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NMFS – Reclamation  
Shasta RPA Draft Proposed Amendment Workshop #2  
Science/Modeling Workplans Stakeholders Meeting  
May 2, 2017

Introductions

<p><b><u>In-person</u></b></p> <ol style="list-style-type: none"><li>1. Craig Addley (PCWA/Cardno Inc.)</li><li>2. Pablo Arroyave (Reclamation)</li><li>3. Ara Azhderian (SLDMWA)</li><li>4. Don Bader (Reclamation)</li><li>5. Lewis Bair (RD 108)</li><li>6. Michelle Banonis (Reclamation)</li><li>7. Federico Barajas (Reclamation)</li><li>8. Lee Bergfeld (MBK)</li><li>9. Alex Biering (FWA)</li><li>10. Christina Durham (NMFS)</li><li>11. Steven Handy (Redding Electric Utility)</li><li>12. Chuck Hanson (Hanson Environmental Inc.)</li><li>13. Michelle Havey (Anchor QEA)</li><li>14. Josh Israel (Reclamation)</li><li>15. Maury Kruth (NCPA)</li><li>16. Anne Kuedar (MBK)</li><li>17. Eric Leitterman (SCVWD)</li><li>18. Ansel Lundberg (SMUD)</li><li>19. Todd Manley (NCWA)</li><li>20. Ron Milligan (Reclamation)</li></ol>	<ol style="list-style-type: none"><li>21. Dave Mooney (Reclamation)</li><li>22. Paul Olmstead (SMUD)</li><li>23. Nancy Parker (Reclamation)</li><li>24. Eric Poncelet (Kearns &amp; West)</li><li>25. Jeff Rieker (Reclamation)</li><li>26. Deanna Serena (CCWD)</li><li>27. Jeff Sutton (TCCA)</li><li>28. Brycen Swart (NMFS)</li><li>29. Allison Tebbo (SWC)</li><li>30. Mike Wright (Reclamation)</li><li>31. Garwin Yip (NMFS)</li></ol> <p style="text-align: center;"><b><u>Call-in/WebEx</u></b></p> <ol style="list-style-type: none"><li>32. Craig Anderson (USFWS)</li><li>33. Thad Bettner (GCID)</li><li>34. Mark Biddlecomb (Ducks Unlimited)</li><li>35. Tom Boardman (SLDMWA)</li><li>36. Frances Brewster (SCVWD)</li><li>37. Steve Chedester (Exchange Contractors)</li><li>38. Miles Daniels (NMFS-SWFSC)</li><li>39. Ammon Danielson (WAPA)</li></ol>	<ol style="list-style-type: none"><li>40. Eric Danner (NMFS-SWFSC)James Gilbert (Reclamation)</li><li>41. Brett Gray (Natomas Mutual Water Co)</li><li>42. Sheila Greene (Westlands Water District)</li><li>43. David Guy (NCWA)</li><li>44. Patti Idlof (Reclamation)</li><li>45. Vanessa Martinez (Cardno)</li><li>46. Noelle Mattock (City of Sacramento)</li><li>47. John McManus (GGSA)</li><li>48. Doug Obegi (NRDC)</li><li>49. Shelley Ostrowski (WWD)</li><li>50. Alex Peltzer (SVWA)</li><li>51. Jason Roberts (CDFW)</li><li>52. John Rubin (SLDMWA)</li><li>53. Dan Ruiz (Westside)</li><li>54. James Takehara (NCPA)</li><li>55. Carl Wilcox (CDFW)</li><li>56. Marcus Yasutake (City of Folsom)</li><li>57. Greg Zlotnick (SJWD)</li></ol>
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*Note: items in italics below represent follow-up responses to questions asked during the meeting. These are items not discussed/presented during the meeting.*

