

# Annual Report of Activities Water Year 2016

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Stanislaus Operations Group (SOG)  
September 2016

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## Acronyms and Abbreviations

<b>Term</b>	<b>Definition</b>
7DADM	Seven-Day-Average Daily Maximum Temperature
BiOp	Biological Opinion
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CDEC	California Data Exchange Center
CDFW	California Department of Fish & Wildlife
CWT	Coded Wire Tag
CDWR	California Department of Water Resources
ESA	Endangered Species Act
GDW	Stanislaus River at Goodwin Dam (CDEC gauge)
KF	Knights Ferry
NMFS	National Marine Fisheries Service
OBB	Stanislaus River at Orange Blossom Bridge (CDEC gauge)
OID	Oakdale Irrigation District
Reclamation	U.S. Bureau of Reclamation
RPA	Reasonable and Prudent Alternative
RPN	Stanislaus River at Ripon (CDEC gauge for dissolved oxygen)
SOG	Stanislaus Operations Group
SSJID	South San Joaquin Irrigation District
SWP	State Water Project
SWRCB	State Water Resources Control Board
TUCP	Temporary Urgency Change Petition
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish & Wildlife Service
WOMT	Water Operations Management Team
WY	Water Year

*Cover Photo:* Releases through the low level outlet of New Melones Dam. October 5, 2015, 246 cfs.  
*Credit:* Barb Byrne, NMFS

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## CHAPTER 1 INTRODUCTION AND BACKGROUND

### 1.1 Introduction

This report summarizes the activities and actions of the Stanislaus Operations Group (SOG) for Water Year (WY) 2016<sup>1</sup> in compliance with the NOAA's National Marine Fisheries Service (NMFS) 2009 Biological Opinion and Conference Opinion on the Long Term Operations of the Central Valley Project (CVP) and State Water Project (SWP; NMFS BiOp). Table 1-1 lists the Reasonable and Prudent Alternative (RPA) actions from the NMFS BiOp. These RPAs establish the requirements related to Stanislaus operations.

**Table 1-1. NMFS BiOp Reasonable and Prudent Alternative (RPA) actions, description, and page references in the 2009 BiOp with 2011 amendments<sup>2</sup> related to Stanislaus operations:**

ACTION ID	Page #	RPA Action Name
Section 11.2.1.2	9	Research and Adaptive Management (Annual Review)
Section 11.2.1.3	10	Monitoring and Reporting: (e) Adult escapement and juvenile monitoring for steelhead on the Stanislaus River.
Action III.1.1	7-9, 47	Establish Stanislaus Operational Group (SOG) for Real-Time Operational Decision-Making.
Action III.1.2	47-48	Provide Cold Water Releases to Maintain Suitable Steelhead Temperatures.
Action III.1.3	49-53, Appendix 2-E <sup>3</sup>	Operate the East Side Division Dams to Meet the Minimum Flows, as Measured at Goodwin Dam.
Action III.2.1	53-54	Increase and Improve Quality of Spawning Habitat with addition of 50,000 Cubic Yards of Gravel by 2014 and with a Minimum Addition of 8,000 Cubic Yards per Year for the Duration of the Project Actions.
Action III.2.2	54	Conduct Floodplain Restoration and Inundation in Winter or Spring to Inundate Steelhead Juvenile Rearing Habitat on One-to Three-Year Schedule.
Action III.2.3	54-55	Restore Freshwater Migratory Habitat for Juvenile Steelhead by Implementing Projects to Increase Floodplain Connectivity and to Reduce Predation Risk During Migration.

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<sup>1</sup> WY 2016 started on 10/1/15 and ended on 9/30/16. Because the report was due at the end of September, the operations tables do not include the last few days of the water year.

<sup>2</sup> The 2011 NMFS RPA adjustments are available online at:

[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711\\_ocap\\_opinion\\_2011\\_amendments.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

<sup>3</sup> Appendix 2-E is available at:

[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/appendix\\_2-rpa\\_supporting\\_documents\\_compiled.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/appendix_2-rpa_supporting_documents_compiled.pdf)

ACTION ID	Page #	RPA Action Name
Action III.2.4	55	Evaluate Fish Passage at New Melones, Tulloch, and Goodwin Dams.

## 1.2 Background

The Stanislaus River is of considerable interest to fishery management agencies, the public, and the U.S. Bureau of Reclamation (Reclamation). The agencies with trust responsibilities for fishery and water resources in the Stanislaus River include the U.S. Fish and Wildlife Service (USFWS), NMFS, California Department of Fish and Wildlife (CDFW), and State Water Resource Control Board (SWRCB). Reclamation is responsible for operating the East Side Division, which includes New Melones Dam and powerplant. The East Side Division is operated to provide flood control, irrigation, power generation, general recreation, water quality, and fish and wildlife enhancement<sup>4</sup>. A partnership between the Oakdale Irrigation District and the South San Joaquin Irrigation District (collectively, the Districts), known as the Tri Dam Project, own and operate multiple features on the Stanislaus River. These include Donnell and Beardsley dams and reservoirs (upstream of New Melones) and Tulloch Dam and Reservoir (downstream of New Melones). The Districts own Goodwin Dam and Reservoir located downstream of Tulloch Dam.

On June 4, 2009, NMFS issued its NMFS BiOp<sup>5</sup>. On April 7, 2011, NMFS issued adjustments<sup>6</sup> to the RPAs of the NMFS BiOp. Unless noted otherwise, references to page numbers in this document refer to page numbers in the 2011 NMFS RPA Adjustments. References to the NMFS BiOp should be considered to include the 2011 NMFS RPA Adjustments. The NMFS BiOp required that Reclamation create the Stanislaus Operations Group (SOG). The SOG is a technical team providing advice to NMFS and the Water Operations Management Team (WOMT) on issues related to the Stanislaus River fishery and water resources (2011 NMFS RPA Adjustments, *pp.* 8-9).

The SOG mission is “to gather and analyze information, and make recommendations, regarding adjustments to water operations within the range of flexibility prescribed in the implementation procedures”<sup>7</sup> for the Stanislaus River and for the operation of the East Side Division as a unit of the overall CVP which is consistent with all relevant laws, regulations, and standards, including the NMFS BiOp. Reclamation maintains its authority and responsibility for operations of the East Side Division complex. The SOG provides operational advice to NMFS and WOMT but has no authority in operational decisions. NMFS considers advice from SOG when making a final determination as to whether or not a proposed operational action is consistent with obligations to the NMFS BiOp and Endangered Species Act.

<sup>4</sup> PL 78-534 and PL 87-874

<sup>5</sup> The NMFS BiOp is available online at:

[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/nmfs\\_biological\\_and\\_conference\\_opinion\\_on\\_the\\_long-term\\_operations\\_of\\_the\\_cvp\\_and\\_swp.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/nmfs_biological_and_conference_opinion_on_the_long-term_operations_of_the_cvp_and_swp.pdf)

<sup>6</sup> The 2011 NMFS RPA adjustments are available online at:

[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711\\_ocap\\_opinion\\_2011\\_amendments.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

<sup>7</sup> 2011 NMFS RPA Adjustments at p. 7.

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### **1.3 Membership**

The SOG WY 2016 membership was:

- Reclamation
- USFWS
- NMFS
- CDFW
- California Department of Water Resources (CDWR)
- Environmental Protection Agency (EPA)
- U.S. Army Corps of Engineers (USACE)
- SWRCB

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## CHAPTER 2 SUMMARY OF ACTIONS AND SOG DISCUSSIONS

SOG monthly meetings for WY 2016 consisted of:

### 2.1 Monthly Discussion Topics

- Water operations at Goodwin Dam;
- Water quality [temperatures at Orange Blossom Bridge (OBB) and Knights Ferry (KF), dissolved oxygen (DO) at Ripon];
- Stanislaus RPA Actions (2011 NMFS RPA Adjustments at pages 46-55);
- Stanislaus River Forum update;
- Fish monitoring; and
- Restoration.

### 2.2 Other Discussion Topics

Additional substantive issues reviewed by SOG during WY 2016 include:

#### 2.2.1 Advice on implementation of the pulse flows in Action III.1.3

- Fall Attraction Flows (September and October 2015 meetings) – see details in advice provided in Appendix A.
- Winter Instability Flows (December 2015 and January and February 2016 meetings) – see details in advice provided in Appendix B.
- Spring Pulse Flow (March 2016) – see details in advice provided in Appendix C.

#### 2.2.2 SWRCB's Temporary Urgency Change Order and the Districts' Augmented Flow Release

The following details the timeline for the augmented flow release:

- April 1, 2016: Reclamation filed a Temporary Urgency Change Petition with SWRCB to temporarily modify requirements in its water right permits for the New Melones Project. Reclamation requested to temporarily modify both its water right conditions requiring implementation of San Joaquin River flow objectives from April through June of 2016 (per Water Rights Revised Decision 1641) and Stanislaus River DO objectives through September of this year.
- April 14, 2016: Reclamation submitted an email rescinding its request to modify the DO requirements.

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- April 19, 2016: SWRCB issued a Temporary Urgency Change Order (TUCO)<sup>8</sup> lowering the required Vernalis pulse flow from 4,880 cubic feet per second (cfs) to 3,000 cfs from April 15-May 15, the Vernalis base flow through the end of May from 2,280 cfs to 1,000 cfs, and the Vernalis base flow in June from 2,280 cfs to 500 cfs.

The Districts hold senior water rights on the Stanislaus River, including the rights to store water in the old Melones Reservoir, decreed rights, and upstream and downstream storage and direct diversion rights. Because the Districts' water rights and other San Joaquin basin water rights are not conditioned on meeting Water Rights Decision 1641 requirements, limited supplies were available to Reclamation in WY 2016 to meet flow and other water quality requirements and maintain water in storage. The Districts conditionally offered an additional 75 TAF to the Stanislaus River above the Appendix 2-E spring pulse flow to help meet the required flows in the TUCO. The Districts indicated that this release was contingent on the ability to re-divert the incremental flow increase in the Delta to supplement water supplies south of the Delta. The primary limitation on delta diversions during this time was Action IV.2.1 of the NMFS BiOp, relating to the Vernalis-inflow-to-export-ratio. In order to lessen the limitations and support the additional release of 75 TAF, NMFS approved flexibility in the implementation of Action IV.2.1 of the NMFS BiOp<sup>9</sup>. While Reclamation and the Districts released the amounts of water required by the TUCO, plus an additional 32 TAF from the Stanislaus basin, depletions were high and the flows at Vernalis did not meet the TUCO 31-day average flow requirement.

## 2.3 Implementation of RPA Actions in WY2016

### 2.3.1 RPA Action III.1.2 - Temperature Management

This RPA action requires Reclamation to manage the cold water supply within New Melones Reservoir and make cold water releases from New Melones Reservoir to provide suitable temperatures for California Central Valley (CV) steelhead (*Oncorhynchus mykiss*) rearing, spawning, egg incubation, smoltification, and adult migration in the Stanislaus River downstream of Goodwin Dam.

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<sup>8</sup> The TUCO is available online at:

[http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/applications/transfers\\_tu\\_notices/2016/sjr\\_tucp\\_order\\_041916.pdf](http://www.waterboards.ca.gov/waterrights/water_issues/programs/applications/transfers_tu_notices/2016/sjr_tucp_order_041916.pdf)

<sup>9</sup> Request for flexibility from Reclamation:

[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/bureau\\_of\\_reclamation\\_s\\_april\\_12\\_2016\\_request\\_for\\_nmfs\\_concurrence\\_on\\_flex\\_of\\_san\\_joaquin\\_river\\_ie\\_ratio.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/bureau_of_reclamation_s_april_12_2016_request_for_nmfs_concurrence_on_flex_of_san_joaquin_river_ie_ratio.pdf)

Response from NMFS:

[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/nmfs\\_determination\\_on\\_san\\_joaquin\\_river\\_ie\\_flex\\_-\\_april\\_14\\_2016.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/nmfs_determination_on_san_joaquin_river_ie_flex_-_april_14_2016.pdf)

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The 56°F temperature criterion at OBB in the fall is intended to provide temperatures suitable for adult CV steelhead migration and holding. The NMFS BiOp states “This criterion shall apply as of October 1 or as of initiation date of fall pulse flow as agreed to by NMFS.” While normally SOG would advise the initiation date of the fall temperature criterion, temperature management during October to December of 2015 was determined by the Stanislaus Operations Plan submitted by Reclamation to the SWRCB and SOG provided no additional advice on implementation of Action III.1.2 for this period [temperature targets excerpted below; see details in Appendix A (in particular, pages A-4, A-13, and A-14)].

- **August 1 to October 31: 7 DADM not to exceed 65°F at Goodwin Dam** (measured at USGS 11302000).
- **November 1 to November 25 7DADM not to exceed 60°F at Orange Blossom Bridge** (measured at CDEC station OBB).
- **November 25-December 31: 7DADM not to exceed 56°F at Orange Blossom Bridge** (measured at CDEC station OBB).

Temperature criteria and water temperatures during WY 2016 are summarized in Chapter 3 Figure 3-3.

### **2.3.2 RPA Action III.1.3 - Flow Management**

This RPA action requires Reclamation to provide minimum instream flows in the Stanislaus River according to the New Melones year type specific minimum flow schedules in Appendix 2-E of the NMFS BiOp.

#### **2.3.2.1 Fall Pulse Flow**

The fall attraction flow is one component of the daily flow schedule required. As stated in the 2011 RPA Adjustments, the fall attraction flow is intended “...to improve in-stream conditions sufficiently to attract CV steelhead to the Stanislaus River.” The RPA action further notes that “...based upon the advice of SOG and concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action.”

Because New Melones storage was so low by the end of WY 2015 (Sept. 30, 2015 storage was 267.7 TAF), no CVP Project water was available to release for the Appendix 2-E fall pulse flow. Reclamation facilitated a release of 23,000 acre-feet (AF) of water from the Districts for the fall pulse flow.

SOG considered two reshaped flow schedules (Figure 2-1), both had the same volume (23,207 AF) as the Critical fall pulse in Appendix 2-E. Both “Alt A” and “Alt B” schedules reshaped the fall pulse volume into a three-peak release (the maximum daily releases in the alternatives reach 1,150 cfs (in “Alt A”) or 1,250 cfs (in “Alt B”); comparable to the peak sustained flow of 1,250 cfs in the default 2-E flow schedule). Relative to the default schedule in Appendix 2-E, both the “Alt A” and “Alt B” schedules (a) provided greater variability in flow in order to deter spawning until flows steady in the pulse tail, and (b) extended the pulse “tail” into November, which SOG expected would help to buffer water temperatures through mid-November. The “Alt B” schedule started and ended later –SOG advised this schedule based on a general consensus (at the 10/05/15 SOG meeting) that a later start to the fall pulse flow would be most likely to sustain suitable temperature conditions for adult salmonids through mid-November, when longer and cooler nights result in cooler water temperatures even at lower instream flow levels.

The rationale for the shaping and timing of the fall pulse flow, including a discussion of stakeholder input received at the Stanislaus River Forum, are provided in Appendix A. Actual fall pulse flow implementation is shown in Figure 3-2 in Chapter 3. The instream releases during the fall pulse flow period totaled 23,009 AF.

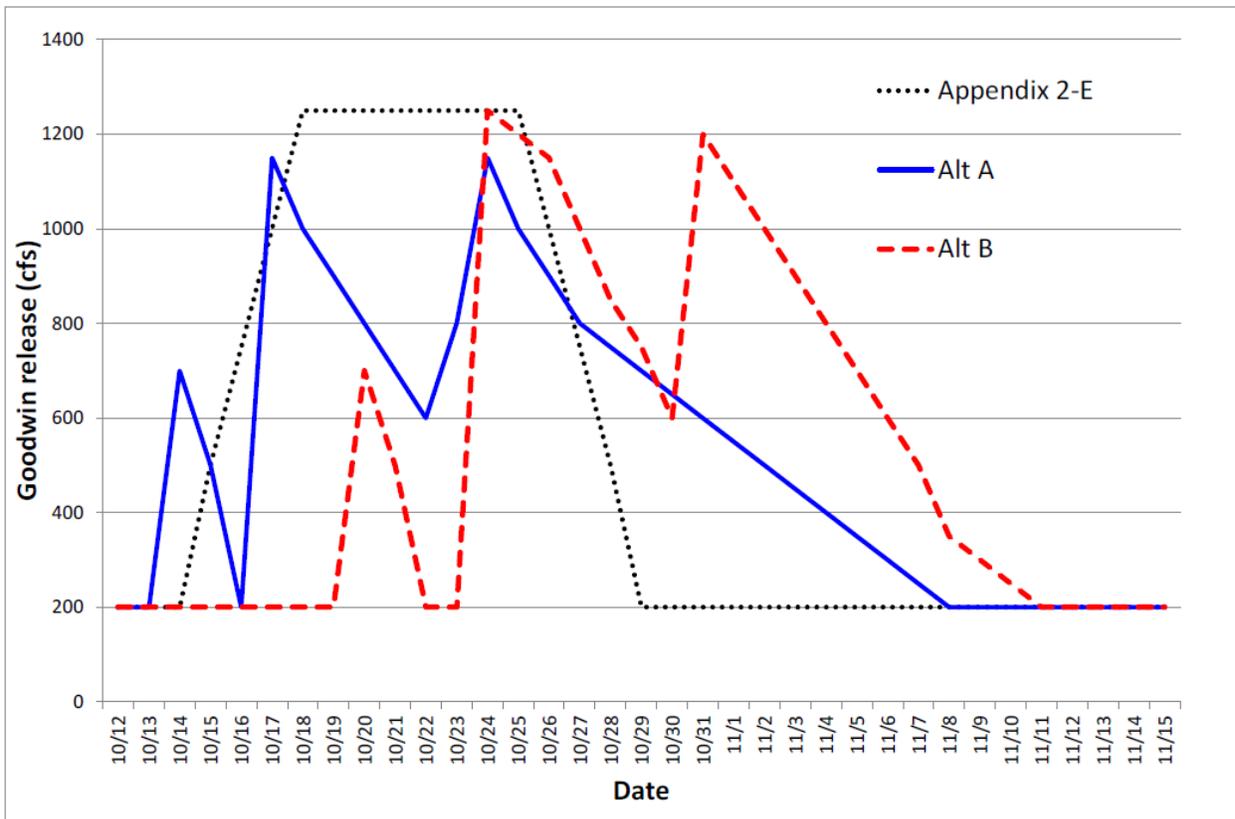


Figure 2-1. Selected Stanislaus fall pulse flow schedules considered by SOG for October November 2015. SOG advised, and NMFS approved, implementation of the “Alt B” pulse flow schedule

### 2.3.2.2 Winter Instability Flows

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Winter instability flows in January and February are another component of the daily flow schedule in Appendix 2-E required per Action III.1.3 of the RPA in the NMFS BiOp. The winter instability flows are intended “...to simulate natural variability in the winter hydrograph and to enhance access to varied rearing habitats” (2011 RPA Amendments p. 50). The RPA further states (p. 50) that “...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action.”

For January and February 2016, SOG advised, and NMFS approved, that given the current context and severity of New Melones storage conditions and the current limits to Reclamation’s discretion on water releases, natural storm pulses in January satisfied the winter instability flows. NMFS determined these flows were consistent with the implementation procedures of RPA Action III.1.3. Specifically, the natural storm pulse January 5-7, 2016 (realized storm flow in-river at Orange Blossom Bridge was 1,169 AF in addition to the 200 cfs base flow) was considered to satisfy the January winter instability flow and the multiple natural storm events in the second half of January (realized storm flow in-river at Orange Blossom Bridge was 2,705 AF in addition to the 200 cfs base flow) was considered to satisfy the February winter instability flow. Full details are provided in Appendix B.

### **2.3.2.3 Spring Pulse Flow**

The spring pulse flows identified in Action III.1.3 are intended to serve multiple purposes. Spring pulse flows provide outmigration flow cues to enhance likelihood of anadromy. The late spring flows help with conveyance and maintenance of downstream migratory habitat quality. The 2011 NMFS BiOp Amendments further note (p.50) that “...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action.” In WY 2016, SOG advised that the spring pulse flow be reshaped as one of two alternatives (Figure 2-2). SOG preferred “Alt A” and NMFS concurred that “Alt A” met the intent of RPA Action III.1.3. “Alt A” reshaped the Critical spring pulse flow volume into six smaller pulses from April to mid-May (Appendix C). SOG identified that the “Alt A” schedule had slightly higher stranding risks compared to the “Alt B” schedule, and NMFS recommended monitoring for stranding, and rescue. CDFW was able to complete a stranding survey after the first pulse peak (after which flows did not drop below 800 cfs) and results are summarized in Appendix D.

Flows during the spring pulse did not match the SOG shaping due to the higher flows required by the TUCO (described above in section 2.2.1 *SWRCB's Temporary Urgency Change Order and the District's Augmented Flow Release*; see also the Goodwin release compared to the default Appendix 2-E schedule shown in Figure 3-2). Since the flows were above the Appendix 2-E flow schedule, this release was technically not under SOG's purview, but SOG did provide comments to Reclamation and the Districts on SOG's preferred shaping of the additional release. SOG provided its original shaping advice during the March SOG meeting, but provided subsequent shaping advice via email on April 28 and May 10 and at the SOG meeting in May.

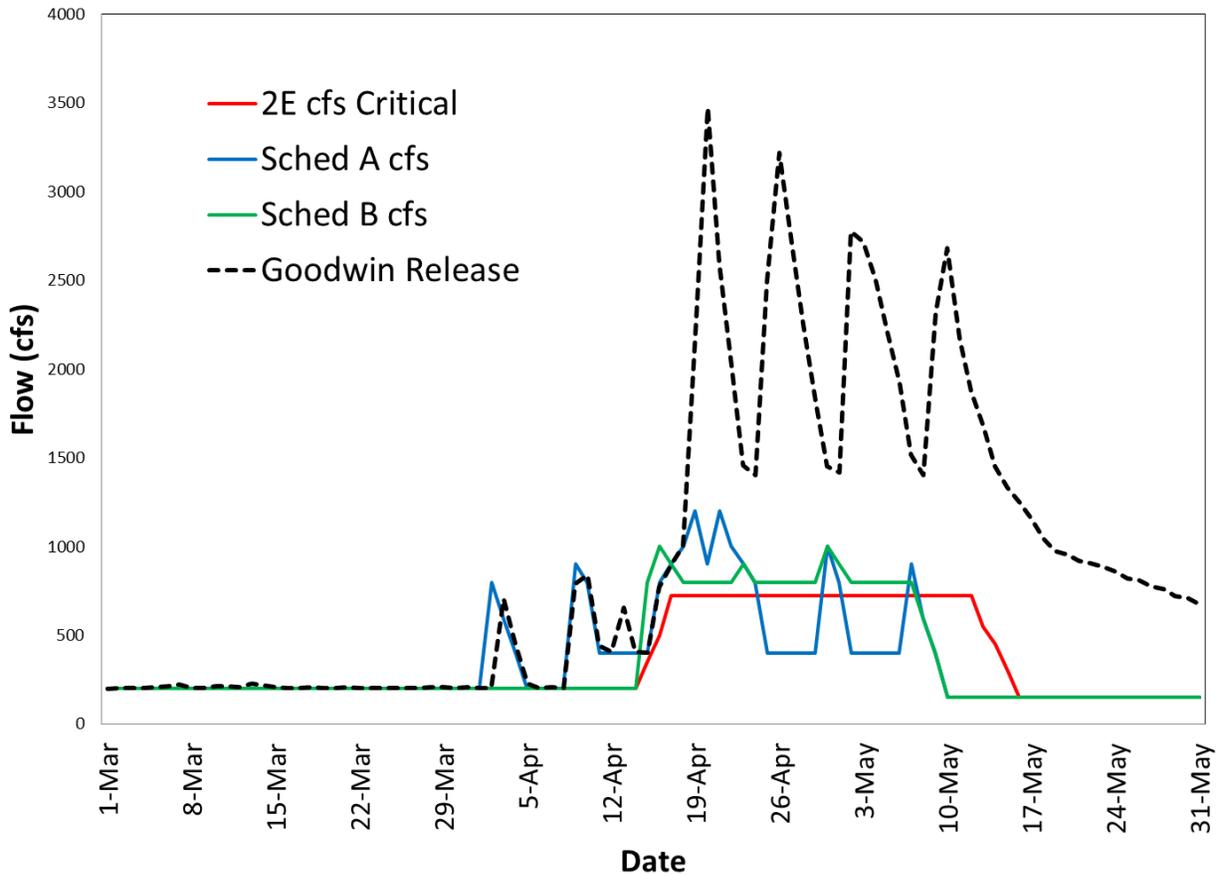


Figure 2-2. Selected spring pulse flow schedules considered by SOG. SOG advised and NMFS approved the “Sched A” (also referred to as “Alt A”) shaping.

### 2.3.3 RPA Action Suite III.2 - Habitat Restoration

The NMFS BiOp included a suite of four habitat restoration RPA actions<sup>10</sup> to improve habitat for spawning, rearing, and migrating CV steelhead:

<sup>10</sup> 2011 NMFS RPA Adjustments at pages 53-55. The 2011 NMFS RPA Adjustments are available online at: [http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711\\_ocap\\_opinion\\_2011\\_amendments.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

- **RPA Action III.2.1** -- Gravel augmentation
- **RPA Action III.2.2** -- Conduct Floodplain Restoration and Inundation Flows
- **RPA Action III.2.3** -- Restore Freshwater Migratory Habitat for Juvenile Steelhead by Implementing Projects to Increase Floodplain Connectivity and to Reduce Predation Risk During Migration
- **RPA Action III.2.4** -- Evaluate Fish Passage at New Melones, Tulloch, and Goodwin Dams

A summary of completed (since 2009) and potential habitat restoration projects relevant for the objectives of RPA Actions III.2.1, III.2.2, and III.2.3 is provided in Table 2-1. SOG expects that RPA Action III.2.4, which calls for an evaluation of fish passage at New Melones, Tulloch, and Goodwin Dams, is being addressed by the Interagency Fish Passage Steering Committee.

