RIVER VOICES

WATER SECURITY AND SUSTAINABILITY

The quest to keep water in our rivers
April 2015 Issue

A RIVER NETWORK PUBLICATION

CLICK THE BLUE LINKS WITHIN THIS NEWSLETTER TO DIG DEEPER ON THE TOPICS.

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TABLE OF CONTENTS

MISSION, VISION, AND FOCUS

River Network empowers and unites people and communities to protect and restore rivers and other waters that sustain all life. We envision a future of clean and ample water for people and nature, where local caretakers are well-equipped, effective and courageous champions for our rivers. Our three strategies for focused investment are strong champions, clean water, and ample water.

IN THIS ISSUE

A few years ago on one of our family and friends rafting trips, my daughter asked me what would happen if the river ran dry.

We had a wide ranging conversation that eventually included our whole crew, ebbing and flowing through the rest of our days on the water. By the end of that trip, the focus had shifted to why we need advocates for keeping our rivers wet and who might be an advocate. Our exploration barely scratched the surface, but we sure had fun along the way.

This issue of River Voices attempts to recreate the spirit of that exploration. We have collected a great set articles to get you thinking about whether we have ample water in our rivers for people and nature, what do we when the answer is no, tools for determining how your river is doing and how much water your river needs, and some new perspectives. Thank you contributors! We don't attempt to provide you with definitive answers or all perspectives. Rather, we hope to inspire you to explore further.

HERE ARE A FEW OTHER IMPORTANT ANNOUNCEMENTS FROM YOUR FRIENDS AT RIVER NETWORK:

- Register for ***River Rally 2015*** from May 1-4 in NM to learn, celebrate, and get inspired.
- Register for the ***new ideas and innovations forum*** on water security and scarcity on June 24, 2015.
- Support us through your ***donations*** and ***Partner dues***.
- Get ready for a new River Network website soon!

Enjoy and I look forward to seeing many of you in New Mexico!

Nicole Silk, President
River Network

GHOST RIVERS

Is a river still a river when the water's all gone?

by Brian Richter and Nicole Silk

Last November, when the US Geological Survey released its latest assessment of water use in America, there was very good news: we are now withdrawing less water from our rivers and aquifers than we did in 1970, even though the US population has increased by half. This rather remarkable accomplishment was made possible largely by improved water-use efficiencies in our power plants, along with modest improvements in farm irrigation.

The bad news in the backdrop is that many of our rivers are but relics of their former selves, with much of their water flow heavily depleted, particularly in the West and during drier months of the year (see map below). Half of the rivers of the West have lost more than half of their original water flows during some portion of the year, and a quarter have lost more than 75%, a situation that hasn't improved much at all in the past half-century. In some areas of the East, many rivers are now experiencing marked declines in flows for the first time.

How do we reconcile these two seemingly conflicting realities of using less water but not seeing our rivers rebound? To understand what's happening with our rivers, we need to understand the basic math of 'water budgets.'

TAKING STOCK OF OUR WATER BUDGETS

Our rivers and aquifers are drying up for one simple reason: we are consumptively using water faster than it can be naturally replenished with rain or snow, or artificially refilled with imported water or desalted ocean water. The illustration below helps to explain the flow of water into and out of a river, but the same processes apply to groundwater aquifers as well. Note that the 'consumptive losses' pictured here include all water that is not returned to its original source after use—it may be evaporated, or it might be exported to another place, resulting in a net loss to the original water source.

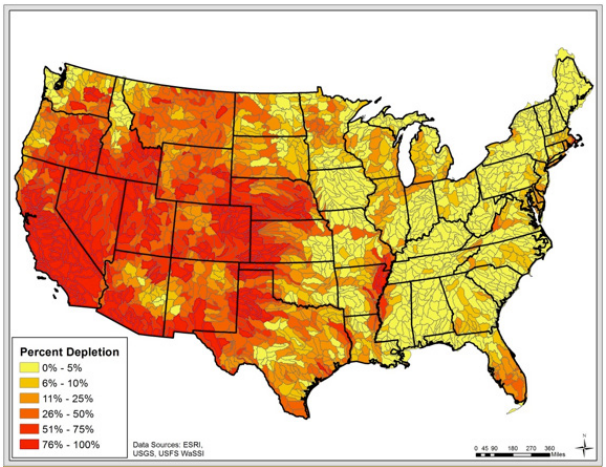

Figure 1. This map depicts the extent to which renewable water supplies are being depleted within watersheds across the US. Water depletion estimates are based on the worst month of each year, for each watershed. Results based on modeled outputs from WaSSI (USFS)[1]

