

BUILDING BIGHORN RIVER RESILIENCY

By Anne Marie Emery, Executive Director

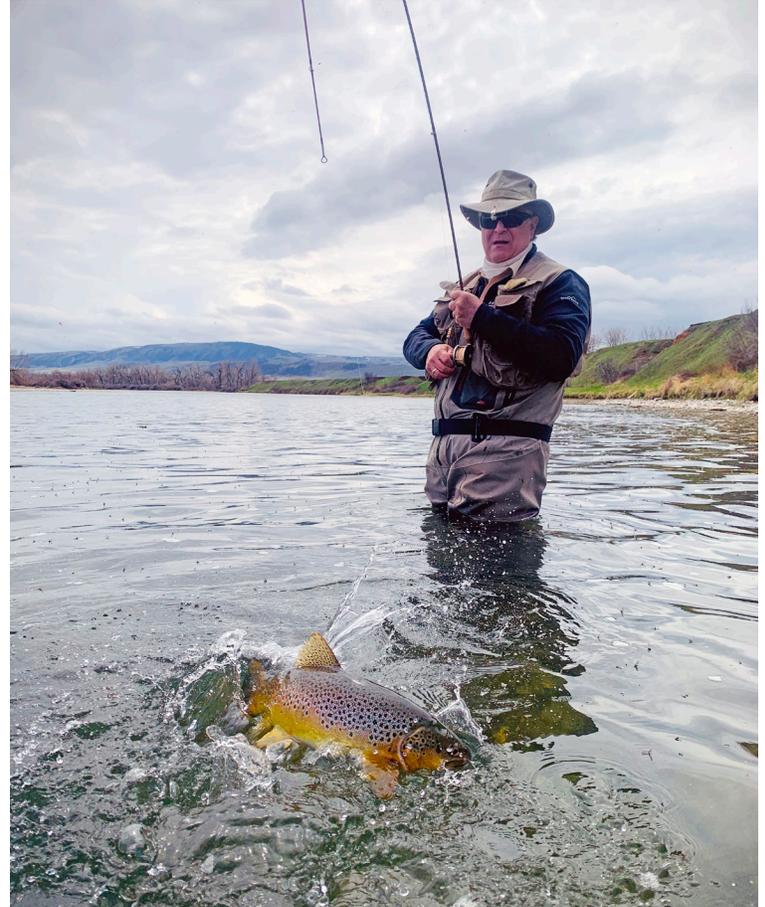
Many rivers across southwest and southcentral Montana are recovering from historic flood events that swallowed bridges, swept away entire sections of roadway, and necessitated the first official “water caused” closure of Yellowstone National Park. Heavy precipitation coupled with unseasonably late snowmelt accelerated rapid runoff into Montana’s rivers this June causing several weeks’ worth of runoff to enter waterways in a period of less than 48 hours. In response, beloved free-flowing rivers such as the Yellowstone and its tributaries rapidly reached record high flow levels, devastating communities with unprecedented flooding and triggering social and ecological impacts that will continue to emerge in coming years.

The Bighorn was lucky. Thanks to storage availability provided by upstream reservoirs- reservoirs that up to three weeks ago were in question of even filling to full pool- the effects of sudden peak inflows were absorbed behind dams, buffering the effects of rapid runoff into the Bighorn while also alleviating further flooding of the Yellowstone. The river remains accessible, fishable and within its banks.

However, Bighorn anglers must only look back over the past twelve years to understand that changing hydrological events, whether in magnitude or timing, have consequences on the Bighorn, too. The period of 2010-2017 saw two record April through July runoff years, and two consecutive drought years. While reservoirs help alleviate some of the impacts variable water years can bring, continuous errors in forecasting resulting from late/spring early summer precipitation as well as changes in runoff timing will continue to challenge operations moving forward. How do we plan for this growing uncertainty? How do we prepare the river such variability? How do we adapt to what we cannot control?

At the BHRA, and with your support, we focus on *resilience*. Bighorn River resilience, or the river’s capacity to quickly recover from disturbance and adapt to change, is critical to our mission as changing climate conditions affect water supply and delivery throughout the basin and on the river.

As we wade into the 2022 season and an increasingly



Robert Bolt with a resilient Bighorn Brown Trout. - Photo by John Sindland

uncertain future, we ask for your help in investing in the resiliency of the Bighorn River. **This year, especially, we are working to raise 160K in additional income to fund the restoration of up to 12 Bighorn side channels in 2023.** If restored, these channels would add up to 6 miles of river habitat to the river, helping slow down and spread out the river during high flow years, and increasing spawning and rearing habitat to wild trout in low flow years. We need your help to make this happen.

