST ^D | Mossdale Kodiak Trawl ^E |
|----------------------|---|-------------------------------|---------------------------|----------------------------------|--------------------------|---------------------------------|------------------------------------|
| Sample Date | 5/21-5/27 | 5/21-5/27 | 5/21-5/27 | 5/21-5/29 | 5/21-5/22 | 5/23-5/29 | - |
| Chinook | | 522 ^F | | | | | |
| FR Chinook | 339 | 2,630 | 6 | 3 | 1 | 133 juveniles 12 smolts | |
| SR Chinook | 12 | 3 | | | | 1 smolt | |
| WR Chinook | | | | | | | |
| LFR Chinook | | | | | | | |
| Ad-Clipped Chinook | 176 | 941 | 1 | | | 11 FR (9 juveniles 2 smolts) | |
| Steelhead (ad-clip) | | | | | | | |
| Steelhead (wild) | | 1 | | | | 2 | |
| Green Sturgeon | | | | | | | |
| Flows (avg. cfs) | | | | 10,612 | 12,573 | 1,790 | |
| W. Temp. (avg. °F) | | | | 66.3 | 63 | 60.5 | |
| Turbidity (avg. NTU) | | | | 21.9 | 24.9 | 17.9 | |

^A DJFMP data taken from Bay Delta Live for the period of 5/21 to 5/27. Not included in the table above is 1 CHNE (the code used for spray-dyed Chinook, usually represent fish used for a gear efficiency trial) reported at the Chippis Island Trawl and 1 adult salmon at the Sacramento trawl.

^B Knights Landing RST sampling period was from 5/21 at 10:45 am to 5/29 at 11:15 am.

^C Tisdale RST sampling period was from 5/21 at 10:00 am to 5/22 at 9:30 am. Both traps were modified to 50% cone sampling during the sampling period.

^D GCID RST sampling period was from 5/23 to 5/29. On 5/24 a log was jammed in the trap cone.

^E Mossdale trawl data was reported after the DOSS call.

^F Preliminary data included a large number of unclipped fish not assigned to race collected at the Sacramento trawl on 5/25.

Agenda Item 9.

DOSS Estimates of Fish Distribution and Assessment of Entrainment Risk

DOSS estimates of the current distribution of listed Chinook, as a percentage of the population, are based on recent monitoring data and historical migration timing patterns. DOSS acknowledges the limitations of the length-at-date criteria, particularly in distinguishing between young-of-year spring run Chinook and young-of-year fall-run Chinook. Additionally, once hatchery fall-run releases (75% of which are unmarked) occur upstream of a monitoring location (the first of which occurred on 3/22/17 for the current outmigration season), DOSS assumes that many of the unclipped spring-run-sized Chinook (and perhaps some of the winter-run-sized Chinook) observed in monitoring may be unmarked hatchery fall-run Chinook that fall into the spring-run or winter-run size ranges.

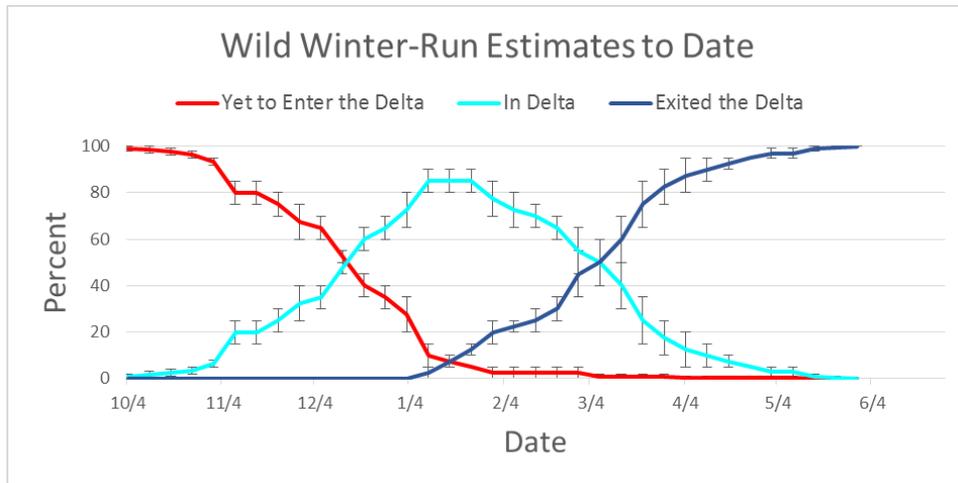
| Location | Yet to Enter Delta (Upstream of Knights Landing) | In the Delta | Exited the Delta (Past Chippis Island) |
|---|---|-----------------------------|---|
| <i>Wild young-of-year (YOY) winter-run Chinook salmon</i> | 0% (Last week: same) | 0% (Last week: 0%-1%) | 100% (Last week: 99%-100%) |
| <i>Wild young-of-year (YOY) spring-run Chinook salmon</i> | 0%-3% (Last week: 0%-5%) | 0%-3% (Last week: 0%-5%) | 94%-100% (Last week: 90%-100%) |
| <i>Hatchery winter-run Chinook salmon (released 2/2/17)</i> | 0% (Last week: same) | 0% (Last week: 0%-1%) | 100% (Last week: 99%-100%) |

