



TROUT UNLIMITED

2017-2018 Project List

...by the next generation, Trout Unlimited will ensure that robust populations of native and wild coldwater fish once again thrive within their North American range, so that our children can enjoy healthy fisheries in their home waters.

This is an ambitious goal and to accomplish it Trout Unlimited is employing a comprehensive strategy to:

- * **Protect** the highest quality trout and salmon habitat.
- * **Reconnect** vital coldwater habitat through dam and culvert removal projects and the improvement of in-stream flows.
- * **Restore** degraded habitats so that they again support healthy trout and salmon populations.
- * **Sustain** our progress by introducing young people to the joys of fishing while educating and motivating them to become the future generation of environmental stewards, and by supporting our members, volunteers, staff and partners with tools and research conducted by our science team.

Please read on to learn how your Griffith Circle membership support will enable Trout Unlimited members and staff to work toward our shared mission and goals in the year ahead.

I. PROTECT

Wild Steelhead Initiative (AK, CA, ID, OR, WA)

Wild steelhead are the most revered sport fish on the West Coast, and for good reason. They are strong, beautiful and elusive, and on the end of a line they test the skills of the most seasoned anglers. Sadly, throughout their native range, wild steelhead populations have dropped dramatically, and so has the opportunity to fish for them. In 2014, TU launched its Wild Steelhead Initiative to rebuild and sustain wild steelhead in rivers with high potential to support abundant, fishable populations. This is a multi-faceted effort, which includes habitat protection and restoration, advocacy to improve hatchery and fishery management, data collection by anglers, and development of new scientific methods to enable better management. Priority rivers include Washington's Skagit and Olympic Peninsula rivers (e.g., Hoh and Sol Duc), Oregon's North Umpqua and John Day rivers, California's Eel River and Pescadero Creek, and the steelhead rivers in Alaska's Tongass National Forest.

Great Lakes Advocacy (WI, MI)

The Great Lakes are threatened by invasive species, pollution, and emerging commercial aquaculture proposals, creating a need for state and federal policies that protect the Great Lakes, and for sustained public funding for Great Lakes restoration efforts. To address these challenges, a powerful constituency of recreational anglers needs to be mobilized. Recreational fishing in the Great Lakes is a major economic contributor to local economies, and fishing is an important part of the lives of the 1.6 million anglers who fish in the Great Lakes region, and the millions more who visit and enjoy the Great Lakes states. In 2016, TU helped pass federal legislation to reauthorize the Great Lakes Restoration Initiative, the primary funding program for conservation efforts in the Great Lakes basin. We are now working to prevent harmful commercial aquaculture in the Great Lakes, protecting/increasing funding for the Great Lakes Restoration Initiative, and cultivating stronger, more diverse, and engaged TU chapters in the region.

Shale Gas Project (NY, PA, WV, VA, MD, OH)

Unprecedented gas drilling is underway in the Marcellus and Utica shales, which underlie six Eastern states. After more than five years of intensive drilling, companies are now looking to move natural gas to eastern markets by way of major natural gas interstate pipelines—many of which are proposed to bisect the East's best native and wild trout habitat. TU is leading and working closely with sportsmen and women to ensure that shale gas-related development, including pipelines, is done responsibly, and any impact to native and wild trout streams is avoided or minimized. Using monitoring data collected by angler scientists and TU's Conservation Success Index (CSI), TU is working to protect exceptional coldwater fisheries, and providing an extra set of eyes and ears on the ground to help underfunded regulatory agencies stem potential pollution to streams from shale-gas related activity. On the George Washington and Jefferson National Forests, home to 60 percent of Virginia's wild brook trout streams, a new Forest Plan was developed that charts the course for future energy development. TU successfully advocated for brook trout habitat protections, and the new Forest Plan placed 84 percent of the forests off limits to new leasing while honoring existing energy development rights. Since 2010, TU has trained 800 volunteer "citizen scientists," who are monitoring over 390 sites on 318 streams throughout

Pennsylvania, West Virginia, and Virginia. Citizen scientists are actively establishing baseline watershed conditions in coldwater streams with a high likelihood of future shale gas and/or pipeline development, and have identified pollution events as a result of shale gas development and notified the appropriate authorities. This results in pollution issues being swiftly addressed, limiting damage to the aquatic ecosystem.

Bristol Bay (AK)

Bristol Bay may be the most important salmon ecosystem on Earth. It is the most prolific sockeye salmon-producing system in the world, and is also home to large healthy runs of Chinook and coho salmon, as well as world-famous rainbow trout. TU continues to lead the fight to prevent the development of the proposed Pebble Mine, an enormous gold and copper mine that would be located in the middle of salmon spawning grounds in the headwaters of Bristol Bay. If developed, Pebble Mine could decimate this irreplaceable ecosystem and the \$1.5 billion fish-based economy it supports. TU has been a leader in the effort to stop Pebble for over a decade, and we are implementing several complementary strategies at both the federal and state levels to protect this world-class salmon and trout ecosystem.

Tongass Rainforest (AK)

At 17 million acres, the lush Tongass is both the country's largest national forest and the biggest swath of relatively intact temperate rainforest left in the world. It produces about one-third of Alaska's total salmon catch, supports fishing and tourism industries that contribute \$1 billion to the state economy each year, and is an internationally-renowned sportfishing destination for salmon, steelhead, char, and trout. In 2016, a new management plan was put in place that prevents old-growth logging in two million acres of prime fish and wildlife habitat. These protections were the direct result of many years of TU effort to mobilize anglers, hunters, and commercial fishermen, and we will continue to organize Tongass supporters to defend these protections against anticipated attempts to roll them back.

Protecting Streams from Off-Highway Vehicle Abuse

The irresponsible use of off-highway vehicles takes a heavy toll on fish and wildlife habitat across the country. In 2017, as in years past and future, in state legislatures and in the halls of Congress as well as in the development of Travel Management Plans for federal lands, TU is bringing to bear the voices of anglers and other outdoors lovers to bring about better management and enforcement, as well as stiffer penalties for scofflaws. There is a place for recreational OHV riding, but it should be on designated trails, not in rivers, streams, and wetlands.

Responsible Renewable Energy Development

A landscape vision for renewable (wind and solar) energy development is needed to ensure responsible development that protects ecologically-significant natural communities and landscapes. Development of renewable resources on our federal public lands should be a deliberate process that seeks to minimize impacts on the nation's land, water, fish and wildlife resources. Focusing energy development on degraded lands that provide minimal ecological and fish and wildlife values, and that have high renewable energy potential, should be a priority. TU's Government Affairs team led the effort to

introduce a bipartisan bill that would help to balance renewable energy development with fish and wildlife habitat conservation on public lands, and to dedicate project-generated revenues to that end. Our strong efforts to build bipartisan support for the bill yielded enormous bipartisan support for the bill in the 114th Congress, and we are now poised to pass this bill in the 115th Congress.

Protecting Headwater Streams through the Clean Water Act

The Environmental Protection Agency and Army Corps of Engineers finalized their rule to clarify the jurisdiction of the Clean Water Act in 2016. In so doing, they reinstated protections for millions of small and intermittently-flowing streams, and many wetlands, that had been in limbo for more than a decade because of a pair of Supreme Court cases and the policies put into place to implement those court rulings. Those policy changes had stripped 20 million acres of wetlands of the law's protections, and placed "at risk" 59 percent of U.S. stream miles. The new rule restored protections from pollution, dredging, and filling to headwaters and seasonally-flowing streams. TU was instrumental in working with the EPA to help clarify how and where the rule will be applied, and to get it adopted. In 2017, the new administration has signaled that they intend to abandon the rule, and issued an executive order to that end. We are working to defend the rule, and to advocate in Congress to prevent the roll-back of its critical protections for our headwater streams.