1. Opening Remarks (Pablo Arroyave – Reclamation, Garwin Yip -- NMFS)
  - Reclamation opened the meeting stating that this was the second of four workshops to discuss a process to consider amendments to the Shasta RPA under the NMFS Biological Opinion (BiOp). The goal of these workshops is to make the process as deliberative and transparent as possible.
  - NMFS echoed Reclamation’s sediments, and followed with a brief overview of the amendment process and some of the issues that need to be considered (i.e., climate change, hydrology, lessons from 2014 and 2015, how to operate in drought conditions). The purpose is to use a science-based approach, monitoring, and best practices informed by the data.
2. Workshop Objectives, Agenda, and Format (Jeff Rieker – Reclamation, Eric Poncelet [facilitator] – Kearns and West)
  - Reclamation went over the objectives of this specific workshop, which are to learn about, discuss, and get input on the following topics:
    - Temperature management planning for the 2017 Sacramento River temperature management season
    - System-wide analyses of the draft proposed amendment (issued January 19, 2017) to the Reasonable and Prudent Alternative of the 2009 NMFS BiOp for the long-term operation of the Central Valley and State Water Projects related to Shasta Reservoir operations
  - Reclamation noted that the workshop format would be a brief presentations on each of the topics followed by open floor questions and dialogue before moving on to the next topic.
  - The meeting facilitator outlined the format of the meeting and went over some of the ground rules. Based on a show of hands, most people in the room attended the first workshop.
  - This was followed by introductions around the room and then on the phone – each person introduced themselves as well as their affiliation (see list of participants on page 1).
3. Presentation (Jeff Rieker - Reclamation) -- 2017 Sacramento River Temperature Management Planning (Powerpoint slides were sent to meeting participants in advance of the meeting.)
  - Reclamation provided an overview on the 2017 Sacramento River temperature management planning process, outlining compliance requirements under the State Water Resource Control Board’s Water Rights Order 90-5 and the NMFS 2009 RPA with 2011 amendments Action 1.2.4, the hydrology outlook, and related study opportunities.

Meeting attendees provided the following questions and feedback:

- Question: Lewis Bair (RD 108) – Have you looked at this temperature performance through this year and over the past 20 years? How many of those years met the temperature requirement? Would you have had to modify operations in those years?

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- Jeff Rieker (Reclamation): Yes. Last year, we did a similar analysis of the seven-day average of the daily maximums (7DADM) as well. We are doing that in a modeling scenario, which will be discussed in the next section.
- Question: Lewis Bair (RD 108) – What are the monitoring goals? How will we monitor and determine success of the pilot study? What are we hoping to learn this year?
  - Jeff Rieker (Reclamation): We are monitoring the 53°F daily average temperature (DAT) vs. 55°F 7DADM vs. 56°F DAT in real time. We are hoping to see the benefits/impacts of operating to the DAT vs. the 7DADM. Last year, those two metrics would have resulted in different answers. The study should determine whether the 53°F DAT and 55°F 7DADM are operationally feasible.
- Question: Lee Bergfeld (MBK) – Where does the End-of-September (EOS) storage end up with the 53°F DAT? Are we able to meet both the temperature and storage targets?
  - Jeff Rieker (Reclamation): The EOS storage targets are different based on the water year type. For example, an above normal water year target is 3.2 million acre-feet (MAF). Generally, yes, we are around 3 to 3.1 MAF.
- Question: Jeff Sutton (TCCA) – With respect to the correspondence between Reclamation and NMFS pertaining to the RPA amendment, is the RPA amendment different from the reinitiation of consultation process? When will the results of the April forecast and temperature model runs be available to water users?
  - Jeff Rieker (Reclamation): The amendment process is established under the adaptive management provision in the BiOp. There is an ongoing discussion for elements to be looked at during re-consultation. Reclamation’s March 22, 2017 letter to NMFS reflects Reclamation’s thoughts on those elements. We completed the temperature model runs last week and they will be posted on the NMFS website under the Sacramento River Temperature Task Group (SRTTG) link soon. Reclamation’s notes will be posted there as well.
- Question: Jeff Sutton (TCCA) and Ara Azhderian (SLDMWA) – Is part of the target study to test 53°F DAT as a surrogate for 55°F 7DADM? Will the monitoring tell us if the 53°F DAT is adequate? Will part of this year’s program attempt to account for the cost of maintaining temperature to the California Data Exchange Center gaging station upstream of the confluence of Clear Creek on the Sacramento River (CCR) or wherever the downstream redd is?
  - Jeff Rieker (Reclamation): Yes, the target study will give us a concept of how the two relate. If the compliance point is determined to be further downstream than CCR, that would be subject to further discussion and analysis to decide whether to operate to that new location.
- Question: Ara Azhderian (SLDMWA) – There was mention of an off ramp if significant impacts are seen. What is a “significant” impact?

