MEMORANDUM

TO:	Katrina Harrison, USBR
FROM:	Bruce DiGennaro, Program Manager CSAMP
DATE:	December 7, 2017
RE:	**CSAMP and Reinitiation of Consultation**

The Collaborative Adaptive Management Team (CAMT) has reviewed and discussed your May 4, 2017 document regarding possible ideas for CSAMP engagement in the Reinitiation of Consultation (ROC) process for the Coordinated Long-Term Operations (LTO) of the Central Valley Project (attached). We appreciate the opportunity to discuss opportunities for CSAMP to engage in the ROC process.

A significant amount of new science information has been developed since the existing BiOps and RPAs were written. Rather than focus narrowly on the existing RPAs as suggested in your May 4, 2017 document, CAMT believes it would be more productive for CSAMP to focus on new science information that can help inform the development of a proposed action that can meet specific water delivery and species protection objectives.

CSAMP was specifically created to engage in science and adaptive management associated with contentious operational issues in the Delta. To that end, CSAMP is currently engaged in several ongoing science initiatives that should be helpful for the ROC process. These initiatives are primarily focused on operations and potential impacts on entrainment and critical habitat for Delta Smelt and salmonids. The specific studies are briefly described below.

CSAMP can provide results of the studies listed below, as well as assist in interpretation of study findings and their application to management and operations. CSAMP can also assist in identifying data gaps and/or hypotheses that should be examined to improve the underpinnings of any proposed action or alternative action.

CSAMP INVESTIGATIONS RELEVANT TO ROC.

1. **Factors Affecting Delta Smelt Entrainment** –Lenny Grimaldo of ICF is directing a series of studies to improve our understanding of the factors that affect the potential for, and magnitude of, Delta Smelt entrainment at Project facilities in the south Delta. The studies include statistical analyses of existing data to identify key factors affecting adult entrainment in the winter, development of sediment transport models and behavioral rules to model adult Delta Smelt movement relative to turbidity, velocity, salinity and other factors, and estimates of the population level effects of entrainment. Results of these studies are expected to be available in early 2018.

2. **Review of Delta Smelt Survey Data** – This effort involved an independent review and analyses of historic survey data for Delta Smelt. CAMT will be discussing the findings of this work over the next few months.
3. **Fall Outflow Modeling** – Through the Delta Smelt Scoping Team, CAMT has engaged researchers to conduct occupancy modeling work to examine factors affecting Delta Smelt occupancy and movement within the Delta. Results of this modeling work are expected in late 2018.
4. **Effects of Water Project Operations on Juvenile Salmonid Migration and Survival in the South Delta** – This report prepared by the CAMT Salmon Scoping Team provides a comprehensive review of existing data regarding juvenile salmonid migration and survival in the south Delta, responds to key management questions and identifies future research needs to address existing uncertainties and gaps in knowledge. CAMT is currently discussing specific follow-up research initiatives.
5. **Salmonid Rearing Habitat in the Delta** – CAMT is currently discussing possible initiatives to identify and implement restoration actions on public lands in the Delta to improve rearing opportunities for juvenile salmonids.

POSSIBLE IDEAS FOR CSAMP TO EXPLORE RELATED TO THE REINITIATION OF CONSULTATION ON THE COORDINATED LONG-TERM OPERATION OF THE CENTRAL VALLEY PROJECT AND STATE WATER PROJECT

DRAFT MAY 4, 2017

Reclamation and DWR are soliciting input from the Collaborative Science and Adaptive Management Program (CSAMP) for the reinitiation of consultation (ROC) on the Coordinated Long-term Operation (LTO) of the Central Valley Project (CVP) and State Water Project (SWP). Reclamation proposes an analysis on a subset of the Reasonable and Prudent Alternatives (RPAs) under the 2008 U.S. Fish and Wildlife Service (USFWS) Biological Opinion and 2009 National Marine Fisheries Service (NMFS) Biological Opinion and new ideas as a potential starting point.

BACKGROUND

On August 2, 2016, Reclamation, as the lead Federal agency for Section 7 of the Endangered Species Act (ESA), along with the California Department of Water Resources (DWR) as the applicant, requested reinitiation of consultation with the USFWS and NMFS on the LTO. All agencies committed to an open and transparent process for reviewing the existing Reasonable and Prudent Alternatives outlined in the 2009 NMFS Biological Opinion and the 2008 USFWS Biological Opinion. The Collaborative Science and Adaptive Management Program provides a forum for agencies, water users, and non-governmental organizations to discuss and provide information on areas of scientific disagreement. The Water Infrastructure Investment for the Nation (WIIN) Act provides for soliciting input from CSAMP during the ROC on LTO.

PROPOSAL

CSAMP could consider a subset of the RPAs that agencies or stakeholders believe have been difficult to implement or question the efficacy. Consideration should include:

- What were the biological purposes of the RPA?
- How effective has the RPA been in achieving the purposes?
- Potential alternative approaches for meeting the underlying purposes?

