

Riffles

SUMMER 2020 FIELD UPDATE



DIVERSION CONVERSION In the Upper Clark Fork

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There's no silver bullet for healing the 120-mile long and historically hard-working Upper Clark Fork. Obviously, cleanup of the legacy metals pollution strewn across the river and its floodplain from over a century of mining and smelting in Butte and Anaconda is Priority #1. And fortunately, that work – overseen by Montana Dept. of Environmental Quality (DEQ) – is underway. (See “What's Up in the Upper Clark Fork” for an update on how it's proceeding.) However, a slew of other river stressors are clamping down on the river's full recovery, including: chronic dewatering, riparian habitat degradation, and tributary creeks and streams that are cut off from their mainstem rivers.

To rebuild a healthy Upper Clark Fork, it's clear that we need a

multi-phase strategy that combines a variety of projects to re-water, reconnect, and restore stream habitat. That's exactly where the Clark Fork Coalition has focused its restoration efforts this past decade. And it's why we're especially excited about progress that we're making with our partner, Trout Unlimited (TU), to upgrade large irrigation diversion dams on the Upper Clark Fork River.

So what's the problem with these irrigation diversion dams? They create barriers in the river each summer and lead to the loss of tens of thousands of fish in dead-end ditches. In a 28-mile stretch of the Clark Fork between Warm Springs and Deer Lodge, these dams and diversions prevent native fish from reaching hundreds of miles of upstream habitat. Access to these clean, cold headwater

strongholds are critical to the survival of our native trout fisheries.

What is the purpose of these diversions, and why are they here? Contrary to some rumors, they are not designed to block river recreation or trap fish. They exist to move water from point A to point B to grow crops during the Deer Lodge Valley's arid summers. Examples include “push-up” dams that consist of rocks, boulders, and dirt pushed into place with heavy equipment to guide river water into a ditch, as well as pin-and-plank style structures that span the river.

They arrived in the Clark Fork watershed over a century ago, and are still widely used today. But unfortunately, the impacts of these irrigation systems are starting to catch up with a warming and

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Left: The annual building and maintenance of push-up dams can have a big impact on aquatic and riparian habitat in the UCF.
Right: Valiton Diversion, July 31, 2019, with river-spanning push-up dam in place.

growing West. In addition to entraining large numbers of fish, these diversions and dams fragment habitat, alter the river's natural form and function, create recreation hazards, and impair boat passage. In addition, the twice-yearly use of large machinery in the river increases erosion, degrades water quality, damages riverbeds and the aquatic invertebrates they support, and harms riparian habitat.

These irrigation systems are also highly inefficient at moving water. Which means that a rancher has to divert extra river water to be certain their fields get what they need. That, in turn, reduces instream flow in a river already facing chronic, and often severe de-watering. (In recent years we've documented flows as low as 2.6 cfs in the Clark Fork mainstem: essentially reducing it to an ankle-deep and dangerously warm trickle.) The good news is that many irrigators are open to doing things differently. It's just that the technical and cost hurdles tend to put solutions out of reach.

Fortunately, help is on the way, thanks to support from the Open Rivers Fund (a program of Resources Legacy Fund supported by The William and Flora Hewlett Foundation). With those funds, in 2019 the Coalition and TU launched Phase One of a project that will ultimately upgrade and/or retire eight high-priority mainstem diversions. Subsequent support from the U.S. Fish and Wildlife Service, Montana TU, George Grant TU, Westslope TU, the USDA Natural Resource Conservation Service, and Montana Natural Resource Damage Program is putting meat on the bones of the project as we enter Year Two.

In this first phase we're focused on four diversions in a roughly nine-mile stretch of the Clark Fork beginning at Warm Spring Creek. According to CFC project manager, Andy Fischer, "Each diversion has its

own issues, but collectively their impact on fisheries, recreation, stream function, water quality, and instream flow is significant. Tackling these first four diversions will be a good start on a big problem."

We're excited to get the ball rolling, but it's no quick fix. The Deer Lodge Valley's long winters mean a short field season, which affects site studies, construction, and monitoring. Each diversion's unique engineering, design, and permitting requirements can span months or years. Crafting landowner agreements takes time and trust-building, and legally changing water rights is a complex and lengthy process. Add in agency negotiations and fundraising, and you can see why two of the biggest keys to Clark Fork restoration are patience and persistence.

But the ball *is* rolling, and by the end of 2020, barring weather or contracting delays, we expect to begin dam removal and fish screen construction on one diversion near the confluence of Dry Cottonwood Creek. We are also working toward decommissioning a second diversion near Warm Springs Creek, which could free up as much as 7 cfs of water (more than 410 million gallons per year) for much-needed instream flow.

Like the slow, steady process of Superfund cleanup and restoration (see next page), it's not the whole solution, but it's a step. And for a river with challenges 150 years in the making, every step matters. Ultimately this project will help reconnect nearly 30 miles of the Upper Clark Fork and restore access to cool headwaters habitat, which will help fish and other aquatic species as they respond to drought, high water temperatures, low flows, predation, and other stressors.

Many thanks to *you* for the steady support that makes this work possible, and to our project partners and funders for investing in the promise and future of a clean, healthy, and connected Clark Fork.

WHAT'S UP in the Upper Clark Fork?

In the historically hard-working headwaters of the Clark Fork watershed, we're starting to see excellent results emerge after seven years of Superfund cleanup of the legacy mining wastes strewn along a 50-mile stretch of the Upper Clark Fork (UCF). Coupled with more than a decade of complementary stream restoration projects in the tributaries feeding into this stretch of river, we're making good progress. But it's still a long road ahead, given the scope and complexity of the issues facing the river. We want to keep you up to speed every step of the way.