Through increasing our understanding of the river with long-term monitoring, identifying adaptive management projects such as side channel restoration, and nurturing cooperation among the communities that depend on it, we work to strengthen the Bighorn’s ability to recover from the future water challenges we cannot anticipate today, together.



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OUR WORK

SURVEYING RESTORATION POTENTIAL

In March, contractor Mike Sanctuary (Confluence Consulting, Inc.) worked with BHRA to survey profiles of 12 side channels that BHRA has identified for potential reconnection with the Bighorn River. The resulting forms of data, which were collected using an array of highly accurate equipment, included: 1) water surface elevations of the Bighorn River at 2,000 cfs, 2) elevation and bed surface profiles of side channel inlets, 3) longitudinal profiles along the center of side channels, and 4) estimates of potential high-water levels within side channels. After field collection, these data were entered into a computational software program that calculated the volume of excavation material needed to achieve reconnection with the Bighorn River at 2,000cfs. To evaluate the ability of each side channel to move sediment and maintain side channel connectivity following reconnection, survey pins were installed on both sides of side channel inlets and throughout the entire length of side channels for both monitoring of entrance elevations and overall channel profiles before and after reconnection. This work will be crucial for designing and planning the BHRA's proposed 12 side channel excavation projects in 2023, as well as setting the stage for monitoring the success of the project in the years to come.



Mike Sanctuary of Confluence Consulting

BIGHORN RIVER STEWARDSHIP SUCCESS



This spring, the Bighorn River Alliance organized a river clean up with local agency/nonprofit partners to remove non-functional, hazardous fencing and trash from and around the Bighorn River. A total of 30 volunteers and agency partners from the National Park Service, Backcountry Hunters & Anglers, and Montana Fish, Wildlife and Parks worked with BHRA to remove over a mile of barbed wire fencing on the river. In one key location, where the riverbank was eroding, groups constructed a small buck and rail fence to prevent anglers from further eroding the bank. In addition to the fence, BHRA obtained permits that allowed NPS to use a backhoe to remove metal rip rap - including a car frame, old irrigation plow, tires and scrap metal - from the river itself. At the end of the day, MFWP transported metal items to a local recycling center where the load weighed in at 1300 lbs! BHRA thanks our working partner groups, supportive members, and volunteers for helping enhance the Bighorn, together.



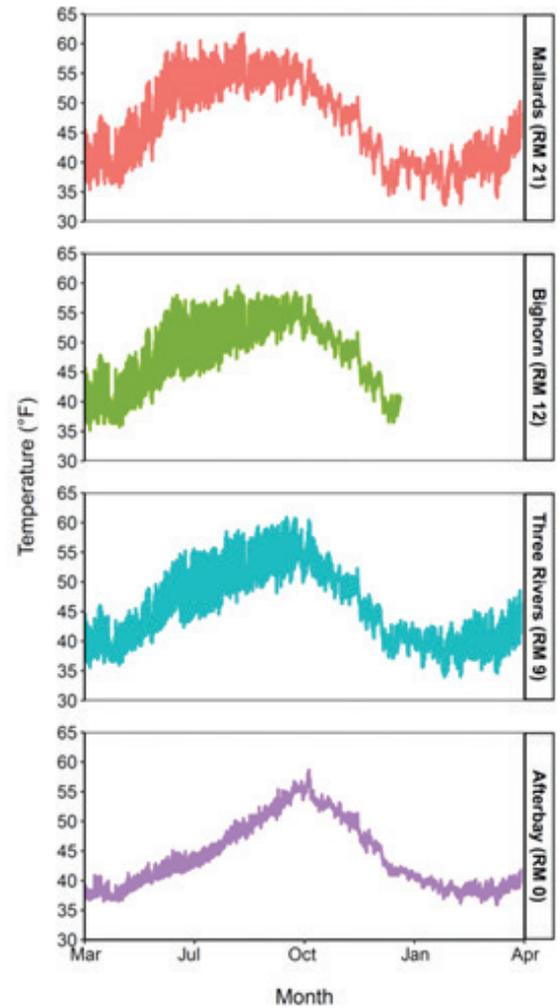
VISIT OUR WEBSITE AT BIGHORNIVERALLIANCE.ORG

MONITORING BIGHORN TEMPERATURES

Last year, BHRA installed temperature recording devices throughout 20 miles of the cold-water fishery section of the Bighorn River. While river temperatures directly below the dam are recorded by USBR real time sensors, there are no temperature recording devices on sections downstream of the dam, leaving gaps in our understanding of how thermal dynamics change with downstream progression.