**Table 2-1. Completed (since 2009) and potential habitat restoration actions on the Stanislaus River relevant for the objectives of RPA Actions III.2.1, III.2.2, and III.2.3**

<b>Recovery action</b>	<b>Project extent</b>
COMPLETED gravel augmentation projects (for spawning habitat at all locations; some gravel placed at the cable crossing in Goodwin Canyon intended for mobilization and downstream placement by river flows)	
Goodwin Canyon at cable crossing – 2011	3,333 cubic yards
Goodwin Canyon at float tube pool – 2012	2,000 cubic yards
Goodwin Canyon at cable crossing – 2015	5,333 cubic yards
Main channel and floodplain bench at Honolulu Bar – 2012	8,000 cubic yards total used for spawning riffles in main channel and 0.7 acre floodplain bench
COMPLETED floodplain & side-channel restoration (for improved rearing habitat, improved migratory habitat, improved connectivity to avoid stranding)	
Lancaster Road side-channel -- 2011	640 feet of side-channel and 2 acres of floodplain habitat
Side-channel improvement at Honolulu Bar to reduce stranding risk – 2012	
Floodplain at Honolulu Bar, including clearing on non-native vegetation and planting of native riparian vegetation – 2012	2.4 acres
POTENTIAL Projects	
Two Mile Bar	<i>Anticipated gravel:</i> 6,000 cubic yards.
Horseshoe Recreation Area	<i>Anticipated gravel:</i> 6,000 cubic yards

Valley Oak Recreation Area	<i>Anticipated gravel:</i> 3,000 cubic yards
Buttonbush	<i>Anticipated habitat:</i> Up to 5 acres of side-channel and floodplain habitat and 2,800 feet of side-channel habitat. Approximately 2,500 cubic yards of gravel.
Potential site near Oakdale	<i>Anticipated habitat and gravel:</i> Acres of habitat and volumes of gravel are yet to be determined.
Goodwin Canyon	<i>Anticipated gravel:</i> The 2009 NMFS BiOp requires 50,000 cubic yards by 2014 (extension has been granted; including the 2015 augmentation in Goodwin Canyon, total augmentation through 2015 is 18,666 cy), and 8,000 cubic yards per year thereafter. The 8,000 cubic yards /year rate was achieved in 2012 during the Honolulu Bar restoration work.

## CHAPTER 3 WATER OPERATIONS SUMMARY

This chapter describes Stanislaus River operations for water year 2016, pertaining to RPA Actions III.1.2 and III.1.3. These actions are presented in reverse order for clarity.

### 3.1 Action III.1.3 – Flow Management

Figure 3-1 summarizes New Melones Reservoir operations from October 2015 through late September 2016.

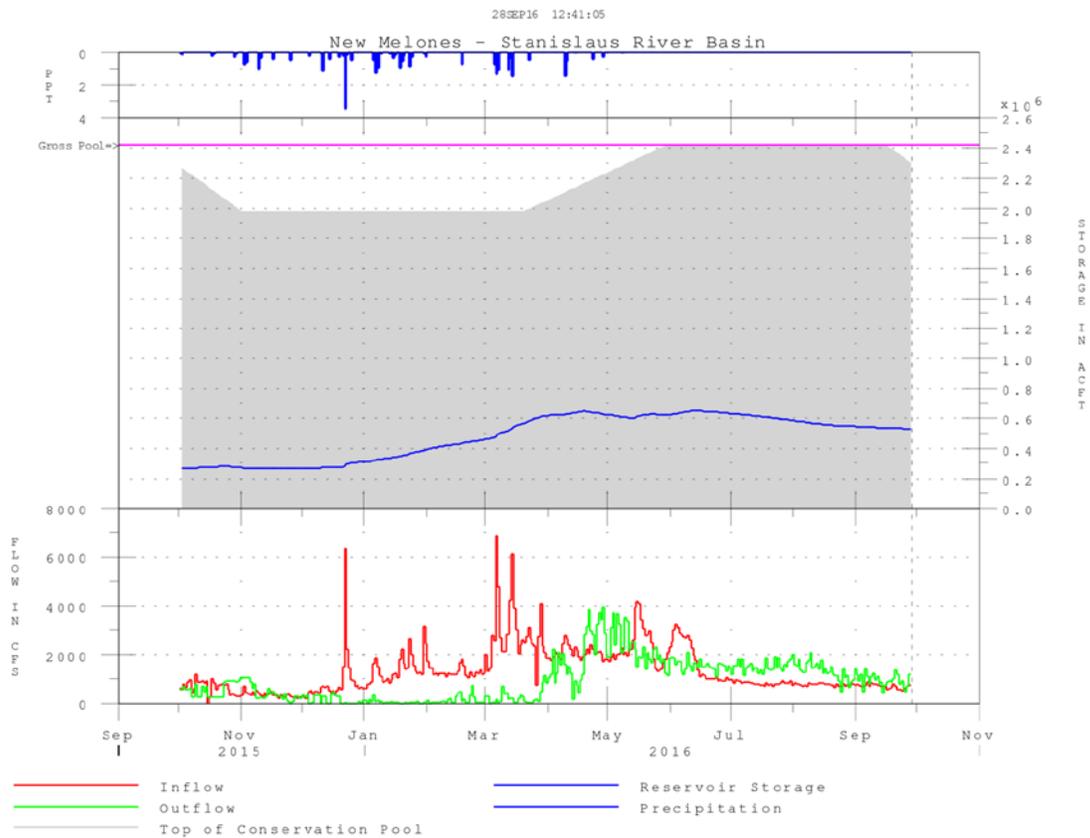


Figure 3-1. Summary of New Melones Reservoir Operations during the 2016 water year.

The 2016 WY classifications for determining Appendix 2-E minimum flows, based on the New Melones Index, were as follows in Table 3-1 (the New Melones Index is the sum of end-of-February storage and forecasted inflows for March through September). Per agreement (SOG meeting notes from February 17, 2010), the New Melones Index was calculated by using the Interim Plan of Operations methodology which uses the 90% exceedance forecast for any forecasted elements of the index<sup>11</sup>.

**Table 3-1. Water Year Classification by Month during WY 2016**

<b>Month</b>	<b>Water Year Classification</b>
October	Critically Dry
November	Critically Dry
December	Critically Dry
January	Critically Dry
February	Critically Dry
March	Critically Dry
April	Critically Dry
May	Critically Dry
June	Critically Dry
July	Critically Dry
August	Critically Dry
September	Critically Dry

### **3.2 Stanislaus River Operations:**

The October pulse was implemented according to the September SOG advice. During April and May, releases were governed by Appendix 2-E and the Vernalis flow target in the 4/19/16 TUCO<sup>12</sup>. An additional 75,000 acre-feet was shaped and released in conjunction with Appendix 2-E flows. In June, operations were governed somewhat by Appendix 2-E but mostly by the drought operations plan to meet the Vernalis flow target. From late June until late August, Stanislaus River DO was the controlling standard driving Goodwin releases. For late-August through late September (the time this report was drafted), Appendix 2-E was the controlling standard.

Goodwin Reservoir releases to the Stanislaus River are shown in Figure 3-2, including the primary reasons for those releases. Table 3-2 contains a summary of release changes from Goodwin Reservoir indicating the purpose of the operational change.

<sup>11</sup> For more information on this methodology, see Appendix C of the WY 2010 SOG Annual Report, available at: [http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Stanislaus%20Operations%20Group/2010\\_sog\\_annual\\_report.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Stanislaus%20Operations%20Group/2010_sog_annual_report.pdf)

<sup>12</sup> [http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/drought/tucp/usbr\\_tucp.shtml](http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/usbr_tucp.shtml)

### WY 2016 Stanislaus River Operations

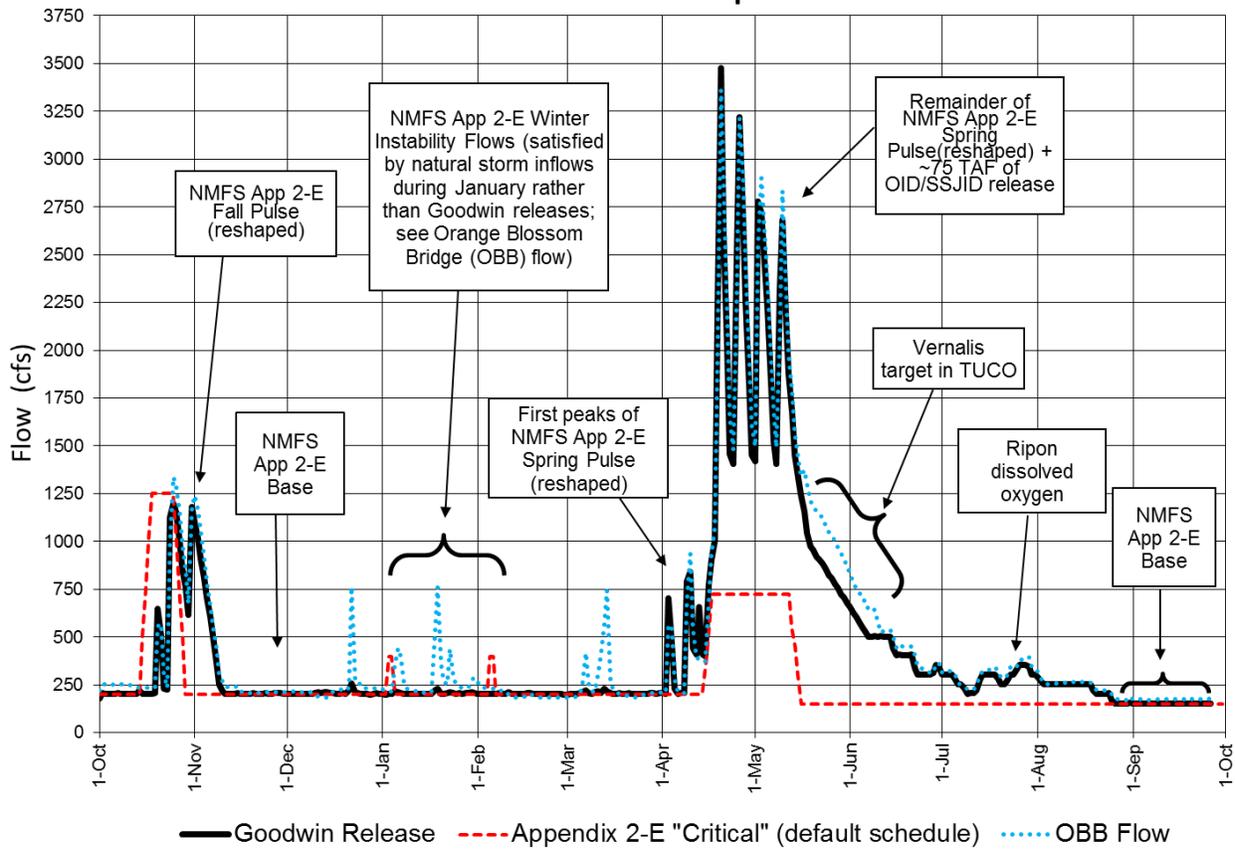


Figure 3-2. Summary of Stanislaus River releases at Goodwin Dam during WY 2016. Boxes identify the controlling requirements

Table 3-2. Release changes at Goodwin Dam during WY 2016

NEW MELONES LAKE OPERATIONS - GOODWIN RELEASE LOG				
Date	Time of Change	Increase or Decrease	Flow (cfs)	Comment/Reason
10/1/2015	1000	Increase	200	Appendix 2E flow min
10/19/2015	2300	Increase	300	Bi-Op SEC 2E Fall Attraction flows
10/20/2015	0100	Increase	400	Bi-Op SEC 2E Fall Attraction flows
	0300	Increase	500	
	0500	Increase	700	
10/21/2015	0100	Decrease	500	Bi-Op SEC 2E Fall Attraction flows
	2000	Decrease	400	
10/22/2015	0100	Decrease	300	Bi-Op SEC 2E Fall Attraction flows
	0500	Decrease	200	

<b>NEW MELONES LAKE OPERATIONS - GOODWIN RELEASE LOG</b>				
<b>Date</b>	<b>Time of Change</b>	<b>Increase or Decrease</b>	<b>Flow (cfs)</b>	<b>Comment/Reason</b>
10/23/2015	2000	Increase	300	Bi-Op SEC 2E Fall Attraction flows
	2200	Increase	400	
10/24/2015	0001	Increase	500	Bi-Op SEC 2E Fall Attraction flows
	0200	Increase	750	
	0400	Increase	1,000	
	0600	Increase	1,250	
10/25/2015	0100	Decrease	1,200	Bi-Op SEC 2E Fall Attraction flows
10/26/2015	0100	Decrease	1,150	Bi-Op SEC 2E Fall Attraction flows
10/27/2015	0100	Decrease	1,000	Bi-Op SEC 2E Fall Attraction flows
10/28/2015	0100	Decrease	850	Bi-Op SEC 2E Fall Attraction flows
10/29/2015	0100	Decrease	750	Bi-Op SEC 2E Fall Attraction flows
10/30/2015	0100	Decrease	600	Bi-Op SEC 2E Fall Attraction flows
	2300	Increase	850	
10/31/2015	0100	Increase	1,100	Bi-Op SEC 2E Fall Attraction flows
	0300	Increase	1,200	
	2300	Decrease	1,100	
11/2/2015	0100	Decrease	1,000	Bi-Op SEC 2E Fall Attraction flows
11/3/2015	0100	Decrease	900	Bi-Op SEC 2E Fall Attraction flows
11/4/2015	0100	Decrease	800	Bi-Op SEC 2E Fall Attraction flows
11/5/2015	0100	Decrease	700	Bi-Op SEC 2E Fall Attraction flows
11/6/2015	0100	Decrease	600	Bi-Op SEC 2E Fall Attraction flows
11/7/2015	0100	Decrease	500	Bi-Op SEC 2E Fall Attraction flows
11/8/2015	0100	Decrease	400	Bi-Op SEC 2E Fall Attraction flows
	1500	Decrease	300	
11/9/2015	0100	Decrease	250	Bi-Op SEC 2E Fall Attraction flows
4/3/2016	0001	Increase	300	First part of NMFS Appendix 2e Spring pulse flow
4/3/2016	0200	Increase	400	
4/3/2016	0400	Increase	500	
4/3/2016	0600	Increase	750	
4/3/2016	0800	Increase	800	
4/4/2016	0001	Decrease	600	
4/4/2016	0400	Decrease	500	
4/4/2016	0800	Decrease	400	
4/5/2016	0001	Decrease	300	
4/5/2016	0400	Decrease	250	
4/5/2016	0800	Decrease	200	

<b>NEW MELONES LAKE OPERATIONS - GOODWIN RELEASE LOG</b>				
<b>Date</b>	<b>Time of Change</b>	<b>Increase or Decrease</b>	<b>Flow (cfs)</b>	<b>Comment/Reason</b>
4/9/2016	0001	Increase	300	Continuation of NMFS Appendix 2e Spring pulse flow
4/9/2016	0200	Increase	400	
4/9/2016	0400	Increase	500	
4/9/2016	0600	Increase	750	
4/9/2016	0800	Increase	900	
4/10/2016	0001	Decrease	800	
4/11/2016	0001	Decrease	600	
4/11/2016	0400	Decrease	400	
4/16/2016	0001	Increase	500	Continuation of NMFS Appendix 2e Spring pulse flow
4/16/2016	0200	Increase	650	
4/16/2016	0400	Increase	800	
4/17/2016	0001	Increase	900	
4/18/2016	0001	Increase	1,000	
4/19/2016	0001	Increase	1,250	Continuation of NMFS Appendix 2e Spring pulse flow
4/19/2016	0200	Increase	1,500	
4/19/2016	0400	Increase	1,750	
4/19/2016	0600	Increase	2,000	
4/19/2016	0800	Increase	2,250	
4/19/2016	1000	Increase	2,500	
4/20/2016	0001	Increase	3,000	
4/20/2016	0200	Increase	3,500	
4/21/2016	0001	Decrease	3,000	
4/21/2016	0400	Decrease	2,500	
4/22/2016	0001	Decrease	2,000	
4/23/2016	0001	Decrease	1,700	
4/23/2016	0400	Decrease	1,400	
4/25/2016	0001	Increase	1,650	NMFS Appendix 2e Spring pulse flow with additional District water
4/25/2016	0200	Increase	1,900	
4/25/2016	0400	Increase	2150	
4/25/2016	0800	Increase	2650	
4/26/2016	0001	Increase	3200	
4/27/2016	0001	Decrease	2700	
4/28/2016	0001	Decrease	2200	
4/29/2016	0001	Decrease	1800	

<b>NEW MELONES LAKE OPERATIONS - GOODWIN RELEASE LOG</b>				
<b>Date</b>	<b>Time of Change</b>	<b>Increase or Decrease</b>	<b>Flow (cfs)</b>	<b>Comment/Reason</b>
4/30/2016	0001	Decrease	1600	
4/30/2016	0400	Decrease	1400	
5/2/2016	0001	Increase	1650	NMFS Appendix 2e Spring pulse flow with additional District water
5/2/2016	0200	Increase	1900	
5/2/2016	0400	Increase	2150	
5/2/2016	0600	Increase	2650	
5/2/2016	0800	Increase	3100	
5/3/2016	0001	Decrease	2700	
5/4/2016	0800	Decrease	2400	NMFS Appendix 2e Spring pulse flow with additional District water
5/5/2016	0800	Decrease	2100	
5/6/2016	0800	Decrease	1800	
5/7/2016	0400	Decrease	1600	
5/7/2016	0800	Decrease	1400	
5/9/2016	0600	Increase	1650	NMFS Appendix 2e Spring pulse flow with additional District water
5/9/2016	0800	Increase	1900	
5/9/2016	1000	Increase	2150	
5/9/2016	1200	Increase	2650	
5/9/2016	1400	Increase	3000	
5/10/2016	0800	Decrease	2500	
5/11/2016	0800	Decrease	2000	
5/12/2016	0800	Decrease	1800	
5/13/2016	0800	Decrease	1600	
5/14/2016	0400	Decrease	1400	
5/15/2016	0400	Decrease	1300	
5/16/2016	0800	Decrease	1200	
5/17/2016	0800	Decrease	1100	
5/18/2016	0800	Decrease	1000	
5/19/2016	0800	Decrease	950	Ramping down while meeting SWRCB's TUCO requirements at Vernalis.
5/21/2016	0800	Decrease	900	
5/23/2016	0800	Decrease	850	
5/25/2016	0800	Decrease	800	
5/27/2016	0800	Decrease	750	
5/29/2016	0800	Decrease	700	
5/31/2016	0800	Decrease	650	

<b>NEW MELONES LAKE OPERATIONS - GOODWIN RELEASE LOG</b>				
<b>Date</b>	<b>Time of Change</b>	<b>Increase or Decrease</b>	<b>Flow (cfs)</b>	<b>Comment/Reason</b>
6/2/2016	0800	Decrease	600	
6/4/2016	0800	Decrease	550	
6/6/2016	0800	Decrease	500	
6/15/2016	0800	Decrease	400	Ramping down while meeting SWRCB's TUCO requirements at Vernalis.
6/22/2016	0800	Decrease	300	Ramping down while meeting SWRCB's TUCO requirements at Vernalis.
6/28/2016	1800	Increase	350	Ripon DO
6/30/2016	1400	Decrease	300	Conserve storage
7/5/2016	1400	Decrease	250	Conserve storage
7/8/2016	1500	Decrease	200	Conserve storage
7/12/2016	1400	Increase	250	Ripon DO
7/13/2016	1400	Increase	300	Ripon DO
7/19/2016	1400	Decrease	250	Conserve storage
7/22/2016	1400	Increase	300	Ripon DO
7/25/2016	1200	Increase	350	Ripon DO
7/29/2016	2000	Decrease	300	Ripon DO
8/1/2016	1300	Decrease	275	Ripon DO
8/2/2016	1400	Decrease	250	Ripon DO
8/19/2016	0800	Decrease	200	Conserve storage
8/25/2016	0800	Decrease	150	Conserve storage

### **3.3 Action III.1.2 - Temperature Management**

Figure 3-3 is a summary of temperature operations from October 2015 through September 2016. Temperature exceedances were reported to NMFS and the SOG per the exception procedure.

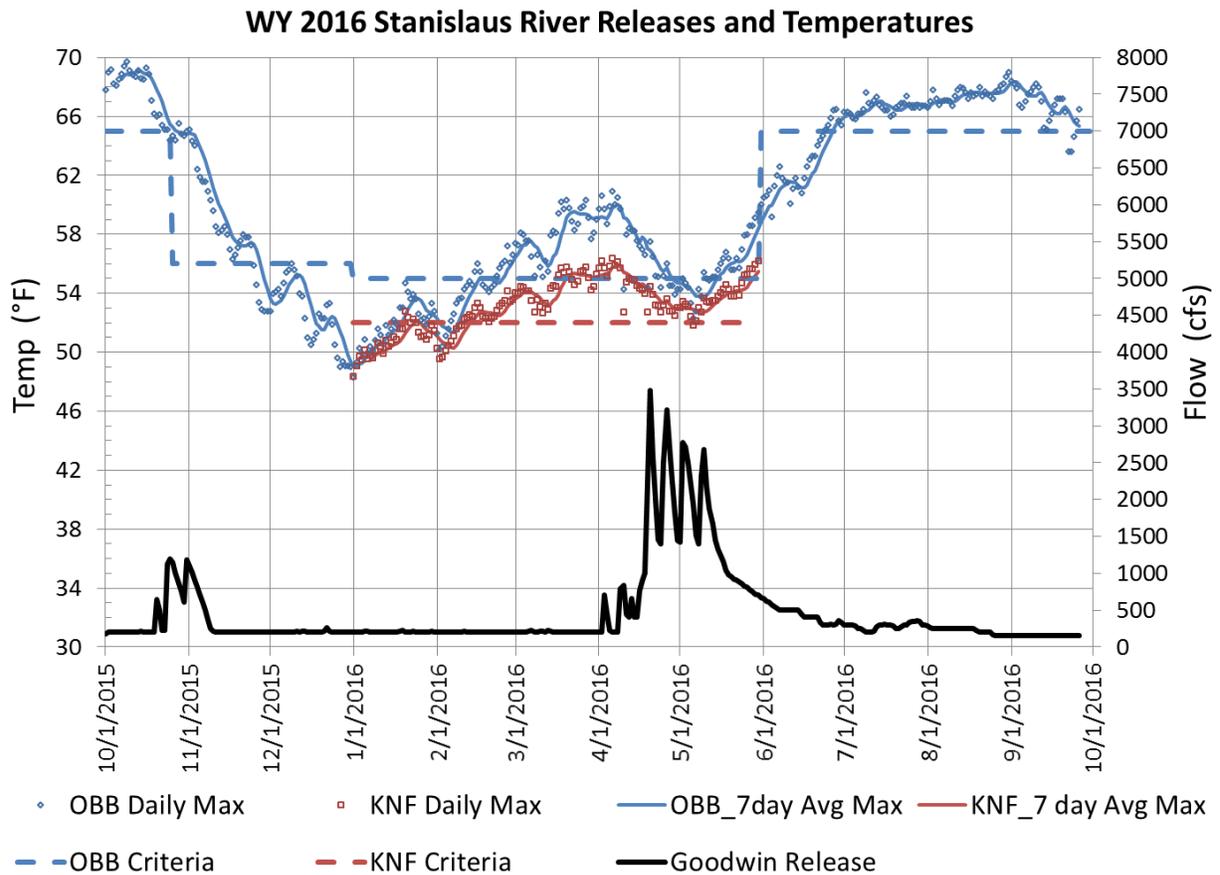


Figure 3-3. Summary of releases at Goodwin Dam and water temperatures at Orange Blossom Bridge (measured) and Knights Ferry (estimated) during WY 2016. The 7DADM targets October through December are per the temperature management plan submitted to the SWRCB in August 2015; the 7DADM targets January through September are per Action III.1.2 in the NMFS BiOp.

### 3.4 Summary of Water Year 2016 NMFS BiOp RPA Action III.1.2 Exceptions

RPA Action III.1.2 describes suitable temperatures for CV steelhead life stages on the Stanislaus River. The temperature criteria, measured at both OBB and Knights Ferry, are based on a 7-day average daily maximum temperature (7DADM). Stanislaus River temperatures are influenced by the upstream reservoir systems at Goodwin Dam, Tulloch Dam, and New Melones Dam (additional reservoir systems further upstream are assumed to have minimal effect on water temperature due to the large size of New Melones Reservoir). No temperature control devices or other physical structures are available to manage for temperature blending at these facilities except for a low-level outlet at New Melones that can only be used when the water surface elevation is below 808.0 feet. The outlet controls at both New Melones Dam and Tulloch Dam typically draw the coolest water available in those reservoirs. In the series of reservoirs (New Melones, Tulloch, and Goodwin), downstream temperature can be somewhat influenced with increased flows from Goodwin Dam. However, there are operational limitations to utilizing additional water due to conflicts with Reclamation’s obligations served by New Melones Reservoir storage and the desire to preserve cold water for fishery purposes later in the year.

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Because of extremely low reservoir levels at New Melones due to the extended drought, the low-level outlet was available for use in October and November. Reclamation's Regional Engineer advised that the low-level outlet only be used for its intended purpose (to make temporary base flow releases during times when the multipurpose tunnel has been dewatered for inspection and maintenance) when reservoir elevation exceeds 808.0 feet. This advice is in accordance with both the Design Operating Criteria and the Standard Operating Procedures for New Melones Dam and Reservoir.

The NMFS RPA provides a temperature exception procedure which requires Reclamation to notify NMFS if the temperature requirement is expected to be exceeded based on a three-day average daily maximum. Reclamation is also required to provide an evaluation of the conditions and identify conflicts with Reclamation's nondiscretionary requirements. The temperature exceptions in WY 2016 (see Figure 3-3) were noted and discussed within SOG including a modified plan of operations for the fall (October - December 2015; see discussion in Section 2.3.1). However, in spite of elevated flows for a fishery pulse, temperatures exceeded the OBB criterion in the fall. The Knights Ferry temperature criterion was exceeded from mid-February through May and the OBB temperature criterion was exceeded from mid-February through April. The large spring pulse flow helped reduce water temperatures below 55°F for a short period in early May but the combination of warm air temperatures, low reservoir storage and reduced flows pushed water temperatures back above the OBB temperature criterion by the end of June and through the remainder of summer.

## CHAPTER 4 SUMMARY OF SELECTED STANISLAUS FISH MONITORING DATA

Monitoring data from the Stanislaus River are summarized below for both fall-run Chinook salmon (*Oncorhynchus tshawytscha*) and *O. mykiss* (when data is present). The location of monitoring sites is shown in Figure 4-1.

