

Mr. David Murillo
Regional Director
Mid-Pacific Region
U.S. Bureau of Reclamation
2800 Cottage Way, MP-3700
Sacramento, California 95825-1898

RE: Proposed Amendment to the Reasonable and Prudent Alternative of the 2009 Opinion

Dear Mr. Murillo:

On June 4, 2009, NOAA's National Marine Fisheries Service (NMFS) issued a biological and conference opinion (Opinion) on the long-term operations of the Central Valley Project (CVP) and State Water Project (SWP). The NMFS 2009 Opinion concluded that the CVP/SWP operations were likely to jeopardize the continued existence of several federally listed species under NMFS's jurisdiction and destroy or adversely modify designated critical habitat. Consequently, NMFS provided a reasonable and prudent alternative (RPA) that met the criteria of 50 CFR 402.02. On April 7, 2011, NMFS issued a 2011 amendment of the 2009 RPA¹.

On August 2, 2016, the U.S Bureau of Reclamation (Reclamation) requested using the adaptive management provision in the 2009 Opinion (section 11.2.1.2) related to Shasta Reservoir operations. The basis for this request included recent, multiple years of drought conditions, new science and modeling, and new data demonstrating the low population levels of endangered Sacramento River winter-run Chinook salmon and threatened Central Valley spring-run Chinook salmon.

The purpose of this letter is to transmit a proposed amendment to the 2011 amended RPA related to Shasta Reservoir operations (RPA Action Suite I.2). This proposed amendment was developed in consultation with Reclamation and represents substantial agreement between our two agencies. Specific areas of agreement include:

1. This amendment is necessary as part of a science-based adaptive management process.
2. This amendment is part of a phased approach that will inform the CVP-SWP Long-term operations reconsultation.
3. Reclamation will implement a pilot approach for temperature management in summer 2017 as part of this amendment process.
4. Reclamation and NMFS will undertake additional modelling and analyses during 2017 and beyond.
5. Reclamation and NMFS will initiate a structured stakeholder engagement process that will inform future decision-making.

Enclosure 1 provides a "track changes" version of the relevant pages of the 2011 RPA, modified to reflect the proposed changes. Enclosure 2 provides a clean version of the proposed revised RPA with the 2017 amendment text. Enclosure 3 provides an administrative record

1

http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/040711_ocap_opinion_2011_amendments.pdf

memorandum that includes a more detailed description of the scientific basis and rationale for the changes proposed in Enclosure 1. Enclosure 4 contains an initial scope of work for needed model improvements and analyses prepared by NMFS.

1. *This amendment is necessary as part of a science-based adaptive management process.* Science-based adaptive management allows for changes in response to new information. NMFS is proposing an amendment to the 2011 amended RPA based on the following considerations:

- A. Operations of Shasta and Keswick reservoirs. Operations of these reservoirs have been the subject of multiple annual reviews. In particular, Shasta operations were one of the main focuses of the 2015 annual review, and the independent review panel (IRP) recommendations called for supplementation, and ultimate replacement, of the tools (both numerical models and field equipment) currently used to manage temperature releases. The IRP also urged the agencies to continue efforts to connect hydrologic conditions to fish and macroinvertebrate life history requirements and to describe a new set of storage and release scenarios into the future. These recommendations were made to increase reliability (accuracy, resolution, and redundancy) of the data guiding water operations in Shasta Reservoir and the Sacramento River.²
- B. Drought Conditions. 2014 and 2015 were the third and fourth consecutive years of drought conditions (e.g., dry hydrology, high air temperatures). These conditions precipitated extremely challenging operations of Shasta and Keswick reservoirs that resulted in many lessons learned on what information to consider in the development and implementation of both the initial forecast process and the May temperature management plan process.
- C. New Science and Temperature Survival Models. Since the 2011 RPA amendment was issued, new models have become available to describe the conditions necessary to provide suitable water temperatures for winter-run Chinook spawning, egg incubation, and fry emergence throughout the temperature management season. Another newly available model evaluates the potential temperature-dependent mortality of winter-run Chinook from any given operational scenario.
- D. Request for Reinitiation. On August 2, 2016, Reclamation requested reinitiation of the entire CVP/SWP operations consultation, citing new information related to multiple years of drought and recent data demonstrating extremely low population levels of endangered Sacramento River winter-run Chinook salmon. In an August 17, 2016, response letter to Reclamation, NMFS agreed to reinitiate consultation.
- E. Increased efficiency and effectiveness. In reviewing the current RPA language, NMFS has determined that there are efficiencies that can be gained by fine-tuning the biological metrics and the process to achieve those metrics. This proposed

² <http://deltacouncil.ca.gov/sites/default/files/2015/12/LOBO%20IRP%202015%20Report.pdf>

amendment has the potential to increase both biological effectiveness of the RPA and water supply reliability by realizing operational efficiencies.

