

2019 Coldwater Conservation Fund Funded Proposals

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The Next Stage: Advancing TU as a National Leader in Real-time Water Quality Monitoring

Project Overview

The cold, clean water that sustains healthy trout and salmon is at risk from warming due to climate change and from degradation due to human development across the US. A key part of TU's strategy to conserve and improve these coldwater habitats is to target our work using the best, most complete water quality data available. In 2017, CCF support enabled TU to build expertise in deploying the low-cost open-source Mayfly sensor stations developed by the nonprofit <u>Stroud Water Research Center</u> (Stroud)



as part of their EnviroDIY program. Using that funding, our staff has deployed these stations at multiple sites in Pennsylvania and Michigan and trained TU's volunteer angler scientists, generating real-time water quality data and sharing it publicly on the web. We have also built and used the tools to evaluate potential monitoring sites' suitability based on cellular connectivity, a requirement for real-time data upload.

At a time when funding is declining for water quality monitoring stations traditionally deployed by agencies such as the United States Geological Survey (USGS), the Mayfly stations provide similar functionality at as little as 4% of the price of a USGS station. Following TU's 2017 introduction to the Mayfly systems and their implementation, the interest in and demand for these stations has grown tremendously among TU partners and chapters, to the extent that Stroud, a relatively small regional non-profit organization based in Southeast Pennsylvania, is unable to build enough Mayfly stations for TU. As a result, we propose to create in-house capacity to acquire, build and program these stations, as well as to develop a process for broader engagement, training and technical support. With further support from CCF, TU can take the lead in bringing this technology to our chapters, staff and partners more broadly across the country.

In western Oregon, Mayfly loggers will inform the TU chapters and staff working with partners to improve water quality and quantity in drinking watersheds where USGS monitoring stations are sparse or absent. In Michigan, TU chapters, watershed associations and the US Forest Service would leverage this technology to collect long-term baseline datasets in high-quality watersheds at-risk from development. Also, in Michigan, angling outfitters are interested in access to real-time data to inform fishing tactics and self-imposed fishing moratoriums during stressful thermal conditions. Interest from anglers in real-time temperature and flow data to inform their fishing plans and tactics can be leveraged to increase capacity for long-term continuous data collection, facilitating the robust baseline datasets necessary to protect streams and rivers from future development.

Project Description

Mayfly stations are weatherproof, solar-powered, and expandable to accommodate a vast range of environmental sensors. Data are collected continuously at fixed stations and include depth, conductivity and temperature measurements. This information can be used to establish baseline conditions, track emerging water quality issues, measure the effectiveness of watershed-scale restoration, inform fishing

moratoriums during stressful thermal conditions, foster environmental stewardship and contribute to a growing national network of monitoring stations deployed and maintained by citizen science programs (see http://data.wikiwatershed.org). Designed to be adopted and maintained by trained volunteer groups, such as TU chapters or watershed associations, the technology is accessible, maintenance costs are limited, and data are automatically loaded to a website provided by Stroud for real-time public access.

This proposal involves leveraging existing programming and electronics expertise within the TU Science Team, as well as Eastern Conservation staff experience in implementing multiple angler science programs. If funded, it will create new capacity for real-time continuous water monitoring technology. Science staff in Boise, Idaho will procure the station components, assemble them, program the Mayfly controllers and ship them as a solar-powered, weatherproof kit ready for installation by trained volunteers. A second component of the project will adapt the training and support materials developed by Stroud to provide for the specific needs of TU chapters and staff. Stroud provides web-based charting and visualization for the Mayfly data, plus an active online community of shared expertise, all at no cost.

Finally, TU staff will apply this new capacity to the chapters, staff and partners we have identified to deploy these stations in areas where real-time continuous data is needed. This involves (a) identifying individuals to curate and maintain a sensor station, (b) providing TU-specific training that covers all aspects of deploying and maintaining sensor stations and data management and interpretation, (c) helping the individual/organization deploy the sensor station(s), (d) creating a supplemental monitoring plan to enhance the real-time sensor-derived data, and (e) being available for technical support and ongoing maintenance/troubleshooting advice. Starting with an initial focus in the Great Lakes region, TU will begin to create "knowledge-base hubs" that can support expansion of this effort in regions throughout the country. With funding from CCF, TU will assemble ten Mayfly Sensor Stations able to measure temperature, depth and conductivity. We will build upon partnerships with TU chapters, staff and partners to deploy these ten stations in focal watersheds. Organizations that adopt stations will have the option to fund additional sensors, such as turbidity or dissolved oxygen, to further expand capacity for real-time data collection at the site.

CCF Funding Need and Budget

Coldwater Conservation Funds would enable TU to build the necessary capacity, resources and knowledge-base to get this project off the ground. The funds will support TU staff time and sensor station hardware. With this in-house capacity and knowledge base established, TU would be well positioned to seek federal or foundation dollars to support continued expansion of the effort throughout the United States.

Budget: \$30,000

\$8,200: TU staff support for sourcing, building and programming sensor stations.

\$11,300: TU staff support for partnership cultivation, training and technical support.

\$10,500: Sensor station components



Stewardship Contracting: A New Revenue Stream for Restoration

Project Overview

A \$35,000 donation from the CCF would enable TU to pilot Stewardship Contracting projects on National Forests in Vermont and South Carolina. These pilots would allow TU to begin accessing a major new funding source for habitat improvement projects on national forest lands, which are home to some of the best trout habitat in the country. Once we develop an understanding of how to use stewardship contracting, we will be able expand our use of this tool to other National Forests.

Project Background

Importance of National Forests to TU's mission: National Forest lands are managed by the U.S. Forest Service for multiple uses, including timber, grazing, and recreation. These lands are enormously significant for TU's mission. More than 50% of the nation's blue-ribbon trout streams flow across National Forests. South of Asheville, NC nearly 80% of brook trout habitat is found on national forest land. Partnering with the Forest Service to improve coldwater habitat is one of the most effective conservation strategies available to TU.

Over the past 15 years the Forest Service has lost a third of its workforce due to budget cuts, severely limiting the agency's ability to manage its trout habitat. TU has stepped in to fill the void, hiring staff to work with 10 National Forests in the East and Midwest. Through these partnerships, TU is able to leverage the diminished but still significant resources of a large federal agency to improve trout habitat. For example, when TU hired staff to work with National Forests in northern Wisconsin, culvert and dam removal projects jumped from just a few projects a year to 11 projects in a single field season that reconnected 42 miles of trout habitat.

<u>Using timber receipts to fund habitat improvement:</u> Part of the Forest Service's mandate is to produce timber. In a traditional timber sale, the Forest Service awards the contract to the highest bidder and sends the revenue back to a general fund. In the early 2000's, Congress gave the Forest Service new authorities to sell timber using "Stewardship Contracts" through which timber revenues are used to fund habitat improvements on the forest. The Forest Service has embraced this new approach, and in 2018 the agency entered into more than 250 stewardship contracts across the U.S.

