Annual Report of Activities

October 1, 2010 to September 30, 2011

Photo credit: John Hannon

Stanislaus Operations Group (SOG)

October 2011

Acronyms and Abbreviations

3DADM	Three-Day-Average Daily Maximum temperature
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
CDFG	California Department of Fish & Game
CWT	Coded Wire Tag
DWR	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
SRMFFN	Stanislaus River Minimum Flows for Fishery Needs
SSJID	South San Joaquin Irrigation District
SWP	State Water Project
SWRCB	State Water Resources Control Board
USFWS	U.S. Fish & Wildlife Service
VAMP	Vernalis Adaptive Management Program
WOMT	Water Operations Management Team

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Chapter 1 – Background

1.1 Background

The Stanislaus River is a significant resource of considerable interest to fishery management agencies, the public, and Reclamation. The United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), California Department of Fish and Game (CDFG), and State Water Resource Control Board (SWRCB), are agencies with trust responsibilities for fishery and water resources in the Stanislaus River. Reclamation is responsible for operating the East Side Division which includes New Melones Dam and Powerplant. Tri-Dam Project, a partnership between the Oakdale Irrigation District and the South San Joaquin Irrigation District, owns and operates Donnells and Beardsley Dams and Reservoirs upstream of New Melones Reservoir and Tulloch Dam and Reservoir downstream of New Melones Reservoir. Oakdale Irrigation District and South San Joaquin Irrigation District own Goodwin Dam and Reservoir located downstream of Tulloch Dam. The East Side Division is operated to provide flood control, irrigation, power generation, general recreation, water quality, and fish and wildlife enhancement[1].

On June 4, 2009, NMFS issued its Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project (NMFS BiOp)[2]. On April 7, 2011, NMFS issued adjustments[3] to the RPA of the NMFS BiOp (2011 NMFS RPA Adjustments). All references in this document to page numbers refer to the page numbers in the 2011 NMFS RPA adjustments, unless noted otherwise; all references to the NMFS BiOp should be considered to include the 2011 NMFS RPA Adjustments. The NMFS BiOp included the requirement that Reclamation create the Stanislaus Operations Group (SOG). The SOG is a technical team that provides advice to NMFS and to the Water Operations Management Team (WOMT) on issues related to fisheries and water resources on the Stanislaus River, per the decision-making procedures outlined on pages 8-9 of the 2011 NMFS RPA Adjustments.

The purpose of the SOG is "to gather and analyze information, and make recommendations, regarding adjustments to water operations within the range of flexibility prescribed in the implementation procedures"[4] 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 has no authority to make operational decisions, but rather provides advice to NMFS and WOMT. NMFS will consider advice from SOG when making a final determination as to whether or not a proposed operational action is consistent with the NMFS BiOp and ESA obligations.

[1] PL 78–534 and PL 87-874
[2] The NMFS BiOp is available online at: http://swr.nmfs.noaa.gov/ocap.htm
[3] The 2011 NMFS RPA adjustments are available online at: http://swr.nmfs.noaa.gov/ocap/040711_OCAP_opinion_2011_amendments.pdf
[4] 2011 NMFS RPA Adjustments at p.7.

1.2 Membership

The SOG consists of representatives from Reclamation, USFWS, NMFS, CDFG, DWR, and the SWRCB. Other agencies may be added to the SOG provided existing agencies approve of the change in SOG membership. Stanislaus Operations Group (SOG) member agencies and the lead contacts are:

Bureau of Reclamation (Reclamation)

Randi Field – Stanislaus Operator

Patti Clinton – SOG group coordinator

U. S. Fish and Wildlife Service (USFWS)

J.D. Wikert

Nick Hindman

National Marine Fisheries Service (NMFS)

Barb Byrne

California Department of Fish and Game (CDFG)

Tim Heyne

California Department of Water Resources (DWR)

Andy Chu

Dan Yamanaka

State Water Resources Control Board (SWRCB)

Kari Kyler

Chapter 2 – Summary of RPA Adjustments

2.1 NMFS OCAP RPA Adjustments

On April 7, 2011, NMFS issued adjustments[5] to the RPA of the NMFS BiOp (2011 NMFS RPA adjustments), including some adjustments to the text within the Stanislaus RPA Actions. The changes to the Stanislaus RPA actions are provided in full in Appendix A, both in "track changes" and final form. The most substantive adjustment was the new language added to Action III.1.3. The new language notes that while the minimum flow schedules provided in Appendix 2-E remain the same,

> "The amendments to Action III.1.3 and its implementation procedures are intended to provide the SOG with more flexibility to adjust the timing, magnitude, and duration of the pulse flows (*not* the minimum flows in between pulses) described in Figure 11-1 and Appendix 2-E based on considerations such as:
>
> a) optimizing intended benefits to CV steelhead (*e.g.*, based on observed fish distribution or run timing and observed flow and temperature conditions and the intent of the pulse flow as described in the "Rationale," above);
>
> b) coordinating Stanislaus River flows for CV steelhead with flows on other San Joaquin River tributaries (*e.g.*, during the fall attraction flow or during the VAMP period); or
>
> c) coordinating operational objectives to use Goodwin Dam releases to achieve multiple benefits (*e.g.*, during April and May when Stanislaus River flows may be contributing to multiple regulatory requirements at the same time).
>
> Any change in the timing, magnitude, and/or duration of the pulse flows must provide protection to CV steelhead and critical habitat that is equal to or greater than the protection provided by the pulse flows as described in Appendix 2-E. This clarified flexibility can also result in improved water supply when multiple operational objectives can be satisfied with a single strategic release. These amendments were supported by the ISP.[6]"

2.2 Responses to Independent Review Panel's comments

NOAA's National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (FWS), and the Bureau of Reclamation (Reclamation, collectively the Federal Agencies) received the 2010 Independent Review Panel (IRP) report. In general, the IRP recommendations affirmed the Federal Agencies' 2010 approach, and included the finding that "the effectiveness of RPA actions in meeting operational targets was usually adequate in 2010". After carefully evaluating the critiques contained within the report and the recommendations for adjustments to the implementation of some RPA actions, the Federal Agencies provided a follow-up letter in response to the IRP's recommendations and comments (Appendix B).

[5] http://swr.nmfs.noaa.gov/ocap/040711_OCAP_opinion_2011_amendments.pdf
[6] Excerpt from pages 52-53 of the 2011 NMFS RPA adjustments

In addressing IRP's comment "II.B. Action is a physical compliance – it needs to be related to presence….", NMFS agreed that much of the technical team annual reports focused on physical compliance and agreed to increase efforts to monitor and report on the species' responses. There are a number of ongoing monitoring projects occurring on the Stanislaus River (see below).

Existing Projects with Monitoring Data	**Current Studies that may Provide Information in the Future**
Fish Counting Weir[7]	Otolith Microchemistry Research
Rotary Screw Traps	Acoustic Tagging of *O. mykiss*
Escapement Surveys	

Data on anadromous *O. mykiss* are limited on the Stanislaus River; more data are available on temporal and spatial patterns of fall-run Chinook salmon and resident *O. mykiss*. The SOG has had preliminary discussions of how to best use existing monitoring data to evaluate the RPA actions, but we have not developed a formal assessment process at this time.

Chapter 3 – Summary of Actions and SOG Discussions

The following agenda items were discussed at monthly SOG meetings from October 2010 through September 2011. Meeting notes and supplemental SOG documents[8] are posted on the SOG website: http://swr.nmfs.noaa.gov/ocap/sog.htm.

3.1 Monthly Discussion Topics

- Fish monitoring
- Water operations and water quality (flows measured at Goodwin Dam, temperatures at OBB and KF)
- Stanislaus RPA Actions (2011 NMFS RPA Adjustments at pages 46-55); key actions summarized below:

Temperature management -- RPA Action III.1.2 (2011 NMFS RPA Adjustments at p. 47)
This RPA calls for 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 Central Valley steelhead (*Oncorhynchus mykiss*) rearing, spawning, egg incubation, smoltification, and adult migration in the Stanislaus River downstream of Goodwin Dam.

Flow management -- RPA Action III.1.3 (2011 NMFS RPA Adjustments at p. 49)
This RPA calls for Reclamation to operate releases from the East Side Division reservoirs according to the yeartype-specific minimum flow schedules in Appendix 2-E of the NMFS BiOp.

Gravel augmentation -- RPA Action III.2.1 (2011 NMFS RPA Adjustments at p. 53)

[7] Data summarized in Chapter 5
[8] A summary of supplemental documents available on the SOG webpage is provided in Appendix C.

This RPA calls for Reclamation to minimize effects of water operations on the Stanislaus River through improving spawning habitat for steelhead trout. On June 30, 2010, Reclamation submitted to the National Marine Fisheries Service a plan[9] which outlines projects that aim to achieve placement of 50,000 cubic yards of gravel on the Stanislaus River by 2014. This plan includes project descriptions for projects scheduled or likely to occur (e.g., Honolulu Bar, Goodwin Canyon, Lover's Leap), implementation schedules and monitoring efforts to improve spawning habitat. Project descriptions for potential projects may help to meet the gravel augmentation requirements under this action, but are in various stages of development, are also described (e.g., Knights Ferry, Two Mile Bar, Horseshoe Recreation Area, and Valley Oak Restoration Area). During 2011, approximately 5,000 tons of gravel was placed in Goodwin Canyon, and a separate side-channel restoration project at Lancaster Road provided additional gravel bedded juvenile rearing habitat.

Conduct Floodplain Restoration and Inundation Flows -- RPA Action III.2.2 (2011 NMFS RPA Adjustments at p. 54)

This RPA calls for Reclamation to seek advice from SOG to develop an operational strategy to achieve floodplain inundation flows that inundate CV steelhead juvenile rearing habitat on a one- to three-year return schedule, and to submit a proposed plan of operations to achieve this flow regime by June 2011. During 2010, SOG discussed several ongoing or proposed floodplain restoration projects (e.g. Honolulu Bar, Lovers Leap, and Two Mile Bar) which provide several ecological benefits such as: providing refuge from predators, producing additional food resources, improving vegetative contaminant removal, promoting natural riparian recolonization of woody species which can reduce water temperatures, attenuating flood flows, increasing groundwater recharge, and cleaning instream gravels through deposition of fine sediments on the floodplain. These projects can also provide local gravel for meeting the requirements of Action III.2.1, minimizing the need to import gravel from other watersheds and reducing transportation costs. Projects which restore floodplain and side-channel habitats can increase the acres of seasonally inundated habitats necessary for rearing salmonids without requiring changes to the existing hydrograph. As summarized in Section 3.4, a draft plan was submitted in 2011.

Restore Freshwater Migratory Habitat for Juvenile Steelhead -- RPA Action III.2.3 (2011 NMFS RPA Adjustments at p. 54)

This RPA calls for Reclamation to, in cooperation with SOG, develop a list of projects to improve the habitat values of freshwater migratory habitat in the Stanislaus River. This project list was submitted in 2010 and is available at:
http://swr.nmfs.noaa.gov/ocap/sog/HabitatPlan_ActionIII.2.3.pdf.

Evaluate Fish Passage at New Melones, Tulloch, and Goodwin Dams -- RPA Action III.2.4 (2011 NMFS RPA Adjustments at p. 55)

SOG expects that Action III.2.4, which calls for an evaluation of fish passage at New Melones, Tulloch, and Goodwin Dams, will be addressed by the Interagency Fish Passage Steering Committee.

[9] The plan for gravel augmentation is available on the SOG webpage: http://swr.nmfs.noaa.gov/ocap/sog.htm

3.2 Other Discussion Topics

The following list of SOG discussion topics highlights some additional substantive issues reviewed by SOG over the past year. Minor or logistical discussion items are documented in the notes, but not listed here.

- OCAP Annual Report Workshop
- Tri-Dam's additional power generation unit at Tulloch Dam.
- Lower Stanislaus River system temperature model development
- SOG Charter and MOU
- Suspected Knights Ferry temperature problem.
- Annual Review Report

3.3 Temperature Criterion in October

A structured decision-making process was proposed last fall (September 2010) for SOG to use when considering whether or not to advise that the 56 degree F temperature criterion at Orange Blossom Bridge should apply as of the initiation date of the fall pulse flow, rather than as of October 1[10]. The process to guide SOG advice on this issue has not yet been agreed to by all agencies represented at SOG. .

3.4 Floodplain Plan Update

Per RPA Action III.2.2, Reclamation sought advice from SOG to develop an operational strategy to achieve floodplain inundation flows that inundate CV steelhead juvenile rearing habitat on a one- to three-year return schedule. Under this RPA action, Reclamation was to submit a proposed plan of operations to NMFS by June 2011. The operational strategy had been in development months in advance of June 30, 2011; however, multiple reviews resulted in delays. NMFS granted an extension to August 31, 2011. After further evaluation and revision by Reclamation, the draft operational strategy was submitted to NMFS on August 31, 2011. In addition to discussing tools for assessing floodplain flows and floodplain restoration projects, the draft operational strategy proposed modification to the Appendix 2-E flows for 2012. NMFS commented that the Appendix 2E flows for 2012 should not be modified while the tools for assessing the flows are still under evaluation.

3.5 Summary of RPA III.1.3 Appendix 2E Minimum Flow Discussions

The implementation of RPA Action III.1.3 minimum flow was guided by the Appendix 2E flow schedule and current hydrologic conditions, and with the flexibility clarified by the revised language in the 2011 NMFS RPA Adjustments. As in 2010, SOG advised modification of the timing and shape of the winter pulse periods in January and February. SOG advised that both winter instability flows would be timed to coincide with a natural precipitation event if possible (Appendix D). The group advised that the flood control action in late December through early January be deemed to satisfy the purposes of the January pulse (Appendix D). The February pulse was delayed until later in the month in order to coincide with a natural precipitation event (Appendix D). In the spring, flood flow coordination was discussed to address flood releases

[10] 2011 NMFS RPA Adjustments at p. 47

and backwater effects of the San Joaquin River (Appendix D), though no modification of the Appendix 2E flows were necessary during the spring since flood releases satisfied the minimum flows for fishery purposes. Specific details of the resulting pulse flows are provided in Chapter 4: Water Operations summary.

Chapter 4 – Water Operations Summary

This chapter briefly describes Stanislaus River operations for water year 2011, pertaining to RPA Actions III.1.2 and III.1.3. These Actions are presented in reverse order for clarity.

4.1 Action III.1.3 – Operate the East Side Division Dams to Meet the Minimum Flow, as Measured at Goodwin Dam, Characterized in Figure 11-1, and as Specified in Appendix 2-E[11]

Figure 1 is a summary of Goodwin Dam river releases and New Melones Reservoir storage. October 2010 through June 2011 New Melones storage has steadily increased to 97% total capacity due to high inflows. From July through September 2011 the majority of operations were driven by the United States Corps of Engineers' requirements to reduce storage for allowable storage/flood control. The Stanislaus River Minimum Flows for Fish Needs (SRMFFN) prescribed in Appendix 2-E is also shown in the figure.

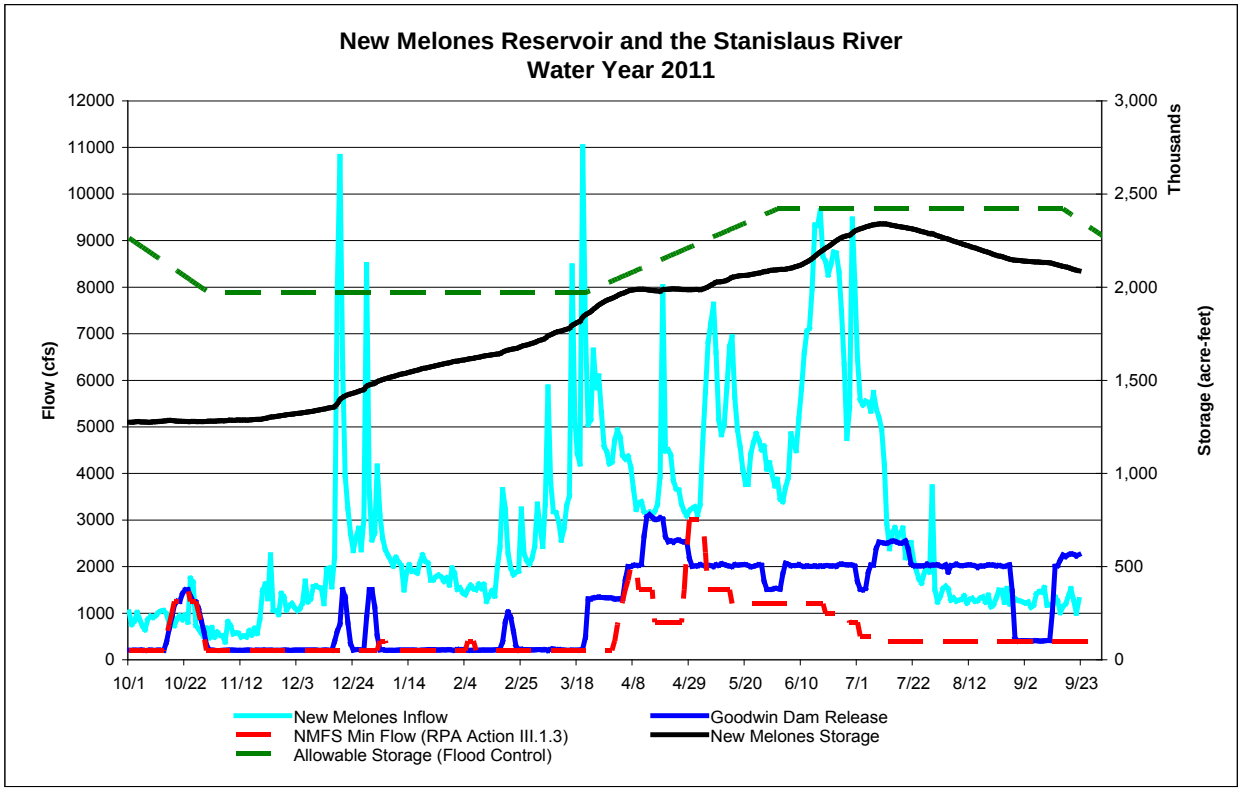

Figure 1 Summary of New Melones Reservoir and the Stanislaus River Flows

[11] Appendix 2-E of the NMFS BiOp is available online at: http://swr.nmfs.noaa.gov/ocap.htm

The 2011 water year classifications (Table 1) for determining Appendix 2-E minimum flows, based on the New Melones Index are (New Melones Index is based on forecasted inflows and storage volume. Although water year 2011 precipitation and snow pack were plentiful, initial storage conditions were poor and there was a lag in the classifications as the reservoir storage recovered):

Table 1: Appendix 2-E Water Year 2011 Classification by Month

Month	Water Year Classification
October	Dry
November	Dry
December	Below Normal
January	Below Normal
February	Below Normal
March	Below Normal
April	Above Normal
May	Above Normal
June	Wet
July	Wet
August	Wet
September	Wet

The Goodwin Reservoir release to the Stanislaus River and SRMFFN are shown again in Figure 2. In addition, the primary reasons for release changes to the Stanislaus River are identified on the figure. NMFS and SOG provided several opportunities for river flow release flexibility to meet the requirements of RPA Action III.1.3 (Appendix D). On December 29, 2011, river flows were increased at Goodwin Dam to provide flood control relief from Tulloch Lake. These flows were determined to have served the intent and purpose of the January pulse flow proscribed in Appendix 2E of the NMFS BiOp. The early February pulse flow, as also proscribed in Appendix 2E, was purposefully postponed to correspond with a natural precipitation event. The natural event occurred on February 18th and releases were additionally increased for Tulloch Lake flood control relief on the 19th (Appendix D). Releases from Goodwin Reservoir were increased on April 5th and April 12th for New Melones Reservoir flood control purposes. These flows were subsequently determined by NMFS and SOG to have served the intent and purpose of the April pulse flow (Appendix D). At the end of August flows were reduced for several in-stream activities. The two week period between August 28th and September 12th provided an opportunity for gravel augmentation, habitat restoration, and fish weir maintenance.

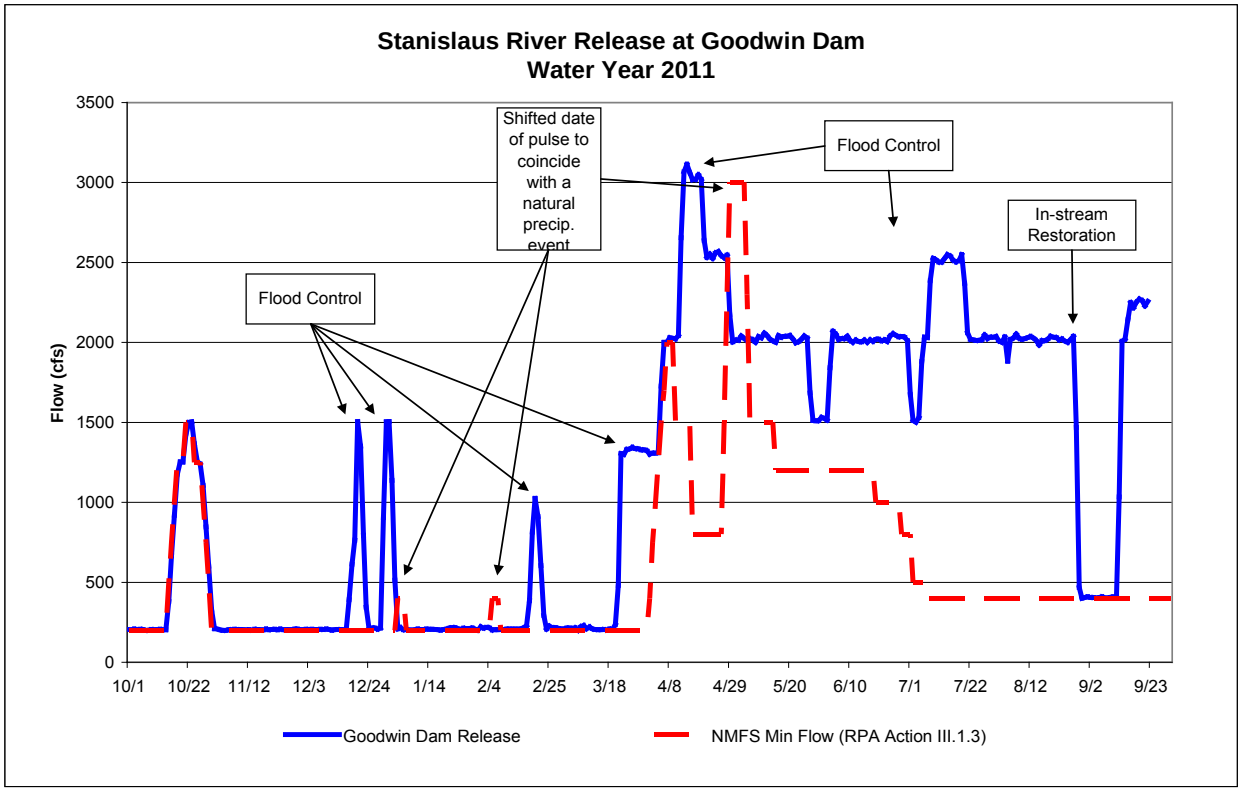

Figure 2: Summary of Stanislaus River Release at Goodwin Dam

Table 2 contains a summary of release changes from Goodwin Reservoir indicating the purpose of the operational change. Reclamation has made provisions to notify the public of potential safety or high flow considerations such as recreational precautions, inundation, and seepage as appropriate. Several media/press releases were issued warning when flows were uncharacteristically high.

Table 2 Water Year 2011 Release Changes at Goodwin Dam

Start Date	End Date	Release	Comment
10/15/2010	10/21/2010	Increase	NMFS RPA III.1.3 minimum flows for fish schedule.
10/24/2010	10/30/2010	Decrease	NMFS RPA III.1.3 minimum flows for fish schedule.
12/17/2010	12/17/2010	Increase	Tulloch Lake inflow management
12/19/2010	12/19/2010	Increase	Tulloch Lake inflow management
12/21/2010	12/23/2010	Decrease	Ramping down from Tulloch flood control
12/29/2010	12/29/2010	Increase	Tulloch flood control release
1/1/2011	1/2/2011	Decrease	Ramping down from Tulloch flood control.

2/18/2011	2/18/2011	Increase	NMFS minimum flows
2/19/2011	2/19/2011	Increase	Tulloch flood control due to sideflows
2/21/2011	2/21/2011	Decrease	Initial flood control rampdown - further reductions possible Tue
2/22/2011	2/23/2011	Decrease	Tulloch flood control reduction
3/21/2011	3/21/2011	Increase	Tulloch Flood Control
4/5/2011	4/5/2011	Increase	New Melones flood control-fill management
4/12/2011	4/12/2011	Increase	New Melones flood control-fill management
4/20/2011	4/20/2011	Decrease	New Melones fill management
4/29/2011	4/29/2011	Decrease	New Melones fill management
5/27/2011	5/27/2011	Decrease	New Melones fill management
6/3/2011	6/3/2011	Increase	New Melones fill management
7/1/2011	7/1/2011	Decrease	Temporary reduction for public safety over holiday weekend
7/5/2011	7/5/2011	Increase	New Melones fill management
7/8/2011	7/8/2011	Increase	New Melones fill management
7/20/2011	7/20/2011	Decrease	New Melones fill management
8/28/2011	8/29/2011	Decrease	Temporary reduction for in-stream river restoration
9/12/2011	9/12/2011	Increase	New Melones reservoir management
9/15/2011	9/15/2011	Increase	New Melones reservoir management

A final determination of the water year classification calculation method and implementation is currently under review. In the interim, the New Melones Water Supply Parameter was calculated by using the Interim Plan of Operations (IPO) framework (SOG meeting notes from February 17, 2010).

