COLDWATER CONSERVATION FUND

2021 IMPACT REPORT

TROUT UNLIMITED
COLDWATER CONSERVATION FUND

COLDWATER CONSERVATION FUND (CCF)

$445,480 IN CCF GRANTS IS LEVERAGING NEARLY $13 MILLION IN PUBLIC FUNDING

11 PROJECTS FUNDED IN 2021

Completed **35 FISH PASSAGE DESIGNS** for projects in New York, Massachusetts, Vermont, and New Hampshire

Implemented **6.3 STREAM MILES** of habitat restoration across **5 HEADWATER STREAMS** in the John Day watershed

Restored **1.5 STREAM MILES** of Alaska's Resurrection Creek, designed and constructed **7 FISH PASSAGE PROJECTS**, restored access to **50 MILES OF STREAM** to salmon.

Developing a **BIOENERGETIC MODEL** to inform river management and salmonid restoration in California & elsewhere in the West

ADVANCING TECHNOLOGY for monitoring effectiveness of process-based restoration

Inventoried **931 ROAD-STREAM CROSSINGS** in Idaho and **962 CROSSINGS** in the Wisconsin's Driftless Area

Developing a **DECISION SUPPORT TOOL** to produce more strategic and informed results in future restoration and connectivity work

Using **NEW ANALYTICAL TOOLS** to identify groundwater-influenced streams and climate-resilient coldwater habitats to identify areas of greatest need

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THREE EASTERN PROJECTS

FOUR WESTERN PROJECTS

FOUR SCIENCE PROJECTS

Reconnecting Habitat in the Northeast More Efficiently and Cost-Effectively by Hiring a Staff Engineer

CCF 2021 Grant: $50,000

Leveraged Funds: $3.3 Million

Completed 35 fish passage designs over the past 2 years for projects in New York, Massachusetts, Vermont, and New Hampshire

CORE FUNDING LEVERAGED

Since January 2022, we leveraged the $50,000 CCF grant spent on in-house engineering into over $3.3 million in implementation funding, primarily from state and federal grants for 17 reconnection and restoration projects across New England and New York. Funding from the CCF enabled TU to hire one part-time engineer (Stream Restoration Specialist) in New Hampshire, and supported the training and promotion of an existing full-time staff person in Vermont as a Stream Restoration Specialist. This boost of in-house engineering expertise has made us more efficient and competitive, and helped us to secure more grant funding for a greater on-the-ground conservation impact.

BEFORE: Dam blocks fish passage on the Mettowee River in Dorset, Vermont.

AFTER: Removal of the dam opened up 6 miles of previously inaccessible upstream coldwater habitat.

IMPACT & OUTCOMES

This CCF grant increased our capacity to do in-house stream design, focused on improving aquatic habitat connectivity (such as through culvert replacements and small dam removals), and has enabled us to complete 35 designs over the past two years. While permitting and fundraising for construction typically adds one or more years to the time needed to reach project implementation, we were able to complete several projects efficiently because of this added capacity (indeed, two of these projects completed in 2023 are highlighted in the accompanying photos). Also, the newly-trained staff provided support and expertise at critical times when design revisions were required due to changes in permitting standards. The Stream Restoration Specialists are also trained to develop formal project reports upon completion of a project, a step that is typically required for final approval and payment from funding agencies.

New Hampshire Stream Restoration Specialist with agency and municipal partners at the Childs Brook culvert replacement project in Bath, New Hampshire.

Implementing the Sky Island Conservation Plan in the Mountains of North Carolina

CCF 2021 Grant: $35,000

Leveraged Funds: $1.43 Million

Once completed, this project will reconnect 1 mile of brook trout habitat and reduce sedimentation by 621 tons

CORE FUNDING LEVERAGED

Funding from the CCF enabled us to invest the staff time necessary to develop project plans and write funding proposals that led directly to TU's ability to secure infrastructure funds for shovel-ready projects. The timing of this CCF grant aligned strategically with the passing of the Bipartisan Infrastructure Law legislation, and when infrastructure funding was becoming available, we had solidified plans with the U.S. Forest Service (USFS) and were ready to secure it. The CCF's support of this project helped us leverage $1.2 million from the USFS, and $230,000 from the North Carolina Land and Water Fund.

Bank stabilization on Kuykendall Creek.

Fish sampling on Cathey's Creek.

Culvert in the Cathy's Creek watershed.