Here is an example of how it works. The Forest Service would plan a timber harvest and work with Trout Unlimited to identify the habitat improvement needs in the area such as culvert replacements, dam removals, and instream wood additions. The Forest Service estimates the value of the timber sale and together we plan the habitat improvement projects whose costs equal the timber value. When the timber is sold the money goes into a Forest Service account from which TU would withdraw funds to pay for the habitat improvement work.

TU has been missing the boat on Stewardship Contracting. We could be taking on a much bigger role in directing how Stewardship Contracting is done in trout and salmon watersheds, but we don't know how. A \$35,000 grant from the CCF would enable us to hire a consultant with Stewardship Contracting experience to work with our project managers to develop new stewardship projects in Vermont and South Carolina. Once developed, the projects will provide a template that enables TU to develop additional Stewardship Contracting projects in the future.

<u>Why now?</u> Agriculture Secretary Sonny Purdue has directed the Forest Service to increase its timber production. The focus on timber harvest is diverting some of the money that used to be available to fund TU's habitat restoration work. Furthermore, Congress eliminated the \$35 million Legacy Roads and Trails Program, which had provided an important source of culvert replacement funding. The combination of declining funding and increasing focus on timber makes it imperative for TU to start using Stewardship Contracting to fund restoration work. Furthermore, by encouraging the Forest Service to use Stewardship Contracting instead of traditional timber sales as they seek to increase timber production, and by participating in the process as an advocate for coldwater habitat improvement, we will create better outcomes for trout fisheries.

Project Areas:

- 1. <u>Andrew Pickens National Forest, South Carolina.</u> In the mountains of South Carolina there are important habitats for southern Appalachian brook trout, and the Andrew Pickens National Forest has been a leader in brook trout restoration. They also have extensive experience with Stewardship Contracting and are eager to work with TU. Using stewardship funding we will enhance habitat through large wood additions, replace culverts to expand brook trout habitat, and reintroduce brook trout into historic habitat where they have been eliminated by non-native species.
- 2. <u>Green Mountain National Forest, Vermont.</u> TU has worked on this forest for several years on culvert replacements and wood additions. Funding for culvert replacement has run dry due to the loss of the Legacy Roads and Trails Program, and future funding for wood addition is uncertain. TU and the Forest Service have developed integrated plans that include 70 miles of potential wood additions, and the Forest has asked TU to work with them on stewardship agreements to fund this work.

TU has also been approached by the Pisgah National Forest in North Carolina and the Ottawa National Forest on Michigan's Upper Peninsula to participate in Stewardship Contracting. Once we know how to develop stewardship projects, we will be able to expand to other National Forests.

Budget

TU will hire a consultant to help us develop our first two Stewardship Contracts. This work includes creating Stewardship Proposals with the Forest Service to become authorized to enter into Stewardship Contracts, developing the contract and financial plans with the Forest Service, putting together bid documents for the timber, selecting and managing the timber contractor, and setting up the internal accounting for this new revenue stream. TU project managers will be involved with the consultant throughout the process to ensure proper project design, and to gain the knowledge needed to use stewardship authorities in the future.

Each stewardship project is expected to generate between \$50,000 and \$100,000 for habitat restoration, which means the \$35,000 CCF donation will leverage \$100,000 to \$200,000 through these two pilot projects alone. By creating the ability for TU to use Stewardship Contracting in the future, the ultimate leveraging effect will be even greater.

TOTAL:	\$35,000
Travel:	\$2,500
TU project manager salary:	\$12,500
Stewardship contracting consultant:	\$20,000

Restoring the Fire-Ravaged Upper Eel River in Northern California

Project Summary

This project intends to catalyze restoration at a significant scale with the U.S. Forest Service (USFS) in the Mendocino National Forest. The project will result in the development of watershed restoration planning tools for the upper Eel River in northern California, one of the state's wildest and most important rivers for the recovery of north coast steelhead populations and an area that was recently severely impacted by huge, catastrophic wildfires. The USFS, which manages most of the burned land covered in this proposal, lacks capacity to develop plans that will effectively restore the watershed and conserve its aquatic species, especially post fire. A \$20,000 contribution from the CCF funds will enable TU staff to dedicate the resources necessary to collaboratively outline the framework for an Upper Eel River Watershed Restoration Plan that will provide maximum benefit to steelhead, coho, and chinook populations and the stream networks that support them.



Eel River steelhead trout.

Background and Conservation Need

Recently featured in the award-winning documentary "A River's Last Chance," the Eel River is one of the jewels of California's north coast, and fundamental to the conservation and recovery of California steelhead (pictured above). Sadly, in 2018 the Mendocino Complex Fires decimated nearly 500,000 acres (700 square miles) of land, much of which was in the upper Eel River watershed. About three-quarters of the burned area is national forest. In addition, more than 325 miles of year-round streams, plus seasonal water bodies, were within the burn zone, which burned mostly at moderate or high severity that left little if any riparian vegetation living (picture below). A majority of Mendocino National Forest (MNF) land was burned



The impacts of fire in the Mendocino National Forest were significant due to extreme temperatures. With funding from CCF, we can work with the USFS to develop the framework of a comprehensive Restoration Plan so these areas will once again be accessible and fishable.

by the Mendocino Complex fires and USFS employees do not have the resources to address the impacts of the fires on our rivers and streams while also addressing ongoing management needs. As a result, most of the burned areas, including historically significant streams and rivers for anglers and wildlife, are closed to the public. Without the assistance of TU, the USFS cannot respond to current management needs, nor can they plan for future restoration.

The USFS in Region 5 is notoriously understaffed and the management needs for such large areas of land, connected by some of the best trout streams in the country, are large; particularly following such large and catastrophic fires. In addition to addressing the impacts of fire, the USFS must also now consider the possibility of dam removal of two significant barriers, Cape Horn Dam and Scott Dam, above which lies 288



Several large wood and boulder structures were installedas part of the Soda Creek Instream Steelhead Habitat Enhancement Project in (2013). Since completion, deep pools scoured providing refugia habitat for rearing steelhead trout.

miles of habitat. As a result, collaborative projects between TU and the USFS are much needed and have the potential to make significant impacts. There is a window of opportunity now for TU to build on its existing partnership with Region 5 of the USFS to guide the development of multiple restoration initiatives. These funds will also assist TU staff with procuring additional grant funds to support the proposed planning effort.

