

NMFS – Reclamation
 Shasta RPA Draft Proposed Amendment Workshop #1
 Science/Modeling Workplans Stakeholders Meeting
 March 24, 2017

Introductions

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| 1. Todd Manley (NCWA) | 17. Jeff Rieker (Reclamation) | 33. Carl Wilcox (CDFW) |
| 2. Craig Addley (Cardno Inc.) | 18. Garwin Yip (NMFS) | 34. Jeff Sutton (TCCA) |
| 3. Steven Handy (Redding Electric Utility) | 19. Christina Durham (NMFS) | 35. Max Zakato |
| 4. Liz Kiteck (Reclamation) | 20. Pablo Arroyave (Reclamation) | 36. Jason Peltier (San Luis & Delta- Mendota Water Authority) |
| 5. Thuy Washburn (Reclamation) | 21. Michelle Banonis (Reclamation) | 37. John Rubin |
| 6. Tom Boardman (San Luis & Delta- Mendota Water Authority) | 22. Francis Brewster (Santa Clara Valley Water District) | 38. Margarite petiel (CCWD) |
| 7. Randi Field (Reclamation) | 23. Sheila Greene (Westlands Water District) | 39. Andrew Fecko (PCWA) |
| 8. Don Bader (Reclamation) | 24. Josh Israel (Reclamation) | 40. Bruce McLaughlin |
| 9. Chuck Hanson (Hanson Environmental Inc.) | 25. Ron Milligan (Reclamation) | 41. James Takahara |
| 10. Dave Mooney (Reclamation) | 26. Danielson (WAPA) | 42. Ansel Weber (?) SMUD |
| 11. Luis Bair (RD 108) | 27. Mike Krowalski (WAPA) | 43. Doug Obegi (NRDC) |
| 12. Thad Bettner (GCID) | 28. Travis Yonts (Reclamation) | 44. Lee Burteau |
| 13. Brycen Swart (NOAA Fisheries) | 29. Eric Danner (NMFS- SWFSC) | 45. John Mclain |
| 14. Jim Piper (City of Sacramento Department of Utilities) | 30. Miles Daniels (NMFS-SWFSC) | 46. Mike Deas (Watercourse Engineering Inc.) |
| 15. Federico Barajas (Reclamation) | 31. Mike Ford (DWR) | |
| 16. Shelly Stratimore | 32. Jason Roberts (CDFW) | |

1. Overview of meeting purpose (TPs)
2. Presentation--Reclamation Draft Workplan for Shasta and Trinity Division Seasonal Operational Water Temperature Modeling (Jeff Rieker)

- Technical work group will convene in a month or so
 - Future: Need to consider:
 - Transition from current to future model application
 - Ongoing revisions once completed
3. Presentation--NMFS Southwest Fisheries Science Center Science/Modeling Efforts and Workplans (Eric Danner)
- RAFT output Sacramento River modeling of temperature over space and time is based on Reclamation's input data. The SWFSC is not ready to utilize their reservoir model as input to RAFT/CVTEMP
 - Future:
 - How do we best use these physical models moving forward?
 - What studies are needed?

Questions for Eric:

- Shelia: Are we working on a bioenergetics model? Eric's presentation made it sound like that was in process, but that has not been reviewed. Are we working on this model?
 - **GETBACK.** Garwin/Josh—We are assessing predation to be able to work toward building a model in the future. Also working on an individual based model.
- Frances: On reservoir modeling slides with profiles, it looked like there was a big change between observations and predictions where the reservoir appeared to warm up significantly—why such a big jump? What are we doing to resolve that?
 - Miles: It was a model spinup effect—we think it is a spurious artifact. We put this graph together quickly. We need to work out in the code so that you don't have the huge gradient. **UPDATE**-- this artifact has since been corrected.
- Sheila: With RAFT predictions of temp-dependent egg mortality—do you go back and validate predictions vs. observed? How well does it validate? I thought NMFS had overseen a program to measure temperature in the redds within the last few years. At least the temperature from the model could be validated with those data.
 - **GETBACK.** Miles: Speaking as an end user, Eric has graphs of temperature-dependent mortality model results vs. actual at RBDD. However it is difficult to validate the model, especially with field measurements.
- Jeff Sutton: Comment from CSAMP presentation--modeling doesn't take into account the improvements to the system, for example, TCD installation and retirement of RBDD gates, if data shut off at 2011. That is a concern regarding model inputs. How are these assumed operational improvements being incorporated?
 - **GETBACK.**
- Lewis Bair: Jump from temperature to survival at RBDD has a lot of other stressors that add additional uncertainty (disease, etc) in addition to temperature. We should spend time talking about red bluff and NMFS change from observed temperature over the eggs to survival percentages. This is a big change and everyone should understand the differential.

