

BRIDGE

GLOBAL WATER QUARTERLY REVIEW



JULY 2018

The Nature
Conservancy



Connecting Work Around the World

BRIDGE: TO JOIN, LINK, CONNECT OR UNITE.

Water security is inextricably linked to nearly every aspect of the Conservancy's work - building healthy cities, protecting land and water, fighting climate change, and providing food and water sustainably. Part of our role, as a Global team, is to draw connections between the distinct, unique work happening on the ground around the world, to build the case for nature-based solutions and create transformational impact on a global scale.

Bridge, a Global Water Quarterly Review, is dedicated to bringing you the must-read stories from the Conservancy's front lines by featuring conservation successes that are both locally significant and globally impactful. In its inaugural issue, we have chosen to feature work that is exemplary of the type of collaboration and innovation necessary for The Nature Conservancy to reach its global goals.

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California's First Farmer-Led Groundwater Market

The Nature Conservancy has helped design and implement the first groundwater market under California's new groundwater law, the Sustainable Groundwater Management Act.

Ventura County, located in California's south coast, is one of United States' most productive agricultural counties (ranked 10th in California and 11th in the US)¹, with agricultural production valued at \$2.1B in 2016.² California's landmark groundwater law, the Sustainable Groundwater Management Act (SGMA), requires that 127 groundwater basins, including those in Ventura County, develop Groundwater Sustainability Plans that ensure pumping within sustainable limits. In western Ventura County, where over 70 percent of groundwater use is agricultural, the California Department of Water Resources has designated two groundwater basins as being in critical overdraft under SGMA.

The local management agency may have to reduce groundwater use in these basins by as much as 40 percent to achieve a sustainable yield. While these reductions are critical to achieving long-term sustainability of water use, which includes nature's needs, they also pose significant challenges to wisely managing reduced water allocations to keep irrigated agricultural land in production. The Nature Conservancy (TNC) has a vested interest in preserving farming in the county because it buffers important river and wetland habitat from nearby urban lands.

Growers in the region quickly identified water markets as an important tool for managing limited groundwater resources. By allowing for prices to reflect the true value of water, markets are recognized as an effective mechanism for sustainably managing limited water resources while providing

groundwater users the flexibility they need to meet their water demands. As an agricultural landowner in the Ventura County groundwater basin, The Nature Conservancy will also be able to trade in the market to secure water for nature beyond what the sustainable yield requires to sustain groundwater dependent ecosystems and avoid other undesirable results.

In June 2017, TNC won a Conservation Innovation Grant of over \$1.8M from the Natural Resources Conservation Service, to design incentives for market participation and adoption of new technology to monitor individual wells' groundwater use. A stakeholder group of groundwater users, including TNC, designed the new market's rules, and the Fox Canyon Groundwater Management Agency (FCGMA) has subsequently implemented two pilot water markets, the second of which launched in March 2018, to test the effectiveness and efficiency of the market by allowing trading within a sub-geography. If these pilots are successful, FCGMA may expand the water market to its entire jurisdiction, incorporating lessons learned from the two pilots.

The first of its kind under SGMA, the Fox Canyon groundwater market will demonstrate the role of groundwater markets in achieving environmental benefits while preserving agriculture in one of the most productive regions in the country. This market may serve as a model for other groundwater management agencies seeking flexible tools for achieving sustainability goals under SGMA.

¹ Farm Bureau of Ventura County. County Crop Data. <<http://www.farmbureauvc.com/county-crop-data>>.

² Ventura County Agricultural Commissioner. 2018. Ventura County's 2016 Crop and Livestock Report. Camarillo, CA.



A River with Global Impact

After four years of hard, focused and persistent work and fundraising, the New Jersey Chapter, in partnership with the state, NGOs and federal agencies began work to remove the 109-year old Columbia dam on the Paulins Kill river. This project is part of a comprehensive watershed restoration plan being implemented by the Chapter to restore this beautiful region.



Above: A river is returning. The notch at Columbia dam on Friday, August 3, 2018 (top) and Monday, August 6, 2018 (bottom).
© The Nature Conservancy

Aerial view of the Paulins Kill, Columbia Dam and Delaware River. © Jim Wright/Lighthawk

Revival of a River

The Paulins Kill, one of the largest New Jersey tributaries to the Delaware River, has significant stretches where water temperatures are too warm for aquatic animals, and erosion and sedimentation create additional problems for wildlife. Dams on the Paulins Kill impede important migratory fish like the iconic American shad from reaching historic spawning grounds, as well as slow the river's flow, creating unhealthy, stagnating ponds. They also block sediment from entering the Delaware and rejuvenating the marshes downriver.