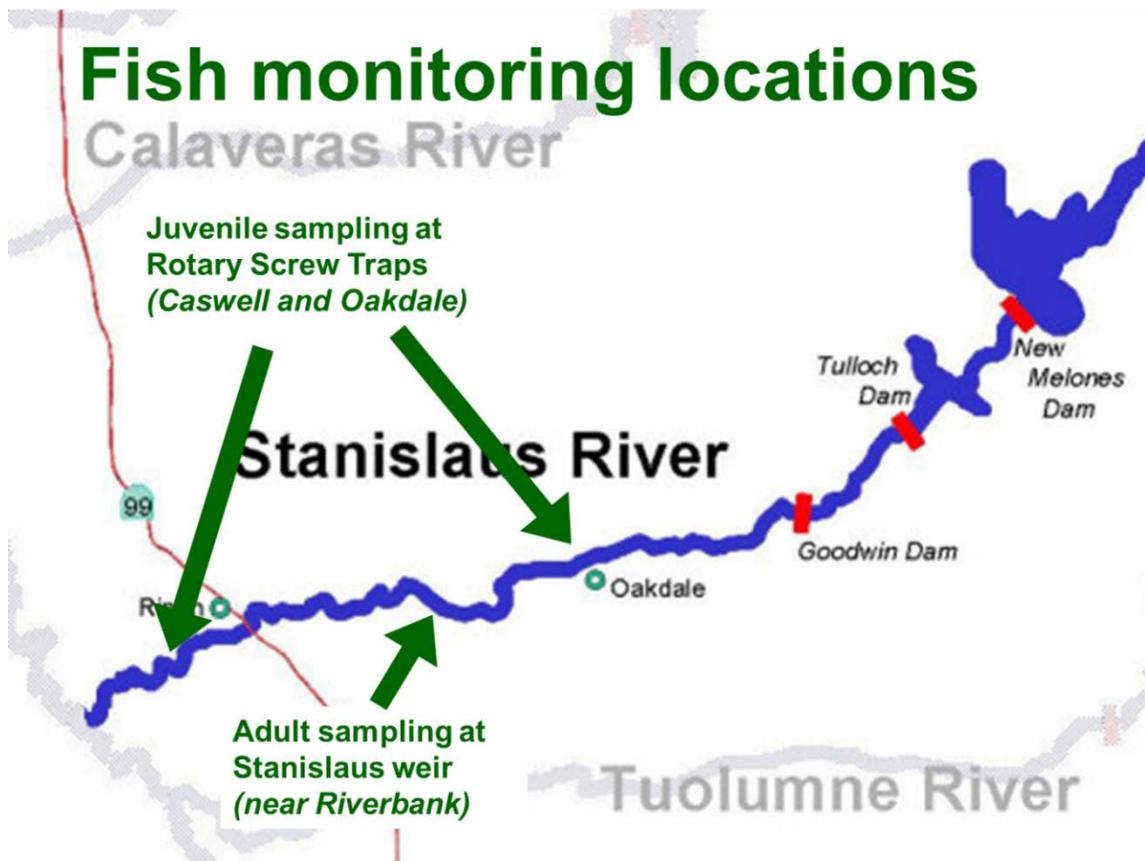


Figure 4-1. Location of fish monitoring efforts on the Stanislaus River

The USFWS funds Cramer Fish Sciences to conduct rotary screw trap monitoring on the Stanislaus River at Caswell Memorial State Park (approximately river mile 9). During the 2016 juvenile outmigration season, the trap sampled 132 out of 150 days during the 1/4/16 to 6/8/16 sampling season. A total of 2,164 Chinook were captured during the season, over twice the total of 905 Chinook captured over the 2015 juvenile outmigration season. Daily Chinook catch and lengths are reported in Figure 4-2 and Figure 4-3.

Two *O. mykiss* (fork lengths of 275 mm and 264 mm; Figure 4-3) were captured on 3/9/16 and 3/15/16 during a period of naturally elevated (*i.e.*, not due to reservoir releases) instream flows due to storm events (note elevated Ripon flow during the first half of March in Figure 4-2).

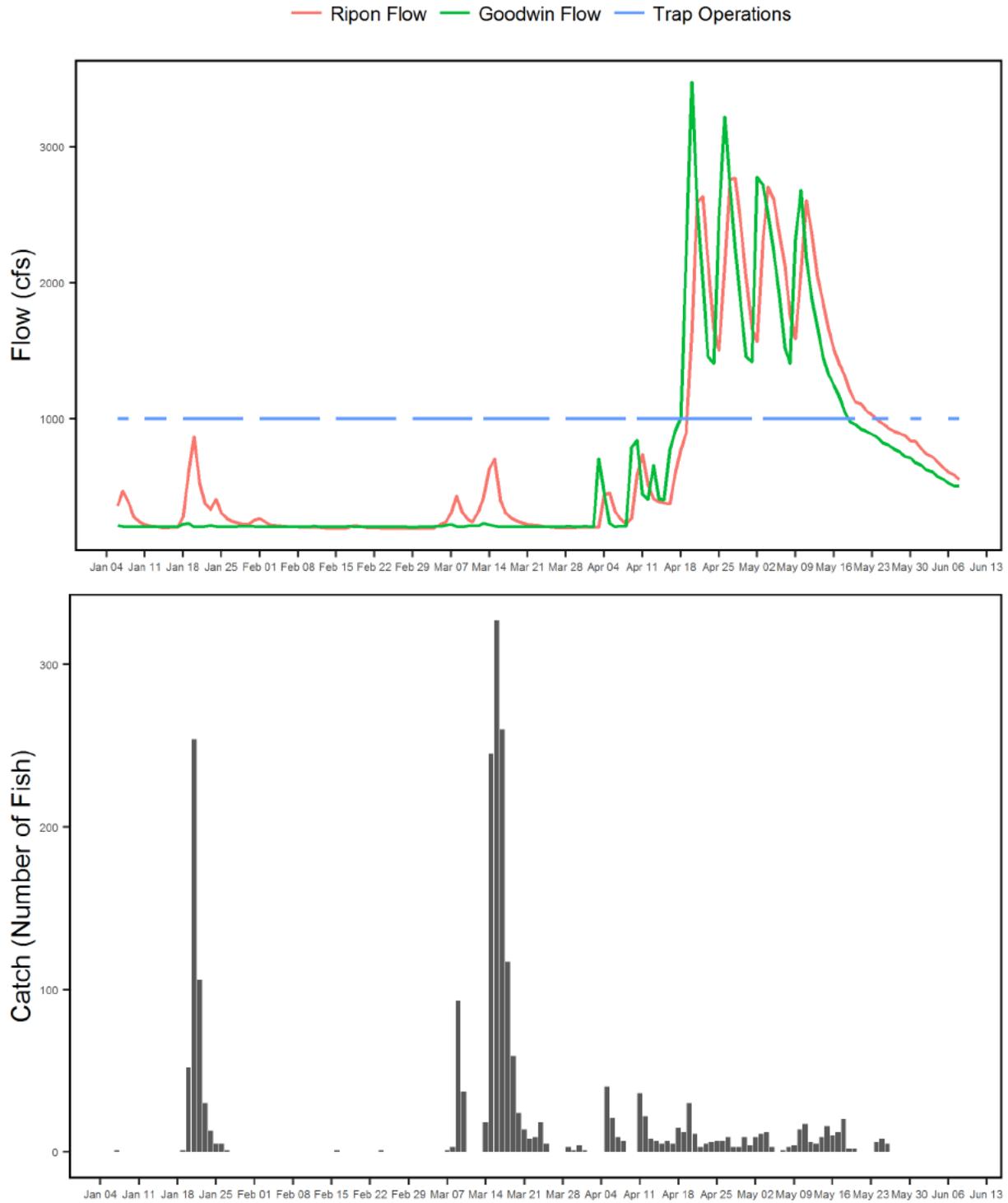


Figure 4-2. Daily catch of outmigrating juvenile Chinook salmon at Caswell and daily average flow (cfs) at Ripon (RIP) and Goodwin Dam (GDW) from 1/4/16 to 6/8/16. Figure courtesy of Cramer Fish Sciences.

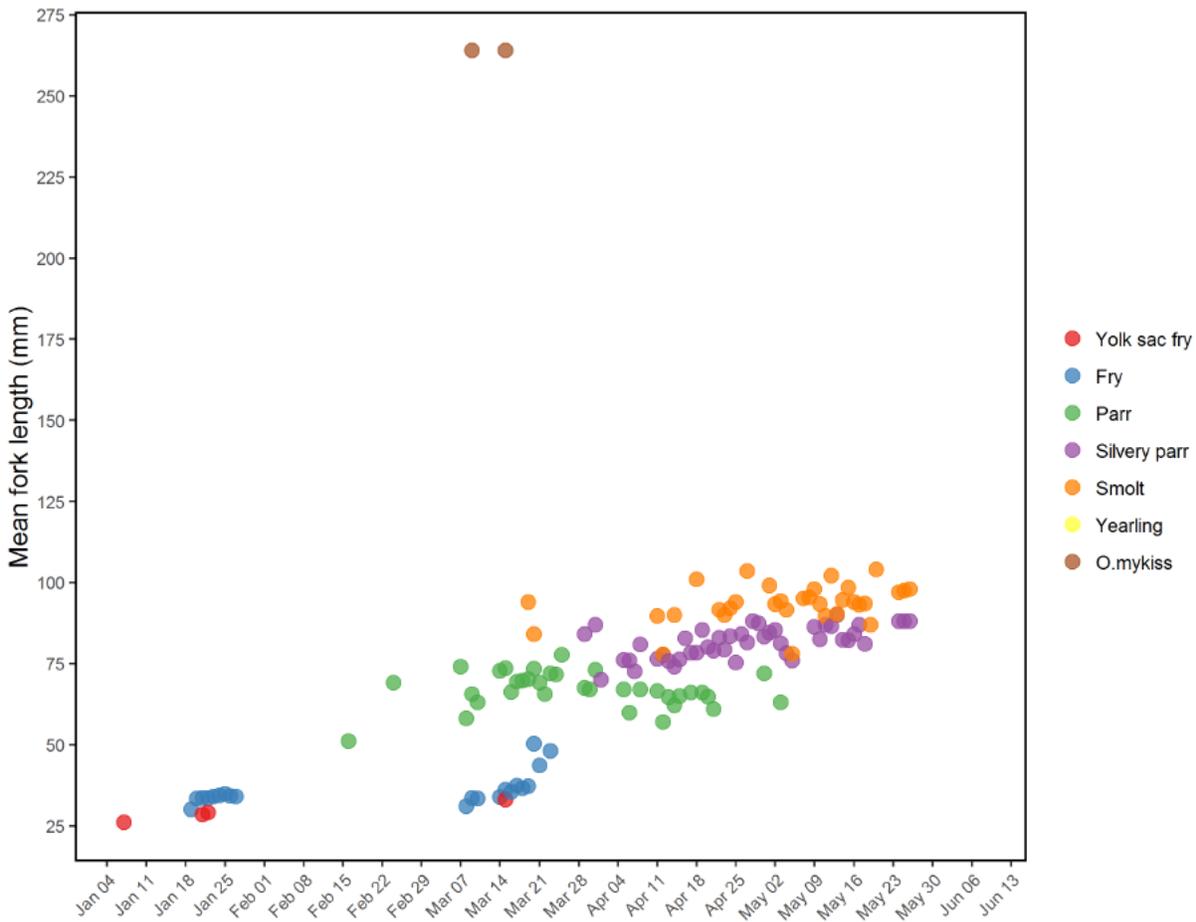


Figure 4-3. Mean daily fork length by life stage of outmigrating juvenile Chinook salmon and outmigrating juvenile *O. mykiss* captured at Caswell from 1/4/16 to 6/8/16. Figure courtesy of Cramer Fish Sciences.

The Districts' and Tri-Dam Project fund Fishbio to conduct adult weir monitoring near Riverbank (approximately river mile 31) and juvenile rotary screw trap monitoring near Oakdale (approximately river mile 40). During the 9/15/15 to 2/11/16 period of sampling, the net upstream passage of adult fall-run Chinook at the weir was 12,703 – nearly double the next-highest passage (seasonal total of 7,248 in 2012) observed since the weir sampling began in 2003. 3,279 (25.8%) of the Chinook were ad-clipped. Figure 4-4 shows daily net upstream passage of Chinook over the sampling period. Upstream passage of five *O. mykiss* was observed at the weir (Figure 4-5). Of the five *O. mykiss*, two individuals were greater than 16" in length (fish larger than this size threshold are assumed to be anadromous rather than resident adults) and three individuals (including both fish greater than 16") had a clipped adipose fin, indicating a hatchery origin. Juvenile monitoring data from the Oakdale rotary screw trap is provided in Figure 4-4 (Chinook salmon) through Figure 4-7 (*O. mykiss*).

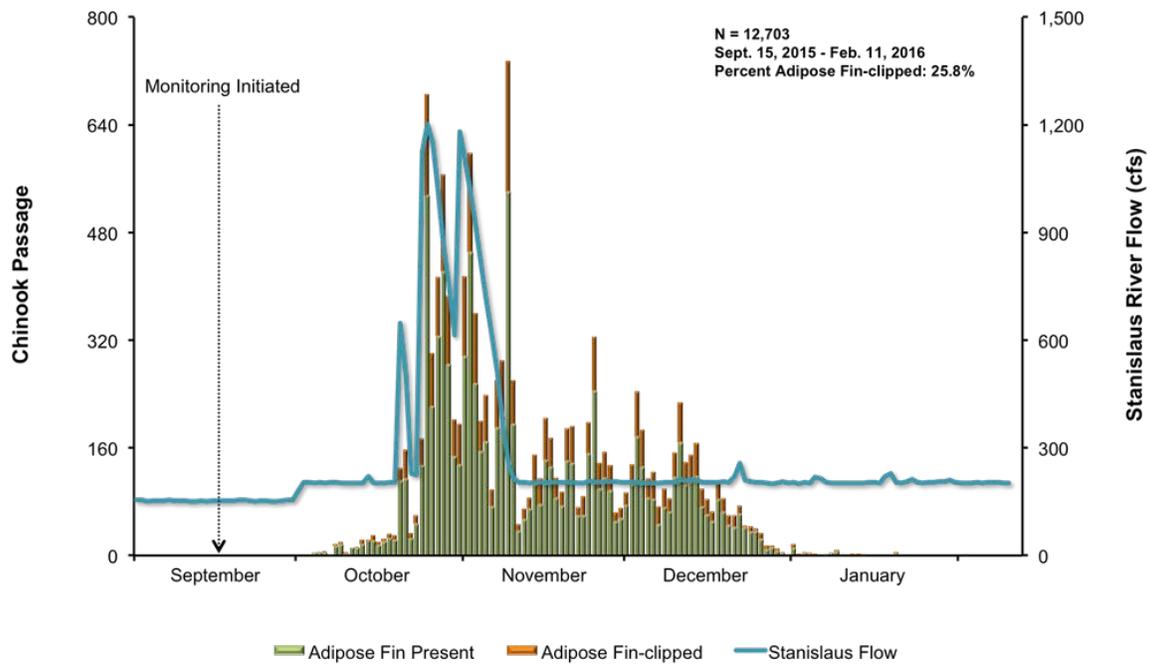


Figure 4-4. Daily upstream passage of adult Chinook salmon at the Stanislaus River Weir and flow at Goodwin Dam (GDW) and Ripon (RIP) from 9/15/15 to 2/11/16. Figure courtesy of FISHBIO.

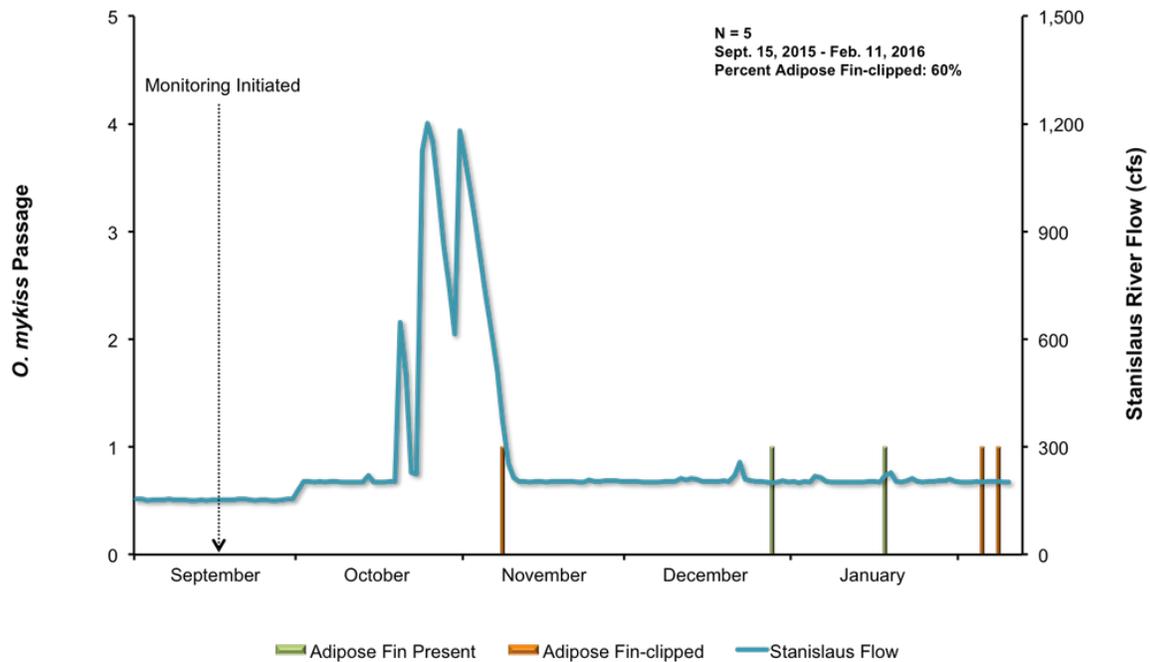


Figure 4-5. Daily Upstream passage of *O. mykiss* at the Stanislaus River Weir and flow at Goodwin Dam (GDW) and Ripon (RIP) from 9/15/15 to 2/11/16. Figure courtesy of FISHBIO.

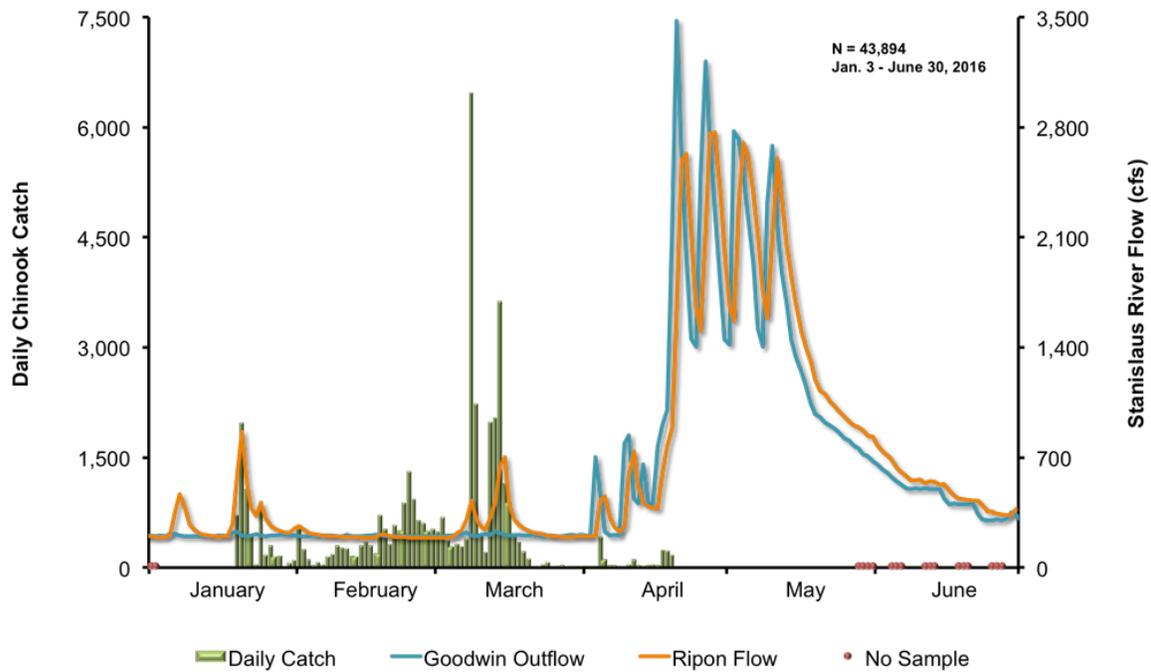


Figure 4-6. Daily catch of outmigrating juvenile Chinook salmon at the Stanislaus River rotary screw trap at Oakdale and flow at Goodwin Dam (GDW) and Ripon (RIP) from 1/3/16 to 6/30/16. Figure courtesy of FISHBIO.

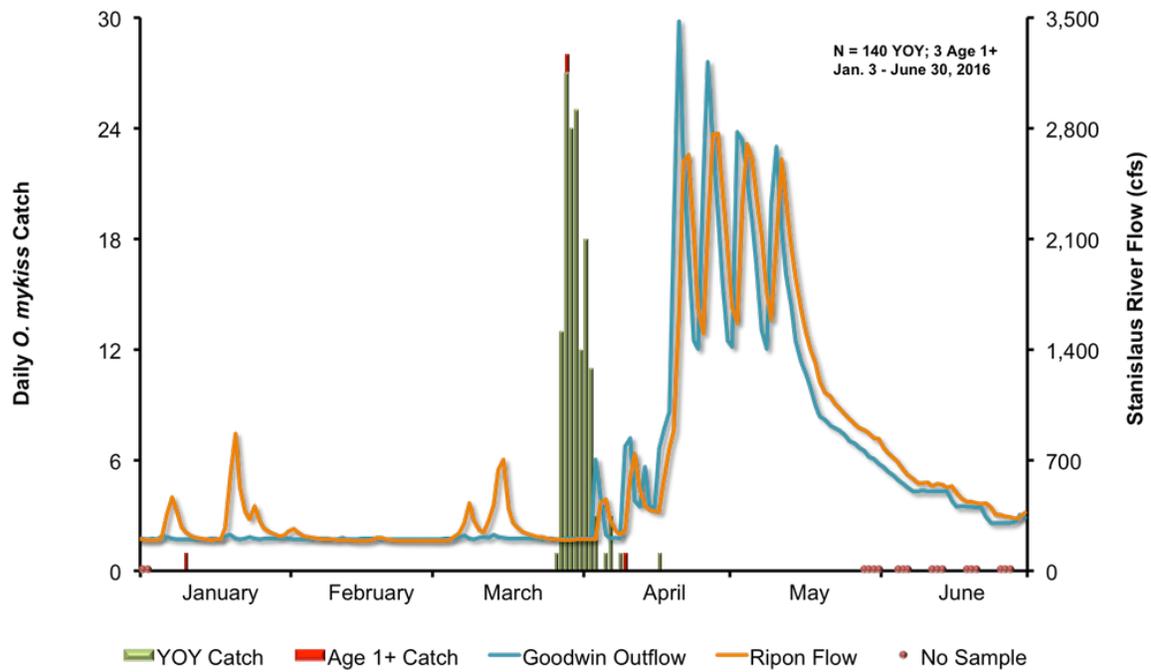


Figure 4-7. Daily catch of outmigrating juvenile *O. mykiss* at the Stanislaus River rotary screw trap at Oakdale and flow at Goodwin Dam (GDW) and Ripon (RIP) from 1/3/16 to 6/30/16. Figure courtesy of FISHBIO.



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## CHAPTER 5 REFERENCES

- National Marine Fisheries Service (NMFS). 2009. Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project. NMFS-Southwest Region. 844 pages plus appendices.  
[http://www.westcoast.fisheries.noaa.gov/central\\_valley/water\\_operations/ocap.html](http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/ocap.html)
- NMFS. 2011. Letter transmitting the 2009 Reasonable and Prudent Alternative with 2011 Amendments. April 7.  
[http://www.westcoast.fisheries.noaa.gov/central\\_valley/water\\_operations/ocap.html](http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/ocap.html)

# Appendix A—SOG advice on fall pulse flow



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## Stanislaus Fall Pulse Flow

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Garwin Yip - NOAA Federal <garwin.yip@noaa.gov>

Mon, Oct 5, 2015 at 10:14 AM

To: Elizabeth G' Kiteck <EKiteck@usbr.gov>

Cc: abahls@usbr.gov, "knwhite@usbr.gov" <knwhite@usbr.gov>, Barbara Byrne <Barbara.Byrne@noaa.gov>

Liz,

As you know, Action III.1.3 (page 49 of the 2011 RPA Amendments to the NMFS Biological Opinion) provides for the adaptive management of the flow schedule in Appendix 2-E of the NMFS Biological Opinion. Specifically, "...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action." (page 50 of the 2011 RPA Amendments to the NMFS Biological Opinion).

NMFS agrees that for 2015, the fall attraction flow may be reshaped according to either the "Alt A" or "Alt B" schedules in Attachment 1 of the attached SOG advice. NMFS determines that the proposed change in the fall pulse flow schedule is consistent with the implementation procedures of RPA Action III.1.3. NMFS understands that because of uncertainty about temperature conditions and migration timing in October, SOG requests a flexible time window, with the specific fall pulse flow alternative ("Alt A" or "Alt B") to be determined by SOG in early-mid October. This flexibility is granted. NMFS requests that SOG report back to NMFS and WOMT via e-mail on the specific pulse schedule as soon as determined, and no later than October 31, 2015.

As noted in the SOG advice, NMFS has already concurred that the proposed Stanislaus Operations Plan, including fall temperature management, is consistent with the implementation procedures of RPA Action III.1.2. Since SOG provides no additional advice on this point, no new NMFS determination is necessary for the implementation of Action III.1.2.

WOMT--In the interest of following the process provided in NMFS' Opinion section 11.2.1.1, this e-mail is to inform WOMT of NMFS' determination, and to provide WOMT with an opportunity to discuss the proposal. If anyone wants to discuss the SOG advice or NMFS determination, please let Aaron Miller know, and he can schedule a WOMT meeting, or discuss during tomorrow's scheduled WOMT call. Thanks.

