

Meeting Summary  
**FLOW WORK GROUP**

Monday July 10, 2023  
MS Teams

**Monday, July 10, 2023: 1:00 PM**

**Participants**

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

Other participants: Kiana Abel (USBR/TRRP), John Bair (McBain Assoc.), Chris Laskodi (USBR/YTTFP/TRRP), Eric Peterson (USBR/TRRP), Oliver Rogers (USBR/TRRP), Derek Rupert (USBR), Karl Seitz (HVTFP), Reuben Smit (USFWS), Veronica Yates (HVTFP)

**Action Items Derived During the Meeting**

Action Item 1: Ken will email Mike Dixon to inform him of the workgroup's decision to pursue a recommendation for winter variable flow implementation in WY2024.

Action Item 2: Kyle and Ken will develop a brief written plan for workgroups to evaluate the contents of the DSS and recommend deletions or additions, which will be forwarded to IDT.

Action Item 3: Dave and Kyle will evaluate the effects of WVF on bed disturbance and possibly fish Capacity.

Action Item 4: Ken will compare Lewiston release temperatures to the mainstem upstream of the reservoir.

Action Item 5: Bill will evaluate the effects of WVF on fish size and possibly abundance and timing.

Action Item 6: Ken and Chris will coordinate with Ben King to see if there are results from macroinvertebrate sampling that could be presented to TMC in September to describe the effects of WVF on food production.

**Action Items Outstanding from Previous Meetings**

All action items from 20 March meeting were completed.

**Summary of Meeting by Agenda Item**

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

All action items from the 20 March meeting were completed.

### **Seasonally Oscillating Hydrograph (Rupert)**

Derek Rupert from USBR Northern CA Area Office gave a presentation on a proposed method for developing annual hydrographs. The method uses a sine wave to determine annual baseflows with a wavelength of one full calendar year. The peak and trough occur at the summer and winter solstices, respectively, and the rest state (midpoint between peak and trough) coincides with annual equinoxes. Amplitude and the resulting water volume would be water-year dependent and determined annually in April with the publication of the DWR Bulletin 120 water year forecast. Deviations from current water management in the Trinity River include carry-over storage and water releases and variable annual winter and summer baseflows. Some water would be reserved for other objectives such as riparian scour and geomorphic work. The presentation is available on the TRRP website on the page for this workgroup meeting and includes several questions posed to the workgroup.

Ken suggested that the date of minimum flow, i.e., the trough of the sine wave, could be adjusted to coincide with empirical observations of minimum flows. He thought this might be around the fall equinox and/or leaf fall when riparian plants significantly reduce their water uptake. Kyle noted that the proposed flow schedules hold a minimum for a long duration and the timing looked good to him. Minimum flow starts about when spring Chinook have arrived and begins to increase about when fall Chinook begin to arrive.

Todd asked where this method was at in the implementation process and expressed concern about it being implemented as-is. The flow schedules could be considered ballpark, at best, and are not based on empirical observations or supported by modeling. Derek said the method is currently the only proposal for flow management in Clear Creek and is likely to be implemented there after ESA consultation is complete. He also acknowledged that the method is conceptual at this point and is looking for input on improvements.

Kyle addressed the question of how low summer baseflow could/should go by stating that adequate temperatures for holding spring Chinook and other animals needs to be considered. Ken thought flow could be less than the current proposal of 350 cfs.

Derek had noted during the presentation that some natural hydrographs show a right-skewed wave form instead of the symmetric sine wave, which is attributable to spring snow melt. Ken thought incorporating this could be an improvement, but questions remain as to whether a snow or rain dominant hydrograph is best for Lewiston releases. Kyle noted that skewness is already incorporated to some degree in the shift between water years in April. For example, if a wet winter follows a drier winter, the hydrograph would shift up in April, providing a right skew. In contrast, if a dry winter followed a wetter winter, flows would drop in April providing a left skew.

Regarding other improvements and the use of water volume above baseflow, Seth suggested it would be good to consider synchronizing releases with natural tributary accretion events.

### **What models to continue including in DSS? What to add? (De Julio)**

Kyle shared the Decision Support System used annually by the Flow Workgroup to evaluate proposed hydrographs, pointing out that it has changed little in recent years despite a growing recognition that several of the model results have provided little to no value in decision making. Ken noted that some of the metrics, particularly temperature compliance, are identical across hydrographs in most or all years because the time periods for calculating the metrics occur after all hydrographs have returned to summer baseflow. In addition, there has been a growing awareness within the program of the importance of foodweb development in hydrographs, which is not captured at all by the fish production model. Eric pointed out that we have some additional metrics yet to be incorporated into the DSS specific to foodweb development, i.e., the number of days of inundation at various flow levels. Kyle also pointed out that these metrics are included in the recently approved programmatic objectives document.