Maine Brook Trout Project (ME)

Maine is the last great native brook trout stronghold in the United States; indeed, Maine brook trout are arguably the most intact population of native trout remaining anywhere in the lower 48 states. To protect these fish, TU is using our Conservation Success Index (CSI) to advocate for better fishery management and identify key parcels for purchase or conservation easements, and collaborating with timber companies, land trusts, and landowners to improve land management. TU is a leader in the statewide volunteer effort to sample and identify previously undocumented native brook trout ponds, a huge undertaking that since its inception has resulted in increased regulatory protections for dozens of these precious wilderness waters. TU is expanding the volunteer survey program to also identify sea-run brook trout populations on Maine's coast, and we recently celebrated our leading role in the permanent protection of 8,200 acres of land in the Cold Stream watershed, which includes the entire 14 mile length of Cold Stream and seven ponds designated as "Heritage Brook Trout Waters" by the state.

Smith River (MT)

Montana is a state of famous rivers, yet one river more than any other is treasured by residents and non-residents alike: the Smith. The Smith is a blue-ribbon trout fishery for brown, rainbow, Westslope cutthroat, and brook trout. A Canadian mining company has its eyes on an estimated \$2 billion in copper located near Sheep Creek (the proposed project is known as the Black Butte Copper Mine), one of the Smith's most important tributaries and the nursery of the majority of the river's trout. TU has developed a large and diverse coalition of sportsmen and women, boaters, ranchers, veterans, and others that is working, through leadership and outreach, to create the political will to give the Montana Department of Environmental Quality the necessary tools to regulate hard-rock mining on the Smith River and throughout the state. TU's efforts to date have resulted in the Montana Department of Environmental Quality issuing two separate findings of deficiencies for the company's mining permit application.

Southern Sierra Forest Project (CA)

TU is playing a lead role in a coalition of conservation groups working to protect and restore lands and waters in national forests in the southern Sierra Nevada. Collectively, these public lands provide some of the best fishing in California, and are home to three species of native trout. These forests harbor 100 percent of the native range of the fabled California golden trout, California's state fish and the focus of an intensive, ongoing restoration effort by TU and other partners (the Golden Trout Restoration Project). The Sierra, Sequoia, and Inyo National Forests are completing updates to their master Forest Plans, which will be test cases for new planning regulations and procedures for the U.S. Forest Service. TU staff and grassroots volunteers are working in tandem to rally sportsmen and women around the state to support the protection of roadless areas and headwaters, improved fishing and hunting access, and the better management of alpine meadows.

Elk River (OR)

The Elk River in southwest Oregon is an exceptionally productive salmon and steelhead river, and is one of the few coastal watersheds in the area that has not experienced heavy logging. TU is leading a broad bipartisan coalition of local conservationists, elected officials, business owners, fishing guides, and local and statewide sportsmen's organizations (www.sportsmenfortheelk.org) to protect the remaining backcountry lands in the Elk River watershed. TU has succeeded in designating part of this watershed as a federal wilderness area, and we continue our work leading the coalition of stakeholders working to secure comprehensive protection for the entire watershed.

Little Mountain (WY)

Little Mountain is located in southwest Wyoming on the east side of Flaming Gorge National Recreation Area where the Green River merges into Flaming Gorge Reservoir. It is prized for its exceptional native cutthroat trout fisheries and abundant big-game herds; it is also an area targeted for natural gas extraction. TU has formed the Greater Little Mountain Coalition, a grassroots, citizen-led group of local sportsmen and women, local businesses, and members of county government. Together, we have developed a unique proposal to keep gas rigs out of the best habitat and to ensure that any natural gas drilling done in the area is done responsibly, minimizing impacts to fish and wildlife. As part of an ongoing planning process, the Bureau of Land Management has adopted the Greater Little Mountain Coalition's vision for protecting this special 522,000-acre landscape. This process is a shining example of how to reach consensus on a plan for balancing energy development with fish and wildlife habitat protections.

Thompson Divide (CO)

The Thompson Divide is located in a wild and unspoiled corner of the White River National Forest. This 222,000-acre landscape also serves as the headwaters for iconic trout streams like the Crystal, Roaring Fork, and North Fork of the Gunnison. TU and its Sportsmen for the Thompson Divide Coalition have worked for several years to permanently protect this area. In November 2016, we were successful in getting 25 oil and gas leases canceled by the Bureau of Land Management. Moving forward, TU is

defending this decision against litigation and advocating for a bill introduced by Senator Bennet that would facilitate a lease exchange and prohibit future oil and gas leasing. Home for Colorado River cutthroat trout and countless other wildlife species, this mountainous area is a special place to Coloradans. Important as a recreation area in both the summer and winter, this landscape is vital to sustaining the economic health of several rural communities in central Colorado.

Public Lands Defense

Following the 2016 national elections, our public lands face an uncertain future. What we do know is that anti-public land factions have been emboldened, Congress is anxious to roll back environmental protections and policies, and the Administration has wasted no time in using its executive powers to reverse policy gains of the last eight years. In response, TU is focusing much of its efforts moving forward on defense. More specifically, we are mobilizing the collective talent of our staff, grassroots members, and partners in the sportsmen's community. Our primary focus is to oppose the sale and transfer of public lands and defend the Antiquities Act of 1906, as well as recently designated national monuments.

Upper Methow Valley (WA)

In January 2017, TU welcomed the Bureau of Land Management's decision to implement a two-year temporary mineral withdrawal on 340,000 acres in the upper Methow Valley headwaters of the Okanogan National Forest. Moving forward, TU will continue to work with sportsmen and women and others to secure a 20-year hard rock mineral withdrawal as well as a permanent withdrawal through federal legislation. The upper Methow is critical to the recovery of the Columbia River's great salmon runs, especially in the face of climate change, and nearly \$100 million has been invested in salmon recovery efforts in the valley already.

Pennsylvania Unassessed Waters Initiative (PA)

In Pennsylvania, we are racing to secure protective designations for trout streams before pipeline construction and other forms of development occur. Since 2011, TU specially trained field crews have sampled roughly 600 streams (typically finding that about 40 percent host wild trout populations). We pass the information along to the Pennsylvania Fish and Boat Commission, which then considers the streams for formal listing as "Wild Trout" streams. Over the past year, we have gained Wild Trout Stream designation for 297 new waters. Classification as "Cold Water Fisheries" under the state's water quality regulations trigger more stringent environmental protections when the Department of Environmental Protection reviews permits for development activities within that watershed. A Wild Trout Stream designation also ensures that wetlands adjacent and contiguous to that stream are protected.

2. RECONNECT

Penobscot River Restoration Project (ME)

The Penobscot River Restoration Project is arguably the most comprehensive and innovative river restoration project in the nation, restoring access for Atlantic salmon and 10 other species of sea-run fish

to nearly 1,000 miles of river through the removal of two dams and a bypass around a third. TU and its Penobscot River Restoration Trust partners -- who acquired the dams after raising \$25 million for their purchase -- have now removed the dams and completed the Howland Dam bypass project. TU is now monitoring the return of sea-run fish, including river herring and American shad, which are already returning in vastly increased numbers. The 726 salmon counted this year represented a nearly threefold increase over the historic low counted in 2014, and give reason for optimism for their continued recovery.

