Meeting Summary

# FLOW WORK GROUP

Tuesday November 14, 2023

TRRP Office/MS Teams

## Tuesday, November 14, 2023: 9:00 AM

**Participants**

Core members: Justin Alvarez (HVTFP), Galen Anderson (USFS), Todd Buxton (USBR/TRRP), Kyle De Juilio (YTFP), Patrick Flynn (Trinity Co.), Ken Lindke (CDFW, coordinator), Trevor Morgan (CDWR), Bill Pinnix (USFWS)

Other participants: Kiana Abel (USBR/TRRP), John Bair (McBain Assoc.), Emily Cooper-Hertel (YTFP), Mike Dixon (USBR/TRRP), Chris Laskodi (USBR/YTFP/TRRP), Eric Peterson (USBR/TRRP), Roman Pitman (NOAA), Oliver Rogers (USBR/TRRP), Karl Seitz (HVTFP), Reuben Smit (USFWS)

## Action Items Derived During the Meeting

Action Item 1: Ken will request that the Fish Workgroup develop more biologically relevant temperature objectives/targets that could include some or all of the following: sub-daily temperatures, 2-D temperature variability, more spatially relevant domains (e.g., linear distance within suitable ranges), and dose-response.

## Action Items Outstanding from Previous Meetings

All action items from 10 July meeting were completed.

## Summary of Meeting by Agenda Item

**Review/updates on outstanding action items (Lindke/All)**

All action items from the 10 July meeting were completed.

**DSS (Decision Support System) review (De Juilio)**

Models and analysis in the DSS for making flow decisions are antiquated and don't provide sufficient distinction between proposed hydrographs for a given water year type. The DSS was always intended to change through time, adding and removing models and analyses to improve management decision making. We are there needing that change now. Workgroups were tasked to review and make recommended changes. De Juilio will lead the conversation, hoping it will be a discussion.

The Flow WG is dissatisfied with the DSS and its limited ability to inform flow management decisions. Most years we are limited to one or two indicators of success. Bedload transport was focused on last year, even though there aren't really any ties to successes. Hoping to go through the lists and consider each for the basis of decision making. Peterson adds background: IDT also took on this task, and IDT is

supposed to review long-term monitoring. These two efforts would hopefully run in parallel in IDT, even though this path would be slower. IDT could have something for water year 2025. Peterson suggested adding two more columns to the objectives/targets table: monitoring activities and models are relevant to each objective/target. This would be a good place to start for linking DSS content and long-term monitoring to obj./targets. Ultimately, we should expand the DSS beyond just flow management, as was originally envisioned. The guidance memo for DSS review has only been seen by the IDT at this point.

Pittman relayed that Seth Naman felt that the wetted width and nutrient flux (Physical Habitat DSS) would be helpful additions to the DSS. De Juilio commented that flow objective 4 fits with that request. For completeness, we should consider models/metrics that were included in the original DSS but have been dropped over the years – the guidance memo includes the original DSS. De Juilio noted that the utility of the bar scour metric is questionable because the underlying data is outdated. However, conceptually it could be an informative tool. Buxton noted that modeling scour depth was made by the modeler and he couldn't trust the data.

Temperature is important to consider within this group. Buxton noted that we will soon be able to predict subdaily temps, and wondered if we could add this to the DSS. He's curious if there are ideas out there. Ken said we would need to understand the model better, temporal resolution would make sense, would need a clearer picture than just temp and subdaily. 1D subdaily for the restoration reach is what Buxton is working on. Gaeuman is doing some 2D modeling, does Kyle know where that is at? Site specific validation of the 2D temp model in SRH-2D. The first step would be to develop objectives and figure out how to summarize. It's a good development and temp is really complex in time and space, but not sure that we have biological objectives that are nuanced enough to add this to the DSS at this time. Lindke expressed dissatisfaction with the current temp targets. They are regulatory and not a great surrogate for meaningful biological responses. Point compliances based on 30+ year old information are inadequate. He would like to move toward something like the linear distance within a suitable range, or a dose-response metric vs a critical threshold. Would need to develop a thermal dose and subdaily would be important. The Fish WG should take this up. River length of optimal temperature is important.