Kyle noted three primary components of fish outmigration that we could have some management effect on: the number, size, and timing of outmigrants. However, it would be challenging to come up with DSS metrics for these because we don't have sufficient understanding of the relative importance of the three. We don't know what the desired outmigration condition is and it probably varies across years. Perhaps this is something the Fish Workgroup should address.

Bill reminded everyone that the TMC directed program scientists, following SAB recommendations, to develop a DSS to inform adaptive management and changes to ROD releases based on numeric input. It didn't originate from the workgroups. It is important to have something like this to document how decisions are made. Even if we don't see much difference among model results, we've still documented what numbers we've looked at in the decision making process. Seth noted that the DSS was never intended to be set in stone and that workgroups should reconsider their respective sections as needed.

Ken asked what should be done when we have objectives and/or known ecological concepts (e.g., foodwebs) that aren't captured in any of our available models and may conflict with result from available model results. Bill said it is incumbent on the Program to develop those tools, update models, and/or offer new metrics to address these deficiencies.

Todd supported re-evaluating the DSS, but urged us to keep it as-is until then. It is important to maintain a record of what has been evaluated as Bill suggested.

Kyle agreed to work with Ken to develop a plan on how workgroups should evaluate the contents of the DSS and suggest deletions or additions. The plan will be forwarded to IDT for consideration, and IDT can distribute to workgroups as an assignment.

### **WY2024 planning for Flow WG recommendations, i.e., WVF, ROD, or something else? (All)**

Ken explained that we're discussing WY2024 flow planning so early this year because we will need to put a proposal for winter variable flows before TMC in September if that is the will of the group. He supported that effort and asked for concurrence. A few members voiced support and nobody was in opposition. Eric added that we need to focus on a technical recommendation at this point because it is uncertain whether Reclamation has sufficient ESA coverage to implement WVF. Ken said a technical recommendation is the focus and this is the only jurisdiction, so to speak, of workgroups anyway. Whatever IDT and TMC choose to do with the technical recommendation is beyond our scope in terms of

legal coverage or policy considerations. Seth said that if we plan to recommend WVF in WY2024, we'll need to inform Reclamation and TMC ASAP. We agreed to inform Mike Dixon and let him decide who to inform and on what timeline. Kyle informed the group that a major issue in the community last year was the uncertainty in flow management. The public was not given enough advanced warning of our change in management. Regardless of what action will be taken in WY2024, the public needs to be informed as soon as possible. Todd said that just telling the public that we're going to do WVF, ROD, or something else is insufficient. A flow schedule that could be scaled to available water would be better. Ken supported the same proposal that was approved by TMC in the December 2022 meeting and agreed to inform Mike D. that the Flow Workgroup intends to recommend WVF for WY2024. The specific details of flow schedules were not decided.

### **Strategy for WVF post-hoc analysis for TMC (All)**

Ken shared the winter variable flow report sections on proposed effectiveness monitoring. Several folks had agreed prior to the meeting to do some analyses contained therein. The objective of the discussion was to solicit additional ideas and review the analyses that are already planned. These will be preliminary and presented to TMC at their September meeting prior to advancing a flow workgroup recommendation to implement WVF in WY2024. When necessary data are finalized and additional data or analyses can be completed, a retrospective report will be completed. Following are some discussion notes on individual analyses.

#### *Channel bed mobilization*

Dave Gaeuman and Kyle had discussed and agreed prior to the meeting to conduct an analysis using sheer stress curves developed for the redd scour report (Gaeuman et al. 2023) to estimate the proportions of the bed that were mobilized for each maximum fisheries flow reach. The curves relate flow magnitude within each MFF reach to the proportion of the bed that is mobilized based on sheer stress and previous substrate mapping. Combined with hydrographs, this can provide a daily time series of the proportion of the bed that is mobilized in each MFF reach on each day.

Todd suggested that we could also look at sediment mobilization in gaged tributaries (e.g., Indian Creek) compared to the mainstem. When tributaries are delivering sediment to the mainstem, is the mainstem mobilizing those sediments? Kyle asked whether capturing the difference in flow between the North Fork gage and Lewiston releases would be sufficient as a first cut.

Seth asked whether we could document tributary delta buildup that occurred because synchronized flows were not released, e.g., using aerial imagery. Nobody thought we have data or imagery to do this formally, but Ken suggested that we could present anecdotal evidence from the Flow Workgroup field visits to Deadwood Creek, Trinity House Gulch, and Douglas City on 30 January.