-Garwin-

---

*Garwin Yip*

Water Operations and Delta Consultations Branch Chief

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**2015.10.2\_SOG Fall Pulse Flow and Temp Initiation Advice.pdf**  
444K



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## Stanislaus Fall Pulse Flow

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**Bahls, Amanda** <abahls@usbr.gov>

Mon, Oct 5, 2015 at 5:18 PM

To: Barbara Byrne - NOAA Federal <barbara.byrne@noaa.gov>, Garwin Yip <Garwin.Yip@noaa.gov>  
Cc: "Aaron@DWR Miller" <Aaron.Miller@water.ca.gov>, Amanda Bahls <abahls@usbr.gov>, "Anderson, Craig" <Craig\_Anderson@fws.gov>, Andy Chu <andy.chu@water.ca.gov>, Carolyn Bragg <CBragg@usbr.gov>, Chris Carr <ccarr@waterboards.ca.gov>, Dan Yamanaka <dan.yamanaka@water.ca.gov>, Daniel Worth <daniel.worth@waterboards.ca.gov>, David P van Rijn <dvanrijn@usbr.gov>, "Diane@Waterboards Riddle" <Diane.Riddle@waterboards.ca.gov>, Donna Garcia <dcgarcia@usbr.gov>, "Duane@Wildlife Linander" <Duane.Linander@wildlife.ca.gov>, "Ford, Mike" <john.ford2@water.ca.gov>, "Giudice, Domenic" <domenic.giudice@wildlife.ca.gov>, "Gutierrez, Monica" <Monica.Gutierrez@noaa.gov>, "He, Li-Ming" <li-ming.he@noaa.gov>, "Hidalgo, Christina R SPK" <christina.r.hidalgo@usace.army.mil>, James Edwards <edwardsj@water.ca.gov>, Jessica Andrieux <jandrieux@usbr.gov>, John Hannon <JHannon@usbr.gov>, "John\_Wikert@fws.gov" <John\_Wikert@fws.gov>, Julie Zimmerman <julie\_zimmerman@fws.gov>, "k Kundargi Kenneth@Wildlife" <Kenneth.Kundargi@wildlife.ca.gov>, "Kiteck, Elizabeth" <EKiteck@usbr.gov>, Kristin N White <knwhite@usbr.gov>, Larry Lindsay <larry.lindsay@waterboards.ca.gov>, "Imao@usbr.gov" <Imao@usbr.gov>, "Mary (Catherine) Blackwell" <mblackwell@usbr.gov>, Michael George <Michael.George@waterboards.ca.gov>, Michele Palmer <mpalmer@usbr.gov>, Pat Brantley <pbrantley@dfg.ca.gov>, Paul Fujitani <PFujitani@usbr.gov>, "Pettit, Tracy" <tracy.pettit@water.ca.gov>, Randi Field <rfield@usbr.gov>, "Reed, Rhonda" <Rhonda.Reed@noaa.gov>, Tim Heyne <theyne@dfg.ca.gov>

Garwin,

At its 10/05/2015 meeting, the Stanislaus Operations Group (SOG) discussed the upcoming fall attraction flow schedule in Appendix 2-E of the NMFS Biological Opinion (BiOp). As per your request, SOG is writing to notify NMFS and WOMT of its decision to pursue the Alt B flow that begins October 20th.

The forecasted warm air temperatures led the group to choose the later alternative (Alt B). There was no dissenting opinion offered in the meeting.

Regards,

Amanda (on behalf of SOG)

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**SOG ADVICE RE: IMPLEMENTATION OF THE STANISLAUS RPA ACTIONS  
DURING OCTOBER AND NOVEMBER  
10/2/2015**

Background

*Flow*

The fall attraction flow is one component of the daily flow schedule in Appendix 2-E of the NMFS BiOp<sup>1</sup> required per Action III.1.3 of the Reasonable and Prudent Alternative (RPA). As noted in the 2011 RPA Amendments<sup>2</sup> (p. 50), the fall attraction flow is intended "...to improve in-stream conditions sufficiently to attract Central Valley (CV) steelhead to the Stanislaus River." The RPA further notes (p. 50) that "...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action."

*Temperature*

The 56°F fall temperature criterion at Orange Blossom Bridge (OBB) required per Action III.1.2 of the RPA is intended to provide temperatures suitable for the migration and holding of adult CV steelhead. The BiOp notes (p. 47 of the 2011 RPA Amendments) that "This criterion shall apply as of October 1 or as of initiation date of fall pulse flow as agreed to by NMFS."

This criterion can be difficult to meet in most Water Year types, because of the increased difficulty of meeting temperatures during the extreme drought conditions of Water Year 2015, a Stanislaus Operations Plan (Attachment 2) was submitted to the State Water Resources Control Board (SWRCB) by Reclamation, after consultation with the Stanislaus irrigation districts and the resource agencies. According to that plan, 56°F is not targeted at OBB until November 25, 2015. Given the current severe drought conditions, and reservoir storage concerns, NMFS concurred that the proposed operations through December 31, 2015 are consistent with the exception procedures under Action III.1.2 of the NMFS BiOp. **Therefore, SOG is not providing any additional advice on implementation of Action III.1.2 at this time.**

*Input from stakeholders*

On the September 16, 2015 Stanislaus River Forum (SRF) call, the All Outdoors (a rafting company) representative asked that, when discussing the shaping and timing of the fall pulse flow, the SOG consider the following preferred rafting conditions:

- Preferred rafting flows: 800-1200 cfs, high end of the range preferred. 600-800 cfs is do-able, but not desirable.
- Timing of rafting flows: 10am-4pm on weekends, preferably in October rather than November

<sup>1</sup> Available online at:

[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/nmfs\\_biological\\_and\\_conference\\_opinion\\_on\\_the\\_long-term\\_operations\\_of\\_the\\_cvp\\_and\\_swp.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/nmfs_biological_and_conference_opinion_on_the_long-term_operations_of_the_cvp_and_swp.pdf)

<sup>2</sup> Available online at:

[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711\\_ocap\\_opinion\\_2011\\_amendments.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

- Location of rafting flows: Between Goodwin Dam and Knights Ferry

*Coordination with other San Joaquin tributaries*

SOG's scope is limited to implementation of the Stanislaus actions in the NMFS BiOp, but SOG does consider other expected flows in the San Joaquin basin when providing advice on BiOp implementation. However, due to drought conditions, no fall pulse flows are expected from either the Tuolumne River or Merced River this year.

Below, SOG advises two options for a modified fall attraction flow schedule (for initiation in either mid- or late-October) that we believe are consistent with the intent of RPA actions III.1.3. The proposed flow schedules do accommodate the preferred flows for rafters on at least one October weekend.

SOG advice

*Flow*

**For 2015, SOG advises that the fall attraction flow (Critical yeartype) be reshaped according to the “Alt A” or “Alt B” flow schedule (with the alternative to be selected in early or mid-October based on observed conditions) described in Table 1 and Figure 1 of Attachment 1.**

*Pulse shaping:*

At the 9/16/15 SOG meeting, SOG members reviewed the three-peak flow schedule implemented in October and November of 2014 and agreed to implement a similar three-peak schedule in 2015. The “Alt B” schedule is nearly identical to the pulse flow implemented in 2014 and schedules the first major peak (second peak overall) of the pulse flow (1250 cfs) for the weekend of October 24-25. The “Alt A” schedule is a variation of the three peak schedule that shifts the first major peak (second peak overall) of the pulse flow (1150 cfs) to the weekend of October 17-18. In order to extend the tail of the final peak to maintain some augmented flow at least through the first week of November, the two major peaks of the “Alt A” schedule are slightly lower.

Both reshaped flow schedules have the same volume (23,207 AF) as the Critical fall pulse in Appendix 2-E. Both the “Alt A” and “Alt B” schedules reshape the fall pulse volume into a three-peak release (the maximum daily releases in the alternatives reach 1150-1250 cfs; comparable to the peak sustained flow of 1250 in the default 2-E flow schedule) that provides flow variability expected to deter spawning at the higher flows that won't be sustained through egg incubation and fry emergence. The technical team believes both schedules meet the intent of the RPA action, namely, improving instream conditions and providing an attraction cue for adult salmonids returning to spawn.

*Pulse timing:*

At the 9/16/15 SOG meeting, SOG members agreed to design two alternatives – one with the first major peak in mid-October (similar to the initiation timing of the Appendix 2-E schedule), and another with the first major peak in late October. Both alternatives extend

the pulse flow into November; SOG expects that the higher-than-base flows will help to buffer water temperatures during the seasonal transition to cooler air temperatures.

**However, because of uncertainty about temperature conditions in mid-late October, SOG requests that NMFS approve implementation of either schedule, with the choice of alternative to be made by SOG in early or mid-October,** based on early or mid-October water quality conditions (*e.g.*, water temperatures and dissolved oxygen) and fish monitoring data (*e.g.*, observed salmonid passage at the weir, carcass survey data). SOG did not identify specific conditions for implementation of either alternative, but discussed some qualitative considerations. For example, SOG is unlikely to choose implementation of the earlier “Alt A” schedule unless water temperatures cool considerably, or fish passage through the weir increases considerably, during the week of 10/5/15.

Because of additional coordination needs this year due to low reservoir elevations and use of the low-level outlet at New Melones, Reclamation needs a week of notice to implement either schedule. So, SOG would need to advise the “Alt A” schedule no later than 10/7/15 (for a 10/14/15 start) and the “Alt B” schedule no later than 10/13/15 (for a 10/20/15 start).

The full list of considerations discussed by SOG at the 9/16/15 meeting is summarized in Table 2 of Attachment 1.

# **ATTACHMENT 1**

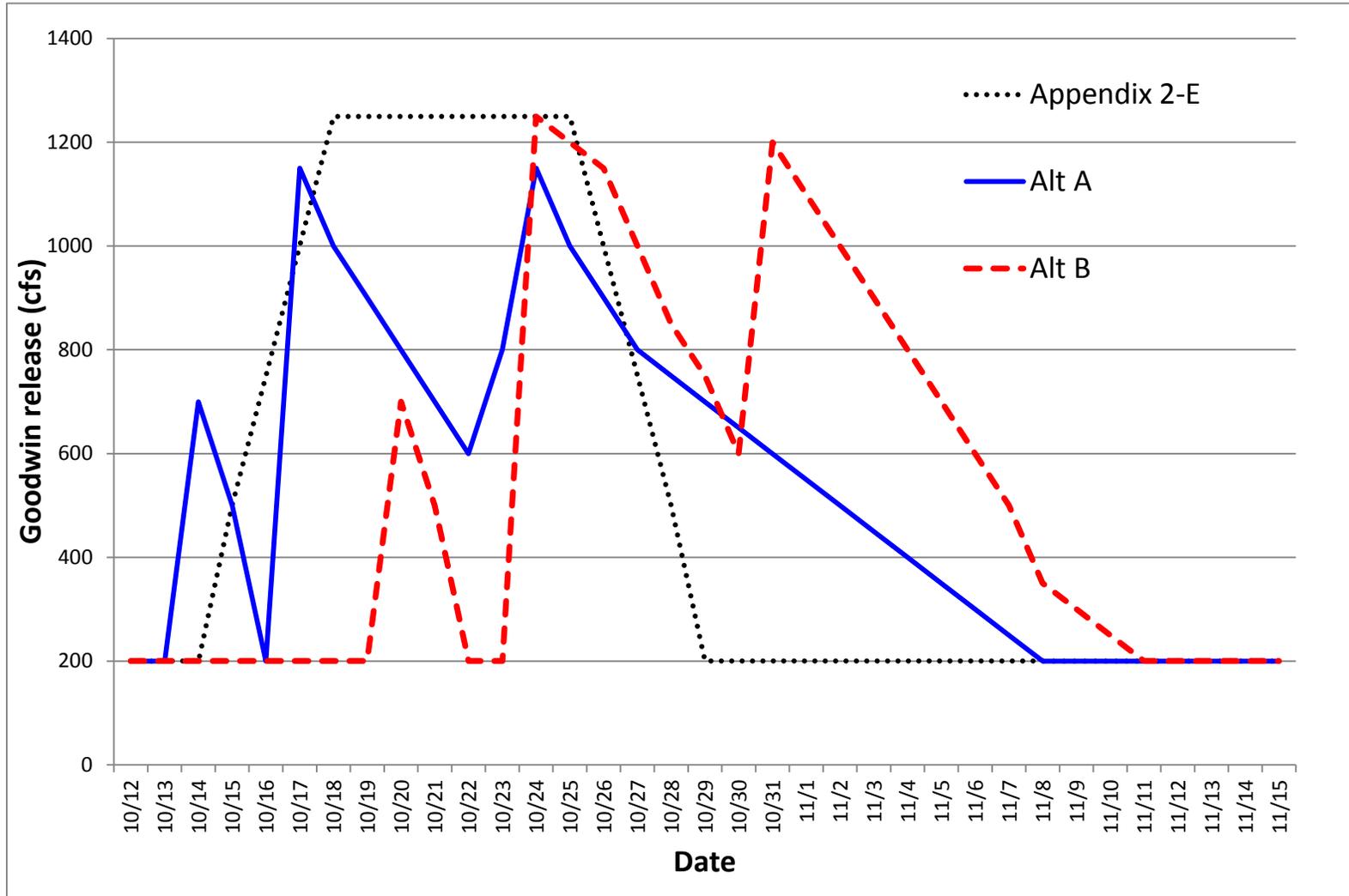
**Stanislaus fall attraction flow schedule advised  
by SOG for October-November 2015**

**Table 1.** Stanislaus fall pulse flow schedules considered by SOG for October-November 2015. SOG advised that “Alt A” or “Alt B” pulse be implemented rather than the Appendix 2-E schedule, with the alternative to be selected by SOG in early or mid-October based on observed conditions. The pulse volume was calculated against a base flow of 200 cfs.

Appendix 2-E Stanislaus River Minimum Fish Flow Schedule Water Year Type: Critically Dry						Alt A Stanislaus River Minimum Fish Flow Schedule Water Year Type: Critically Dry						Alt B Stanislaus River Minimum Fish Flow Schedule Water Year Type: Critically Dry								
		Daily				Cumulative			Daily				Cumulative			Daily				Cumulative
		Total CFS	Base CFS	Pulse CFS	Pulse AF	Pulse AF			Total CFS	Base CFS	Pulse CFS	Pulse AF	Pulse AF			Total CFS	Base CFS	Pulse CFS	Pulse AF	Pulse AF
OCT	10/12	200	200	0	0	0	OCT	10/12	200	200	0	0	0	OCT	10/12	200	200	0	0	0
	10/13	200	200	0	0	0		10/13	200	200	0	0	0		10/13	200	200	0	0	0
	10/14	200	200	0	0	0		10/14	700	200	500	992	992		10/14	200	200	0	0	0
	10/15	500	200	300	595	595		10/15	500	200	300	595	1587		10/15	200	200	0	0	0
	10/16	750	200	550	1091	1686		10/16	200	200	0	0	1587		10/16	200	200	0	0	0
	10/17	1000	200	800	1587	3273		10/17	1150	200	950	1884	3471		10/17	200	200	0	0	0
	10/18	1250	200	1050	2083	5355		10/18	1000	200	800	1587	5058		10/18	200	200	0	0	0
	10/19	1250	200	1050	2083	7438		10/19	900	200	700	1388	6446		10/19	200	200	0	0	0
	10/20	1250	200	1050	2083	9521		10/20	800	200	600	1190	7636		10/20	700	200	500	992	992
	10/21	1250	200	1050	2083	11603		10/21	700	200	500	992	8628		10/21	500	200	300	595	1587
	10/22	1250	200	1050	2083	13686		10/22	600	200	400	793	9421		10/22	200	200	0	0	1587
	10/23	1250	200	1050	2083	15769		10/23	800	200	600	1190	10612		10/23	200	200	0	0	1587
	10/24	1250	200	1050	2083	17851		10/24	1150	200	950	1884	12496		10/24	1250	200	1050	2083	3669
	10/25	1250	200	1050	2083	19934		10/25	1000	200	800	1587	14083		10/25	1200	200	1000	1983	5653
	10/26	1000	200	800	1587	21521		10/26	900	200	700	1388	15471		10/26	1150	200	950	1884	7537
	10/27	750	200	550	1091	22612		10/27	800	200	600	1190	16661		10/27	1000	200	800	1587	9124
	10/28	500	200	300	595	23207		10/28	750	200	550	1091	17752		10/28	850	200	650	1289	10413
NOV	10/29	200	200	0	0	23207	NOV	10/29	700	200	500	992	18744	NOV	10/29	750	200	550	1091	11504
	10/30	200	200	0	0	23207		10/30	650	200	450	893	19636		10/30	600	200	400	793	12298
	10/31	200	200	0	0	23207		10/31	600	200	400	793	20430		10/31	1200	200	1000	1983	14281
	11/1	200	200	0	0	23207		11/1	550	200	350	694	21124		11/1	1100	200	900	1785	16066
	11/2	200	200	0	0	23207		11/2	500	200	300	595	21719		11/2	1000	200	800	1587	17653
	11/3	200	200	0	0	23207		11/3	450	200	250	496	22215		11/3	900	200	700	1388	19041
	11/4	200	200	0	0	23207		11/4	400	200	200	396.6942	22612		11/4	800	200	600	1190	20231
	11/5	200	200	0	0	23207		11/5	350	200	150	297.5207	22909		11/5	700	200	500	992	21223
	11/6	200	200	0	0	23207		11/6	300	200	100	198.3471	23107		11/6	600	200	400	793	22017
	11/7	200	200	0	0	23207		11/7	250	200	50	99.17355	23207		11/7	500	200	300	595	22612
	11/8	200	200	0	0	23207		11/8	200	200	0	0	23207		11/8	350	200	150	298	22909
	11/9	200	200	0	0	23207		11/9	200	200	0	0	23207		11/9	300	200	100	198	23107
	11/10	200	200	0	0	23207		11/10	200	200	0	0	23207		11/10	250	200	50	99	23207
	11/11	200	200	0	0	23207		11/11	200	200	0	0	23207		11/11	200	200	0	0	23207
	11/12	200	200	0	0	23207		11/12	200	200	0	0	23207		11/12	200	200	0	0	23207
	11/13	200	200	0	0	23207		11/13	200	200	0	0	23207		11/13	200	200	0	0	23207
	11/14	200	200	0	0	23207		11/14	200	200	0	0	23207		11/14	200	200	0	0	23207
	11/15	200	200	0	0	23207		11/15	200	200	0	0	23207		11/15	200	200	0	0	23207

Dark green cells indicate weekend days

**Figure 1.** Stanislaus fall pulse flow schedules considered by SOG for October-November 2015. SOG advised that “Alt A” or “Alt B” pulse be implemented rather than the Appendix 2-E schedule, with the alternative to be selected by SOG in early or mid-October based on observed conditions.



**Table 2.** Factors considered in the design of the SOG-advised fall pulse flow.

<b>Driver</b>	<b>Location</b>	<b>Lifestage</b>	<b>Notes</b>
Agriculture	lower trib	N/A	The NMFS Appendix 2-E flow schedule does, in some months in some yeartypes, require flows above 1500 cfs. Because of seepage concerns, NMFS limited the duration of those flows to no more than 10 consecutive days. When the default Appendix 2-E flow schedule for a pulse event does not exceed 1500 cfs, NMFS will not require that a reshaped flow exceed 1500 cfs.
D.O.	Vernalis	Adult	The combined pulse should, ideally, provide sufficient flow to achieve a D.O. of at least 7ppm in the deepwater ship channel.
Migration Window	Vernalis	Adult	Provide temperature/D.O. suitable for upmigration for at least several weeks.
Monitoring	Riverbank	N/A	Weir operation is impacted when flows exceed 1500 cfs, or last for more than a few days at 1500 cfs. Ramping down to 500 cfs after peak flows allow the weir to be cleaned.
Redd Scour/Stranding	Trib/spawning area	redd/eggs/fry	The main pulse should occur before a significant number of the season's redds are created. Historically, few redds are built before the 4th week of Oct, though in some years redd activity picks up in mid-October.
Redd Stranding	Trib/spawning area	redd/eggs/fry	The pulse should avoid sustained flows that would encourage redd construction in areas that will be dewatered during post-attraction-pulse flows.
Straying	Vernalis	Adult	Straying may be reduced when San Joaquin flows at Vernalis exceed 4,000 cfs.
Straying	delta	Adult	Straying may be reduced when the ratio of south delta exports to inflow ( ) is no greater than 2:1.
Straying	Vernalis/ I street	Adult	Straying may be reduced when the ratio of Sacramento Inflow (I Street) to SJ Inflow (Vernalis) is no greater than 2:1.
Temperature	Vernalis	Adult	Pulse should be late enough to provide cool enough temperatures for upmigrants through the San Joaquin to avoid egg

			mortality within migrating adults.
Temperature	Trib/spawning area	Adult	Pulse should be shaped and timed to provide and maintain instream temperatures sufficient to avoid egg mortality for returning adults.
Preferred rafting flows	Goodwin Canyon to Knights Ferry	N/A	Preferred flows for rafting are 800-1200 cfs between 10am and 4pm on weekend days during October.
Stanislaus Salmon Festival	Knights Ferry	N/A	Flows <500 cfs are preferred for setup of the "Salmon Cam" at the festival.

## **ATTACHMENT 2**

**Stanislaus Operations Plan submitted to the  
SWRCB**

**U.S. Bureau of Reclamation  
New Melones Operations  
Stanislaus River Temperature Management  
August 10 through December 31, 2015**

Reclamation has been working closely with the State and Federal fishery agencies, and Oakdale Irrigation District and South San Joaquin Irrigation District (the districts), to plan operations for New Melones Lake and Tulloch Reservoir for the remainder of the calendar year.

The following summarizes the draft plan for temperature management, river releases and lake operations for review by the agencies and the State Water Resources Control Board. The attached documents provide supporting technical information.

**NEW MELONES OPERATIONS PLAN – SUMMARY:**

**Temperature Targets**

- Given the severe drought conditions and uncertainty about operations this year, the following temperature targets might not be achieved on the targeted timeframe, but real-time blending decisions will be guided by these general targets with the limited resources available. Current modeling and past performance also indicate that these target temperatures will be difficult to achieve.
- Through December 31, 2015, given the low storage concerns in the basin, temperature management will rely solely on blending operations (at New Melones and Tulloch), not on flow releases above the minimum instream flow requirements below Goodwin Dam per Appendix 2-E<sup>1</sup> (“Table 2e flows”) of the 2009 NMFS Biological Opinion on Long-term Operations of the CVP and SWP<sup>2</sup> (2009 NMFS BiOp).
- Proposed temperature targets:
  - **August 1 to October 31: 7 DADM not to exceed 65°F at Goodwin Dam** (measured at USGS 11302000).
    - Although sustained water temperatures above 65°F are not suitable for juvenile rearing of Central Valley steelhead (*Oncorhynchus mykiss*), this target aims to provide suitable temperatures for oversummer rearing of

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<sup>1</sup> See Appendix 2-E in:

[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/appendix\\_2-rpa\\_supporting\\_documents\\_compiled.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/appendix_2-rpa_supporting_documents_compiled.pdf)

<sup>2</sup> [http://www.westcoast.fisheries.noaa.gov/central\\_valley/water\\_operations/ocap.html](http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/ocap.html)

- juvenile *O. mykiss* within Goodwin Canyon.
  - Temperature model runs show lower temperatures may be achievable during October and operations will target decreasing temperatures during October, to the extent feasible, in order to transition to the cooler water temperatures suitable for salmonid spawning.
- **November 1 to November 25 7DADM not to exceed 60°F at Orange Blossom Bridge** (measured at CDEC station OBB).
  - Shifting the target location downstream to Orange Blossom Bridge may focus cooler temperatures within much of the available spawning habitat for fall-run Chinook salmon (*O. tshawytscha*) and Central Valley steelhead (*O. mykiss*).
  - While 56°F would be more suitable for adult salmonid migration (whether holding or spawning), temperature modeling indicates that this lower threshold may not be feasible until after mid-November, when shorter days and cooler air temperatures cause water to cool as it moves downstream.
- **November 25-December 31: 7DADM not to exceed 56°F at Orange Blossom Bridge** (measured at CDEC station OBB).
  - Provides water temperatures suitable for spawning and incubation by fall-run Chinook salmon, adult migration and holding of Central Valley steelhead. Water temperatures in at this threshold are highly dependent on ambient conditions.
- Given current severe drought conditions, and reservoir storage concerns, NMFS has concurred that this proposed plan is consistent with the exception procedures under Action III.1.2<sup>3</sup> of the 2009 NMFS BiOp.

**Flows & Reservoir Operations:**

- Release to the Stanislaus River the Table 2e flows through December, but see conditions on fall pulse flow in the next bullet.
- For this year, the Table 2e Fall Pulse Flow (above the base flow of 150 cfs) will be achieved using water conserved by the Districts over the summer through aggressive water conservation efforts.
- Per the 2009 NMFS BiOp, the Stanislaus Operations Group may provide advice to NMFS and the Water Operations Management Team to adjust the

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<sup>3</sup> See details of Action III.1.2 in the 2009 RPA with 2011 Amendments; page 47 of Enclosure 2 of the document posted at:

[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711\\_ocap\\_opinion\\_2011\\_amendments.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

shaping and timing of the default Table 2e fall pulse flow; any adjusted flow schedule must be approved by NMFS before implementation.

- Under the current conditions, it appears that the combination of Stanislaus River and other San Joaquin River tributary releases will not be sufficient to meet the October Vernalis Flow in Decision 1641. Reclamation will continue to monitor conditions and may submit a Temporary Urgency Change Petition (TUCP) to the SWRCB.
- The Districts will continue to take irrigation water through September 30
- The low-level outlet will be opened to 250 cfs once the New Melones Lake elevation lowers to 808'; releases through the low-level outlet may be adjusted slightly based on observed in-river water temperatures and starting date, but this flow rate generally is needed to ration the available volume of cold water through October.
- At about the time New Melones lowers to elevation 808', the Districts are prepared to draw up to 1,000 cfs per day from Tulloch reservoir (total volume not to exceed 30 TAF) to meet irrigation demand through September 2015 in coordination with New Melones operations and the release of Table 2e flows. Given the uncertain temperature effects of this phase of operations and the potential adverse effect to residents along Tulloch reservoir, Reclamation and the Districts will be closely monitoring conditions to verify that the Tulloch drawdown operation is having a measurable effect on lowering Goodwin release temperatures.
- Once the New Melones Lake elevation lowers to about 785', releases through the Penstock Intake will cease.
- The release of water from New Melones to support the Fall Pulse flow will begin with a blend of 25% from the Penstock Intake and 75% from low-level outlet; this blend may be adjusted based on observed in-river water temperatures and availability of the main outlet at New Melones.

### **Coordination**

- Reclamation, in coordination with the Districts, fisheries agencies, and the Stanislaus Operations Group, will meet at least bi-weekly to access and potentially respond to changing conditions recognizing that the temperature targets described above may not be achieved on the targeted timeframe.
- Reclamation, in coordination with the fisheries agencies and the Districts, will also prepare and submitted to the State Water Resources Control Board a report in January 2016, which documents the effectiveness of the Stanislaus River operations this year in protecting the fishery resources given the limitations of the drought and the structural infrastructure.

## **HYDROLOGY UPDATE**

Attachment 1 summarizes the most recent inflows to New Melones through July 20, 2015, and the projected hydrology through December 2015. This summary illustrates two significant differences from the storage projections prepared in April 2015 (Attachment 2). First, there has been better than forecasted inflows into New Melones over the spring and summer. The second, and most significant, change has been the Districts' conservation efforts which have totaled to approximately 80,000 acre-feet.

These factors have resulted in a new end-of-September storage of 259,000 acre-feet at New Melones. In April of this year the projected storage at New Melones was 147,000 acre-feet by the end of September.

## **KEY MODELING ASSUMPTIONS/REFINEMENTS**

### Use of the Low-Level Outlet

Attachment 3 summarizes the operation constraints for use of the low-level outlet at New Melones. Generally, the low-level outlet should not be operated until the lake level drops below elevation 808', and the low-level outlet should not be operated above 1,000 cfs to protect the access road and outlet facility.