IMPACT & OUTCOMES

In 2017, the CCF provided a grant for us to analyze brook trout populations in the Southern Appalachians. That analysis —something that we would not have done without CCF funding—led us to prioritize an area with great conservation potential which we call Sky Island. This area encompasses the headwaters of six major drainages—Cathey's Creek, Davidson, South and North Fork Mills, Pigeon, and Tuckaseigee, and is home to some of the region's best native brook trout and wild trout fisheries.

Once we identified the Sky Island priority area, we then set out to fill the remaining data gaps and to document the habitat impairments that are limiting trout fisheries from reaching their full potential. The result was a series of maps detailing the conditions in each Sky Island watershed, which we then used to identify the projects that will result in the greatest habitat improvements. In 2021, the CCF provided a follow-up grant to plan and fundraise for those projects. They will be implemented on the ground in the coming years.

The goal was to leverage $580,000, and we succeeded in leveraging $1.43 million for two culvert replacements, 19 streambank stabilizations, the removal of 12 obsolete culverts, and road decommissioning. Project outcomes will include:

- Reconnecting 1 mile of stream
- Reducing instream sedimentation by 621 tons
- Removing 12 obsolete culverts
- Completing streambank stabilization work at 19 sites

Upgrading Protections for New York Trout Streams

CCF 2021 Grant: $30,000

Petitioning for the protection of 505 streams in the Delaware River watershed

CORE FUNDING LEVERAGED

The goal of this project was to protect New York trout streams by upgrading their status from "Class C" (fishery) to "Class C-T" (fishery, trout) or "Class C-TS" (fishery, trout—spawning) in New York regulations. These upgraded classifications trigger permit requirements for activities that would disturb the stream bed or stream banks, or that would introduce discharge of various kinds into them. Funding from the CCF enabled TU to work with our partners to advocate for legislation to upgrade the regulatory status of deserving waters in New York, and when the legislation failed, we used remaining CCF funding to pursue the administrative track, petitioning for the protection of 505 trout streams.

Native brook trout in a tributary stream that flows into the Delaware River.

Erosive road bank in the Willowemoc Creek—a famous Catskill tributary that flows into the Beaverkill and eventually, the Delaware River.

Brown trout in the Catskills region.

IMPACT & OUTCOMES

TU's outreach to state legislators was successful, and State Assembly Bill 2023 - A4601A (meant to upgrade New York stream designations) was passed. However, Governor Hochul declined to sign the legislation, citing impacts to agriculture users and potential staffing issues within New York State Department of Environmental Conservation (NYSDEC), and it failed to become law. We then changed our strategy to work with the relevant state agencies through the administrative process. TU is currently in communications with NYSDEC on this issue and recently submitted a petition requesting reclassifications for multiple streams, particularly in the Upper Delaware Watershed to start. We will also be monitoring and weighing in during the state's "Triennial Review" process taking place in the coming year.

CHALLENGES & LESSONS LEARNED

Through this work, we learned that, in practice, streams petitioned for upgrades are handled by regulators under antidegradation policy to maintain the values on which the petitions are based (fishing, swimming, sources of drinking water, etc.). In our case, that means that known trout waters would be handled by regulators in a way that is intended to maintain fisheries values. Armed with this knowledge, and with the long-term goal of formal designation, TU sent the NYDEC a list of 505 trout waters for petition in the Delaware River watershed.

This is a great example of how the CCF's support enabled us to adjust our strategy when the legislation was not signed into law. We were able to stay in the game and pursue a new administrative track for protections that will, in time, lead to increased protections.

Implementing Prioritized Restoration Projects in the Klamath River Hydropower Reach

CCF 2021 Grant: $48,980

Leveraged Funds: $1.87 million plus $23 million pending

Planning, design, and fundraising will enable a small dam removal, 27 miles of fencing, fish screen designs, and more in 2024

CORE FUNDING LEVERAGED

CCF funding provided critical seed funding to increase TU's staff capacity to design and implement projects in the hydropower reach of the Klamath, and to take advantage of the current pools of federal funding available through the Bipartisan Infrastructure Law to accelerate the pace and scale of restoration in this critically important region. We hired Evan Bulla to lead this work, using matching funding from the California Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, Oregon Watershed Enhancement Board, U.S. Fish and Wildlife Service (USFWS), and other private donors. This additional staff capacity has allowed us to develop and design projects, and to apply for and secure $1.87 million for restoration projects, with an additional $23 million pending. This work has leveraged TU's strengths at building collaborations and partnerships with private landowners, Tribes, state and federal agencies, and other NGOs. Construction will begin in 2024 on multiple projects including a small dam removal on Jenny Creek, fencing of the reservoir footprints associated with the removal of Iron Gate, Copco 1, and JC Boyle dams, restoration of the Spencer Creek floodplain, and the design of fish screens on at least five large irrigation diversions in this reach.