4.2 Action III.1.2 Provide Cold Water Releases to Maintain Suitable Steelhead Temperatures

Figures 3 and 4 are summaries of temperature operations from October 2010 through September 2011. Due to temperature probe difficulties at the Orange Blossom Bridge gage station beginning in January 2011 and ending August 2011, temperature observations are estimated based on statistical relationships with the Ripon gage. Frequent high flow/flood control conditions and relatively mild meteorological conditions, winter through spring, masked the persistent gage difficulties at Orange Blossom Bridge. The Ripon gage station also experienced difficulties between 3/2/2011 and 4/3/2011 (this period is identified on the figures). These graphs identify periods where temperatures were met or exceeded the temperature criterion and where the temperature exception was triggered. Temperature exception notifications were provided by Reclamation for NMFS approval, with input from members of the SOG. These exceptions are summarized in the section below.

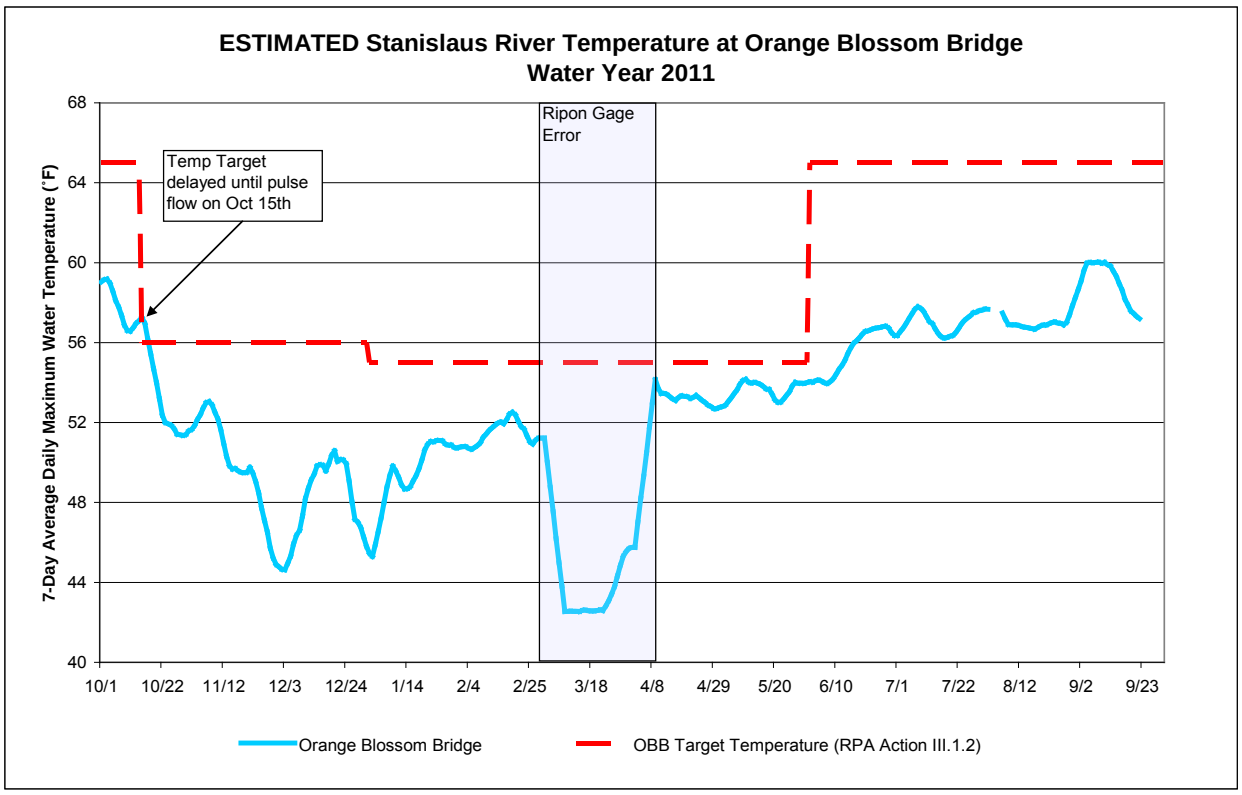

Figure 3: Summary of Temperature at Orange Blossom Bridge
Note: Data 1/1/2011 -8/18/2011 are estimated based on Ripon (RPN) gage due to gage problems at Orange Blossom Bridge (OBB).

The Orange Blossom Bridge October 1st temperature criteria was delayed until the initiation date of the fall pulse flow as allowed by RPA Action III.1.2 and determined by NMFS (See Appendix E).

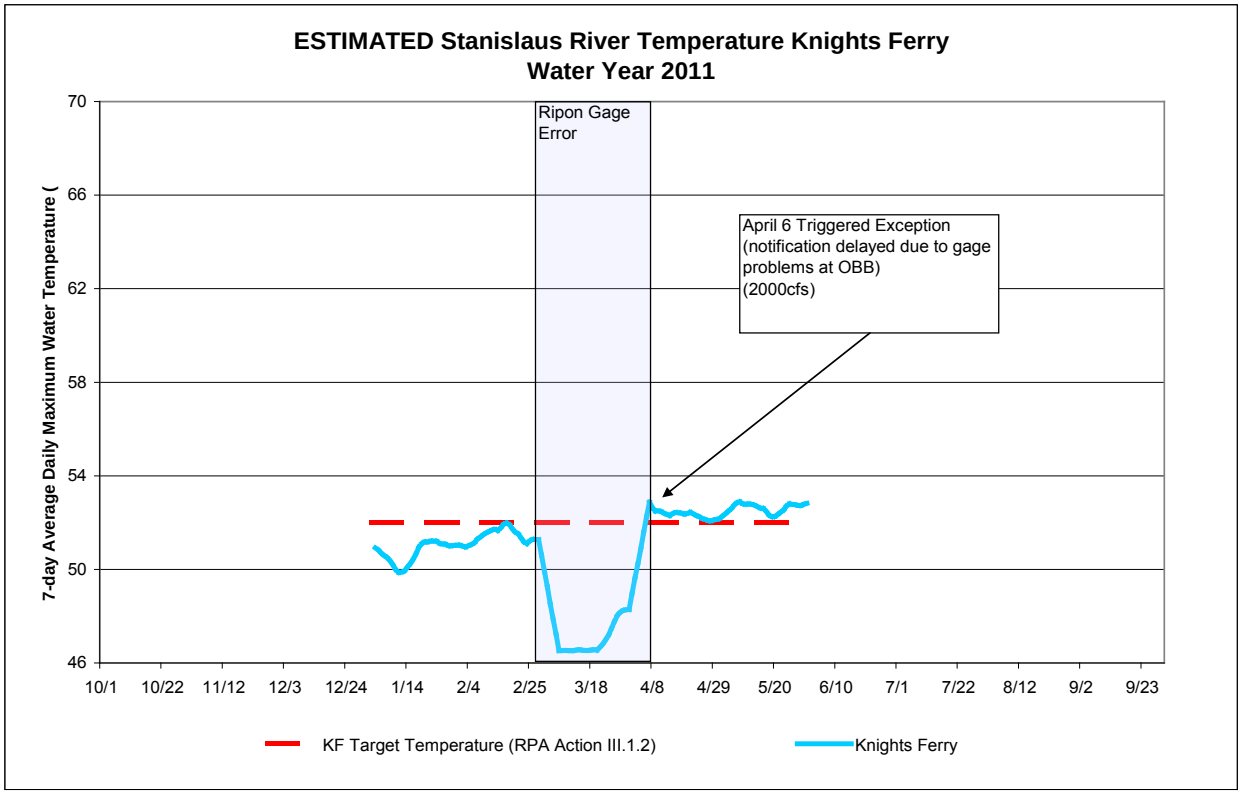

Figure 4: Summary of Temperatures at Knights Ferry
Note: Data 1/1/2011- 5/31/2011 are estimated based on Ripon (RPN) gage due to gage problems at Orange Blossom Bridge (OBB).

Summary of Year 2011 NMFS BiOp RPA Action III.1.2 Exceptions

The NMFS BiOp describes suitable temperatures for Central Valley (CV) steelhead life-stages on the Stanislaus River under RPA Action III.1.2. The temperature criteria, measured at both Orange Blossom Bridge and Knights Ferry are based on a seven-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 size of New Melones Reservoir). Temperature control devices or other physical structures are not available to manage for temperature blending at these facilities. 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 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. When possible, temperature simulation modeling was used to evaluate in-stream temperatures and guide temperature management decisions. If additional releases to achieve temperature targets conflict with Reclamation's nondiscretionary requirements, the NMFS RPA provides an exception procedure.

The temperature exception requires Reclamation to notify NMFS if the temperature target is expected to exceed based on a three-day average daily maximum. Reclamation is also

required to provide an evaluation of the conditions and identify conflicts. Reclamation has sent e-mail notifications/determinations to NMFS containing the following information:

- Compliance location exceeding temperature target
- Date the three-day average daily maximum temperature (3DADM) was exceeded
- A table of recent maximum daily temperatures
- Current Goodwin Dam releases
- Expectation of temperature target exceedence
- Temperature management conflict rationale
- Historical water temperature downstream of Goodwin Dam
- Simulated Temperature Outlook (using a stand-alone Stanislaus River six-hour time-step temperature model) at a 90% or 50% hydrology runoff exceedence probability for Orange Blossom Bridge and Knights Ferry (Includes expected allocation and delivery pattern and an assumed historical meteorological condition.)

[Note that not all notifications included each of the above components, but the notifications have since evolved to this list.]

In water year 2011, due to the frequent high flow/flood control conditions, improved storage conditions, and relatively mild meteorological conditions, in-stream temperature criteria were expected to be met. However, persistent gage difficulties at Orange Blossom Bridge, masked by cool and high flow conditions, revealed a likely temperature exceedence at Knights Ferry for nearly 40% of the temperature management period (temperatures were estimated after the fact based on a statistical relationship from the Ripon temperature gage). Per discussion with NMFS, it is unlikely Reclamation would have made operational adjustments to Stanislaus River flow if actual Knights Ferry temperatures were known at the time. Temperature modeling simulated for May assuming a Goodwin Dam release of 3,000 cfs indicated the Knights Ferry temperature criterion could not be achieved. River releases for flood control and fill management were higher than normal and there were downstream flooding concerns during this period. DWR repaired the Orange Blossom Bridge temperature gage on August 18, 2011.

Reclamation has submitted one temperature notification in water year 2011 (Appendix E).

Table 2: Summary of RPA Action III.1.2 Exceptions

Date	Location	Goodwin Dam Release (cfs)	Duration of Temperature Exceedence 7DADM (Days)	Maximum 7DADM Temperature of Exceedence Duration (oF)	Target 7DADM Temperature (^{o}F)	Rational: Operational conflict
6-Apr-11	Knights Ferry	2,000	56	52.9	52	On May 27, 2011 NMFS and Reclamation suspected a defective temperature probe at Orange Blossom Bridge. Due to flood control/high river releases and cool/cold ambient conditions, gage problems at Orange Blossom Bridge (OBB) were masked until this date. Knights Ferry temperatures were estimated after the fact using the Ripon (RPN) gage which indicated an exceedence from April 6 - May 31. The estimated exceedence was reported to NMFS on May 31, 2011. Per discussion with NMFS, it is unlikely Reclamation would have made operational adjustments to Stanislaus River flow if actual Knights Ferry temperatures were known at the time. River releases for flood control and fill management were higher than normal and there were downstream flooding concerns during this period.

Chapter 5 – Summary of selected Stanislaus Fish Monitoring Data

Monitoring data from a counting weir and rotary screw traps on the Stanislaus River are summarized below for both fall run Chinook salmon and *O. mykiss*. Other data available, but not summarized here, include the carcass survey information from CDFG (available from the early 1950's to the present). Some current studies on the Stanislaus may provide information for evaluation in the future: one such study is analyzing otolith microchemistry from fall-run Chinook salmon to learn about the outmigration pattern of returning spawners, another is studying the migration behavior of acoustically tagged juvenile steelhead.

Adult Monitoring at the Stanislaus Weir (between Oakdale and Ripon)

Figures 5 and 6 plot the flow at Ripon and Goodwin Dam compared to the number of adult Chinook salmon caught in the Stanislaus River Weir (aka Alaskan weir, portable resistance board weir) from September 1 through late February in 2009 and 2010, respectively. Ten *O. mykiss* were observed at the weir during sampling from 9/9/2009 - 6/24/2010 (one individual observed on 9/18, 9/19, 10/14, 11/12, 2/3, 2/13, 3/15, and 5/23; two individuals observed on 9/25); six O. mykiss were observed during sampling from 9/7/2010-4/4/2010 (one individual observed on 11/6, 1/5, 1/26, 2/9, 3/1, and 3/14). These graphs and weir data were provided by FishBio, the operator of the Stanislaus weir.

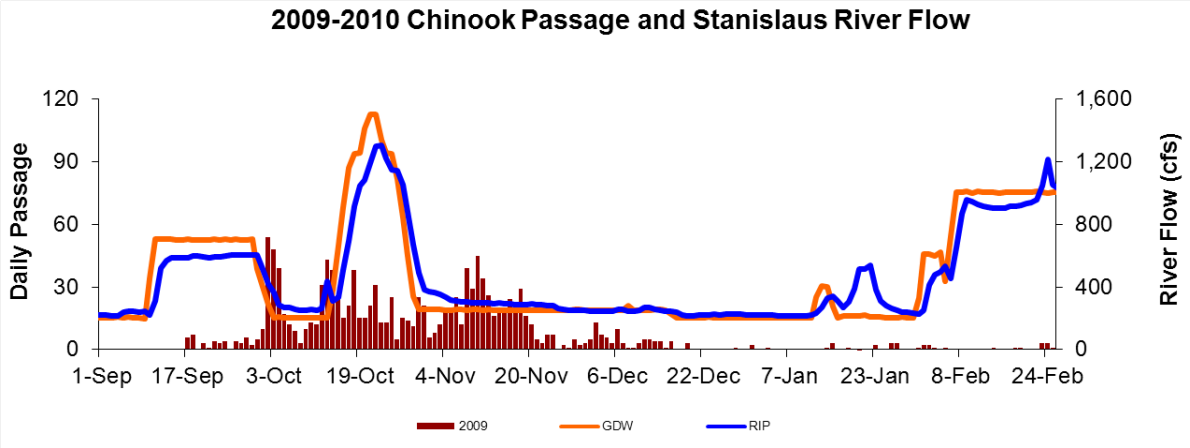

Figure 5 Chinook Passage and Stanislaus River Flow 2009-2010

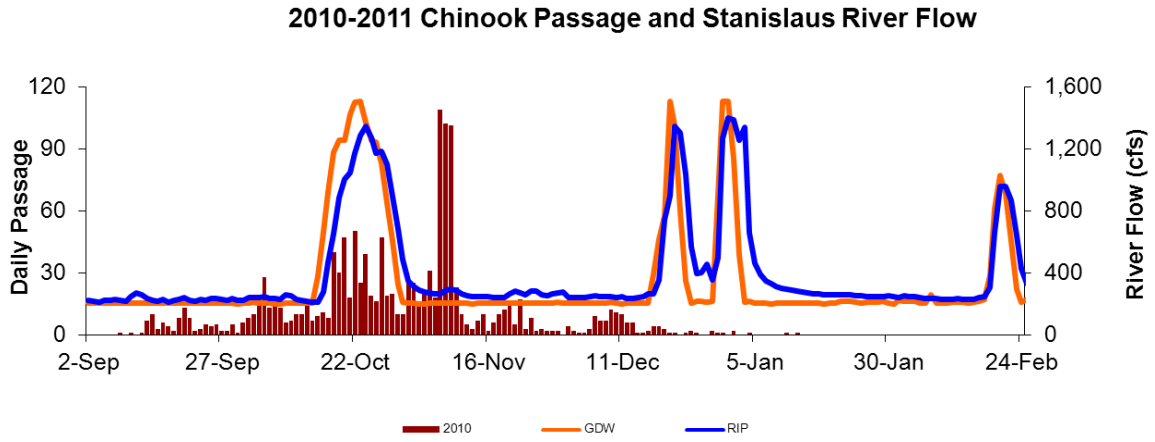

Figure 6 Chinook Passage and Stanislaus River Flow 2010-2011

Figure 7 reports the number of adult Chinook salmon that have been observed at the Stanislaus weir by 4/4from 2003 to 2010. These data, provided by FishBio, are available on a weekly basis and can help to indicate both the abundance, and relative timing, of migrating Chinook in the Stanislaus basin compared to previous years. Because of ongoing high flows, the Stanislaus weir is not yet in operation for the 2011 fall migration season. Sampling with the weir is expected to begin in early November, once flows drop below 1,500 cfs.

Year	Net Passage by April 4th
2010	1382
2009	1294
2008	923
2007	408
2006	3056
2005	4121
2004	4408
2003	4848

Figure 7 Net Upstream Passage of Chinook salmon at the Stanislaus Weir by April 4th, from 2003 to 2010

The following figure (Figure 8) compares the Chinook salmon passage at the Stanislaus River Weir from 2003 to 2010 (again, no 2011 data because the weir is not yet sampling this fall). This graph and the weir data were provided by FishBio.

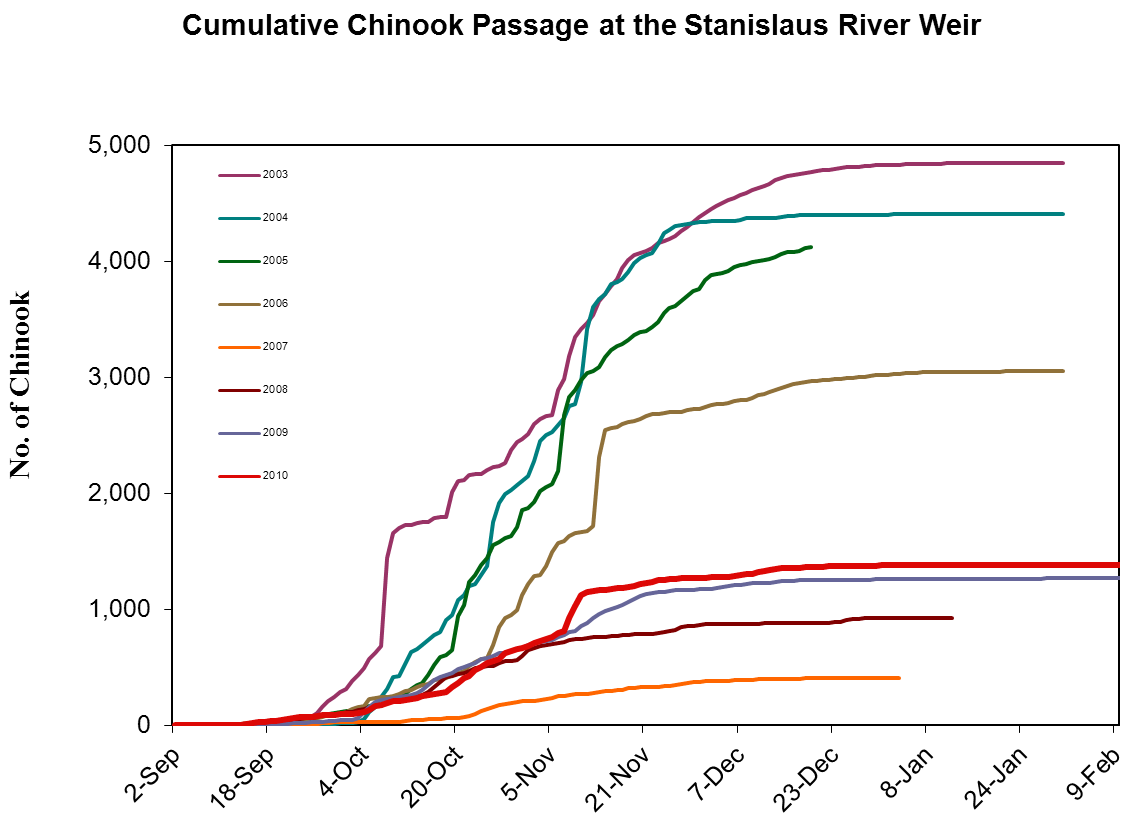

Figure 8 Cumulative Chinook Passage at the Stanislaus River Weir

Juvenile Monitoring at the Caswell and Oakdale Rotary Screw Traps

Figure 9 and 10 plot the flow at Ripon, CA (RIP) and daily catch of juvenile Chinook salmon and days of operation for the rotary screw trap at Caswell Memorial State Park on the lower Stanislaus River from January to June 2010 and 2011. Just one *O. mykiss* was recorded at the Caswell rotary screw traps in 2010 (5/14/2010); two *O. mykiss* were recorded at Caswell in 2011 (one during the week of 3/21 and another during the week of 6/13). The 2010 data were provided by Cramer Fish Sciences through funding by FWS; the 2011 graph was provided through the FishBio San Joaquin Basin newsletter.

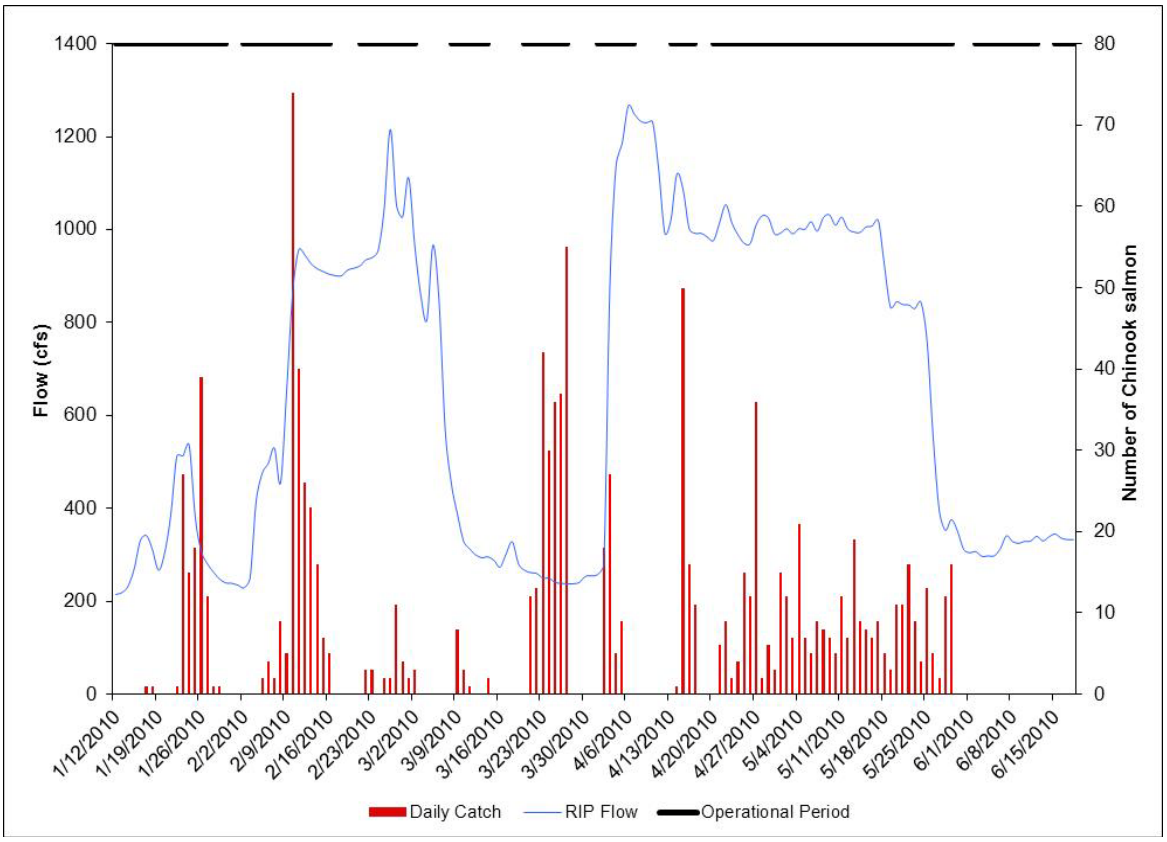

Figure 9 Summary of 2010 Fish Sampling at the Caswell Rotary Screw Trap.

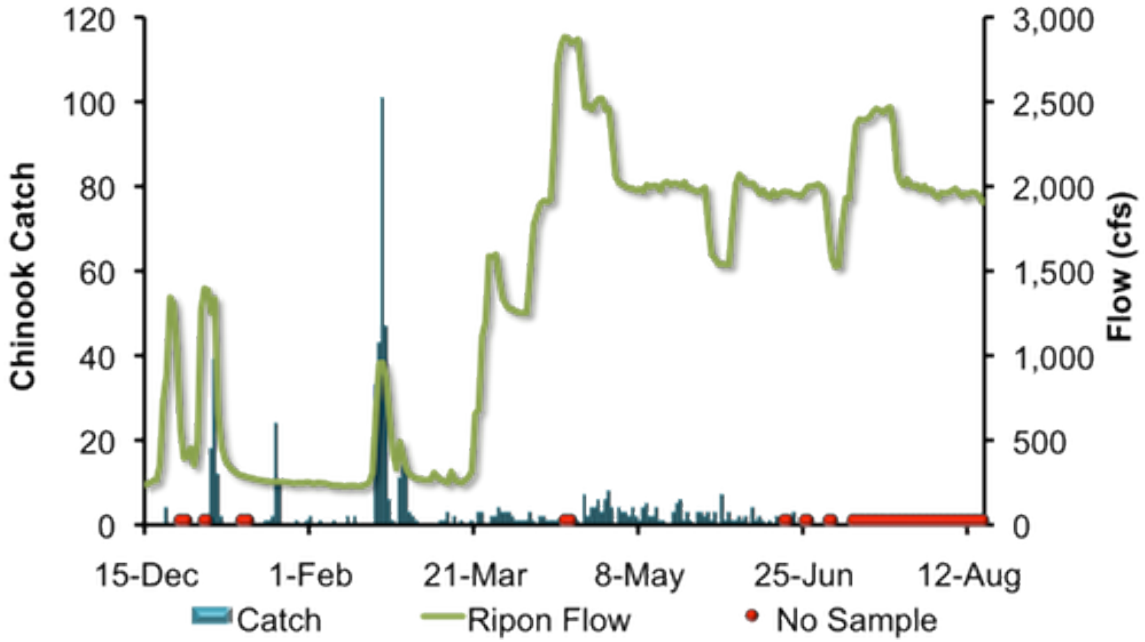

Figure 10 Summary of 2011 Fish Sampling at the Caswell Rotary Screw Trap.