In spring of 2021, BHRA staff installed four temperature recording devices, known as thermographs, to better understand how river temperatures change with flow, through time, and from varying release elevations from the dam. Thermographs were deployed at Afterbay Dam, Three Rivers, Bighorn Access and Mallards Landing where they were anchored to the river bottom and programmed to record instantaneous water temperatures every 15 minutes, 365 days a year.

From this data we observed that river temperatures varied through time at all sites, but daily and seasonal patterns of variability changed moving downstream. For instance, day-to-day temperature swings were relatively small near Afterbay dam (<5 °F difference), and river temperatures slowly climbed during the summer to a maximum in October. In contrast, daily fluctuations during the summer were dramatic at downstream sites (~10 °F). Furthermore, downstream sites warmed more quickly during mid-summer months, such that the overall shape of the temperature plots appeared wave-like compared to the peaked plot near Afterbay. Unlike many Montana rivers in 2021, the Bighorn River temperatures stayed within trout friendly ranges (less than 70 °F) during the summer, welcome news for wild trout and anglers.



River temperature dynamics at four sites on the Bighorn River during 2021-2022. River miles (RM) are measured in distance from the Afterbay dam. The thermograph at Bighorn access malfunctioned and stopped recording temperature during the winter.

MEET OUR FIRST RESEARCH COORDINATOR

As our dedication to science-based research increases, so does our need for in-house expertise to guide the organization and the river in impactful ways. BHRA is thrilled to introduce you to **James Paris PhD**, our first full time Research Coordinator!



James grew up by a small spring stream within the larger Big Wood River Valley of central Idaho, where he was often found running up and down the trails along the river and its tributaries. After receiving a BA in Biology at Colgate University in upstate New York, he returned to Idaho to complete a PhD in Biology with Colden Baxter focusing on the ecology of rivers and streams. Within collaborative, field-based projects conducted in the Methow and Snake Rivers of the Columbia Basin, James's doctoral research investigated how the flow of energy through aquatic food webs -- or the web of feeding interactions that link many species together within biological communities -- varies through time and across diverse habitats within complex river-floodplain landscapes and the implications of such variability for the conservation of biodiversity and the management and restoration of riverine landscapes. This work provided hours of practice in stream and river sampling techniques, aquatic invertebrate taxonomy, food-web and ecosystem analyses, and community outreach. In his spare time, James enjoys river running, river snorkeling, backpacking, skiing, flipping over rocks in streams, all with his partner Jade.

James is excited to join the BHRA staff in protecting and preserving the Bighorn River system. If you have questions about the river, or observations to share, you can reach James at the BHRA office or by email at James@bighornriveralliance.org.

2022 BIGHORN CARP TOURNAMENT



1st Place - "Mulletov Carptail"- Mike Ward & Justin Waayenberg
 2nd Place - "Flying V"- Camille & Matt McCormick

The 2022 Bighorn Carp Tournament had 18 teams compete in the annual event for the coveted trophy marking each winner since 1989. The weather was warm and it was a beautiful day on Bighorn Lake. The anglers set off at 10 AM with an air horn blast sending boats dispersing every which way from the launch. The competing teams were: Carp Squad (CO), Return of the Golden Boners (CO), Team Brock (CO), Team Best (MT), Escaped from the Home (SD), Carp Creepers (MT), Fly Benders 2.0 (WY), Team Lombardozzi (MT), Champions (MT), Team Hilbers (MT), Wyola Wildcats (MT), Lip Lovers (MT), Mulletov Carptail (MT), Flying V (MT), Sucker Punch (MT), Team Bonanini (MT), Carpe the Diem (WY), and Team Flanagan (MT).

Four-o'clock brought the fishing to an end and all the anglers back to the boat launch with a clear winner. Mulletov Carptail (Mike Ward and Justin Waayenberg of Adipose Boatworks) crushed the competition with a total of fifteen carp. Flying V (Camille and Matt McCormick) came in second with eight carp caught.

The after-party was held at the Bighorn Angler who sponsored the celebration with BHRA. The party featured BBQ by Bud's Catering out of Hardin, MT and beer by Thirsty Street Brewery from Billings, MT. Music, mingling, corn hole and friends rounded out a lively evening in Fort Smith, MT. Join us next year when we do it again!

2022 BIGHORN CARP TOURNAMENT

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