IMPACT & OUTCOMES

The removal of four dams on the Klamath River provides an historic opportunity to reconnect habitat for anadromous fish, including salmon and steelhead. TU has been a leader in the Klamath River dam removal process for decades, and we are working with partners to assess and prioritize restoration efforts in the "hydropower reach." The Klamath River once supported the third-largest runs of salmon and steelhead in the lower 48 states, and the removal of these four antiquated dams (J.C. Boyle, Copco No.1, Copco No. 2, and Iron Gate) will allow anadromous salmonids (as well as lamprey) to return to over 400 stream miles of historic habitat in the upper basin. This will be the largest dam removal process in history, and consequently has the potential to be the standard-bearer for other large dam removal efforts in the future (e.g. the lower Snake River dams). For dam removal to be successful, it is critical that anadromous fish have plenty of high-quality habitat and coldwater refugia in the upper basin.

Small dam to be removed on Jenny Creek, a tributary to the Klamath River.

With a new staff role dedicated to restoration in this reach, TU was able to build a close project partnership with the Yurok Tribe to seek funding for restoration work on three tributaries (Spencer Creek, Shovel Creek, and Jenny Creek) as well as to design and secure funding for fish screening of irrigation diversions in the Keno reach and fencing of the impoundments around the four dams to protect replanting efforts from cattle grazing, ATVs, and feral horses. The fencing project alone will protect more than 4,500 acres of land by installing 27 miles of wildlife-friendly fencing with angler/recreational access and management central to the design. Notably, the CCF also invested in 2023 in funding the coordination of a very large program to address strategically all of the high-priority restoration projects in this reach through a collaboration of state, federal, Tribal, and NGO partners. That investment is providing the capacity for TU to convene and lead the restoration collaborative, a direct outgrowth of this 2021 staff expansion.

At multiple levels, without the support of the CCF, this critical restoration work would not be feasible.

Low Flows and Fish Food: A Model to Inform Streamflow Management in Coastal Rivers

CCF 2021 Grant: $17,000

Leveraged Funds: $392,000

Developing a bioenergetic model to inform river management and salmonid restoration in California & elsewhere in the West

CORE FUNDING LEVERAGED

The CCF grant leveraged $392,000 from the Marin Community Foundation, and a proposal to the Wildlife Conservation Board has been submitted in February 2024 that will potentially secure more funds. CCF funds made it possible to continue the development of a bioenergetic model to inform flow management to support fishery health. CCF funds also enabled project team members to take important steps towards determining how to apply the model in different systems and diverse streams.

IMPACT & OUTCOMES

A healthy fish population requires abundant, appropriate food. Food availability is the key factor in determining the carrying capacity of a system, fish territory size, and fish population structure. We also know that food availability is related to water flows, and our bioenergetics work has indicated that flows can be managed to maximize food available at key times for native fish. In other words, we can use bioenergetics to determine the most bang (food) for our buck (water) which can help ameliorate the tension between ecological and human needs and guide important management practices, such as the timing of diversions or flow releases to support the health of salmonid species. Project outcomes include:

Aquatic invertebrates were collected and picked/sorted from Dutch Bill Creek as part of this project and sampling being done on Peñas Creek.

- A flow "gaming" tool was finalized, which allows users to input different water year types (wet/normal/dry) and different flow and diversion scenarios in order to manipulate and design optimized flows meant to keep fish in good condition (i.e. not just to meet minimum flow requirements based on physical habitat characteristics without taking fish condition into account).
- A scientific journal article, "Process-based tool to estimate ecological risk in a regulated river," was published in the *Journal of the American Water Resources Association* with two TU co-authors, Rene Henery and Natalie Stauffer-Olsen, outlining bioenergetics work.
- Optimal sites for study within the Russian River watershed were identified based on availability of flow data, fish data, and diversity/comparability of habitat and fish abundance: Dutch Bill Creek at Tyrone, Dutch Bill Creek at Westminster, Green Valley Creek, and Peñas Creek.
- Invertebrates were picked and sorted and it was determined that the availability of fish food (in the form of aquatic invertebrates) was highest at Green Valley Creek, second highest at Peñas Creek, and lowest in Dutch Bill Creek.
- Russian River basin sites were visited and invertebrates were collected.
- Areas for additional work using the bioenergetics model/approach were identified: the Navarro basin and the Walker basin.