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- Jeff Rieker (Reclamation): We have a situation this year where flow rates are not driven by downstream temperature. Strong flows are coming into the delta, so we are not anticipating much impact from this because the cold water resource is available.
- Question: Steven Handy (Redding Electric Utility) – Modeling generally shows a high likelihood of success. What are we trying to learn? How will it be applicable to the challenging years (e.g., 2014/2015 dry water years)?
  - Jeff Rieker (Reclamation): There will be some limitations for applying this year to challenging water years.
  - Ron Milligan (Reclamation): This is really about the day-to-day operation. What is the forecast and how does the rain forecast factor in for the operators? This should tell us how sensitive our operation is for regulating temperature releases.
- Question: Steven Handy (Redding Electric Utility) – Have flows changed due to this? What does that look like? What is the timing of those flows? Are there any historical data where we could meet these targets? Does the RPA have the documentation in it (or references) that show we can meet these targets?
  - Garwin Yip (NMFS): EPA (2003) indicates that 7DADM is a better metric than the DAT. During one of the annual reviews of the long-term operation of the biological opinions, the independent review panel asked if fish are farther upstream, then why are we providing 56°F in areas where the fish aren't spawning. The NMFS-SWFSC modeling indicate eggs incubate at far cooler temperatures in the field than in the lab, hence the 53°F vs. the 56°F.
  - Jeff Rieker (Reclamation): This year flows will be operating to the cold water target. Our previous ability to meet the targets will be addressed in the next presentation.
  - Brycen Swart (NMFS): Enclosure #3 to the January 19, 2017 NMFS letter to Reclamation includes an analysis of the 1996-2003 data. It shows that 53°F at CCR was attainable at all flow and temperature conditions in previous years.
- Question: Paul Olmstead (SMUD) – How will Reclamation account for this water? Where do these additional flows come from? Is this water for mitigation?
  - Jeff Rieker (Reclamation): Reclamation does not anticipate any additional releases this year since the hydrology is so good. Flow operations won't change from existing requirements.
  - Ron Milligan (Reclamation): No additional volume of water should be needed. Reclamation is grappling with what is the right set of metrics for operational standards. How do we operate the temperature control device? If the cold water resource isn't there, what is the proper strategy? Mitigation is most likely needed in that case.
- Question: Frances Brewster (SCVWD) – How will we measure whether this operational scenario has any biological benefit?

- Garwin Yip (NMFS): We don't have real-time monitoring for how eggs are doing in the gravel. The only way to measure the biological metrics would be to dig up the redds to determine if there are any dead eggs. The one metric we do measure is egg-to-fry survival at the Red Bluff Diversion Dam (RBDD). Other than that, we use models to determine how temperature is affecting survival. We assume that the temperatures in the document will be sufficient for egg survival. Enclosure #3 includes the biological needs of the species. Right now, the RPA requires 56°F DAT to RBDD with the exception that Reclamation could move it upstream if determined infeasible. Based on literature, however, we know that 56°F DAT is not conducive to incubation.
- Jeff Rieker (Reclamation): There are limitations to what we can and can't do from an operations standpoint.
- Brycen Swart (NMFS): Over the last 18 years, there has been an approximately 1.7°F degree difference between the DAT and 7DADM for CCR (1998 was the first CCR measurement). Those averages are available in Table 12 of the January 19, 2017 letter.
- Question: Craig Addley (Cardno) – There is a concern that the biology is not very settled and there needs to be more biological modeling and monitoring. That includes both studies in the lab and in the field. Are eggs hatching at different temperatures (lab/field)? Hatchery eggs could be used in the field to determine temperature sensitivity. Are fry the sensitive stage? Lots of lab data show that eggs are less sensitive than alevin (still in gravel). As they emerge from the gravel, fry are very sensitive to temperature bioenergetically. Too much cold water is being wasted early in the incubation period and temperatures rise later in the fall during a potentially more sensitive window. Additional study in the lab and in the field is important. RBDD is 60 miles downstream. Is it egg or fry survival we're dealing with?
  - Christina Durham (NMFS): Appreciate the comment and NMFS is interested in that type of data and monitoring as well.
- Question: Chuck Hanson (Hanson Environmental Inc.) – There is a lot of investment this year and it's an extremely important data point. Biological modeling is valuable as a tool, but it is still in a developmental stage. We should not rely on modeling results alone to evaluate the biological success this year. Higher flows and greater turbidity are expected this year. Can we effectively detect redds and carcasses? What can we put in place to accomplish the goals?
  - Jason Roberts (CDFW) – Dave Vogel and others investigated the carcass and redd survey protocols and ultimately they agreed that it was the best method available. He thinks the adult escapement protocols will be sufficient to deal with low visibility this year. (Jason offered that Chuck contact him to chat further. If he has additional questions about the RBDD rotary screw trap [RST], he should contact Jim Smith.)
- Question: Ara Azhderian (SLDMWA) – The data from the RST at RBDD is being used as an indicator, and the modeling which is based on the RST data is being used as an indicator, so the heart of the data is the RBDD monitoring. What plans are in