Figure 11 summarizes biosampling data for Chinook salmon and *O. mykiss* captured and measured at Oakdale between January 4, 2010 and June 30, 2011. The graph and data were provided through FishBio.

Species	Age Class	#	Average	
			Fork Length	Weight (g)
Chinook	Fry (< 50mm)	3,929	36 (26-49)	0.4 (0.2-5.0)
Chinook	Parr (50-69 mm)	629	59 (50-69)	2.2 (0.3-7.3)
Chinook	Smolt (≥70 mm)	328	86 (70-140)	8.4 (3.3-31.4)
O. mykiss	Age 1+ (100-299 mm)	21	234 (160-292)	110.0 (14.0-264.0)

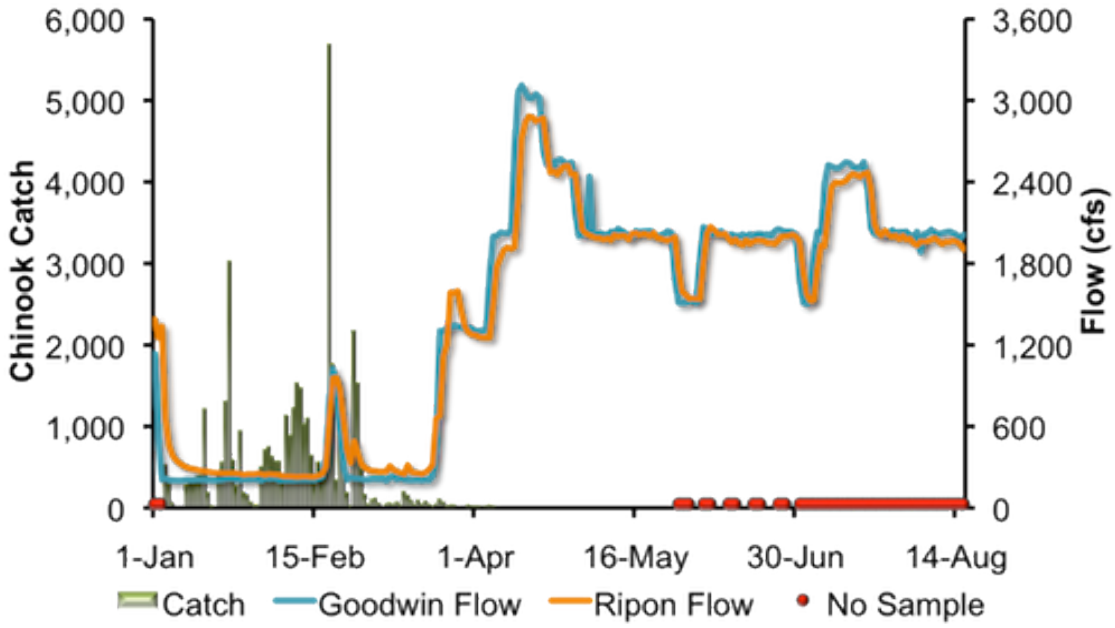

Figure 11 Summary of 2011 Fish Sampling at the Oakdale Rotary Screw Trap.

Chapter 6 – Year in Review and Requests for Feedback

6.1 Issues that arose in 2011 and are likely to be revisited by SOG in 2012

SOG had some discussions regarding implementation of the Stanislaus RPA actions that are still ongoing. Brief summaries are provided below.

Action III.1.3 – Minimum Flow management
The flow schedules in Appendix 2-E of the NMFS BiOp specify the minimum instream flow releases at Goodwin Dam[12], by water year type. While both Reclamation (employing the Interim Plan of Operations (IPO) framework[13]) and NMFS (under the framework used to develop the RPA) determine year type based on the specific hydrology of the Stanislaus basin, by using the New Melones Index (a.k.a. the New Melones Water Supply Parameter), the calculation of yeartype under the IPO framework and the RPA do differ and may result in different yeartype designations. A summary of this issue was provided in the 2010 SOG Annual Report, and is provided again here in Appendix F. While this issue is not yet resolved, NMFS and Reclamation expect to continue discussions regarding the different calculations of yeartype and how each alternative might impact management of reservoir releases and instream flows for fishery benefit.

Actions III.1.3 and III.2.2 –High flow/Inundation flow management
High flows above 1,500 cfs, depending on their duration, can cause seepage damage to crops during non-dormant periods (Reclamation 1982), and flood control flows near 5,000 cfs may cause property damage. Due to the incised/armored channel, only high flows will mobilize channel gravels and replenish spawning habitat. However, ongoing restoration efforts have been designed to provide inundated habitat at lower flows. Opportunities for seepage monitoring and property protection for short duration pulses are being examined.

Action III.1.3 and IV.2.1 - An "inverted" spring pulse due to the interaction of between Action III.1.3 (Stanislaus minimum flows), Action IV.2.1 (a Vernalis flow requirement), and the timing of the VAMP flows.
Due to flood control actions that began in March of 2011, flows were higher than anticipated there was no "inverted" pulse in the spring. The "inverted pulse" was a condition experienced in year 2010 when Action IV.2.1 required higher Stanislaus River flows outside of the VAMP period (April 1-15, and May 16-31). However, this topic may be revisited by SOG as Action IV.2.1 moves from Phase I to Phase II in 2012.

[12] "GDW" on CDEC
[13] Reclamation is operating New Melones for the NMFS BiOp RPA Actions. The use of the "IPO framework" is limited to the calculation of water year type.

Action III.1.2 - Handling temperature exceedances with the temperature exception procedure

While SOG did not discuss or implement any changes to the temperature exception procedure during the 2011 water year, NMFS and Reclamation expect to initiate further discussion with SOG members on this issue during the 2012 water year. Some of the factors the group expects to consider include: using climate forecast information to pre-schedule temperature management releases 3-4 days in advance, assessing the impact that additional releases may have on water commitments from New Melones Reservoir, and providing springtime seasonal temperature management when release temperatures from the New Melones outlet may not be much cooler than the temperature target downstream at Knights Ferry.

6.2 Successes and Requests for Feedback

SOG's major accomplishments this year were the coordination and implementation of two in-stream efforts completed in August and September. Reclamation added approximately 5,000 tons of gravel into Goodwin Canyon as part of the gravel augmentation plan required in RPA Action III.2.1; this is the largest quantity of gravel ever added at this location. The FWS-led habitat restoration project at Lancaster Road completed restoration of 640 feet of remnant side channel habitat allowing it to flow at the 1.5 year return interval (575 cfs) and three cross-channels designed to inundate at higher flows; these actions support. RPA Action III.2.3. SOG also was successful in coordinating flow releases under RPA Action III.1.3 during Stanislaus and San Joaquin Rivers flood control operations.

SOG is particularly interested in feedback from the panel on the following questions:

- What studies or monitoring data would improve our ability to adaptively manage within the flexibility of the RPA actions or improve our ability to assess the effectiveness of our implementation of the RPA actions?

- What advice can you provide regarding the implementation (in timing or shaping) of particular pulses in the flow RPA, specifically the winter "storm" pulses, the spring pulse (which partially coincided with the VAMP pulse flow) and the October fall pulse flow?

- Do you have suggestions for any specific sort of analysis that would be most appropriate to use when implementing temperature management throughout the year (e.g., addressing impacts to water supply and all beneficial uses)? Are there particular data gaps (e.g., outlet temperatures at New Melones and Tulloch and reservoir temperatures at Goodwin) that you recommend filling in order to substantively improve the effectiveness of our implementation of Action III.1.2, including the exception procedure?

References

Bureau of Reclamation. 1982. *Operating Plan for New Melones Reservoir as required by the February 2, 1982 Order of the United States Court of Appeals for the Ninth Circuit.*

NMFS. 2009. *Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project.*

NMFS. 2011. *Track Changes Version of the 2009 Reasonable and Prudent Alternative that Includes Only the Pages that have 2011 Amendments.*

Appendix A

2011 NMFS RPA Adjustments

Action III.1.3. Operate the East Side Division Dams to Meet the Minimum Flows, as Measured at Goodwin Dam, Characterized in Figure 11-1, and as Specified in Appendix 2-E

Objective: To maintain minimum base flows to optimize CV steelhead habitat for all life history stages and to incorporate habitat maintaining geomorphic flows in a flow pattern that will provide migratory cues to smolts and facilitate out-migrant smolt movement on declining limb of pulse.

Action: Reclamation shall operate releases from the East Side Division reservoirs to achieve a minimum flow schedule as described in Appendix 2-E and Figure 11-1, below. This flow schedule specifies minimum flows and does not preclude Reclamation from making higher releases for fishery benefits or other operational criteria. When operating at higher flows than specified, Reclamation shall implement ramping rates for flow changes that will avoid stranding and other adverse effects on CV steelhead. In particular, flows that exceed 800 cfs will inundate known side channels that provide habitat, but that also pose stranding risks. When spring pulses greater than 800 cfs are identified in Figure 11-1, the declining limb is not reduced below 800 cfs until after the last pulse.

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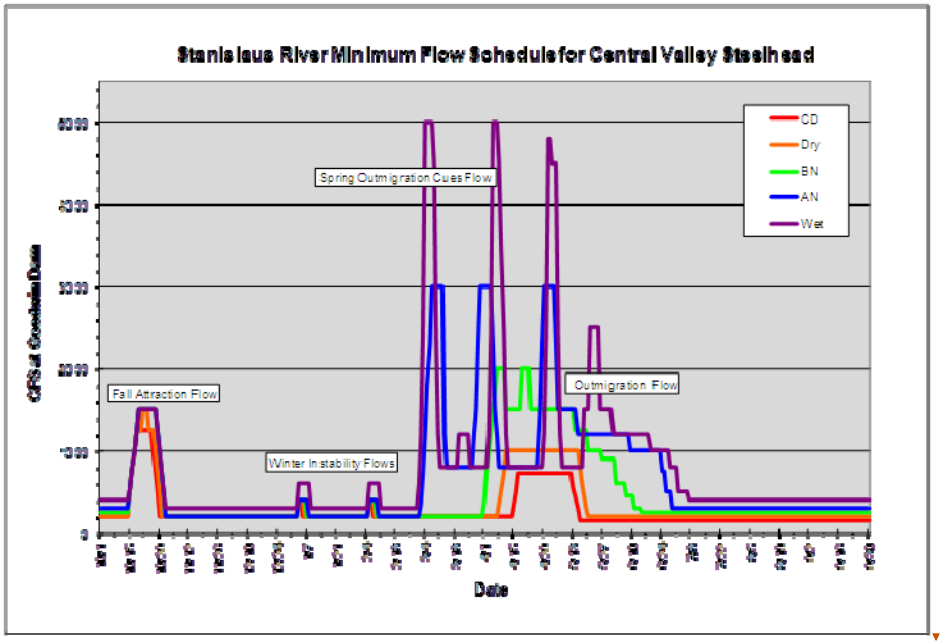

Figure 11-1. Minimum Stanislaus River in-stream flow schedule for CV steelhead as measured at Goodwin Dam

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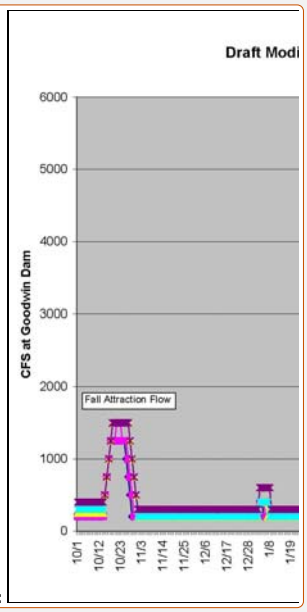

Implementation procedures: Reclamation shall convene the SOG to adaptively manage flows according to this schedule. The timing, magnitude, and duration of the flows in Appendix 2-E are intended to provide certain hydrologic features at certain times of year to benefit CV steelhead, as explained in the Rationale. Based upon the advice of SOG and the concurrence by NMFS[6], 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 example, Reclamation may execute shorter duration pulses more frequently (*e.g.*, 2 - 4 times) during the longer pulse period. Implementation of this action should be coordinated with allocation of water resources dedicated for fish, such as the 98.3 TAF to CDFG and b(2) or b(3), if applied. The SOG shall follow standard operating procedures resolving any conflict through the WOMT process. The team shall also advise Reclamation on operations needed to minimize the adverse effects of flow fluctuations associated with New Melones Reservoir and Goodwin Dam operations on CV steelhead spawning, egg incubation, and fry and juvenile rearing within the Stanislaus River. If new information is developed, such as an update of Stanislaus River CV steelhead in-stream flow needs, more specific geomorphic analyses regarding channel forming flows, or real-time recommendations from the SOG, Reclamation may submit to NMFS a revised annual minimum flow schedule that may be implemented if NMFS concurs that it is consistent with ESA obligations. These revisions may trigger re-initiation and re-consultation.

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Rationale: This flow schedule includes the following components:

1) Minimum base flows based on IFIM (Aceituno 1993) to optimize available CV steelhead habitat for adult migration, spawning, and juvenile rearing. These base flows are scaled to water year type as defined by the New Melones water supply parameter[7], with lowest flows in critically dry years and highest flows in wet years.

Deleted: Interim Operations Plan (IOP)

2) Fall pulse flow to improve in-stream conditions sufficiently to attract CV steelhead to the Stanislaus River.

3) Winter instability flows to simulate natural variability in the winter hydrograph and to enhance access to varied rearing habitats.

4) Channel forming and maintenance flows in the 3,000 to 5,000 cfs range in above normal and wet years to maintain spawning and rearing habitat quality. These flows are scheduled to occur after March 1 to protect incubating eggs and are intended to work synergistically with providing outmigration flow cues and late spring flows, described next. These flows are high intensity, but limited duration to avoid potential seepage issues that have been alleged under extended periods of flow greater than 1,500 cfs.

[6] Concurrence by NMFS is necessary only for pulse flows that are timed or shaped differently than the pulse descriptions I Appendix 2-E.

[7] The New Melones water supply parameter is calculated as the sum of end of February New Melones Reservoir storage and cumulative inflow to New Melones Reservoir from March through September.

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flow is to provide flow cues downstream for incoming adults, as well as providing some remedial effect on the low dissolved oxygen conditions that develop in the Stockton Deep Water Ship Channel. In addition to steelhead, this action also produces ancillary benefits to fall-run EFH.

Modeling conducted in the preparation of this action indicate that the temperature criteria of Action III.1.2 can generally be met under this alternative minimum flow schedule and are often improved, but that exceedances may occur in certain months (*e.g.*, May and early fall) during dry year types. Based on SALMOD analyses, temperature related mortality may be about 2 percent higher in critically dry years, but is reduced by about 1 percent in all other year types under the proposed alternative (Figure 11-3).

Salmon Mortality:

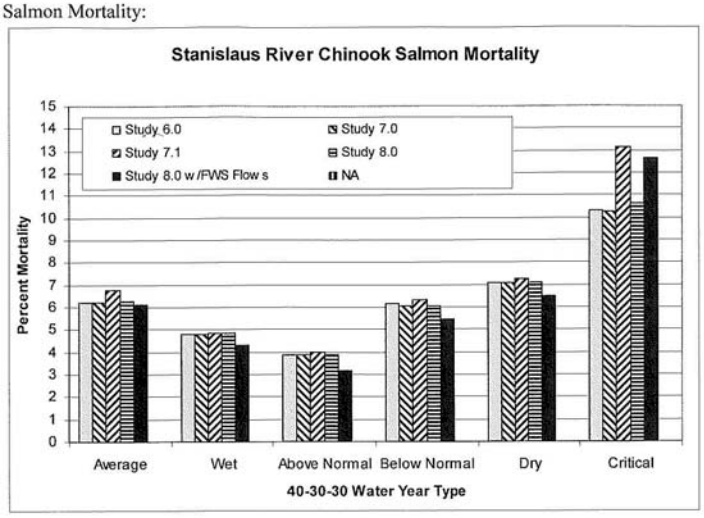

Figure 11-3. Modeled temperature effects of alternative Stanislaus River flows, draft provided by Reclamation on May 5, 2009.

Rationale for 2011 amendments:

1) Figure 11-1: Figure 11-1, as provided in the 2009 RPA, showed draft flows that varied slightly from the final flow schedule in Appendix 2-E. Figure 11-1 is now fully consistent with the flow schedule in Appendix 2-E.
2) Flexibility in implementing flow schedules: The minimum flow schedules provided in Appendix 2-E remain the same. The amendments to Action III.1.3 and its implementation procedures are intended to provide the SOG with more flexibility to adjust the timing, magnitude, and duration of the pulse flows (*not* the minimum flows in between pulses) described in Figure 11-1 and Appendix 2-E based on considerations such as:

a) optimizing intended benefits to CV steelhead (*e.g.*, based on observed fish distribution or run timing and observed flow and temperature conditions and the intent of the pulse flow as described in the "Rationale," above);
b) coordinating Stanislaus River flows for CV steelhead with flows on other San Joaquin River tributaries (*e.g.*, during the fall attraction flow or during the VAMP period); or
c) coordinating operational objectives to use Goodwin Dam releases to achieve multiple benefits (*e.g.*, during April and May when Stanislaus River flows may be contributing to multiple regulatory requirements at the same time).

Any change in the timing, magnitude, and/or duration of the pulse flows must provide protection to CV steelhead and critical habitat that is equal to or greater than the protection provided by the pulse flows as described in Appendix 2-E. This clarified flexibility can also result in improved water supply when multiple operational objectives can be satisfied with a single strategic release. These amendments were supported by the ISP.

Action Suite III.2. Stanislaus River CV Steelhead Habitat Restoration

Overall objective: Dam operations have and will continue to suppress channel-forming flows that replenish spawning beds. The physical presence of the dams impedes normal sediment transportation processes. This action is necessary to partially alleviate adverse modification of steelhead critical habitat from operations.

Action III.2.1. 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: Reclamation shall minimize effects of their operations through improving spawning habitat with addition of 50,000 cubic yards of gravel by 2014. Reclamation shall submit a plan, including monitoring, and schedule to NMFS for gravel augmentation by June 2010. Reclamation shall begin gravel augmentations no later than summer 2011. Reclamation shall submit to NMFS a report on implementation and effectiveness of action by 2015. Spawning gravel replenishment sites shall be monitored for geomorphic processes, material movement, and salmonid spawning use for a minimum of three years following each addition of sediment at any given site.

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Rationale: Kondolf (*et al.*,) 2001 identified levels of sediment depletion at 20,000 cubic yards per year owing to a variety of factors including mining and geomorphic processes associated with dam operations, past and ongoing. Kondolf (*et al.*,) 2001 and other reports cited in that work, identify a loss of over 60 percent of spawning area for salmonids since 1966. This level of replenishment will restore adversely affected spawning habitat to relieve adverse habitat conditions and provide sediment to partially offset ongoing loss rates. Sediment addition may also be conducted in a manner to remediate sediment related loss of geomorphic function, such as channel incision, to and allow for inundation of floodplain rearing habitat.

Rationale for 2011 Amendment: Use of "tons" in the 2009 RPA was a typographical error. The change from "tons" to "cubic yards" was made to be consistent with the intent of the action. This change does not result in any change in implementation.

Action III.2.2. Conduct Floodplain Restoration and Inundation Flows in Winter or Spring to Inundate Steelhead Juvenile Rearing Habitat on One- to Three-Year Schedule.

Action: Reclamation shall seek advice from SOG to develop an operational strategy to achieve floodplain inundation flows that inundate CV steelhead juvenile rearing habitat on a one- to three-year return schedule. Reclamation shall submit a proposed plan of operations to achieve this flow regime by June 2011. This plan shall include the minimum flow schedule identified in Action III.1.2, or shall provide justification for any proposed modification of the minimum flow schedule. NMFS will review and, if satisfactory, approve the operational strategy. Reclamation will implement strategy starting in 2012.

Rationale: Kondolf *et al*., (2001) identified that floodplain terraces and point bars inundated before operation of New Melones Dan have become fossilized with fine material and thick riparian vegetation that is never rejuvenated by scouring. Channel forming flows in the 8,000 cfs range have occurred only twice since New Melones Dam began operation 28 years ago. Lack of channel forming flows and lack of sediment input blocked by the dams has resulted in channel incision of one to three feet over 13 years. Floodplain juvenile rearing habitat and connectivity will continue to be degraded by New Melones operations, as proposed.

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

Objective: This action is necessary to compensate for continued operational effects on rearing and freshwater migratory habitat due to flood control operations. The goal of this action is to improve habitat quality of freshwater migratory habitat for juvenile steelhead.

Action: By June 2010, in cooperation with the SOG, Reclamation shall develop a list of projects to improve the habitat values of freshwater migratory habitat in the Stanislaus River, and associated monitoring, for implementation and submit the list to NMFS for review. Reclamation shall begin implementation of NMFS-approved projects by June 2011. Reclamation shall submit a report of project implementation and effectiveness by June 2016.

These projects may include actions that reduce exposure to predation directly, or projects that may offset predation effects by improving rearing habitat values to allow juveniles to grow larger before outmigration. These projects may include both flow- and non-flow-related actions. Flow-related actions shall be coordinated with operational flows as defined in Action III.2.2 and Action III.1.2. These projects may also include, but shall not be limited to,

Enclosure 2

Clean Version of the 2009 Reasonable and Prudent Alternative Revised to Include the 2011 Amendments

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Southern Residents depend on Chinook salmon as prey. Preparation of hatchery management plans for fall-run at Nimbus Fish Hatchery and spring-run and fall-run at Trinity River Fish Hatchery is necessary to reduce operational effects on Southern Residents prey over the long term. Improving the genetic diversity and diversity of run timing of Central Valley fall-run will decrease the potential for localized prey depletions and increase the likelihood that fall-run can withstand stochastic events, such as poor ocean conditions (Lindley *et al.*, 2009), and thereby provide a consistent food source in years with overall poor productivity. .

III. EAST SIDE DIVISION

Introduction to Stanislaus River/Eastside Division Actions: The steelhead population on the Stanislaus River is precariously small and limited to habitat areas below the dams that historically were unsuitable owing to high summer temperatures. All of the four steelhead populations in the Southern Sierra Nevada Diversity Group of the CV steelhead DPS are in similar condition and are not presently considered viable. Using the framework in this Opinion for jeopardy analysis, the DPS is not viable if one of the Diversity Groups is not viable. The overall poor status of the Diversity Group increases the importance of minimizing the effects of project operations on the Stanislaus River population.

Modeled operations suggest that it is possible to operate dams of the Eastside Division in a manner that avoids jeopardy to steelhead; however, if future climate conditions are warmer, drier, or both, summertime temperatures will restrict the extent of suitable habitat for steelhead.

The fundamental operational criteria are sufficiently ill-defined in the CVP/SWP operations BA as to provide limited guidance to the Action Agency on how to operate. This suite of actions provides sufficiently specific operational criteria so that operations will avoid jeopardizing steelhead and will not adversely modify their critical habitat. Operational actions to remove adverse modification of critical habitat include a new flow schedule to minimize effects of flood control operations on functionality of geomorphic flows and access of juvenile steelhead to important rearing areas.

Overall Objectives: (1) Provide sufficient definition of operational criteria for Eastside Division to ensure viability of the steelhead population on the Stanislaus River, including freshwater migration routes to and from the Delta; and (2) halt or reverse adverse modification of steelhead critical habitat.

Overall Rationale: Sufficient uncertainty exists as to whether VAMP pulse flows and b(2) allocations are reasonably likely to occur in the future. VAMP, as defined by the SJRA, is due to expire in 2011. The BA commits to subsequent flows similar to VAMP ("Vamp-like flows"), but this is a very vague commitment. The project description does not define the particular contribution, timing, duration, or magnitude of these flows from the tributaries that contribute to VAMP, including the Stanislaus River. In addition, the BA specifies the amount of water designated to offset VAMP export curtailments as 48 TAF; but the need, based on past

performance, has varied from approximately 45 to 150 TAF. Additional demands for smelt protection and future drainage settlement terms are being placed on b(2) water, and it is uncertain that b(2) water will be available consistently in each year in the quantity, duration, and timing needed for CV steelhead in the Stanislaus River. The annual water contract allocation process from New Melones is inadequately defined in the project description to assure the proposed action will not prevent the establishment of a viable population of steelhead.

Action III.1.1. Establish Stanislaus Operations Group for Real-Time Operational Decision-Making as Described in These Actions and Implementation Procedures

Action: Reclamation shall create a SOG to provide a forum for real-time operational flexibility implementation of the alternative actions defined in this RPA and for clarification of decision-making processes regarding other allocations of the NMTP. This group shall include Reclamation, NMFS, USFWS, DWR, CDFG, SWRCB, and outside expertise at the discretion of NMFS and Reclamation. This group shall provide direction and oversight to ensure that the East Side Division actions are implemented, monitored for effectiveness and evaluated. Reclamation, in coordination with SOG, shall submit an annual summary of the status of these actions. See introduction to RPA for further information on group procedures.

Action III.1.2. Provide Cold Water Releases to Maintain Suitable Steelhead Temperatures

Action: Reclamation shall manage the cold water supply within New Melones Reservoir and make cold water releases from New Melones Reservoir to provide suitable temperatures for CV steelhead rearing, spawning, egg incubation smoltification, and adult migration in the Stanislaus River downstream of Goodwin Dam in order to maintain the following temperature compliance schedule:

Criterion and Temperature Compliance Location	Duration	Steelhead Life Stage Benefit
Temperature below 56°F at Orange Blossom Bridge (OBB)	Oct 1*-Dec 31	Adult migration
Temperature below 52 °F at Knights Ferry and 57°F at OBB	Jan 1-May 31	Smoltification
Temperature Below 55°F at OBB	Jan 1-May 31	Spawning and incubation
Temperature below 65°F at OBB	June 1-Sept 30	Juvenile rearing

***This criterion shall apply as of October 1 or as of initiation date of fall pulse flow as agreed to by NMFS**.

Temperature compliance shall be measured based on a seven-day average daily maximum temperature.