With the data collected by this project from both above and below the flow release site, the results of the flow augmentation should be better understood, and perhaps the amount and timing of water released could be altered to optimize benefits to coho and other native fish in Dutch Bill Creek.

Expanding TU's Restoration Work in Alaska

CCF 2021 Grant: $50,000
Leveraged Funds: $5.5 Million

Restored 1.5 stream miles of Resurrection Creek, designed and constructed 7 fish passage projects, restored access to 50 miles of stream to salmon.

CORE FUNDING LEVERAGED

The CCF grant enabled TU to engage with agencies, Tribes, NGOs, and landowners on a variety of restoration projects across the state. TU was able to leverage funding from Kinross Gold, a multi-national mining corporation, to match additional federal and non-federal funds and jumpstart the Resurrection Creek restoration project that had stalled due to insufficient funding. The result was 1.5 miles restored in 2023, with another four miles to be restored over the next three years. Additionally, TU has collaborated with partners and helped to kickstart numerous projects across the state, including several fish passage projects in southeast Alaska and in Cordova, the restoration of an historically-mined stream in the Yukon-Charley National Park and Preserve, and several mine reclamation projects on Bureau of Land Management (BLM) lands in central Alaska. Finally, TU initiated a collaboration with the USFWS in the Togiak National Wildlife Refuge. CCF funds leveraged $150,000 from Kinross Gold Corporation, $78,000 from BLM, $795,000 from National Oceanic and Atmospheric Administration, and $4.5 million from the USFS.

IMPACT & OUTCOMES

The CCF provided important seed funding to leverage federal project dollars and to launch a state-wide restoration program in Alaska. With support from the CCF, we added capacity and restoration expertise to our staff by hiring a southeast Alaska Project Manager and a Statewide Habitat Restoration Director. With the additional capacity, TU's Alaska Program has developed new partnerships with agencies, Tribes, and communities across the State, leading to a broad suite of habitat restoration projects in some of Alaska's most prized watersheds. While TU has had a strong advocacy and community engagement presence in Alaska for nearly two decades, CCF support has helped to round out our portfolio of work in Alaska and build even more community support for fish and wildlife habitat conservation. Specifically, we:

- Hired a project manager in southeast Alaska, and a statewide restoration director. These new positions have allowed TU to engage in and initiate numerous conversations regarding habitat restoration and fish passage across the state.
- Began the work of replacing seven high-priority fish passage crossings on the Tongass National Forest restoring access to salmon in over five miles of stream.
- Assisted partners in replacing two large crossings in Cordova that restored access to over 40 miles of stream and floodplain habitat.
- Worked with the BLM and the USFWS on developing a prioritization plan for restoration projects in the Yukon River.
- Leveraged additional funds for the Resurrection Creek Restoration Project, and shared these stories in social media and other news outlets highlighting the value of restoring healthy and functioning watersheds for the benefit of fish and all those who rely on them.

Partners gather to see stream channel restoration work at Resurrection Creek in 2023, outside Hope, Alaska.

Construction of a new stream channel in Resurrection Creek, 2023, outside Hope, Alaska.

John Day Headwaters Resiliency Project

CCF 2021 Grant: $47,000
Leveraged Funds: $398,000

Implemented 6.3 stream miles of habitat restoration across 5 headwater streams

CORE FUNDING LEVERAGED

CCF funds have been critical in the development of our new TU program focused in the Lower Snake and Mid-Columbia region, where it is difficult to raise private funds. The CCF grant provides flexible funding which has allowed us to expand signficantly our geography, partnerships, staff pool, fundraising, and groundwork. Specifically for the John Day Headwaters Resiliency Project, TU has expanded to new geographies that are important to local communities and high-priority fish species: Chinook salmon, steelhead, Redband trout, and bull trout (and around eight other key coldwater species including Pacific lamprey). CCF funds leveraged $75,000 from the National Fish and Wildlife Foundation, $78,000 from the Confederated Tribes of the Umatilla Indian Reservation (and extensive in-kind time), $120,000 from the USFS (and extensive in-kind time), $80,000 from the Oregon Watershed Enhancement Board, and $45,000 from Northwest Youth Corps.