- **REQUEST** that we consider the distance and stressors between temperature down to survival at RBDD
 - ???: In predation/tethering study from last slide-- would this device give any sort of population abundances/predator density abundances or would it just identify species? Is this project currently funded? If it is not funded, is it just a science fair project or a tool in development for use?
 - **GETBACK**
- 4. Discussion--Reclamation science planning concepts (Michelle/Josh)
 - Gaps in science?
 - Lots of things we're talking about go beyond the shelf life of the RPA adjustment, and is more appropriate for the ROC on LTO effort.
 - Should look holistically across the whole system and species
 - Science workplan should be general, but focus and prioritize Shasta and the Sac.
 - Collaborative planning
 - Structured decision-making
 - Expertise shared across the agencies
 - Open data
 - External review
- 5. Open questions and comments:
 - Thad: Interest in forming technical committee, participation will be important to create a trusted tool. On biological workplan, will there be another technical committee or will discussions go through CSAMP? There are a lot of different forums on science, we should try to consolidate into the best forum.
 - Michelle: CSAMP is a good forum, but it depends on our objectives. CSAMP allows for vetting of certain topics, but might not make for a good technical forum. We will have to think about what works best. There is limited capacity in CSAMP and we need to be mindful of how much to tack on. We need to think strategically about the best way to do this.
 - ???: Anyone else doing science besides Eric? To develop robust approaches needs variety. Is there funding for others to examine issues related to winter run?
 - Josh—the modeling plan you heard about addresses many of the issues the science center has been working on. NCWA salmon recovery program call today to discuss other stressors in the system—predation, disease, pathogens, improved temp modeling---that has been a stakeholder-led effort that has been a good collaboration that has helped prioritize different topics.
 - Todd-the idea is to develop near term actions and projects that can be completed to move the needle on species.
 - Question really on fundamental science---issues with egg and juvenile survivorship. If you don't understand what is happening you cannot fix it. What Eric has been doing with egg mortality model needs validation from field data. You would want to tag fish and track mortality. Maybe some of that is happening, but it seems important to make progress.

- ????: In looking to prioritize projects, sometimes we don't get a measure of our investment return. Many times we focus on investment dollars and not what information we have gained from the effort.
 - Pablo--Reclamation agrees that the basis of our funding has to be focused on most urgent need to fill the gaps that will help us continue to operate the projects. We've been getting a lot of drought funding, but that's going away, so we need to identify the most urgent priorities for funding
 - Sheila: There are other egg mortality and life cycle models used in the previous BO--- will there be an effort to compare and contrast the more recent NMFS models to the existing models for the purpose of comparing and contrasting them to explain why there are differences? The other models are the Interactive Object Oriented Simulation model, the OBAN winter run model, the USBR egg mortality model and the Cramer Fish Sciences egg mortality models. There is also a population model named SalMod. And there is an egg mortality model used on the American River.
 - **GETBACK.** Josh: We'll use a set of tools, not just a single tool
 - Eric: Mid-April – will host a technical workshop to get into the weeds of the temperature-dependent mortality model and CVTEMP website.
 - Doug: Will we apply the egg mortality model to other rivers and species?
 - Eric: Looking at this on Clear Creek. Ben Martin coordinating with USFWS and we are open to expansions. You need the right level of data to apply. Most other runs aren't subject to the same constraints as winter run. A bit different incubation in that winter-run are challenged by warmer water temperatures at the back end of incubation, vs. spring-run that are challenged by warmer water temperatures at the front end of incubation. WR model is parametrized with increasing temperatures at end of egg development. A spring run model would need the reverse construct, but we think the fundamental biology and physics would be the same.
 - Doug: Would encourage you to think about scaling up to include non-listed fall run as well as part of a larger CVPIA context.
 - Eric: concern that these are hatchery fish as opposed to wild fish.
6. Other comments mentioned for the next workshop:
- Will there be modeling greenhouse gases and how it would affect everything?
 - Will there be an economics impacts analysis?

Side comment/recommendation:

Would've been helpful to open it up to other scientific presentations.
 Needed a facilitator.

Additional email questions from Shelia for Eric (received 03/28/17):

In the temperature-related egg mortality model, they use the egg to fry survival to Red Bluff for calibration. For a long time around here we have discussed the limitation of the rotary screw traps during times of high flows and debris. They pull the traps when the flows get very high

because the associated debris damages the traps or the flow dis-lodges them. We also know that fish tend to move under high flow conditions because the turbidity tends to go up too. The method the USFWS used to interpolate when the traps are out is to take an average before and after which misses the time period when the fish density is usually high. This results in an underestimate of the egg to fry survival. How has NFMS dealt with this? There are other circumstances when the traps are raised, hatchery steelhead release and exceedance of take limits.

GETBACK