Here's the latest:

SUPERFUND CLEANUP along the river flowing through the Grant-Kohrs Ranch National Historic Site near Deer Lodge will wrap up this fall. With the G-K Ranch data added in, the overall Superfund project will have cleaned up 11 miles of river, 600 acres of floodplain, and it will have removed 1.7 cubic yards of contamination. That amounts to about 25% of the project. Unfortunately, the work to-date has consumed more than half of Montana DEQ's cleanup budget, so cost-effectiveness is a top consideration going forward. Where does Superfund cleanup head next? Back upriver to private rangeland that contains some of the worst contamination in the Deer Lodge Valley. We've had our eye on this stretch in recent years, because eroding banks and berms have allowed toxic "slickens" sitting in the floodplain to move into the river. We tracked that erosion in 2018 and 2019, and last September documented a fish kill in this area when heavy rains sent a pulse of contamination into the river. It's critically important to get after this stretch, and we're pleased DEQ will be mobilizing crews there toward the end of this year.

- **Current Concerns:** Maintaining the cleanup project's momentum through budget constraints and Covid; making sure the agencies integrate riparian and aquatic habitat needs into cleanup plans; re-contamination of downstream restored areas before cleanup can begin; ensuring transparency in cleanup planning.
- **In 2020** we will document aquatic and riparian habitat baseline conditions; rank and hazard-

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EDUCATION...AT A DISTANCE

While we've had to adjust our hands-on watershed programs to accommodate social distancing, our education partners' help made it possible to still provide students with some cool river science this spring. (Yay teachers!) There's no substitute for field-based learning, but it turns out mere distance can't extinguish the spark of a powerful "aha" moment!

🍃 We partnered with the City of Missoula Storm Water Division to provide 45 students in two Missoula elementary schools with learning tools and virtual visits to explore local water quality. Through this Storm Drain Stenciling activity, kids learned what happens when runoff and pollution combine by surveying their neighborhood for areas where storm water drains, and then sending their data to CFC and the City. Armed with that data, CFC staff deployed to stencil clean water messages ("Reduce Your Stormwater Footprint" and "Next Stop Clark Fork River") at each site, sharing the stenciling via video with the students.



🍃 In the Deer Lodge Valley we partnered with Anaconda High School to offer our "Snow on the Go" virtual curriculum – a distance learning adaptation of our "Snow & Tell" program. Students explored the connection between snowpack and water supply by accessing snowpack data online and creating and testing hypotheses about the correlation to local stream conditions. Thanks to the Dennis & Phyllis Washington Foundation for helping to launch *Snow on the Go!*

We miss the rich, in-person interactions that add so much to learning. But we've discovered there's nothing virtual or remote about a genuine "aha" moment. The excitement of learning about our watershed is burning as bright as ever in the eyes of our future river stewards!





classify remaining slickens on the mainstem; review agency cleanup designs with restoration experts; provide site tours and technical support for landowners; remove Superfund fencing on Dry Cottonwood Creek Ranch to allow wildlife renewed access to the river after six years of recovery; and continue public outreach and education about the cleanup.

RESTORED FISHERIES are not an automatic outcome of cleanup. Fish require clean, healthy, and connected tributaries that can help this “sleeping giant of a fishery” reach its full ecological potential. UCF tributaries support conservation populations of native westslope cutthroat trout, and some support threatened bull trout, but they are compromised by chronic de-watering, and barriers to fish passage.

- **Recent Progress:** Replaced two fish barrier culverts on Dry Cottonwood and Cottonwood creeks; installed an innovative new fish screen, upgraded a diversion, and constructed a new weir system to allow fish passage at the Cottonwood-Baggs Creek confluence; completed a bank stabilization/habitat project on lower Racetrack Creek; and started planning water-savings and fish passage projects on multiple tributaries.
- **In 2020** we'll install a new fish screen and diversion on Mill Creek; improve mainstem diversions (see pg. 1-2); design a new fish-friendly culvert on a tributary to Boulder Creek; pursue an irrigation upgrade project on upper Cottonwood Creek, and complete additional flow restoration projects to add another 7 cfs to the mainstem river.

FIELD RESEARCH is essential to understanding how large-scale cleanup and restoration are impacting the river, floodplain, aquatic and riparian habitats, and fish and wildlife. How are habitats

changing and species responding? Is water quality improving? Are cleanup results what we expected? The unprecedented transformation now underway in the UCF puts us in uncharted waters. Navigating well means being alert to the lessons the river is teaching us.

- **In 2020** we'll work with partners to continue field research on water quality (nutrients and heavy metals), macroinvertebrates, bank erosion, contaminant migration, and bird and riparian habitat, and we'll study geomorphology and fish habitat studies in pre- and post-cleanup areas. We're also collaborating to study the potential for stored water to improve flow and temperature in UCF tributaries, and to explore creative leasing strategies for conserving the UCF's limited water resources.

In addition, we're keeping tabs on Superfund cleanup in Butte, moving forward to develop a research, education, and outreach hub at Dry Cottonwood Creek Ranch, and continuing to provide watershed science programs to Deer Lodge Valley students.

Why the intense focus in the UCF? Simple: what happens in the headwaters affects the entire Clark Fork system. The UCF is also the most impacted, altered, and heavily-polluted part of the watershed. Even so, it has sustained people, fish, wildlife for millennia, and Montana's key industries for nearly 200 years. It deserves the best cleanup and restoration we can muster. Let's do this!

Many thanks to our partners, who make this work possible, including: Watershed Restoration Coalition; Trout Unlimited; UM, UM Western, MSU, and MT Tech; Geum Environmental Consulting; Applied Geomorphology Inc; private landowners; local leaders and stakeholders; educators; state and federal agencies (DEQ, NRDP, DNRC, USFS, USFWS, NRCS); CFWEP; private foundations; and donors like YOU!