the works to improve monitoring at RBDD or enhance monitoring between RBDD and the spawning grounds?

- Brycen Swart (NMFS): NMFS isn't required to monitor species, that is the responsibility of the action agency (Reclamation) to prove to NMFS that the species is not being jeopardized.
  - Garwin Yip (NMFS): Reclamation and NMFS are a partnership for the Shasta RPA adjustment, which includes a monitoring requirement. We want to find the catch-all answer that addresses all the needs, but how much time do we have to land on an answer for the winter-run? What is the best available now? What helps protect the species this year so that the numbers don't go down?
  - Michelle Banonis (Reclamation): Reclamation is implementing the RPAs. NMFS is the expert on the species and we assume that NMFS does have an obligation to monitor overall status of the species.
- Question: Ara Azhderian (SLDMWA) – Last year was a pilot to the pilot. What analysis was done on last year's data?
    - Jeff Rieker (Reclamation): That is addressed in the next presentation.
  - Question: Jeff Sutton (TCCA) – There is a pretty good record on survival under variable hydrologies. Are there other ways we [water users] can help? Water users are looking for opportunities to help Reclamation collect better data that doesn't break the CVP. There are huge data gaps (60 miles); how can we help get more data?
    - Jason Roberts (CDFW): We should make sure that USFWS is at these meetings if we are going to talk about the USFWS RST.
    - Brycen Swart (NMFS): There will be an upcoming publication (Salmon and Sturgeon Assessment of Indicators by Life Stage) that includes many different resource agencies and five recommendations came out of that publication as high priorities and research data gaps. He can provide that draft paper.
4. Presentation (Jeff Rieker – Reclamation) -- System-wide Evaluations of Draft Proposed Amendment (Powerpoint slides were sent to meeting participants in advance of the meeting.)
- Reclamation presented an overview of the system-wide analyses of the draft proposed amendment to the 2009 BiOp, which contained the following:
    - Storage and Flow Targets/Restrictions Overview and Analyses Review
    - Temperature Compliance Overview and Analyses Review
    - Analyses Review of Biological Impacts
    - Biological Objectives Overview and Analyses Review
    - Other Analyses Review

Meeting attendees provided the following questions and feedback:

- Question: Jeff Sutton (TCCA) – How are the 3-30% biological objectives going to be verified?
  - Jeff Rieker (Reclamation): Reclamation would be running initial analyses to determine how often these objectives would be hit.
  - Garwin Yip (NMFS): What do the fish feel if we check the box by meeting the requirements? At the time the requirements were established we didn't

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have specific tools to assess different life stages. This is the first attempt to provide some biological objectives. We need to adjust the biological objectives based on the water year type.