Exception: If any of these criteria is or is expected to be exceeded based on a three-day average daily maximum temperature, Reclamation shall immediately notify NMFS of this condition and shall submit to NMFS a written determination that, after taking all actions within its authorities, it is unlikely to meet the above temperature requirement and the extent

and duration of the expected exceedance. This determination must be supported by specific iterative modeling techniques that vary allocations and delivery schedules. In the event that Reclamation determines that other nondiscretionary requirements (*e.g.*, D-1641 or requirements of the USFWS' Delta smelt biological opinion) conflict with attainment of the temperature requirement, Reclamation will convene SOG to obtain recommendations. If consensus cannot be achieved within SOG, then SOG shall advise NMFS, and NMFS will make a recommendation to WOMT per standard operating procedures.

Rationale: CV steelhead are dependent on East Side Division operations to maintain suitable in-stream temperatures. Operational criteria are not clearly described in the CVP/SWP Operations BA to ensure that appropriate temperatures are met for CV steelhead adult migration, spawning, egg incubation, juvenile rearing, and smoltification. The temperature compliance schedule above provides an operational framework to minimize temperature-related effects of proposed operations in the reaches of the river most used by CV steelhead on a year-round basis. Temperature criteria for adult CV steelhead migration in the lower Stanislaus River are included, as we expect that fall attraction flows will improve downstream temperature conditions for adult migration.

Observations at the fish counting weir on the Stanislaus River indicate that apparent CV steelhead enter the river in October, usually coincident with the release of fall attraction flows that provide cooler water and flow cues for fall-run.

The literature regarding appropriate criteria for smoltification suggests optimal temperatures of less than 52°F (Adams *et al*., 1975, Myrick and Cech 2001) or 57°F (EPA 2001). In order to provide optimal temperatures for smoltification within a feasible operational scenario, the smoltification temperature criteria are lower for Knights Ferry at 52°F and 57°F for Orange Blossom Bridge.

No steelhead spawning surveys have been conducted on the Stanislaus River, but fall-run surveys indicate that spawning may occur from Goodwin Dam (RM 59) almost to the City of Oakdale (RM 40), with the highest use occurring above Knights Ferry (RM 55). Based on observations of trout fry, most spawning occurs upstream of OBB (Kennedy and Cannon 2002). Consequently, specific temperature criteria of 55ºF or less at Riverbank should be met from December through May to ensure that temperatures are suitable for all available spawning habitat, however, modeled results and CDEC data (figure 6-35) indicates that temperatures at Riverbank are likely to exceed this level. Based on observations of trout fry, most spawning occurs upstream of OBB (Kennedy and Cannon 2002). Suitable spawning temperatures are likely to be met at OBB, except in May in critically dry years, and exception procedures will be implemented.

Action III.1.3. Operate the East Side Division Dams to Meet the Minimum Flows, as Measured at Goodwin Dam, Characterized in Figure 11-1, and as Specified in Appendix 2-E

Objective: To maintain minimum base flows to optimize CV steelhead habitat for all life history stages and to incorporate habitat maintaining geomorphic flows in a flow pattern that will provide migratory cues to smolts and facilitate out-migrant smolt movement on declining limb of pulse.

Action: Reclamation shall operate releases from the East Side Division reservoirs to achieve a minimum flow schedule as described in Appendix 2-E and Figure 11-1, below. This flow schedule specifies minimum flows and does not preclude Reclamation from making higher releases for fishery benefits or other operational criteria. When operating at higher flows than specified, Reclamation shall implement ramping rates for flow changes that will avoid stranding and other adverse effects on CV steelhead. In particular, flows that exceed 800 cfs will inundate known side channels that provide habitat, but that also pose stranding risks. When spring pulses greater than 800 cfs are identified in Figure 11-1, the declining limb is not reduced below 800 cfs until after the last pulse.

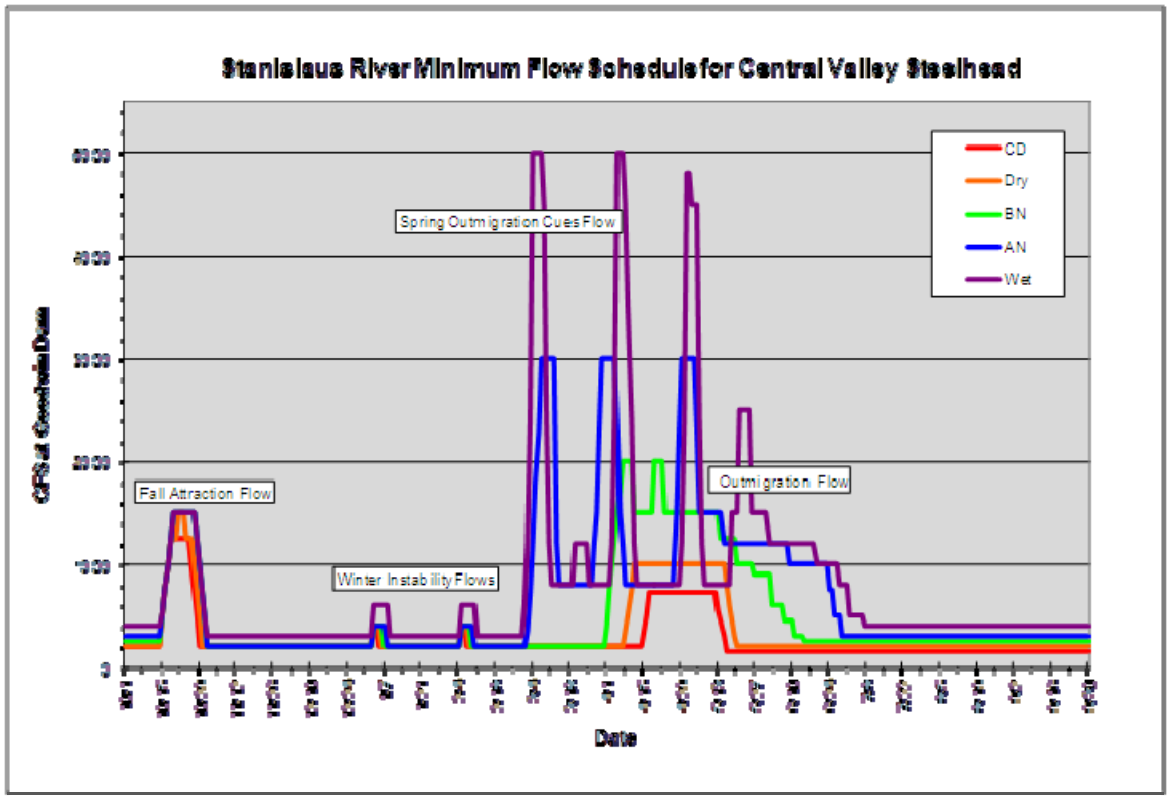

Figure 11-1. Minimum Stanislaus River in-stream flow schedule for CV steelhead as measured at Goodwin Dam

Implementation procedures: Reclamation shall convene the SOG to adaptively manage flows according to this schedule. The timing, magnitude, and duration of the flows in Appendix 2-E are intended to provide certain hydrologic features at certain times of year to benefit CV steelhead, as explained in the Rationale. Based upon the advice of SOG and the concurrence by NMFS[6], 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 example, Reclamation may execute shorter duration pulses more frequently (*e.g.*, 2 - 4 times) during the longer pulse period. Implementation of this action should be coordinated with allocation of water resources dedicated for fish, such as the 98.3 TAF to CDFG and b(2) or b(3), if applied. The SOG shall follow standard operating procedures resolving any conflict through the WOMT process. The team shall also advise Reclamation on operations needed to minimize the adverse effects of flow fluctuations associated with New Melones Reservoir and Goodwin Dam operations on CV steelhead spawning, egg incubation, and fry and juvenile rearing within the Stanislaus River. If new information is developed, such as an update of Stanislaus River CV steelhead in-stream flow needs, more specific geomorphic analyses regarding channel forming flows, or real-time recommendations from the SOG, Reclamation may submit to NMFS a revised annual minimum flow schedule that may be implemented if NMFS concurs that it is consistent with ESA obligations. These revisions may trigger re-initiation and re-consultation.

Rationale: This flow schedule includes the following components:

1) Minimum base flows based on IFIM (Aceituno 1993) to optimize available CV steelhead habitat for adult migration, spawning, and juvenile rearing. These base flows are scaled to water year type as defined by the New Melones water supply parameter[7], with lowest flows in critically dry years and highest flows in wet years.

2) Fall pulse flow to improve in-stream conditions sufficiently to attract CV steelhead to the Stanislaus River.

3) Winter instability flows to simulate natural variability in the winter hydrograph and to enhance access to varied rearing habitats.

4) Channel forming and maintenance flows in the 3,000 to 5,000 cfs range in above normal and wet years to maintain spawning and rearing habitat quality. These flows are scheduled to occur after March 1 to protect incubating eggs and are intended to work synergistically with providing outmigration flow cues and late spring flows, described next. These flows are high intensity, but limited duration to avoid potential seepage issues that have been alleged under extended periods of flow greater than 1,500 cfs.

[6] Concurrence by NMFS is necessary only for pulse flows that are timed or shaped differently than the pulse descriptions I Appendix 2-E.

[7] The New Melones water supply parameter is calculated as the sum of end of February New Melones Reservoir storage and cumulative inflow to New Melones Reservoir from March through September.

5) Outmigration flow cues to enhance likelihood of anadromy.

6) Late spring flows for conveyance and maintenance of downstream migratory habitat quality in the lowest reaches and into the Delta.

An analysis of Stanislaus River rotary screw trap captures of smolted CV steelhead conducted by Reclamation in April 2009 (Hannon 2009b) identified that the median date for smolt CV steelhead out migration is March 1 (Figure RR- Julian Day 60), ranging from January through June. Juveniles are generally captured in trawls at Mossdale in smolted condition in late May (Julian Day 151 and Figure 4-4). CV steelhead are larger than fall-run smolts and may be less dependent on pulse flows to convey them out of the Stanislaus River, but the variability of pulses provides migratory cues to smolted CV steelhead. Capture information suggests that it is important to maintain suitable migratory conditions from the Stanislaus River to the Delta into the month of June. This action will allow more smolted fish to migrate out of system by extending the declining limb of the outmigration pulse and increasing migratory cues.

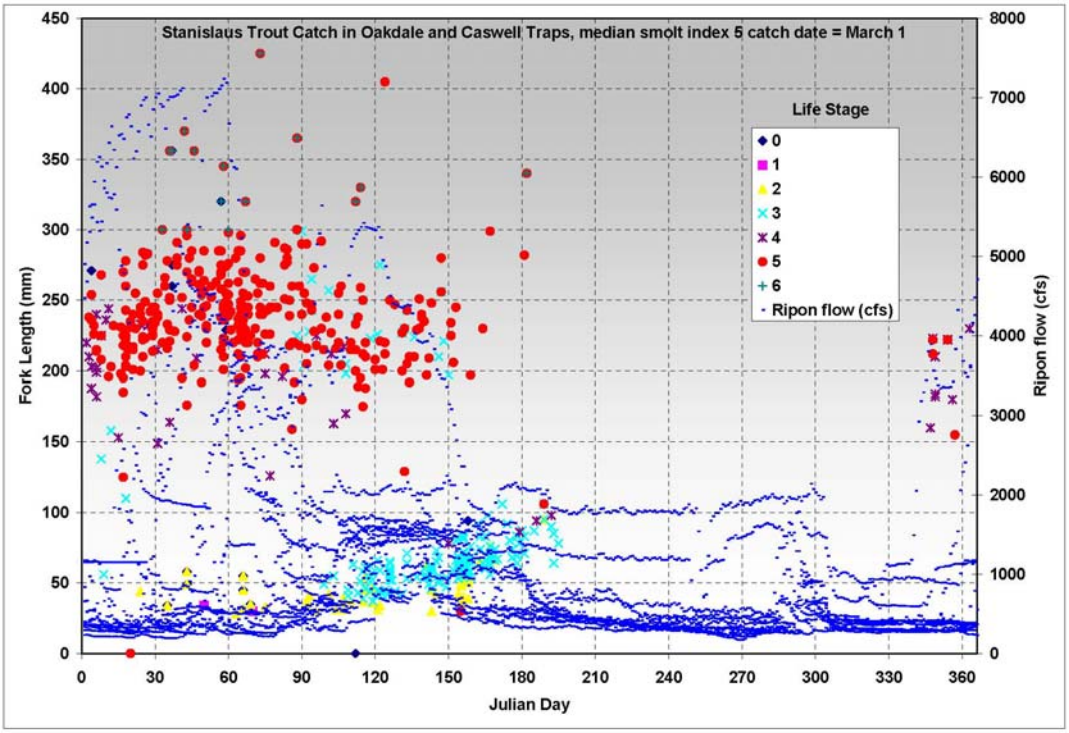

Figure 11-2. Smolt stage *O.mykiss* captured in Stanislaus River Rotary Screw Traps

The fall pulse flow was originally instituted to provide attraction flows for fall-run. Monitoring of adult salmonids at the Stanislaus River counting weir indicates that the fall pulse flow attracts both fall-run and CV steelhead into the Stanislaus River, making freshwater riverine habitat available. These riverine conditions have better temperature and water quality than conditions in the Delta during this period. The purpose of the fall pulse

flow is to provide flow cues downstream for incoming adults, as well as providing some remedial effect on the low dissolved oxygen conditions that develop in the Stockton Deep Water Ship Channel. In addition to steelhead, this action also produces ancillary benefits to fall-run EFH.

Modeling conducted in the preparation of this action indicate that the temperature criteria of Action III.1.2 can generally be met under this alternative minimum flow schedule and are often improved, but that exceedances may occur in certain months (*e.g.*, May and early fall) during dry year types. Based on SALMOD analyses, temperature related mortality may be about 2 percent higher in critically dry years, but is reduced by about 1 percent in all other year types under the proposed alternative (Figure 11-3).

Salmon Mortality:

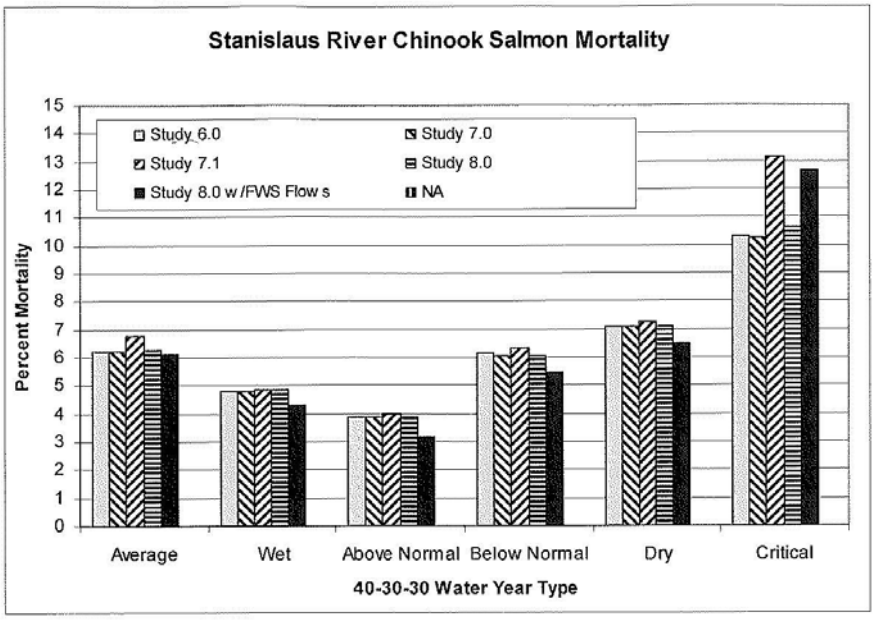

Figure 11-3. Modeled temperature effects of alternative Stanislaus River flows, draft provided by Reclamation on May 5, 2009.

Rationale for 2011 amendments:

1) Figure 11-1: Figure 11-1, as provided in the 2009 RPA, showed draft flows that varied slightly from the final flow schedule in Appendix 2-E. Figure 11-1 is now fully consistent with the flow schedule in Appendix 2-E.
2) Flexibility in implementing flow schedules: The minimum flow schedules provided in Appendix 2-E remain the same. The amendments to Action III.1.3 and its implementation procedures are intended to provide the SOG with more flexibility to adjust the timing, magnitude, and duration of the pulse flows (*not* the minimum flows in between pulses) described in Figure 11-1 and Appendix 2-E based on considerations such as:

a) optimizing intended benefits to CV steelhead (*e.g.*, based on observed fish distribution or run timing and observed flow and temperature conditions and the intent of the pulse flow as described in the "Rationale," above);
b) coordinating Stanislaus River flows for CV steelhead with flows on other San Joaquin River tributaries (*e.g.*, during the fall attraction flow or during the VAMP period); or
c) coordinating operational objectives to use Goodwin Dam releases to achieve multiple benefits (*e.g.*, during April and May when Stanislaus River flows may be contributing to multiple regulatory requirements at the same time).

Any change in the timing, magnitude, and/or duration of the pulse flows must provide protection to CV steelhead and critical habitat that is equal to or greater than the protection provided by the pulse flows as described in Appendix 2-E. This clarified flexibility can also result in improved water supply when multiple operational objectives can be satisfied with a single strategic release. These amendments were supported by the ISP.

Action Suite III.2. Stanislaus River CV Steelhead Habitat Restoration

Overall objective: Dam operations have and will continue to suppress channel-forming flows that replenish spawning beds. The physical presence of the dams impedes normal sediment transportation processes. This action is necessary to partially alleviate adverse modification of steelhead critical habitat from operations.

Action III.2.1. 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: Reclamation shall minimize effects of their operations through improving spawning habitat with addition of 50,000 cubic yards of gravel by 2014. Reclamation shall submit a plan, including monitoring, and schedule to NMFS for gravel augmentation by June 2010. Reclamation shall begin gravel augmentations no later than summer 2011. Reclamation shall submit to NMFS a report on implementation and effectiveness of action by 2015. Spawning gravel replenishment sites shall be monitored for geomorphic processes, material movement, and salmonid spawning use for a minimum of three years following each addition of sediment at any given site.

Rationale: Kondolf (*et al.*,) 2001 identified levels of sediment depletion at 20,000 cubic yards per year owing to a variety of factors including mining and geomorphic processes associated with dam operations, past and ongoing. Kondolf (*et al*.,) 2001 and other reports cited in that work, identify a loss of over 60 percent of spawning area for salmonids since 1966. This level of replenishment will restore adversely affected spawning habitat to relieve adverse habitat conditions and provide sediment to partially offset ongoing loss rates. Sediment addition may also be conducted in a manner to remediate sediment related loss of geomorphic function, such as channel incision, to and allow for inundation of floodplain rearing habitat.

Rationale for 2011 Amendment: Use of "tons" in the 2009 RPA was a typographical error. The change from "tons" to "cubic yards" was made to be consistent with the intent of the action. This change does not result in any change in implementation.

Action III.2.2. Conduct Floodplain Restoration and Inundation Flows in Winter or Spring to Inundate Steelhead Juvenile Rearing Habitat on One- to Three-Year Schedule.

Action: Reclamation shall seek advice from SOG to develop an operational strategy to achieve floodplain inundation flows that inundate CV steelhead juvenile rearing habitat on a one- to three-year return schedule. Reclamation shall submit a proposed plan of operations to achieve this flow regime by June 2011. This plan shall include the minimum flow schedule identified in Action III.1.2, or shall provide justification for any proposed modification of the minimum flow schedule. NMFS will review and, if satisfactory, approve the operational strategy. Reclamation will implement strategy starting in 2012.

Rationale: Kondolf *et al*., (2001) identified that floodplain terraces and point bars inundated before operation of New Melones Dan have become fossilized with fine material and thick riparian vegetation that is never rejuvenated by scouring. Channel forming flows in the 8,000 cfs range have occurred only twice since New Melones Dam began operation 28 years ago. Lack of channel forming flows and lack of sediment input blocked by the dams has resulted in channel incision of one to three feet over 13 years. Floodplain juvenile rearing habitat and connectivity will continue to be degraded by New Melones operations, as proposed.

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

Objective: This action is necessary to compensate for continued operational effects on rearing and freshwater migratory habitat due to flood control operations. The goal of this action is to improve habitat quality of freshwater migratory habitat for juvenile steelhead.

Action: By June 2010, in cooperation with the SOG, Reclamation shall develop a list of projects to improve the habitat values of freshwater migratory habitat in the Stanislaus River, and associated monitoring, for implementation and submit the list to NMFS for review. Reclamation shall begin implementation of NMFS-approved projects by June 2011. Reclamation shall submit a report of project implementation and effectiveness by June 2016.

These projects may include actions that reduce exposure to predation directly, or projects that may offset predation effects by improving rearing habitat values to allow juveniles to grow larger before outmigration. These projects may include both flow- and non-flow-related actions. Flow-related actions shall be coordinated with operational flows as defined in Action III.2.2 and Action III.1.2. These projects may also include, but shall not be limited to,

evaluations to identify locations or sources of higher juvenile mortality in order to identify and implement projects with the highest likelihood to prevent CV steelhead mortality.

Rationale: Predation studies on the Tuolumne River have shown losses of up to 60 percent of outmigrating salmon smolts in run-of-river gravel mining ponds and dredged areas. Losses on the Stanislaus River have not been similarly quantified, but predation on fall run smolts and *O. mykiss* by striped bass and large mouth bass have been documented. These run-of-river ponds also reduce flow velocities as compared to incoming river channels, requiring outmigrating salmonids to expend more energy to traverse these sections. Operational releases provide flows lower than typical unimpaired flows, which exacerbates the effect of this stressor on outmigrating juveniles and degrades the habitat value of necessary freshwater migratory corridors. Additional flows or flow pulses could alleviate this added energy demand and improve survival through these problem areas. Channel modifications in these problem areas can improve migration success. Improvements in floodplain habitat quality can improve juvenile growth and larger juveniles are more likely to avoid predation mortality.

Action III.2.4. Evaluate Fish Passage at New Melones, Tulloch, and Goodwin Dams

Objective: Evaluate access for steelhead to historic cold water habitat above New Melones, Tulloch, and Goodwin dams.

Action: See Fish Passage Program, Action V.

Rationale: The effects analysis in this Opinion leads to the conclusion that steelhead will continue to be vulnerable to serious effects of elevated temperatures in dry and critically dry years, even if actions are taken to improve temperature management. The frequency of these occurrences is expected to increase with climate change and increased water demands. Therefore, it is essential to evaluate options for providing steelhead to access their historic cold water habitat above New Melones, Tulloch, and Goodwin dams and to provide access if feasible..

IV. DELTA DIVISION

Introduction: An important life history phase for all anadromous fish is their movement through an estuary as adults moving upstream to spawning grounds, and as juveniles moving downstream to the ocean. For some fish, the estuary also serves as a staging area and, for some juveniles, a rearing area prior to their entering the ocean. Within the Central Valley, all anadromous fish, including listed winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon, depend on the Sacramento-San Joaquin Delta environment during these life phases. This dependence was an important factor in designation of critical habitat in the Delta for these species. A properly functioning Delta is critical to migration pathways and rearing habitat, both of which are primary constituent elements of critical habitat for these fish.

Appendix B

Federal response to the 2010 Independent Review Panel Report

DEC 17 2010

Dr. Clifford Dahm, Delta Science Program
Delta Stewardship Council
980 Ninth Street, Suite 1450
Sacramento, California 95814

Dear Dr. Dahm:

NOAA's National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (FWS), and the U.S. Bureau of Reclamation (Reclamation, collectively the Federal Agencies) have received your December 14, 2010, letter, transmitting the independent review panel's report titled, "Report of the 2010 Independent Review Panel (IRP) on the Reasonable and Prudent Alternative (RPA) Actions Affecting the Operations Criteria And Plan (OCAP) for State/Federal Water Operations." The Federal Agencies appreciate the Delta Stewardship Council's (DSC) and IRP's assistance in fulfilling a critical component of adaptive management within NMFS' RPA, and also the Secretaries of the Interior's and Commerce's commitment to undertake an integrated annual review of the Services' respective biological opinions and RPAs.

It is clear from our initial read of the report that the Panelists were diligent and thoughtful in addressing their charge of helping us learn appropriate lessons from evaluating real-time operations during the prior water year. The Panel's expertise, including anadromous fish, estuarine ecology, native fish biology and ecology, and hydrodynamics and transport modeling, is critical to their independent review of the complex and challenging real-time operations and scientific studies that the agencies engage in throughout the year. We appreciate the recommendations that affirm our current approach, including the finding that "the effectiveness of RPA actions in meeting operational targets was usually adequate in 2010." We are in the process of carefully evaluating the critiques contained within the report, and the recommendations for adjustments to the implementation of some RPA components. We intend to complete our analysis, and finalize any proposed adjustments to implementation in mid-January.

The DSP can be assured that the recommendations and responses from the IRP will be considered carefully by the Federal Agencies as we continue to develop lessons learned, incorporate new science, and make appropriate scientifically-justified adjustments to our respective RPAs or their implementation to support water year 2011 real-time decision making. This report is the latest in a series of independent science reviews that have ensured that the Federal Agencies are constantly learning from and incorporating the best scientific information into implementation actions necessary to avoid jeopardizing ESA-listed fish in the Delta while providing irrigation and drinking water to California's farmers and municipalities.

If you have any questions regarding this letter, please contact Garwin Yip (NMFS) at (916) 930-3611, or via e-mail at garwin.yip@noaa.gov; Jennifer Norris (FWS) at (916)930-5633, or via e-mail at jennifer_norris@fws.gov; or Mike Chotkowski (USBR) at (916) 978-5025.

Sincerely,

Maria C. Rea
Central Valley Office Supervisor
National Marine Fisheries Service

Sincerely,

Mary Grim
Acting Field Supervisor
Bay-Delta Fish and Wildlife Office

Sincerely,

Mike Chotkowski
Regional Environmental Officer
U.S. Bureau of Reclamation

MAR 9 2011

Dr. Clifford Dahm
Delta Science Program
Delta Stewardship Council
980 Ninth Street, Suite 1450
Sacramento, California 95814

Dear Dr. Dahm:

On December 17, 2010, NOAA's National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (FWS), and the U.S. Bureau of Reclamation (Reclamation, collectively the Federal Agencies) sent you a letter with an initial response pursuant to the independent review panel's report titled, "Report of the 2010 Independent Review Panel (IRP) on the Reasonable and Prudent Alternative (RPA) Actions Affecting the Operations Criteria And Plan (OCAP) for State/Federal Water Operations." This letter is provided as a follow-up to the Federal Agencies' December 17, 2010, letter. The enclosure provides responses to the IRP's recommendations and comments, and also provides adjustments to the implementation of NMFS' and FWS' respective biological opinions on the long-term operations of the Central Valley Project and State Water Project, in support of real-time decision making in water year 2011.