2. *This amendment is part of a phased approach that will inform the CVP-SWP Long-term operations reconsultation.* This 2017 proposed amendment is designed for implementation through a phased approach. With Reclamation's commitment to implement the temperature management pilot project now (with associated analysis and monitoring), NMFS believes that ongoing reconsultation will provide a venue to conduct a comprehensive analysis of integrated system operations, including any additional changes made through the 2017 amendment following stakeholder outreach and input. Evaluating the performance of these new metrics now will significantly improve our ability to responsibly develop a new biological opinion as we progress through reconsultation.
3. *Reclamation will implement a pilot approach for temperature management in summer 2017 as part of this amendment process.* Given the time of year and the importance of setting sideboards prior to the initial water year forecast, our understanding is that Reclamation has agreed to implement the pilot program for Shasta Reservoir temperature management [RPA Actions I.2.3(3) and I.2.4] in the enclosed proposed amendment in water year 2017. The remainder of the changes in this proposed 2017 amendment are subject to further refinement. Our understanding is that Reclamation intends to share the entirety of this proposed 2017 RPA amendment externally. In this vein, we expect the metrics in this proposed 2017 amendment to be the start, not the end, of a conversation about how to refine and optimize management of Shasta resources for temperatures and other needs. We also believe that operating to these changes now, within more favorable hydrologic conditions seen so far in water year 2017, will afford us a needed opportunity to examine how new metrics perform.
4. *Reclamation and NMFS will undertake additional modelling and analyses during 2017 and beyond.* NMFS and Reclamation are both committed to developing a Joint Science and Modeling Plan to begin in water year 2017. More specifically, Reclamation has committed to developing an analysis throughout the 2017 water year to evaluate the system-wide impacts of revised temperature management values, locations, and metrics on CVP operations, the environment, and/or impacts to other ESA listed species. In addition, Enclosure 4 includes a science workplan developed by the NMFS-Southwest Fisheries Science Center (SWFSC) that shall be implemented as further pieces of this proposed RPA amendment are discussed. The science workplan incorporates ongoing efforts in the upper Sacramento River to better understand Shasta and Keswick reservoir operations and their effects on winter-run Chinook salmon and their habitat. It also incorporates efforts to revise existing models or develop new models to increase the accuracy of operational forecasts and provide increased certainty for meeting habitat needs for Sacramento River winter-run Chinook salmon and water supply. Such ongoing and future efforts include: a coupled physical modeling framework to quantify the advection and heat exchange of water throughout the Central Valley basin; biological models that include Chinook salmon embryo development and survival; individual-based models of freshwater Chinook salmon life stages (InSALMO); stage structured models of

the full salmon life cycle; conversion of the NMFS-SWFSC's River Assessment for Forecasting Temperatures Decision Support Tool to a web-based version; and continued development of the SacPAS (Sacramento Prediction & Assessment of Salmon) website by Reclamation and the University of Washington.

5. *Reclamation and NMFS will initiate a structured stakeholder engagement process that will inform future decision-making.* We share Reclamation's commitment to stakeholder engagement and agree to work jointly with Reclamation to ensure that dialog occurs prior to finalizing the language of this amendment. To further meaningful stakeholder engagement and discussions on the remainder of this proposed amendment text, NMFS has, jointly with your staff, established the following schedule for stakeholder workshops for the remainder of this water year. These workshops will be co-led by NMFS and Reclamation.
- February 23: seek input on initial science the modeling workplan and water year forecast planning
 - April 20: seek input on final spring forecast and draft temperature pilot plan components modeling
 - June 22: review final 2017 temperature management pilot plan and status report on system-wide modelling
 - September 21: discuss 2017 pilot results with feedback to prepare for the annual review of the long-term operations biological opinions, and present system-wide modelling results and other analyses.

In summary, NMFS believes that this approach, to implement the 2017 pilot temperature management study and associated analyses while continuing to discuss portions of the remainder of the proposed 2017 amendment, is necessary to continue to ensure that operations of the CVP and SWP avoid jeopardizing endangered and threatened species. All of the proposed changes to the Shasta RPA actions are intended to meet their respective objectives, as stated, in the 2009 Opinion.

I look forward continued collaboration with Reclamation on implementation of the RPA and jointly learning from the pilot program and accompanying new science and modelling endeavors. If you have any questions regarding this letter, please contact Garwin Yip, of my staff, at (916) 930-3611, or via e-mail at garwin.yip@noaa.gov.

Sincerely,

Barry A. Thom
Regional Administrator

Enclosures:

1. Track Changes Version of the 2009 RPA with 2011 Amendments that Includes Only the Pages that have 2017 Amendments
2. Clean Version of the 2009 RPA with 2011 Amendments Revised to Include the 2017 Amendments
3. 2017 Shasta RPA Amendment Memorandum
4. NMFS-SWFSC Central Valley water modeling Science Workplan

cc: ARN: 151422SWR2006SA00268
FWS – Paul Sousa, Kaylee Allen
DWR – Mark Cowin, Kathy Kelly
CDFW – Chuck Bonham, Scott Cantrell

DRAFT