- Question: Jeff Sutton (TCCA) – Will NEPA be conducted on the RPA adjustment? How will it impact other listed species (e.g., garter snake, water fowl, delta smelt)?
  - Michelle Banonis (Reclamation): Reclamation would do a supplemental NEPA analysis if impacts were above and beyond the current NEPA document.
  
- Question: Ara Azhderian (SLDMWA) – Where do the spring and fall storage numbers come from and what do they mean?
  - Garwin Yip (NMFS) – NMFS provided the numbers and the partners (Reclamation/NMFS) need to determine what is feasible. They are intended to ensure enough water to make it through the temperature management season, and also provide
  - Brycen Swart (NMFS) -- Historical analysis of storages across water years by month is provided in Enclosure #3 of the January 19 letter. and historically we have been able to implement to those numbers.
  - Jeff Rieker (Reclamation): Enclosure #1 of the March 22, 2017 response discusses the utility of spring storage as it relates to forecasting efforts each year.
  
- Question: Ara Azhderian (SLDMWA) – What does feasibility mean? Under existing conditions, do you meet the flow or storage targets? So, is it a probability analysis?
  - Jeff Rieker (Reclamation): If you do a CalSim analysis, are these spring targets even capable of being met under different hydrology scenarios and what actions would be required? CalSim should show where impacts accrue to. Yes, it is a probability analysis. Does it need to move over in the re-consultation field?
  
- Question: Lee Bergfeld (MBK) – Looking at the storage/flow targets/restrictions, won't the spring restrictions almost always be in place? The ability to meet those targets is already included in the Wilkins Slough relaxation so keep that in mind. The interaction between the CalSim and HEC5Q model indicates we will often run out of cold water. When interpreting the model results, CalSim can be a coarse tool, so results need to be evaluated in great detail. How will those caps be implemented? At Keswick?
  - Jeff Rieker (Reclamation): Several of the modelers are here today. Another workshop is scheduled for June 22 and hopefully we will have made progress by that point to discuss early results. Reclamation appreciates those comments on the model.
  
- Question: Frances Brewster (SCVWD) – There is a lot at stake here. You'll be assessing the biological benefits based on survival at RBDD. There ought to be a

better measure of survival than something 60 miles downstream. We need to do a better job of monitoring the biological impacts.

- Jason Roberts (CDFW): Fish agencies and NCWA had this conversation about setting up a RST closer to the spawning grounds. There were six meetings and the conclusion was that it was not necessarily the best thing to do. The risk is in counting the fish to death or possibly having to subsample, which is the same concern as the RBDD RST.
- Lewis Bair (RD 108): Is it 55°F 7DADM? It is difficult to screen out other variables happening between here and RBDD. It is helpful for those with a biological background to share their thoughts with Jason. I am frustrated that the agency that would permit the additional take is the same agency that manages the winter run.
- Josh Israel (Reclamation): There are some interesting studies that can be done, but they tend to be 18-month cycles and may not fit into this process from a time and cost standpoint. The temperature gradient that we're talking about studying is similar to the salinity gradient in the delta where the studies are evaluating the effect on growth and mortality. It will require much more collaboration between the agencies.
- Question: John McManus (GGSA) – Are the April flow ranges (not currently in the BiOp) adequately protective for spring run to get out of the system?
  - Garwin Yip (NMFS): CDFW issued a memo indicating that there are spring run that come out of the tributaries in May. This RPA adjustment is focused on winter run.
  - Jason Roberts (CDFW): My program manages Mill and Deer Creek. JSAT tag studies show most fish are dying in the mainstem Sacramento River. Spring run are on the 100-fish level and all of these actions to reduce flows have directly impacted spring runs. Tributary spring-run populations are in trouble.
- Comment: John McManus (GGSA) – The interest is in the adults, I would hope that fry are robust enough to make it to RBDD.
- Question: Jeff Sutton (TCCA) – Was there any conversation to fill data gaps during high flow at RBDD?
  - Jason Roberts (CDFW): USFWS should call in here to talk about their monitoring program. USFWS is capturing those gaps up until there is a crew safety issue. They are monitoring as best they can. Staffing levels a few years ago caused a few missed monitoring days, but that is no longer an issue.
  - Brycen Swart (NMFS): See the notes from workshop #1, there was a question about the RBDD. It goes into more detail on the USFWS sampling program.
  - Jeff Sutton (TCCA): Has there been any effort to explore other methods to fill the data gap? Creative methods?
  - Lewis Bair (RD 108): USFWS does fill the gaps more frequently now with their monitoring program. We are trying to tune up RBDD. We look at temperatures, but they may not link tightly with RBDD estimates. One variable in percent survival is turbidity. We are focused on egg-to-fry survival