The top offender in this regard is the Columbia Dam. For more than 100 years, this 18-foot high barrier

has stopped migratory American shad swimming in from the Delaware River from spawning in the Paulins Kill's waters. In fact, its effects to diadromous fish were so negative that it was ranked in the top 5% of dams prioritized for removal on the East Coast by The Nature Conservancy and the Northeast Association of Fish and Wildlife Agencies. From an ecological perspective, it was ripe for removal.

The 109-year-old dam was originally constructed for ice harvesting in 1909, and then re-operated for hydropower generation, supplying two local towns in the Philadelphia area with electricity. However, the power produced for today's needs supplied less

than 200 homes, and the added expense to install fish ladders made continued maintenance of the dam no longer economically feasible. The license was surrendered to the Conservancy, and the restoration process could begin.

With maintenance no longer an option, The Nature Conservancy looked to replace the energy lost by the dam removal with an alternative low-cost and low-impact renewable source. The NJ Chapter partnered with the NJ Division of Fish and Wildlife to design solar panels that would be installed over the nearby state trout hatchery, which has been struggling to protect young fish from a bacterial disease spread by

predatory birds. The solar panels will act as a buffer to protect the young trout, while simultaneously generating clean energy exceeding that produced by the Columbia Dam. Perhaps most importantly, The Nature Conservancy found a creative way to generate more energy without having to convert natural, intact lands that are vital to the continued health of the river system.

Once the Columbia Dam is removed, the river will once more allow free passage of fish – as well as kayakers – between the Delaware and the Paulins Kill.

The Paulins Kill and the Western Balkans

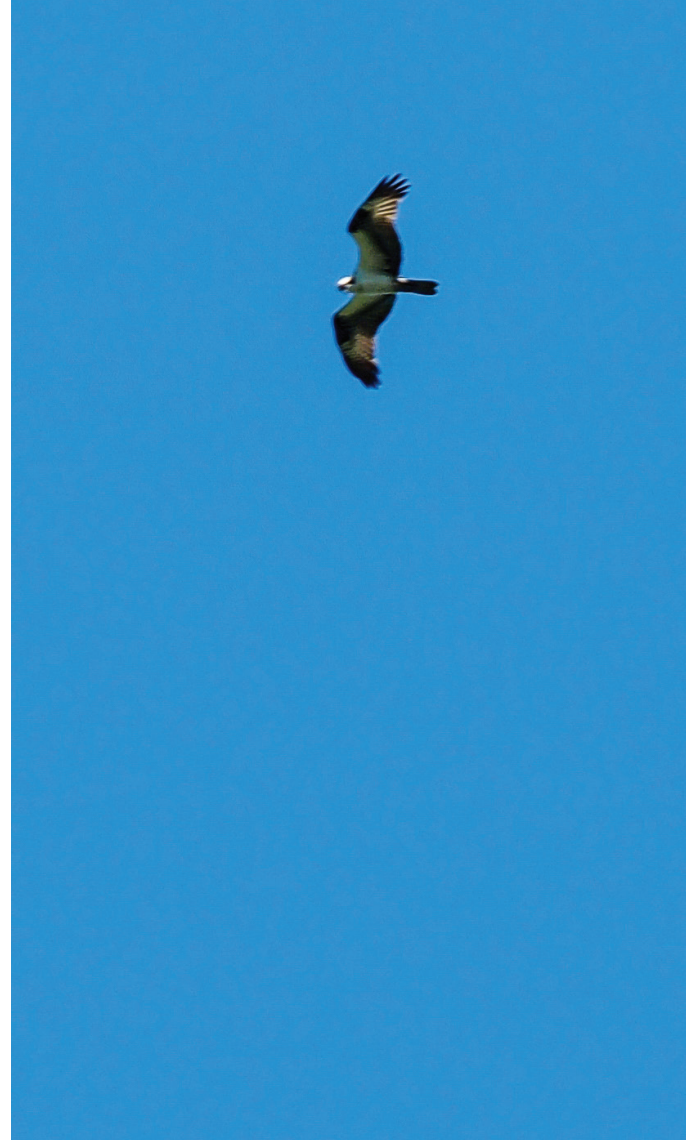
The Nature Conservancy is working to replicate this energy swap – high-impact energy for low-impact energy – to restore connectivity and prevent fragmentation in biodiverse river basins all over the world. The reconnection of the Paulins Kill is a gold standard from which other programs can glean valuable insights.

With climate change driving global agendas, countries are increasingly turning to clean energy sources to meet their energy needs. The Nature Conservancy knows that global climate goals cannot be met without a rapid and massive transition to low-carbon energy sources, but energy growth is projected to be a top driver of land and water-use change worldwide, threatening biodiverse lands and waters, and increasing the release of land-based carbon emissions.