Conversations are already underway between the TU California Science Program, the North Coast Coho Program and MNF USFS staff regarding strategic planning needs. It is unlikely that the work needed to assess the damage from fires and determine recovery potential to rivers and streams will occur anytime soon, leaving fish at the mercy of post fire impacts for years to come. Synthesizing information on topics such as sedimentation issues,

riparian revegetation, habitat restoration, and fish passage barrier removal is needed in order for the USFS and others to understand the needs associated with restoring the highly degraded burn zone in the upper Eel watershed. A USFS approved Upper Eel River Watershed Restoration plan will enable TU to act on behalf of the USFS as both a grantee and project proponent and will impact hundreds of miles of fishable streams and rivers.

This project proposes to build on our work and relationship with the MNF USFS to outline a comprehensive Upper Eel River Watershed Restoration Plan for the burned areas of MNF. More specifically, funding from the CCF would allow TU to create a Scope of Work and outline for the Upper Eel River Watershed Restoration Plan. This effort would involve working with the USFS to:

- 1) Identify roles and responsibilities;
- 2) identify what surveys need to be completed within the burn zone;
- 3) identify high priority projects;

4) identify qualified professionals to complete necessary assessments, designs, and outline the process for securing permits and environmental compliance;

5) identify and apply for at least five additional grants to finalize the Watershed Plan and move forward with restoration implementation.

Our effort will leverage CCF funding with CA state grant funds for maximum benefit to fish in the Eel River and its tributaries, which together represent one of California's premier recreational fisheries.

Funding Need

This project will be led by Dr. Natalie Stauffer-Olsen, with support from Anna Halligan, Elizabeth Mackey and Dr. Rene Henery. We respectfully request \$20,000 in total to support the proposed project. We calculate (based off of our previous partnerships with the USFS) that this relatively small investment in our work by the CCF will help us leverage hundreds of thousands, if not millions, of dollars of funding to move forward with restoring the streams and rivers, once prized by anglers, that are currently threatened by fire impacts and dam operations. **Specifically, CCF funding will cover:**

- \$18,000 in salary/benefits for four TU staff
- \$2,000 to cover travel expenses

Improving Habitat for Maine Brook Trout

Project Overview

Instream large wood addition projects have been proven to boost brook trout biomass, yet very little of this work is occurring Maine, which the Eastern Brook Trout Joint Venture has described as "the last true stronghold for brook trout in the eastern United States." One of TU's primary conservation strategies is to protect and enhance the best native trout strongholds, and you can't find a better place to do that than Maine. A \$20,000 grant from the CCF will enable TU to start a new habitat work crew to enhance native brook trout strongholds and expand the core of brook trout habitat in Maine classified as "Resilient" by TU's Conservation Portfolio. We propose to plan and permit wood addition projects, purchase equipment, and hire a work crew to complete the first year of projects in 2020, establishing a presence that will attract more partners and funding to sustain this work into the future.

Project Description

In watersheds with a history of intensive logging, trout streams generally lack the instream wood they need to provide optimal fish habitat. These wood-starved streams are often wide and shallow, lacking in overhead cover and deep pools, scoured of gravel that is needed for trout spawning, and depleted of nutrients provided by the organic matter in wood and leaves that helps form the base of the aquatic food chain. In Maine, these habitat problems have been documented in detailed habitat assessments by state fisheries biologists and TU volunteers on more than a dozen of the state's best brook trout streams.

The solution is simple: add wood back into the streams. TU and the Vermont Fish and Wildlife Department have completed dozens of miles of wood additions, and we have intensively monitored restored streams and control sites over several years to document the changes that take place after wood is added back into a stream system. The results have been stunning: on average we see a 150% increase in brook trout biomass after wood addition. As demonstrated in Vermont, large wood addition projects can be an effective strategy to address these issues. However, wood addition projects for brook trout in Maine have been limited to a few small demonstration projects by the Maine Department of Inland Fisheries and Wildlife, and in over a decade have not reached a meaningful scale.

Two Maine landowners who own and manage more than 100,000 acres of Maine forestland have approached TU seeking assistance for large wood addition projects for brook trout habitat on their properties. The two interested landowners present conservation opportunities in two very different landscapes. The Emerson Brook/South River watershed is one of the few large ownerships in heavily-developed southern Maine managed as commercial timberland and represents an opportunity to maintain and enhance aquatic habitat in one of the few undeveloped watersheds with a robust brook trout population in the region. The West Branch/Middle Branch Pleasant River watershed is in the heart of northern Maine's "Unorganized Territories", surrounds the Appalachian Trail's famed "100 Mile Wilderness" and is largely owned and managed by the Appalachian Mountain Club (AMC) as a combination of ecological reserve, land used for low-impact recreation like hiking, angling, and remote wilderness lodged, and timber harvest. The AMC property is surrounded by a matrix of other conservation lands and is the headwaters of the largest tributary to the Penobscot River. Lower reaches of both branches of the Pleasant River support both brook trout and endangered Atlantic salmon. TU's Brook

Trout Conservation Portfolio indicates that large portions of both ownerships are classified as "Resilient" habitat and nearby areas could reach the "Resilient" classification with improved habitat and connectivity.

Budget

With a \$20,000 donation from the CCF, TU will plan and implement the first round of wood addition projects in these watersheds. TU will obtain the necessary equipment and hire a work crew for the summer of 2020. The project planning and permitting work will be led by TU's Jeff Reardon, who has been leading TU's conservation work in Maine for the past 20 years and is well-positioned to develop the partnerships with land managers and permitting agencies to target high priority projects for the first year. TU will hire a seasonal crew of three to complete the work in the field, modeled on the seasonal work crews we have employed in Vermont and New Hampshire for the past several years. We will purchase chain saws and griphoists to provide the crew with the necessary equipment.

We are approaching this as a "start-up" and requesting the full cost of the project from the CCF in 2020, after which we expect the program to become self-sustaining through contributions from land trusts, landowners, and grant programs. Start-up funding would provide the base of equipment and landowner relationships to build a large wood addition program in Maine.

TOTAL	\$20,000
Equipment: chain saws, hard hats, and griphoist:	\$2,500
4-person work crew for 25 days of wood additions:	\$17,500



APPENDIX A: Map depicting Maine brook trout habitat and the location of wood addition project sites.

Restoring Water and Habitat in the Land of Enchantment

Project Summary

This project will expand Trout Unlimited (TU) water and habitat work into northwest New Mexico including wild and native trout issues in the mainstem and key tributaries of the Rio Chama. This important tributary of the Rio Grande has important coldwater resources that are at risk from recurrent drought and changing climate. A \$50,000 CCF grant will be used to match \$150,00 from other sources to hire and support a full-time staff person for two years. Multiple funders such as the Hewlett Foundation, The Water Foundation, Gates (Colorado) Foundation, and National Fish and Wildlife Foundation plan to invest soon in the Rio Grande River Basin. We need full-time ground-based capacity to capitalize on this opportunity – to build a long-term public and private land program in this geography and oversee high elevation meadow restoration, fish barrier removal, and streamflow, riparian, and channel restoration projects.