New England Culvert Project (VT, NH, MA)

By removing, replacing, or retrofitting currently impassable stream crossings, TU aims to reconnect Eastern brook trout habitat across the northeast. The New England Culvert Project had a very successful 2016 field season, completing nearly a dozen projects across Massachusetts, New Hampshire, and Vermont. Our team of three full-time and eight seasonal staff reconnected lower stream reaches to over 17 miles of upstream brook trout habitat, assessed more than 1,800 road stream crossings for fish passage and hydraulic vulnerability, completed 12 final engineering plan sets, submitted and received 15 wetlands permits, and installed more than 110 large wood structures on nine properties to restore over 5 miles of high quality in-stream habitat. The project team anticipates reconnecting more than 20 miles of habitat in 2017.

Pennsylvania Coldwater Habitat Restoration Program (PA)

Throughout Pennsylvania, native brook trout are at risk. Pressures from poor land management, natural resource development, and other problems have harmed fish populations and reduced fishing opportunities throughout the state. In addition to improving instream habitat, a major emphasis of this initiative is to identify and address stream crossings (such as road culverts) that act as barriers for fish passage. TU got its start on planning and implementing fish habitat improvement projects in 1998 in the Kettle Creek watershed, and subsequently has expanded its reach to other high priority coldwater streams in central and northcentral Pennsylvania. To date, hundreds of culvert surveys have been completed, and the work of designing and implementing restoration projects based on those surveys is well underway.

Upper Delaware River Project (NY, PA, NJ)

TU is reconnecting habitat in the Beaverkill and Willowemoc watersheds through the replacement of impassible culverts, highlighted by the removal of a culvert on Horse Brook that was blocking spawning migrations for trout coming up from the Beaverkill. TU is also completing instream and riparian restoration projects throughout the Catskills (with the help of the Millennium Stream Improvement Fund), including floodplain restoration on The Nature Conservancy's Neversink Preserve. In New Jersey, TU has expanded its Musconetcong River program to encompass additional coldwater tributaries to the Delaware River; recent projects there have included major dam removals on the Musconetcong, and instream restoration projects on smaller tributaries that hold native brook trout. TU is advocating for strong protections for gas drilling and pipeline-related development in the Delaware River watershed as a whole, and for instream flows that meet the needs of both coldwater fish and citizens in New York City. In 2016, TU helped pass the Delaware River Basin Conservation Act, federal legislation that will help

spur additional conservation work in the Delaware watershed.

The California Water Project (CA)

The California Water Project is achieving durable streamflow protection for salmon, steelhead, and trout, and changing the way that water rights are managed in California. TU is realizing these major outcomes through a combination of tactics: reform of California's system of water rights administration, developing strategic agreements for instream flow protection in key watersheds, entering into cooperative partnerships with the wine grape industry (aka "Water and Wine") and other water users, and helping drive hydropower reform efforts. In the Central Valley, we are working to improve streamflows and fishing opportunities in the Yuba, Merced, and Tuolumne Rivers, and participating in a basin-wide negotiation to resolve river flow disputes. This comprehensive program evaluates and supports the needs of coldwater fish throughout entire river systems, and delivers benefits to fish and fishing through actions ranging from improving dam operations in the mountains to restoring floodplains in the lower watershed.

The Washington Water and Habitat Program (WA)

Washington State has some of the most innovative water laws in the West, and as a result TU's work there has set a high bar for implementing instream flow projects, using the laws to improve steelhead, salmon, and trout rivers like the Yakima, Wenatchee, Entiat, Methow, and Okanogan. The Washington Water Project is identifying willing partners, especially in ranching and farming communities, and then leasing or permanently acquiring water rights, or retrofitting outdated irrigation systems to improve stream flow and to remove fish passage barriers. We have completed a multi-year flow project, worth more than \$10 million, involving the Methow Valley Irrigation District and other water users, to restore Methow and Twisp river flows and fish passage. We are now tackling another large effort -- the Barkley Project -- which will restore even more Methow River flows and also provide habitat and fish passage restoration benefits.

The Utah Water and Habitat Program (UT)

TU remains committed to "proving up" the Utah Water Leasing Bill that we helped to pass in 2008, so that it's either made permanent or another ten-year pilot period is secured. We are continuing efforts to put that bill to work (in partnership with landowners) to develop and implement leases in priority river systems and tributaries including the Bear, Weber, and Colorado. In 2017, we secured the first water lease in the state which protected stream flows in the Weber River watershed to benefit native Bonneville Cutthroat Trout and other species. Elsewhere, in addition to pursuing water leasing opportunities, TU is also restoring fish passage by replacing antiquated irrigation diversions and culverts with fish-friendly structures. Finally, TU is centrally involved in the Utah State Water Plan development process (after being selected by the Governor to help chair this multi-year undertaking), providing us with an important opportunity to ensure that coldwater conservation is part of the state's vision for the future.

The Idaho Water and Habitat Program (ID)

Idaho has a wealth of spectacular trout, salmon, and steelhead rivers, all of which need sufficient water

and connected river and stream habitats to thrive. TU is partnering with landowners, government agencies, and local communities to remove fish passage barriers and to put water back into rivers. Rivers benefiting from this work include the Portneuf, Snake, Teton, Big and Little Lost, Big Wood, and Salmon (including salmon and steelhead tributaries like the Lemhi, Pahsimeroi, and Yankee Fork). Last year, we completed a large-scale project to restore salmon and steelhead spawning habitat on the Yankee Fork. We are now in the second phase of that project. The Idaho Water Project is also protecting critical watersheds from unwise water development that would reduce flows and damage fisheries. In addition, we are working with our partners to ensure that long-term protection for Henry's Fork flows remains a priority, especially in the winter below Island Park Dam.

The Colorado Water and Habitat Program (CO)

Colorado has remarkable trout fisheries to match its renowned scenery—but many of the state's rivers and streams are in trouble. We are currently working at a watershed scale to reconnect and restore coldwater habitat in the Gunnison, Yampa/White, Rio Grande, and Dolores River basins. We are forging partnerships with farmers and ranchers to implement new irrigation practices that will keep more water in these rivers and prevent trout from being killed in irrigation ditches. We are also linking these on-the-ground programs to education and outreach geared toward expanding Colorado's water policies to allow the use of water conserved via irrigation efficiency projects to restore streamflows. Further, we're leveraging potential funding from large municipalities in the region to develop large-scale projects to restore streamflows in the Upper Colorado River Basin. TU contributed critical negotiating and organizing muscle to ensure that the permitting disputes on the Windy Gap and Moffat firming projects on the upper Colorado River were settled, and that they included long-term wild trout protection and restoration provisions. We are now spearheading that restoration will begin implementation of a multi-million dollar NRCS Regional Conservation Partnership Program project to rebuild stream channels and restore flows and habitat in the upper Colorado River.

The Wyoming Water and Habitat Program (WY)

The Wyoming Water Project continues to combine on-the-ground work to reconnect and restore key coldwater fisheries with legislative activities designed to pass a bill that will allow private landowners to use their water rights flexibly to restore streamflows. TU has place-based staff in every major river basin in Wyoming – the North Platte, Green, Bighorn, and Upper Snake. We are working with local elected officials, federal and state resource agencies, and ranchers and farmers to design, fund, and implement projects that provide fish passage, eliminate ditch entrainment (trout diverted into irrigation canals), and conserve water. The project work not only addresses critical coldwater fishery issues, but also helps to build trust in rural towns and with agricultural producers – key constituencies to securing necessary legislative or policy gains that expand the streamflow restoration toolbox in Wyoming. Those efforts paid off when we secured funding and landowner participation in the the System Conservation Pilot Program - designed to reduce water demands in the Upper Colorado River Basin. As a result, we secured -five individual landowner leases to conserve 3,000 acre-feet of water. We have since secured eight individual additional leases and conserved more than double the amount of water -- 10,000 acre-feet. Now, in 2017, we have submitted 21 applications that would conserve over 20,000 acre-feet of water. TU has been responsible for most of the lease opportunities brought forward in the program, and, importantly, the Wyoming State Engineer's Office now is a partner in our push to shepherd these newly protected flows

downstream.

