Riffles

SPRING 2022 FIELD UPDATE

CLARK FORK COALITION

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A QUEST FOR QUALITY

in the Bitterroot Basin

"*Iconic*" barely scratches the surface. Known the world over for its rugged beauty, sparkling waters, and prized fisheries, the Bitterroot River basin captures, for many, the quintessence of western Montana. Its snow-capped peaks, crisp mountain streams, and forests and floodplains provide food, water, shelter, and movement corridors for a wealth of wildlife, and have sustained and inspired human communities for more than 10,000 years.

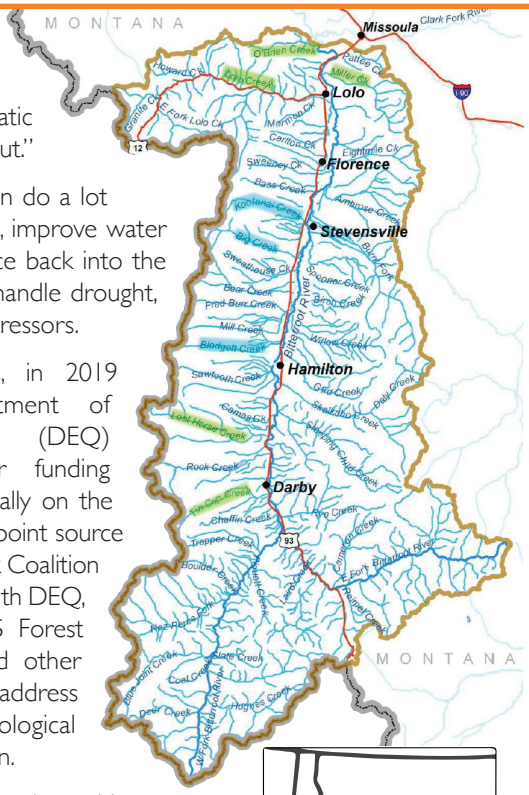
For the past century and a half, this major Clark Fork watershed subbasin has also seen extensive logging and road-building, large agricultural operations with hundreds of miles of irrigation ditches, and rapidly expanding residential development. Those activities span the valley, but their impacts, ultimately, trickle down to the Bitterroot and its many tributaries. It is here, flowing beneath, through, and around all that grandeur and beauty, that we gain insight into the true health and vitality of this storied watershed.

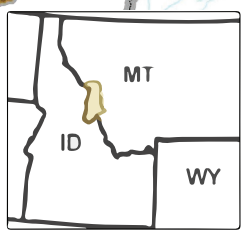
For Clark Fork Coalition project manager Jed Whiteley, one of the most important measures of watershed health is water quality—the vital sign that often reflects the final chapter of complex stories of geology, land use, history, climate, and more.

"Poor water quality can have a major negative effect on fish and other aquatic organisms, and unfortunately, it's a reality in many, if not most, Bitterroot tributaries," Jed explains. "The cumulative impacts of logging and agriculture have led to excess sediment and high nutrient levels in many creeks. The increasing impacts of climate change mean they also suffer from extremely low to nonexistent flows and high water temperatures that are harmful to aquatic life, particularly native trout."

The good news is we can do a lot to reverse these impacts, improve water quality, and build resilience back into the system so it can better handle drought, intense fires, and other stressors.

To boost such efforts, in 2019 the Montana Department of Environmental Quality (DEQ) launched a three-year funding program focused specifically on the Bitterroot to reduce nonpoint source pollution.* The Clark Fork Coalition has worked extensively with DEQ, as well as with the US Forest Service, landowners, and other partners, to holistically address water quality and ecological conditions across the basin.





READ ON to learn more about this work and the collaborative efforts underway across the Bitterroot to keep its vital waters flowing clean, cool, and abundant.

**Pollution originating from many places instead of a single source*

Photo: US Forest Service, Wikimedia

SPOTLIGHT Lolo Creek

Lolo Creek is the Bitterroot's third-largest tributary. This still-wild place is home to a rich diversity of wildlife, including native fish, moose, lynx, and bear.

Lolo Creek faces several water quality issues, but excessive sediment is an especially widespread challenge due to the area's naturally erosive soils. Build hundreds of miles of roads across steep hillsides, log thousands of acres, add rain and gravity, and all that crumbling soil quickly finds its way into stream bottoms, where it smothers spawning grounds and reduces aquatic insect production.