Peterson is suggesting if we want something that is relevant to a flow DSS start with objectives and targets. Don't want it to become an IAP catchall. Lindke: stoplight concept we're looking at ties to biology, but the point of this DSS is to select among alternative flow recommendations vs evaluating conditions relative to biology. The stoplight approach doesn't seem directly usable as-is, but conceptually it's a good idea. If we were to adapt it, it will be critical to relate colors to biological responses, not relative performance of alternative. E.g., if all alternatives are terrible for a given metric, all red, not some with green or yellow because they're less terrible. De Juilio: how do we make this more digestible for the public and managers as to why we are making this recommendation? Alvarez: we haven't used the stoplight method and seems like it's a good communication tool. There was general agreement.

Less empirical items – what used to be in the DSS? Risk of salmonid egg mortality, riparian encroachment, lower juvenile Klamath disease and water quality conditions, meeting policy requirements, learning potential, construction impacts (elevation of flows), hydropower offset, recreational use, lake levels on June 1. Buxton suggests adding holding area from a velocity perspective, easy to do and a simple calculation. Was there an objective to provide holding habitat? Lindke, bigger picture question – do we want to include things that aren't an issue under current flow regime?

Velocity, temperature, holding, really good subject for the fish workgroup. Do staff measure temps at the weirs? Yes, twice a day. Laskodi: would you see a difference in hydrographs aside from drastic summer flow changes. Buxton: No, because of static baseflow. Objective is to show decision makers the effect of the flows are on these species.

Lee is interested in adding frog and turtle data because of the potential listing of the western pond turtle and yellow legged frog.

Suggest a contrast winter flow "what would have happened." Lindke mentions that we've done this before. Dixon confirms that it's a good idea to add it for the record, despite TMC votes.

Buxton suggests consistency: let's formalize how the table is changed and what updates are made. Modeling unimpeded hydrographs – necessary to inform decision makers later down the road.

De Juilio: Who's tool is this? This is the flow workgroups tool to be able to change and present to the IDT then TMC. Should it be broad or narrow? It was originally intended to include all actions – seems achievable to come up with a DSS for flow management, specifically. Objectives, targets, structure and then the flow workgroup decides how to move forward with. Let's agendize this for a future meeting – temperature and flow objectives. If this is a flow workgroup tool, what do we want it to look like?

**WY23 winter flow implementation analysis and reporting (Lindke/all)**

Lindke proposed that a report on WY23 WVF implementation should be prepared that formally documents the results. The preliminary results presented to the public at Indian Creek lodge and to TMC at their September 2023 meeting was a start, but there are additional models and data that weren't available then. The report would be peer reviewed. He's looking for willing participants and brainstorming on what should be included.

WVFs were only partially implemented in WY23. They were not implemented as recommended or approved by the TMC. Synchronized flows did not happen and the elevated base flow period hydrograph was modified due to infrastructure constraints. Keep the discussion to biology. Workgroup product in the end. Lindke would be the PI on the project. Chris has done some analysis on the fishing impacts, two data sources that give us an idea. It's too difficult to include economic impact. Option to combine topics. Report is fantastic and definitely needed.

Synchronized flow component: redistribution of delta sediments. Buxton thinks the analysis would be simple. Would it include grainsize transport threshold with velocity? No, probably not because of the difference of the forms of the sediment. De Juilio – redds and sedimentation, entrainment threshold is important. Buxton, we could go theoretical – may not have the capacity to go down that road. De Juilio is advocating for using the bed scour model 40 miles in 2D – not site specific. Lindke will need to demonstrate the benefits and drawing a contrast to the potential benefits of what we didn't implement. How do we quantify the geomorphic piece of the puzzle. DeJuilio: bedload transport is legacy and not sure it's tied to objectives moving forward. Not sure the physical work group has moved forward with a decision. It's uncertain if this should be included because the synchronized flows were not implemented.