Background and Conservation Need

Over the past two decades, TU has struggled to expand capacity in key parts of the Southwest, including the sparsely populated headwater regions of the Rio Grande River Basin in New Mexico and Colorado. However, we now have strongholds in Del Norte (CO) and Santa Fe (NM) with full-time TU staff presence along with local TU chapters and volunteers. Further, we have additional staff focusing on public land, water, and habitat issues in nearby basins like the San Juan and TU Science Team capacity dedicated to helping prioritize watershed-based project work.

A specific staff person on the ground and working streams in and around Chama will leverage foundation and private support with federal and state funding sources that have prioritized local solutions to longterm and complex natural resource issues in the Rio Grande River Basin. An additional strategic hire is necessary to cover rural and isolated landscapes in the northwest corner of New Mexico, increase the TU conservation footprint in an identified drought hotspot and climate change adaptation flashpoint, and leverage federal, state, tribal, and private funding critical to mission success. It's also an opportunity to expand TU's partnership footprint with tribal partners and native Hispanic communities in and around the town of Chama.

National Forest partnership opportunities in northern New Mexico reflect intensified drought conditions, less reliable snowpack, and increased water demands across the board. TU is prioritizing high elevation meadow restoration to help store water on the land instead of new reservoirs. TU has had success in other geographies, both in other western states and nearby in New Mexico, identifying locations for restoration and natural water storage improvement techniques to positively change the timing of water delivery ultimately providing more, colder, and cleaner, water downstream at the time it's needed most. In addition, the Forest Service has approached TU about working on fish barriers to reconnect existing RGCT populations and in a couple instances, either build or enhance structures purposefully installed to isolate the native trout and reduce impacts from non-native trout.

The Rio Chama also has private land restoration opportunities. It is the largest headwater tributary of the Rio Grande. With 760,000 acre-feet of authorized storage, Bureau of Reclamation and the Corps of Engineers operate the Chama's three dams to provide water for tribal, irrigation and municipal uses in

the Middle Rio Grande. There are both large dam water management and a plethora of tributary flow and habitat issues TU has identified as fishery priorities. Streamflow restoration projects abound including the ability to tap into federal Farm Bill program dollars for on-farm and ranch water use efficiency improvements. There is ample opportunity to work with the Spanish-speaking Acequia (small, often informal, but organized shared ditch users in northern New Mexico) community on water use, efficiency, and habitat restoration projects. Further, there are several local tribes active in the Southwest Tribal Fisheries Commission that TU can partner with and jointly identify and implement projects.

Both habitat restoration on National Forest lands and traditional TU program work with ranchers on water use issues are in play, and directly in TU's wheelhouse. Based on the close geographic proximity of upper Wolf Creek and Banded Peak Ranch to New Mexico and the Upper Chama, there is potential for this staff person to provide support (e.g., technical assistance, outreach to landowners, etc.) for some innovative native San Juan cutthroat trout work as well. These activities are described in a separate CCF proposal entitled *San Juan Cutthroat Trout Recovery Project*.

Fisheries and Cultural Significance

The northern half of the state, where TU's restoration projects occur and where we hope to expand, is where the headwaters for most coldwater streams in New Mexico originate. Fishing can be spectacular. Tailwater sections below dams like El Vado and Abiquiu, the Rio Chama mainstem as it flows through public and private land, wild trout tributaries like the Brazos and Vallecitos, and small native trout streams (thankfully off the beaten path) are all ready for the adventure seeking angler conservationist.

This is also where ancient history informs modern social interactions. Native American tribes and Spanish-descended campesinos – whose ancestors founded so many northern New Mexican villages – both rightfully claim the ground as their place of origin. Our chapters enlist Hispanic and tribal chapter neighbors to engage and lead interactions with communities. TU is committed to enhancing economic opportunities that include recreational fishing, civic pride, increased tourism and community enterprise. Neither this nor other TU projects in New Mexico could even be contemplated if TU was not prepared to honor and conform to cultural values.

Funding Need and Budget

This proposal represents an opportunity to build a long-term place-based program to benefit native Rio Grande cutthroat and wild trout habitat in New Mexico. Maximizing the overlap between TU mission objectives and important federal, state, and foundation funders will help scale up restoration efforts and increase our market share of available resources in the Upper Rio Grande.

Specifically, CCF funding will cover:

- \$50,000 for salary/benefits for TU's Northwest New Mexico Project Manager
- The remainder of the \$200,000 two-year budget to cover the rest of the salary/benefits, travel, office, and indirect expenses will be raised from foundation, federal, and private dollars.

Monitoring using Mobile Applications: Taking TU Angler Science to the Next Level

Project Overview

Trout Unlimited is a science-based organization, with Angler Science as a focal area in our current strategic plan. In 2018/19, with CCF support and in collaboration with other programs, TU Science developed two mobile applications for use by TU grassroots volunteers and staff to collect data that could be used for more strategic conservation decisions. The first is the WiseH2O app that enables water quality monitoring using a color-reactive test strip paired with a mobile phone to screen for contaminants. A monitoring program is currently being piloted with the Kiap-TU-Wish Chapter in Pierce County, Wisconsin using this technology. The second is the RIVERS (River Inventory by Volunteers for Efficient Restoration Strategies) App, which allows for data collection and photographic documentation of stream and river impairments. Both mobile applications have the potential for much wider volunteer- based data collection to increase our capacity for data-driven planning, and grassroots is hungry for more. The proposed project would refine the technology behind these mobile applications and expand training of volunteers in their use to much broader geographies.



functional WiseH2O app and test strips. Volunteer leaders within the Kiap-TU-Wish Chapter are using these tools to monitor water quality once per month at ten sites on multiple streams and rivers, as well as to implement event- based sampling (i.e., following strong rainfall) in Pierce County, Wisconsin. A second group of volunteers has been asked simply to collect data in an ad hoc way while they are fishing.

The next step for this project is to continue to work with MobileH2O to refine the WiseH2O mobile application using feedback from the Kiap-TU-Wish chapter based on their pilot sampling efforts, and then scale up deployment of the mobile app and monitoring program across the entire

Project Description

The focus of this proposal is to further refine the WiseH2O mobile application with technical updates based on field testing and expand the program from a local pilot by the Kiap-TU-Wish Chapter to the entire Driftless Area of Minnesota, Wisconsin, Iowa and Illinois (see mock map below). The WiseH2O app is being developed by Boisebased MobileH2O, LLC in direct collaboration with TU staff and the Kiap-TU-Wish Chapter through a user-feedback process. Over the last year these efforts have led to a



Driftless Area, an agricultural landscape with marked water quality issues. The scaling-up will require purchasing of materials and multiple training sessions by lead volunteers, staff, and project partners.