Renewables are about two to eight times more land and water intensive than fossil fuels. In fact, depending on what mix of renewables are deployed at scale, as much as 20 percent of the world's remaining natural lands and 300,000 kilometers of free-flowing rivers could be impacted by energy development. To put that in perspective, 20 percent of the world's remaining natural lands is about the size of Russia, while 300,000 km of river could wrap around the earth 4.5 times and still have some room to flow.

But at The Nature Conservancy, we know that the world can meet its energy needs while keeping our most biodiverse lands and waters intact. Science tells us this future is possible, and the Columbia Dam removal project is an exemplary case. We're hoping to replicate a similar approach in the Western Balkans, and staff are already exchanging best practices across the Atlantic.

The countries of the Western Balkans are undergoing a rapid energy transition, and governments are turning to hydropower to exploit the region's abundance of free-flowing rivers.



All photos:
© Jeffrey Burian

Opposite Page: Osprey soaring over the dam site; Barbara Brummer, State Director of TNC's New Jersey Chapter poses with Shelly Lakly, Managing Director of TNC's Saving Great Rivers Team, Global Water at the celebration. Shelly and Barbara's teams are collaborating to bring the success of NJ's dam removal to programs around the world.

This Page: Barbara Brummer strikes a pose with the Columbia Dam removal taking place in the background; an Eastern painted turtle hides in the tall grasses; a close up of the dam removal; De-watering of the Columbia Dam. Before the dam removal can start, water behind the dam must be lowered.

Born from mountainous glaciers, the rivers of the Western Balkans are Europe’s biodiversity hotspot, supporting a number of endemic species that are both economically and culturally significant. Here endemic marble trout can grow to over one meter in length and many rivers are so pristine that hikers can drink directly from their waters.

The Nature Conservancy’s Nevada Chapter, Global Water team and Europe Region crafted a strategy around the idea of sustainable energy planning for the Balkans; energy that supports long term economic development for the region while preserving the natural systems on which people and nature depend. The strategy promotes wholistic energy planning, which entails considering all renewable energy sources including solar and wind

to minimize the amount of hydropower installed, and, like the case with the Columbia Dam, replacing hydropower assets with low-impact energy. The goal is to maintain the free-flowing rivers and pristine, connected natural lands that make the region so unique.

Most countries currently develop their energy on a project-by-project basis, and different types of renewable energy development – wind, solar, hydropower – are not planned together; countries are developing one-off projects without considering the entire energy system. This would be akin to a country developing a national road system by paving roads one by one without consideration for how they intersect, or whether they intersect at all. This piecemeal method is what we refer to as a business-

as-usual planning and management approach.

At The Nature Conservancy, we are advocating for a paradigm shift to consider the entire system in which energy is developed and operated, regardless of energy type. Widespread adoption of a system-scale approach could allow the world to meet energy generation goals with far lower impacts on rivers, lands and the communities that depend on them; approximately 100,000 kilometers – or nearly one-third of rivers projected to be impacted by hydropower development – would remain free-flowing and continue to provide services to people and nature.

Whether developing or retiring assets, a system-scale approach would enable a country or state

to examine their energy needs and choose the best combination of assets that not only meet those needs but preserve important social and environmental benefits. Using this approach, The Nature Conservancy hopes to have more wins like the Paulins Kill and to reconnect thousands of kilometers of free-flowing rivers for the benefit of both people and nature.



Aerial of the Columbia Dam on the Paulins Kill. Lessons learned from the removal could affect Balkan Rivers like the Una in Bosnia (opposite page)© Jim Wright/Lighthawk



The crystal clear Una River flowing through Bosnia. The river forms a natural border between Croatia and Bosnia-Herzegovina. © Ken Geiger

Photo: Limarí River Basin, Chile
© The Nature Conservancy



Chile's Return of a River for People and Nature

Chile's Limarí River basin represents a unique and timely opportunity for The Nature Conservancy to develop scalable, innovative solutions to water scarcity that would benefit both people and nature.

Located 400 km north of Chile's capital city Santiago, the Limarí River originates high in the Andes and travels down to coastal wetlands before spilling into the Pacific Ocean. The basin is home to a large range of unique biodiversity, including threatened native and endemic species like a small freshwater shrimp whose prevalence is an indicator of the overall health of the Limarí River system.

At the same time, the basin also supports an extensive agriculture sector. Over the last century, Chile has invested in extensive water infrastructure projects to support the implementation of a highly elaborate water allocation system, and, as a result, the combination of these two developments have propelled agriculture to become Chile's most important economic activity.

