

Change the Course: A New Model of Freshwater Conservation and Restoration

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In more and more river basins around the world, water use is bumping up against the limits of a finite supply. Groundwater is being overpumped, wetlands are drying out, lakes are shrinking, and large rivers—from the Indus and the Nile to the Murray and the Colorado—are so tapped out that they rarely reach the sea.¹

Society faces a difficult conundrum: water is finite, but human demands for it are not. Water is needed to produce just about everything we use, eat, and wear—from electricity and paper to burgers and blue jeans. Researchers at the University of Twente in the Netherlands have estimated that humanity's collective water footprint totals some 9,087 cubic kilometers per year—a volume of water equivalent to the annual flow of 500 Colorado Rivers.²

We depend on freshwater ecosystems for clean water, fisheries, food, and recreation. They support the web of life on the planet. Any hope to keep rivers healthy requires that we do two things: shrink our human water footprint and restore flows to depleted ecosystems.

At the moment, however, the cards are stacked against success. As long as water flows from a tap when the faucet is turned, most people do not think about water. Few have any idea that each of their cotton shirts requires some 700 gallons (2,650 liters) of water to make (with most of those gallons consumed by cotton crops in the field). Likewise, most people are unaware that it takes vast quantities of water to cool the thermoelectric power plants that generate their electricity or that each

gallon of gasoline fueling their cars takes 13 gallons of water to produce. All told, the average American's water footprint amounts to some 2,000 gallons of water a day—twice the global average.³

On the production side of the equation, many farmers have little incentive to use their water supply more efficiently as irrigation is heavily subsidized and legal regimes often promote usage over conservation. With agriculture accounting for 70 percent of global water use,⁴ these issues present major barriers to downsizing humanity's water footprint. Corporations increasingly recognize the risks of water shortage

Enter Change the Course

In 2012, the National Geographic Society, Bonneville Environmental Foundation (BEF), and Participant Media launched a first-of-its-kind freshwater restoration effort designed to address these global water challenges. This campaign, called Change the Course (CtC), combines the educational reach and storytelling power of National Geographic, innovative water restoration tools and experience of BEF, and the social engagement acumen of Participant Media to create a virtuous and expanding cycle of freshwater education, conservation, and restoration.

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to their operations and bottom lines,⁵ with the most forward-thinking businesses pro-actively reducing their water footprints. But these actions are typically designed to reduce the vulnerability of business operations in the face of water shortages and only rarely address the needs of depleted freshwater ecosystems.

Lastly, in this time of tight budgets and competing priorities, funding is scarce to implement on-the-ground projects that can conserve water and enhance flows in dewatered rivers and streams. New financial models and revenue sources are needed to fill this funding gap.

We are piloting CtC in the Colorado River Basin, the iconic North American river that sculpted the Grand Canyon, that supports more than 30 million people and 5 million acres of cropland but that is now tapped out: water demands exceed the available supply. In most years, the Colorado dries up 90 miles before it reaches the Sea of Cortez (Gulf of California) in Mexico. Heavy diversions severely drain many of the Colorado's tributary rivers as well, placing fish, birds, wildlife, and a \$26 billion regional economy that depends on healthy river flows in the basin at risk.⁶

Perspectives



Sandra Postel

Change the Course projects span the Colorado River Basin. Rivers in which CtC has supported flow restoration (orange) or anticipates supporting flow restoration (blue).

The basic model of CtC involves five key elements: public engagement, personal water conservation pledges, corporate sponsorships that fund our restoration efforts, the execution of on-the-ground flow restoration projects, and the sharing of our successes and lessons through online storytelling and public outreach.⁷

Our efforts to educate and engage the public around freshwater include innovative online and social media

tools that focus on building an understanding of each individual's water footprint. We employ SMS text messaging and email platforms as well as online interactive tools. By using National Geographic's water footprint calculator, for example, people can discover how much water they use on a daily basis through their diets, energy consumption, home activities, and purchases of consumer goods. Through this tool and our periodic

texts and emails, they also receive tips on how they can conserve water. We also engage the public through more directed efforts, including presentations at events, corporate employee engagement initiatives, and NGO partnerships.

The CtC campaign also invites individuals to pledge to take action in their lives to shrink their own water footprint. We motivate people to join our pledge community by promising

that for each individual pledge, CtC will restore 1,000 gallons of water to a depleted portion of the Colorado River Basin.⁷

This promise is possible because CtC also offers corporations the opportunity to join the campaign as a sponsor, which provides a built-in mechanism for them to balance their own water footprint by returning some water to a depleted ecosystem. In this way, corporate sponsors underwrite the public pledges to conserve, fund CtC's flow restoration projects, and expand the envelope of corporate water stewardship.