Additionally, in early 2019 TU Science, in collaboration with other programs (Volunteer Operations, Eastern Conservation), developed and launched the RIVERS mobile app thanks to support from the 2018 CCF. The RIVERS App allows photo documentation of common stream impairments via data fields and geolocated photos using mobile devices. The RIVERS App has been made available through trainings at TU Regional Meetings and Lines-to-Leaders webinars and has been used to date by several TU Chapters to conduct inventories of disturbances in their home waters (e.g., the Rogue and Mianus Rivers). Simple materials been developed that are hosted on TU's website training have (https://www.tu.org/science/science-engagement/angler-science/rivers/).

The next phase of the RIVERS App project will be to continue to improve the app and conduct future trainings with TU volunteers. Through the above pilot applications, useful feedback

is coming in suggesting that refinements are needed, and a Version 2 needs to be released. The other aspect of this project is to continue to provide trainings at TU Regional Meetings and through Lines-to-Leaders webinars, develop additional training materials to be hosted on tu.org (videos, etc.), and refine back-end data access and visualization within the current web-application.

CCF Impact

Coldwater Conservation Funds would take these mobile applications to the next level and enable broader crowd-sourcing of data by TU volunteers. CCF funds will allow dedicated staff time to expand the water quality monitoring program in the Driftless Area by refining the WiseH2O mobile app, purchasing materials, developing training materials, and providing face-to-face training. Likewise, the

RIVERS App will be refined, and additional training materials and in-person trainings will be conducted. Advancing these mobile-app based monitoring and assessment programs will empower TU's volunteerbased monitoring programs and take Angler Science within TU to the next level!

Budget: \$27,000

WiseH2O WQ Monitoring

\$ 13,000: Mobile application refinement

- \$ 5,000: Training and resources
- \$ 2,000: Travel

RIVERS App

- \$ 2,000: Mobile application refinement
- \$ 3,000: Training resources
- \$ 2,000: Travel



The RIVERS App allows photographic data collection on stream disturbances that can then be queried and viewed by TU volunteers, staff, and partners in a web application

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Batten Kill Home Rivers Initiative

Project Overview

A \$40,000 grant from the CCF will be matched by \$90,000 from TU chapters and councils and \$50,000 from the U.S. Forest Service to launch a new Home Rivers Initiative on the Batten Kill River in Vermont and New York. TU will hire a new staff position to lead the program, taking the successful small-scale restoration efforts that have been completed to date and expanding them to the 57-mile Batten Kill River and its many tributaries.

Project Description

The Batten Kill (or Battenkill, depending on which side of the New York/Vermont border you're on), has long been one of America's most storied trout fisheries. The clean, cold water coming from the headwaters on the Green Mountain National Forest and emanating from numerous springs provided the basis for a thriving trout fishery made famous by the likes of Charles F. Orvis and Lee Wulff. By the 1990s, however, the Batten Kill had stopped living up to its reputation. A 1-2 punch of habitat degradation and over-harvest (the limit back then was 12 trout) had decimated the fishery. Lee Wulff even packed up and left his home of 20 years on the Batten Kill, citing the fishery's decline.

The state of Vermont considered stocking to cover up the river's ills, something it hadn't done since 1976, but instead opted for catch-and-release regulations on the river's wild trout. That solved the harvest problem, and anglers began seeing big brown trout in the Batten Kill again. But the overall trout numbers were still very low, and the cause was determined to be a lack of instream habitat. TU chapters and other local partners began installing large wood structures in the river and worked with Vermont Fish and Wildlife to closely monitor the fish response. What they found in the restoration areas was very encouraging: a sustained fivefold increase in wild trout populations across all year classes — including a robust population of trout exceeding 18 inches.

The habitat improvement projects are so effective because they help to narrow the river and accelerate current velocities, which helps keep the water cool; they create more deep pool habitat; and, perhaps most importantly, they provide cover for juvenile trout to escape predation. Having proven the effectiveness of these projects on nine stream segments totaling four miles (one of which is shown in the image below), we are now ready to add a full-time staff position to expand habitat improvement efforts throughout the watershed. The Home Rivers Initiative coordinator will work with landowners and other partners to plan and implement habitat improvements, including wood addition projects, to boost trout populations in the Batten Kill from its headwaters in Vermont through its coldwater reaches in New York.



Budget

TU chapters and councils in Vermont and New York have been working since 2017 to raise the necessary funding to launch a Home Rivers Initiative. The funding need is \$180,000 that covers two years of salary and benefits, plus travel and other expenses, for the new staff position. Chapters and Councils have raised \$90,000. The U.S. Forest Service has pledged \$50,000. A \$40,000 donation from the CCF would match these contributions and enable TU to start a new Home Rivers Initiative on the Batten Kill.

Driftless Area Program Expansion in Minnesota

Project Overview

A \$20,000 grant would be matched by contributions from state and federal agencies, individual donors, and private foundations to hire a new Project Manager for Driftless Area Restoration in Minnesota. This is the rare case where restoration funding is not the limiting factor. We currently have a \$9.2 million agreement with the Natural Resources Conservation Service and a \$1.5 million agreement with the State of Minnesota for habitat restoration. The limiting factor is staff capacity to plan, permit, and oversee restoration projects. Funding from the CCF would enable us to add staff in Minnesota and increase the pace of spring creek restoration there.

Project Description

The Driftless Area Restoration Effort is a national success story. The so-called "Driftless" region of the Midwest is a spring creek mecca, with more than 600 of them spread across portions of four states. These streams were badly damaged by agriculture a century ago, but respond extremely well to restoration, often with ten-fold increases in trout populations. In total, more than 150 miles of spring creeks have been restored in the Driftless Area over the past decade.

In the early 2000s, TU volunteers recognized the success of local stream restoration efforts and set out to create a regional program that would increase the pace and scale of restoration work. At the time, about 3 to 5 miles of restoration work was getting done across the four-state area. TU hired staff to lead the program in 2004, and today, through the Driftless Area Restoration Effort, we are completing 20 miles of restoration each year.

Much of that work, however, is being done in Wisconsin. Despite the restoration needs and the abundance of funding and willing landowners, Minnesota is lagging behind. From 2016-2018, in Wisconsin, where we have three staff working in the Driftless, we completed 32 projects under our \$9.2M funding agreement with the Natural Resources Conservation Service. In Minnesota, where we have a portion of one staff person's time focused on restoration projects in the Driftless, we completed zero NRCS projects. With an increase in staffing we can put restoration funding to better use in Minnesota and dramatically improve trout fisheries.

Budget

The cost of hiring a new staffer in Minnesota, including salary, benefits, travel, and other expenses, is \$180,000 over two years.

