Matt and Eric,

I think it may be time for us to have a meeting so that our teams can meet and touch bases on the Bitterroot Front project again. I’m looking forward to meeting the Bitterroot Forest’s new hydrogeologist.

Here is a re-cap of what we are bringing to the table.

Our aim and goal is to establish a permanent network of water quality monitoring stations across the entire Bitterroot River Watershed to collect data relevant to both the quantity and the quality of the water throughout the watershed. It’s is a Herculean goal in terms of magnitude and complexity, but we have made a great deal of headway since embarking on the venture in 2017. We have grown from four sampling sites along the mainstem in 2017 to six sites on the mainstem and eleven sites on six tributaries on the East side of the valley [our

Sapphire Front project].

Establishing a couple of sites on each of the major tributaries on the West side would be the next logical expansion of our enterprise. Our priorities in establishing new sampling sites has largely been guided by the State of Montana’s TMDL process and results and has involved collecting data for a suite of nutrient analysis, YSI parameters [temperature, dissolved oxygen, barometric pressure, pH, conductivity, and turbidity], and flows [used in establishing nutrient loads]. We have recently added Algae Sampling and analysis to our repertoire.

Our equipment includes

1. one Pro Plus YSI [with conductivity/temp, pH, DO, & nitrate sensors], Pro DSS YSI
2. one Pro DSS YSI [with conductivity/temp, pH, DO, turbidity & nitrate sensors]
3. one FlowTracker2 flow gauge
4. plus accompanying software for downloading all data

As we look toward establishing sampling sites on the Bitterroot Front we can make some broad and basic distinctions. The steep granite slopes of the Bitterroot Mountains with their relatively narrow belt of floodplain from their bottom to the river present a very different landscape than the Sapphires. It subsequently presents a different set of impairments. The predominant impairment on the East side is nutrient impairment of one sort or another. The predominant impairment on the West side is flows.

Flows are of extreme importance to irrigators and recreationists alike in the Bitterroot valley and we have a long history in the valley of a cooperative effort between the state private irrigation companies and conservation organizations addressing the issue.

Trout Unlimited identified low flows as their major priority following a study done in the 1970’s and has since been pursuing a steady program of re-establishing flows in selected tributaries on the West side by converting old agricultural water rights to instream flows.

With flows being such high priority on the West side the Bitterroot River Health Check program has begun collecting and reviewing all the flow data that we can find on the West side tributaries since we always try to situate our sites within a context of past data sites and use the historical sites if at all possible.

While doing this we became aware of an interesting study of water quantity that is currently being done in the Bitterroot-Selway Wilderness. The study is being conducted on watersheds in three different states. It involves surrounding the watershed with GPS transmitters mounted on bedrock that send a continual signal to satellites determining their exact location. It turns out that the weight of all the water in the watershed actually depresses the earth’s surface as it accumulates through the winter and they rise again as the weight is lifted following runoff. By measuring the rise and fall of the land surface the amount of water in the basin can be determined and how much comes and goes seasonally. Interesting theory.

Since the Bitterroot valley and our west side drainages sit on the border of the water basin they are studying I decided to initiate some conversation with the local scientist in charge of the study.

Here is the last email I got.

Hi Michael,

I hope you're doing well. I discussed our conversation with members of our field operations team, and we are excited about the possibility of exploring synergies between our hydrogeodesy research and your team's river protection and monitoring work in the Bitterroot.

We do have a GPS site deployed in the Lost Horse drainage, but we do not yet have any stream gauges deployed. We are aiming to get the stream gauges deployed this summer, and can then let you know where we put them.

I am looping in one of our field operations managers and project scientists, Dr. Lia Lajoie (cc'd). She has expressed particular interest in working together with local citizen science groups. Although our research focus is more on the side of investigating water quantity over quality, we think it would be great to explore shared interests and opportunities for collaboration. I'm not sure if you've had a chance to talk things over with your groups yet, but if they are interested to potentially become involved in our project, to consider ways we might integrate our work into the USFS Bitterroot Front Plan, or just to find ways that our work might support your ongoing efforts, we are happy to discuss further.

We look forward to hearing more of your good thoughts!

Best wishes,  
Hilary

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We have through Hilary, become connected with Dr. Payton Gardner, Assistant Professor of Hydrogeology at UM. He said that his team, (1 postdoc and two graduate students), is interested in the timing of run off and how that compares to other measures of water storage in the mountains they are collecting and was interested in leveraging our work together.  He said they have some money to install gauges, or potentially update existing ones, and some man-power to make measurements and install/repair gauges “and of course lots of fancy instrumentation to make field water quality and gauging measurements.”

Since this time BRPA along with Dr. Payton Gardner, Assistant Professor of Hydrogeology at UM. have installed measuring gauges at three sites on the Bitterroot Front on Lost Horse, Mill, and Bass Creeks that have been operational for three years now and can serve as prototypes for what we propose for the other streams along the Bitte*rroot Front.*

I have also had discussions with the DNRC hydrologist Evan Norman about the state’s protocols and procedures and standards related to installation of stream gauges as well as Vicki Watson at Um Watershed Health Clinic.

It seems clear that installation of flow gauges runs the gamut from the least costly but most labor intensive and time consuming process of installing a stilling well and gauge and then taking the series of measurements to establish a rating curve to the more costly but much less labor intensive less time consuming option of a digitally based flow gauge that transmits continually by satellite.

I will get you some price options on the remote transmitter and other less expensive flow recording devices soon. BRPA can get up to 1/3rd off in our discount arrangement with some companies via the WaterKeepers Alliance.

So how about arranging a zoom meeting so we can all just meet each other and get re-oriented?

Michael Howell, Executive Director

Bitterroot River Protection Association