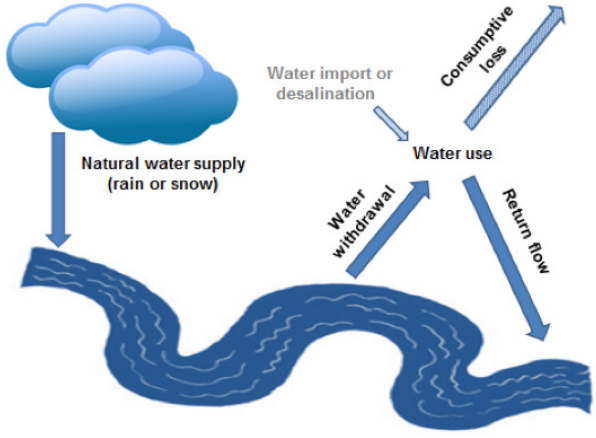

Figure 2. This 'water budget' diagram illustrates the use, loss, and replenishment of water from a water source such as a river or groundwater aquifer. Adapted from *Chasing Water* by Brian Richter, Island Press 2014

[1]Results portrayed here are based primarily on a comparison of consumptive losses to natural water supplies. The use of water infrastructure such as reservoirs, importation pipelines, or desalination plants to increase water availability during dry months is not accounted for here.

Much of the water that is withdrawn from rivers for our use in cities and on farms is returned to the river after use; in fact, more than three-fourths of all withdrawn water in the US is returned, on average. But averages can be deceiving! The percent of water returned from a power plant differs greatly from the percent returned on a farm, for example. Power plants consumptively lose less than 5%, but farms typically lose half or more of the water withdrawn from a river.

The water flow in our rivers, or the volume of water stored in our aquifers, has not rebounded because even while we are withdrawing less water, *we are still losing the same volume or more to consumptive losses*, and that rate of water loss is greater than what is being replenished. ***Here's why.*** Power plants withdraw a lot of water—accounting for nearly half of all US withdrawals—but they lose very little to evaporation (less than 5%). That means that even an 80% reduction in power plant withdrawals—if it could be attained—would produce less than 1% reduction in consumptive losses.[2]

The progress made in irrigated agriculture is similarly complicated and contradictory. Even though many farmers are using more efficient irrigation practices such as drip irrigation that enables them to withdraw less water from rivers or aquifers, their crops still consumptively use the same or more water (referring to Figure 2, withdrawals and return flows are decreasing in agriculture, but consumptive losses are staying the same or increasing). Similarly, virtually all of the water applied to outdoor landscaping or golf courses in cities is consumptively lost, and that volume has actually been increasing in recent decades, offsetting any gains in agriculture or power generation.

The bottom line: if we hope to restore water to our depleted rivers and aquifers, we need to find ways to substantially reduce consumptive losses.

[2]We note, however, that reducing power plant withdrawals is a very good thing nonetheless, because it reduces the energy required to move water around and it lessens the potential for sucking aquatic animals into power plant intakes.

SIDEBAR: WHAT WATER LAW APPLIES TO YOUR RIVER?

Water law in the US is a complex soup of federal, state, and administrative laws. This sidebar is intended to provide you with a basic lay of the land from which you can explore further on your own. State law generally governs how water rights are allocated and assigned except when otherwise reserved for federal purposes (e.g., federal lands and rights associated with sovereign nations/tribes). Administrative law and regulatory systems come into play when seeking surface water or groundwater withdrawal permits (or discharge permits). Where do you start? Start with your state.

As a result of history and geography, states use one of two approaches for assigning water rights: The Riparian Doctrine and the Prior Appropriation Doctrine (California's approach is a bit of both):

- **The Riparian Doctrine is largely followed in states located East of the Mississippi River and was the approach most familiar to early settlers from Europe:** The owner of land that borders a water body, river or lake, has the right to a reasonable use of water. This right is shared by other riparian land owners, cannot be lost by nonuse, and generally cannot be separated from the land. When there is a shortage, all landowners with rights share in the loss.