The Montana Water and Habitat Program (MT)

The Montana Water Project continues to build on its already remarkable record of restoring dewatered streams, repairing aging water infrastructure, and working to improve water policy for the benefit of Montana's treasured coldwater fisheries. Our strategy focuses on restoring streamflows in key watersheds like the Blackfoot, Madison, Upper Clark Fork, and Yellowstone Rivers, where projects improve native and wild trout populations while testing and reforming water policy and regulatory processes along the way. Flow restoration projects recently brought to completion and underway include the Bear Creek flow acquisition partnership with Kinross mining company (aiding Yellowstone cutthroat trout), and efforts to reconnect Indian Creek to the Madison River. Together, the Montana Water Project's three areas of focus—restoring dewatered streams, addressing aging water infrastructure, and making water policy more friendly to fish—are a comprehensive effort to protect and restore cold, clean water to Montana's trout streams.

The New Mexico Water and Habitat Program (NM)

TU identified New Mexico as a key need and opportunity for expanding our water and habitat activities, and thanks to funding over the past two years from the Turner and LOR foundations, TU is moving forward with both streamflow protection and habitat restoration efforts. TU recently finished negotiations with a landowner to lease water rights and the process is now moving forward with the State Engineer's Office in what could be one of the first conservation water transactions in state history. Further, additional watersheds are being prioritized for water marketing approaches, and habitat restoration efforts continue on Comanche Creek and other important northern New Mexico waters where partnerships with the agricultural community will be critical to long-term program success.

The Oregon Water Project (OR)

TU is expanding its Oregon Water Project with new initiatives and increased staffing in priority rivers such as the Rogue and Umpqua and, in the Northeastern part of the state, the Grand Ronde, John Day, and Umatilla. TU completed its first instream flow transaction in the Rogue River in the first year of the program, and already has a number of projects in the pipeline. These new efforts supplement ongoing programs to improve flows below hydroelectric dams and a comprehensive program to improve streamflow and water quality in the Upper Klamath Basin. That work improves conditions in the Wood, Sprague, and Williamson rivers, and their tributaries, by collaborating with ranchers, farmers, and state and federal agencies to implement science-based restoration while retaining agricultural viability throughout the community.

Klamath River Dam Removal (OR, CA)

The Klamath River was historically the third most-productive salmon river on the West Coast. However, its legendary salmon and steelhead runs have been reduced dramatically by loss of habitat due to dams, and by massive water diversions. TU is a key leader of the coalition of stakeholders that reached agreement with the dam owner PacifiCorp to remove four hydroelectric dams near the California-Oregon

border. This will restore fish access for the first time in almost a century to nearly 500 miles of salmon and steelhead habitat, and is expected to increase steelhead populations and Chinook salmon runs by 80 percent. The project is now fully-funded, and paperwork is pending to transfer the dams to the corporation that will manage dam removal; that removal is scheduled for 2020.

3. RESTORE

North Coast Coho Project (CA)

California's North Coast is the home of legendary steelhead and salmon rivers such as the Russian, Garcia, Navarro, and Eel. These streams flow almost entirely through private land, and their watersheds have been harvested for redwood and other coastal timber for over a century. TU's North Coast Coho Project engages timber companies and other private landowners in partnerships to restore habitat over half a million acres of private timberlands in Sonoma, Mendocino, and Humboldt counties. Since the inception of this project, TU has improved or eliminated 480 miles of logging roads, removed eight major fish migration barriers, reconnected greater than 47 miles of stream habitat, and installed more than 930 instream structures to improve habitat for coho salmon and steelhead. The North Coast Coho Project has been active for over a decade, and is one of the most important coho and steelhead restoration programs in the state.

Central Valley Floodplains, (CA)

Once the largest complex of floodplains and seasonal wetlands in North America, California's Central Valley was also a fertile rearing ground for one of the West's great salmon resources. Decades of irrigation and unsustainable land use practices have resulted in much of that fertile floodplain habitat being lost, accompanied by a rapid decline in salmon and steelhead populations in the Sacramento and San Joaquin river systems. TU helped gain approval of a statewide flood-protection plan, the first of its kind in more than half a century, and we and a coalition of partners are advocating for widespread restoration of floodplains and river functions in California's flood management efforts. Giving rivers more room to move simultaneously restores critical habitat for juvenile salmon and other wildlife while reducing flood risk and the cost of managing flooding. Now, TU is working with private landowners and flood control agencies to test the new approach.

Sierra Nevada Meadows Restoration (CA)

High altitude meadows in the Sierra Nevada and southern Cascade ranges supply water to many of California's famous trout rivers, as well as to municipal water systems for downstream communities. But historic land uses, livestock grazing, and recreational uses have diminished the function of these natural "sponges" that store and slowly release water. High altitude meadows are the last refuge for some native trout populations in California, and TU helped to form a novel partnership to protect and restore these meadows. This partnership is developing new science-based tools and strategies to identify high-priority meadow systems and to improve their function and resilience, which will benefit native trout, downstream fisheries, and water supply. Over the last two years, TU staff have begun to design and plan for 12 meadow restoration sites in the southern Sierra, some of which harbor native golden trout and

Kern River rainbow trout. TU now is working with specialists to conduct site surveys and develop restoration plans, and with the Forest Service to streamline permitting.

Eagle Lake Rainbow Trout (CA)

A prized target for anglers, the Eagle Lake rainbow has one of the most limited ranges of any native trout in the western U.S—it is found only in Eagle Lake and its small tributaries (Pine Creek) in Lassen County, California. This species is unusual in that it is adapted to highly alkaline waters, but Eagle Lake rainbow trout have declined significantly due to decades of habitat degradation from a variety of factors, including fish passage barriers, small water impoundments, grazing, roads, and propagation of non-native brook trout. Trout Unlimited's Science and Public Lands staff have played a lead role in a partnerships with resource agencies and local landowners and land users to develop and implement the Eagle Lake Rainbow Trout Restoration Agreement; habitat restoration progress under this agreement was a primary factor in a recent decision by the U.S. Fish & Wildlife Service not to list the Eagle Lake rainbow under the Endangered Species Act.

Lahontan Basin Trout Initiative (CA, NV, OR)

The Lahontan Basin is an exceptional landscape spanning three western states: California, Oregon, and Nevada. Rich in fish and wildlife, this eco-region provides outstanding fishing and outdoor recreation opportunities. It is home to the prized Lahontan cutthroat, the basin's only native trout, which embodies all that is exceptional about this rugged western landscape: history, beauty, adaptability, and persistence. As the largest subspecies of cutthroat trout, there is no other fish like it anywhere in the world. TU is coordinating our western conservation programs in the basin to build a community of stewards who will ensure that waters continue to support Lahontan cutthroat and other fish and wildlife species. As part of this initiative, TU has formed a 10-year partnership with the National Fish and Wildlife Foundation, with goals that include creating five resilient Lahontan cutthroat populations (in addition to those already in existence), protecting existing pure populations from non-natives while increasing Lahontan cutthroat angling opportunities.

Olympic Peninsula Habitat Restoration Project (WA)

The Olympic Peninsula Habitat Restoration Project aims to restore and sustain steelhead and salmon habitat in critical watersheds with some of the highest potential on the West Coast. The intact headwaters habitat in Olympic National Park provide a stronghold for salmon and steelhead, but downstream habitat has been degraded by human activities, and anadromous fish populations continue to decline. TU worked with local partners to identify opportunities for significant habitat improvements through restoration, and hired a project manager to implement those improvements. Our goals for this program over the next three years include: (1) establishing local, regional and statewide partnerships to develop a durable conservation strategy for restoring wild steelhead populations, (2) developing a business plan and 10-year roadmap to identify and prioritize fish passage and habitat restoration needs, and (3) successfully implementing restoration projects that address high-priority limiting factors for wild steelhead and salmon.