Initial temperature modeling had assumed that the low-level outlet could be used for blending starting around July 15 at a rate of 250 cfs. This date was based on earlier estimates of New Melones lake levels this summer. Given that New Melones has more storage than previously projected, and given the operational constraints on the low-level outlet, use of the low-level outlet for blending is not possible until approximately August 23 (or until storage in New Melones is 302,000 acre-feet, see Attachment 4).

The Districts have conducted additional temperature modeling with the low-level outlet being used under these constraints. (See Attachment 5.) These runs showed two periods wherein water temperatures were elevated; late August/early September and during the pulse flow in later October.

Through coordination with the Districts and State and Federal fishery agency staffs, some potential modeling refinements were discussed (see meeting summaries in Attachment 6 and Attachment 7). Some specific refinements identified were:

- Use the shaping and timing of the WY 2015 fall pulse flow in future modeling runs (Attachment 8)
- Investigate if the October temperature increase could be reduced by changing the mix of release through the low-level and the Penstock Intake from 25%-75% to a

higher percentage from the low-level outlet.

To address the second bullet, above, the Districts also ran a model wherein 100% of the pulse flow came from the low-level outlet (Attachment 9). In this run, the October temperature increase dissipated with 100% of the release coming from the low-level outlet. This run was done without the constraint of 1,000 cfs for the low-level outlet. Through further investigation, it may be possible to achieve the improved water temperatures by blending 75% from the low-level and 25% from the Penstock Intake. With adequate lead time, this operation would likely avoid the 1,000 cfs limitation on the low-level outlet.

The August/September increase in temperature may possibly be addressed by withdrawing water from Tulloch, slightly before or at the time the low-level outlet is opened. Modeling suggests that withdrawing water from Tulloch at 500 cfs could result in 2-4 degrees improvement in river release temperature. Releasing water out of Tulloch would reduce the amount of warm water being released from New Melones at this time. Such an operation could address the temperature rise in late August early September and is being further evaluated.

#### Use of the Penstock Intake:

- The Flood Control and Irrigation (FC&I) Valve off the Penstock intake can no longer be used once New Melones Lake drops below about 785' (expected to occur in mid to late October). Reclamation is currently watching for vortex formation that could limit or even preclude use of the power plant. Should this occur, Reclamation will begin use of the FC&I Valve up to the point the lake drops below about 785'.

#### Additional Temperature Model Refinements and Temperature Targets

Attachment 10 contains a summary of additional analysis and conclusions about the water temperature modeling after looking more closely at the boundary conditions. The changes outlined in Attachment 10 have been made to the model and these modifications were applied to the additional modeling conducted to fully assess the suite of actions outlined above (Attachment 5).

#### **OCTOBER PULSE FLOW**

The use of the limited remaining stored water in New Melones for the October Pulse Flow raises significant factual and legal issues for Reclamation and the Districts. For this year, Reclamation and the Districts have agreed that Reclamation may release a portion of the water conserved by the Districts this summer for the fall pulse flow, and the

Districts will be compensated for the water released through a purchase agreement. Reclamation and the Districts are working on the final details of this agreement, and we will continue to plan (in coordination with the SOG) on these flows this fall.

# Appendix B— SOG advice on winter instability flows

January winter instability flow: B-1 to B-21

February winter instability flow: B-22 to B-39



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## NMFS determination re Winter Instability Flows on the Stanislaus River

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Garwin Yip - NOAA Federal <garwin.yip@noaa.gov>

Fri, Jan 15, 2016 at 4:21 PM

To: "knwhite@usbr.gov" <knwhite@usbr.gov>

Cc: "Mao, Leeyan" <Imao@usbr.gov>, Brycen Swart - NOAA Federal <brycen.swart@noaa.gov>, Barbara Byrne - NOAA Federal <barbara.byrne@noaa.gov>, Peggy Manza <pmanza@usbr.gov>, Elizabeth Kiteck <ekiteck@usbr.gov>, Ronald MILLIGAN <RMILLIGAN@usbr.gov>, Carolyn Bragg <cbragg@usbr.gov>, Amanda Bahls <abahls@usbr.gov>, Drew Lessard <DLessard@usbr.gov>, "Mary (Catherine) Blackwell" <mblackwell@usbr.gov>, "womt@water.ca.gov" <womt@water.ca.gov>

Kristin,

As you know, Action III.1.3 (pages 49-50 of the 2011 RPA Amendments to the NMFS Biological Opinion) provides for the adaptive management of the flow schedule in Appendix 2-E of the NMFS Biological Opinion. Specifically, "...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action."

Given the current context and severity of New Melones storage conditions, and current limits to Reclamation's discretion on water releases, NMFS agrees that it is appropriate for the natural storm pulse in early January 2016 to be considered in lieu of a controlled release to satisfy the January winter instability flow. **NMFS determines that the January winter instability flow has been satisfied consistent with the implementation procedures of RPA Action III.1.3.**

In its advice, SOG also recommended maintaining the RPA Appendix 2E base flows of 200 cfs during February until the SOG meeting on February 17, 2016, when it will review the latest storage conditions, inflow forecasts, and observed flow events before providing SOG advice on the February winter instability flow. SOG anticipates providing final advice on the February winter instability flow by Friday, February 19, 2016. **NMFS approves the request to maintain the RPA Appendix 2E base flows of 200 cfs until advice is finalized and requests that final advice be provided to NMFS no later than Friday, 2/19/16.**

WOMT--In the interest of following the process provided in NMFS' Opinion section 11.2.1.1, this e-mail is to inform WOMT of NMFS' determination, and to provide WOMT with an opportunity to discuss the proposal. If anyone wants to discuss the SOG advice or NMFS determination, please initiate a WOMT meeting. Thanks.

-Garwin-

---

*Garwin Yip*

Water Operations and Delta Consultations Branch Chief  
NOAA Fisheries West Coast Region  
U.S. Department of Commerce

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——— Forwarded message ———

From: **White, Kristin** <[knwhite@usbr.gov](mailto:knwhite@usbr.gov)>  
Date: Fri, Jan 15, 2016 at 9:24 AM  
Subject: Re: Winter Instability Flows  
To: Garwin Yip - NOAA Federal <[garwin.yip@noaa.gov](mailto:garwin.yip@noaa.gov)>  
Cc: "Mao, Leeyan" <[lmao@usbr.gov](mailto:lmao@usbr.gov)>, Brycen Swart - NOAA Federal <[brycen.swart@noaa.gov](mailto:brycen.swart@noaa.gov)>, Barbara Byrne - NOAA Federal <[barbara.byrne@noaa.gov](mailto:barbara.byrne@noaa.gov)>, Peggy Manza <[pmanza@usbr.gov](mailto:pmanza@usbr.gov)>, Elizabeth Kiteck <[ekiteck@usbr.gov](mailto:ekiteck@usbr.gov)>, Ronald MILLIGAN <[RMILLIGAN@usbr.gov](mailto:RMILLIGAN@usbr.gov)>, Carolyn Bragg <[cbragg@usbr.gov](mailto:cbragg@usbr.gov)>, Amanda Bahls <[abahls@usbr.gov](mailto:abahls@usbr.gov)>, Drew Lessard <[DLessard@usbr.gov](mailto:DLessard@usbr.gov)>, "Mary (Catherine) Blackwell" <[mblackwell@usbr.gov](mailto:mblackwell@usbr.gov)>

Garwin -

Attached is the SOG advice for implementing the January winter instability flows. As a summary, SOG advises that the natural storm pulse January 5-7, 2016 be considered to satisfy the January winter instability flow (Critically Dry year type) in the Appendix 2-E flow schedule.

In addition, SOG recommends maintaining the RPA Appendix 2E base flows of 200 cfs during February until SOG advice is finalized. SOG expects to review the latest storage conditions, inflow forecasts, and observed flow events at the February 17, 2016 SOG meeting, and final advice on the February winter instability flow is anticipated by Friday, February 19, 2016.

Reclamation requests approval from NMFS for implementing this advice.

Kristin White, PE\*  
*Program Manager*  
U.S. Bureau of Reclamation, Mid-Pacific Region  
Ph: [916-989-7226](tel:916-989-7226) (Central California Area Office)  
\*Inactive

On Wed, Dec 30, 2015 at 11:21 AM, Brycen Swart - NOAA Federal <[brycen.swart@noaa.gov](mailto:brycen.swart@noaa.gov)> wrote:

Lee,

Thank you for the update on the status of SOG advice regarding implementation of RPA Action III.1.3 of the 2009 NMFS BiOp, specifically the winter instability flows during January and February. NMFS approves Reclamation's request to maintain the RPA Appendix 2E base flows of 200 cfs through mid-January while SOG finalizes its advice on the shaping and timing of the winter instability flows.

NMFS requests that either the finalized advice, or an update on when advice is expected, is provided no later than Friday, 1/15/16.

Sincerely,  
Brycen Swart (acting for Garwin Yip)

**Brycen Swart**  
*Fisheries Biologist*  
California Central Valley Area Office  
NOAA Fisheries West Coast Region  
[916-930-3712](tel:916-930-3712)



**NOAA FISHERIES**  
West Coast Region

On Wed, Dec 30, 2015 at 10:18 AM, Mao, Leeyan <[lmao@usbr.gov](mailto:lmao@usbr.gov)> wrote:

Good morning Brycen,

Due to the low attendance at the December SOG meeting (and no representation from the fishery agencies), advice on implementation of the winter instability flows (WIF) for January was not finalized. Reclamation anticipates receiving SOG advice on these flows in mid-January. Reclamation requests approval to maintain the RPA Appendix 2E base flows of 200 cfs (without WIF) through the first two weeks of January and will update NMFS on the recommended implementation of the WIF once we have SOG advice.

Thanks,

Lee

—

Lee Mao  
Deputy Area Manager, Central California Area Office  
Bureau of Reclamation, Mid-Pacific Region  
(916) 989-7267 Office (Note: New Office number)  
(916) 947-0396 Cellular  
[lmao@usbr.gov](mailto:lmao@usbr.gov)



**2016.1.15\_SOG WIF Advice wFeb.pdf**  
434K

## **SOG ADVICE RE: JANUARY 2016 WINTER INSTABILITY FLOW 1/15/16**

### Background

Winter instability flows in January and February are a component of the daily flow schedule in Appendix 2-E of the NMFS BiOp<sup>1</sup> required per Action III.1.3 of the Reasonable and Prudent Alternative (RPA). As noted in the 2011 RPA Amendments<sup>2</sup> (p. 50), the winter instability flows are intended "...to simulate natural variability in the winter hydrograph and to enhance access to varied rearing habitats." The RPA further notes (p. 50) that "...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action."

On December 30, 2015, NMFS approved Reclamation's request to maintain the RPA Appendix 2E base flows of 200 cfs while SOG finalized advice on or before January 15, 2016 [*Attachment 1*]. Below, **SOG advises that the natural storm pulse January 5-7, 2016 be considered to satisfy the intent of the January winter instability flow.**

SOG is not providing specific advice on the February winter instability flow at this time, but expects to face similar constraints next month. Therefore, **SOG recommends maintaining the RPA Appendix 2E base flows of 200 cfs during February until SOG advice is finalized.** SOG expects to review the latest storage conditions, inflow forecasts, and observed flow events at the February 17, 2016 SOG meeting, and final advice on the February winter instability flow is anticipated by Friday, February 19, 2016.

### SOG advice

**For January 2016, SOG advises that the natural storm pulse January 5-7, 2016 be considered to satisfy the January winter instability flow (Critically Dry yeartype) in the Appendix 2-E flow schedule.**

### Rationale:

- Realized storm flow in-river at Orange Blossom Bridge was of a similar peak flow to the SOG-advised winter instability flow proposed for January 2015 [*Previous advice provided in Attachment 2, direct comparison provided in Attachment 3*]
- Realized storm flow in-river at Orange Blossom Bridge (1169AF above a base flow of 200 cfs) exceeded the volume of the 2015 SOG-advised proposed winter instability flow (793AF above a base flow of 200 cfs; the same volume as the Appendix 2-E default winter instability flow) [*Attachment 3*]
- Concerns about storage in New Melones (currently at 331 TAF, more than 200 TAF lower than the beginning of 2015) [*Attachment 4*]

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<sup>1</sup> The BiOp and all appendices are available online at:

[http://www.westcoast.fisheries.noaa.gov/central\\_valley/water\\_operations/ocap.html](http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/ocap.html)

<sup>2</sup> Available online at:

[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711\\_ocap\\_opinion\\_2011\\_amendments.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

- The river guidance plot for Orange Blossom Bridge shows further increased natural storm based flow above the 200 cfs base flow over the next week *[Attachment 5]*
- All current storage in New Melones is part of the Districts' 2016 water and conservation account, therefore Reclamation has no discretion on water releases. The irrigation districts are not comfortable with increasing flows above the base flow.

Short-term inundation of shallow water habitat can provide benefits to rearing salmonids such as: temporary spatial refuges from large predators, increased temperatures that may allow short-term increases in growth rate, and increased allochthonous input to the main channel. In the current context of severe drought, serious concerns about storage in New Melones, and lack of Reclamation discretion to increase releases, SOG believes that the intended biological benefits have been largely satisfied by the natural storm pulse.

# **ATTACHMENT 1**

**NMFS approval regarding Reclamation's request to maintain base flows while SOG finalized advice for January 2016 winter instability flow**



## RE: Winter Instability Flows

**Brycen Swart - NOAA Federal** <brycen.swart@noaa.gov>

Wed, Dec 30, 2015 at 11:21 AM

To: "Mao, Leeyan" <lmao@usbr.gov>

Cc: Garwin Yip - NOAA Federal <garwin.yip@noaa.gov>, Barbara Byrne - NOAA Federal <barbara.byrne@noaa.gov>, Peggy Manza <pmanza@usbr.gov>, Elizabeth Kiteck <ekiteck@usbr.gov>, Ronald MILLIGAN <RMILLIGAN@usbr.gov>, Kristin White <knwhite@usbr.gov>, Carolyn Bragg <cbragg@usbr.gov>, Amanda Bahls <abahls@usbr.gov>, Drew Lessard <DLessard@usbr.gov>, "Mary (Catherine) Blackwell" <mblackwell@usbr.gov>

Lee,

Thank you for the update on the status of SOG advice regarding implementation of RPA Action III.1.3 of the 2009 NMFS BiOp, specifically the winter instability flows during January and February. NMFS approves Reclamation's request to maintain the RPA Appendix 2E base flows of 200 cfs through mid-January while SOG finalizes its advice on the shaping and timing of the winter instability flows.

NMFS requests that either the finalized advice, or an update on when advice is expected, is provided no later than Friday, 1/15/16.

Sincerely,  
Brycen Swart (acting for Garwin Yip)

**Brycen Swart**  
*Fisheries Biologist*  
California Central Valley Area Office  
NOAA Fisheries West Coast Region  
916-930-3712  
[www.westcoast.fisheries.noaa.gov](http://www.westcoast.fisheries.noaa.gov)



On Wed, Dec 30, 2015 at 10:18 AM, Mao, Leeyan <lmao@usbr.gov> wrote:

Good morning Brycen,

Due to the low attendance at the December SOG meeting (and no representation from the fishery agencies), advice on implementation of the winter instability flows (WIF) for January was not finalized. Reclamation anticipates receiving SOG advice on these flows in mid-January. Reclamation requests approval to maintain the RPA Appendix 2E base flows of 200 cfs (without WIF) through the first two weeks of January and will update NMFS on the recommended implementation of the WIF once we have SOG advice.

Thanks,

Lee

--  
Lee Mao  
Deputy Area Manager, Central California Area Office  
Bureau of Reclamation, Mid-Pacific Region  
(916) 989-7267 Office (Note: New Office number)  
(916) 947-0396 Cellular  
[lmao@usbr.gov](mailto:lmao@usbr.gov)

# **ATTACHMENT 2**

NMFS approval of SOG advice for January and February  
2015 pulses



Barbara Byrne - NOAA Federal <barbara.byrne@noaa.gov>

## Fwd: January and February 2015 Pulse

1 message

**Garwin Yip - NOAA Federal** <garwin.yip@noaa.gov>

Fri, Dec 19, 2014 at 2:30 PM

To: "Morstein-Marx, Thomas" <TMorsteinMarx@usbr.gov>

Cc: Patricia L Clinton <PClinton@usbr.gov>, Barbara Byrne <Barbara.Byrne@noaa.gov>, "womt@water.ca.gov" <womt@water.ca.gov>, EVasquez@usbr.gov

Tom--As you know, Action III.1.3 (page 49 of the 2011 RPA Amendments to the NMFS Biological Opinion) provides for the adaptive management of the flow schedule in Appendix 2-E of the NMFS Biological Opinion. Specifically, "...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action." (page 50 of the 2011 RPA Amendments to the NMFS Biological Opinion)

NMFS agrees that for January and February 2015, the winter instability flows may be (1) reshaped according to the attached SOG advice (specifically, the "Alt-A" column in Table 1 and shape in Figure 1), and (2) shifted in timing to coincide with a natural storm event, or, in the event of no rainfall, be initiated no later than the last day of the month in which it was scheduled per Appendix 2-E.

NMFS determines that the proposed changes in the shaping and timing of the January and February winter instability flows are consistent with the implementation procedures of RPA Action III.1.3.

WOMT--In the interest of following the process provided in NMFS' Opinion section 11.2.1.1, this e-mail is to inform WOMT of NMFS' determination, and to provide WOMT with an opportunity to discuss the proposal. If anyone wants to discuss the SOG advice or NMFS determination, please initiate a WOMT meeting. Thanks.

-Garwin-

*Garwin Yip*

Water Operations and Delta Consultations Branch Chief

NOAA Fisheries West Coast Region

U.S. Department of Commerce

California Central Valley Area Office

650 Capitol Mall, Suite 5-100

Sacramento, CA 95814

Office: [916-930-3611](tel:916-930-3611)

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[www.westcoast.fisheries.noaa.gov](http://www.westcoast.fisheries.noaa.gov)



----- Forwarded message -----

From: **CLINTON, PATRICIA** <[pclinton@usbr.gov](mailto:pclinton@usbr.gov)>

Date: Thu, Dec 18, 2014 at 8:48 AM

Subject: January and February 2015 Pulse

To: Garwin Yip <[Garwin.Yip@noaa.gov](mailto:Garwin.Yip@noaa.gov)>

Cc: Elizabeth Vasquez <[evasquez@usbr.gov](mailto:evasquez@usbr.gov)>, Barb Byrne <[barbara.byrne@noaa.gov](mailto:barbara.byrne@noaa.gov)>

Garwin,

At the December Stanislaus Operations Group (SOG) meeting, SOG members discussed the upcoming winter instability flows (one each in January and February) in Appendix 2-E of the NMFS Biological Opinion (BiOp).

Attached is the final SOG advice regarding a reshaping and shift in timing of the winter instability flows that we believe meets the intended objectives of the flow schedule specified in the BiOp per Action III.1.3.

We request that NMFS concur with this advice regarding Stanislaus operations during January and February of 2015. Please send your final decision to Tom Morstein-Marx, Reclamation, with a cc: to me; I'll forward your decision to the Stanislaus Operations Group for their information.

Regards,  
Patti (on behalf of SOG)

--  
*Patti Clinton*  
Natural Resources Specialist  
Bureau of Reclamation  
Central California Area Office  
7794 Folsom Dam Road  
Folsom, California  
[916.989.7173](tel:916.989.7173)

---

 **2014.12.17\_SOG winter pulse advicep.pdf**  
99K

**SOG ADVICE RE: IMPLEMENTATION OF THE STANISLAUS RPA ACTIONS  
DURING JANUARY & FEBRUARY 2015  
12.17.2014**

Background

Winter instability flows in January and February are a component of the daily flow schedule in Appendix 2-E of the NMFS BiOp<sup>1</sup> required per Action III.1.3 of the Reasonable and Prudent Alternative (RPA). As noted in the 2011 RPA Amendments<sup>2</sup> (p. 50), the winter instability flows are intended "...to simulate natural variability in the winter hydrograph and to enhance access to varied rearing habitats." The RPA further notes (p. 50) that "...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action."

Below, SOG advises a modified winter instability flow for implementation in both January and February that we believe is consistent with the intent of the RPA action.

SOG advice

*Flow per RPA Action III.1.3*

**For January and February 2014, SOG advises that the winter instability flow (Critically Dry yeartype) (a) be reshaped according to the "Alt-A" flow schedule described in Table 1 and Figure 1, and (b) be shifted in time to coincide with a natural storm event (or scheduled to be initiated by the end of each calendar month if no rainfall event occurs).**

- a) **RESHAPING:** This alternate pulse shaping has the same volume (793 AF in addition to the 200 cfs base flow) as the Critically Dry winter instability pulse in Appendix 2-E but has been reshaped to include a higher peak flow. The technical team believes it meets the intent of the RPA action, namely, it provides variability in the winter hydrograph by simulating a small storm pulse. The shape of the "Alt-A" pulse, with its more rapidly rising limb and more slowly descending limb, is more typical of the flow pattern associated with storm events. Reshaping the subdaily flow pattern to increase the peak flow to 750 cfs for part of the first day of the pulse will inundate a greater portion of the Honolulu Bar restoration area and will likely allow at least partial inundation of the Lancaster Road restoration area. Short-term inundation of shallow water habitat can provide benefits to rearing salmonids such as: temporary spatial refuges from large predators, increased temperatures that may allow short-term increases in growth rate, and increased allochthonous input to the main channel. It was the opinion of SOG members familiar with those areas that, since the restoration at Honolulu Bar, there are minimal stranding concerns for juvenile salmonids for flow changes between 200 and 750 cfs.

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<sup>1</sup> The BiOp and all appendices are available online at:  
[http://www.westcoast.fisheries.noaa.gov/central\\_valley/water\\_operations/ocap.html](http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/ocap.html)

<sup>2</sup> Available online at:  
[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711\\_ocap\\_opinion\\_2011\\_amendments.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

If the yeartype based on the New Melones water supply parameter changes in February (the first month in which an official forecast is available), SOG will provide new advice on how to reshape the water volume of the winter instability flow for that new yeartype.

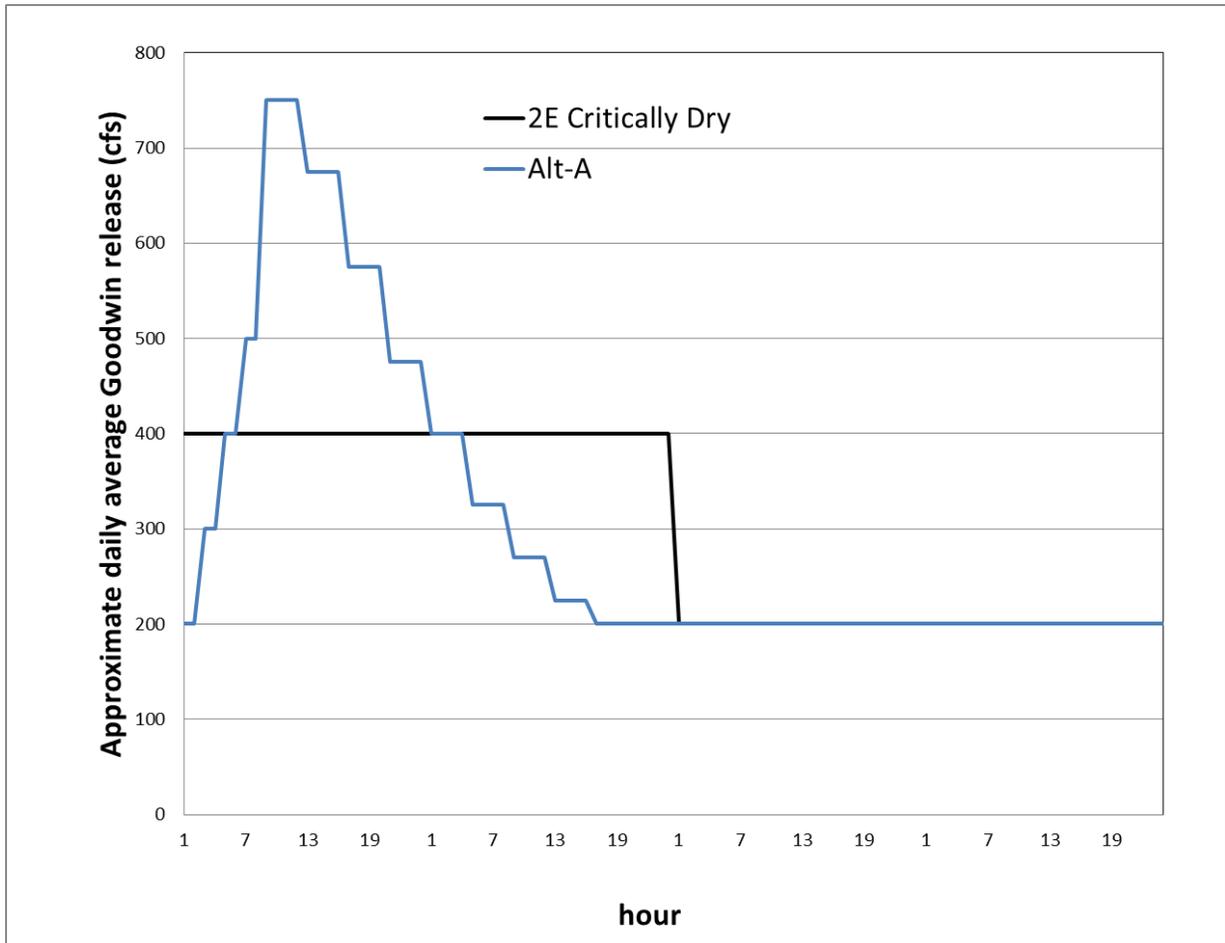
- b) **SHIFT IN TIME:** According to the flow schedule in Appendix 2-E, the January and February winter instability flows are scheduled to begin on January 3<sup>rd</sup> and February 5<sup>th</sup>, respectively. Allowing the winter instability flow to be shifted in time to coincide with a natural storm event within each month is expected to better capture the characteristics of a natural hydrograph, as the runoff, turbidity, meteorological conditions, etc. associated with a natural storm event will co-occur with the pulse of regulated flow.

If the January winter instability pulse hasn't been implemented by the January SOG meeting on 1/21/15, then SOG will schedule the pulse to be initiated no later than 1/31/15. If the February winter instability pulse hasn't been implemented by the February SOG meeting on 2/19/15, then SOG will schedule the pulse to be initiated no later than 2/28/15.

**Table 1** Winter instability flow shape advised by SOG (Alt-A, highlighted in yellow), in comparison to the pulse as described in Appendix 2-E..