Rationale for changes in distribution

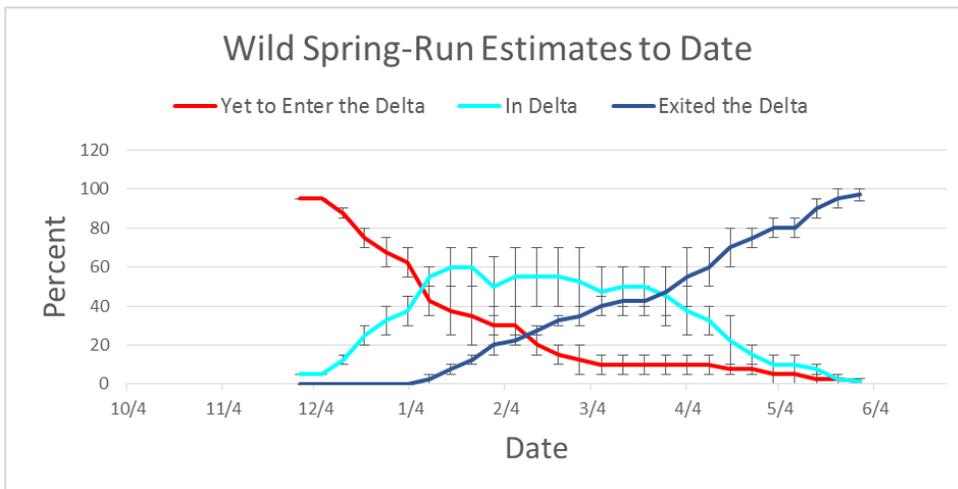
Wild winter-run Chinook: Over the past week no juvenile winter-run-sized Chinook salmon were observed at any monitoring locations. Based on monitoring observations and seasonal timing, DOSS estimated that all wild winter-run Chinook have moved out of the Delta past Chippis Island.

Wild spring-run Chinook: Over the past week, 1 juvenile spring-run-sized Chinook was observed at GCID, 3 were observed at the Sacramento trawl, and 12 at Chippis Island., DOSS estimated that a few percent more have moved out of the Delta past Chippis Island.

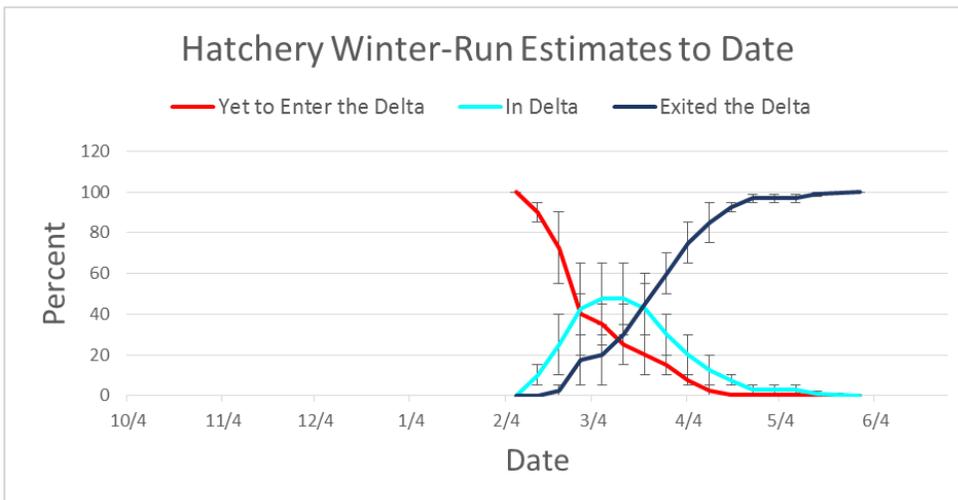
Hatchery winter-run Chinook: Over the past week, many ad-clipped Chinook were reported at monitoring locations in the Delta and at Chippis, but no CWT information is available for the recent week’s monitoring catch. Migration information on the acoustic-tagged hatchery winter-run Chinook is no longer available since the JSATS tags have reached their 60-day battery life. Based on seasonal timing, DOSS estimates that all hatchery winter-run have moved out of the Delta past Chippis Island.