The Federal Agencies appreciate the Delta Stewardship Council's (DSC) and IRP's assistance in fulfilling a critical component of adaptive management within NMFS' RPA, and also the Secretaries of the Interior's and Commerce's commitment to undertake an integrated annual review of the Services' respective biological opinions and RPAs.

If you have any questions regarding this letter, please contact
Garwin Yip (NMFS) at (916) 930-3611, or via e-mail at garwin.yip@noaa.gov;
Jennifer Norris (FWS) at (916) 930-5633, or via e-mail at jennifer_norris@fws.gov; or
Mike Chotkowski (Reclamation) at (916) 978-5025, or via e-mail at mchotkowski@usbr.gov.

Sincerely,

Maria C. Rea
Central Valley Office Supervisor
National Marine Fisheries Service

Sincerely,

Michael Hoover
Acting Field Supervisor
Bay-Delta Fish and Wildlife Office
U.S. Fish and Wildlife Service

Sincerely,

Michael Chotkowski
Regional Environmental Officer
U.S. Bureau of Reclamation

Enclosure

Joint Department of Commerce and Department of Interior Response to the Independent Review Panel's (IRP) 2010 Report of the Reasonable and Prudent Alternative (RPA) Actions Affecting the Operations Criteria and Plan (OCAP) for State/Federal Water Operations

Independent Review Panel Members:
James J. Anderson, University of Washington
Ronald T. Kneib (Chair), RTK Consulting Services & Univ. of Georgia (Emeritus)
Stacy A. Luthy, University of the Pacific
Peter E. Smith, U.S. Geological Survey (Retired)

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Contents

I. Introduction

NOAA's National Marine Fisheries Service (NMFS) and the US Fish and Wildlife Service (FWS) have each issued Biological Opinions on long-term operations of the Central Valley Project (CVP) and State Water Project (SWP, hereafter CVP/SWP; OCAP Opinions) that include Reasonable and Prudent Alternative (RPA) actions designed to alleviate jeopardy to listed species and adverse modification of critical habitat. NMFS' RPA requires the U.S. Bureau of Reclamation (Reclamation) and NMFS to host a workshop no later than November 30 of each year to review the prior water year's operations and to determine whether any measures prescribed in the RPA should be altered in light of information learned from the prior years' operations or research (NMFS' OCAP Opinion, section 11.2.1.2, starting on page 583).

Under direction from the Secretaries of Commerce and Interior, the NMFS review has been expanded to include a review of the implementation of the FWS OCAP Opinion. The intent of the annual review is to inform NMFS and FWS as to the efficacy of the prior year's water operations and regulatory actions prescribed by their respective RPAs. The review process is intended to determine whether a technical basis exists for amending specific measures in the RPA to reflect new information, provided that such amendments are consistent with the OCAP Opinions' underlying analyses and conclusion, and do not limit the effectiveness of the RPAs in avoiding jeopardy to listed species or adverse modification of critical habitat. Outcomes of this process may include changes to monitoring and data used for decision-making (*e.g.*, improvements in monitoring), or refinement of the criteria, thresholds and/or other indicators used by the technical teams in making recommendations for management actions. The goals of this process will also be to develop lessons learned, incorporate new science, make appropriate science-based adjustments to support the subsequent year's real-time decision making, and identify strategies to better integrate the NMFS and the FWS' RPAs as they are currently implemented.

The Delta Stewardship Council convened an Independent Review Panel (IRP) on November 8-9, 2010. This workshop provided the IRP a forum for presentations and discussion of previously submitted technical reports. The IRP Report was finalized on December 9, 2010. What follows is a unified response by NMFS, FWS, and Reclamation to the comments and recommendations of the panel. In the following pages, we have excerpted the salient portions of the IRP' comments *in italics* and provided our responses in standard font. The agencies focused on comments relating to science and technical issues. We did not respond to comments that pertained to the regulatory process of interagency consultation.

The agencies thank the IRP for their time and diligence in completing what we hope is the first in a series of reviews that will improve both the scientific basis and the overall implementation of the OCAP Opinions on the effects of water project operations. The IRP's willingness to engage on the science issues is the foundation of an improved collaborative process. We also thank the Delta Stewardship Council for its efforts in developing and facilitating the review process.

II. Response to Narrative Notes for Table 2, Letters C-G: IRP Report Pages 10-12

B. Action is a physical compliance – it needs to be related to presence and bioenergetic responses of fish.

All of the actions in the NMFS RPA were intended to meet the objective of the action or action suite, which include the species' presence and expected responses of the fish. As explained in the approach to the RPA (NMFS OCAP Opinion page 576), "NMFS concentrated on actions that have the highest likelihood of alleviating the stressors with the most significant effects on the species, rather than attempting to address every project stressor for each species or every [primary constituent element] of critical habitat." NMFS agrees that much of the information provided within the technical team annual reports, and presented to the IRP, focused on physical compliance. We will increase our efforts to monitor and report on the species' responses.

C. Improved temperature predictions were demonstrated by the NOAA/NASA study which should replace the concept of temperature compliance points with continuous spatial temporal predictions of temperature in the river and tributaries of the Central Valley. Linking the predictions from models with temperature and precipitation across seasonal and yearly scales should vastly improve the efficacy of within year and across year decisions on allocations of cool water resources in the system.

D. Need to link better forecasting of seasonal flow with down stream temperature modeling and then link effects of temperature on fish vital rates: egg, juvenile, and adult survivals, egg incubation time, juvenile growth. Strongly encourage implementation of the temperature forecasting and assessment program described by NOAA.

NMFS intends to integrate the improved temperature predictions from the work presented by Eric Danner into the temperature planning process on the Sacramento River, as this technological tool becomes available. We agree with the ISP that more finely resolved spatial and temporal temperature predictions will be useful in temperature management, and expect that the Sacramento River Temperature Task Group (SRTTG) will consider this information (as available) when setting temperature compliance points during 2011. NMFS also agrees that with further development of (and experience with) new temperature management tools, it may become easier to operate to a more sophisticated performance measure for RPA compliance. However, NMFS does not propose, for 2011, any adjustment to the use of temperature compliance points in the RPA for management of Sacramento River temperature.

NMFS agrees that there should be a better linkage of temperature effects on fish vital rates. This is consistent with the ISP's recommendation made elsewhere in the report that we should monitor the biological responses of fish to physical compliance and achievement of physical targets. The technical teams currently evaluate biological responses in a qualitative sense, and provide advice on operations based on literature and professional judgment. NMFS supports modeling efforts and studies that evaluate and correlate fish responses to various operational scenarios.

E. It is not known why the compliance point was established downstream (Jelly's Ferry) when aerial redd surveys in 2010 indicated redds were upstream of Airport Road Bridge.

Typically, the temperature compliance point is set in May utilizing information from the aerial redd surveys to determine winter-run Chinook salmon spawning distribution. In 2010, the aerial redd survey data were not available to the SRTTG until approximately July 15. These data indicated that winter-run Chinook salmon were spawning above the Airport Road compliance point. Due to the difficulty in detecting salmon redds from a fixed wing aircraft (higher altitude), and the poor visibility, the SRTTG left the temperature compliance point at Jelly's Ferry in the event that there were undetected redds located downstream, between Airport Road and Jellys Ferry.

Preseason temperature planning is unclear. The documentation was inadequate to assess the efficacy of coordination in real time or the effectiveness of the action on fish.

NMFS agrees that documentation and rationale for establishing the temperature compliance point, and effectiveness of the action on fish, need to be bolstered.

F. Compliance points should be re-evaluated and possibly moved to better match actual fish habitat usage.

The Clear Creek Technical Group is working on a proposal to establish water temperature criteria and a temperature compliance point that better matches Central Valley steelhead spawning distribution and fish habitat usage.

G. While "fish population data" was listed in the presentation as a priority for data collection, the panel was not presented much about this topic, though the potential for competition and/or interbreeding of transported fish with native (or put and take fisheries) populations is of importance. We hope that risk assessment for major habitat degradation (e.g., the Cantara loop metam sodium spill in the Sacramento River in 1991) is also being considered.

NMFS agrees that the potential for competition and/or interbreeding of transported fish with native fish (or put and take fisheries) populations are important. The Interagency Fish Passage Steering Committee, and its subcommittees, in their implementation of NMFS RPA Action V, the Fish Passage Program, will be considering and addressing these issues. Risk assessment will definitely be considered as part of implementing the Fish Passage Program.

III. Response to Narrative Notes for Table 3, Letters H-M: IRP Report Pages 13-14

H. While there are likely important reasons to know the identity of specific fish (i.e., where, when or by whom it was tagged), the presence or changing numbers of tagged fish at a specific location provides information on timing of emigration that can be useful in implementing RPAs.

At some times of the year, when few hatchery releases are in the system, NMFS agrees that simply knowing the numbers of tagged fish can provide useful information on emigration timing. However, the surrogate releases of coded wire-tagged (CWT) Chinook salmon (two to three releases of late fall-run Chinook salmon from Coleman National Fish Hatchery in December and January as surrogates for yearling spring-run Chinook salmon; a release of winter-run Chinook salmon from Livingston Stone National Fish Hatchery in February), which are the basis for the third trigger of RPA Action IV.2.3 relating to managing flows in Old and Middle Rivers, appear at the Federal and state fish facilities along with tagged fish from other releases (for example, slower emigrating individuals from the late fall-run Chinook salmon production release). Differentiation between release groups cannot be made until CWT data have been extracted. These data are necessary for accurate determination of action triggers under RPA Action IV.2.3. In 2010, the Delta Operations for Salmonids and Sturgeon (DOSS) group used "tag fraction projections" provided by the California Department of Water Resources (DWR, see Table A) to implement the third trigger, given the lag time in reading the CWTs. During 2011, DOSS will likely need to project out some number of unread tags, but hopes to decrease the CWT-reading lag time.

Table A: Example of "tag fraction projection" table provided to DOSS during 2010.

Coleman Hatchery Late-Fall and Livingston Stone WinterChinook Loss at the Delta Fish Facilities, 2009/2010, BASED ON DWR EDITS TO FWS CWT DATA

Release Date	Cwtrace	Release Site	Loss	Release Number	% Loss	First Concern Level	Second Concern Level	Date of First Loss	Date of Last Loss
12/16/2009	LF	BattleCreek	938.175	904699	0.104	n/a	n/a	12/26/2009	2/8/2010
12/28/2009	LF	BattleCreek	56.73	75676	0.075	0.5%	1.0%	1/22/2010	2/2/2010
1/14/2010	LF	BattleCreek	799.885	174386	0.459	0.5%	1.0%	1/24/2010	2/8/2010
2/10/2010	W	Redding	0	198100	0.000	0.5%	1.0%	*	*
		Lost tag/No tag	0.00						
		Non-Read Tags	122.28						
	since 2/8/2010 12:00		**159.12**						
		Unknown	**281.40**						

For Chinook lost 10/1/2009 through 2/7/2010
SWP Tags read 10/1/2009 through 2/8/2010
CVP Tags read 10/1/2009 through 2/8/2010
***Livingston Stone winter-run Chinook release**

Revised 2/12/2010

DWR ESTIMATE OF NON-CONFIRMED TAGGED LOSS AND NEW TOTAL TAGGED LOSS THRU 2/11/2010

Release Date	Confirmed TagLoss	Proportion Confirmed TagLoss	Proportion NON Confirmed TagLoss	New Total	Released	%Loss
12/16/2009	938.175	0.522721321	147.09378	1085.269	904699	0.119959
12/28/2009	56.73	0.031608155	8.8945347	65.62453	75676	0.086718
1/14/2010	799.885	0.445670524	125.41169	925.2967	174386	**0.530603**

I. As stated in the DOSS Technical Report (page 19), the formulation of the second trigger was mathematically incorrect.

NMFS agrees with the recommendation, and is currently developing a second trigger.

J. Adequate for salmon but action not currently coordinated with delta smelt program – coordination will require completion of work on delta smelt studies.

The Smelt Working Group (SWG) and DOSS provide advice regarding OMR flows for the management of delta smelt and salmonids, respectively. Currently, there is overlapping group membership. That is, there are scientists that participate in both the DOSS group and SWG proceedings. Information is passed between the groups on a weekly basis regarding actions being considered. While maintaining less negative OMR flows provides benefits to both smelt and salmonids, each group considers current operations and provides advice based on the needs of "its own" species.

The agencies recognize that good coordination between the SWG and the DOSS is necessary, but has at times been difficult. The SWG meets (Monday morning) before the DOSS does (Tuesday morning). Any recommendations or advice from the SWG and DOSS are discussed at Tuesday afternoon WOMT meetings, at which time FWS and NMFS determinations on any recommendations or advice are made, and the more protective action takes precedence at the time. The FWS agrees that the SWG can and

should then consider the NMFS determination when it next meets. This may mean that the SWG will have to meet a second time during the week in some cases.

> *K: The management of Export/Import (E/I) program and impact on fish entrainment is uncertain.*

More information will become available as the six-year acoustic tagging experiment (its objective is to "confirm proportional causes of mortality due to flows, exports and other project and non-project adverse effects on steelhead smolts out-migrating from the San Joaquin basin and through the southern Delta") is implemented. NMFS will also continue to review data from other studies, such as the VAMP study, that provide information on survival and route selection of salmonids migrating from the San Joaquin River basin.

> *L. The current approach to behavioral barriers in the Delta has been largely trial and error in which a system is envisioned and then deployed for testing; tracking trajectories or final destinations of tagged fish encountering the barrier. This approach has been used for decades in the Columbia River system at great cost and with limited success (Anderson 1988). Current studies in the Delta appear to be on a similar path…. Linking the environment to fish behavior requires a detailed description of the flow environment, the sensory signals relevant to the fish and knowledge of the fish's response to the sensory information. Linking these elements in a predictive model has been done in other systems (Goodwin et al. 2006) and the approach can be readily applied to the Delta…. We understand that the VAMP review panel (Hankin and others, 2010) strongly recommended a return to a physical barrier at the HOR for the reason of routing more flow down the main stem of the San Joaquin River to improve outmigrant survival. Therefore, the GS barrier, to be implemented for the first time this winter (WY 2011) may have the greatest potential.*

NMFS recognizes the importance of these and other barriers to salmonid management and will review and consider the results of ongoing studies, as appropriate, when formulating new management strategies. As presented at the workshop, the California Department of Water Resources is currently implementing a non-physical fish barrier at Georgiana Slough. We will consider the IRP's (in support of the VAMP review panel) recommendation to return to a physical barrier at the HOR.

> *M. The panel recommends further collaboration between the water and fish agencies in assessing the variable efficiency of [salmonid] salvage as related to water operations….*

NMFS agrees with the ISP on the benefit of ongoing collaboration with Reclamation and DWR on these issues. As indicated in the NMFS Opinion, NMFS believes changes to the infrastructure of the fish facilities or in the operations and management protocols are important avenues to pursue in order to increase the overall efficiency of fish salvage and survival.

IV. Response to Narrative Notes for Table 4, Letters N-T: IRP Report Pages 14-18

N. The new delta smelt studies, which are coordinating sampling with the temporal patterns of tides and turbidity, represent a major advancement in research on this species and potentially for management of the Delta.

FWS supports well-designed studies relating to the delta smelt and its habitat requirements, including those intended to better define the conditions correlated with movements of delta smelt. The studies, currently underway, are in their first year and will continue for several more. FWS looks forward to discussing results from the first year with the Panel during the 2011 review. As studies are completed and peer reviewed, the FWS will consider and incorporate appropriate findings into new management strategies in general and the RPA in particular.

O. In short, any rectified behavior, which moves fish upstream on the flood tide without realistically expressing the actual cues that induce the behavior, is simply inadequate. The goal should be to develop, from first principles, a behavioral model for how multiple species in the Delta, not just delta smelt, respond to their local environment.

FWS agrees that neither the current version of the RMA Smelt Behavior Model nor the DSM-2 Particle Tracking Model is adequate for addressing questions of adult delta smelt movement. FWS would welcome the development of a delta smelt behavioral model suitable to aid management of the species.

P. During 2010, Action 1 was never triggered because the average daily turbidity at Victoria Canal did not exceed 12 NTU for three consecutive days.

FWS agrees that the close proximity of the Victoria Canal station to the export facilities limits its usefulness in detecting first flush conditions, as by the time smelt would occur there, it would likely be too late to avoid or minimize entrainment. We also agree that adjusting both the stations and the criteria used for detecting first flush may be needed. In WY 2011 the SWG will monitor several turbidity stations in addition to the three criterion stations; in particular, the SWG will focus on turbidity at False River, Dutch Slough at Jersey Point, and Old River at San Joaquin River. These station data will be compared to (a) data from the three criterion stations and (b) flow conditions on the Sacramento and San Joaquin Rivers to determine their efficacy in detecting the first flush.

During the first flush of 2010, OMR flows were already curtailed to be no more negative than -5,000 cfs by the salmon Biological Opinion (RPA Action IV.2.3). That level of OMR flow was sufficient to prevent turbid Sacramento River water from being drawn down to the Victoria Canal station and triggering the Action. Without the salmon Action, however, it is likely that OMR flows would have been higher, and the delta smelt Action would have been triggered. The delta smelt Action should not rely on the salmon Action. The panel feels it would be wise to adjust slightly the trigger for Action 1 so that it gives an earlier warning for first flush.

The implementation of Action 1 for smelt does not rely upon the implementation of the NMFS Action for salmonids, but relies entirely upon meeting or exceeding the criteria set forth in the FWS RPA. It is entirely appropriate, however, for the SWG to consider *all* factors affecting the Delta environment, including the implementation of the NMFS RPA. We are less certain than is the Panel of the conditions that may have prevailed at Victoria Canal absent the salmonid action. This uncertainty highlights the need for monitoring turbidity at additional stations, reviewing outcomes and, potentially, developing new criteria.

> *Adjusting the trigger to be a three-day average of the monitoring stations at Prisoners Pt, Holland Cut, and Victoria Canal might be adequate, although some analyses should be done to confirm this and determine whether a trigger of 12 NTU is the appropriate magnitude. The SWG has suggested five alternative sites for use in WY 2011, which can be considered also. The SWG has acknowledged this and has already proposed to incorporate peak turbidity on the incoming tides as a consideration in their evaluation process of entrainment risk level for delta smelt.*

FWS agrees with the Panel. A pilot study of turbidity and delta smelt movement was conducted last winter by the USGS and U.C. Davis' Bodega Bay Marine Lab, in collaboration with the California Department of Fish and Game. The follow-up study planned for this year will attempt to more precisely characterize the migratory response of delta smelt to the pulse of high water turbidity associated with the first large freshet of winter. It is well-known that delta smelt tend to prefer areas of elevated turbidity, but the role turbidity dynamics play in the timing of migration is not as well understood. Increased knowledge of the timing of delta smelt migratory movements in the presence of early turbidity plumes could be quite valuable. It may aid in better predictions of delta smelt distribution early in winter. Since smelt distribution is a primary factor in assessing entrainment risk, there could be a reduction in the water cost of RPA Actions 1 or 2. FWS is also hopeful that the additional turbidity stations established by the Projects and the USGS will help improve predictions of entrainment risk.

> *The turbidity data from 2010 did show that an OMR flow objective as restrictive as -2,000 cfs may not be necessary in years of average or below average hydrology in order to keep turbidity in the south Delta low (below 12 NTU) and delta smelt entrainment minimal. In 2010, for example, OMR flows of -5,000 cfs proved adequate with a first flush of 57,000 cfs (on the Sacramento River at Freeport). These data suggest that the OMR flows objective required in Action 1 should really depend on the size of the first flush. The larger the first flush, the less negative the OMR flow objective that will be needed. The panel recommends that this idea be further investigated as additional years of turbidity data are collected and improved numerical models of sediment transport are developed and become capable of accurate turbidity prediction.*

The FWS biological opinion states:

"Total entrainment depends on precipitation patterns, ambient air temperature, controlled and uncontrolled releases from waterways feeding the Delta, specific operations of facilities such as the DCC, and condition of the year's pre-spawning cohort based on current year habitat quality. All of these factors may affect the distribution of delta smelt adults as and after they migrate into the Delta – and *it is the migration into the entrainment risk zone and the area of that zone based on operational conditions at the time that determines ultimate mortality*." (OCAP p 331, italics added)

Implementation of FWS RPA Action 1 is intended as a proactive measure to reduce entrainment during a period (first flush) following which, historically, take has occurred. It is also intended (see italicized statement above) to prevent residual flows caused by project operations from creating adverse migratory conditions or confusing migratory cues during their initial migration.

Scaling a reduction in negative flow to the size of the first flush does not comport with the second intended function of the Action. However, we appreciate the panel's comment and intend to continue to study the issue. As noted above, delta smelt migration is an active research area. Future findings may cast new light on the role of migratory cues in delta smelt management.

> *Q. In as far as salvage of delta smelt reached a level of concern (92) but did not exceed the incidental take limit of 123 fish, it could be concluded that the Action contributed to reducing take. However, it is also possible that the apparent success was due in part to the generally low abundance of delta smelt in the system*

FWS agrees with the Panel that "the apparent success [of RPA implementation as measured by salvage] may have been due in part to the generally low abundance of delta smelt in the system." However, authorized take is presently scaled to abundance as indexed by the Fall Mid-Water Trawl (B.O. pp 286-288). Authorized take is based simply upon an estimate of how much take *is expected to occur* as result of Project operations. That take did not exceed the concern level indicates that the FWS was successful in estimating the cumulative take of adults, given the implementation of the RPA.

> *The process by which the recommendation of the SWG was rejected is unclear even though the outcome appeared to be favorable (i.e., an anticipated level of jeopardy was avoided while export flows were not unduly affected). In fact, according to Table 2 of the SWG Report to the IRP, the FWS determination of allowable export flows exceeded that recommended by the SWG on 4 out of 17 times.*

FWS agrees that the process can, at times, be unclear, and will work to improve communications in WY 2011. In particular, we will work to improve the clarity of our linkages between the recommendation and the determination. **The panel should note that a few SWG reports have been accompanied by dissenting opinions prepared by a minority of the work group in cases where the minority has a different take on the nature or significance of the risk information. FWS considers all information contained in SWG reports before drawing conclusions.**

> *The same Table 2 also shows that the observed OMR flow range exceeded the range allowable under the FWS Opinion in 4 of 15 cases. However, it should be noted that the amount by which flows exceeded allowable limits was usually – though not always – minimal. It is also notable that observed flow ranges tended to be in the upper end of the allowable range on most occasions. This is partly due to the use of a 14 day running average in determining OMR flow ranges, but operating near the upper end of the allowable range does tend to invite incidents that exceed the set limits.*

The apparent discrepancy between observed OMR flow and RPA-determined flow ranges stems to some extent from the as-yet-incomplete transition protocol that is intended to ensure the Projects' compliance with the RPA (B.O. p 295). As previously stated, while the B.O. clearly states the standard for meeting flow requirements, the protocol by which exports are adjusted has not yet been fully

resolved. However, it should also be noted that OMR is allowed under the B.O. to be no more than 25% more negative than the requirement (B.O. p 281).

> *Lacking accurate real-time information on the population size and locations of vulnerable sub-populations, the SWG recommendations are based largely on historical patterns, salvage numbers and the individual experience/expert opinions of the individuals within the working group. The potential problems here are that while historical patterns might predict general trends, they are usually not sufficiently sensitive in predicting events in any given year, and composition of the SWG will inevitably change over time, as will the level of first-hand experience with studying delta smelt and the Delta ecosystem.*

FWS acknowledges this difficulty, and notes that a method for estimating population parameters from survey data is currently in development, as are at least three life cycle models. In the meantime, historical experience remains the best available guide to interpreting PTM runs, trawl results, and other indicators of risk. It is also worth noting that the SWG retains members with experience dating back to 2004. Turnover has occurred gradually, and as former members have been lost, new members with considerable existing expertise are recruited to succeed them. Because experience *per se* cannot be retained, the biological opinion included the Delta Smelt Risk Assessment Matrix (DSRAM; B.O. pp 311-323), which was developed by the Delta smelt Working Group to improve decision-making by capturing the major risk factors for delta smelt and summarizing the tools available. The DSRAM includes extensive footnotes to further support the retention of institutional knowledge.

> *R. Salvage is certainly a qualitative indicator of mortality that can be linked to water operations, but it remains a questionable quantitative measure of population jeopardy.*

In determining whether an action is likely to cause jeopardy, FWS considers (1) the status of the species, (2) the environmental baseline, (3) all effects of the proposed action, and (4) the cumulative effects of other anticipated actions. The final analysis considers whether the species can be expected to survive, framed in terms of the species reproduction, numbers, and distribution in the wild. Thus, salvage *per se* is only a part of the determination, and not the deciding factor.

> *Until more refined methods relating delta smelt population dynamics to variation in the quantity and quality of its Delta habitat, there may be ways to develop an incremental improvement in the use of available information. For example, sophisticated refinements to tools are not necessary to recognize – even at the most basic level – that not all individuals salvaged represent an equal amount of jeopardy to the population. The expected lifetime contribution to reproduction in a population (i.e., Fisher's reproductive value) varies in a manner that can be calculated from age-specific survivorship and per capita fecundity at a given age (Kozlowski 1993). A pre-spawn adult female delta smelt or one containing mature or maturing eggs is a much greater loss to the future population than a larva, an adult male, or a spent female. Consequently, a scientifically defensible ecological connection between salvage and jeopardy would weight the protection afforded to different life stages in the population. In practical terms, it is advisable to adjust the allowable incidental take of delta smelt for different life stages.*

FWS agrees that this is useful information. That is why the analysis examines both adult and juvenile fish and take is authorized separately by life stage.