TOTAL:	\$180,000
CCF:	\$20,000
U.S. Fish and Wildlife Service:	\$30,000
Private Foundations:	\$30,000
Individual Donors:	\$20,000
National Fish and Wildlife Foundation:	\$30,000
Natural Resources Conservation Service:	\$50 <i>,</i> 000

With the addition of a new staff position in Minnesota to coordinate landowner outreach, survey and design, permitting, construction oversight, and monitoring we will complete \$2 million worth of spring creek restoration in Minnesota over the next two years totaling 6 miles.

APPENDIX: Driftless Area Stream Restoration Photos



Driftless Area spring creek pre-restoration. Note that the stream is over-widened, shallow, and silty, with badly eroding banks that will continue to contribute excess sediment.



Driftless spring creek during restoration. Note the re-grading of stream banks, narrowing of channel, and re-meandering, which improves depth and current velocity, benefiting water temperatures and scouring sediment to provide more spawning gravel and places for aquatic insects to live. The increase in food sources for trout is a primary reason why we see ten times more fish after restoration at many restoration sites.



Post-restoration.

San Juan Cutthroat Trout Recovery Project

Project Summary

Trout Unlimited (TU) is leading the recovery of what could be the rarest trout in the world – the San Juan cutthroat trout (SJCT). Upper Wolf Creek on the San Juan National Forest and the Banded Peak Ranch in the Navajo River basin have been selected as two main project sites for initial SJCT restoration and monitoring. A \$50,000 contribution from the Coldwater Conservation Fund (CCF) will provide matching funds that will help secure the \$200,000 of public funding needed to complete these projects. The requested contribution from the CCF will allow TU staff to "jumpstart" SJCT recovery efforts.



SJCT, Grayhackle #1, courtesy of Dr. Kevin Rogers, CPW

Background and Conservation Need

Trout Unlimited proposes this project in light of the <u>rediscovery</u> of SJCT. SJCT were thought to be extinct until genetic analysis recently revealed several extant SJCT populations in their native Colorado. With eight populations totaling fewer than 1,000 individuals and occupying less than seven miles of stream, the SJCT has the been called the "rarest trout in the world". This project will be an initial step towards the recovery of sustainable populations of SJCT and will provide an opportunity to scientifically and strategically reintroduce SJCT in locations expected to be most resilient to increasing threats to coldwater fish.

Recovery of SJCT will require a coordinated effort across TU programs (e.g., Government Affairs, Sportsmen's Conservation Project, Science and Western Water and Habitat), Councils and chapters as well as with local communities and Federal and state agencies. The project will showcase TU's conservation chops and serve as a model for native trout recovery throughout the West. The list of SJCT threats is long, including drought, diminished snowpack and wildland fire. Regarding the latter, the 416 Fire, one of largest wildfires in Colorado history, harmed two populations of SJCT just north of the town of Durango in 2018. This event reinforces the need for TU to act quickly in this recovery effort.

With rediscovery of SJCT, the U.S. Fish and Wildlife Service will decide if it warrants listing as threatened or endangered under the Endangered Species Act (ESA). If listed, land use restrictions commonly mandated under ESA could be invoked resulting in restrictions to a multitude of community activities like grazing, fishing and wood gathering. Further, it is universally believed that SJCT will benefit from continued public awareness of its plight, which would be substantially reduced if anglers were prohibited from catching this beautiful fish in its native habitat.

Trout Unlimited has established and is leading the SJCT Work Group to coordinate recovery efforts across the San Juan National Forest. The Work Group includes Colorado Parks and Wildlife, Southern Ute Indian Tribe, TU Fiver Rivers Chapter, U.S. Fish and Wildlife Service, Chama Peak Landowners Alliance, county and city officials and private landowners. The people at this table are directly responsible for the future success of this recovery project. Through the SJCT Work Group matching funds will be leveraged, projects designed and implemented, political will created, and the story of these imperiled fish told. For this to happen, TU will need to remain at the helm.

Project Description and Objectives

This project will focus on the upper Wolf Creek and Navajo River watersheds located in southern Colorado. Upper Wolf Creek will be the first SJCT restoration stream, planned for stocking in 2020. A wetland restoration project of approximately two acres has been permitted in the South Fork of Wolf Creek in conjunction with this SJCT reintroduction. Trout Unlimited is essential to completing this work in a timely manner. The San Juan National Forest lacks funding, grassroots volunteers and technical expertise. Trout Unlimited, with support from both the CCF and chapter volunteers, can address these shortcomings, helping ensure a smooth start to the recovery project and position TU as a leader. Upper Wolf Creek is a popular fishery and transitioning it to SJCT could be controversial. Using CCF funding, TU staff will take a lead role in educating anglers through local fly shops, public meetings and dissemination of materials.

In the Navajo River watershed TU is partnering with the Banded Peak Ranch, which is providing access to the ranch to complete monitoring as part of a landscape-scale watershed assessment. In addition to monitoring, TU staff will work with Colorado Parks and Wildlife staff to evaluate a series of ponds for potential introduction of SJCT. Overall, this assessment will identify locations to achieve improvements to water retention on the land and recommend a variety of restoration and habitat improvement techniques to support current and future SJCT populations. This work is an essential step towards both designing restoration projects and securing additional funding in future years.

These are just two initial projects in the overall recovery effort. As additional funding is secured from Colorado Parks and Wildlife, Forest Service, etc. and the SJCT Work Group builds momentum, TU will advance other near and long-term priorities. These include evaluation of SJCT populations impacted by the 416 Fire, recovery projects in the Hermosa Creek watershed (home to several remaining SJCT populations), developing a decision framework for SJCT recovery based on best available science, and generating more local support through a well-coordinated public outreach campaign.

Funding Need and Budget

A \$50,000 contribution from the CCF would provide critical funds to initiate recovery of the rediscovered SJCT and help secure \$200,000 in additional public funds. Initial project work in upper Wolf Creek and the Banded Peak Ranch is a great opportunity for both TU and the recovery of SJCT. Done right, it will serve as a springboard for one of TU's most important native trout recovery efforts in the West. Based on the close geographic proximity of upper Wolf Creek and Banded Peak Ranch to New Mexico, there is potential for this recovery project to receive support (e.g., technical assistance, outreach to landowners, etc.) from a new TU staff hire in northern New Mexico. This position is captured in a separate CCF proposal entitled *Restoring Water and Habitat in the Land of Enchantment*.

Funding from the CCF for the SJCT Recovery Project will cover:

- \$25,000 for salary/benefits for TU staff to lead the recovery work in upper Wolf Creek and Banded Peak Ranch.
- \$25,000 for recovery project implementation including construction contracts and monitoring equipment.