Working closely with local conservation organizations, CtC invests these corporate funds in on-the-ground projects. These work collaboratively with water-rights holders to modernize irrigation systems or apply new water-use practices that can restore water to depleted ecosystems. Our aim is to demonstrate that flow restoration can be beneficial not only to rivers but to the larger community around them—in effect, increasing the value of water. Through BEF's Water Restoration Certificate program,⁸ each project is third-party certified, ensuring high ecological value for the investment made, and the volume of water restored is verified and registered in an online registry. For corporations seeking to meet sustainability goals, this accountability tool is an important feature.

Lastly, we share the stories of these projects with our pledge community and the wider public. National Geographic produces short videos for online distribution, as well as articles and photo galleries that tell the stories of these projects in an engaging way.

By involving a broad segment of the public in conservation activities and promoting the idea that good water stewardship requires corporations to help return flows to the environment

to balance out their water impacts, we aim to change the way society uses, manages, and values fresh water.

Progress to Date

We initiated CtC in 2012 and launched all of its elements in February 2013. To date, we have built a pledge community of 91,000 people from all 50 states and more than 100 countries, raised over USD \$1.2 million from corporate sponsors to support river restoration projects, and restored 2.8 billion billion gallons of water to depleted ecosystems in the Colorado watershed. Through our work with partners on the ground, so far we have restored flows to five rivers that span the basin—from headwater tributaries in the Rocky Mountains to the Colorado River Delta in Mexico (see map).

The following project descriptions show that each of our restoration projects spotlights an innovative policy or technology that can restore flows while also benefiting local economies.

A Water Lease for the Yampa River

The Yampa River is a beautiful headwater tributary that flows through western Colorado farm country, the popular tourist town of Steamboat Springs, and Dinosaur National Monument before joining the Green River and ultimately the main channel of the Colorado River. In late June 2012, when drought gripped much of the West, flows in the Yampa had dropped to 5 percent of the normal for that time of year. The river's native whitefish population was at risk of crashing, and tubing and fly-fishing businesses had been shut down due to the lack of flow.⁹

In response, CtC partnered with the Denver-based Colorado Water Trust (CWT) to execute a water lease that kept the river flowing at healthier levels throughout the

summer, averting a major fish die-off and enabling recreation activities to resume. As CWT's executive director Amy Beatie said, the purpose of the lease was “to maximize the beneficial use of water in Colorado.”⁹

Besides rescuing a river and its dependents, the Yampa drought-lease set a precedent in Colorado. It was the first use of a 2003 state law that allows farmers, ranchers, water districts, or other entities to temporarily loan water to rivers and streams in times of need. The 2012 lease was so successful that the CWT executed several others in 2013, including another one for the Yampa.

Restoration of Wetlands and Base Flows in the Colorado Delta

One of the planet's great desert aquatic ecosystems, the Colorado River Delta was once a lush area of wetlands spanning some two million acres. But half a century of upstream river diversions that siphoned off virtually all of the Colorado River's flow have dried it out. About 90 percent of the wetlands are gone and with them large portions of the native fish, birds, and wildlife.¹⁰

The CtC campaign is working with partners in the US and Mexico to help fund and execute wetland restoration projects in the Delta through a water bank called the Colorado River Delta Water Trust. The trust purchases or leases water rights from delta farmers who voluntarily decide to commit that water to restore critical wetland habitats, river flows, and riparian areas. As cottonwoods, willows, and other native vegetation return, the ecosystem is bouncing back.

Thanks to the historic agreement known as Minute 319 signed by the US and Mexico in late 2012, an addition to the 1944 binational water treaty—the delta received



Cheryl Zook/National Geographic

During the drought of 2012, an innovative water lease brought the Yampa River back from the brink of an ecological crash and allowed for recreational use in Steamboat Springs throughout much of the summer.

an ecologically beneficial “pulse flow” during the spring of 2014 that rejuvenated the river’s channel, promoted native cottonwood and willow germination, and brought water to active wetland restoration sites.¹¹ The CtC campaign has partnered with the Delta Water Trust to help secure the “base flows” that are crucial to sustaining the ecological benefits of the pulse, as well as to purchase permanent water rights for a new restoration site that will create the habitat connectivity essential for the rebuilding of bird and wildlife populations. The delta is an important ecosystem along the Pacific Flyway, so residents of both the US and Mexico will benefit from this increase in bird populations.