WY 2017 wild winter-run distribution estimates to date.



WY 2017 wild spring-run distribution estimates to date.



WY 2017 hatchery winter-run distribution estimates to date.

DOSS Feedback on Entrainment Risk

DOSS provides weekly entrainment risk outlooks by considering (a) two different categories of entrainment risk based on listed fish distribution and (b) factors that influence their potential for entrainment. The two entrainment risk categories considered include:

- **Interior Delta Entrainment Risk**- fish in the Sacramento River that have the potential to be entrained into the Interior Delta through the Delta Cross Channel (when open) and/or Georgiana Slough; and
- **CVP/SWP Facilities Entrainment Risk**- fish in the Interior Delta that have the potential to be entrained into the CVP/SWP facilities.

Influencing factors considered include:

- **Exposure Risk** (both categories)- estimated scale (low, medium, high) of fish anticipated to be in vicinity of an entrainment risk,
- **Routing Risk** (Interior Delta Entrainment Risk)- estimated scale (low, medium, high) that flow split conditions could result in fish migrating into the interior delta instead of remaining in main channel, and
- **OMR/Export Risk** (CVP/SWP Facilities Entrainment Risk)- for fish in the Interior Delta, estimated scale (low, medium, high) that OMR and/or Export levels could result in entrainment into the CVP/SWP facilities.

To provide an overall assessment of entrainment risk, the estimated current status of these influencing factors are described below for each of the entrainment risk categories. Risks are unchanged from the previous week unless noted otherwise.

Interior Delta Entrainment Risk for listed salmonids in the Sacramento River over the next week:

- **Exposure Risk: LOW**
 - All winter-run and most spring-run Chinook salmon are estimated to have migrated out of the Delta past Chipps Island.
- **Routing Risk: LOW**
 - Intermediate river flows are expected to mute the tidal effects at Georgiana Slough (reducing the risk of routing into Georgiana Slough).
 - Delta Cross Channel is closed and likely to remain closed if river flow remains above ~20,000 cfs.
- **Overall Entrainment Risk: LOW**

CVP/SWP Facilities Entrainment Risk for listed salmonids in the Interior Delta over the next week:

DOSS notes that these risk assessments at negative OMR levels are not relevant to current OMR levels of ~3,000 cfs, which are projected to shift to ~-4,000 cfs on 6/1/17.

- **Exposure Risk: LOW** (last week: MEDIUM)
 - OMR is positive.
 - Recent data from Mossdale⁷ reported catch of unclipped and clipped Chinook salmon (likely a mix of fall-run Chinook and hatchery spring-run Chinook).
 - All recent salvage of hatchery Chinook is from releases in the San Joaquin Basin suggesting that most of the unclipped Chinook observed in recent salvage are also of San Joaquin basin origin.
 - For the salvage reporting period of 5/22/17-5/28/17, 5 wild steelhead were salvaged at the export facilities.
 - DOSS estimates that all Sacramento basin winter-run and most Sacramento basin spring-run Chinook salmon have exited the Delta past Chipps Island.
 - Historically, most steelhead outmigration from the San Joaquin River is during April and May.