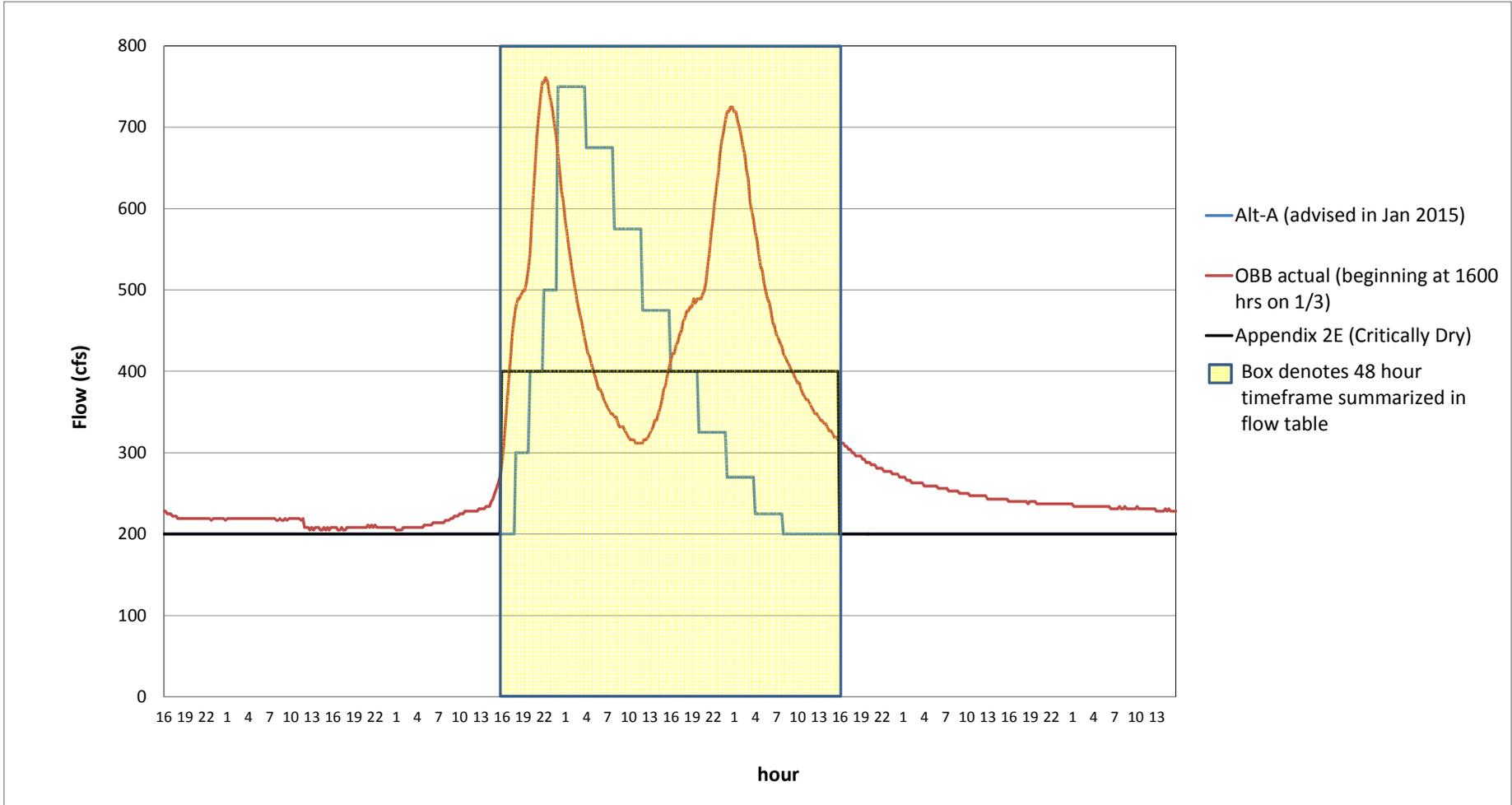
Day	Time	Appendix 2E (Critically Dry)	Alt-A
1	1	400	200
1	2	400	200
1	3	400	300
1	4	400	300
1	5	400	400
1	6	400	400
1	7	400	500
1	8	400	500
1	9	400	750
1	10	400	750
1	11	400	750
1	12	400	750
1	13	400	675
1	14	400	675
1	15	400	675
1	16	400	675
1	17	400	575
1	18	400	575
1	19	400	575
1	20	400	575
1	21	400	475
1	22	400	475
1	23	400	475
1	0	400	475
2	1	400	400
2	2	400	400
2	3	400	400
2	4	400	400
2	5	400	325
2	6	400	325
2	7	400	325
2	8	400	325
2	9	400	270
2	10	400	270
2	11	400	270
2	12	400	270
2	13	400	225
2	14	400	225
2	15	400	225
2	16	400	225
2	17	400	200
2	18	400	200
2	19	400	200
2	20	400	200
2	21	400	200
2	22	400	200
2	23	400	200
2	0	400	200
avg hourly cfs:		400.0	399.6

**Figure 1:** Plot of winter instability flow shapes from Table 1. Note that the horizontal “Hour” axis is *not* intended to imply any particular date since the advice is to implement the pulse, if possible, coincident with a natural storm event rather than on a specific calendar date.



# **ATTACHMENT 3**

Comparison of January storm to SOG-advised winter  
instability flow



Date/Time of OBB flow	Appendix 2-E flow (cfs)	Alt-A Jan 2015 (cfs)	OBB actual (cfs)
1/5/2016 16:00	400	200	285
1/5/2016 17:00	400	200	391
1/5/2016 18:00	400	300	479
1/5/2016 19:00	400	300	499
1/5/2016 20:00	400	400	545
1/5/2016 21:00	400	400	689
1/5/2016 22:00	400	500	755
1/5/2016 23:00	400	500	731
1/6/2016 0:00	400	750	666
1/6/2016 1:00	400	750	587
1/6/2016 2:00	400	750	524
1/6/2016 3:00	400	750	474
1/6/2016 4:00	400	675	431
1/6/2016 5:00	400	675	400
1/6/2016 6:00	400	675	378
1/6/2016 7:00	400	675	356
1/6/2016 8:00	400	575	344
1/6/2016 9:00	400	575	332
1/6/2016 10:00	400	575	319
1/6/2016 11:00	400	575	312
1/6/2016 12:00	400	475	312
1/6/2016 13:00	400	475	323
1/6/2016 14:00	400	475	340
1/6/2016 15:00	400	475	378
1/6/2016 16:00	400	400	413
1/6/2016 17:00	400	400	436
1/6/2016 18:00	400	400	465
1/6/2016 19:00	400	400	479
1/6/2016 20:00	400	325	489
1/6/2016 21:00	400	325	509
1/6/2016 22:00	400	325	587
1/6/2016 23:00	400	325	666
1/7/2016 0:00	400	270	719
1/7/2016 1:00	400	270	719
1/7/2016 2:00	400	270	689
1/7/2016 3:00	400	270	637
1/7/2016 4:00	400	225	571
1/7/2016 5:00	400	225	524
1/7/2016 6:00	400	225	484
1/7/2016 7:00	400	225	445
1/7/2016 8:00	400	200	422
1/7/2016 9:00	400	200	404
1/7/2016 10:00	400	200	386
1/7/2016 11:00	400	200	369
1/7/2016 12:00	400	200	356
1/7/2016 13:00	400	200	344
1/7/2016 14:00	400	200	336
1/7/2016 15:00	400	200	323
Average cfs over 48-hour winter instability flow period	400	400	471
Average volume (AF) over 48-hour winter instability flow period	1587	1585	1870

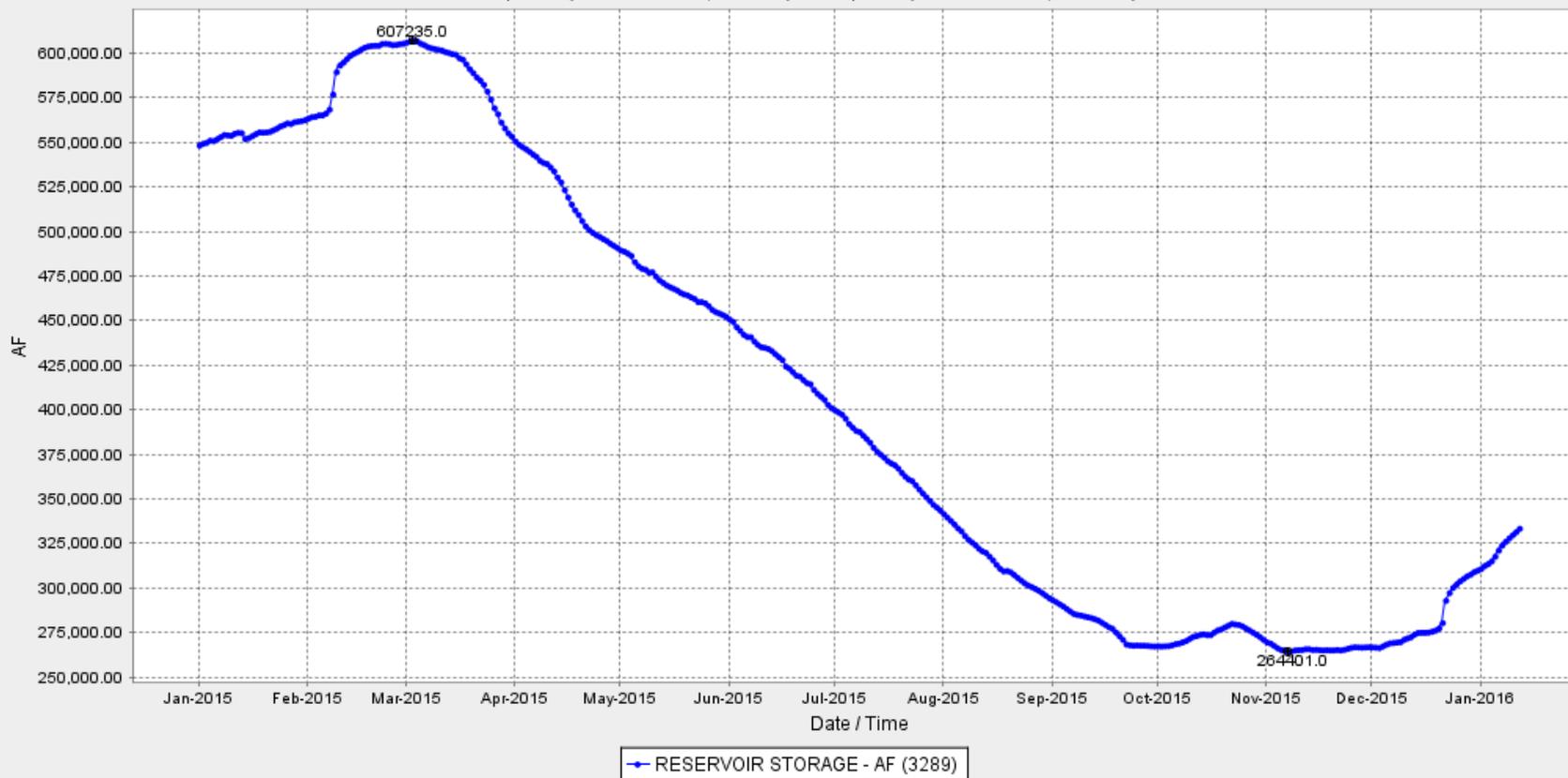
# **ATTACHMENT 4**

## New Melones storage from January 1, 2015

### NEW MELONES RESERVOIR ( NML )

Date from 12/31/2014 12:37 through 01/13/2016 12:37 Duration : 378 days

Max of period : (03/03/2015 00:00, 607235.0) Min of period: (11/07/2015 00:00, 264401.0)



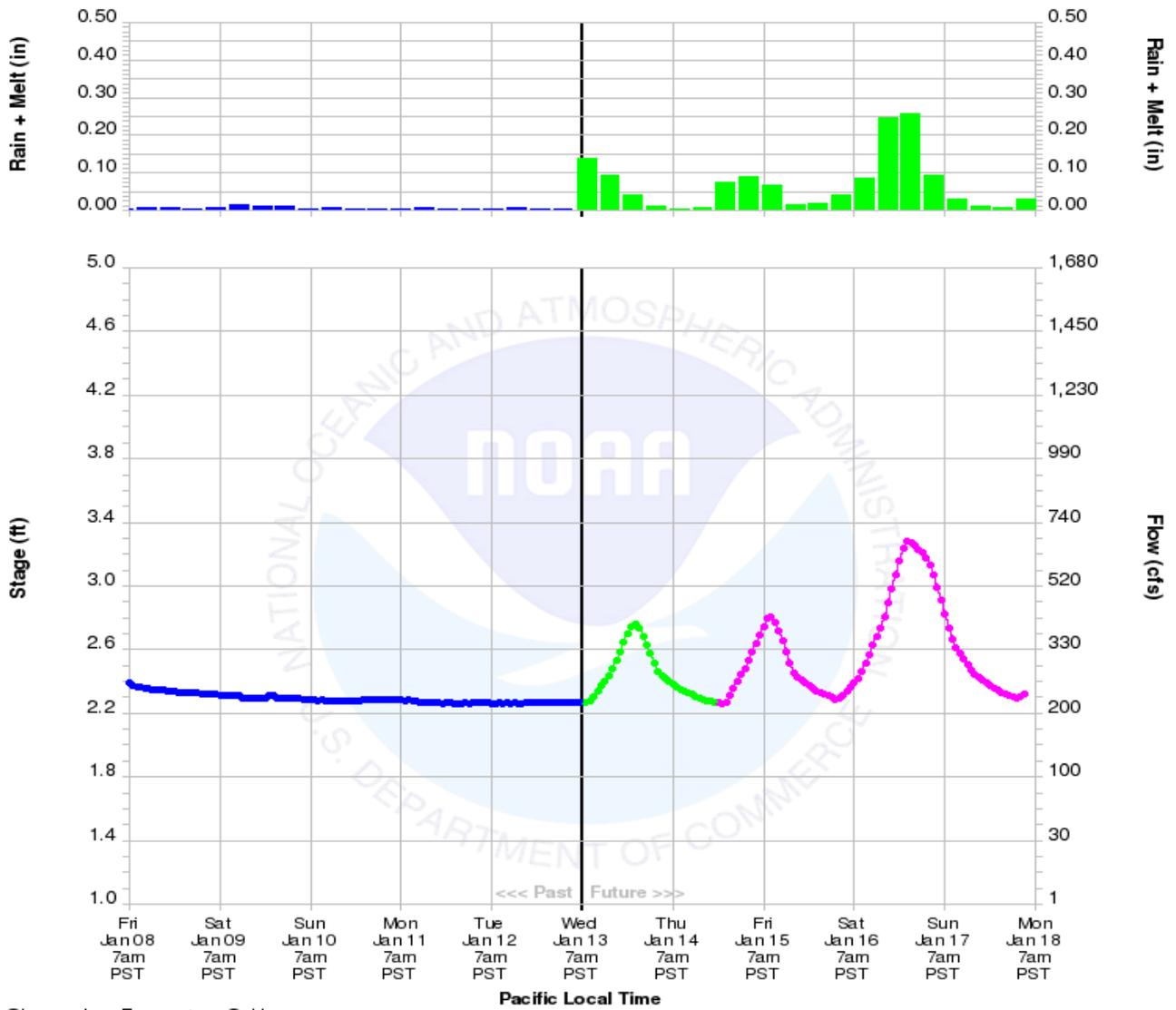
Generated on Wed Jan 13 12:39:16 PST 2016

[Plot all NML Sensors](#) | [Real-Time NML Data](#) | [NML Data](#) | [Daily NML Data](#) | [Show NML Map](#) | [NML Info](#)

Plot from ending date:  Span:  days

# **ATTACHMENT 5**

## Orange Blossom Bridge guidance plots



Observed ● Forecast ● Guidance ●  
 Created: 01/13/2016 at 7:51 AM PST (OBBC1 Forecast Run Time = 1547Z)

California Department of Water Resources  
 NOAA / NWS / California Nevada River Forecast Center



---

## NMFS determination RE: February Winter Instability Flows

---

Garwin Yip - NOAA Federal <garwin.yip@noaa.gov>

Tue, Feb 23, 2016 at 12:28 PM

To: "knwhite@usbr.gov" <knwhite@usbr.gov>

Cc: Lee Mao <lmiao@usbr.gov>, Barbara Byrne - NOAA Federal <barbara.byrne@noaa.gov>, Peggy Manza <pmanza@usbr.gov>, Elizabeth Kiteck <ekiteck@usbr.gov>, Ronald MILLIGAN <RMILLIGAN@usbr.gov>, Carolyn Bragg <cbragg@usbr.gov>, Amanda Bahls <abahls@usbr.gov>, Drew Lessard <DLessard@usbr.gov>, "Mary (Catherine) Blackwell" <mblackwell@usbr.gov>, "womt@water.ca.gov" <womt@water.ca.gov>

As you know, Action III.1.3 (pages 49-50 of the 2011 RPA Amendments to the NMFS Biological Opinion) provides for the adaptive management of the flow schedule in Appendix 2-E of the NMFS Biological Opinion. Specifically, "...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action."

On January 15, 2016, NMFS approved a request to maintain the RPA Appendix 2E base flows of 200 cfs until SOG advice on the February winter instability flow was finalized, and requested that final advice be provided no later than Friday, February 19, 2016. Reclamation provided the final SOG advice (attached) on February 19, 2016.

In consideration of the timing, magnitude, and duration of the natural storm pulses that occurred in late January, and given the current context and severity of New Melones storage conditions, current limits to Reclamation's discretion on water releases, and limited precipitation forecasted through the end of February, NMFS agrees that it is appropriate for the natural storm pulses in late January 2016 to be considered in lieu of a controlled release to satisfy the February winter instability flow. **NMFS determines that the February winter instability flow has been satisfied consistent with the implementation procedures of RPA Action III.1.3.**

WOMT--In the interest of following the process provided in NMFS' Opinion section 11.2.1.1, this e-mail is to inform WOMT of NMFS' determination. If anyone wants to discuss the SOG advice or NMFS determination, please do so at this afternoon's WOMT meeting. Thanks.

-Garwin-

---

*Garwin Yip*

Water Operations and Delta Consultations Branch Chief

NOAA Fisheries West Coast Region

U.S. Department of Commerce

California Central Valley Area Office

650 Capitol Mall, Suite 5-100

Sacramento, CA 95814

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[www.westcoast.fisheries.noaa.gov](http://www.westcoast.fisheries.noaa.gov)



—— Forwarded message ——

From: **White, Kristin** <[knwhite@usbr.gov](mailto:knwhite@usbr.gov)>

Date: Fri, Feb 19, 2016 at 9:59 AM

Subject: February Winter Instability Flows

To: Garwin Yip <[Garwin.Yip@noaa.gov](mailto:Garwin.Yip@noaa.gov)>

Cc: "Mao, Leeyan" <[Imao@usbr.gov](mailto:Imao@usbr.gov)>, Brycen Swart - NOAA Federal <[brycen.swart@noaa.gov](mailto:brycen.swart@noaa.gov)>, Barbara Byrne - NOAA Federal <[barbara.byrne@noaa.gov](mailto:barbara.byrne@noaa.gov)>, Peggy Manza <[pmanza@usbr.gov](mailto:pmanza@usbr.gov)>, Elizabeth Kiteck <[ekiteck@usbr.gov](mailto:ekiteck@usbr.gov)>, Ronald MILLIGAN <[RMILLIGAN@usbr.gov](mailto:RMILLIGAN@usbr.gov)>, Carolyn Bragg <[cbragg@usbr.gov](mailto:cbragg@usbr.gov)>, Amanda Bahls <[abahls@usbr.gov](mailto:abahls@usbr.gov)>, Drew Lessard <[DLessard@usbr.gov](mailto:DLessard@usbr.gov)>, "Mary (Catherine) Blackwell" <[mblackwell@usbr.gov](mailto:mblackwell@usbr.gov)>

Garwin -

Attached is the SOG advice for implementing the February winter instability flows. As a summary, SOG advises that the natural storm pulses in late January be considered to satisfy the February winter instability flow (Critically Dry year type) in the Appendix 2-E flow schedule.

Reclamation requests approval from NMFS for implementing this advice.

Kristin White, PE\*

*Program Manager*

U.S. Bureau of Reclamation, Mid-Pacific Region

Ph: [916-989-7226](tel:916-989-7226) (Central California Area Office)

\*Inactive



**2016.02.19\_SOG WIF Advice.pdf**

1115K

## **SOG ADVICE RE: February 2016 WINTER INSTABILITY FLOW 2/19/16**

### Background

Winter instability flows in January and February are a component of the daily flow schedule in Appendix 2-E of the NMFS BiOp<sup>1</sup> required per Action III.1.3 of the Reasonable and Prudent Alternative (RPA). As noted in the 2011 RPA Amendments<sup>2</sup> (p. 50), the winter instability flows are intended "...to simulate natural variability in the winter hydrograph and to enhance access to varied rearing habitats." The RPA further notes (p. 50) that "...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action."

On January 15, 2016, NMFS approved Reclamation's request (supported by SOG advice) that the natural storm pulse January 5-7, 2016 be considered to satisfy the intent of the January winter instability flow (WIF). At that time, NMFS also approved a request to maintain the RPA Appendix 2E base flows of 200 cfs until advice is developed for the February WIF. NMFS requested that final advice be provided to NMFS no later than Friday, February 19, 2016. *[These approvals are included as Attachment 1]*

**Below, SOG advises that the multiple natural storm events in the second half of January be considered to satisfy the intent as meeting the intent of the February winter instability flow.**

### SOG advice

**For February 2016, SOG advises that the natural storm pulses in late January 2016 be considered to satisfy the February winter instability flow (Critically Dry yeartype) in the Appendix 2-E flow schedule.**

### Rationale:

- In January, there were three large natural flow events at Orange Blossom Bridge (OBB). The first event included 2 peak flows (January 5-7) and was approved by NMFS (on January 15, 2016) as meeting the intent of the January WIF. The remaining events occurred 2 and 3 weeks following the first event (January 18-20 and January 23-24) and constituted approximately 2,700 AF of water at OBB above the 200 cfs base flow. The appendix 2-E WIF requirement for a Critically Dry February consists of 793 AF above the base flow at Goodwin. *[Attachment 2]*
- The absence of precipitation to date in February and the forecasted precipitation through the end of the month is not expected to create a storm event substantial enough to be considered to meet the intent of the February WIF during the month of February. *[Attachment 3]*

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<sup>1</sup> The BiOp and all appendices are available online at:  
[http://www.westcoast.fisheries.noaa.gov/central\\_valley/water\\_operations/ocap.html](http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/ocap.html)

<sup>2</sup> Available online at:  
[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711\\_ocap\\_opinion\\_2011\\_amendments.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

- Realized storm flow in-river at Orange Blossom Bridge (OBB) is expected to provide the intended benefits of the RPA WIF requirement at Goodwin. The WIF components of the 2-E flow schedule are intended to simulate natural variability in the winter hydrograph and to enhance access to varied rearing habitats. In previous years, SOG has advised reshaping the pulse from the 2-E schedule to mimic a natural storm event in order to inundate a greater area of shallow water habitat (for example, at the Honolulu Bar restoration area). Short-term inundation of shallow water habitat can provide benefits to rearing salmonids such as: temporary spatial refuges from large predators, areas with increased water temperatures that may allow short-term increases in growth rate, and increased allochthonous input to the main channel.
- SOG has concerns about extremely low storage conditions in New Melones due to the multi-year drought and what that might mean for future operations. As of February 17<sup>th</sup>, storage was at 432 TAF, which is 18% of capacity and 30% of the historical average for this date. *[Attachment 4]*
- All current storage in New Melones is part of the Districts' 2016 water and conservation account, therefore Reclamation has limited discretion on water releases.

In the current context of severe drought, serious concerns about storage in New Melones, and the current limits to Reclamation's discretion on increasing releases, SOG believes that the intended biological benefits have been satisfied by the natural storm pulses in late January.

# **ATTACHMENT 1**

NMFS approval of January winter instability flow  
and maintaining the 2-E base flow until advice  
could be developed for February



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## NMFS determination re Winter Instability Flows on the Stanislaus River

---

Garwin Yip - NOAA Federal <garwin.yip@noaa.gov>

Fri, Jan 15, 2016 at 4:21 PM

To: "knwhite@usbr.gov" <knwhite@usbr.gov>

Cc: "Mao, Leeyan" <lmao@usbr.gov>, Brycen Swart - NOAA Federal <brycen.swart@noaa.gov>, Barbara Byrne - NOAA Federal <barbara.byrne@noaa.gov>, Peggy Manza <pmanza@usbr.gov>, Elizabeth Kiteck <ekiteck@usbr.gov>, Ronald MILLIGAN <RMILLIGAN@usbr.gov>, Carolyn Bragg <cbragg@usbr.gov>, Amanda Bahls <abahls@usbr.gov>, Drew Lessard <DLessard@usbr.gov>, "Mary (Catherine) Blackwell" <mblackwell@usbr.gov>, "womt@water.ca.gov" <womt@water.ca.gov>

Kristin,

As you know, Action III.1.3 (pages 49-50 of the 2011 RPA Amendments to the NMFS Biological Opinion) provides for the adaptive management of the flow schedule in Appendix 2-E of the NMFS Biological Opinion. Specifically, "...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action."

Given the current context and severity of New Melones storage conditions, and current limits to Reclamation's discretion on water releases, NMFS agrees that it is appropriate for the natural storm pulse in early January 2016 to be considered in lieu of a controlled release to satisfy the January winter instability flow. **NMFS determines that the January winter instability flow has been satisfied consistent with the implementation procedures of RPA Action III.1.3.**

In its advice, SOG also recommended maintaining the RPA Appendix 2E base flows of 200 cfs during February until the SOG meeting on February 17, 2016, when it will review the latest storage conditions, inflow forecasts, and observed flow events before providing SOG advice on the February winter instability flow. SOG anticipates providing final advice on the February winter instability flow by Friday, February 19, 2016. **NMFS approves the request to maintain the RPA Appendix 2E base flows of 200 cfs until advice is finalized and requests that final advice be provided to NMFS no later than Friday, 2/19/16.**

WOMT--In the interest of following the process provided in NMFS' Opinion section 11.2.1.1, this e-mail is to inform WOMT of NMFS' determination, and to provide WOMT with an opportunity to discuss the proposal. If anyone wants to discuss the SOG advice or NMFS determination, please initiate a WOMT meeting. Thanks.