- **The Prior Appropriation Doctrine is largely followed by states west of the Mississippi River and has historical roots in the need to divert water for mining activities as well as scarcity in some areas.** The phrase "first in time, first in right" is often associated with this doctrine—The first one to put the water to beneficial use has a priority right to the water for that use. Junior rights are met after senior rights are fully satisfied. This right is transferable and land ownership is not required to obtain a water right.

Although these two basic approaches can explain how surface water rights are allocated, the reality is often far more complex given the interplay between surface water and ground water, the impact of return flows, the challenge of monitoring withdrawals, the management of dams upstream, the effect of compact decisions, and assorted administrative and regulatory decisions and rulings. Creating a map of water rights and withdrawals for your river (and noting seniority if in states where the Prior Appropriation Doctrine applies) can be really useful when trying to determine how to protect your river's flow regime.

For more information about water law and your state, check out:

- ***Water Law in a Nutshell*** by Getches
- ***Water Follies*** by Glennon

TO REVIVE A RIVER, CONSERVATION IS KEY

In response to drying rivers and falling aquifer levels, cities and farmers have historically invested most heavily in 'supply-side' strategies, such as building reservoirs to store water during wet months for use in drier times, or building pipelines to bring in water from far-distant rivers. While these water-supply investments helped to keep water budgets balanced for a few decades, we are quickly exhausting opportunities to save ourselves with infrastructure. For example, as depicted in Figure 1 above, there are very few untouched water sources in the West, so when western cities reach into distant watersheds for more water supply they are only spreading and intensifying the risks of water scarcity to more places.

Fortunately, there remains huge untapped potential to reduce our demands on available water supplies, both in cities and on farms, and these 'demand management' approaches are almost always the most cost-effective and environmentally-friendly options for balancing water budgets. For instance, western US cities are using ***twice as much water*** as Australian cities use; most of this difference can be found in outdoor landscape watering. The Aussies have learned to use native, drought-tolerant plants in their yards and commercial landscape areas, minimizing the volume of supplemental water that must be applied.

While urban water conservation is extremely important, ***the potential for saving water on farms*** is even greater, simply because agricultural irrigation accounts for 2/3 of all consumptive losses in the US (and >90% globally). A relatively small percentage savings in irrigated agriculture can yield a tremendous volume of water for river restoration, or to provide for new urban water supplies.

The ***Alliance for Water Efficiency's*** website describes many proven ways to reduce consumptive losses in cities and on farms. If your organization is advocating for more sustainable approaches to water management, you should strongly encourage water planners and other decision makers to fully maximize the potential for reducing consumptive use through water conservation ('demand management'), before turning to any supply-side options.

A GREAT NEED FOR IMPROVED WATER GOVERNANCE

There are some distinct differences in the legal systems for water allocation used in the western US versus the East (see sidebar—What Water Law Applies to Your River?). However, these legal systems generally share a common flaw in their inadequacy for protecting river flows from overuse.

There are two very important ways to protect 'environmental flows' (see sidebar—How Much Water Does Your River Need?) in rivers, and both should be applied. The first principle is to set a maximum limit on the volume of water that

can be consumptively used from each river. This 'cap' can vary among the different months of the year, and these limits can be allowed to flex upward when more water is available in wet years (see Brian's ***Chasing Water*** book for more details). These monthly caps should be set on the basis of the water flows needed to protect the river's ecological health. Importantly, the setting of limits on consumptive use has proven to be a powerful stimulus for water conservation.

These monthly caps serve the purpose of ensuring that a sufficient volume of water is reserved for environmental protection. But further refinement of environmental flow specifications will be highly desirable for many rivers, particularly those that have been dammed. The adoption of environmental flow provisions, as explained in detail in the book ***Rivers for Life***, will help to ensure that proper levels of low flow, occasional high-flow pulses, and even moderate floods are sustained in the river.

Those interested in learning more about these issues will enjoy the workshop on "Water Balance and Security" at the ***River Rally 2015*** in New Mexico!