and Exhibit 3 shows that one degree can be really important. Not sure you can rely on RBDD. How to refine that in-gravel temperature survival number?

- Question: Craig Addley (Cardno) – With respect to the modeling, water users on the American River are sensitive to the Folsom Reservoir. Be sensitive to draining the Folsom in dry years because it goes dead or goes very low. The mortality model is a surrogate for temperature impacts, but is being generated by RBDD data. If you're going to put biological criteria in the RPA, then the model should go directly to RBDD and not use a surrogate.
  - Brycen Swart (NMFS): He did put in metrics like egg-to-fry survival around 25% for an average and 18% for critically dry years.
  - Garwin Yip (NMFS): 3-30% would be before implementation during the temperature management season. After the temperature management season, those percentages in Action 1.2.5 are based on estimates from RBDD RST. The temperature-dependent mortality percentages by water year type are based on the Martin model. What is the temperature-dependent mortality to avoid jeopardy for the species?
  - Craig Addley (Cardno): Those numbers are model generated, which is a concern because those aren't real numbers.
  
- Question: Ara Azhderian (SLDMWA) – These biological objectives present a false measure of success. The model suggests low temperature mortality, but we got average survival at RBDD, so we should use real numbers. There were huge socio-economic impacts last year, but it is not really translating into more winter run. Ultimately, the measure of success needs to be the number of salmon coming back.
  - Brycen Swart (NMFS): The whole point of the life cycle model will hopefully address those escapement numbers and help us to understand the stressors at each life stage. How does changing the variables increase or decrease the numbers? What effect will restoration have?
  
- Question: Lewis Bair (RD 108): River Garden Farms put in rearing structures last week. Does Action 1.2.5 address that? Wouldn't having this as the driver disincentivize water users from doing those types of projects? How do we go back and adjust this to account for those other projects?
  - Brycen Swart (NMFS): Reclamation only has flow and temperature, so they are limited on the actions they can propose. We need to develop better partnerships to address those discretionary actions.
  - Christina Durham (NMFS): If we improve survival to RBDD, NMFS is looking for specific levels of survival. The incentive is that if you increase survival, then maybe you don't need as many prescriptive measures when going through re-consultation.
  - Garwin Yip (NMFS): These are the minimum objectives to avoid jeopardy. The mentality should be to implement more projects so that NMFS is not imposing these minimum actions to avoid jeopardy.

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- Dave Mooney (Reclamation): When we are in a consultation realm, we are looking at the incidental take of the federal project and whether there is a change in the status of the species.
- Question: Jeff Sutton (TCCA) – The lower Klamath River flow augmentation ROD recently came out for flows from the Trinity River. How can that be a no jeopardy when CVP/SWP is a jeopardy? Augmenting flows for species that are not listed doesn't make sense.
  - Garwin Yip (NMFS): The CVP/SWP operations consultation is through 2030 and Reclamation does not reconsult each year. For the lower Klamath River flow augmentation project, NMFS set up a programmatic consultation with no incidental take statement, so Reclamation would have to engage in an annual consultation if they determine that a flow augmentation or pulse(s) are necessary.
  - Ara Azhderian (SLDMWA): What if your conclusion is no?
  - Brycen Swart (NMFS): In 2015, the water from Whiskeytown Reservoir diverted through the Spring Creek Tunnel into Keswick Reservoir was actually warmer.
  - Jeff Rieker (Reclamation): We would have to look back at the data from that time.

5. Next Steps

- Notes and Responses to Questions – let Jeff Rieker know by May 12
- Future Workshops
  - June 22 – Status/Updates
  - September 21 – Status/Results