Tillamook-Nestucca Salmon SuperHwy Project (OR)

In an unprecedented collaborative approach, TU is leading a group of local, state, and federal partners to restore access for salmon and steelhead to spawning and rearing habitat across the six-river Tillamook-Nestucca region on Oregon's North Coast. The effort is strategic, outcome-based, and attainable, and will benefit local economies, transportation infrastructure, and recreation, as well as fish and their watersheds. Over the next ten years we will remove 93 fish passage barriers (mostly culverts) to reconnect 178 miles of habitat (95 percent of total available habitat) on behalf of six species of fish. These projects will create 400 jobs and contribute over \$53 million to local economies. Since we launched the partnership in 2014, we have completed 10 projects to reconnect 43 miles of habitat. In 2017, we will hire a dedicated TU "Salmon Superhighway" Project Coordinator to help to accelerate the pace of work.

Lake Sammamish Kokanee Restoration Project (WA)

TU launched the Lake Sammamish Kokanee Project last year to advance ongoing efforts to restore imperiled kokanee salmon in the Lake Sammamish watershed near Seattle. The three key elements of this project include habitat and fish passage restoration, community outreach and youth education, and a citizen science initiative. Through close coordination with our local, state, and federal partners in the Lake Sammamish Kokanee Workgroup, TU is working to reconnect and restore aquatic habitat that historically supported a robust kokanee population in the Lake Sammamish watershed – which was designated as an Urban Wildlife Refuge Partnership in 2013. Our project work raises the profile of Lake Sammamish Kokanee and teaches area residents and visitors about the inextricable connections among watershed health, fish, and human activities. Our community outreach efforts cultivate strong community partnerships to grow a solid volunteer base and resources to sustain kokanee restoration efforts in the long term. TU's youth education programs include development of indoor and outdoor classroom curricula to engage students and provide them with knowledge and tools to contribute to the restoration of this species that was once abundant in this now-urban watershed. TU also is developing a citizen science initiative to assist with monitoring and evaluation of kokanee populations and restoration activities.

Upper Deschutes Restoration Project (OR)

TU is collaborating with local conservation organizations and agencies on a comprehensive effort to restore native redband, steelhead, bull trout, Chinook and sockeye salmon in the Upper Deschutes River, which has been degraded by development, dams, and incompatible land use. We have initiated a stewardship education program for adults (Deschutes Restoration Outreach Program) and youth (Spring-fed Rivers Stewardship Program for 3rd – 5th grade) to teach and train our next generation of conservationists and anglers, reaching 700 students each year. We have completed fish restoration and floodplain enhancement projects for key habitat in each major tributary of the Upper Deschutes Basin, improving water retention, conserving cold water, and diversifying floodplain habitat for native and wild fish. We have repaired streambanks and restored streamside vegetation along 20 miles of the spectacular Metolius and Fall rivers through projects that reduce erosion and sediment inputs into the rivers and protect critical spawning habitat for trout and salmon. Staff are working closely with the Deschutes TU Chapter (the Redbands) to advocate for more natural flow for the Upper Deschutes and spawning tributaries.

Middle Clark Fork River Restoration Project (MT)

TU's large-scale restoration efforts on the Middle Clark Fork River are cleaning up abandoned mine damage, improving flows for native Westslope cutthroat and bull trout, and connecting relatively healthy upstream fish populations to populations in the lower reaches. Since 2004, we have been re-building the Ninemile Creek watershed—a critical Clark Fork River tributary—one stream at a time. We now have reconnected five tributaries to Ninemile Creek, all of which have been recolonized by cutthroat trout, and in 2016, we reconstructed over one mile of new channel and floodplain on the main stem of Ninemile Creek itself. Not coincidentally, biologists recently found fresh evidence of trout spawning in the newly-constructed reach for the first time in decades. In 2017, we are continuing our restoration work on the mainstem of Ninemile Creek, working towards our goal of restoring ten miles.

Upper Clark Fork Restoration Project (MT)

For the past seven years TU has led a watershed-scale effort to restore fish passage and habitat for native Westslope cutthroat trout and bull trout in Montana's Upper Clark Fork. A massive Superfund effort to clean up historic mine pollution (the largest in the country), coupled with the removal of the Milltown Dam just upstream of the city of Missoula, catalyzed efforts to restore river health and native fish communities in the watershed. TU is working with agricultural producers, landowners, regional conservation groups, and agencies to restore important tributary habitats and reestablish migration corridors for native fish. We've completed projects in Rock Creek, Harvey Creek, and Warm Springs Creek, and we continue to work with local ranchers and farmers to upgrade irrigation infrastructure and restore fish passage and habitat in other important tributaries in the upper reaches of the Clark Fork.

Little Blackfoot River Abandoned Mine Restoration Project (MT)

The Little Blackfoot River is a Westslope cutthroat trout stronghold in the upper Clark Fork Basin, but several of its headwater tributary streams are impaired from metals contamination from dozens of abandoned mines in the area. TU collaborated with the Helena National Forest, Montana Department of Environmental Quality, the local conservation district, landowners, and other partners to draft a Metals Restoration Strategy for the upper Little Blackfoot River. The document provides a framework for project identification and prioritization, source assessment, and monitoring activities that will guide restoration efforts for TU and our partners. Recently, we implemented our first project under the strategy, removing 4,000 cubic yards of contaminated waste rock at the Lilly Orphan Boy abandoned mine site, and cleaning up the 14th- ranked abandoned mine project on the Montana State Priority Site List.

Owyhee Redband Trout Restoration Project (ID, NV, OR)

We launched our Owyhee Redband Trout Restoration Project several years ago to restore native interior redband trout in the Owyhee basin of Idaho, Nevada, and Oregon. Since then, TU has worked with the Bureau of Land Management to complete an assessment of redband trout habitats, and to monitor stream temperatures throughout the Owyhee basin and the Owyhee Front, and (with the National Fish and Wildlife Foundation) to prioritize and implement on-the-ground habitat restoration projects that restore and protect critical coldwater habitats. We now are spearheading a large, collaborative restoration initiative across the basin that is supported by a grant from the Natural Resources Conservation Service Regional Conservation Partnership Program. Our work, which is closely-coordinated among 13 different

stakeholder partners, will increase the resiliency of Owyhee redband trout populations, and ensure that they continue to persist in this unique desert landscape.

Blackfoot River Restoration Initiative (ID)

Over the past decade, TU has helped to keep Yellowstone cutthroat trout off the endangered species list through a three-pronged effort in the Snake River watershed: restoring historical spawning tributaries, improving water management below Palisades Dam, and engaging anglers as part of the solution. Our projects—first in the South Fork Snake and more recently in the Blackfoot River—have reconnected over 125 miles of stream by removing fish passage barriers and restored over 19 miles of spawning and rearing habitat by reconstructing degraded stream channels. In 2017, we are continuing to implement fish passage and habitat restoration projects via our innovative partnership with leading phosphate mining companies in the region.

Snake River Headwaters Restoration Initiative (WY)

Few western rivers enjoy a backdrop as unique and spectacular as the upper Snake River in western Wyoming. The system of headwater streams and rivers that creates the Snake—eventually the largest tributary to the Columbia River—lies at the heart of the Greater Yellowstone Ecosystem, the largest intact functioning ecosystem in the lower 48 states. Despite that, human activities and development continue to impact hydrologic function, stream habitat and native fish populations. In fact, forty-six miles along five different streams in the Snake River Headwaters sub-basin are listed as “water quality impaired.” We launched the Snake River Headwaters Restoration Initiative to leverage the capacity of our active local chapter in and around Jackson Hole. We hired a project manager to work with the chapter and local partners to develop and implement high-priority restoration projects. During the next two years, we will reconnect 40 miles of native trout spawning and rearing habitat, restore 10 miles of valuable habitat by improving water quality and quantity, and educate 400 students about the watershed through our Adopt-a-Trout Program and other outreach initiatives.