Reclamation developed a list of initial ideas that may increase operational flexibility and feasibility while also meeting the objectives of the BOs. CSAMP could, if desired, expand upon some or all of these ideas or identify others. To date, some ideas from Reclamation include:

- **Clear Creek Channel Maintenance Flows**: Development of pilot studies to create pulse flows in Clear Creek to provide channel maintenance flows in accordance with the 2009 NMFS BO (RPA Action I.1.2). The RPA requires use of the Glory Hole Spillway in Whiskeytown Reservoir, which is only designed for flood management operations when the water elevations are extremely high in the reservoir. Pilot studies may consider using the regular outlet to Clear Creek on Whiskeytown Dam, or using the Glory Hole Spillway opportunistically during storm events when appropriate. The pilot studies also may evaluate methods that would be coordinated to maximize spring attraction benefits and channel

maintenance flows, and set maximum annual flow volumes. The pilot studies may consider the use of additional mechanical side channel restoration to provide benefits when flow actions do not adequately address the needs.

- **Old and Middle River Actions and the Inflow to Export Ratio:** Evaluation of methods to combine the Old and Middle River (OMR) actions (2008 USFWS BO RPA Actions 1 through 3, and the 2009 NMFS BO RPA Actions 4.1.2 and 4.2.1), and also address the objectives of the San Joaquin River Inflow to Export (I/E) Ratio (2009 NMFS BO RPA Action IV.2). The methods evaluated may be based on fish presence and behavior, and could include development of criteria for operational triggers and off-ramps, rather than dates.
- **Fall X2 Action:** Consider working to develop and deploy new smelt sampling methods that do not involve capturing smelt, but rather viewing them with underwater video cameras. Phytoplankton blooms in the lower Sacramento River (as occurred in 2011, 2012, and 2016) increased Aulocoseira, aka Melosira, which is generally considered a nuisance species, and may be eaten by zooplankton. However, it is unknown whether these blooms had any benefit to smelt due to low smelt population numbers and smelt sampling methods. If phytoplankton blooms can be verified to benefit smelt, the results of DWR's Ridge Cut Slough and Reclamation's Sacramento Ship Channel pilot studies may be considered as option to help meet the objectives of the 2008 USFWS BO (Component 3).
- **Delta Entrainment:** Reevaluate operational criteria for the Delta Cross Channel (DCC) Gates (2009 NMFS BO Action IV.1), and Head of Old River possible barriers. Operational criteria could be modified. A pulse could be provided in the delta during key migration periods to decrease entrainment.
- **Shasta Temperature Management:** Reclamation and NMFS are going through an RPA adjustment process for temperature management on the Sacramento River (2009 NMFS BO RPA Action Suite 1.2). The RPA will likely be modified to include development of a monitoring plan, coordination on temperature modeling, and a pilot project. Updates to temperature criteria or alternative measures to meet the underlying biological objectives will be done, not in 2017, but as part of the ROC on LTO. Tradeoffs between species and life-stages of species, as well as better understanding of the relationships between forecasts, releases, averaging periods, and storage targets could be beneficial. Development of an optimization model may also help improve understanding and optimize criteria for different life-stages, species, and beneficial uses.
- **Sacramento River Tradeoffs:** Providing fish passage over Shasta Dam (2009 NMFS BO RPA Action LF 2) increases the spawning habitat available to the winter-run Chinook salmon, and will allow for spawning in native streams upstream from the reservoir, in whatever unimpaired temperature water exists. Once this high quality habitat is accessible to the winter-run Chinook salmon, are temperature targets in the Sacramento River still valid?
- **Salvage:** A pilot project or existing monitoring could be used to evaluate fish survival through the south Delta / San Joaquin and compare it to fish survival through the salvage facilities to determine whether salvage should be avoided or encouraged (2009 NMFS BO RPA Action IV.4.3).
- **Habitat Restoration:** Habitat restoration could be part of a portfolio of actions that improve the status of the species. Greater habitat restoration could offset the need for greater flow to

some extent. Evaluation may include determining the relative benefit of habitat restoration and flow-related components, by determining a fish per action metric and developing models to evaluate actions through the uniform metric of fish. This could include determining to what extent habitat restoration reduces the stressors on the fish populations, through mechanisms such as reducing predation by improving cover, or increasing food and growth, and the corresponding increase in biological objectives such as life history diversity, spatial diversity, productivity, and abundance. The increase in these biological objectives could then be compared to the increase in these biological objectives from another action, such as greater flow for cold water during egg emergence.

NEXT STEPS

1. Identify elements of interest to CSAMP. Let Reclamation know which elements CSAMP is exploring.
2. Scope a proposed way to explore the ideas.
3. Identify a mechanism to implement the scope.
4. CSAMP to report back to Reclamation on the results by February 2018.

Reclamation and DWR would consider the results of CSAMP exploration in the development of initial alternatives for the ROC on LTO National Environmental Policy Act document. It is anticipated that one of the alternatives from the National Environmental Policy Act document will become the proposed action for the Section 7 Endangered Species Act consultation.