*Garwin Yip*

Water Operations and Delta Consultations Branch Chief  
NOAA Fisheries West Coast Region  
U.S. Department of Commerce  
California Central Valley Area Office  
650 Capitol Mall, Suite 5-100  
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----- Forwarded message -----

From: **White, Kristin** <[knwhite@usbr.gov](mailto:knwhite@usbr.gov)>  
Date: Fri, Jan 15, 2016 at 9:24 AM  
Subject: Re: Winter Instability Flows  
To: Garwin Yip - NOAA Federal <[garwin.yip@noaa.gov](mailto:garwin.yip@noaa.gov)>  
Cc: "Mao, Leeyan" <[Imao@usbr.gov](mailto:Imao@usbr.gov)>, Brycen Swart - NOAA Federal <[brycen.swart@noaa.gov](mailto:brycen.swart@noaa.gov)>, Barbara Byrne - NOAA Federal <[barbara.byrne@noaa.gov](mailto:barbara.byrne@noaa.gov)>, Peggy Manza <[pmanza@usbr.gov](mailto:pmanza@usbr.gov)>, Elizabeth Kiteck <[ekiteck@usbr.gov](mailto:ekiteck@usbr.gov)>, Ronald MILLIGAN <[RMILLIGAN@usbr.gov](mailto:RMILLIGAN@usbr.gov)>, Carolyn Bragg <[cbragg@usbr.gov](mailto:cbragg@usbr.gov)>, Amanda Bahls <[abahls@usbr.gov](mailto:abahls@usbr.gov)>, Drew Lessard <[DLessard@usbr.gov](mailto:DLessard@usbr.gov)>, "Mary (Catherine) Blackwell" <[mblackwell@usbr.gov](mailto:mblackwell@usbr.gov)>

Garwin -

Attached is the SOG advice for implementing the January winter instability flows. As a summary, SOG advises that the natural storm pulse January 5-7, 2016 be considered to satisfy the January winter instability flow (Critically Dry year type) in the Appendix 2-E flow schedule.

In addition, SOG recommends maintaining the RPA Appendix 2E base flows of 200 cfs during February until SOG advice is finalized. SOG expects to review the latest storage conditions, inflow forecasts, and observed flow events at the February 17, 2016 SOG meeting, and final advice on the February winter instability flow is anticipated by Friday, February 19, 2016.

Reclamation requests approval from NMFS for implementing this advice.

Kristin White, PE\*  
*Program Manager*  
U.S. Bureau of Reclamation, Mid-Pacific Region  
Ph: [916-989-7226](tel:916-989-7226) (Central California Area Office)  
\*Inactive

On Wed, Dec 30, 2015 at 11:21 AM, Brycen Swart - NOAA Federal <[brycen.swart@noaa.gov](mailto:brycen.swart@noaa.gov)> wrote:  
Lee,

Thank you for the update on the status of SOG advice regarding implementation of RPA Action III.1.3 of the 2009 NMFS BiOp, specifically the winter instability flows during January and February. NMFS approves Reclamation's request to maintain the RPA Appendix 2E base flows of 200 cfs through mid-January while SOG finalizes its advice on the shaping and timing of the winter instability flows.

NMFS requests that either the finalized advice, or an update on when advice is expected, is provided no later than Friday, 1/15/16.

Sincerely,  
Brycen Swart (acting for Garwin Yip)

**Brycen Swart**  
*Fisheries Biologist*  
California Central Valley Area Office  
NOAA Fisheries West Coast Region  
916-930-3712  
[www.westcoast.fisheries.noaa.gov](http://www.westcoast.fisheries.noaa.gov)



On Wed, Dec 30, 2015 at 10:18 AM, Mao, Leeyan <[Imao@usbr.gov](mailto:Imao@usbr.gov)> wrote:  
Good morning Brycen,

Due to the low attendance at the December SOG meeting (and no representation from the fishery agencies), advice on implementation of the winter instability flows (WIF) for January was not finalized. Reclamation anticipates receiving SOG advice on these flows in mid-January. Reclamation requests approval to maintain the RPA Appendix 2E base flows of 200 cfs (without WIF) through the first two weeks of January and will update NMFS on the recommended implementation of the WIF once we have SOG advice.

Thanks,

Lee

—

Lee Mao  
Deputy Area Manager, Central California Area Office  
Bureau of Reclamation, Mid-Pacific Region  
(916) 989-7267 Office (**Note: New Office number**)  
(916) 947-0396 Cellular  
[Imao@usbr.gov](mailto:Imao@usbr.gov)

---

 **2016.1.15\_SOG WIF Advice wFeb.pdf**  
434K

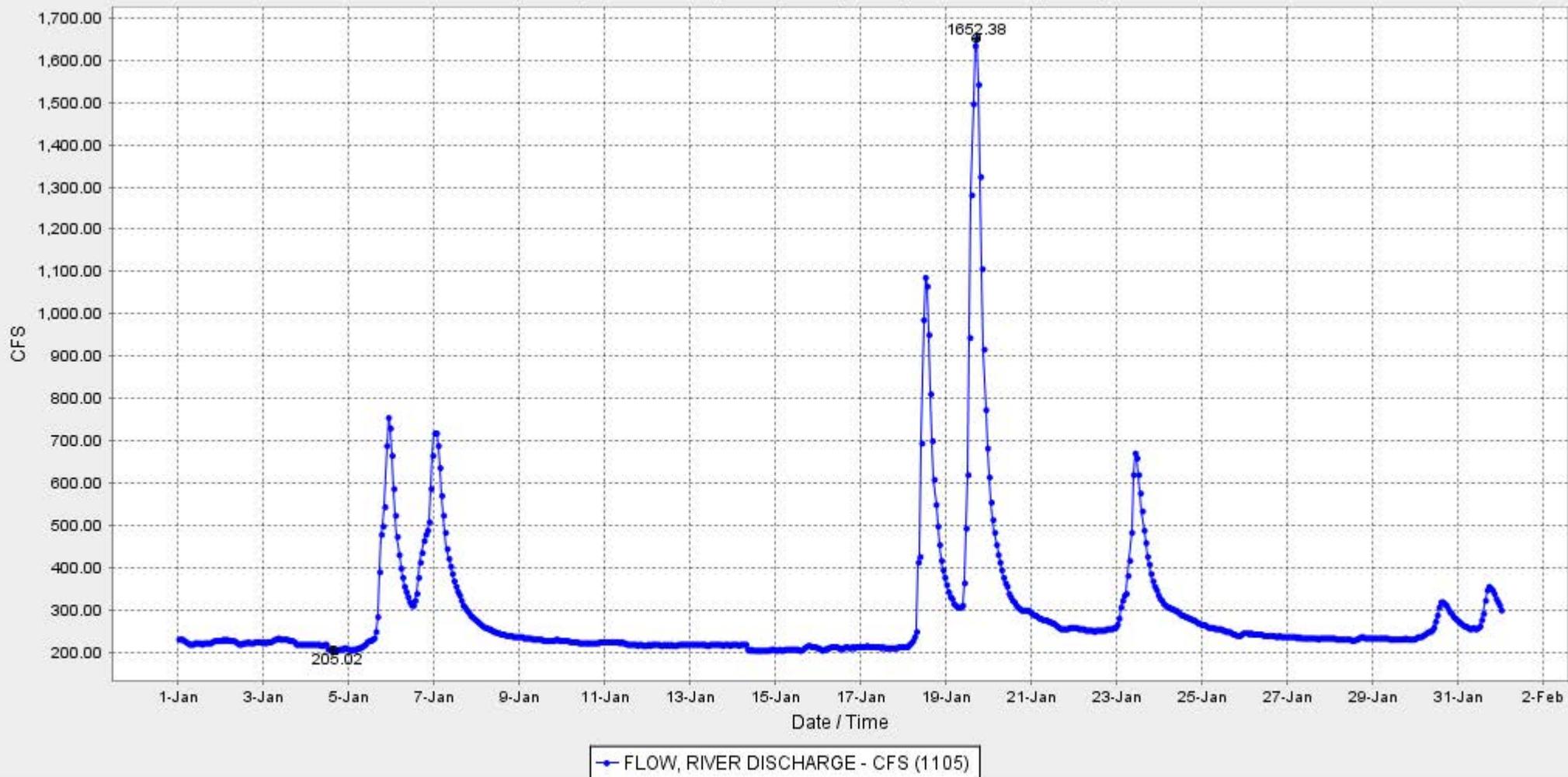
# **ATTACHMENT 2**

## January storm pulse information

# STANISLAUS R AT ORANGE BLOSSOM BRIDGE ( OBB )

Date from 01/01/2016 00:00 through 02/01/2016 00:00 Duration : 31 days

Max of period : (01/19/2016 17:00, 1652.38) Min of period : (01/04/2016 15:00, 205.02)



Generated on Thu Feb 11 06:29:31 PST 2016

[Plot all OBB Sensors](#) | [Real-Time OBB Data](#) | [OBB Data](#) | [Daily OBB Data](#) | [Show OBB Map](#) | [OBB Info](#)

WY 2016 SOG Annual Report -- Appendix B

B-31

Plot from ending date:  Span:  days

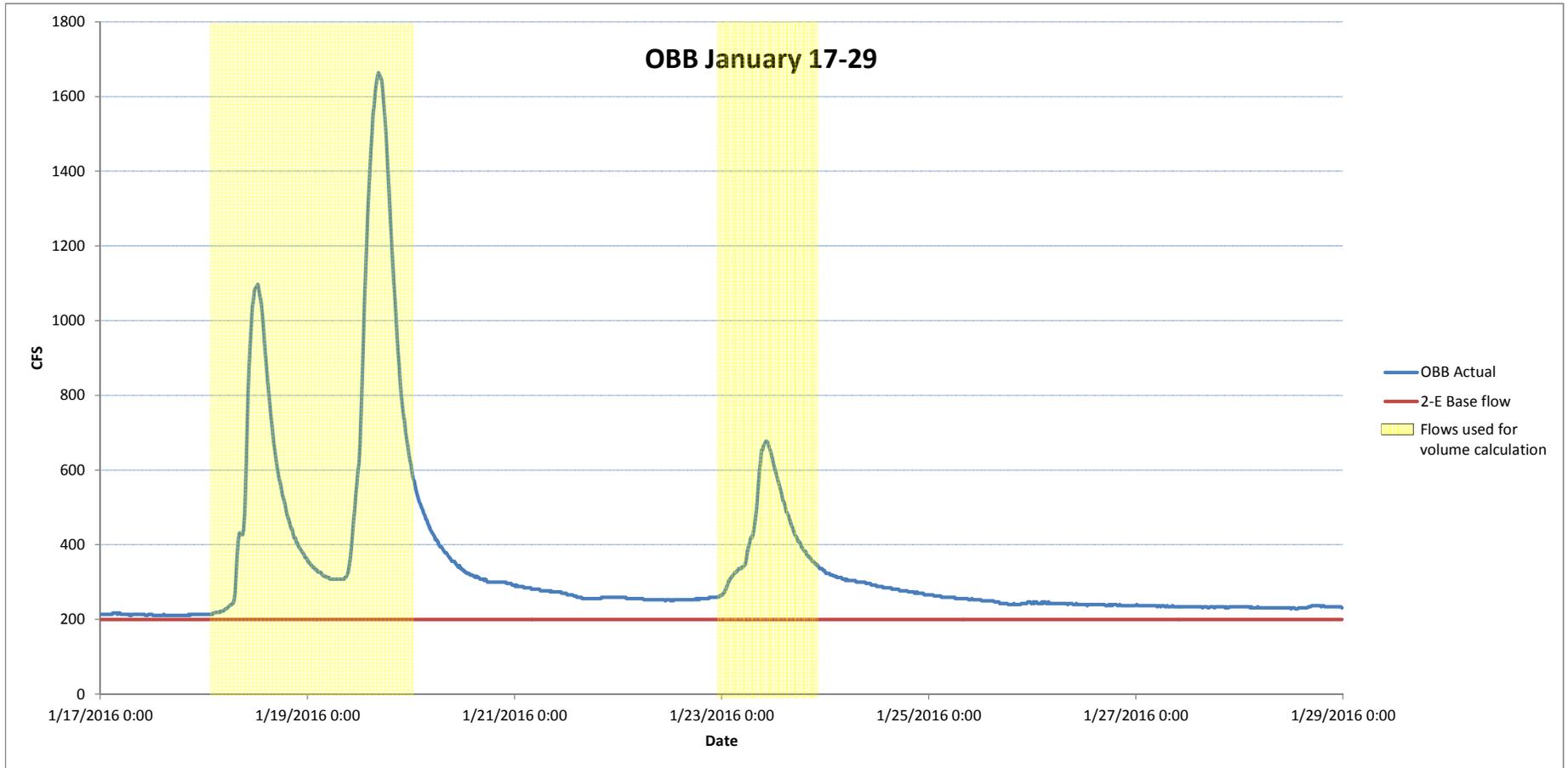
<b>Date</b>	<b>Time</b>	<b>OBB Actual (CFS)</b>
1/18/2016	0:00	214
1/18/2016	1:00	214
1/18/2016	2:00	214
1/18/2016	3:00	219
1/18/2016	4:00	222
1/18/2016	5:00	228
1/18/2016	6:00	237
1/18/2016	7:00	250
1/18/2016	8:00	413
1/18/2016	9:00	427
1/18/2016	10:00	695
1/18/2016	11:00	986
1/18/2016	12:00	1087
1/18/2016	13:00	1066
1/18/2016	14:00	952
1/18/2016	15:00	812
1/18/2016	16:00	701
1/18/2016	17:00	609
1/18/2016	18:00	550
1/18/2016	19:00	499
1/18/2016	20:00	455
1/18/2016	21:00	418
1/18/2016	22:00	395
1/18/2016	23:00	378
1/18/2016	0:00	361
1/19/2016	1:00	344
1/19/2016	2:00	332
1/19/2016	3:00	327
1/19/2016	4:00	316
1/19/2016	5:00	312
1/19/2016	6:00	308
1/19/2016	7:00	308
1/19/2016	8:00	308
1/19/2016	9:00	312
1/19/2016	10:00	365
1/19/2016	11:00	494
1/19/2016	12:00	620
1/19/2016	13:00	945
1/19/2016	14:00	1282
1/19/2016	15:00	1498
1/19/2016	16:00	1635
1/19/2016	17:00	1652
1/19/2016	18:00	1543
1/19/2016	19:00	1325
1/19/2016	20:00	1107
1/19/2016	21:00	917

<b>Date</b>	<b>Time</b>	<b>OBB Actual (CFS)</b>
1/19/2016	22:00	774
1/19/2016	23:00	683
1/20/2016	0:00	615
1/20/2016	1:00	555
1/20/2016	2:00	514
1/20/2016	3:00	484
1/20/2016	4:00	455
1/20/2016	5:00	431
1/20/2016	6:00	413
1/20/2016	7:00	395
1/20/2016	8:00	378
1/20/2016	9:00	365
1/20/2016	10:00	356
1/20/2016	11:00	340
1/20/2016	12:00	332
1/20/2016	13:00	323
1/20/2016	14:00	319
1/20/2016	15:00	312
1/20/2016	16:00	308
1/20/2016	17:00	304
1/20/2016	18:00	300
1/20/2016	19:00	300
1/20/2016	20:00	300
1/20/2016	21:00	300
1/20/2016	22:00	300
1/20/2016	23:00	296
1/23/2016	0:00	266
1/23/2016	1:00	281
1/23/2016	2:00	308
1/23/2016	3:00	323
1/23/2016	4:00	336
1/23/2016	5:00	340
1/23/2016	6:00	382
1/23/2016	7:00	418
1/23/2016	8:00	484
1/23/2016	9:00	620
1/23/2016	10:00	672
1/23/2016	11:00	660
1/23/2016	12:00	620
1/23/2016	13:00	577
1/23/2016	14:00	534
1/23/2016	15:00	489
1/23/2016	16:00	460
1/23/2016	17:00	427
1/23/2016	18:00	409
1/23/2016	19:00	386

<b>Date</b>	<b>Time</b>	<b>OBB Actual (CFS)</b>
1/23/2016	20:00	369
1/23/2016	21:00	356
1/23/2016	22:00	348
1/23/2016	23:00	336
1/24/2016	0:00	327
1/24/2016	1:00	323
1/24/2016	2:00	316
1/24/2016	3:00	312
1/24/2016	4:00	308
1/24/2016	5:00	308
1/24/2016	6:00	304
1/24/2016	7:00	304
1/24/2016	8:00	300
1/24/2016	9:00	296
1/24/2016	10:00	292
1/24/2016	11:00	296
1/24/2016	12:00	288
1/24/2016	13:00	288
1/24/2016	14:00	285
1/24/2016	15:00	285
1/24/2016	16:00	281
1/24/2016	17:00	281
1/24/2016	18:00	277
1/24/2016	19:00	277
1/24/2016	20:00	274
1/24/2016	21:00	270
1/24/2016	22:00	270
1/24/2016	23:00	266

**Average CFS                    473**

**Total AF above  
Base Flow                    2705**



# **ATTACHMENT 3**

## Orange Blossom Bridge guidance plot

# STANISLAUS R AT ORANGE BLOSSOM BRIDGE (OBB)

Elevation: 117' · STANISLAUS R basin · Operator: CA Dept of Water Resources

Datum 0 = 117.20' NGVD

River Stage Definitions: Monitor stage 13.0' Flood stage 16.0'

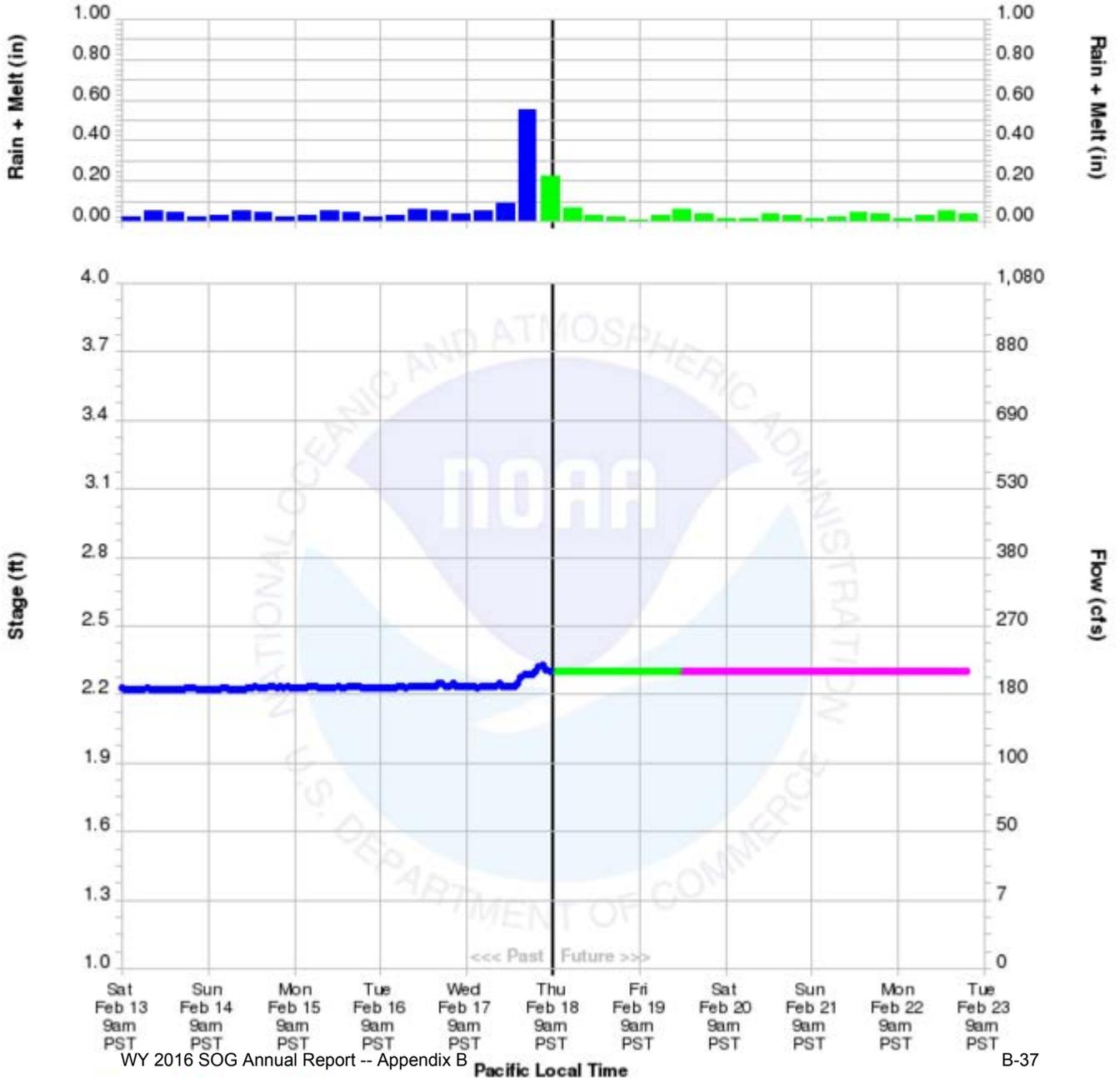
Peak Stage of Record 31.8' on 12/23/1956

**Warning:** Levels identified as "guidance" have significant uncertainty

due to future weather and/or reservoir regulation and are provided for planning purposes only.

Be sure to reload this page for up-to-date information. [[<< Previous](#)] Forecast Point [[Next >>](#)]

San Joaquin River System river forecast bulletin.



**ATTACHMENT 4**  
New Melones storage from January 1,  
2015 to present

# NEW MELONES RESERVOIR ( NML )

Date from 12/31/2014 11:54 through 02/18/2016 11:54 Duration : 414 days  
Max of period : (03/03/2015 00:00, 607235.0) Min of period : (11/07/2015 00:00, 264401.0)



RESERVOIR STORAGE - AF (3289)

# Appendix C—SOG advice on spring pulse flow



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## SOG Advice for the Spring Pulse Flow

---

Garwin Yip - NOAA Federal <garwin.yip@noaa.gov>

Wed, Mar 30, 2016 at 10:06 AM

To: Kristin <knwhite@usbr.gov>

Cc: Thomas Patton <tpatton@usbr.gov>, ELIZABETH KITECK <ekiteck@usbr.gov>, Ronald Milligan <rmilligan@usbr.gov>, Drew Lessard <dlessard@usbr.gov>, "Mary (Catherine) Blackwell" <mblackwell@usbr.gov>, Amanda Bahls <abahls@usbr.gov>, Leeyan Mao <lmao@usbr.gov>, Barbara Byrne - NOAA Federal <barbara.byrne@noaa.gov>, "womt@water.ca.gov" <womt@water.ca.gov>

Kristin,

As you know, Action III.1.3 (pages 49-50 of the 2011 RPA Amendments to the NMFS Biological Opinion) provides for the adaptive management of the flow schedule in Appendix 2-E of the NMFS Biological Opinion. Specifically, "...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action."

The attached SOG advice identifies two alternatives to reshaping the spring pulse volume in Appendix 2-E. The advice indicates that SOG prefers Alt A based on the broader timeframe (April 2 through May 9, 2016) over which outmigration opportunities and temperature buffering will be provided, relative to Alt B (April 15 through May 9, 2016). The SOG advice acknowledges the guidance in the Biological Opinion to not reduce flows below 800 cfs until the late spring flows occur, but notes that "SOG believes that the intent of this was to avoid stranding at Honolulu Bar, which has been restored since the BO was issued. As such, SOG believes that the risk of stranding is minimal with the pulse shaping."

NMFS concurs that both Alt A and Alt B in the SOG advice meet the objective of RPA Action III.1.3 "...to incorporate habitat maintaining geomorphic flows in a flow pattern that will provide migratory cues to smolts and facilitate out-migrant smolt movement...", although as indicated in the SOG advice, Alt A is preferable. NMFS recommends validation monitoring (in this case, to validate the assumption of minimal stranding with the implementation of Alt A) in between the pulses if crews are available, and rescue of any stranded/isolated salmonids.

WOMT--In the interest of following the process provided in NMFS' Opinion section 11.2.1.1, this e-mail is to inform WOMT of NMFS' determination, and to provide WOMT with an opportunity to discuss the proposal. As this is a time critical issue, if anyone wants to discuss the SOG advice or NMFS determination, please initiate a WOMT meeting as soon as possible.

Thanks.

-Garwin-

---

Garwin Yip

Water Operations and Delta Consultations Branch Chief  
NOAA Fisheries West Coast Region  
U.S. Department of Commerce  
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[www.westcoast.fisheries.noaa.gov](http://www.westcoast.fisheries.noaa.gov)



[Quoted text hidden]

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 **2016.03.25\_SOG advice\_spring pulse.pdf**  
145K

**Stanislaus Operations Group Advice Re:  
Stanislaus River Spring 2016 Outmigration Pulse flow**  
March 18, 2016

**Background**

Spring outmigration pulse flows are one component of the daily flow schedule in Appendix 2-E of the NMFS BiOp<sup>1</sup> required per Action III.1.3 of the Reasonable and Prudent Alternative (RPA). As noted in the 2011 BiOp Amendments<sup>2</sup>, spring pulse flows are intended to provide “outmigration flow cues to enhance likelihood of anadromy” and “late spring flows for conveyance and maintenance of downstream migratory habitat quality”. The 2011 BiOp Amendments further note (p. 50) that “...based upon the advice of SOG and the concurrence by NMFS, the flows may be implemented with minor modifications to the timing, magnitude, and/or duration, as long as NMFS concurs that the rationale for the shift in timing, magnitude, and/or duration is deemed by NMFS to be consistent with the intent of the action.”

Below, SOG advises a modified spring outmigration pulse flow schedule (based on the pulse volume of the NMFS BiOp Critical year flow schedule) that we believe is consistent with the intent of the RPA action. If additional water becomes available, SOG is willing to coordinate to help shape the higher volume.

**SOG advice**

**For 2016, SOG advises that the spring outmigration pulse flow (Critical yeartype<sup>3</sup>) be reshaped either according to the flow schedule described in “Alt A” or “Alt B”<sup>4</sup>, with “Alt A” preferred.** Both alternatives have the same volume (30,842 AF above a base flow of 200 cfs in April and 150 cfs in May) as the spring outmigration pulse in the Critical yeartype schedule in Appendix 2-E. The technical team believes that reshaping meets the intent of the RPA action by providing at least one spring pulse flow that may cue anadromy and improve migratory habitat in both the Stanislaus River and in the mainstem San Joaquin River and southern delta. In the Stanislaus River, higher flows are expected to reduce water temperature and inundate some shallow water habitat which may provide juvenile salmonids with short-term growth benefits as well as potential refuge from predation. In the mainstem San Joaquin River and south delta, higher flows from the Stanislaus River (and other San Joaquin tributaries) are expected to convey outmigrating salmonids more rapidly along their migratory pathway, which may improve outmigration success.

Some key features of the “Alt A” pulse include:

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<sup>1</sup> The BiOp and all appendices are available online at:

[http://www.westcoast.fisheries.noaa.gov/central\\_valley/water\\_operations/ocap.html](http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/ocap.html)

<sup>2</sup> Available online at:

[http://www.westcoast.fisheries.noaa.gov/publications/Central\\_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711\\_ocap\\_opinion\\_2011\\_amendments.pdf](http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf)

<sup>3</sup> SOG expects that the yeartype used to implement the Appendix 2-E RPA flows (which is based on the New Melones Water Supply Parameter rather than the San Joaquin Valley “60-20-20” Index) will remain “Critical” through April and May.