FWS agrees that linking RPA actions and vital rates would improve their effectiveness; however, much needed data is either not complete or not available, such as a widely-accepted delta smelt life cycle model and sediment transport model. The FWS agrees that linking RPA actions to vital rates in a more quantitative way is very important to our understanding of how Project operations affect delta smelt, both in terms of entrainment and impacts to critical habitat. However, until models and studies are completed, reviewed, and generally accepted, the FWS must utilize the tools that are currently available.

S. There is no metric by which to evaluate the effectiveness of the action on early life stages, which are not accurately counted among the salvage values.

FWS agrees with the Panel, and notes that further research in combination with ongoing larval sampling is likely to clarify this issue.

T. The 2010 Water Year was considered below – but close to – average. Drier years are likely to present greater problems related to demand for proportionally higher exports and a greater pressure for legal remedies. Successful legal challenges to any of the actions have potential to: (1) inhibit the actual effectiveness of the action, (2) preclude any evaluation of efficacy, and (3) inhibit agency coordination (if agencies are on different sides of proceedings). Consequently, linking vital rates and the population dynamics of delta smelt to the physical flows targeted by the RPA actions needs to be a high priority for future studies involving delta smelt.

FWS agrees with the Panel and has made this a high priority. DOI agency staff scientists are working on a planning-level life cycle model for delta smelt that uses CALSIM II and DSM2 outputs and recent species-specific information in a life-cycle context. This will create a simple model intended to allow a more explicit comparison of the effects of Project alternatives to natural sources of mortality and their interactions. A second quantitative life-history model for delta smelt is also currently under development by DOI staff in collaboration with others. This model is a hierarchical time-series model with at least two levels, a state process model and an observation model, which are fit to existing data using statistical methods. The state process model will be used to predict abundances of delta smelt at different life history stages (e.g., spawning adults, post-larval stage fish, and pre-spawning adults) and in two or more regions, including the western Delta, north and eastern Delta, and southern Delta. The observational model is intended to link data collected from multiple aquatic surveys (at least the Spring Kodiak Trawl Survey, the Fall Mid-Water Trawl Survey, the 20-mm Survey, and the Summer Tow-Net Survey) to the corresponding unobserved abundances by life stage. These quantitative tools will allow us to model population dynamics of these fish, to quantify the effects of different factors on dynamics, and to predict the effects of management decisions.

V. Response to Proposal Adjustments of OCAP RPA Actions: IRP Report Pages 18-30

NMFS presented several preliminary proposals at the 2010 Integrated Annual Review of the OCAP Opinions that suggested possible adjustment to RPA implementation. FWS will continue to participate in discussions with NMFS and project agencies to develop a flow transition protocol and improve compliance monitoring in conjunction with the proposals. Based on the panel's comments, DWR's comments, and initial discussions with other management and project agencies, some of the proposed RPA adjustments have emerged as more promising than others. Below is a summary of those proposals, categorized according to NMFS' assessment of the likelihood that the proposed RPA adjustment will be further discussed and pursued in 2011:

Promising: very likely to be discussed further in 2011:

Proposal I.A (part 1): OMR Flow Management: Formula used for managing OMR flow

Proposal I.A (part 2): OMR Flow Management: Export reduction floor

Proposal 1.C: 2nd OMR Trigger for OMR flow management

Proposal III: Adjust the Shasta Reservoir February forecast (currently based on the 90% exceedance forecast) to include data from NOAA's NWS' new tool that can predict climate over the next 90 days.

Proposal IV: Adjust Stanislaus Operations to improve flexibility.

Somewhat promising: may be discussed further in 2011:

Proposal V (part 1): Increase survival/reduce predation during Delta migration (consider opportunities for a more successful barrier at the Head of Old River)

Less promising: probably will not be discussed further in 2011:

Proposal I.B*: calendar based OMR trigger [NMFS proposed no change; DWR in their comments asked panel to consider whether this action is appropriate]

Proposal II: San Joaquin Inflow-to-Export Ratio Action

Proposal V (part 2) -- Increase survival/reduce predation during Delta migration (screen predators from entering the Clifton Court Forebay)

Proposal V (part 3) -- Increase survival/reduce predation during Delta migration (accelerate the timing for implementation of RPA Actions IV.4.1-IV.4.3

**The panel, in its response to the NMFS proposals, wove in several recommendations for further research – for example, a recommendation in the response to Proposal I.B. for more acoustic tag studies that would provide information on how the migration routes and timing of salmonids are influenced by flow patterns in the Delta. Our categorization of Proposal I.B. as less likely to be discussed in 2011 is focused on any likelihood of a change to the RPA implementation in 2011 (which we judge unlikely), and is NOT intended to dismiss the possibility of discussions regarding the studies suggested by the panel, which NMFS agrees could provide some very useful information.*

VI. Next Steps

FWS and NMFS will continue to support ongoing studies and, as appropriate, work to incorporate new information into RPA implementation. Below is a summary of planned 2011 activities following IRP's 2010 Report.

Joint FWS and NMFS Activities:

1. FWS, NMFS and the Projects will continue to develop an adjusted flow transition protocol for implementing actions related to Old and Middle River flows, including a possible adjustment to compliance monitoring.
2. FWS and NMFS will work with the technical teams to establish a more standardized format for future reports and presentations.
3. FWS, NMFS, and the agency participants on the technical teams will review findings from any relevant completed study and, as appropriate, integrate them into new management strategies in general and RPAs in particular.

FWS Activities:

1. FWS will ensure the SWG meeting notes better reflect steps taken by SWG in formulating their recommendations.
2. FWS will work to improve the clarity of the linkages between the recommendation and the determination.
3. FWS will review and, as appropriate, integrate any newly released operational delta smelt or multi species behavioral model into future management strategies.
4. FWS will continue to monitor turbidity at additional stations, review outcomes and if deemed appropriate, will develop new criteria.

NMFS Activities:

1. NMFS is in the process of preparing formal adjustments to the RPA through the section 7 process with Reclamation.
2. NMFS has already coordinated with DOSS on corrections to the second trigger in Action IV.2.3 and will provide an adjusted RPA through the appropriate Endangered Species Act section 7 process.
3. NMFS will discuss with the SRTTG ways to improve documentation of temperature management decisions.
4. NMFS-Protected Resources Division staff will continue to work with the NMFS-Southwest Fisheries Science Center (SWFSC) to utilize improved temperature prediction tools for Sacramento River temperature management.
5. NMFS expects the Stanislaus Operations Group will initiate discussions and coordinate with the Vernalis Adaptive Management Plan technical team regarding options to better integrate implementation of the NMFS RPA flow requirements on the Stanislaus River with the timing of other springtime flows from the Merced and Tuolumne Rivers.
6. NMFS will continue to explore options to improve the turnaround time of salvage and loss data from the fish facilities, including the reading of coded wire tags.
7. NMFS will consider information from the Clear Creek Technical Group regarding possible adjustments to temperature management on Clear Creek.

Appendix C

Meeting Notes and Handouts – SOG Water Year 2011

Meeting Notes and Handouts – SOG Water Year 2010/2011

Electronic versions of these materials can be found at http://swr.nmfs.noaa.gov/ocap/sog.htm

Date	Meeting Notes and Handout Descriptions	Authored
10/28/10	Meeting Notes – 10/28/10	SOG
	Agenda	Reclamation
	Sign-in Sheet	SOG
	Operations and Temperature Summary for New Melones and Lower Stanislaus River – Prepared October 28, 2010	Reclamation
11/17/10	Meeting Notes – 11/17/10	SOG
	Agenda	Reclamation
	Sign-in Sheet	SOG
	Operations and Temperature Summary for New Melones and Lower Stanislaus River – Prepared November 16, 2010	Reclamation
12/15/10	Meeting Notes – 12/15/10	SOG
	Agenda	Reclamation
	New Melones Lake Daily Operations – 12/15/10	Reclamation
	Tulloch Reservoir Daily Operations – 12/15/10	Reclamation
	Goodwin Reservoir Daily Operations – 12/15/10	Reclamation
	New Melones – Stanislaus River Basin Storage USACE	Reclamation
	Goodwin Dam (GDW) Discharge– 12/15/10	Reclamation
	Orange Blossom Bridge Temperatures– 12/15/10	Reclamation
	Current Reservoir Conditions – 12/14/10	Reclamation
	San Joaquin Precipitation 5-Station Index – 12/14/10	Reclamation
	Stanislaus River – Orange Blossom Stage Forecast – 12/15/11	Reclamation
1/19/11	Meeting Notes – 1/19/11	SOG
	Agenda	Reclamation
	New Melones Lake Daily Operations – 1/19/11	Reclamation
	Tulloch Reservoir Daily Operations – 1/19/11	Reclamation
	Goodwin Reservoir Daily Operations – 1/19/11	Reclamation
	New Melones – Stanislaus River Basin Storage USACE	Reclamation
	Goodwin Dam (GDW) Discharge	Reclamation
	Orange Blossom Bridge Temperatures	Reclamation
	Estimated Knights Ferry Temperatures, 1-19-11	Reclamation
	New Melones Lake Isothermobaths – 2010-2011	Reclamation
	San Joaquin Precipitation: 5-Station Index, 1/17/11	Reclamation
	Current Reservoir Conditions, 1/18/11	Reclamation
2/16/11	Meeting Notes – 2/16/11	SOG
	Agenda	Reclamation
	New Melones Lake Daily Operations – 2/16/11	Reclamation
	Tulloch Reservoir Daily Operations – 2/16/11	Reclamation
	Goodwin Reservoir Daily Operations – 2/16/11	Reclamation
	New Melones – Stanislaus River Basin Storage USACE	Reclamation

	Goodwin Dam (GDW) Discharge	Reclamation
	Orange Blossom Bridge Temperatures	Reclamation
	Estimated Knights Ferry Temperatures, 2-16-11	Reclamation
	New Melones Lake Isothermobaths – 2010-2011	Reclamation
	Stanislaus River Preliminary 90% Exceedence Outlook	Reclamation
	Stanislaus River Preliminary 50% Exceedence Outlook	Reclamation
	San Joaquin Precipitation: 5-Station Index, 2/14/11	Reclamation
	Current Reservoir Conditions, 2/15/11	Reclamation
	Caswell Memorial State Park Rotary Screw Traps 1/18-2/13/11	FWS
3/16/11	Meeting Notes – 3/16/11	SOG
	Agenda	Reclamation
	New Melones Lake Daily Operations – 3/15/11	Reclamation
	Tulloch Reservoir Daily Operations – 3/15/11	Reclamation
	Goodwin Reservoir Daily Operations – 3/15/11	Reclamation
	New Melones – Stanislaus River Basin Storage USACE	Reclamation
	Goodwin Dam (GDW) Discharge	Reclamation
	Orange Blossom Bridge Temperatures	Reclamation
	Estimated Knights Ferry Temperatures, 3/15/11	Reclamation
	New Melones Lake Isothermobaths – 2010-2011	Reclamation
	Stanislaus River Preliminary 90% Exceedence Outlook	Reclamation
	Stanislaus River Preliminary 50% Exceedence Outlook	Reclamation
	San Joaquin Precipitation: 5-Station Index, 3/13/11	Reclamation
	Current Reservoir Conditions, 3/15/11	Reclamation
	Stanislaus River Minimum Flow Schedule for Central Valley Steelhead	Reclamation
	Stanislaus Weir Update – 3/14/11	FWS
	Caswell Memorial State Park Rotary Screw Traps; 2/14 – 3/13/11	FWS
3/28/11	Emergency SOG Meeting	NMFS
4/20/11	Meeting Notes – 4/20/11	SOG
	Agenda	Reclamation
	April Attendance Record	SOG
	New Melones Lake Daily Operations – 4/20/11	Reclamation
	Tulloch Reservoir Daily Operations – 4/20/11	Reclamation
	Goodwin Reservoir Daily Operations – 4/20/11	Reclamation
	New Melones – Stanislaus River Basin Storage USACE	Reclamation
	Goodwin Dam (GDW) Discharge	Reclamation
	Orange Blossom Bridge Temperatures	Reclamation
	Estimated Knights Ferry Temperatures, 4/19/11	Reclamation
	New Melones Lake Isothermobaths – 2010-2011	Reclamation
	Stanislaus River Preliminary 90% Exceedence Outlook	Reclamation
	Stanislaus River Preliminary 50% Exceedence Outlook	Reclamation
	San Joaquin Precipitation: 5-Station Index 4/17/11	Reclamation
	California Snow Water Content – 4/18/11	Reclamation
	Current Reservoir Conditions - 4/19/11	Reclamation
5/18/11	Meeting Notes – 5/18/11	SOG

	Agenda	Reclamation
	May Sign-in Sheet	SOG
	New Melones Lake Daily Operations – 5/17/11	Reclamation
	Tulloch Reservoir Daily Operations – 5/17/11	Reclamation
	Goodwin Reservoir Daily Operations – 5/17/11	Reclamation
	New Melones – Stanislaus River Basin Storage USACE	Reclamation
	Goodwin Dam (GDW) Discharge	Reclamation
	Orange Blossom Bridge Temperatures	Reclamation
	Estimated Knights Ferry Temperatures, 5/18/11	Reclamation
	New Melones Lake Isothermobaths – 2010-2011	Reclamation
	Stanislaus River Preliminary 90% Exceedence Outlook	Reclamation
	Stanislaus River Preliminary 50% Exceedence Outlook	Reclamation
	San Joaquin Precipitation: 5-Station Index -5/15/11	Reclamation
	California Snow Water Content – 5/16/11	Reclamation
	Current Reservoir Conditions - 5/17/11	Reclamation
	Caswell Memorial State Park Rotary Screw Traps; 4/18-5/16/11	FWS
6/15/11	Meeting Notes – 6/15/11	SOG
	Agenda	Reclamation
	June Attendance Record	SOG
	New Melones Lake Daily Operations – 6/15/11	Reclamation
	Tulloch Reservoir Daily Operations – 6/15/11	Reclamation
	Goodwin Reservoir Daily Operations – 6/15/11	Reclamation
	New Melones – Stanislaus River Basin Storage USACE	Reclamation
	Goodwin Dam (GDW) Discharge	Reclamation
	Orange Blossom Bridge Temperatures	Reclamation
	Estimated Knights Ferry Temperatures, 6/15/11	Reclamation
	New Melones Lake Isothermobaths – 2010-2011	Reclamation
	Stanislaus River Preliminary 25% Exceedence Outlook	Reclamation
	San Joaquin Precipitation: 5-Station Index -6/13/11	Reclamation
	California Snow Water Content – 6/13/11	Reclamation
	Current Reservoir Conditions - 6/15/11	Reclamation
7/20/11	Meeting Notes – 7/20/11	SOG
	Agenda	Reclamation
	July Attendance Record	SOG
	New Melones Lake Daily Operations – 7/18/11	Reclamation
	Tulloch Reservoir Daily Operations – 7/18/11	Reclamation
	Goodwin Reservoir Daily Operations – 7/18/11	Reclamation
	New Melones – Stanislaus River Basin Storage USACE	Reclamation
	Goodwin Dam (GDW) Discharge	Reclamation
	Orange Blossom Bridge Temperatures	Reclamation
	Estimated Knights Ferry Temperatures, 6/15/11	Reclamation
	New Melones Lake Isothermobaths – 2010-2011	Reclamation
	Stanislaus River Preliminary 50% Exceedence Outlook	Reclamation
	San Joaquin Precipitation: 5-Station Index -7/13/11	Reclamation
	California Snow Water Content – 7/17/11	Reclamation
	Current Reservoir Conditions - 7/17/11	Reclamation

	Caswell Memorial State Park Rotary Screw Traps; 6/15-7/8/11	FWS
	FY2011 Technical Report: Juvenile Stanislaus River Chinook salmon pathogen and physiology assessment: Jan-May 2011	FWS
8/17/11	Meeting Notes – 8/17/11	SOG
	Agenda	Reclamation
	August Sign-in Sheet	SOG
	New Melones Lake Daily Operations – 8/17/11	Reclamation
	Tulloch Reservoir Daily Operations – 8/17/11	Reclamation
	Goodwin Reservoir Daily Operations – 8/17/11	Reclamation
	New Melones – Stanislaus River Basin Storage USACE	Reclamation
	Goodwin Dam (GDW) Discharge	Reclamation
	Orange Blossom Bridge Temperatures	Reclamation
	New Melones Lake Isothermobaths – 2010-2011	Reclamation
	Stanislaus River Preliminary 50% Exceedence Outlook	Reclamation
	San Joaquin Precipitation: 5-Station Index -8/15/11	Reclamation
	California Snow Water Content – 7/7/11	Reclamation
	Current Reservoir Conditions - 8/16/11	Reclamation
	Draft Outline for SOG 2011 Annual Report	NMFS

Appendix D

Flow Notification

From:	Barbara Byrne
To:	See, Matthew A; Field, Randi C; andychu@water.ca.gov; Barnett-Johnson, Rachel; "bruce.oppenheim@noaa.gov"; Anderson, Craig; "Crystal Sinclair"; "Dan Yamanaka"; Fujitani, Paul E; Garcia, Donna; Garwin. Yip@noaa.gov; "Greg Wilson"; Hannon, John M; "Hinojosa, Tracy"; Hindman, Nick; "Jeff Stuart"; "Kari Kyler"; Kiteck, Elizabeth G; "Li-Ming He"; Nicolos, Carol J; "Pettit, Tracy"; "Rhonda Reed"; Guinee, Roger; Schroeder, Robert L; theyne@dfg.ca.gov; "Tran, Loi"; Vasquez, Elizabeth A; Wikert, John; "Gutierrez, Monica"; "Chris Carr";
Subject:	Update on scheduling of January storm pulse on the Stanislaus per Action III. I.3
Date:	Thursday, January 06, 2011 3:42:52 PM

Happy 2011, SOG-members.

I'm writing with a quick update on the scheduling of the January storm pulse on the Stanislaus per NMFS RPA Action III.1.3. Because the B2IT meeting (the intended venue for discussion of pulse timing options) was cancelled today, Matt, Randi & I had a conference call this afternoon to review the forecast data.

SUMMARY OF PULSE SCHEDULING DISCUSSION:
Currently, the DRY flow schedule in Appendix 2-E is being implemented. That schedule calls for a January pulse of flows below Goodwin of at least 400cfs for at least three days. As clarified last year, the timing of the January and February storm pulses may be adjusted to coincide with natural precipitation events. The river guidance plot shows little precipitation through the weekend (http://www.cnrfc.noaa.gov/graphicalRVF.php?id=obbc1) and Randi reported that dry conditions are being forecast through January 21st. Because there is no natural storm event expected in the next two weeks, we propose that SOG review the latest forecast data and discuss possible pulse timing at the next SOG meeting on January 19th.

COMMENTS? If you have feedback on this proposal please reply all to the group.

Thanks,
Barb

Barb Byrne
Fishery Biologist

barbara.byrne@noaa.gov
office: (916) 930-5612
fax: (916) 930-3629

NOAA-NMFS
Central Valley Office
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814
http://swr.nmfs.noaa.gov/

From: Barbara Byrne
To: Field, Randi C;
cc: Yip, Garwin; "Rhonda Reed";
Subject: RE: Prelim. Goodwin Release Proposal
Date: Wednesday, January 19, 2011 10:04:41 AM

NMFS has discussed the Jan pulse and believes that pulse in early January (which began in late December) meets the intent of the RPA – we expect to present this and discuss with SOG this afternoon.

_____
Barb Byrne
Fishery Biologist

barbara.byrne@noaa.gov
office: (916) 930-5612
fax: (916) 930-3629

NOAA-NMFS
Central Valley Office
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814
http://swr.nmfs.noaa.gov/

From: Field, Randi C [mailto:RField@usbr.gov]
Sent: Wednesday, January 19, 2011 8:19 AM
To: Barbara Byrne
Subject: Prelim. Goodwin Release Proposal

Hi Barb,

I'm hoping to get a hold of someone from your shop before 10:00 am this morning - here's the background on the proposal:

We are hoping to accommodate all parties and I need to know if NMFS is still needing the January fishery pulse. If so, I propose to have the pulse this Fri-Sat-Sun. The forecast for the rest of the month is dry - I can update SOG on what the meteorologists say later this afternoon. I just received an e-mail from DWR and work on the levee downstream of Vernalis is wrapping up and they are not requesting reduced releases from the upstream reservoirs. TriDam however, is trying to limit the number of times their contractor is in and out of Goodwin (minimize Goodwin drawn down intervals). TriDam will be drawing down Goodwin on Monday, Jan 24th.

Here is the proposal:

Releases increase at Goodwin 1/21 at 08:00 from 200 cfs to 400 cfs and are maintained for 3 days. Releases would then decrease on 1/24 at 08:00 from 400 cfs to 200 cfs.

Please give me a call 979-2066. Thank you,
Randi

Randi Field
U.S. Bureau of Reclamation
Central Valley Project Operations Office
3310 El Camino Avenue, Suite 300
Sacramento, CA 95821
(916) 979-2066
rfield@usbr.gov

From: Barbara Byrne
To: Wikert, John; Clinton, Patricia L;
cc: andychu@water.ca.gov; Nicolos, Carol J; Anderson, Craig; "Crystal Sinclair"; "Dan Yamanaka"; Cox, Dan; Garcia, Donna; Kiteck, Elizabeth G; Vasquez, Elizabeth A; Garwin.Yip@noaa.gov; "Greg Wilson"; Hannon, John M; "Kari Kyler"; "Li-Ming He"; See, Matthew A; Hindman, Nick; "Tracy" "Pettit"; Fujitani, Paul E; Barnett-Johnson, Rachel; Field, Randi C; "Rhonda Reed"; Guinee, Roger; Schroeder, Robert L; "Tim Heyne";
Subject: RE: Scheduling NMFS Feb pulse
Date: Monday, February 14, 2011 3:53:05 PM
Attachments: image001.gif
image003.png
image004.png

Hi all –

So far, DFG, NMFS, FWS, DWR, and Reclamation have given a thumbs up on scheduling the Feb pulse at the end of this week. Kari, unless we hear otherwise in the next hour, we will assume the SWRCB has no objections.

Barb

_____
Barb Byrne
Fishery Biologist

barbara.byrne@noaa.gov
office: (916) 930-5612
fax: (916) 930-3629

NOAA-NMFS
Central Valley Office
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814
http://swr.nmfs.noaa.gov/

From: John_Wikert@fws.gov [mailto:John_Wikert@fws.gov]
Sent: Monday, February 14, 2011 3:15 PM
To: Clinton, Patricia L
Cc: andychu@water.ca.gov; Barbara Byrne; Nicolos, Carol J; Anderson, Craig; 'Crystal Sinclair'; 'Dan Yamanaka'; Cox, Dan; Garcia, Donna; Kiteck, Elizabeth G; Vasquez, Elizabeth A; Garwin.Yip@noaa.gov; 'Greg Wilson'; Hannon, John M; 'Kari Kyler'; 'Li-Ming He'; See, Matthew A; Hindman, Nick; 'Tracy' 'Pettit'; Fujitani, Paul E; Barnett-Johnson, Rachel; Field, Randi C; 'Rhonda Reed'; Guinee, Roger; Schroeder, Robert L; 'Tim Heyne'
Subject: RE: Scheduling NMFS Feb pulse

Happy Monday everyone.

No objections from me on the proposed schedule.

J.D. Wikert
U.S. Fish & Wildlife Service
Anadromous Fish Restoration Program
4001 N. Wilson Way
Stockton , CA 95205
(209) 334-2968 ext. 403
(209) 403-1046 - Cellular
Email: john_wikert@fws.gov

In: "Clinton, Patricia L" <PClinton@usbr.gov>

"Clinton, Patricia L" <PClinton@usbr.gov> 02/14/2011 02:29 PM	To "Field, Randi C" <RField@usbr.gov>, Barbara Byrne <Barbara.Byrne@noaa.gov>, 'Tim Heyne' <theyne@dfg.ca.gov>, 'Crystal Sinclair' <CSINCLAIR@dfg.ca.gov>, "Anderson, Craig" <Craig_Anderson@fws.gov>, "Cox, Dan" <Dan_Cox@fws.gov>, "Wikert, John" <john_wikert@fws.gov>, "Hindman, Nick" <nick_hindman@fws.gov>, "Guinee, Roger" <roger_guinee@fws.gov>, "Garwin.Yip@noaa.gov" <Garwin.Yip@noaa.gov>, 'Li-Ming He' <Li-Ming.He@noaa.gov>, 'Rhonda Reed' <Rhonda.Reed@noaa.gov>, "Nicolos, Carol J" <CNicolos@usbr.gov>, "Garcia, Donna" <dcgarcia@usbr.gov>, "Kiteck, Elizabeth G" <EKiteck@usbr.gov>, "Vasquez, Elizabeth A" <EVasquez@usbr.gov>, "Hannon, John M" <JHannon@usbr.gov>, "See, Matthew A" <msee@usbr.gov>, "Fujitani, Paul E" <PFujitani@usbr.gov>, "Barnett-Johnson, Rachel" <rbarnettjohnson@usbr.gov>, "Schroeder, Robert L" <RSchroeder@usbr.gov>, "andychu@water.ca.gov" <andychu@water.ca.gov>, 'Dan Yamanaka' <dany@water.ca.gov>, 'Tracy' 'Pettit' <pettit@water.ca.gov>, 'Greg Wilson' <gwilson@waterboards.ca.gov>, 'Kari Kyler' <KKyler@waterboards.ca.gov>
	cc
	Subject RE: Scheduling NMFS Feb pulse

Good afternoon,
Sounds like a good recommendation.
Patti

From: Field, Randi C
Sent: Monday, February 14, 2011 11:36 AM
To: Barbara Byrne; 'Tim Heyne'; 'Crystal Sinclair'; Anderson, Craig; Cox, Dan; Wikert, John; Hindman, Nick; Guinee, Roger; Garwin.Yip@noaa.gov; 'Li-Ming He'; 'Rhonda Reed'; Nicolos, Carol J; Garcia, Donna; Kiteck, Elizabeth G; Vasquez, Elizabeth A; Hannon, John M; See, Matthew A; Clinton, Patricia L; Fujitani, Paul E; Barnett-Johnson, Rachel; Schroeder, Robert L; andychu@water.ca.gov; 'Dan Yamanaka'; 'Tracy' 'Pettit'; 'Greg Wilson'; 'Kari Kyler'
Subject: RE: Scheduling NMFS Feb pulse

Greetings:

The NOAA 7 day weather forecast for Oakdale http://www.wrh.noaa.gov/sto/ shows rain through Thursday and chance of showers Friday. The weather briefing indicated a series of fronts passing through California resulting in 2-3 inches of precipitation for the Southern Sierras in the next 7 days. The snow levels will drop through the end of the week as the cold front develops (may mean less stream response later in the week).