Bear River Restoration Initiative (UT, ID, WY)

Preserving cutthroat trout diversity is a fundamental requirement for the long-term persistence of the species. Since 2004, TU has completed more than 50 major restoration projects in the Bear River watershed, reconnecting over 250 miles of tributary spawning and rearing habitat to the mainstem river. These ongoing efforts focus on fish passage restoration, canal fish screen installation, and in-stream and riparian habitat improvement. We are working with a broad assortment of private, state, and federal partners to implement meaningful, on-the-ground restoration work. Our overall goal is to enhance and secure Bonneville cutthroat trout populations throughout the watershed to ensure their long-term survival in the face of climate variations. In 2017, we are continuing to use funding from the Natural Resources Conservation Service (NRCS) Regional Conservation Partnership Program to complete a large-scale instream flow and habitat reconnection project on the East Fork Bear River, near Evanston, Wyoming.

Weber River Restoration Initiative (UT)

The Weber River Restoration Initiative was started in 2011, and was the result of both of the high-profile restoration successes in the nearby Bear River and the intense energy and interest of TU's Utah Council in working in this important native fish stronghold. The Weber River provides some of the best large-river habitat for Bonneville cutthroat trout that remains in Utah (it is also home to the imperiled bluehead sucker). We recently secured our first instream flow lease in the state of Utah in this basin and we are working with irrigators to eliminate fish entrainment and restore upstream fish passage at mainstem Weber River and tributary irrigation diversions.

Colorado Mine Remediation (CO)

TU is restoring Colorado wild and native trout habitat by cleaning up toxic pollution from abandoned mines on the Snake River, Kerber Creek, Clear Creek, and the Lake Fork of the Arkansas River. Kerber Creek will likely become the first stream ever to be removed from the state's impaired waterways list. We have capitalized on that success to expand our restoration footprint in the state. And we continue to capitalize on our novel partnership with Freeport McMoRan Copper and Gold, Inc., which has allowed us to initiate high-profile project work in Clear Creek on Colorado's Front Range. Last year, we also developed a similar funding partnership with Newmont Mining Co., which will fund our work to reclaim abandoned mines and restore Colorado streams, including in the headwaters of Kerber Creek, and in Leavenworth Creek, a Clear Creek tributary near Denver.

Abandoned Hard Rock Mine Restoration (WA)

Few projects illustrate the conundrum of abandoned mine restoration better than the Red Shirt Mill project on the banks of Washington's Methow River. The Methow is home to Endangered Species Act-listed Chinook salmon, steelhead, and bull trout, as well as coho salmon and Westslope cutthroat trout, and has seen millions of dollars invested in habitat restoration efforts to benefit these fish. But those investments are being undermined by contamination from toxic mine tailings at the Red Shirt Mill, a historic hard rock mill site on the Methow near Twisp. While tribal and state programs fund habitat restoration, no funding source or mechanism exists for abandoned mine restoration. The erosion of toxic heavy metals into the Methow River at this site is a chronic problem that could quickly turn acute in the event of a flood or large-scale erosion event, given the 20,000 – 30,000 cubic yards of tailings material at the site. TU is working hard to develop the Red Shirt Mill project, and a new funding program to pay for it, in order to restore the Methow River and pave the way for our organization and others to begin to tackle the backlog of similarly destructive abandoned mine restoration projects across the state of Washington.

Big Wood River Home Rivers Initiative (ID)

TU launched the Big Wood River Home Rivers Initiative in the Sun Valley area in 2013, and we've been working with stakeholders since then to restore the Big Wood and to make the river and its tributaries more resilient in the face of threats like drought and fire. Efforts over the past few years have included continued work in local schools to track fish and enlist the next generation of angler conservationists via the Adopt-A-Trout Program (this effort combines fish tracking and research with an outdoor curriculum to educate local students about the important recreational fishery in their backyard). Restoration work has included working with local landowners on Loving Creek to reconnect and restore one of fabled

Silver Creek's most important spawning and rearing tributaries. In 2017, we are continuing to implement stream function and habitat restoration projects that were identified in the comprehensive Big Wood River Assessment that we completed last year.

Southwestern Native Trout Conservation (AZ, NM, CO)

TU staff have joined TU volunteers and other partners in continuing with trout habitat restoration efforts in the wake of extreme drought and wildfire damage. One promising aspect of this work has been the Gila trout expansion efforts in Arizona and New Mexico, including a 5 mile project on Frye Creek, Arizona, and a stream/lake project on Snow Lake, New Mexico.

Driftless Area Restoration Effort (WI, MN, IA, IL)

In this lovely and trout-rich area of the upper Mississippi Valley, TU chapters and staff are leading the effort to restore degraded spring creeks and their watersheds to health. This is TU's largest Home Rivers Initiative, encompassing 4,000 miles of coldwater streams spread across 24,000 square miles. The Driftless Area Restoration Effort brings together volunteers from two dozen TU chapters and four state councils to organize and fund projects with natural resource management and agriculture agencies, land trusts, and other nonprofit and community groups. The effort has strengthened TU's relationships across this area with economic development and tourism groups as well as with policy makers, and to date 200-plus projects have restored greater than 100 miles of trout streams.

Rogue River Home Rivers Initiative (MI)

TU's first urban Home Rivers Initiative presents a different set of conservation problems from those with which TU typically contends, and includes the challenges of concentrated development and storm water management. Project activities include municipality watershed planning, conducting studies and watershed assessments, providing training for new volunteers in collecting flow and temperature data, and hosting volunteer events such as river clean-ups. TU has distributed 350 rain barrels to residents in the watershed, installed 20,000 square feet of stream buffers, rain gardens, and bio-swales, worked to establish a regional program that offers incentives to residents and businesses that install green infrastructure practices (with the help of local high school and college students). Elsewhere in the watershed, TU received funds from the Great Lakes Restoration Initiative to plant 700 feet of trees and other native plants along Cedar Creek, fence off cattle, and install more than 1,000 feet of instream habitat. Finally, a 36-acre parcel that was once pasture was enrolled in the Wetland Reserve Program, conserving it in perpetuity.

Farm Bill Conservation Programs

TU's field staff, working closely with farmers and ranchers, are increasingly making use of Farm Bill Conservation Program funding to accomplish on-the-ground stream restoration goals. With that in mind, TU has worked closely with Congress over the past several years to try to re-authorize the Farm Bill, to keep funding flowing through its conservation programs. These efforts paid off in 2014 with passage of the new Farm Bill, and with additional programmatic efforts like the Regional Conservation Partnership Program, which is now available to provide new benefits for native and wild trout. Over the next few

years, the bill is set to expand the landscape-level benefits of Farm Bill programs by promoting the kinds of regional partnerships TU has been leading on the ground in places like the Driftless Area (WI), lower Gunnison (CO), upper Columbia (WA), Bear (UT/WY), and Blackfoot (ID).

Eastern Abandoned Mine Program

According to the EPA, toxic runoff from abandoned coal mines is the single largest threat to the environment in much of the Appalachian area. Building on our pioneering mine remediation work in Pennsylvania, TU is helping to clean up abandoned mines throughout the region. In 2014, TU was recognized with a Pennsylvania Governor's Award for Environmental Excellence in acknowledgement of the more than 120 projects completed through its Abandoned Mine Drainage Technical Assistance Program. This program serves to assist chapters and other groups to ameliorate the polluted water flowing from abandoned coal mines. TU recently celebrated the recovery of Twomile Run in the Kettle Creek watershed, where a fish survey by TU biologists confirmed that brook trout have returned to the previously dead, Abandoned Mine Drainage-polluted Twomile Run.