An Irrigation Upgrade Lifts Flows in the Verde River

Most farmers in the Verde River Valley of central Arizona irrigate as their predecessors did 150 years ago: they build a simple earthen dam in the river channel to divert water into their irrigation ditch. Laterals off of the main ditch bring water from the Verde to their homes and farms. With no way to measure or monitor the volume of water in the ditch system, irrigators often take nearly all the water in the river channel.¹²

As a result, the Verde, which runs 195 miles (314 kilometers) from spring-fed headwaters north of Prescott then south to its confluence with the Salt River near Phoenix, gets severely depleted during the growing

season. At times during the summer months the river channel is dry for several miles at a stretch. With irrigators having neither the funding nor the incentive to alter their practices, the river’s health suffers year after year—and so do the myriad fish, birds, beavers, river otters, and other wildlife dependent on the Verde for their sustenance.

In 2013, CtC partnered with The Nature Conservancy and local irrigators to upgrade the irrigation system and demonstrate that with smarter water management and improved infrastructure, it is possible to restore flow to the river with no sacrifice in crop production. With the installation of a solar-powered “smart” gate and water-level sensor, the irrigators can



Cheryl Zook/National Geographic

Conservation groups are reintroducing tens of thousands of native cottonwoods, willows, and mesquite into the Colorado Delta landscape, creating jobs, habitats and a healthier environment. Here, an aerial view of the Laguna Grande restoration site.

now divert just the amount of water they need for their crops, leaving the rest for the river.¹² The relatively low unit cost for the upgrade and the large corresponding flow increase is a bargain compared to many other water projects in the western United States.

The CtC campaign plans to continue investments for irrigation efficiency upgrades that further restore flows in the Verde Valley and other watersheds across the Colorado basin.

The Power of Stories

For each of these projects, our CtC team produces articles, photo galleries, and videos that tell the stories of why flow restoration was needed, what it achieved, and to introduce the local

people who made it happen.¹³ This not only enables our pledge community and sponsors to see tangible results from their pledges and funding, it inspires replication and innovation, generating momentum for more conservation and restoration.

For example, a year after the Yampa water lease, CtC again partnered with the Colorado Water Trust to execute projects and agreements that helped restore flows to the Fraser and the Roaring Fork, two headwater rivers of high ecological and recreational value. Following our production of three videos about the Colorado Delta, the Mexican conservation group Pronatura Noroeste requested Spanish-language versions of the videos for distribution to conservation

and community groups in Mexico. And after viewing CtC's video about the Verde River restoration effort, an official at the US Department of Interior decided to share the video with her staff.

Moving to Scale

Given the results of our first full year of implementation, we have confidence that our pilot in the Colorado River Basin has achieved "proof of concept" and that our CtC model is ready to be implemented in other river basins, both nationally and internationally. That said, we have learned important lessons along the way and do not wish to underplay the challenges involved in replicating CtC in other geographies, cultures, or



Cheryl Zook/National Geographic

The picturesque Verde River in central Arizona is a hot spot of biological diversity.

legal frameworks. A few of the lessons noted are the following:

- Strong relationships with on-the-ground conservation groups are essential.
- Securing corporate sponsorships and acquiring funding takes time.
- The ability to track, monitor, and account for the volumes of water restored—made possible for CtC by BEF's Water Restoration Certificate program—is a key motivation for corporate participation.
- Developing highly effective restoration projects on the ground is time-consuming and labor-intensive; it requires strong, local NGO capacity and a reasonable measure of public support.

We designed CtC to directly address the global freshwater challenge: how do we meet the food, energy, and water demands of growing populations while at the same time sustaining the health of freshwater ecosystems? We knew of no integrated approach that addressed the fundamental social, economic, and environmental drivers of freshwater depletion, and that had the potential to advance transformational solutions to this challenge.

Our CtC team chose an unconventional strategy that ties together the experience and capacity of three very different, yet complementary, organizations. By bringing together storytelling, education, public engagement through social media, corporate action, sponsorship, and on-the-ground restoration

projects that work closely with farmers and local water users, CtC is testing a new model that bridges long-standing divides and elevates water stewardship.

Its ultimate success, however, lies in its potential to scale up. Our goal in sharing our model and some results from our pilot in the Colorado River Basin is to catalyze a dialogue. Where and how can a multifaceted approach like Change the Course be adapted for other river basins? Is the model scalable? What are the toughest challenges? What are the potential pitfalls?

Our sense is that by building this movement of public and corporate water stewardship, we can in fact positively change the course of humanity's water future. We look forward to new ideas and partnerships to make that happen. **S**



Cheryl Zook/National Geographic

“Ditch boss” Frank Geminden shows off a new automated headgate that allows the Diamond S ditch to meet its users’ needs while leaving more water in central Arizona’s Verde River.

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