

Henry's Fork Watershed Council Annual Watershed Conference Meeting Minutes

December 17, 2024

Introductions and Community Building

Aaron Dalling, co-facilitator from Fremont-Madison Irrigation District (FMID), welcomed everyone to the Henry's Fork Watershed Council annual watershed conference. Aaron mentioned that the Watershed Council just celebrated its 30th Anniversary of the Watershed Conference. The group then went around with introductions.

Rob said thank you to Keith and Roger for the great EIWRC's meeting last week. He learned a lot and felt the speakers did a great job.

Brandon highlighted that there's been a lot of trust building and relationships forged through the HFWC. It's now the basis for a lot of collaborative solutions in the watershed.

Keynote: History of science and research in the Henry's Fork Watershed

Rob Van Kirk, Henry's Fork Foundation

The Henry's Fork Watershed is a world-class research laboratory. Why has there been so much research done in the watershed? It's unique on Earth. The Yellowstone hotspot creates unique geology and there is significant tourism and recreation. The quality and importance of our natural resources is very high, and people and institutions care enough to support the work.

We are lucky that the Henry's Fork Watershed receives more water than our neighbors because we are on the west side of the hotspot. There are three subwatersheds that are each different in elevation, topography and hydrology, producing three distinct hydrologic regimes. It's also a wonderful place to study regulated systems: three are three storage reservoirs, 35 major canal systems, and much more. The major lines of inquiry include geology, fisheries, aquatic ecology, socioeconomic, water use and management, and climate and hydrology.

If a tree falls in the forest. Traditional science and research is communicated through peer-reviewed books and journals, "gray literature", conference presentations, or agency planning documents. Generally, scientists talk to each other. We need to do a better job communicating to stakeholders and managers who need and can use that information on-the-ground. That may be through blogs, story maps, social media posts, outreach, "plain language" summaries, and citizen science and other hands-on engagement. We need to meet people where they are.

In future, we hope to improve communications, participate in more regional collaborations, develop more web apps and citizen science, conduct more nutrient and aquatic ecosystem research as well as vegetation/snowmelt/precipitation/streamflow interaction research,

conduct more recreational use monitoring with remote technology, study the relationships between aquatic insects and hatches, and figure out how to adapt to a warmer climate with less streamflow.

Evaluating ecological consequences of ramp-down for cutthroat trout to inform flow management of the Upper Snake River, Wyoming

Colden Baxter, Idaho State University

This is really a team collaboration with Idaho State University, Trout Unlimited, Wyoming Game and Fish, Jackson Hole One Fly, Teton Conservation District, the National Parks Service and more. The lead question for this project is: "Can the fall ramp-down practices be altered to minimize the impact they have on Cutthroat Trout and aquatic macroinvertebrates, while still accomplishing the water management needs of the system?"

The project began this last spring and is intended to be a 2-3 year project. They will conduct a hydrologic analysis of floodplain inundation at various flows, as well as field measurement of ecological responses to flow ramp-down. This is motivated by concerns, especially in 2021, when rapid ramp-down can strand fish and insects.

Pre, during, and post ramp-down field work this fall. Citizen science was also incorporated to make observations each day during ramp down. They have also done some opportunistic PIT tagging and will evaluate longer term effects on fish growth and survival. How do we study fish in relation to the ramp-down? Individual data from PIT tags, site habitat data on fish and insects, but are we going to be able to use this information to learn about fish populations. So far stranded fish include dace and suckers, but many insects have been seen stranded. They're not seeing a large effect on fish population so far, but a big effect on insects. Further research and analysis are ongoing this winter, spring, and next fall.

Wyoming Anticipating Climate-Water Transitions: The University of Wyoming WyACT Project

Brent Ewers, University of Wyoming

Thinking about all the changes that have happened in the past 80 years in the upper Snake system. What can we do in the next 80 years? How do we make predictions about how the socio-economic system will change alongside the biophysical system. This is a massive, \$20 million National Science Foundation project. We know climate will have a profound effect on Wyoming's water resources. Building on earlier climate assessments, acknowledging changes from snow dominated to rain influenced water supply, and communities have diverse climate change views and adaptive capacity. Science and model skepticism limits planning and adaptive capacity, which may be addressed through coproduction of knowledge. Some in the community are skeptical of models, some don't believe climate is changing, and some feel it's a positive.

Trying to address: 1) what are the climate related risks and vulnerabilities impacting water availability, 2) how do communities perceive and respond to climate driven changes in water, 3) how can the co-production process build adaptive capacity, 4) what's the interaction between

society and these biophysical feedback? Wyoming SEaSON is a trusted, high quality, and freely available data and information on climate and impacts. Also did some scenario work to discuss how the region could change during the time frame of current decisions and infrastructure (10-40 years)? 2033-2063? Collaborating via learning spaces like Actional Science Committees, Teacher Reacher Knowledge Exchange, Wind River Startup Challenge, and SEaSON, etc. Idaho owns/manages the water, so how will USBR manage water and what impact will that have?

The goals of this work include providing information the community wants to make decisions over the next 40 years, summarizing observational data. They are learning that it is more effective to talk about scenarios than simply graphs and data. For example, what if, in 40 years, it's hotter and more smokey, what can we do? It seems to really resonate when the discussion is framed around human experience. We hope to improve science communication and trust building in learning spaces, including wyadapt.org.