However, climate change, ecosystem degradation and overexploitation of Chile's water resources have pushed the basin to its limits. In 2015, almost half of agriculture production was lost to the largest drought the basin has ever experienced. The Andean Mountains are the most important source of water for this basin, but fragile ecosystems on the mountainous slopes are sensitive to degradation, and are threatening water sustainability in the region, further contributing to their water security challenges. The long-term sustainability of the Limarí basin is at risk, but by employing innovative, scalable solutions, The Nature Conservancy can create a future that preserves the economic, ecological and cultural significance of the region.

Over the past three years, our engagement in the region has focused on fostering relationships with local stakeholders, universities, and conservation organizations. In February 2018, 40 institutions and 70 stakeholders collaborated with us to complete a Conservation Action Plan (CAP) to identify the main threats to water sustainability in the basin and the promising conservation strategies that could create scalable, local solutions. As part of this process, we have developed a formal partnership with a local university (Universidad de La Serena) that will ensure our solutions are rooted in a strong science foundation and driven by local expertise. Today we have a strong platform; we have built trust with local stakeholders, developed strong local capacity and designed scalable, science-based solutions to water scarcity. Perhaps most importantly, these solutions

can be scaled beyond Chile's borders to serve other regions around the world with similar water challenges.

During the next five years of this project, the Conservancy will explore mixed financing options, which include philanthropic and impact investment capital, to drive local, conservation-based change. As a first step, we will design and implement pilot projects that focus on sustainably sharing water with nature and people. We anticipate designing three pilot projects linking water sustainability and conservation to local economic activities. We'll focus on combining areas of high agriculture production with areas reserved for conservation and/or ecological restoration to gather hands-on experience with environmentally responsible agricultural management practices. Alongside these pilots, The Nature Conservancy will work in partnership with Limarí basin stakeholders to explore the potential for private capital impact investments to support and scale water conservation and agriculture resiliency initiatives, including water markets and infrastructure improvements.

Ultimately, we hope the pilots will help us establish a precedent for climate resilience by demonstrating how striking a balance between agricultural production and nature conservation can create agricultural returns and secure water in the face of climate change.

LOCAL SPOTLIGHT ON WATER FUNDS

QIANDAO LAKE, CHINA

WATER FUNDS IN CHINA CONTINUE TO GROW



Using the results of the China Urban Water Blueprint, the Conservancy is establishing water funds in China that demonstrate how water users and local communities can help to protect and restore watersheds while funding long-term conservation. Furthermore, because the communities that live in China's rural watersheds are often impoverished, the water funds that are established must help to alleviate poverty by ensuring local people can pursue livelihoods that secure their well-being without degrading surrounding lands and waters.

Qiandao Lake supplies drinking water to approximately 10 million people across Zhejiang Province, but the quality of this critical water supply is at risk from land degradation, excessive fertilizer and pesticide use, and livestock waste. To reduce these threats, the Conservancy launched a water fund with the Alibaba Foundation, Minsheng Insurance Foundation and Wanxiang Trust.

In 2018, we began working with local farmers to implement organic, high-end tea and high-yield rice-paddy agriculture. The latter is a cutting-edge effort that uses technology – drones, artificial intelligence and cloud data storage – to improve the accuracy and reduce the dosage of fertilizer applications, thereby reducing production costs while increasing yields and farmers' incomes.

Other nature-based solutions such as ecological ditches have also been established to test whether they provide a cost-effective solution to reduce non-point source pollution. Water education programs have been deployed to teach students and younger generations about the importance of source water and contributing to its protection. The Qiandao Lake Water Fund will improve 15,000 livelihoods while reducing fertilizer and pesticide use across 30,000 acres.

MENDOZA, ARGENTINA

TNC-LATIN AMERICA STRATEGIZES A NEW WATER FUND



On November 15, 2017, a collaboration agreement was signed between Aguas Mendocinas, General Irrigation Department and Environmental and Territorial Order Secretary representatives of the government of Mendoza Province and The Nature Conservancy (TNC) in Argentina to protect the Mendoza River watershed. This agreement took place during a breakfast convened by the Latin American Water Funds Partnership with representatives from local government and private companies who are active in the region.

Since the initial signing, TNC has conducted feasibility studies for the Mendoza Water Fund, and during the process have captured the interest of some key stakeholders like Danone, Quilmes and Coca-Cola. A new agreement is now in the works to formalize their interest as we move forward to the design phase of the Mendoza Water Fund.

Opposite Page: Qiandao Lake © Lingxia XU, Qiandao Lake Tourism Commission

This Page: Late afternoon sunlight reflected off the Caleufu River in Neuquen Province just south of Mendoza, Argentina. © Bridget Besaw

Cover Photo: Chenzhou Hunan, China
© Wong Chi Keung

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