

## Upper Clark Fork Working Group Spring 2021 Newsletter

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Welcome to the first Upper Clark Fork Working Group (UCFWG) newsletter! This newsletter is meant to help UCFWG members learn more about the group, its meetings and activities, and relevant stories and opportunities. Have ideas and stories for upcoming newsletters too? Please contact Madison Boone at [madison.boone@montana.edu](mailto:madison.boone@montana.edu) with your newsletter ideas, feedback, and questions.

### NEWSLETTER HIGHLIGHTS:

#### UCFWG Member Spotlight

Meet members of the UCFWG and learn more about their roles and work.

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#### Spring 2021 Topic Discussions

Did you miss a recent UCFWG Topic Discussion? Want to revisit a specific topic or presentation? Find summaries of the most recent Topic Discussions and recording links below!

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#### Upcoming Events and Opportunities

Learn more about upcoming UCFWG events, workshops, and other opportunities of interest.

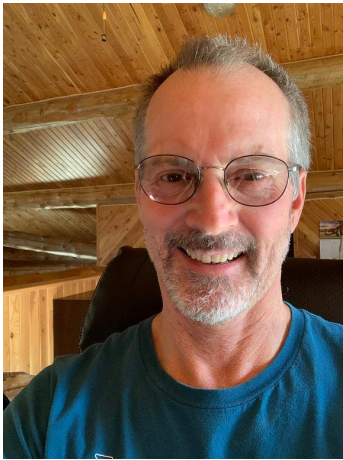


### UCFWG Communications Poll

The UCFWG is conducting a poll to gather feedback from our community. Please take 5 to 10 minutes and send us your responses regarding our meetings, workshops, communication, and direction. We will use some of the responses to this poll to inform you (the UCFWG community) about who is involved in this group, and it will help inform future workshop and discussion content.

Click to take the UCFWG  
Poll

# UCFWG Member Spotlight



**Maury Valett** is a Professor of Systems Ecology at the University of Montana. Maury's work on streams and rivers has combined hydrology, chemistry, and biology to investigate how groundwater-surface water interaction, nutrient limitation, and biological interactions influences ecosystem structure and function. His recent research on the Upper Clark Fork River, MT, integrates work on food webs, heavy metals, and nitrogen enrichment in collaboration with State agencies addressing remediation and restoration.



**Doug Martin** has been with Montana Department of Justice Natural Resource Damage Program (NRDP) since 2001 and the Restoration Program Chief since 2014. As Restoration Program Chief Doug has been involved with the restoration plan development for the Clark Fork River OU, the 2011 Exxon Oil Spill on the Yellowstone River restoration plan, and the Upper Clark Fork River Aquatic and Terrestrial restoration plans and oversees the implementation of the restoration actions associated with plans. He believes strongly that the successful restoration projects are "WE" projects as it takes everyone: the high level bureaucrats, the agencies, the engineers and scientists, the equipment operators, the project neighbors, and the public to make a successful restoration project.



**Tom Parker** is the President and Principal Ecologist of Geum Environmental Consulting, Inc. based in Hamilton, Montana and founded in 2003. Since the mid-1990's, Tom's professional work has emphasized ecological restoration design, planning, and project implementation in river and wetland ecosystems. Tom and his firm have worked for Montana DEQ and NRDP on aspects of upper Clark Fork River restoration and remediation since 2009, and were part of the design team for restoration work associated with Milltown Dam prior to that. Tom enjoys supporting efforts linking research and management by helping to facilitate and coordinate interdisciplinary teams of scientists, engineers and ecological designers.

## Spring UCFWG Topic Discussions

March 2021 - "The significance of a barroom napkin in establishing the restoration of Montana's waters and rivers"

At the March 11 UCFWG Topic Discussion, Larry Peterman (Montana Fish, Wildlife, and Parks, retired) spoke about “the significance of a barroom napkin in establishing the restoration of Montana’s waters and rivers.” Larry started by describing the beginnings of fish management in Montana, where for the first 50 years of the 20th-century management focused on fish stock. Over time, the Fish Division of what is now FWP created a fish biology section and began hiring dedicated biologists. The first jobs these biologists had were to inventory streams and find out what the resource base was. In their inventory, they found that there were few high-quality streams left, with many impacted by human activities. This inventory spurred further assessment of streams across the state, and ultimately only 400 miles out of the 5000 total miles of assessed streams were determined to be Class 1 (highest) quality.