Nash Stream Project (NH)

TU is restoring habitat for wild brook trout, and preparing the way for the eventual return of Atlantic salmon, in Nash Stream, a major component of the upper Connecticut River watershed in the northernmost part of New Hampshire. Trout Unlimited has worked with the New Hampshire Fish and Game Department and other partners for more than a decade to raise \$1.3 million to improve trout habitat in Nash Stream, largely by replacing culverts that blocked fish passage and adding large woody material. Fish surveys have already documented increased numbers of wild trout, which should lend credence to arguments for a decreased focus on management by stocking. The project will be completed in 2018.

Salmon Kill Project (CT)

The Salmon Kill is an important tributary to the Housatonic River, the banks of which suffer from historic agricultural and industrial impacts. With a \$625,000 grant from the natural resource damages assessed to General Electric for the release of PCBs into the Housatonic River Basin, TU is working with local landowners, schools, and other partners on an extensive floodplain and instream restoration project designed to enhance the creek's native brook trout populations. Two restoration sites were completed during the 2015 field season using over 400 logs to stabilize eroding streambanks and improve instream habitat. Following the installation of the large wood treatments, the sites were then planted by local students. Seven additional sites were completed in the 2016 construction season, and similar work is now underway in the 2017 field season.

Shenandoah Headwaters Home Rivers Initiative (VA)

Through collaborative efforts with local farmers to improve water quality, TU is working to bring wild brook trout back to mountain streams and valley spring creeks in the Shenandoah Valley. TU has completed projects on Mossy Creek, including removing a dam and restoring over 2,000 feet of spring creek habitat, as well as habitat improvement projects on Garth Run and Wildcat Hollow, two streams in

state wildlife management areas. In Garth Run, TU documented adult brook trout in the newly recreated pool habitat just two weeks after completing the work. TU's project on Beaver Creek has resulted in the return of native brook trout to a fishery that previously relied entirely on stocking.

Potomac Headwaters Home Rivers Initiative (WV)

Before it reaches the nation's capital, the Potomac is a native brook trout fishery flowing through farmland and small rural communities. However, brook trout resources in the Potomac headwaters have been fragmented and degraded by timber harvest, development, and agriculture. TU and partners are working with private landowners and public land managers to reconnect fragmented populations by restoring riparian and in-stream habitat, and by removing barriers to fish passage. Recent measures of the success of the project (working with our state and federal agency partners as well as landowners) include the installation of 23.5 miles of conservation fencing, planting 300 acres of riparian trees, completing 24 miles of in-stream restoration, reclaiming 22 miles of old unused roads that were eroding into brook trout waters, and improving culverts to open up more than 20 miles of headwater streams for brook trout refuge and spawning, while reducing maintenance costs and flood damages.

Upper Connecticut Home Rivers Initiative (VT, NH)

Historic timber harvests, perched or blocked culverts, and small dams have all degraded native brook trout habitat in the upper Connecticut River watershed. TU is working with timber companies, municipalities, and private landowners on large-scale restoration projects to address these issues. Current and recent projects include replacing culverts on Indian Stream, restoration work on the East Branch of Indian Stream, a habitat study and assessment of the Nulhegan River, and a fish migration study on Indian Stream and the upper Connecticut.

Upper James River Home Rivers Initiative (VA)

The Upper James River watershed drains more than 3,000 square miles of western Virginia encompassing 10 counties and hundreds of tributary streams. The majority of these mountain streams and high valley creeks historically sustained abundant populations of native brook trout and provided a steady source of clean water to the communities and urban areas along the James River and the Chesapeake Bay. Today, however, the remaining intact populations of native brook trout are relegated to isolated mountain headwater streams. To address this, TU and partners have initiated a Home Rivers Initiative (HRI) in the Upper James River watershed, focused on brook trout. Assessment work on the upper Jackson and the Bullpasture rivers has set the stage for project design and implementation work, now underway.

4. SUSTAIN (Science and Volunteer Operations)

Conservation Success Index

The Conservation Success Index (CSI) supplies the roadmap TU needs to achieve its vision of conservation success, and served as the foundational information for TU's 2016 State of the Trout report. The CSI compiles existing scientific data to produce a picture of how a particular trout or salmon species

is faring across its range—which populations are strong and which are struggling? What are the most serious threats, and which restoration projects are likely to yield the greatest benefits? How might emerging threats, such as climate change, proposed oil and gas drilling, or new non-native species invasions affect a particular site or species? Armed with this information, TU staff and volunteers can establish work priorities more effectively, and better measure the success of their actions. The tool continues to evolve – recent applications have included work in small geographies, multi-species perspectives (see Native Fish Conservation Areas below), and linkage to TU’s Conservation Portfolio work (see Conservation Portfolio Planning below).

Conservation Portfolio Planning

Management strategies that maximize biological diversity and promote varied approaches to fish population protection are more likely to succeed in a future in which climate change and invasive species cause rapid environmental change and increasing uncertainty. A diverse management portfolio for native trout can be achieved through the application of the 3-R framework: Representation (protecting/restoring diversity), Resilience (having sufficiently large populations and intact habitats to survive environmental change), and Redundancy (saving enough different populations so that some can be lost without jeopardizing the species). We have applied this approach at the population level to multiple subspecies of cutthroat trout in the interior West, and within the eastern range of brook trout for developing place-based recommendations for the conservation strategies necessary to achieve the portfolio’s goals.

Climate Change Adaptation

Increasing water temperatures, changes in flow regimes, as well as severe floods, droughts, and wildfires pose major threats to wild and native trout. TU has reviewed our restoration and reconnection strategies in light of a warmer and more variable future environment. We have developed adaptation strategies that feature: 1) watershed-scale restoration, 2) restoration of proper watershed function, 3) improvements in instream flows, 4) cooler water within complex stream channels, and 5) more resilient fish populations. Monitoring and adaptive management also is encouraged as we continue to learn more about localized climate impacts and population responses.

Angler Science Monitoring Opportunities

Citizen Science has seen rapid growth in recent years, aided by interconnected mobile technologies that enable the public to collect data from virtually anywhere. Angler Science is defined as anglers collecting scientific information about the streams and fish they love. We believe that TU’s Angler Science is a special breed of citizen science because of the passion of our members in conserving coldwater fisheries and the watersheds that sustain them. TU now provides 10 separate Angler Science programs ranging from basic water quality, habitat, and population monitoring to cutting-edge eDNA and snorkel monitoring programs.

Quantifying Risk in Desert Trout

In collaboration with various partners (including the University of Georgia, US Geological Survey, and the Forest Service) we have developed an entirely new approach to Population Viability Analysis, which

we are using to estimate extinction risk for desert trout in the interior West. Our approach, funded primarily by NASA and with support from the Bureau of Land Management, US Fish and Wildlife Service, and the National Fish and Wildlife Foundation, integrates measurements of habitat quality derived from satellites (flow, stream temperature, riparian vegetation ‘greenness’) with field population monitoring data to model how likely each population is to become extinct over a projected period of time. The key to our approach is that we can do this *simultaneously* across all populations at once, and therefore can borrow information from well-sampled fish populations and apply it to areas where we have little information. We can also evaluate the effectiveness of different management actions, like removing non-native trout or increasing habitat extent. Our models are guiding TU’s on-the-ground restoration activities, and are being integrated into formal agency conservation planning for the threatened Lahontan cutthroat trout as well as for Bonneville cutthroat trout and redband trout.