New England Technical Assistance Program

Project Overview

There are hundreds of restoration projects that never get accomplished, and thousands of willing restoration workers who never get the chance to lift a finger, because they lack a few key pieces of expert assistance. TU has that expertise, and the Technical Assistance project is TU's equivalent of a SWAT team a fast and efficient means of getting our trained experts into projects when and where they are needed, and back out of them as soon as our partners can run with the ball on their own. This idea – which we have already field-tested in Pennsylvania – will leverage a modest investment, and the experience of our field staff, into hundreds of thousands of dollars and a huge positive change for New England's trout.

A \$25,000 grant from the CCF would be matched by the U.S. Forest Service to expand TU's Technical Assistance Program into New England, with an initial focus on trout streams in New Hampshire. Through this program TU will lend its technical expertise to local conservation districts, watershed associations and TU chapters to enable them to complete habitat improvement projects. By providing project designs, obtaining permits, or overseeing construction, TU can set the stage for project implementation and extend its reach by leveraging the resources of local communities.

Project Background

TU started its Technical Assistance Program in Pennsylvania in 2005 to help with the cleanup of abandoned mine pollution. Pennsylvania has a strong network of local watershed associations who wanted to help clean up their local streams, but abandoned mine cleanup is highly technical work for which community-based organizations lack the necessary expertise. By stepping in to assist with the more technical elements of the projects and then letting the partners handle the fundraising, partnership development, and project management, TU enabled dozens of mine cleanup projects to be completed. Based on the success of this program, in 2017 TU created a technical assistance program for other habitat improvement projects in Pennsylvania. Since then we have completed project design, permitting, or construction oversight on hundreds of project sites.

The leveraging power of this technical assistance program is immense. One illustrative example comes from Laurel Run, where TU spent just under \$1,000 to provide the state forest with a design and permit for a streambank stabilization project. With the design and permit in hand, the state forest quickly turned around to obligate \$7,000 from its budget to construct the project, which eliminated over 2,400 pounds of sediment pollution per year. From 2005 to 2018 TU spent \$1.4 million on its abandoned mine technical assistance program. This initial investment helped to leverage more than \$13 million in implementation funding.

The other advantage of the technical assistance approach is that it enables TU to cover more ground than we could if we had to handle all aspects of a project from start to finish. When a local group can handle the landowner outreach, grant writing and administration, contractor selection, and other time- consuming tasks associated with a restoration project, that frees us up to move on to new project sites, the result being that more restoration work gets done on trout streams.

This approach can't be used everywhere. It most cases it is necessary for TU to take the lead and handle all aspects of project management because if we don't, then nobody else will. But in the places where local partners are ready to step up, technical assistance can be very effective.

We will initially focus our New England expansion in the White Mountains of New Hampshire, a stronghold for native brook trout with cold, forested high elevation streams that are projected to be among the region's most resilient to climate change. We will emphasize culvert replacement projects that reconnect fragmented habitat to create larger, more interconnected brook trout populations. The program will be led by TU's Colin Lawson, who has been working with New Hampshire communities on culvert replacement projects for the past nine years and is an expert in culvert assessment and hydraulic modeling, and Jeff Tenley, an engineer who can produce culvert designs that local partners use to initiate permitting and budgeting.

Budget

A \$25,000 contribution from the CCF will be matched by \$15,000 from the U.S. Forest Service to launch the technical assistance program. Funding will be used to publicize the availability of technical assistance to community groups in the White Mountains, and to cover the staff time for Colin and Jeff as they work with communities to develop projects. Traditional grant programs will fund the culvert replacements themselves, but generally will not fund the early stage project development. If only a single culvert project resulted from the technical assistance program, the CCF's \$25,000 contribution would leverage more than \$200,000. The likely outcome based on our experience in Pennsylvania is that the result will be dozens of projects over the next few years, enabling the \$25,000 CCF contribution to leverage well over a million dollars in construction funds for restoration.



Example of a fish passage barrier in the White Mountains of New Hampshire that is blocking brook trout from reaching a critical coldwater tributary in the hot summer months. There are hundreds of sites like this throughout the region.

Deciding the Fate of the Potter Valley Project on California's Eel River

Project Summary

We seek \$20,000 from the CCF board to seize a time-limited opportunity to open up hundreds of miles of blocked habitat in the headwaters of the upper Eel River, one of California's premier steelhead and salmon rivers. TU has the unique opportunity to join with several peer conservation groups, three county governments, and native Tribes to create a new entity to take ownership of the Potter Valley Project, a set of aging hydroelectric facilities, correct its fish passage problems including removal of Scott Dam, which blocks the upper Eel - and operate the modified Project in an environmentally friendly manner. We (TU and partners) have until April 14, 2020 to determine whether a mutually-agreeable project is feasible and, if so, to propose a plan for creating and funding the new entity that will take over the relicensing process. CCF funding would support our participation in this effort over the next year when critical decisions will be made. TU is recognized as a national leader in dam removal and this is an outstanding opportunity to further solidify our reputation as such.



Project Description

Scott Dam on the upper Eel River

The Potter Valley Project (Project) is a 9.4-megawatt hydroelectric project located on the Eel and East Fork Russian rivers, in Lake and Mendocino counties. The inter-

basin water transfer Project diverts water from the Eel River southward and conveys it to the project's powerhouse located in the headwaters of the Russian River. The Eel River is one of California's most important anadromous salmonid rivers, particularly for coho and Chinook salmon and steelhead (all ESA-listed species). However, Project operations have severely degraded salmonid habitat in the Eel River by blocking migratory access to 288 square miles of watershed above Scott Dam and reducing flows below the Project. The Project annually diverts around 70,000 acre-feet out of the Eel River. A number of downstream entities in the Russian River watershed rely on this water, including municipal interests and the Potter Valley Irrigation District (PVID), a small community of farmers between the Eel and Lake Mendocino.

In April 2017, PG&E began the process of renewing its Federal Energy Regulatory Commission (FERC) license for the Project, which expires in April 2022. Almost immediately, the company began informal efforts to find another entity to take over the Project, which loses money due to mitigation requirements, produces a trivial amount of power by modern standards, and faces large relicensing costs due to the need to address fish passage and other environmental issues.

TU's primary goal in the relicensing process is the removal of Scott Dam, which would restore access to 288 square miles of salmon and steelhead habitat in the headwaters of the Eel. To this end, we have been caucusing regularly with peer NGOs, as well as participating in an Ad Hoc stakeholder group (<u>http://pottervalleyproject.org/</u>), convened by Congressman Jared Huffman as a forum for exploring a consensus solution among all affected interests, including conservationists, water users, government agencies, and PG&E. The primary challenge to dam removal is finding enough water to meet the needs of downstream Russian River interests that rely on existing diversions from the Eel to the Russian. Modeling from the Ad Hoc group shows

that without the dam, run-of river wintertime diversion should be enough for Russian River interests downstream of Lake Mendocino (Sonoma Water customers, multiple other cities, Alexander Valley grapegrowers, etc.), but the Potter Valley Irrigation District – a small community of farmers between the Eel and Lake Mendocino – would need to develop alternate water supplies.