Compounding the problem are countless undersized culverts and more frequent wildfires. Post-fire rain events create "sediment bombs" that increase the risk of catastrophic culvert failure, and block fish passage when culverts become clogged. Together, these factors degrade habitat for native westslope cutthroat and bull trout in many creeks.

Lolo National Forest (LNF), DEQ, Montana Fish Wildlife & Parks (FWP), and conservation groups have been aware of the problem for some time. Reducing sediment has been identified as a key goal in watershed management and bull trout recovery plans. In 2014 Clark Fork Coalition began working with LNF to tackle the problem, prioritizing creeks flagged as vital to bull trout recovery.

With support from DEQ, FWP's Future Fisheries Program, the Westslope Chapter of Trout Unlimited, and other funders we've made good progress through seven years and four phases of work, re-naturalizing 37 miles of unused forest roads, removing 40 culverts, and preventing an estimated 78 tons of sediment from reaching streams. Some streams have already improved so much DEQ no longer considers them "sediment impaired." In 2022, we'll use these same techniques on the South Fork of Lolo Creek, which was heavily impacted by the 2017 Lolo Peak fire.

For forest roads that are still in use, we're pursuing different strategies, including upgrading culverts and adding woody debris instream. Better culverts allow streams to regain their full width and floodplains, which prevents culvert-clogging and allows fish passage. Woody debris instream traps fine sediments, creates scour pools, and increases stream productivity. This work gets underway in 2022 on East Fork Lolo and Lost Park Creeks.

Two other major water quality threats in the Lolo watershed are high water temperatures and low flows. Montana's increasingly hot, long, and dry summers coupled with increased domestic water demand put tremendous strain on creeks like Lolo. High water temperatures can be lethal to sensitive native fish. Warm water contributes to algae growth and degrades water quality. And low flows exacerbate both while cutting off escape routes to cooler upstream waters.

To keep more water instream, we're partnering with willing landowners to acquire and lease water rights on the creek, talking with irrigators about lining ditches to decrease water loss, and working to increase the presence of beaver in the watershed to improve water storage. Building on this work, we're collaborating with Lolo Watershed Group to repair degraded streambanks, improve water quality, and restore aquatic and riparian habitats in lower Lolo Creek. In 2021, we installed a fish screen that prevents the loss of as many as 10,000 fish per year in Lolo Ditch. These efforts amplify the benefits of that project by ensuring those thousands of fish have clean water and plenty of it to boost survival and spawning success.

Of the Bitterroot's many tributaries, Lolo is especially significant. For millennia it was a major east-west travel and trade corridor for the Salish and Nez Perce Tribes. This place continues to sustain high densities of native fish and a rich diversity of other wildlife, from moose to bears to lynx. Further, its cold headwaters streams are now expected to play a big role in climate resilience, as they provide increasingly rare cool water habitat in a quickly-warming watershed. We believe that working to keep Lolo's waters clean, plentiful, and accessible is one of the best ways to ensure the health and resilience of this ecologically and culturally vital watershed.

WATCH the video at tinyurl.com/LoloFishScreen

SMALL BUT SIGNIFICANT STREAMS


Landowner Jacob Wustner stands next to an incised bank of Miller Creek.

At the end of the Missoula valley, two relatively small streams—Miller Creek to the east and O'Brien Creek to the west—join the northern Bitterroot just before it merges with the Clark Fork River. Though both tributaries have longstanding restoration needs, they play a big role in sustaining the biodiversity and ecological health of the northern Bitterroot. Now, thanks to conservation partners, private funders, contractors, volunteers, and state agencies' investments, the two streams are getting the help they need.

Miller Creek

If you've floated the quiet stretch of the Bitterroot between Lolo and Missoula you'd be in good company if you drifted unaware past the subtle confluence of Miller Creek. But there's nothing subtle about this tributary's contributions to native and wild trout in the Bitterroot.

The Miller Creek watershed not only provides excellent spawning habitat, it also supports populations of genetically-pure native westslope cutthroat in at least two tributaries. That's impressive for a drainage probably better known as a quickly-growing Missoula neighborhood than a trout stronghold. Unfortunately, poor water quality in the mid and lower reaches due to severe dewatering, excessive sediment, and high water temperatures have compromised that fishery.

The biggest cause of these impairments? Active erosion of streambanks from creek straightening, road-building, and agricultural operations over the last century. More recently, increased development is exacerbating these problems by creating more runoff of stormwater and road sand. Altered and eroding stream channels mean lost floodplain connectivity, reduced habitat diversity, and less riparian vegetation cover, which contributes to high water temperatures.