IMPACT & OUTCOMES

The goal of this project is to restore climate-resilient habitats across the John Day headwaters with young adult stewardship crews using non-mechanized, hand labor (small tools and human hands) as opposed to heavy equipment. The project will help wild steelhead and salmon thrive in the decades to come, while engaging people from many diverse backgrounds in aquatic restoration and stewardship. It closely supports TU's mission by connecting people to help restore some of the most important habitat for coldwater fish in the Lower 48.

The photos above demonstrates crews hard at work planting, placing large wood, and building beaver dam analogues. Photo by: Kholood Eid, National Geographic.

- Implemented 6.3 miles of restoration projects in the North Fork John Day basin. These projects have improved habitat for native species, while restoring floodplain wetlands that are critical for water storage and climate resilience.
- Engaged approximately 50 people from diverse backgrounds in habitat restoration and stewardship. These hand crew members included young adults, veterans, and forestry industry crewmembers from all walks of life. They received a rich and immersive experience learning about the importance of aquatic ecosystems, which we hope will inspire them to become the next generation of stewards.
- Kickstarted two new floodplain reconnection projects in the North and Middle Forks of the John Day. CCF funding has allowed TU staff to engage our partners in the early stages of project development, helping to get these high-priority projects off the ground.
- Forged partnerships with staff from all three Blue Mountains National Forests and the Confederated Tribes of the Umatilla Indian Reservation. These partnerships will continue to be invaluable as TU implements more restoration projects in northeastern Oregon. Matching funds from the CCF have been instrumental in allowing us to leverage a diverse suite of funding to make these partnerships successful.
- Hired two full-time project managers for projects in the John Day basin. This investment in staff has expanded TU's capacity in the region, helping to increase the pace and scale of important restoration work.

PISCES: A Protocol and Integrated System for Connectivity Evaluations

CCF 2021 Grant: $50,000
Leveraged Funds: $70,000

931 road-stream crossings inventoried in Idaho in 2022 and 2023, 962 crossings inventoried in the Wisconsin's Driftless Area in 2023

CORE FUNDING LEVERAGED

The CCF grant for this project leveraged $60,000 from the Idaho BLM and $10,000 from the Wisconsin Department of Natural Resources (DNR). In Idaho, we identified priority watersheds in collaboration with Idaho BLM, identified target road-stream crossings for inventory in the priority watersheds, developed tools to navigate to and track the status of target crossings, and field inventoried 931 crossings for fish passage in summer of 2022 and 2023. We are currently working with Idaho BLM to develop a science-based framework for assessing aquatic connectivity at watershed scales. In Wisconsin, we identified target crossings, developed navigation and status tracking tools, and inventoried 962 crossings for fish passage in four counties in the Driftless Area.

IMPACT & OUTCOMES

The goals of this project were: (1) to develop the tools and workflows for inventorying road-stream crossings in watersheds for fish passage issues; and (2) to provide a science-based framework for prioritizing watershed connectivity with road stream crossing inventory data. The outcome will be a streamlined workflow and tools for road-stream crossings inventories, and providing a novel science-based framework for efficiently assessing and improving aquatic connectivity in priority watersheds.

Carson Jones inventories a perched culvert in Idaho.

Sawyer Finley, Carson Jones, Owen Swavely survey a culvert in Idaho.

Outcomes include:

- Tools, workflow, and protocol for inventories of road-stream crossings for fish passage.
- 931 road-stream crossings inventoried in priority watersheds in southern Idaho in collaboration with BLM.
- 962 road-stream crossings inventoried in Wisconsin's Driftless Area in collaboration with Wisconsin DNR.
- 8 seasonal technicians trained in road-stream crossing inventory protocols.
- A science-based framework for assessing watershed connectivity (forthcoming).

Effectiveness Monitoring of Process-Based Restoration by Integrating Technology

CCF 2021 Grant: $44,000

Advancing technology for monitoring effectiveness of process-based restoration

CORE FUNDING LEVERAGED

The CCF grant leveraged additional funding from Caribou-Targhee National Forest, Jackson Hole Trout Unlimited, Bureau of Land Management, and numerous sources in the Klamath Basin that funded implementation of process-based restoration (PBR) projects. Building on past CCF investments in advancing technology, as part of this monitoring we have incorporated drone-based and satellite-based vegetation monitoring, GPS-based channel survey techniques, instrumentation of groundwater monitoring, and more. These monitoring techniques are being used to develop general monitoring guidance around process-based restoration that TU and its partners can use to monitor the effectiveness of PBR projects into the future.