-Randi

Randi Field
U.S. Bureau of Reclamation
Central Valley Project Operations Office
3310 El Camino Avenue, Suite 300
Sacramento, CA 95821
(916) 979-2066
rfield@usbr.gov

-----Original Message-----
From: Barbara Byrne [mailto:Barbara.Byrne@noaa.gov]
Sent: Monday, February 14, 2011 10:59 AM
To: 'Tim Heyne'; 'Crystal Sinclair'; Anderson, Craig; Cox, Dan; Wikert, John; Hindman, Nick; Guinee, Roger; Garwin.Yip@noaa.gov; 'Li-Ming He'; 'Rhonda Reed'; Nicolos, Carol J; Garcia, Donna; Kiteck, Elizabeth G; Vasquez, Elizabeth A; Hannon, John M; See, Matthew A; Clinton, Patricia L; Fujitani, Paul E; Barnett-Johnson, Rachel; Field, Randi C; Schroeder, Robert L; andychu@water.ca.gov; 'Dan Yamanaka'; 'Tracy' 'Pettit'; 'Greg Wilson'; 'Kari Kyler'
Subject: RE: Scheduling NMFS Feb pulse

SOG,

I agree with Tim. That is, at the Monday 2/14 weather briefing, if Randi
hears about some fairly certain precip heading in on around the 18th, I propose that she should send in a change order to schedule a 3-day

pulse (of
400 cfs) to coincide (as closely as possible) with the forecasted precipitation. I think this is preferable to waiting a week in hope of having a stronger precip event, at the risk of ending up scheduling the pulse without any natural precip at all.

Please weigh in ASAP, even with agreement, so Reclamation can move forward.
As a reminder, to schedule a pulse to start on the 18th (Friday), Randi would need to get a change order out by the close of business on Monday.

Thanks,
Barb

_____
Barb Byrne
Fishery Biologist

barbara.byrne@noaa.gov
office: (916) 930-5612
fax: (916) 930-3629

NOAA-NMFS
Central Valley Office
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814
http://swr.nmfs.noaa.gov/

-----Original Message-----
From: Tim Heyne [mailto:theyne@dfg.ca.gov]
Sent: Thursday, February 10, 2011 2:02 PM
To: Crystal Sinclair; Craig Anderson; Dan Cox; John Wikert; Nick Hindman;
Roger Guinee; Barbara Byrne; Garwin.Yip@noaa.gov; Li-Ming He; Rhonda Reed;
Carol J Nicolos; Donna Garcia; Elizabeth G Kiteck; Elizabeth A Vasquez; John
M Hannon; Matthew A See; Patricia L Clinton; Paul E Fujitani; Rachel Barnett-Johnson; Randi C Field; Robert L Schroeder; 'andychu@water.ca.gov';
Dan Yamanaka (dany@water.ca.gov); Tracy' 'Pettit; Greg Wilson; Kari Kyler
Subject: Re: Scheduling NMFS Feb pulse

Randi

If we are pretty certain that you will at least have clouds for the 2/18 forecast with chance of light rain then I would recommend doing the pulse
then.

Tim Heyne <'>>>>>>>>><
Senior Environmental Scientist

Tuolumne River Restoration Center
California Dept. of Fish and Game
P.O. Box 10, La Grange, CA 95329
(209) 853-2533 Fax:(209) 853-9017

theyne@dfg.ca.gov

>>> "Field, Randi C" <RField@usbr.gov> 2/10/2011 12:04 PM >>>
Greetings:

The timing of the February pulse (delayed per the Appendix 2E schedule to
attempt to coincide with a natural precipitation event) was briefly discussed this morning. I provided the following forecast information based
on this morning's weather briefing:

Confidence	Precip. Magnitude	Start Date of Pulse Notification to Reclamation for scheduling
Less strong	light - moderate	2/18 2/14 COB
Least strong	unknown	2/22 2/16 COB

I will also provide the SOG team with an additional precip. forecast on Monday 2/14 morning.

This information is intended to spur discussion on a decision amongst the
biologists. (The pulse is for three days at 400 cfs.)

Thank you,
Randi

Randi Field
U.S. Bureau of Reclamation
Central Valley Project Operations Office
3310 El Camino Avenue, Suite 300
Sacramento, CA 95821
(916) 979-2066
rfield@usbr.gov

From: Barbara Byrne
To: Clinton, Patricia L; "Tim Heyne"; "Crystal Sinclair"; Anderson, Craig; Cox, Dan; Wikert, John; Hindman, Nick; Guinee, Roger; Garwin.Yip@noaa.gov; "Li-Ming He"; "Rhonda Reed"; Nicolos, Carol J; Garcia, Donna; Kiteck, Elizabeth G; Vasquez, Elizabeth A; Hannon, John M; Fujitani, Paul E; Barnett-Johnson, Rachel; Field, Randi C; Schroeder, Robert L; andychu@water.ca.gov; "Dan Yamanaka"; "Tracy" "Pettit"; "Greg Wilson"; "Kari Kyler"; See, Matthew A;
Subject: Emergency SOG meeting to discuss implementation of III.1.3 during flood management on the San Joaquin
Date: Monday, March 28, 2011 11:36:58 AM
Attachments: image002.gif

Dear SOG members,

NMFS is convening an emergency SOG call for Monday, March 28th, at 2pm (CALL IN: 1-866-842-3781; PARTICIPANT CODE: 3253886) to discuss possible flexibilities in the Action III.1.3 flow schedules under the current condition of high flood risk on the San Joaquin.

Background

Late last week, Reclamation notified NMFS that flood releases in the San Joaquin basin were likely to bring the flow at Vernalis to flood monitor stage by this past weekend, and that those high flows at Vernalis could continue well into April. According to CDEC, the monitor stage at Vernalis is 24.5 feet, flood stage at Vernalis is 29 feet, and the danger stage at Vernalis is 29.5 feet. Yesterday (Sunday), the flow at Vernalis was 19396 cfs and the stage is forecast to exceed monitor stage sometime today.

Reclamation is working with other reservoir operators in the San Joaquin basin to try to coordinate flood releases to reduce the potential for flooding downstream, and is concerned about releasing flows on the Stanislaus for fishery purposes that may increase Vernalis flows to more severe flooding levels. Because New Melones has not yet encroached into its flood space, and because Tulloch will need only to release any new side flows (which are predicted to arrive in a rather flashy, not very predictable, pattern), Reclamation doesn't believe that flood releases from Goodwin (i.e. the pass-through of any Tulloch side flows) will be very high, or very sustained. That is, Reclamation does not, at this time, believe that required flood releases on the Stanislaus, alone, will be sufficient to provide the flows specified under Action III.1.3.. As described in the NMFS BiOp, the Appendix 2-E flows during April and May are intended to provide outmigration cues to Central Valley steelhead.

While there is no explicit "flood exception" procedure in the NMFS RPA, NMFS did not intend for implementation of Action III.1.3 to push Vernalis flows over the recognized flood stage. Please send your thoughts and ideas to the group by e-mail ASAP, and I hope you can join the call at 2pm today. If you cannot make the Monday 2pm call, please weigh in by e-mail, have someone call in on your behalf, or call another SOG member to share your thoughts and have them bring them to the call.

NMFS would like to introduce for discussion the following possible alternative:

> *Provide the Appendix 2-E flows from Goodwin whenever those flows would not cause Vernalis to exceed some specific "concern level". If the Appendix 2-E flows would cause Vernalis to exceed the "concern level", provide as much flow as is possible without causing Vernalis to exceed the "concern level". Coordinate Tulloch flood releases with the releases from other reservoirs to time them in a way that matches, to the extent possible, the variability in the Appendix 2-E schedule.*

As noted in the BiOp, NMFS has some concerns about stranding as flows fall below the 800 cfs level once the spring period of higher flows begins; NMFS would like to discuss ways of minimizing stranding during this period of basin-wide flood management.

DRAFT AGENDA FOR EMERGENCY SOG CALL
Monday, 3/28/2011, 2pm
CALL IN: 1-866-842-3781;
PARTICIPANT CODE: 3253886

1. Review of current and forecasted flows in the SJ Basin
--see, e.g., daily flows at:
Goodwin Dam: http://cdec.water.ca.gov/cgi-progs/queryDaily?s=gdw&d=today
Vernalis: http://cdec.water.ca.gov/cgi-progs/queryDaily?s=VNS&d=today

--see, e.g. river guidance plots for:
Stanislaus at OBB: http://cdec.water.ca.gov/guidance_plots/OBB_gp.html
Tuolumne at Modesto: http://cdec.water.ca.gov/guidance_plots/MOD_gp.html
Merced R. near Stevinson: http://cdec.water.ca.gov/guidance_plots/MST_gp.html
San Joaquin River near Vernalis: http://cdec.water.ca.gov/guidance_plots/VNS_gp.html

2. Quick review of Below Normal flow schedule in Appendix 2-E
3. Assessment of whether or not meeting the Appendix 2-E flows would cause Vernalis to cross into flood stage, including information on stage vs. cfs relationships at Vernalis.
--What are the specific flood concerns (at Vernalis or elsewhere) associated with, e.g. monitor vs. flood stage? What is the appropriate "concern level" for flow management?
4. Discussion of options to implement flows, including discussion of the coordination process with the other tributaries and the Corps

Please send additions to the agenda or your thoughts on implementing Action III.1.3 under current conditions to the whole group.

Thanks for your time,
Barb

_____
Barb Byrne
Fishery Biologist

barbara.byrne@noaa.gov
office: (916) 930-5612
fax: (916) 930-3629

NOAA-NMFS
Central Valley Office
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814
http://swr.nmfs.noaa.gov/

From: Clinton, Patricia L [mailto:PClinton@usbr.gov]

Sent: Tuesday, March 15, 2011 1:45 PM
To: Barbara Byrne; 'Tim Heyne'; 'Crystal Sinclair'; Anderson, Craig; Cox, Dan; Wikert, John; Hindman, Nick; Guinee, Roger; Garwin.Yip@noaa.gov; 'Li-Ming He'; 'Rhonda Reed'; Nicolos, Carol J; Garcia, Donna; Kiteck, Elizabeth G; Vasquez, Elizabeth A; Hannon, John M; Fujitani, Paul E; Barnett-Johnson, Rachel; Field, Randi C; Schroeder, Robert L; andychu@water.ca.gov; 'Dan Yamanaka'; 'Tracy' 'Pettit'; 'Greg Wilson'; 'Kari Kyler'; See, Matthew A
Subject: SOG Meeting - March 16, 2011

Good afternoon,

Attached is the agenda and handouts for tomorrow's meeting.

Sincerely,

Patti Clinton
Natural Resources Specialist
Central California Area Office
7794 Folsom Dam Road,
Folsom, CA 95630-1799
(916) 989-7173

From:	Barbara Byrne
To:	Field, Randi C;
cc:	Fujitani, Paul E; Kiteck, Elizabeth G; Yip, Garwin; "Rhonda.reed@noaa.gov";
Subject:	Adjusted minimum flow schedule under Action III.1.3
Date:	Thursday, April 28, 2011 6:26:37 PM

Hi Randi,

At the Wednesday, 4/20, meeting, SOG advised that the seven days (4/13-4/19) of Goodwin flood releases at or above 3000 cfs be deemed sufficient to provide the benefits to CV steelhead (outmigration cues, maintenance of downstream migratory habitat) intended by the six-day pulse at or above 3000cfs outlined on 4/29-5/4 in the Above Normal schedule of Appendix 2-E of the NMFS RPA. NMFS concurs that this "shifted" pulse provides equivalent protective benefits to listed CV steelhead. For compliance with the RPA, Goodwin releases should meet the following minimum flow schedule during late April and early May:

DATE – MIN FLOW IN APPENDIX 2-E – MIN FLOW UNDER ADJUSTED IMPLEMENTATION OF APPENDIX 2-E FLOWS
4/26 – 800 cfs – 800 cfs *(no change)*
4/27 – 1500 cfs – 1500 cfs *(no change)*
4/28 – 2300 cfs – 1500 cfs
4/29 – 3000 cfs -- 1500 cfs
4/30 – 3000 cfs – 1500 cfs
5/1 – 3000 cfs – 1500 cfs
5/2 – 3000 cfs – 1500 cfs
5/3 – 3000 cfs – 1500 cfs
5/4 – 3000 cfs – 1500 cfs
5/5 – 2300 cfs – 1500 cfs
5/6 – 1500 cfs – 1500 cfs *(no change)*

Regards,
Barb

Barb Byrne
Fishery Biologist

barbara.byrne@noaa.gov
office: (916) 930-5612
fax: (916) 930-3629

NOAA-NMFS
Central Valley Office
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814
http://swr.nmfs.noaa.gov/

Appendix E

Temperature Notification

From: Field, Randi C
To: Barbara Byrne; Barnett-Johnson, Rachel; Fujitani, Paul E; Garwin.Yip@noaa.gov; Hannon, John M; Kiteck, Elizabeth G; Merriweather, Audrey; Rhonda Reed; Clinton, Patricia L;
Subject: Knights Ferry 7DADM Temp. Exceedence 20110531
Date: Tuesday, May 31, 2011 3:04:00 PM
Attachments: RiponKnightsFerryRel.pdf
KNF_est_20110531.pdf

Greetings:

This e-mail serves as formal notification, as required by the 2009 NMFS BiOP, that the Exception criteria under Action III.1.2 (Stanislaus River temperature objective at Knights Ferry) was estimated as triggered on April 6, 2011 through May 31, 2011. Based on a recent discussion (5/27/11) between NMFS and Reclamation, we suspect a defective temperature probe at Orange Blossom Bridge has been reporting below actual temperatures since it was replaced in January 2011. High river releases and cool/cold ambient conditions masked identifying this problem until now. A statistical relationship between Ripon and Knights Ferry is used instead because real-time data is not available at Knights Ferry. A table of estimated maximum daily temperatures at Knights Ferry, using the Ripon temperature gage, is shown below (Table A).

The estimates indicate Knights Ferry temperature exceeded the criteria of 52 ^{o}F by a maximum of 0.9 ^{o}F between April and May. The current Knights Ferry temperature is estimated at 52.8 ^{o}F (7 day average daily maximum).

A relationship between Knights Ferry and Ripon was estimated based on HWMS (modeling calibration) data from year 1999 to year 2006 (graphic attached). Despite the near linear trend of the relationship, the RMSE is 1.1 ^{o}F, and the min/max deviations were -3.2 ^{o}F and +3.6 ^{o}F. Also during the period 3/2/11 to 4/7/11 the Ripon data appears to be suspect and temperatures estimated during this period should be examined with caution.

Stanislaus River releases during this period have been high due to flood control and reservoir fill management. Flows on 4/6/11 were 2,000 cfs and as high as 3,000 cfs. Flows were recently reduced to the lowest flow during the exception period to a rate of 1,500 cfs on 5/27.

Real-time reservoir release temperatures are not available at New Melones, Tulloch, or Goodwin Dam. However, Reclamation receives reservoir temperature profile information from DFG approximately once per month. The latest profile information for May was received 5/27/11 and data will be processed as soon as possible. Storage conditions are good and releases from the reservoirs are expected to be the coldest obtainable.

Because today, May 31, 2011, is the last day of the temperature criterion at Knights Ferry for this year, no future operational actions are planned. Monitoring will continue at Orange Blossom Bridge using the Ripon gage statistical relationship until the temperature probe can be repaired or replaced. It is unlikely Reclamation would have made operational adjustments to Stanislaus River flow if the actual Knights Ferry temperatures were known at the time. River releases for flood control and fill management were higher than normal and there were downstream flooding concerns during this period. Last year Reclamation noted marginal temperature benefit with increased flow rates in the spring months. This year, changes in flow rates for flood control from 2,000 cfs to 3,000 cfs yielded a change in daily average maximum temperature of approximately -0.1 ^{o}F.

Table A. Recent Stanislaus River Temperature Data.

Date	Est. Knights Ferry 7-Day Average Daily Maximum Temp. (^{o}F)	Goodwin Release (cfs)
1/3/2011	50.9	209
1/4/2011	50.8	217
1/5/2011	50.7	204
1/6/2011	50.6	203
1/7/2011	50.5	202
1/8/2011	50.4	201
1/9/2011	50.2	203
1/10/2011	50.0	207
1/11/2011	49.9	205
1/12/2011	49.9	205
1/13/2011	49.9	207

1/14/2011	50.1	206
1/15/2011	50.2	206
1/16/2011	50.4	205
1/17/2011	50.7	203
1/18/2011	51.0	201
1/19/2011	51.1	205
1/20/2011	51.2	207
1/21/2011	51.2	214
1/22/2011	51.2	217
1/23/2011	51.2	216
1/24/2011	51.2	210
1/25/2011	51.1	206
1/26/2011	51.1	213
1/27/2011	51.1	210
1/28/2011	51.0	211
1/29/2011	51.0	214
1/30/2011	51.0	207
1/31/2011	51.0	201
2/1/2011	51.0	221
2/2/2011	51.0	214
2/3/2011	51.0	218
2/4/2011	51.0	215
2/5/2011	51.1	202
2/6/2011	51.1	203
2/7/2011	51.3	204
2/8/2011	51.4	205
2/9/2011	51.5	204
2/10/2011	51.6	207
2/11/2011	51.6	208
2/12/2011	51.7	208
2/13/2011	51.7	208
2/14/2011	51.7	207
2/15/2011	51.8	209
2/16/2011	51.9	217
2/17/2011	52.0	228
2/18/2011	51.9	385
2/19/2011	51.7	814
2/20/2011	51.6	1025
2/21/2011	51.5	911
2/22/2011	51.3	605
2/23/2011	51.2	293
2/24/2011	51.1	208

2/25/2011	51.2	226
2/26/2011	51.3	217
2/27/2011	51.3	216
2/28/2011	51.3	213
3/1/2011	50.6	209
3/2/2011	49.9	209
3/3/2011	49.3	214
3/4/2011	48.5	214
3/5/2011	47.9	212
3/6/2011	47.2	215
3/7/2011	46.5	200
3/8/2011	46.5	223
3/9/2011	46.5	229
3/10/2011	46.5	210
3/11/2011	46.5	220
3/12/2011	46.5	209
3/13/2011	46.6	205
3/14/2011	46.6	203
3/15/2011	46.5	204
3/16/2011	46.5	205
3/17/2011	46.5	201
3/18/2011	46.6	208
3/19/2011	46.6	205
3/20/2011	46.6	235
3/21/2011	46.7	480
3/22/2011	46.8	1305
3/23/2011	47.0	1300
3/24/2011	47.2	1330
3/25/2011	47.5	1334
3/26/2011	47.8	1344
3/27/2011	48.0	1336
3/28/2011	48.2	1334
3/29/2011	48.2	1328
3/30/2011	48.3	1328
3/31/2011	48.3	1323
4/1/2011	49.0	1301
4/2/2011	49.6	1307
4/3/2011	50.2	1307
4/4/2011	50.9	1310
4/5/2011	51.6	1726
4/6/2011	**52.3**	2000
4/7/2011	**52.9**	2002

4/8/2011	**52.6**	2028
4/9/2011	**52.5**	2026
4/10/2011	**52.5**	2022
4/11/2011	**52.5**	2043
4/12/2011	**52.4**	2655
4/13/2011	**52.3**	3066
4/14/2011	**52.3**	3113
4/15/2011	**52.4**	3061
4/16/2011	**52.4**	3017
4/17/2011	**52.4**	3018
4/18/2011	**52.4**	3048
4/19/2011	**52.4**	3019
4/20/2011	**52.4**	2637
4/21/2011	**52.4**	2532
4/22/2011	**52.4**	2552
4/23/2011	**52.3**	2525
4/24/2011	**52.3**	2560
4/25/2011	**52.2**	2568
4/26/2011	**52.1**	2543
4/27/2011	**52.1**	2529
4/28/2011	**52.1**	2546
4/29/2011	**52.1**	2174
4/30/2011	**52.1**	2003
5/1/2011	**52.2**	2014
5/2/2011	**52.3**	2014
5/3/2011	**52.4**	2040
5/4/2011	**52.5**	2025
5/5/2011	**52.6**	2012
5/6/2011	**52.7**	2022
5/7/2011	**52.8**	2017
5/8/2011	**52.9**	2001
5/9/2011	**52.8**	2036
5/10/2011	**52.8**	2028
5/11/2011	**52.8**	2058
5/12/2011	**52.8**	2043
5/13/2011	**52.7**	2021
5/14/2011	**52.7**	2009
5/15/2011	**52.6**	2001
5/16/2011	**52.6**	2042
5/17/2011	**52.5**	2032
5/18/2011	**52.3**	2037
5/19/2011	**52.3**	2039

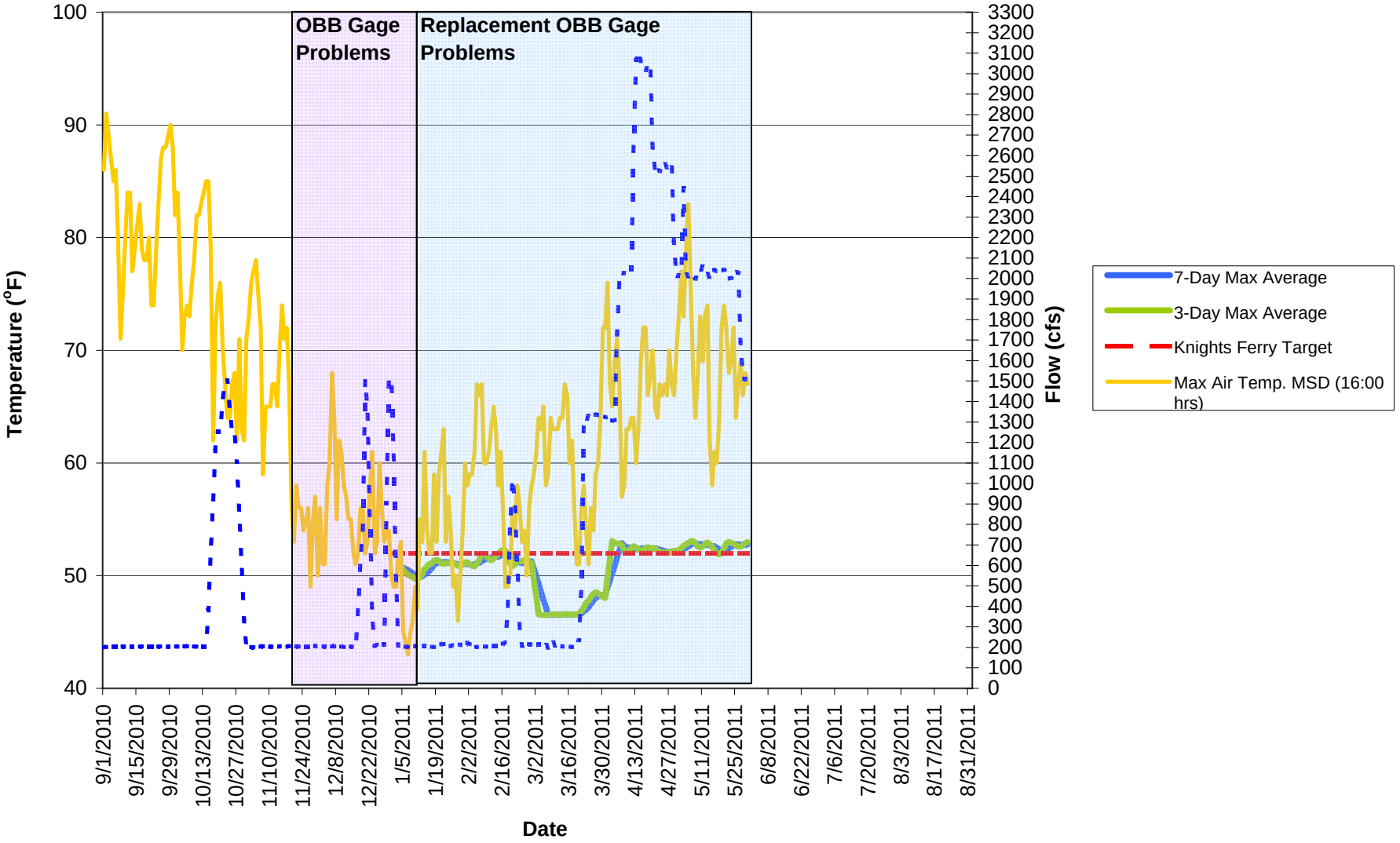
5/20/2011	**52.3**	2042
5/21/2011	**52.3**	2022
5/22/2011	**52.4**	1998
5/23/2011	**52.5**	2004
5/24/2011	**52.7**	2021
5/25/2011	**52.8**	2040
5/26/2011	**52.8**	2027
5/27/2011	**52.8**	1684
5/28/2011	**52.7**	1512
5/29/2011	**52.7**	1510
5/30/2011	**52.8**	1511

Data Source: CDEC and Reclamation

Please contact me for questions or comments.
Thank you,
Randi

Randi Field
U.S. Bureau of Reclamation
Central Valley Project Operations Office
3310 El Camino Avenue, Suite 300
Sacramento, CA 95821
(916) 979-2066
rfield@usbr.gov

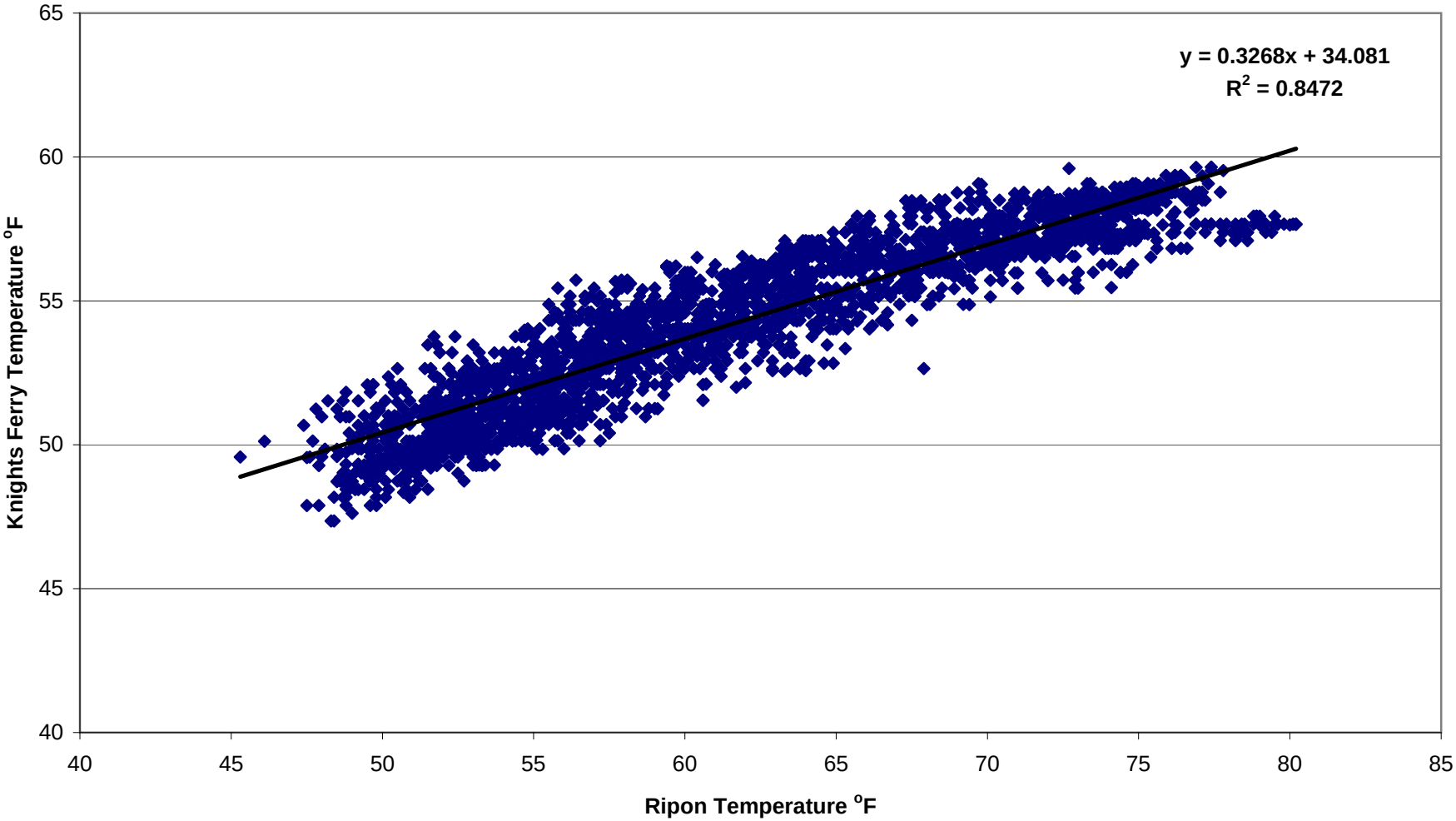
Estimated Knights Ferry Temperatures



5/31/2011

Knights Ferry data is calculated from Ripon Gage 1/11 - 5/31. See Ripon-Knights Ferry relationship.