To address these challenges, we're taking a multi-year, multi-strategy approach. We're reestablishing stream sinuosity, grading the floodplain to remove steep, eroding banks, installing woody debris on the banks and instream, fencing sensitive riparian areas, and planting new trees and shrubs.

We've seen fish numbers double within a single year in one treated reach.

These treatments immediately improve habitat quality and biodiversity and also allow the creek to continue to heal itself. (We've seen fish numbers double within a single year in one treated reach.) After treatment, reduced sediment improves water quality. Reconnected floodplains increase groundwater and surface water storage. Woody debris creates healthier and more diverse habitat. And healthy riparian vegetation creates shade that reduces water temperatures.

At the same time, we're working with landowners to keep more water in the creek, remove barriers to fish passage, fix or remove problematic roads and stream crossings, and protect those pure-strain cutthroat populations in the headwaters.

As a suburban watershed, Miller Creek is facing intense development pressure, along with continued threats from a warming climate. Taken together, these restoration projects will help the creek survive and thrive for generations to come.

O'Brien Creek

Life is pretty serene in the O'Brien Creek watershed these days. But in the late 1800s and early 1900s, this northernmost Bitterroot tributary was a hub of activity. Extensive timber harvesting in the uplands required creek-side roads, two rail lines, a sawmill running 30,000 board feet per day, and a system of chutes to transport logs to the mill. In the lower watershed, it was all about growing food, which meant ditch-building, stream-straightening, and water diversions to meet the irrigation needs of large valley-bottom ranches.

The mill and railroad are gone and logging has ceased, but the extensive impacts of that heavy use are still contributing to deeply incised and failing banks, chronic road erosion and washouts, and a loss of riparian vegetation.

No surprise, then, that the creek suffers from high sediment loads that smother spawning redds and macroinvertebrate habitat, clog culverts, and cause frequent flooding (which leads to more erosion and sediment deposition). These problems, coupled with the proximity of the road to the creek, not only severely degrade water quality, but also create safety hazards for local residents.

In spite of these impairments, O'Brien Creek still supports native fish and is a significant recruitment stream for westslope cutthroat on the lower Bitterroot. We've worked for many years to improve ecological conditions in this drainage, including restoring instream flow to ensure this once chronically de-watered creek now stays wet and connected to the Bitterroot year-round.

Now, we're working with DEQ, Lolo National Forest, and landowners, to enhance habitat conditions. In 2022, two scheduled projects will reduce sediment loads, restore stream function, and dissipate flood energy. We'll be realigning the creek and moving it away from the road, regrading failing banks, increasing the floodplain area to dissipate flood energy, installing woody debris, and planting riparian vegetation. All of these activities will improve water quality, stream health, and resiliency in this small, but significant Bitterroot tributary.

ELSEWHERE IN THE BITTERROOT

Erosive soil, road-building, creek-straightening, and failing stream banks are a big reason for poor water quality in Lolo, Miller, and O'Brien Creeks. Elsewhere in the Bitterroot, low flows and barriers to fish passage are a bigger part of our restoration focus. We're also studying and monitoring water quality in the mainstem river to keep tabs on potential pollutants.

Lost Horse Creek

One of the Bitterroot's larger tributaries, Lost Horse Creek, is a native trout stronghold and supports many other fish and wildlife species. In 2015, the Clark Fork Coalition worked with a local irrigation district to install a siphon in the last half mile of the creek to ensure water could still irrigate crops but would no longer block fish movement. The project also made it possible to leave more water in the creek, preventing it from running dry each summer.

Building on that success, we're now looking upstream, where low flows and fish entrainment hazards still degrade water and habitat quality. We're again working with irrigators to fix the problem, this time through a large diversion upgrade and fish screen. We expect constructionto begin in 2023. Meanwhile, we're exploring other opportunities to keep more water in the creek and improve aquatic and riparian habitat in one of the Bitterroot's most popular and ecologically important tributaries.

Tin Cup Creek

As with many of the Bitterroot's westside drainages, trekking to the headwaters of Tin Cup Creek leads you to a glistening alpine lake, typically bounded by a wooden or concrete dam. It can be a jarring sight in a wilderness setting, but these structures—some first built as long ago as the late 1800s—are proving to be an important strategy for climate resiliency.