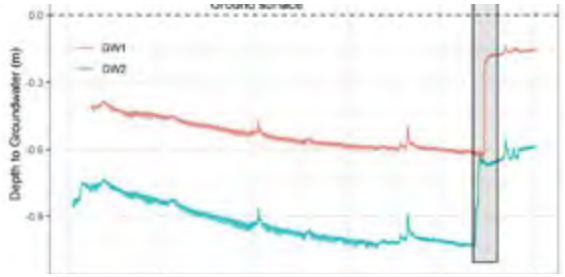
Post-assisted log structures installed as part of a PBR project on North Fork Tincup Creek, Idaho.

IMPACT & OUTCOMES

Monitoring of stream and river restoration has historically been limited by funding, which in turn has limited our understanding of whether restoration projects meet restoration goals, and hindered the advancement of restoration techniques. PBR has become the "it thing" in western stream restoration over the last decade, and this project has allowed us to monitor the effectiveness of PBR projects in Idaho and in the Klamath Basin in Oregon. The goals of this project were: (1) to evaluate the effectiveness of PBR on North Fork Tincup Creek (Idaho); (2) to evaluate the effectiveness of PBR on four Klamath Basin streams; and (3) to develop effectiveness monitoring guidance for PBR for TU and its partners more broadly. Outcomes of this project are ongoing, and include:

- Application of tools and technology from past CCF investments in effectiveness monitoring.
- Understanding the effectiveness of process-based restoration in North Fork Tincup Creek.
- Understanding the effectiveness of process-based restoration in Sun Creek, Deming Creek, Leonard Creek, and the Sycan River in the Klamath Basin.
- Refined application of drone- and satellite-based monitoring on flood extent and floodplain vegetation productivity, groundwater monitoring, and stream channel dynamics.
- Monitoring techniques around process-based restoration that can be generally applied to process-based restoration being undertaken by TU and its partners.

Implementation of process-based restoration on Sun Creek, Klamath Basin, Oregon.



Groundwater level changes in response to process-based restoration on Sun Creek, Klamath Basin, Oregon.

A Scientific Approach to Streamflow Restoration

CCF 2021 Grant: $32,000

Developing a decision support tool to produce more strategic and informed results in future restoration and connectivity work

CORE FUNDING LEVERAGED

To date, CCF funds have enabled us to review and synthesize literature on streamflow restoration practices, engage and workshop with TU's streamflow restoration practitioners, collaborate with a graduate student and her faculty advisor on a related decision support tool, and flesh out the general framework for our decision support tool. Matching in-kind contributions have been received from TU staff (e.g., Rocky Mountain Region: 12 staff x 2 hours/person) and from a collaborating United States Geological Survey (USGS) scientist and adjunct professor at Oregon State University.

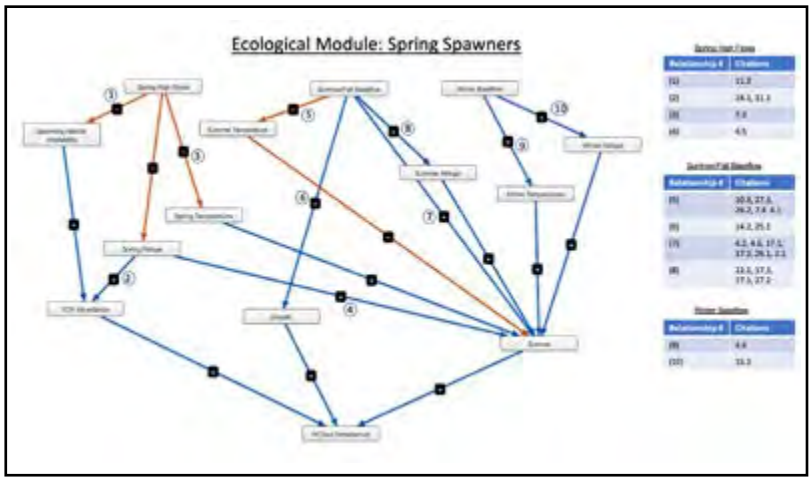
IMPACT & OUTCOMES

The goals of this still-active project are to distill existing science around streamflow restoration practices, and then to develop a decision support framework for informing TU decisions around flow restoration work. The tool will help TU to achieve more consistent and positive conservation outcomes, as well as bridging the gap between scientific theory and real-world restoration practices.