Ripon-Knights Ferry Temperature Relationship
Based on HWMS Temperature Obs. Calibration Data 1999-2006
(1800 hrs only)



From: Garwin yip
To: Field, Randi C;
cc: Barbara.Byrne@noaa.gov; Brown, Howard; Reed, Rhonda;
Subject: RE: October Stanislaus temperature criterion under Action III.1.2
Date: Thursday, September 30, 2010 2:23:38 PM

Randi,

As you know, NMFS' OCAP Opinion, Action III.1.2 (page 621) provides for the option of initiating the temperature criterion upon the initiation date of the fall pulse flow, rather than October 1. Per the recommendation below, NMFS agrees that, for 2010, the fall temperature criterion of 56 degrees Fahrenheit at Orange Blossom Bridge shall apply as of the initiation date of the fall pulse flow, which is October 15, 2010.

-Garwin-

Garwin Yip
NOAA's National Marine Fisheries Service
Water Operations and Delta Consultations Branch Supervisor
garwin.yip@noaa.gov
916-930-3611 (office)
916-716-6558 (cell)
650 Capitol Mall, Suite 8-300
Sacramento, CA 95814

From: Barbara Byrne [mailto:Barbara.Byrne@noaa.gov]
Sent: Thursday, September 30, 2010 1:36 PM
To: Yip, Garwin; 'Rhonda Reed'
Subject: October Stanislaus temperature criterion under Action III.1.2

Garwin & Rhonda,

The SOG group has drafted a proposed process for advising NMFS on whether to implement the fall temperature criterion (from 65 degrees Fahrenheit at Orange Blossom Bridge to 56 degrees Fahrenheit at Orange Blossom Bridge) as of October 1, or as of the initiation date of the fall pulse flow. Because the group has not yet finalized the discussion, there is no formal advice from SOG on this issue this year, though my impression is that there was general consensus on the proposal.

BACKGROUND
The change in temperature criterion in the fall to 56 degrees Fahrenheit is intended to provide temperatures suitable for the migration and holding of adult Central Valley (CV) Steelhead. NMFS expects that few CV steelhead will migrate into the Stanislaus before the fall pulse flow, and have no evidence this year to suggest otherwise. The net upstream cumulative count of fall-run Chinook counted at the Stanislaus Weir as of 9/29/2010 was 87 fish (no CV steelhead yet observed this fall at the weir). To the extent that migration timing of fall-run on the Stanislaus is indicative of migration timing of CV Steelhead, the fact that this year's count is just the 4th highest of only 8 years of data suggests no evidence of "early migration" of salmonids into the watershed.

Daily maximum temperatures measured at Orange Blossom Bridge (http://cdec.water.ca.gov/wquality/OBB_092010.html) have been less than 60 degrees Fahrenheit since 9/19/2010. The 7 day average of the daily maximum temperature (7DADM, the type of temperature criterion applied under Action III.1.2) at Orange Blossom Bridge as of 9/29/2010 is 58.7 degrees Fahrenheit. While some warmer weather is expected over the next week, Randi Field (Reclamation) expects that the 7DADM is likely to remain below 60 degrees Fahrenheit.

MY RECOMMENDATION
For this year, my recommendation is that the shift in the temperature criterion at Orange Blossom Bridge to 56 degrees Fahrenheit apply as of the initiation of the fall pulse flow, i.e. October 15th (per the Dry year schedule in Appendix 2-E of the BiOp).

Please send your final decision to Randi Field, Reclamation, with a cc: to me; I'll forward your decision to the Stanislaus Operations Group for their information.

Thanks,
Barb

_____
Barb Byrne
Fishery Biologist

barbara.byrne@noaa.gov
office: (916) 930-5612
fax: (916) 930-3629

NOAA-NMFS
Central Valley Office
650 Capitol Mall, Suite 8-300
Sacramento, CA 95814
http://swr.nmfs.noaa.gov/

Appendix F

Summary of Differences in Yeartype Calculation

Differences in designating yeartype for implementation of Action III.1.3 of the NMFS BiOp

The Interim Plan of Operations for New Melones Reservoir (IPO) described five water supply categories based on a water supply parameter (sometimes referred to as the "New Melones Index (NMI)") that was the sum of end of February New Melones Reservoir Storage and forecasted inflow to New Melones Reservoir from March through September. While not explicit in the IPO, in practice the water supply parameter was calculated based on the 90% exceedence forecast of inflow. Reclamation operates for the NMFS BiOp RPA Actions and continues to use the "IPO framework" to calculate the water supply parameter and associated water supply categories in the Stanislaus basin.

The NMFS BiOp also uses the IPO water supply parameter to designate yeartype under Action III.1.3 (see NMFS BiOp at p. 624), but does not specify that NMFS intended that the NMI be calculated based on the 50% forecast, nor that (because of the intended switch in forecast used) NMFS described water supply categories, or yeartypes, based on an adjusted set of water supply parameter ranges. At the January 2010 SOG meeting, NMFS provided clarification to SOG as to the intended yeartype designation process; a process consistent with the assumptions used to model this RPA during its development[1].

A final determination of the water year classification calculation method and implementation is currently under review.

[1] Note that because CALSIM II operates with "perfect foresight", there is no forecast component to calculation of the NMI in a CALSIM II model run. The only difference between a CALSIM II model run under the "IPO framework" versus the "RPA framework" is the table used to designate yeartype based on the calculated NMI. In practice, of course, we do not have perfect foresight and the choice of forecast is a factor in designating yeartype.

Table C-1: Comparison of how water year types are defined and updated under Reclamation's "IPO framework" and NMFS' "RPA framework". New Melones Index = NMI = actual end of February storage plus the forecast of March through September inflows to New Melones Reservoir.

Component	Reclamation's "IPO framework"	NMFS' "RPA framework"	Comments
1. Which forecast (50% or 90%) of the through-September inflow is used to calculate the NMI?	90% (not explicit in IPO, but is the current practice, 1997-present)	50% (not explicit in the BO, but is the intended practice of the NMFS RPA)	See evaluation of New Melones storage change using the 50% and the 90% runoff exceedence forecast
2. What is the updating process for the NMI and associated water year type? That is, when is the NMI (and associated year type) first calculated? How often is it adjusted?	The NMI parameter can be calculated when the data becomes available from DWR, typically every month January through May. Monthly updates include the actual inflows from the previous months. Updates may be implemented as soon as they are available. See implementation proposal for specific details.	The NMI will be calculated by the end of the second full week of February; and updated by the second full week of each subsequent month through June. Monthly updates include the actual inflows from the previous months. For each NMI, the schedule of minimum instream flows associated with the resultant yeartype will begin on the first day of the following month. The June NMI will set the schedule to be used through February of the following year.	Both frameworks use the following formula: actual end of Feb storage + actual inflows from March through the most recent month + forecasted inflows to New Melones from the current month through September.
3. How does the NMI map to water supply category/yeartype?	Water supply category/yeartype (NMI, in TAF) Low/Critical (0-1,400) Medium-Low/Dry (1,400-2,000) Medium/Below Normal (2,000-2,500) Medium-High/Above Normal (2,500-3,000) High/Wet (3,000-6,000)	Water yeartype (NMI, in TAF) Very Critical (1000 ≤ NMI ≤ 1399)[2] Critically Dry (1400 ≤ NMI ≤ 1725) Dry (1726 ≤ NMI ≤ 2177) Below Normal (2178 ≤ NMI ≤ 2386) Above Normal (2387 ≤ NMI ≤ 2761) Wet (2762 ≤ NMI)	

[2] The "Very Critical" yeartype was modeled using a flow schedule patterned after those provided in Appendix 2-E; this schedule was provided to SOG in January of 2010 and is included here for informational purposes. However, the flow schedule was not included in Appendix 2-E because it was used more as a modeling tool than as a full characterization of appropriate flows for CV steelhead throughout a Very Critical year. For example, while NMFS did not specify any minimum summer flows in the modeled flow schedule for Very Critical years, NMFS assumes that instream flow would be provided under the Ripon Dissolved Oxygen standard.

Clarified Intent of the NMFS OCAP BO RPA Action III.1.3

As a point of clarification, the definitions of yeartypes given in Appendix 2-E and implementation details of the Appendix 2-E minimum instream flow requirement schedules, as modeled (but see footnote 1) during development of the NMFS BiOp, are provided below:

> **"Wet"** yeartype is when the New Melones Index is greater than 2762 TAF.
> "Above Normal" is when the New Melones Index is greater than or equal to 2387 TAF and less than or equal to 2761 TAF.
> **"Below Normal"** is when the New Melones Index is greater than or equal to 2178 TAF and less than or equal to 2386 TAF.
> **"Dry"** is when the New Melones Index is greater than or equal to 1725 TAF and less than or equal to 2177 TAF.
> **"Critically Dry"** is when the New Melones Index is greater than or equal to 1400 TAF and less than or equal to 1724 TAF.
> **"Very Critical"** is when the New Melones Index is greater than or equal to 1000 TAF and less than or equal to 1399 TAF.
>
> In the unlikely event of the New Melones Index being calculated as being less than 1000 TAF, NMFS assumes that SOG will provide advice to NMFS and WOMT on how to manage flows.

By the end of the second full week of February, the New Melones Index (NMI) will be calculated. In February, the NMI is hereby defined as the sum of projected End-of-February New Melones storage plus the sum of DWR's February 50% exceedance forecast of inflows to New Melones Reservoir for the period Mar 1st through Sep 30th. The daily schedule of minimum instream flow requirements associated with the resultant yeartype (as defined above) will commence on March 1st.

By the end of the second full week of March, the New Melones Index (NMI) will be recalculated. In March, the NMI is hereby defined as the sum of End-of-February New Melones storage plus the sum of DWR's March 50% exceedance forecast of inflows to New Melones Reservoir for the period Mar 1st through Sep 30th. The daily schedule of minimum instream flow requirements associated with the resultant yeartype (as defined above) will commence on April 1st.

By the end of the second full week of April, the New Melones Index (NMI) will be recalculated. In April, the NMI is hereby defined as the sum of End-of-February New Melones storage plus the actual New Melones inflow during March plus the sum of DWR's April 50% exceedance forecast of inflows to New Melones Reservoir for the period Apr 1st through Sep 30th. The daily schedule of minimum instream flow requirements associated with the resultant yeartype (as defined above) will commence on May 1st.

By the end of the second full week of May, the New Melones Index (NMI) will be recalculated. In May, the NMI is hereby defined as the sum of End-of-February New Melones storage plus the actual New Melones inflow during March and April plus the sum of DWR's May 50% exceedance forecast of inflows to New Melones Reservoir for the period May 1st through Sep 30th. The daily schedule of minimum instream flow requirements associated with the resultant yeartype (as defined above) will commence on June 1st.

By the end of the second full week of Jun, the New Melones Index (NMI) will be recalculated. In June, the NMI is hereby defined as the sum of End-of-February New Melones storage plus the actual New Melones inflow during March, April and May plus the sum of DWR's May 50% exceedance forecast of inflows to New Melones Reservoir, incorporating any DWR updates since the official May forecast, for the period Jun 1st through Sep 30th. The daily schedule of minimum instream flow requirements associated with the resultant yeartype (as defined above) will commence on July 1st and continue until March 1st of the following year.

Flow schedule for a "Very Critical" yeartype (for modeling purposes, as described in footnote 2)

Stanislaus River Minimum Fish Flow Schedule
Water Year Type: Very Critical

OCT	CFS	NOV	CFS	DEC	CFS	JAN	CFS	FEB	CFS	MAR	CFS
1	110	1	200	1	200	1	125	1	125	1	125
2	110	2	200	2	200	2	125	2	125	2	125
3	110	3	200	3	200	3	125	3	125	3	125
4	110	4	200	4	200	4	125	4	125	4	125
5	110	5	200	5	200	5	125	5	125	5	125
6	110	6	200	6	200	6	125	6	125	6	125
7	110	7	200	7	200	7	125	7	125	7	125
8	110	8	200	8	200	8	125	8	125	8	125
9	110	9	200	9	200	9	125	9	125	9	125
10	110	10	200	10	200	10	125	10	125	10	125
11	110	11	200	11	200	11	125	11	125	11	125
12	110	12	200	12	200	12	125	12	125	12	125
13	110	13	200	13	200	13	125	13	125	13	125
14	110	14	200	14	200	14	125	14	125	14	125
15	110	15	200	15	200	15	125	15	125	15	125
16	110	16	200	16	200	16	125	16	125	16	125
17	110	17	200	17	200	17	125	17	125	17	125
18	110	18	200	18	200	18	125	18	125	18	125
19	110	19	200	19	200	19	125	19	125	19	125
20	110	20	200	20	200	20	125	20	125	20	125
21	110	21	200	21	200	21	125	21	125	21	125
22	110	22	200	22	200	22	125	22	125	22	125
23	110	23	200	23	200	23	125	23	125	23	125
24	110	24	200	24	200	24	125	24	125	24	125
25	110	25	200	25	200	25	125	25	125	25	125
26	110	26	200	26	200	26	125	26	125	26	125
27	110	27	200	27	200	27	125	27	125	27	125
28	110	28	200	28	200	28	125	28	125	28	125
29	110	29	200	29	200	29	125			29	125
30	110	30	200	30	200	30	125			30	125
31	110			31	200	31	125			31	125

APR	CFS	MAY	CFS	JUN	CFS	JUL	CFS	AUG	CFS	SEP	CFS
1	250	1	500	1	0	1	0	1	0	1	0
2	250	2	500	2	0	2	0	2	0	2	0
3	250	3	500	3	0	3	0	3	0	3	0
4	250	4	500	4	0	4	0	4	0	4	0
5	250	5	500	5	0	5	0	5	0	5	0
6	250	6	500	6	0	6	0	6	0	6	0
7	250	7	500	7	0	7	0	7	0	7	0
8	250	8	500	8	0	8	0	8	0	8	0
9	250	9	500	9	0	9	0	9	0	9	0
10	250	10	500	10	0	10	0	10	0	10	0
11	250	11	500	11	0	11	0	11	0	11	0
12	250	12	500	12	0	12	0	12	0	12	0
13	250	13	500	13	0	13	0	13	0	13	0
14	250	14	500	14	0	14	0	14	0	14	0
15	500	15	500	15	0	15	0	15	0	15	0
16	500	16	250	16	0	16	0	16	0	16	0
17	500	17	250	17	0	17	0	17	0	17	0
18	500	18	250	18	0	18	0	18	0	18	0
19	500	19	250	19	0	19	0	19	0	19	0
20	500	20	250	20	0	20	0	20	0	20	0
21	500	21	250	21	0	21	0	21	0	21	0
22	500	22	250	22	0	22	0	22	0	22	0
23	500	23	250	23	0	23	0	23	0	23	0
24	500	24	250	24	0	24	0	24	0	24	0
25	500	25	250	25	0	25	0	25	0	25	0
26	500	26	250	26	0	26	0	26	0	26	0
27	500	27	250	27	0	27	0	27	0	27	0
28	500	28	250	28	0	28	0	28	0	28	0
29	500	29	250	29	0	29	0	29	0	29	0
30	500	30	250	30	0	30	0	30	0	30	0
		31	250			31	0	31	0		

Evaluation of Historical New Melones Water Supply and Runoff Forecasts

Purpose: Historical New Melones data is presented to understand the risk associated with using less conservative hydrologic runoff forecasts.

Background: See (3/17/2010) handout from NMFS "Table 1. Summary of how water year types are defined and updated in Reclamation's Interim Plan of Operations and the NMFS OCAP Biological Opinion."

Generalized Observations (from small sample, 8 years, of historical data):

- In this sample, 70% of the water year type designations result in the same minimum flow category, or result in the same release volume downstream regardless of forecast or flow category. The remaining 30% can be classified in two groups, the 90% IPO method which is less conservative on the drier/less storage condition, and the 50% NMFS method which is more liberal on the wetter/more storage condition.

- The proposed NMFS minimum flow categories using the 50% runoff forecast appears to be more protective to storage in the drier/less storage conditions. Estimated downstream loss/storage retention, in this condition, is approximately 40 TAF/yr.

- In years where the is little discrepancy between the actual and designated year type category, the proposed NMFS minimum flow categories using the 50% runoff forecast appears to be more liberal to downstream releases in the wet/more storage conditions. Estimated downstream gain/storage loss, in this condition, is approximately 20 TAF.

- Year 2007 exemplifies the situation where the actual water year type (Critical) is the most inconsistent with the designated category (NMFS Minimum Flow category Above Normal, due to high storage conditions). This particular year (Table 1 highlighted) would have yielded a downstream gain/storage loss of approximately 110 TAF in a Critical water year and at the beginning of a dry period.

Discussion:
Using the 50% runoff exceedence forecast early in the spring, especially in the month of March, poses a risk that forecasted water will not manifest as inflow into the reservoir. In the year 2007 example, the 50% forecasted inflow March-September was 579 TAF (the 90% forecasted inflow March-September was 385 TAF). The actual March-September inflow was 319 TAF.

The 1993 NMFS BO requirement (as applied to the Shasta and Trinity system) states to issue the spring allocation of deliverable water "based on a [sic] estimates of precipitation and runoff at least using conservative as 90 percent probability of exceedance". The

rational for using the more conservative forecast is to “substantially reduce the risk of adverse temperature conditions” later in the season. The same reservoir dynamics and risks are applicable to New Melones Reservoir. It is likely that higher minimum flows in the spring and desired temperature objectives in the late summer/fall cannot both be achieved without a conscious compromise.

Table 1. Historical Water Year Types applied to IPO and NMFS methods

Final SJR Water Year Type	Month	End of February Storage (TAF)	IPO Categories (90%)	NMFS Min Flow Categories (50%)	Est. Absolute Storage Difference (TAF)	Loss/Gain to Storage (TAF)
Dry	Feb-02	1587	**BN**	**BN**	0	
Dry	Mar-02		**BN**	**BN**	0	
Dry	Apr-02		**BN**	**BN**	0	
Dry	May-02		**BN**	**D**	38	Loss
Below Normal	Jan-03		**D**	**BN**	0	
Below Normal	Feb-03	1427	**D**	**D**	0	
Below Normal	Mar-03		**D**	**D**	0	
Below Normal	Apr-03		**D**	**D**	0	
Below Normal	May-03		**BN**	**D**	38	Loss
Dry	Apr-04	1442	**D**	**D**	0	
Dry	Jun-04		**D**	**D**	0	
Wet	Jan-05		**D**	**D**	0	
Wet	Feb-05	1437	**BN**	**BN**	0	
Wet	Mar-05		**BN**	**BN**	0	
Wet	Apr-05		**BN**	**AN**	10	Gain
Wet	May-05		**BN**	**AN**	19	Loss
Wet	Jan-06		**AN**	**W**	8	Loss
Wet	Feb-06	2016	**AN**	**W**	7	Loss
Wet	Mar-06		**AN**	**W**	8	Loss
Wet	Apr-06		**W**	**W**	0	
Critical	Jan-07		**BN**	**AN**	0	
Critical	Feb-07	2001	**BN**	**AN**	0	
Critical	Mar-07		**BN**	**AN**	80	Loss
Critical	Apr-07		**BN**	**AN**	10	Loss
Critical	May-07		**BN**	**AN**	30	Loss
Critical	Feb-08	1531	**D**	**BN**	0	
Critical	Mar-08		**BN**	**BN**	0	
Critical	Apr-08		**D**	**D**	0	
Critical	May-08		**D**	**D**	0	
Below Normal	Feb-09	1208	**C**	**D**	0	
Below Normal	Mar-09		**D**	**D**	0	
Below Normal	Apr-09		**D**	**D**	0	
Below Normal	May-09		**D**	**D**	0	

From: Field, Randi C
To: "Barbara Byrne";
cc: Vasquez, Elizabeth A; Fujitani, Paul E; Kiteck, Elizabeth G; Washburn, Thuy T;
Subject: RE: WSP"s for June, July, (and August, if out)
Date: Wednesday, August 18, 2010 10:24:00 AM

Barb,

We would like to propose the following formulas for calculating the New Melones WSP's. This will accommodate the seasonal availability of runoff forecast data generated by DWR which Reclamation uses to calculate the WSP's. DWR's forecasts typically only run January through May. As the season progresses, the addition of actual inflow data is consistent with our historical treatment of the supply parameter. The exception is June where we propose to maintain the same magnitude of pulse initiated in May.

Month	Calculation of the Water Supply Parameter (WSP) for Application to NMFS BO RPA III.1.3
March	End of February New Melones Storage + March through September forecasted inflow (50% and 90% available)
April	End of February New Melones Storage + Actual March inflow + April through September forecasted inflow (50% and 90% available)
May	End of February New Melones Storage + Actual March and April inflow + May through September forecasted inflow (50% and 90% available)
June	Same WSP as May
July	End of February New Melones Storage + Actual March through June inflow + July through September forecasted inflow (50% only as forecasted in May)
August	End of February New Melones Storage + Actual March through July inflow + August through September forecasted inflow (50% only as forecasted in May)
September	End of February New Melones Storage + Actual March through August inflow + September forecasted inflow (50% only as forecasted in May)
October	End of February New Melones Storage + Actual March through September inflow
November	Same WSP as October
December	Same WSP as October
January	Projected End of February New Melones Storage + January through September inflow (50% and 90% available)
February	Projected End of February New Melones Storage + January through September inflow (50% and 90% available)

Using the above information, the recent WSP's result in the following indexes:

Month	90%	50%	Index

May	1890	1979	Dry
Jun	1890	1979	Dry
Jul	NA	1940	Dry
Aug	NA	1960	Dry

For all of the months listed the index is the same for both Derek's table and the IPO.

Please let me know your comments or feedback.

Thank you,
Randi

Randi Field
U.S. Bureau of Reclamation
Central Valley Project Operations Office
3310 El Camino Avenue, Suite 300
Sacramento, CA 95821
(916) 979-2066
rfield@usbr.gov

From: Barbara Byrne [mailto:Barbara.Byrne@noaa.gov]
Sent: Tuesday, August 17, 2010 1:20 PM
To: Field, Randi C
Cc: Vasquez, Elizabeth A
Subject: WSP's for June, July, (and August, if out)

Hi Randi –

Can you send me the New Melones WSP's for June, July & August, using both the 50% and 90% exceedance forecasts? Thanks.

Barb

_____
Barb Byrne
Fishery Biologist

barbara.byrne@noaa.gov
office: (916) 930-5612
fax: (916) 930-3629

NOAA-NMFS

Central Valley Office
650 Capitol Mall, Suite 8-300
Sacramento, CA 95814
http://swr.nmfs.noaa.gov/