John suggested that we could look at riparian scour threshold of 6,000 cfs when looking at bed mobility, and that we could also consider higher thresholds, e.g., for scouring two- and/or three-year-old willows.

#### *Reduce spring cold-water releases*

Bill had discussed and will attempt to conduct preliminary analyses of fish size at the Willow Creek screw trap in 2023. Mean size of fish by week can be compared to previous similar years in terms of flow

(e.g., Wet or Extremely Wet water years) or temperatures. It will be a bit tricky to objectively select comparative years to ensure that they're representative. Bill suggested multiple comparisons might be helpful, e.g., pre-ROD to ROD to WVF. Kyle suggested that it might be useful to compare WVF to ROD at Pear Tree even though we don't have a pre-ROD record there. The numbers of outmigrants is also important. In particular, what is the residual for 2023 relative to the stock-recruit model fit in the outmigration synthesis report for abundance and/or biomass?

The group also discussed ways to characterize effects of WVF on temperature. RBM10 didn't seem like the right tool because the model needs to be updated to get realistic results for 2023 (e.g., calibrated for observed tributary accretion and atmospheric conditions). Kyle and Ken proposed that we compare Lewiston release temperatures to stream temperatures in the mainstem Trinity upstream of the reservoir. It could show a return to more natural temperature regimes earlier in the spring. Ken will conduct this analysis.

#### *Promote seasonally appropriate outmigration*

There wasn't much to go on here because the Program has yet to identify the desired condition for outmigration other than earlier in dry years and later in wet years. Kyle said timing of outmigration is important and likely affected by reduction in cold water suppression in spring, but we don't have an objective for timing. Justin said it would be good to look at. Kyle said if we do want to look at timing, the Thomas Gast report indicated that RT50 is a better metric than RT80. Someone suggested relating outmigration timing to time series of spore counts in the lower Klamath River, but that may have to wait until after the September TMC meeting due to limited time and resources. We'll also need to give more thought to what that analysis might look like.

#### *Increase prey through inundation*

Ken conveyed recent discussions with Chris on the macroinvertebrate sampling that has been ongoing with a Cal Poly Humboldt graduate student, Ben King. Some preliminary results are available, and there appears to be an abundance of vulnerable prey in areas that have been inundated for 6+ weeks, as predicted. Ben is giving a presentation to the Riparian Aquatic Ecology workgroup later this week, so we'll know more then. If data are available, Ken and Chris will work with Ben to relate these results to elevated winter baseflows.

#### *Inundation of rearing habitat*

Kyle suggested that flow-to-Capacity curves developed for each maximum fisheries flow reach for the habitat synthesis report (Cooper-Hertel et al. 2022) could be used to compare physical habitat availability between WVF and a ROD hydrograph. Similar to sheer stress curves discussed above, a timeseries of Capacity can be generated for each MFF reach for each hydrograph. The difference between these timeseries would show the increase (or not) in available rearing habitat resulting from WVF at the 40-mile scale. Kyle will have to check if the Yurok Tribe has the resources to do this analysis by early September.

#### *What hydrographs to model*

While it seemed evident that the observed releases under WVF should be modeled, the RBM10 model could only estimate temperatures based on previous years' atmospheric conditions. It wouldn't be a true

reflection of what happened, but it would be better than nothing. Justin suggested running RBM10 for 300 cfs and what we did. However, the most appropriate comparisons might depend on the analysis being conducted. Ken expressed concern about using different sets for different analyses. It would be difficult to explain and justify to TMC and could easily be confusing. The geomorphic analysis seemed the most concerning because we wouldn't be able to incorporate real tributary accretion, so we might have to use different hydrographs for this. Kyle suggested omitting the bed mobility and riparian scour analyses all together because these were only objectives for synchronized flow releases, which were not implemented.

**Non-agenda item: WY2023 flow volume objective (Buxton)**

Todd informed the group that we're about 10 kaf below the volume that we should have released by this date. It is largely due to the inability to achieve the full 11,000 cfs peak release because of reduced head pressure in Trinity Reservoir due to low storage. There was also less water released than was scheduled in the spring recession. CVO is aware and they appear to have no plan to address it. Todd asked whether the Flow workgroup wanted to propose a useful release of this volume. Ken responded that it would be the responsibility of the Flow workgroup to propose something, but we should get direction from IDT as to whether the Program wants to pursue this effort.

**4:00 PM Adjourn**