Outcomes for this project include:

- Created database of studies on streamflow-fish relationships.
- Drafted a framework for predicting effects of change in water management on streamflow.
- Created a framework for predicting effects of change in streamflow on fish.
- Worked with and supported a graduate student at Oregon State University as she worked on a "sister" project for her Master's thesis.

All of these outcomes have advanced the development of a tool that will help TU staff distinguish between flow restoration projects that can and cannot provide meaningful benefits for trout and salmon.



Effects of streamflow on spring-spawning trout and salmon.

Graduate student and TU employee Ellie Miller presents on streamflow restoration.

Characterizing Groundwater Influence on Stream Temperature for Targeting Climate-Smart Protection and Restoration Actions

CCF 2021 Grant: $41,500

Using new tools to identify groundwater-influenced streams and climate-resilient coldwater habitats to identify areas of greatest need

CORE FUNDING LEVERAGED

The CCF grant allowed us to collect temperature data, learn new analytical tools, and apply those new tools to analyzing TU temperature data. We are already beginning to evaluate the climate resilience and thermal suitability of streams, and this process can, in turn, help us to identify areas in greatest need of protection and restoration. Matching in-kind contributions have been received from TU staff and chapter volunteers in California, Oregon, Idaho, Michigan, and Wisconsin; from a project partner at the U.S. Geological Survey; and from a collaborating scientist at the Cary Institute.

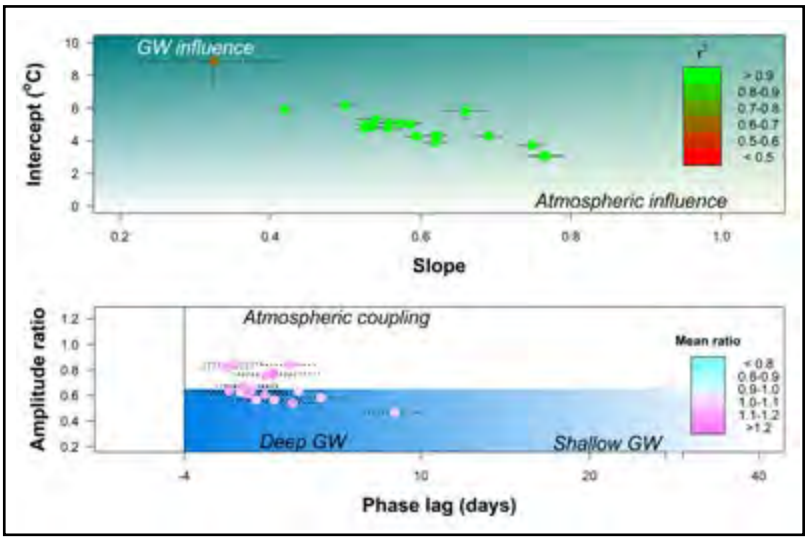
IMPACT & OUTCOMES

Project goals were: (1) to pair air and water temperature sensors; (2) to explore tools for characterizing groundwater signatures on streams; (3) to evaluate relationships between on-site and regional air temperature data; and (4) to disseminate our findings both within and outside TU. We later added a fifth goal: evaluating the thermal suitability of streams for trout.

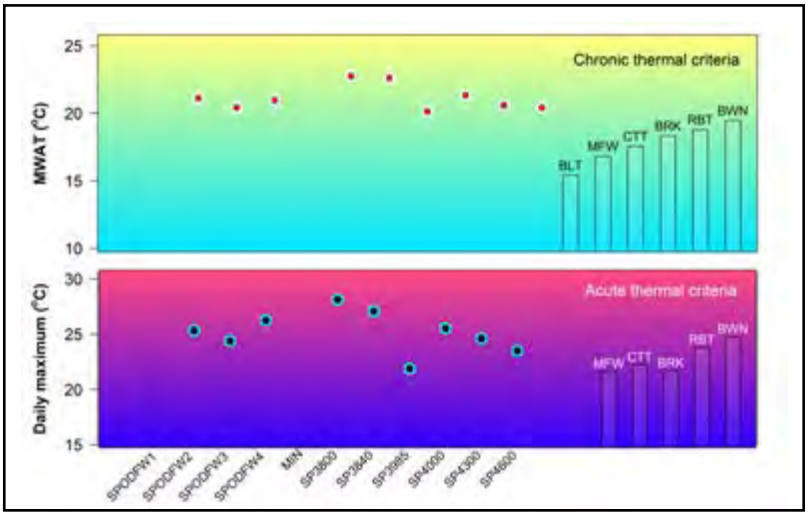
Project outcomes include:

- Established monitoring networks for paired air and stream temperature data.
- Learned and improved temperature monitoring tools.
- Identified groundwater influences on streams in the Klamath, Snake, White, and Wolf river basins.
- Elucidated the limitations of using regional weather stations to predict local air temperature.