Yellowstone Cutthroat Trout in the Teton River

Brian Van Winkle, Friends of the Teton River

Friends of the Teton River was founded in 2001 by local groups who were concerned about declines in water quality in the Teton River fishery. In the late 1990s, there was an estimated low of 14 Yellowstone Cutthroat Trout per mile in upper Teton. One project with the University of Wyoming looks at the divergence of genetics above and below Felt Dam. This research has found there are essentially four distinct genetic populations above and below Felt Dam. They are looking at retrofitting fish passage infrastructure but want to be careful to limit the already increasing Brown Trout populations.

The second project this past summer was an eDNA project with the Forest Service and Idaho State University. They mapped samples in 23 important YCT tributaries with the goal of quantifying the distribution and seasonal habitat of salmonid fishes in the Teton River basin. They also hope to identify what factors affect gene flow and create a working group of stakeholders to develop scenarios to mitigate invasive species. FTR will continue to monitor the fishery, collect temperature and water quality data, and implement meaningful restoration projects that protect and restore healthy, functioning stream channels.

Long-term monitoring in the Upper Teton River Watershed

Rob Van Kirk, Henry's Fork Foundation

Long-term monitoring includes a Yellowstone Cutthroat Trout (YCT) tributary survey, a groundwater-surface water research and monitoring, and recreational use monitoring. The YCT tributary survey began in 2005, and a full survey is done every 10 years, with certain sites every 5 years. A great long-term data set.

There is a long history of research into groundwater and surface water interactions in Teton Valley going back to 1964. The Teton Valley alluvial aquifer is critical to water resources in the

Snake Basin. Recent work has included a GW-SW model that provides information including trends in August-September flow (there is a clear downward trend).

Idaho Fish and Game conducts periodic angler surveys, and HFF, Teton County, FTR, IMN and others conducted recreational use surveys in 2018, 2021, 2022, 2024 at six primary access points. There has been a huge increase over time, with highest use at Rainey Creek access site. In the future we plan to repeat the full YCT tributary survey in 2025, continue monitoring long-term GW-SW trends, and continue the recreational use survey TBD based on resources.

Idaho's newest native fish: status of the Least Chub in the Lower Henry's Fork

Eric Billman, BYU-Idaho

Floodplain habitats in rivers are important for fish but also transferring energy and connecting aquatic with terrestrial organisms that use these habitats. There are quite a few non-game species like sucker, dace, Utah chub and Redside shiner. They use this habitat for spawning and rearing. Started a study in 2021 while IDFG was conducting habitat restoration at Cartier Slough WMA. The aim was to understand how small-bodied fish were using that habitat. They sampled 17 sites. They kept catching these fish that didn't match any native fish expected. They looked a bit like Redside shiners but had major differences. Turned out to be the Least Chub. Historically they had only been found in the Bonneville Basin, but in a variety of habitats like rivers, streams, springs, ponds, and marshes. As of the early 1970s, the Least Chub was only found in 6 isolated populations. There was a conservation agreement in 1998 to try to conserve the species. The Least Chub conservation team has done a great job.

How did they get into the lower Henry's Fork? Bait bucket? Natural colonization? To find out they collected fish from the Henry's Fork and the Bonneville basin to compare and see if they are connected genetically. They match most closely to the Wasatch population. The best match based on genetic analysis is that Least Chub entered the Henry's Fork as long as 1-3 million years ago. They then sampled to determine the scope of their presence in the lower Henry's Fork. They have a wide distribution from St. Anthony down to the convergence with the South Fork. Conservation efforts have essentially doubled the species population.

Streamflow drought limits cold-water fisheries production across the northern Rocky Mountains

Clint Muhlfeld, USGS and Tim Cline, Montana State University

Climate change is increasing the severity and extent of extreme drought events, posing a critical threat to freshwater ecosystems and services. Despite the importance of drought as a significant driver of ecological and evolutionary dynamics, current understanding of drought consequences for production and resilience of valuable freshwater fisheries is extremely limited. In this study, we used long-term fisheries monitoring and climate data to understand drought risks and relationships to production and resilience of ecologically, culturally, and economically important cold-water trout populations across the northern Rocky Mountains of Montana, USA. In both regulated and free-flowing rivers, drought-induced reductions in

streamflow had strong negative effects on trout production. Population productivity was strongly related to streamflow conditions 2-3 years prior, suggesting that streamflow exerts strong controls over recruitment and survival of juvenile fishes. These lagged streamflow effects provide the opportunity to develop a drought risk forecasting framework to make real-time and long-lead population vulnerability outlooks using fish density estimates, probabilistic streamflow outlooks, and streamflow data. Finally, these relationships between streamflow and population abundance and production form the basis of streamflow–fish production rule curves for individual rivers under future drought regimes that can be used to guide long-term policy and management of Montana’s iconic blue-ribbon trout rivers. Together, this drought early warning system will allow managers to proactively manage and mitigate drought risks and impacts, while improving long-term drought resilience for freshwater ecosystems.

Found widespread evidence for streamflow drought effects on valuable fisheries. This approach quantifies the value of water for fish production. This approach can inform proactive management and mitigation strategies (angling restrictions, instream flow policy/water rights, river operations). Water management strategies can consider current and future climate and water uses into planning. Protecting water in moderate flow years, may be as or more important than protecting against low flows.

Community Building and Wrap Up

Jamie Powell, co-facilitator from the Henry’s Fork Foundation called for one minute of silence to reflect on the meeting and prepare any final announcements or comments.

Brian said thank you to the presenters and said it was one of the best sets of presentations he’s seen in a while.