Native Fish Conservation Areas

Native Fish Conservation Areas (NFCAs) help manage native fish communities while simultaneously allowing for compatible recreational and commercial uses. In past work, TU has identified a handful of watersheds in the Colorado River Basin that could be managed under the NFCA concept to benefit Colorado River cutthroat trout. Similarly, in New England, NFCAs could help native anadromous (sea-run) salmonids such as Atlantic salmon and saltwater brook trout. And Heritage Brook Trout ponds in Maine, and in the Upper Snake River Basin that is home to Yellowstone cutthroat trout and redband trout could also benefit from NFCAs. The NFCA concept, developed by TU and its partners, has seen expanded use across the country in the Little Tennessee River Basin, and various river basins in Texas and across the Great Plains. TU and its partners are working to communicate to various conservation partners how NFCAs can benefit trout in important watersheds across the country.

Interactive Mapping and Data Visualization

TU’s Science Program uses innovative web-based mapping and data visualization tools to deliver our science products to field staff and partners. Interactive map tools put spatial information in the hands of decision makers, allowing them to explore data related to fish distributions, habitats, and other factors in Google Earth-like web interfaces. Data visualization tools allow users to filter and sort large datasets to identify conservation opportunities that fit specific criteria. For example, our Idaho Water Transaction Tool highlights those streams in Idaho with existing water use infrastructure that have the highest likelihood of providing functional native trout habitat under projected future climate conditions. TU Western Restoration Program staff can use the tool to identify individual water diversions where upgrades or consolidation can potentially return flows to streams to the lasting benefit of native trout. TU’s mapping expertise is also used to support communications and marketing efforts through Story Maps, which combine photos, narrative content, and maps to share the story of TU’s conservation work.

Aerial and Satellite Imagery Analysis

TU is on the forefront of two conservation applications of aerial and satellite imagery analysis – high-resolution photo interpretation and cloud-based image analysis. First, we use high-resolution aerial photos to monitor key features such as streamside vegetation across large landscapes. Recent TU research has shown that the amount and character of streamside vegetation visible in aerial photos can be linked

to trout abundance. By rapidly evaluating those features we can efficiently describe restoration needs. Second, TU uses cloud-based analytical tools like Google Earth Engine to access large archives of satellite imagery to monitor changes to landscapes over time. Recent applications have tracked the recovery of streamside vegetation over 30 years following a change in cattle grazing management on public lands in Nevada.

Volunteer Operations

What sets TU apart from other conservation organizations is our tremendous representation on the ground. Since the organization's inception, TU has relied on its volunteer leaders to deliver on the mission at the local level. In just the last year, our 385 local chapters and 36 state councils and their volunteers:

- Contributed over 725,000 hours volunteering;
- Participated in 1,085 conservation projects;
- Ignited a spark in the next generation with more than 1,640 youth education programs;
- Served those who have served our country, with over 575 veterans programs and events; and
- Opened the door to a more inclusive future with more than 127 events geared specifically towards attracting women or minorities.

The objective of TU's Volunteer Operations program is twofold: 1) to help improve the effectiveness of TU chapters and councils with a robust series of online and in-person trainings for volunteer leaders, and 2) to coordinate the activities of chapters, councils, and staff programs so that we work efficiently together towards the accomplishment of our mission.

Volunteer Operations Trainings

Every year, our volunteer operations staff hosts between four and six regional meetings across the country as well as the annual meeting. These continue to grow year-after-year and are attended by more than 600 volunteer leaders annually. At the regional meetings, we cover a range of topics from mission-driven presentations and workshops on conservation, angler science, advocacy and youth education to capacity building sessions on membership recruitment and engagement, communications, financial controls, leadership development, and succession and strategic planning. In addition, volunteer operations offer several online trainings each month covering many of these same topics and a suite of online how-to guides and manuals in our "Tacklebox." We have also implemented a pilot program in the Pacific Northwest, hiring a staff leader to facilitate training and communications and coordination between TU staff and grassroots activities, and in doing so to realize the full potential of TU's people – staff and volunteer.

Embrace A Stream

Since 1975, TU's Embrace A Stream grassroots grants program has provided over \$4.5 million in grants to more than 1,000 local chapter and council conservation and education projects that are leveraged on the ground by thousands of volunteers who carry out our mission locally. Embrace A Stream is now bigger

and better than ever – thanks to the generous support of TU members along with a large pool of grant funds available thanks in part to new corporate partners like Sweetwater Brewery and a new online fundraising competition sponsored by the Orvis Company.

Veterans Service Partnership

The Veterans Service Partnership (VSP) is an initiative of TU's to serve veterans, active duty military and their families by engaging them through the recreational therapy of angling and with the sustaining support of the TU community. What sets the VSP apart is our network of volunteers that operate out of an ever-increasing number of local TU chapters across the country. Each chapter is a ready-made community of passionate conservationists and anglers. Many served by TU's VSP are integrated into their chapter community, which becomes a place where veterans can both serve and be served in return. The TU VSP partners with groups like Project Healing Waters, Tragedy Assistance Program for Survivors, Student Veterans of America, and others in order to increase the range of services provided to meet veterans' needs and to strengthen and expand our programs. More than 200 of TU's nearly 400 chapters now run activities serving our nation's military families, offering fly fishing instruction and trips, fly tying, and rod building instruction, all geared toward engaging veterans in the TU community. TU chapters and councils reported running 588 veterans service activities serving over 3,000 veterans, spouses, and families, made possible thanks to over 25,000 hours of TU member volunteer time.

Diversity Initiative

The goal of TU's Diversity Initiative is to create effective strategies and programs to recruit a more diverse TU membership; encourage diversity within leadership at the chapter, state and national levels; and to ensure every chapter creates a welcoming environment for TU members of different genders, ethnicities, ages, and cultures to achieve the TU conservation mission. The primary focus of the Diversity Initiative to date has been encouraging local and state-level women's initiatives to grow and thrive. Today, 33 percent of our chapters are actively hosting events and activities geared at attracting and welcoming women into the chapter, and 66 percent of our chapters have women among their elected leaders. More recently, the Diversity Initiative has broadened its focus to target other under-represented demographics, like Latinos or people of color, in order to empower our local chapters with resources to reach these communities and engage them with our mission-work.

Headwaters Youth Education Program

TU members have long understood the importance of investing in the next generation. Since the organization's inception, our chapters and councils have been teaching kids to fish and explore their natural surroundings in order to make that lasting connection to their water resources. The Headwaters Youth Program is a staffed effort to complement and assist the work of our grassroots volunteers. Headwaters elements include the Stream Girls/Boy Scouts conservation and fishing scouting programs, Trout in the Classroom and Adopt-A-Trout school programs, "Summer on the Fly" summer camp programs and TU Youth Camps as well as the TU Costa 5 Rivers Program to foster conservation and fishing clubs at universities and colleges.

Building Community and Awareness

TU's strategic plan calls for a far deeper engagement of members and non-members alike in our mission, as well as a significant increase in the overall awareness of TU and our work. Our best delivery method for that engagement is the close to 400 chapters and councils that are spread across the country and connected to their local communities. Harnessing this grassroots army and increasing their effectiveness at community building and community engagement is paramount to our growth objectives. Each year, the Volunteer Operations department builds and maintains critical partnerships with companies like LL Bean, Fly Fishing Film Tour, TicketPrinting, and others to provide opportunities and resources for chapters to develop and deploy effective and engaging events in their local communities. Ranging from youth fishing days to fishing film screenings to community conservation projects, these "outward facing events" can be a major draw for new and prospective members and greatly raise the profile of TU.