In January 2019, PG&E filed for Chapter 11 bankruptcy, and signaled its intent to "orphan" the Project. In

response, CalTrout, Sonoma Water, and Mendocino County Inland Water and Power announced they had formed a "Planning Committee" to undertake an effort to submit their own Notice of Intent (NOI) to develop a relicensing proposal, with the support of TU and the Tribes. The NOI proposes that the Planning Group determine, by April 14, 2020 whether a mutually-agreeable project is feasible and, if so, form a new entity to take over the relicensing process by that date. Given its diverse membership, any new licensing proposal that emerges from the Planning Committee will, by necessity, be a true "two-basin solution" – that is, one that restores passage to the Eel headwaters while solving the water supply issues in the Russian River basin.

Need for CCF Funding

With the PG&E bankruptcy and the formation of the Planning Committee, the Potter Valley relicensing has entered a critical new phase – and one that creates a huge opportunity for TU. Our current level of resources allows us to continue to be involved in



the relicensing proceedings – for example, by participating in the Ad Hoc group and commenting on FERC proceedings. But now that an alternative licensing proposal is being developed, the proceedings are rapidly becoming an "inside game." TU will need to join the Planning Committee to be an impact player in that game, and this will require additional funding. Developing a two-basin alternative and forming a new entity to take over the Project in nine months will be a heavy lift, and each partner will be expected to pull its weight in terms of staff time, fundraising ability, and technical expertise. Additional funds are needed to ensure TU staff can invest the time necessary to secure a seat at the Planning Committee table to shape the future of a facility that has kept salmon and steelhead locked out of some of the best habitat in the Eel River system for the past century.

Specifically, CCF funding will cover:

- \$18,200 for salary/ benefits for TU's California Director and California Water Project Attorney to participate in the Planning Committee and Ad Hoc processes
- \$1,800 for project-related travel

Reconnecting A Stream Wilderness Corridor in Rattlesnake Creek, Montana

Project Summary

This project will remove Rattlesnake Creek Dam and restore the stream channel and floodplain through the current dam site. The restoration will reconnect 35 miles of habitat for Bull Trout and other native and wild fish and enhance recreational opportunity by reconnecting the watershed between the Rattlesnake Wilderness Area in the headwaters and the Clark Fork River in downtown Missoula. A \$38,000 contribution from the CCF would provide the critical matching funds to secure the final \$300,000 in public funding needed to complete the project.

Background and Conservation Need

Rattlesnake Creek originates in the Rattlesnake Wilderness and joins the Clark Fork River in downtown Missoula, Montana. The watershed is designated Bull Trout Critical Habitat and also supports robust populations of native Westslope Cutthroat Trout and wild Rainbow, Brook and Brown trout. The Rattlesnake Creek river corridor is a recreation hub for Missoulians and visitors, with a large network of mountain biking and hiking trails. Importantly, the confluence of Rattlesnake Creek and the Clark Fork was historically one of the largest and most important fish camps for the native Salish people.

The Rattlesnake Creek Dam was constructed in 1901 to be the primary water source for the city of Missoula, and immediately blocked upstream fish migrations from the Clark Fork River to important spawning, rearing and coldwater refuge habitat in Rattlesnake Creek. In the early 1980s, Rattlesnake Creek water became contaminated with giardia, which then infiltrated the city's water system. As a result, in 1983 the Mountain Water Company stopped using the Rattlesnake Watershed system as the primary water supply and began maintaining it as the city's backup supply. The dam and adjacent reservoir were maintained by Mountain Water Company until June 22, 2017, when the City of Missoula acquired the utility company and its system infrastructure (including the dam).

Anticipating the eventual purchase of the Mountain Water Company delivery system by the City of Missoula, TU and partners launched the Rattlesnake 4 Fish Passage Project in 2014 – an ambitious plan to fully



Photo of Rattlesnake Creek Dam with the Rattlesnake Wilderness Area in the background.

reconnect the 26-mile-long main stem Rattlesnake Creek river corridor (35 miles with tributary habitat included) by removing fish passage obstacles. Since 2015, TU has installed new fish screens on three of the six irrigation ditches between the dam and Clark Fork confluence, and plans to have all six screened by 2020, thereby eliminating fish entrainment and mortality in irrigation systems. But the centerpiece

of the Rattlesnake Fish Passage Project is the removal of Rattlesnake Creek Dam, which has impeded fish passage and natural stream function in Rattlesnake Creek for more than 100 years.

Cultural Significance



Artist rendition of Salish fish camp at the mouth of Rattlesnake Creek (oil painting by Tony Sandoval, 2003).

The Salish and Kootenai people lived in the northwest more than 40,000 years ago, and Salish-speaking tribes (the Séliš and the Qĺispé) and a Kootenai-speaking band (the Ksanka – Ktunaxa) occupied a huge territory that included Western Montana. In fact, one definition of the word Missoula is from the Salish meaning "place with bull trout," referring specifically to the confluence of Rattlesnake Creek and the Clark Fork of the Columbia River, where they dug bitterroot and fished for Bull Trout in the cold waters of the creek. Even after the arrival of white settlers in the mid-1800s, the confluence of Rattlesnake Creek continued to be an important

settlement for native Americans who sustained themselves by hunting, fishing, and trading.

Project Objectives

TU's vision for this project is a free-flowing Rattlesnake Creek from wilderness to downtown that supports the wild, natural river processes on which fish – and people – depend. By removing the Rattlesnake Creek Dam and rebuilding the historical stream channel and floodplain at the dam site, we will achieve the following specific objectives:

- Restore the ecological integrity of Rattlesnake Creek by restoring its capacity for wood, fine sediment and bedload transport; and reconnecting an important historical migration corridor for native and wild trout.
- Improve recreation and cultural resources by reconnecting a river corridor that provides direct access to wilderness and excellent recreational opportunities and has historical significance in Salish and Kootenai tribal histories.

Funding Need and Budget

This project represents a unique opportunity to remove a large western dam to reconnect both biological and fluvial processes. Moreover, this can happen at a pace that—to our knowledge—has seldom, if ever, been achieved. From inception to demolition will be a short 3 years if we meet our fundraising objectives in 2019. To that end, a \$38,000 contribution from CCF will provide the critical matching funds to secure the final \$300,000 in public funding to complete the dam removal and stream restoration construction on Rattlesnake Creek. **Specifically, CCF funding will cover:**

- \$12,000 for salary/benefits for TU's Middle Clark Fork Project Engineer for design and construction oversite
- \$26,000 for construction contracts to complete dam removal and for the channel/floodplain