Reducing cold water releases in the spring and summer that suppress growth is a critical objective that has to be addressed. Temperature is measured at numerous locations in the mainstem: Hoopa, Lewiston, Douglas City, South Fork (USFWS), North Fork. Using RBM10 seems like the best model. De

Juilio agrees but the RBM10 needs to be updated with the 2023 climate analysis. Laskodi: it probably will tell the same story with the empirical data. Are models the best or is using empirical data the best approach. Split into two sections into what actually happened and those results (use empirical data), and what we recommended and those results (use modeling). RBM10 is every tenth of a mile calculations. Linear pattern of warming is consistent, could estimate fairly easily – similar to the temperature synthesis report. Include both sets of data in the report, limitations on the results are really important. Flow event in January altered the course of the whole implementation.

Fish Growth is important and we have screw trap data at Willow Creek and Pear Tree. What years should we compare to? Preliminary analyses compared WY23 with previous Wet WYs, but WY23 was exceptionally cold. Should we instead consider years with similar temperature regimes? Some combination?

RT50 is better for relating outmigration timing to temperature, RT80 is not as informative. However, we don't know what's good and what's bad other than earlier in dry years, later in wet years. The goal is to have outmigration timing (and size) that improves migration survival through the lower Klamath.

Food Production: the work that Ben King and Chris did showed that there was food production on the flood plains. Thus far we have only shown that it did occur, but it would be nice to tie it back to winter flow implementation vs none. E.g., could we develop a relationship between duration of inundation and biomass production, then quantify biomass production through time comparing WVF implementation vs. none? Can you lump sites to show a relationship between inundation and biomass? Likely there is insufficient data at any one site. Is the relationship consistent across sites? How do we quantify added biomass from WVF implementation? Periphyton data might help fill in some gaps. Thomas Starkey-Owen's work in 2018 was from January through June - no winter flow implementation. Thomas Gast report used fish size and temperatures to estimate food ration. This could be done to compare ration between WVF and ROD flows as another way to get at food production.

Timing of inundation – graphing the area of inundation. Previous presentation with S3 emergence. So difficult to summarize through time and space while assigning value. Progressive ways are explained within the 40-mile capacity report.

Have pre-spawn mortality empirical data: concern of the public. Spring chinook successfully held and spawned under these conditions. Would noting the fishing closure be important?

Hydropower concerns in the original report.

EPA water quality targets at Hoopa (summer impact).

Lindke wants to create a draft report outline after this meeting, circulate among willing participants.

Buxton's other analysis: getting fish into the tributaries with how the mainstem provides access (or not) with elevated flows and resulting inundation of tributary mouths. When are they prevented access from the tribs and given access with winter flow?

Who would like to participate? Todd (wants to see an outline), Kyle & team, Bill & team (tentative commitment). Pear tree data (Hoopa). Talk of comparing screw trap data in regular reporting periods.

**Summer baseflow (Buxton)**

Hoopa water quality considerations also setting nets in the summer.

Value in extending the reach. Buxton truncated to the 40 miles, but it would be easy to add although the survey is from 2009. One challenge is outdated bathymetry downstream of the restoration reach. Want to consider surveying that downstream area. De Juilio thinks there is a 2014 bathymetric data set, although it's not resolution that we're used to. Green lidar possibilities in the near future. Work that can be done by others on summer flow requirements to meet species needs such as frogs and turtles and help manage riparian vegetation. Would like to have a subgroup develop hydrographs that would be beneficial for ecology during the summer. Holding habitat idea that was formed in the 80's and 90's needs to be revisited.

Kyle noted that reducing summer baseflow provides no real water savings because the same releases from Trinity Dam would be needed to maintain release temperatures at Lewison. Whatever reduction in releases from Lewiston would have to be offset by increased diversions through Carr Tunnels to maintain temperatures. Would different summer hydrographs be selected based on the water year type? Different options could be proposed then tweaked to look at outcomes. The Flow WG would work on how flows are implemented, e.g., decisions on mechanisms of the releases. Biological components would be worked on by the other workgroups. How do we craft something that's beneficial for other species as well as fish? Riparian seems really important for summer flows.

**1:10 PM Adjourn**