All of this work was done without any kind of legislative direction, and so in 1961, the group of biologists gathered at a bar in Billings to outline what was needed to maintain the Class 1 streams and how to restore other streams across the state. On their barroom napkin, they came up with three strategies focused on habitat, in-stream flows, and water quality, in essence, an overarching strategy on how to move ahead. For their top priority, protecting stream beds and stream banks from further degradation, the group of biologists worked with legislators and junior chambers of commerce to introduce SB 124 in the 1963 legislature. This bill, one of the first permanent legislative acts in the country, established Fish and Game as a permitting agency and introduced permits for projects that impacted streambeds and banks (known today as 124 permits). More legislation followed SB 124 that focused on the habitat, in-stream flows, and water quality strategies outlined on the barroom napkin. For example, in 1969 the legislature passed an act that allowed Fish and Game to file for instream water rights on twelve streams and in 1973 they passed the Montana Water Use Act, historic for its focus on the adjudication and water permitting process.

A major event that helped to spur further focus on water in Montana was the water crisis brewing in the Yellowstone River Basin during the seventies. The need for domestic energy production was becoming a hot topic around the country, driven in part by global events and oil embargos in the early seventies, and the western United States became a focal point for the development of coal fields for energy. Several coal-fired generating plants, as well projects to develop the water resources necessary to help cool the plants, were proposed in Montana and Wyoming. One such proposed water resource development project was the Allenspur Dam located in the Paradise Valley outside of Livingston. During this period, Larry was hired to work on the Allenspur assessment project with the Environment and Information Division at the time, where he helped supervise a team of biologists putting together an in-stream flow reservation for the Yellowstone River and connected tributaries. Although up against the corporate and legal power of major international companies who were also filing for water rights on the Yellowstone, several conservation groups banded together to put forth a massive public relations campaign opposing the Allenspur Dam and urging for the protection of the Yellowstone River, and in 1978 the Board of Natural Resources and Conservation granted

Fish and Game 5.5 million acre-feet of in-stream flows on the lower Yellowstone and 61 tributaries. This action ultimately doomed the Allenspur Dam project and help chart the course for continued protection and restoration of rivers and streams across Montana.

WATCH THE MARCH 2021 RECORDING

## April 2021 - "Functional responses of riverine food webs to multiple stressors: mapping trophic interactions in the Upper Clark Fork across space and time"



During the April 8 UCFWG Topic Discussion, presenters Rafael Feijo de Lima (UM), Marc Peipoch (Stroud Water Research Center), Jose Sanchez Ruiz (MSU), and Taylor Gold Quiros (UM) spoke about "Functional responses of riverine food webs to multiple stressors: mapping trophic interactions in the Upper Clark Fork across space and time." Rafael began by giving a general introduction of food webs, such as those found in terrestrial and aquatic

ecosystems, and then narrowing down to river food webs specifically, which are a mix of terrestrial and aquatic webs. In the Upper Clark Fork River (UCFR), which has a mining legacy, both nutrient and metal pollution are well documented, though how they contribute to the impairment of the system is unclear.

Rafael presented two hypotheses when thinking about the effects of increased nutrients and primary production. The first, the productivity propagation hypothesis, follows the traditional way of thinking about how metals work in food webs in that enhanced productivity promotes toxicant transfer, whereas the second hypothesis, bloom dilution, proposes that nutrient subsidies reduce toxicant influences because enhanced productivity dilutes metals at higher trophic levels. After Rafael presented these two overarching hypotheses, Marc highlighted a UCFR Food Web Assessment conducted in 2016. The assessment had three goals: 1) Characterize the invertebrate community before and during an algal bloom, 2) Quantify the metal burdens and C and N isotopic signatures of invertebrates and trout, and 3) Combine metals and isotopes to outline the UCFR food web.

Jose then followed Marc to talk about how to build an energy flow food web, noting that food webs are increasingly used as a tool to understand ecosystem stability in the context of a disturbance. To begin to understand the biomass and secondary production of a system, Jose is visiting chosen sites along the UCFR and using a test sample to take representative "hole punches" of the river, which he will then process and use to obtain a biomass measurement. He is also sampling trout individuals and conducting gut content analyses to understand how much of each resource is contributing to biomass. From these analyses, Jose will start to look at how metals flows are related to energy flow food webs and help unravel the mechanisms of what is happening in the river as well as better inform management practices.

To wrap up the presentation on food and energy flow webs, Taylor spoke about building a fish-based food web that looks at top producers and consumers. These kinds of food and flow webs will be created for three separate sites and help answer questions like

how much ingestion is required to sustain a given production. This work can also be tied into larger food webs using the flows Taylor develops as well as the creation of production to ingestion ratios and their inverse, which are less commonly seen. Ultimately, Taylor hopes to uncover what is controlling the movement of energy through the flow web at the three sites.