<sup>4</sup> Flow schedules are described in detail in *Attachment 1*

- Reshaping the large pulse identified in Appendix 2-E into **6 smaller pulses** may maximize opportunities for a broader range of salmonid outmigration timing rather than improving migratory conditions over a shorter duration. Increased flows are intended to cue outmigration and improve migratory habitat downstream.
- The **extended time frame** of approximately 6 weeks may extend the temperature buffering that the pulse flow provides, although temperatures may stay above the RPA temperature criteria<sup>5</sup>. The **small increase in base flow to 400 cfs between most large pulses** may help to further buffer water temperatures.
- The **pulse initiation date of April 2, 2016** is intended to provide pulse flows during the April to mid-May period for the expected salmonid peak outmigration period and contribute to improved mainstem San Joaquin River conditions<sup>6</sup>.
- The OCAP BO Action III.1.3 identifies that when spring pulses go above 800 cfs that the declining limb not be “reduced below 800 cfs until the late spring flows occur.” However, SOG believes that the intent of this was to avoid stranding at Honolulu Bar, which has been restored since the BO was issued. As such, SOG believes that the risk of stranding is minimal with the pulse shaping.
- **Head of Old River Barrier (HORB)** will be in place before the pulse flow begins.
- Other considerations for in-basin interests:
  - The **peak flows on weekends** provide suitable rafting conditions.
  - The short time at peak flows addresses agricultural seepage concerns.

Some key features of the “**Alt B**” pulse include:

- Reshaping the 2-E pulse into **3 larger pulses that maintain flows above 800 cfs throughout the pulse period** in strict accordance to the OCAP BO Action III.1.3. The higher between-pulse flows would shorten the pulse flow timeframe, but further reduce stranding risk compared to “Alt A”. Peak flows are intended to cue outmigration and improve migratory habitat downstream.
- The **shorter time frame** will provide a temperature buffer while the pulse occurs. Buffering during the pulse may be slightly greater compared to “Alt A”, but provides buffering over a shorter period compared to “Alt A”.
- The **continuous inundation** of all areas inundated at 800 cfs allows for productivity that may be lost in the pulses of “Alt A”, which provides continuous inundation only for areas inundated at 400 cfs.
- **HORB** will be in place before the pulse flow begins.
- Other considerations for in-basin interests:
  - The **peak flows on weekends** meet the preferred rafting conditions provided by stakeholders.
  - The shorter time at peak flows addresses agricultural seepage concerns.

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<sup>5</sup> RPA Action III.1.2 calls for the 7 day average of daily maximum temperature (7DADM) to be below 55°F at Orange Blossom Bridge and below 52°F at Knights Ferry.

<sup>6</sup> At the March 16<sup>th</sup> SOG meeting, SOG was informed that no pulse flow was expected on the Merced River and that the pulse volume on the Tuolumne River might range from 11 TAF to 60 TAF, depending on hydrology. Tuolumne pulse flows usually being after April 15<sup>th</sup> which will overlap at least in part with both Stanislaus pulse alternative.

**SOG prefers “Alt A”.** While both alternatives address rafting preferences, seepage concerns, and the salmonid benefits of cuing outmigration and improving migratory habitat downstream, “Alt A” maximizes opportunities for a broader range of salmonids while providing a temperature buffer for a longer timeframe. The stranding concern associated with the decreases in flow below 800 cfs was largely addressed by restoration work at Honolulu Bar.

# **Attachment 1**

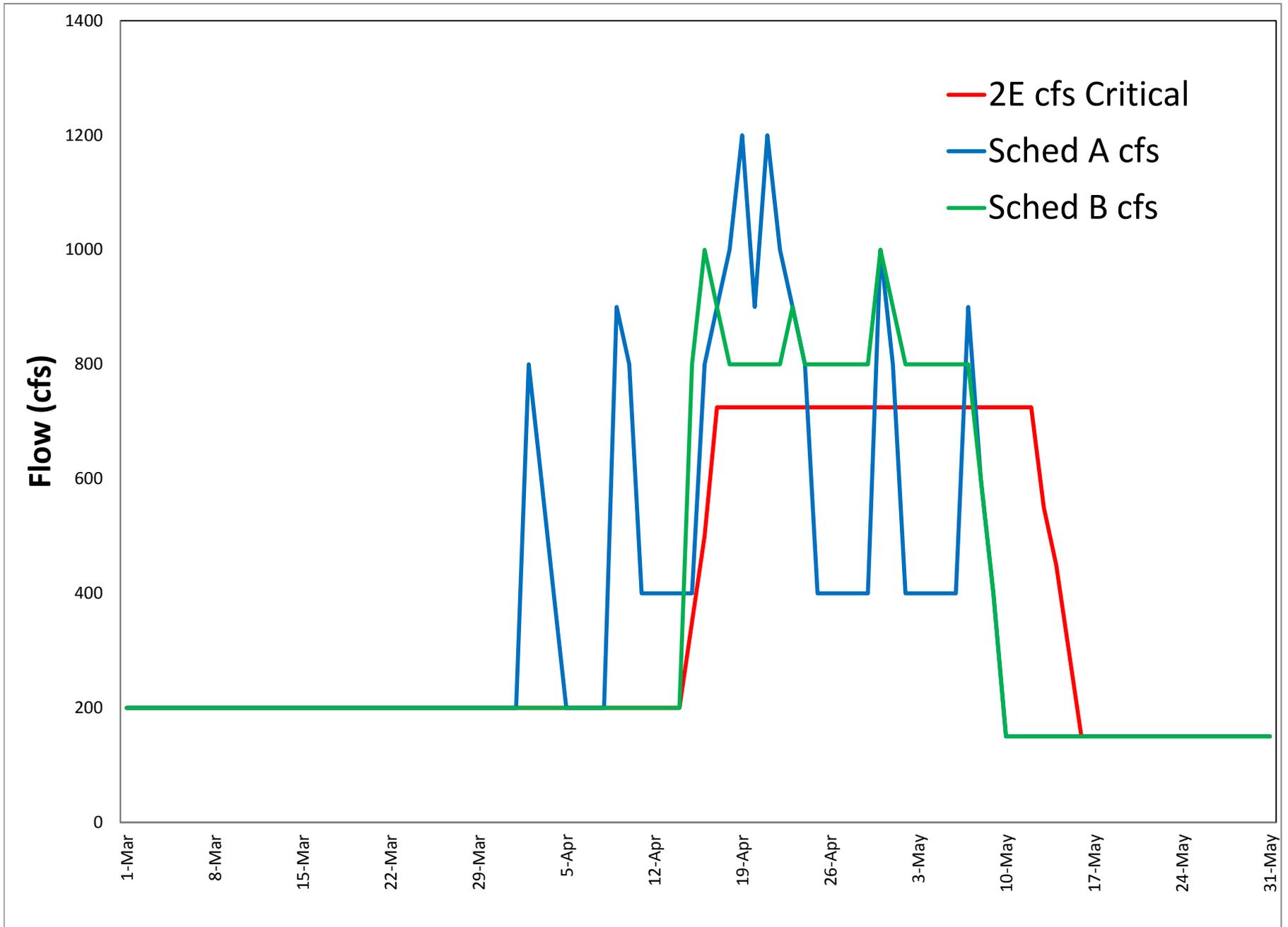
Stanislaus spring outmigration flow  
schedule advised by SOG for April-May  
2016

**DRAFT - Proposed Stan Flow Schedule for Spring 2016**

		2E cfs Critical	2E Crit AF	2E Crit cum AF	Sched A cfs	Sched A AF	Sched A cum AF	Sched B cfs	Sched B AF	Sched B cum AF
T	1-Mar	200	397	397	200	397	397	200	397	397
W	2-Mar	200	397	793	200	397	793	200	397	793
T	3-Mar	200	397	1190	200	397	1190	200	397	1190
F	4-Mar	200	397	1587	200	397	1587	200	397	1587
S	5-Mar	200	397	1983	200	397	1983	200	397	1983
S	6-Mar	200	397	2380	200	397	2380	200	397	2380
M	7-Mar	200	397	2777	200	397	2777	200	397	2777
T	8-Mar	200	397	3173	200	397	3173	200	397	3173
W	9-Mar	200	397	3570	200	397	3570	200	397	3570
T	10-Mar	200	397	3967	200	397	3967	200	397	3967
F	11-Mar	200	397	4363	200	397	4363	200	397	4363
S	12-Mar	200	397	4760	200	397	4760	200	397	4760
S	13-Mar	200	397	5157	200	397	5157	200	397	5157
M	14-Mar	200	397	5554	200	397	5554	200	397	5554
T	15-Mar	200	397	5950	200	397	5950	200	397	5950
W	16-Mar	200	397	6347	200	397	6347	200	397	6347
T	17-Mar	200	397	6744	200	397	6744	200	397	6744
F	18-Mar	200	397	7140	200	397	7140	200	397	7140
S	19-Mar	200	397	7537	200	397	7537	200	397	7537
S	20-Mar	200	397	7934	200	397	7934	200	397	7934
M	21-Mar	200	397	8330	200	397	8330	200	397	8330
T	22-Mar	200	397	8727	200	397	8727	200	397	8727
W	23-Mar	200	397	9124	200	397	9124	200	397	9124
T	24-Mar	200	397	9520	200	397	9520	200	397	9520
F	25-Mar	200	397	9917	200	397	9917	200	397	9917
S	26-Mar	200	397	10314	200	397	10314	200	397	10314
S	27-Mar	200	397	10710	200	397	10710	200	397	10710
M	28-Mar	200	397	11107	200	397	11107	200	397	11107
T	29-Mar	200	397	11504	200	397	11504	200	397	11504
W	30-Mar	200	397	11900	200	397	11900	200	397	11900
T	31-Mar	200	397	12297	200	397	12297	200	397	12297
F	1-Apr	200	397	12694	200	397	12694	200	397	12694
S	2-Apr	200	397	13090	800	1587	14280	200	397	13090
S	3-Apr	200	397	13487	600	1190	15471	200	397	13487
M	4-Apr	200	397	13884	400	793	16264	200	397	13884
T	5-Apr	200	397	14280	200	397	16661	200	397	14280
W	6-Apr	200	397	14677	200	397	17057	200	397	14677
T	7-Apr	200	397	15074	200	397	17454	200	397	15074
F	8-Apr	200	397	15471	200	397	17851	200	397	15471
S	9-Apr	200	397	15867	900	1785	19636	200	397	15867
S	10-Apr	200	397	16264	800	1587	21222	200	397	16264
M	11-Apr	200	397	16661	400	793	22016	200	397	16661
T	12-Apr	200	397	17057	400	793	22809	200	397	17057
W	13-Apr	200	397	17454	400	793	23602	200	397	17454
T	14-Apr	200	397	17851	400	793	24396	200	397	17851
F	15-Apr	350	694	18545	400	793	25189	800	1587	19437
S	16-Apr	500	992	19536	800	1587	26776	1000	1983	21421
S	17-Apr	725	1438	20974	900	1785	28561	900	1785	23206
M	18-Apr	725	1438	22412	1000	1983	30544	800	1587	24792
T	19-Apr	725	1438	23850	1200	2380	32924	800	1587	26379
W	20-Apr	725	1438	25288	900	1785	34709	800	1587	27966
T	21-Apr	725	1438	26726	1200	2380	37090	800	1587	29553
F	22-Apr	725	1438	28164	1000	1983	39073	800	1587	31139
S	23-Apr	725	1438	29602	900	1785	40858	900	1785	32924
S	24-Apr	725	1438	31040	800	1587	42445	800	1587	34511
M	25-Apr	725	1438	32478	400	793	43238	800	1587	36098
T	26-Apr	725	1438	33916	400	793	44031	800	1587	37685
W	27-Apr	725	1438	35354	400	793	44825	800	1587	39271
T	28-Apr	725	1438	36792	400	793	45618	800	1587	40858
F	29-Apr	725	1438	38230	400	793	46412	800	1587	42445
S	30-Apr	725	1438	39668	1000	1983	48395	1000	1983	44428
S	1-May	725	1438	41106	800	1587	49982	900	1785	46213
M	2-May	725	1438	42544	400	793	50775	800	1587	47800
T	3-May	725	1438	43982	400	793	51568	800	1587	49387
W	4-May	725	1438	45420	400	793	52362	800	1587	50973

**DRAFT - Proposed Stan Flow Schedule for Spring 2016**

		2E cfs Critical	2E Crit AF	2E Crit cum AF	Sched A cfs	Sched A AF	Sched A cum AF	Sched B cfs	Sched B AF	Sched B cum AF
T	5-May	725	1438	46858	400	793	53155	800	1587	52560
F	6-May	725	1438	48296	400	793	53948	800	1587	54147
S	7-May	725	1438	49734	900	1785	55733	800	1587	55733
S	8-May	725	1438	51172	600	1190	56924	600	1190	56924
M	9-May	725	1438	52610	400	793	57717	400	793	57717
T	10-May	725	1438	54048	150	298	58014	150	298	58014
W	11-May	725	1438	55486	150	298	58312	150	298	58312
T	12-May	725	1438	56924	150	298	58609	150	298	58609
F	13-May	550	1091	58014	150	298	58907	150	298	58907
S	14-May	450	893	58907	150	298	59204	150	298	59204
S	15-May	300	595	59502	150	298	59502	150	298	59502
M	16-May	150	298	59799	150	298	59799	150	298	59799
T	17-May	150	298	60097	150	298	60097	150	298	60097
W	18-May	150	298	60394	150	298	60394	150	298	60394
T	19-May	150	298	60692	150	298	60692	150	298	60692
F	20-May	150	298	60990	150	298	60990	150	298	60990
S	21-May	150	298	61287	150	298	61287	150	298	61287
S	22-May	150	298	61585	150	298	61585	150	298	61585
M	23-May	150	298	61882	150	298	61882	150	298	61882
T	24-May	150	298	62180	150	298	62180	150	298	62180
W	25-May	150	298	62477	150	298	62477	150	298	62477
T	26-May	150	298	62775	150	298	62775	150	298	62775
F	27-May	150	298	63072	150	298	63072	150	298	63072
S	28-May	150	298	63370	150	298	63370	150	298	63370
S	29-May	150	298	63667	150	298	63667	150	298	63667
M	30-May	150	298	63965	150	298	63965	150	298	63965
T	31-May	150	298	64262	150	298	64262	150	298	64262



# Appendix D—CDFW stranding survey during spring pulse flow



State of California – Natural Resources Agency  
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 Fresno, California 93710  
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[www.wildlife.ca.gov](http://www.wildlife.ca.gov)

EDMUND G. BROWN JR., Governor  
 CHARLTON H. BONHAM, Director



64 ①

April 27, 2016

Barb Byrne  
 Biologist, NOAA Fisheries West Coast Region  
 United States Department of Commerce  
 California Central Valley Office  
 650 Capitol Mall, Suite 5-100  
 Sacramento, California 95814



DOC #00829

**Subject: Stanislaus River Fish Stranding**

Dear Ms. Byrne:

The Stanislaus Operations Group (SOG) is composed of staff from the National Marine Fisheries Service (NMFS), United States Bureau of Reclamation (USBR), United States Fish and Wildlife Service (USFWS), California Department of Water Resources (DWR) and California Department of Fish and Wildlife (CDFW). This group is tasked with managing flows on the Stanislaus River to protect native fish stocks. In March of 2016, the SOG agreed on a pulse flow schedule to provide adequate flows for juvenile Chinook salmon out migration. The schedule included several peaks to provide higher flows encouraging salmon to migrate before water temperatures increase during the summer months. The first peak occurred on April 3<sup>rd</sup> and reached 800 cubic feet per second (cfs) and receded to 200 cfs on April 5<sup>th</sup>. The 200 cfs recession is a concern as the 800 cfs peak would inundate side channels, providing fish access, and would become dry at 200 cfs. The decline to 200 cfs would isolate fish in pools where they would be subjected to poor water quality (low dissolved oxygen and high water temperatures) and predation. This letter is to report CDFW findings on the April 3<sup>rd</sup> peak.

CDFW chose to monitor 5 known sites with stranding potential after the drop in flow in a 6-mile stretch downstream of Goodwin Dam to survey. Goodwin Dam is located at river mile (rm) 58.4 (58.4 miles upstream of the Stanislaus River confluence with the San Joaquin River). *Site 1* is at rm 58.1 and is referred to as the Goodwin Side Channel (GSC). GSC is a side channel that runs through a small riparian area into an exposed gravel pool before flowing back into the main channel. *Site 2* is the Sonora Road Side Channel (SRSC) and is a heavily vegetated side channel that begins just downstream of the Sonora Road Bridge in Knights Ferry at rm 54.5. *Sites 3 and 4* are both near Russian Rapids at river mile 53.9. *Site three* is the Russian Rapids Portage Trail (RRPT) that becomes a side channel when inundated and *site four* is a natural side channel referred to as Russian Rapids Side Channel (RRSC) and flows through a heavily wooded area. *Site 5* is the Lovers Leap Side Channel (LLSC) which is an engineered floodplain and side channel at river mile 52.4.

*Conserving California's Wildlife Since 1870*



Figure 1: Goodwin Side Channel at rm 58.1 from Google Earth.



Figure 2: Sonora Road Side Channel (rm 54.5), Russian Rapids Portage Trail and Russian Rapids Side Channel ( both near rm 53.9) from Google Earth.



Figure 3: Lovers Leap Side Channel (rm 52.4) from Google Earth.

On April 6<sup>th</sup>, 2016 CDFW conducted surveys at all five sites. CDFW first determined whether each site was inundated during the 800 cfs pulse flow. This was confirmed by looking at each site for evidence of water lines, standing water and other signs that water had moved through the area. Inundated areas were further inspected with dip nets to determine the presence of fish in areas with standing water. Water quality (temperature and dissolved oxygen) was also measured in the isolated pools. When fish were found, the site was inspected to determine if the pool remained connected to the main channel. If a connection was not evident, several passes were made with dip nets and seine nets to capture any fish left in these pools. Any fish captured were measured, checked for marks and released back into the river at the nearest suitable habitat.

*Site 1 (GSC)* appeared to sustain flows at 800 cfs and there was a large isolated pool roughly 30 feet long by 6 feet wide with depths ranging from 3 inches to 3 feet. The upstream portion of the pool was covered by dense vegetation and was deep and rocky; the downstream end was shallow and rocky. Fish were immediately observed in this pool. The water temperature was found to be 15.1° Celsius (C) and dissolved oxygen was measured at 4.73 milligrams per Liter (mg/L). The adjacent main channel water temperature was measured at 11.3 °C and the dissolved oxygen was found to be 10.27 mg/L. Water quality was determined to be low and CDFW captured stranded fish to relocate them back into the main channel. CDFW relocated 43 juvenile Chinook salmon and 1 juvenile *O. mykiss*.

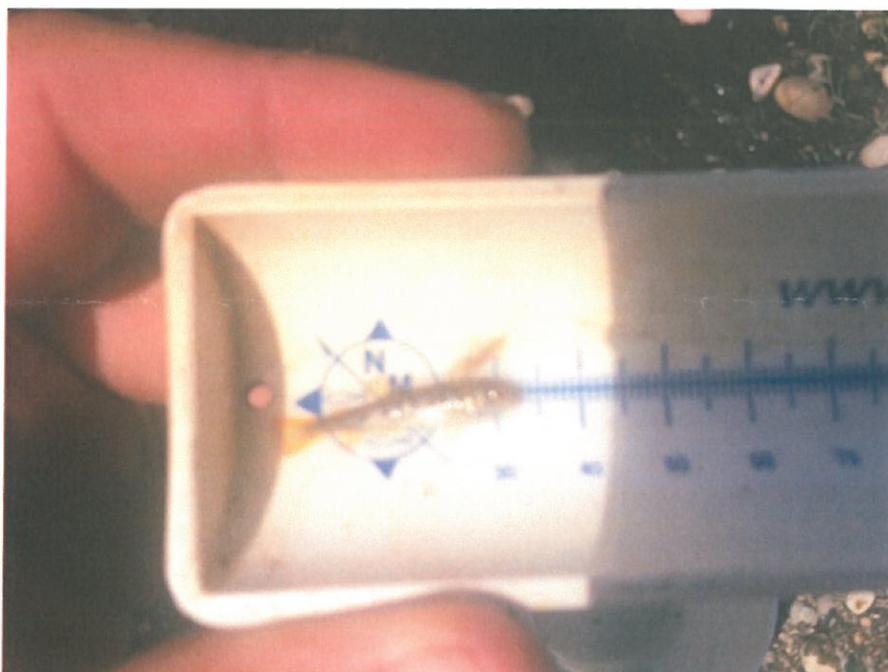


Figure 4: Juvenile *O. mykiss* from GSC.

*Site 2 (SRSC)* did not sustain flows at 800 cfs and appeared to have water 10-15 feet into the top of the channel which did not pass beyond a high point to connect the side channel. No isolated pools or fish carcasses were observed. *Site 3 (RRPT)* also did not connect at 800 cfs. However, a large area of standing water was observed but is not believed to have connectivity since 2011. No fish or other isolated pools were observed along the trail.

At *site 4 (RRSC)*, water flowed through the side channel and receded leaving 4 isolated pools. 3 of the pools were very small, roughly 1 square foot each, and one pool was measured at 8 feet long by 3 feet wide and 4 inches deep. The larger pool water temperature was found to be 13.4°C with dissolved oxygen at 2.80 mg/L. The adjacent main channel water temperature was measured at 12.1°C and dissolved oxygen was found to be 10.21 mg/L. One juvenile *O. mykiss* was captured and relocated and three juvenile Chinook salmon carcasses were measured and brought back to the CDFW La Grange lab.



*Figure 5:* Top half of the RRSC isolated pool.



*Figure 6:* Juvenile Chinook salmon mortality from RRSC.

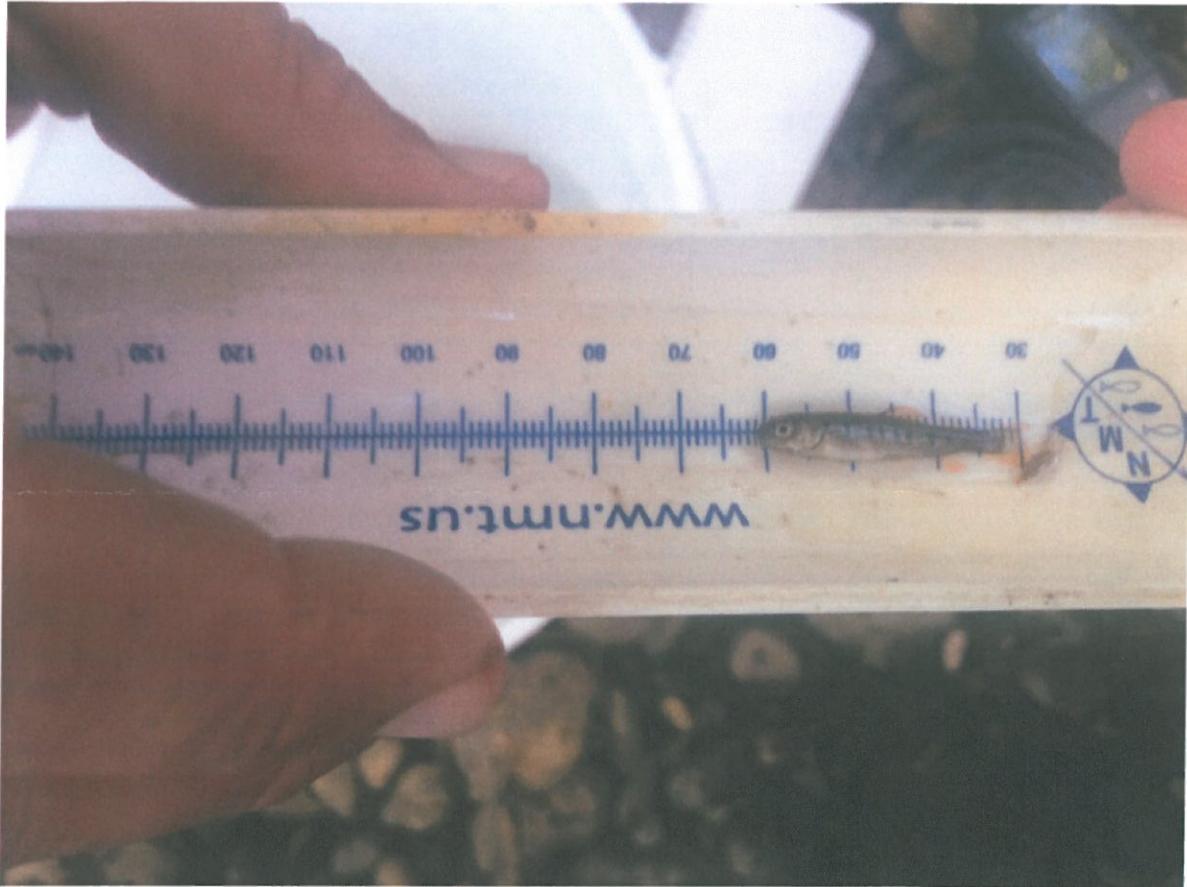


Figure 7: Juvenile *O. mykiss* from RRSC.

48 total fish were found and relocated from two sites on April 6<sup>th</sup>, 2016. 2 were juvenile *O. mykiss* and 46 were juvenile Chinook salmon. Three of the salmon were found dead, likely due to the low dissolved oxygen (2.80 mg/L), and all other fish were successfully measured and released back into the river. Forklengths for *O. mykiss* ranged 30-31 millimeters (mm) with an average forklength of 30.5 mm. Juvenile Chinook salmon forklengths ranged 35-60 mm and the average forklength was 43.7 mm.

48 fish is likely a low estimate of stranding as a result of the drop in flow on the Stanislaus River. This is assumed to be a low estimate as it is unlikely all stranded fish were caught in pools with rocky and complex habitat, giving fish the opportunity to avoid capture. The selected sites were also a subsample and more sites exist, which CDFW was unable to sample, and have an unknown potential for stranding. To avoid stranding, CDFW recommends maintaining flows above 400 cfs in between peak pulse flows which should maintain connectivity. In the following weeks, more surveys should be conducted to look at inundation and connectivity of side channels at various flows to determine safe base flows in between the peak flows.

Ms. Barb Byrne  
April 27, 2016  
Page 9

If you have any questions or concerns, please contact Domenic Giudice, Environmental Scientist at (209) 202-9484 or by email at [domenic.giudice@wildlife.ca.gov](mailto:domenic.giudice@wildlife.ca.gov).

Sincerely,



*JAV*  
Julie A. Vance  
Region Manager

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