- **OMR/Export Risk:**
 - OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: MEDIUM
 - OMR -5,000 cfs: HIGH
 - OMR -6,250 cfs⁸: incrementally HIGHER (given projected hydrology and high Vernalis flow)

Some members expect the relative risk of entrainment of an OMR limit of -6,250 compared to -5,000 cfs to further increase when Vernalis flows decrease.

- **Overall Entrainment Risk:**
 - OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: LOW (was LOW-MEDIUM last week)
 - OMR -5,000 cfs: MEDIUM (was MEDIUM-HIGH last week)
 - OMR -6,250 cfs⁶: incrementally higher within MEDIUM (was incrementally higher within MEDIUM-HIGH last week)

Considering the continued high Vernalis flows forecasted through the weekend, most members agreed that overall entrainment risk into the export facilities is lower at most OMR levels than it would be under lower flow conditions. The overall entrainment risk was driven in large part by the LOW exposure risk and less so (given projected hydrology) by the OMR/Export Risk.

Agenda Item 10.

DOSS Advice to NMFS and WOMT: None

Agenda Item 11.

Next Meeting: The next DOSS conference call will be on **6/6/17 at 9am.**

⁷ The past week's data from the Mossdale Trawl was not available during DOSS; DOSS assumed that catch patterns at Mossdale would be similar to that observed last week.

⁸By request of management, DOSS also assessed risks at an OMR flow more negative than -5,000 cfs.

Appendix A. Updated table included after the DOSS call.

Fish Monitoring: The following table presents fish monitoring data summarized over the identified sampling dates. Unless otherwise noted, any reported sizes are fork length. Chinook run assignments are based on length-at-date criteria. DOSS acknowledges the limitations of the length-at-date criteria, particularly in distinguishing between young-of-year spring run Chinook and young-of-year fall-run Chinook. Additionally, once hatchery fall-run releases (75% of which are unmarked) occur upstream of a monitoring location (the first of which occurred on 3/22/17 for the current outmigration season), DOSS assumes that many of the unclipped spring-run-sized Chinook (and perhaps some of the winter-run-sized Chinook) observed in monitoring may be unmarked hatchery fall-run Chinook that fall into the spring-run or winter-run size ranges.

| Location | Chippis Is. Midwater Trawl ^A | Sacramento Trawl ^A | Beach Seines ^A | Knights Landing RST ^B | Tisdale RST ^C | GCID RST ^D | Mossdale Kodiak Trawl ^E |
|----------------------|---|-------------------------------|---------------------------|----------------------------------|--------------------------|---------------------------------|------------------------------------|
| Sample Date | 5/21-5/27 | 5/21-5/27 | 5/22, 5/24-5/26 | 5/21-5/29 | 5/21-5/29 | 5/23-5/29 | 5/22-5/27 |
| Chinook | | | | | | | 877 |
| FR Chinook | 466 | 3,253 | 6 | 3 | 1 | 133 juveniles 12 smolts | |
| SR Chinook | 15 | 3 | | | | 1 smolt | |
| WR Chinook | | | | | | | |
| LFR Chinook | | | | | | | |
| Ad-Clipped Chinook | 231 | 948 | 5 | | | 11 FR (9 juveniles 2 smolts) | 183 |
| Steelhead (ad-clip) | | | | | | | |
| Steelhead (wild) | 1 | 1 | | | | 2 | |
| Green Sturgeon | | | | | | | |
| Flows (avg. cfs) | | | | 10,612 | 12,128 | 1,790 | |
| W. Temp. (avg. °F) | | | | 66.3 | 63.5 | 60.5 | |
| Turbidity (avg. NTU) | | | | 21.9 | 23.7 | 17.9 | |

^A Data reported in the 5/21-5/27 DJFMP sampling summary. Not included in the table above is 1 CHNE (the code used for spray-dyed Chinook, usually represent fish used for a gear efficiency trial) reported at the Chippis Island Trawl and 1 adult salmon at the Sacramento trawl.

^B Knights Landing RST sampling period was from 5/21 at 10:45 am to 5/29 at 11:30 am.

^C Tisdale RST sampling period was from 5/21 at 10:00 am to 5/29 at 9:30 am. Both traps were modified to 50% cone sampling during the sampling period.

^D GCID RST sampling period was from 5/23 to 5/29. On 5/24 a log was jammed in the trap cone.

^E Mossdale trawl sampling period was from 5/22 to 5/27.