These outcomes will inform decisions around which streams to prioritize for protection and restoration.



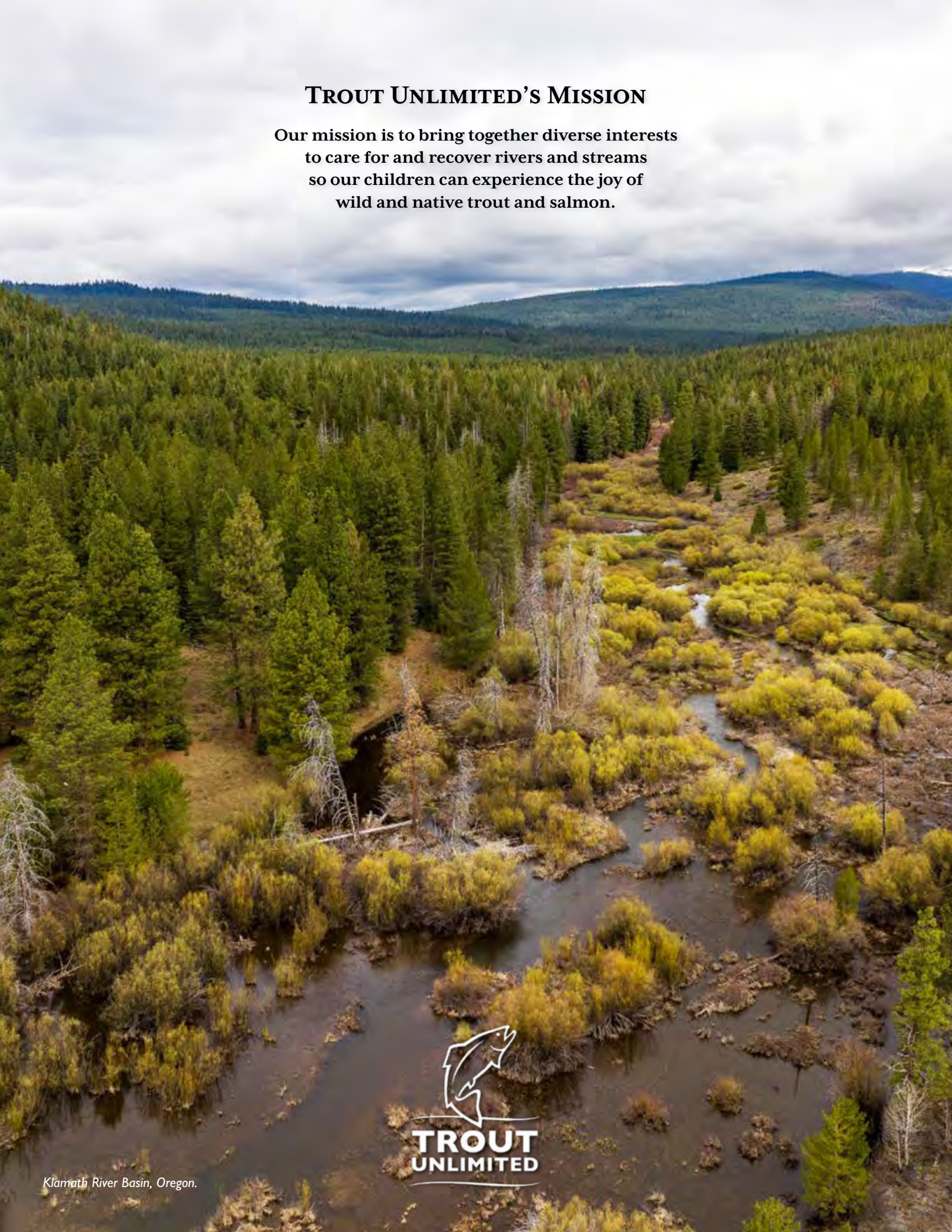
Temperature metrics reveal effects of groundwater on streams.



Comparison of stream temperatures to thermal niches of trout.

Trout Unlimited's Mission

Our mission is to bring together diverse interests to care for and recover rivers and streams so our children can experience the joy of wild and native trout and salmon.



Klamath River Basin, Oregon.