WATCH THE APRIL 2021  
RECORDING

## May 2021 - "Habitat from an aquatic perspective"

At the UCFWG Topic Discussion on May 13, Taylor Gold Quiros (UM) and Alex Leone (Clark Fork Coalition) spoke to the group about "Habitat from an aquatic perspective," moving from a broad perspective to a narrower focus on what they are doing on the UCFR. Taylor began the presentation by explaining the various axes researchers think about when working on rivers (lateral, vertical, and longitudinal) and how researchers can use the habitat mosaic model to define a habitat more easily. When looking at the UCFR and its habitat, one has to take into consideration flooding, groundwater, upwelling, vegetation and detritus, and riparian regeneration, all within the context of restoration activities.



As was touched on in the previous month's presentation, the UCFR has a long mining history which has led to slickens on riparian covers and metals being washed into the river. The input of metals into the system is the main limiting factor of the UCFR, although additional limiting factors include nutrient enrichment, differing morphological habitat, and changes in river flows. Restoration of the UCFR, a decades-long process, has multiple goals, such as restoring aquatic resources to baseline conditions, restoring terrestrial habitat to baseline conditions, offsetting residual effects from hazardous substances, and maximizing the long-term beneficial effects and cost-effectiveness of restoration activities. Taylor noted that it is not only important to think about habitat restoration with the above goals in mind but also from the aquatic perspective. However, defining "good" and "bad" habitat doesn't work from the aquatic perspective because habitat diversity is important, but a starting point to assess habitat can begin by looking at water quality.

To help illustrate what habitat restoration might look like, Alex provided an example of an on-the-ground habitat assessment pilot project he helped conduct with FWP in 2018. This pilot project, based on feedback from the public on the Superfund process, focused on the actual physical habitat from a fish's perspective. The project team flew aerial imagery with the Natural Resource Damage Program (NRDP) in 2018 and then embarked on a fish habitat characterization study focusing on fish habitat assessment and a fish habitat preference evaluation. From these studies and a multitude of on-the-ground surveys and measurements along the river, the team developed a series of maps illustrating things like wet undercut depth, riparian habitat cover, and fish counts to help inform management and its implications. Although the project accomplished many things, the study did have limitations due to its piecemeal approach, the need for more data, and lack of capacity. However, researchers from Montana Tech and NRDP hope to build off the pilot project and complete a more comprehensive assessment of banks as

well as conduct long-term floodplain vegetation monitoring.

WATCH MAY 2021 RECORDING

## Events and Workshops



### Habitat Workshop

Taylor Gold Quiros is leading a Habitat Workshop on June 11<sup>th</sup> starting at 10 a.m. The goal of this workshop is to identify key component measures of habitat diversity and coordinate field assessment efforts on the UCFR for the summer 2021 field season.

If you are interested in attending this Zoom Workshop please register for the workshop by clicking **Register** below.

### [Register](#)

Email Taylor at:

[taylor.goldquiros@umconnect.umt.edu](mailto:taylor.goldquiros@umconnect.umt.edu)



### Upcoming Topic Discussion Meetings

Topic Discussions are regular meetings that occur on the second Thursday of each month and featuring a speaker or set of speakers presenting on a topic related to the UCFR.

- **June 10** - *Algal Blooms*
- **July 8** - *Floodplains*
- **August 12** - *TBD*

Zoom link for all meetings:

<https://umontana.zoom.us/j/97494359807>



## August Field Workshop

Maury Valett, Doug Martin, and Tom Parker will host a field workshop on August 19. Details will be shared closer to the date, and you can also contact Maury ([maury.valett@mso.umt.edu](mailto:maury.valett@mso.umt.edu)), Doug ([dougmartin@mt.gov](mailto:dougmartin@mt.gov)), or Tom ([tparker@geumconsulting.com](mailto:tparker@geumconsulting.com)) for more information or questions.



## Have a Workshop Idea?

Please take the UCFWG Communication Poll and let us know what you are interested in. We would love to hear from you.

[UCFWG Communication Poll](#)

## Have an Event you want Advertised to the UCFWG Community?

Send an email to either Madison Boone, [madison.boone@montana.edu](mailto:madison.boone@montana.edu), or Andrew Hauer, [andrew.hauer@umontana.edu](mailto:andrew.hauer@umontana.edu), and we will work with you to post your event on our website, newsletter, and send emails to our community.

Upper Clark Fork Working Group | [ucfwg.org](http://ucfwg.org)



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