RECOMMENDED RESOURCES

- ***Chasing Water***: *A Guide for Moving from Scarcity to Sustainability*, by Brian Richter. Island Press, 2014.
- ***Rivers for Life***: *Managing Water for People and Nature*, by Sandra Postel and Brian Richter. Island Press, 2003.
- ***Alliance for Water Efficiency website***
- ***Sustainable Waters website***
- ***Tapped out: how can cities secure their water future?*** By Brian Richter and 13 other authors, ***Water Policy*** 15 (2013) 335–363.

SIDEBAR: HOW MUCH WATER DOES YOUR RIVER NEED?

This is a question that has been asked by river conservationists and scientists for more than 50 years now, and thankfully, our ability to answer this question has improved greatly over that time. "Environmental flow" is the term used most commonly to describe the quantity, timing, and quality of water flow required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems. One of the great challenges of sustainable water management is to allocate or reserve water to meet environmental flow needs while also providing water supplies for drinking water and other domestic uses, crop production, industrial use, and energy generation.

Developing environmental flow recommendations requires a sound understanding of the relationship between specific flow characteristics (magnitude, frequency, duration, timing, and rate of change) necessary to sustain ecological health, and then articulating these needs in a manner that can be used to influence water management and regulation. Engaging scientists across disciplines (ecologists, hydrologists, social scientists, economists, etc.), water users and providers (e.g., farmers, corporations, utilities), and community members in this process brings everyone along in their understanding of how rivers work, what they need to remain healthy, and the decisions that we must make as a society.

The concept of environmental flows has been evolving rapidly since the mid-1990s. Today's methodologies can be used to characterize environmental flow needs for specific reaches of a river as well for entire watersheds, regions, or states.

For more information about environmental flows, check out:

- ***A Collaborative and Adaptive Process for Developing Environmental Flow Recommendations*** by Richter et al.
- ***The Ecological Limits of Hydrologic Alteration (ELOHA): A New Framework for Developing Regional Environmental Flow Standards*** by Poff et al.
- ***Environmental Flows—Saving Rivers in the Third Millennium*** by Arthington
- ***A Practical Guide to Environmental Flows for Policy and Planning*** by TNC
- ***USGS Report on Monitoring and Assessments related to environmental flows*** by USGS

WATER MARKETS

A New Approach for Protecting Water in Rivers

by Aaron Derwingson, Patrick McCarthy and Taylor Hawes

Water issues in the West often look very different than those faced in the rest of the country. While water quality problems plague much of the East and Midwest, the Western United States struggles with periodic drought and water scarcity. Most of the intermountain West and Southwest receives 5–20 inches of precipitation a year, while the eastern half of the country receives 30–70 inches. Riparian areas in the West make up less than 3% of the landscape, but provide critical habitat for over 75% of wildlife species. These areas have been significantly altered by water allocation laws that encourage diversion of water out of rivers for cities and crops. Typically, agriculture holds the most senior water rights, followed by cities, industry, and then environmental purposes, if even allowed by state law. Our challenge in the West is figuring out how to put enough water back into rivers and streams to make them healthy again. This requires both creativity and partnership with other water interests.

One promising option is to use local and regional water markets to facilitate water sharing among farms, cities, industry, and the environment. For example, a farmer may have senior water rights on a river that dries up below his farm and a city downstream short of water under certain conditions. An environmental organization and the city could pay the farmer for water in dry years, allowing us to meet multiple goals—sustaining long-term agriculture, shoring up municipal water supplies in dry years, and maintaining river flows. Creative water arrangements like this can help address our most pressing water security problems at the local and regional level.

When considering whether water markets might help your river or watershed, start by evaluating whether 1) your state's water allocation laws permit market-based water sharing, 2) strong partnerships with farmers or cities exist; and 3) the community supports this approach. Each state or region presents different opportunities based on these factors.

TYPES OF WATER TRANSACTIONS

Simply defined, environmental water transactions acquire water for the environment from voluntary sellers (Malloch 2005). More precisely, an environmental water transaction is any agreement by which a water right holder, contractor, or user commits to a change in their water use and/or water right leading to legal or de facto protection of additional water in a waterway or water body to serve environmental purposes (Aylward, ed. 2013). The terms of a water market are determined by place (geography, infrastructure, and patterns of use) and by the physical, legal and cultural rules that govern transactions.