One of the largest is Tin Cup Lake. But its century-old dam had degraded so much that reservoir capacity was reduced by more than half. Each summer the creek would dry up before it reached the Bitterroot. In 2012, the Clark Fork Coalition worked with the irrigation district and Fish, Wildlife, and Parks to repair the dam, restore its capacity, and add a satellite-controlled headgate to help manage water releases into this vital westslope cutthroat and bull trout stream. We also secured a 99-year lease on more than 130 million gallons of that water and acquired senior water rights at the mouth. We're currently working to secure legal protection for that water to be used instream to keep the creek wet, cool, and connected.

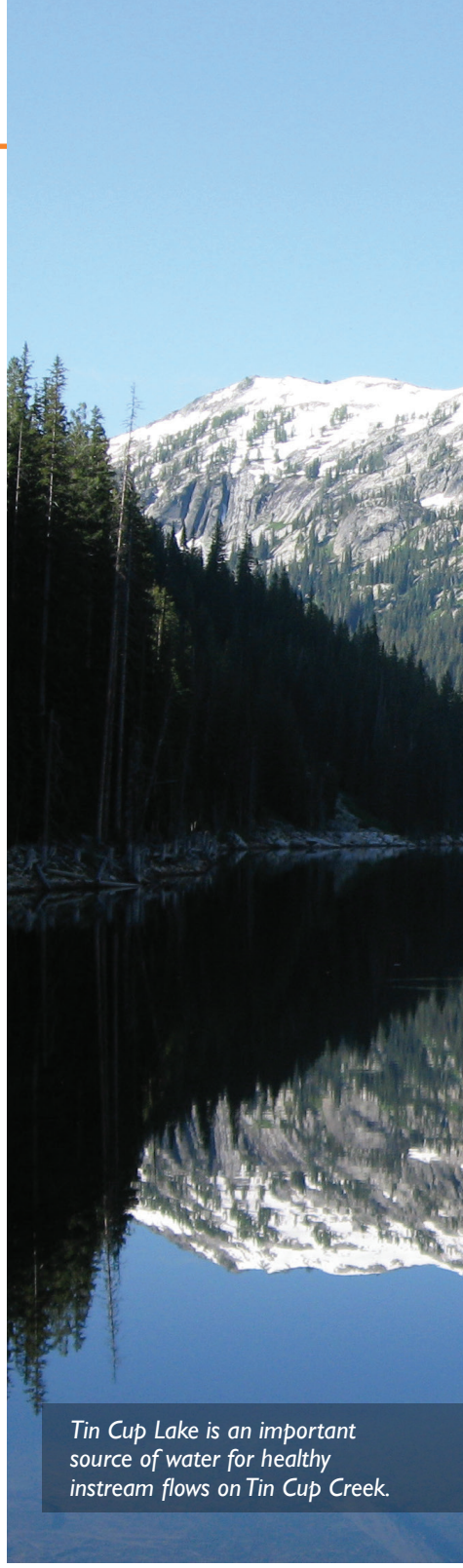
Other Creeks on Our Radar

Given the accelerating impacts of climate change and growth pressures in the Bitterroot basin, we're keeping an eye on several other tributaries that sustain native fish and wildlife but also suffer from chronic de-watering and degraded habitat. In the coming years we'll conduct assessments on Blodgett, Kootenai, and Big Creeks, evaluating stream health, water quality, and ecological conditions and creating a restoration game plan. **STAY TUNED.**

Mainstem Bitterroot

Among its many unique qualities, the Bitterroot River currently does not show evidence of extensive nutrient pollution, unlike many other rivers and streams in western Montana. It's a widespread problem on the Clark Fork, for example, which is why the Clark Fork Coalition has helped administer the Clark Fork River Voluntary Nutrient Reduction Program for many years.

In 2019, DEQ asked us to expand that program to the Bitterroot to keep tabs on nutrient levels, learn more about why conditions differ here, and ensure nutrient pollution remains at bay. We're working closely with the Bitterroot River Protection Association to monitor six sites eight times per year, looking at nutrient levels as well as total suspended sediment. This program and the data collected will help inform and implement DEQ's upcoming Bitterroot River Nutrient Protection Plan, an important new tool to ensure the best possible water quality for the river and the people, fish, and wildlife it sustains.



Tin Cup Lake is an important source of water for healthy instream flows on Tin Cup Creek.

Our work in the Bitterroot would not be possible without private donors and excellent partners, such as the Bitter Root Water Forum, Trout Unlimited, Lolo Watershed Group, Bitterroot River Protection Association, and natural resource agencies. With their restoration work, volunteer contributions, and financial support we're collaborating to ensure high-impact projects continue to improve water quality and ecological conditions throughout the Bitterroot.