There are four primary categories of transactions, with many variations within each category depending on the setting and purpose (adapted from Malloch 2005):

- Acquisition of entire water rights and subsequent transfer to environmental use through existing provisions of state law.
- Acquisition of partial rights, divided in time or quantity. These transactions include long-term leases, annual leases, split-season leases, diversion reduction (forbearance) agreements, dry- or wet-year leases, and other arrangements.
- Source switching agreements, including switching the source of water from surface to ground water, and changing the point of diversion downstream or upstream.
- Compensation agreements that develop "new" water through more intensive or efficient use of existing supplies—also referred to as water management transactions. Such transactions increase conveyance efficiency or on-farm efficiency such that water diversion and

consumption are more closely matched with irrigation system and crop water needs. This category also includes changes in the operation and use of dams, reservoirs, and storage water to meet environmental needs.

WHAT DO THESE TRANSACTIONS LOOK LIKE ON THE GROUND?

Environmental water transactions vary substantially based on circumstances, stakeholders, and objectives. Water transactions are not monolithic but encompass a broad array of sharing arrangements. Here are some very different experiences to help generate new ideas:

- **More water for the Verde River, Arizona:** The Nature Conservancy installed automated headgates and check structures to help farmers manage their water more precisely resulting in more certainty for farmers and more water in Arizona's Verde River. The Conservancy went a step further and offered incentive payments to the ditch company if they could meet a minimum flow target in the river. This approach added 10 cfs of water over a 5 mile reach.

- **Restored flows in the Colorado River Delta:** A broad coalition is working together to restore 154,000 acre-feet (more than 50 billion gallons) of water to the Colorado River Delta in Mexico. Through an international treaty, the U.S. and Mexico each agreed to provide a third of the water with a coalition of private conservation groups providing the remaining third: about 52,000 acre feet of water over five years. Conservation groups have partnered with the Colorado River Delta Water Trust to buy 10,500 acre feet of permanent water rights from willing sellers in Mexico. Coupled with water leased on an annual basis, progress is being made to help restore critical riparian forest for birds and wildlife (***www.raisetheriver.org***).

- **A water bank in Colorado:** Multiple stakeholders in Colorado are working together to mitigate the effects of long-term drought and improve water security for agriculture, cities, and the environment. The primary mechanism The Nature Conservancy has been investigating is a "water bank," a market based program to mitigate water scarcity in the Colorado River Basin. This program would work with willing participants to temporarily reduce their water use in order to ensure interstate compact compliance, meet critical reservoir levels, and restore healthy river flows.

There are numerous unresolved issues and challenges associated with any program that looks to change how water is managed. In the water bank work, collaborators are examining everything from impacts to agricultural operations, challenges working with different irrigation districts, and legal issues with protecting instream flows. A primary issue they will need to solve to make programs like this viable in the long run is determining who can help pay.

WHO PAYS?

Along with addressing the programmatic and operational challenges of a market-based approach to environmental water transactions, determining how to finance these innovations is also crucially important. USDA's Regional Conservation Partnership Program, which was part of the 2014 Farm Bill, provides funding for irrigation improvements—like those in the Verde—that enable environmental water transactions. Second, water funds (public private partnerships where the beneficiaries of water pay for watershed protection and restoration) may prove another source of funding, particularly in scenarios where this strategy is an alternative to costly treatment facilities. Lastly, private investment in water markets and water transactions for environmental returns may provide another option with careful design and appropriate consideration.

For more information about environmental water transactions, check out:

- ***Environmental Water Transactions—A Practitioner's Handbook*** by Bruce Aylward

- ***Agricultural/Urban/Environmental Water Sharing: Innovative Strategies for the Colorado River Basin and the West*** by Colorado State University

- ***Water Transfers in the West*** by Western Governors' Association

- ***Liquid Assets*** by Steve Malloch

PARTNERING WITH AGRICULTURE

The story of the McKinley Ditch

*by Zach Smith**

When standing on the ranch you can't quite see the Little Cimarron River. If it's a good autumn, the snowy peaks of Colorado's San Juan Mountains dominate the backstop the narrow valley to the south. Just standing there among the cowpies, you'd suspect, and be right, that the river is renewed out of those melting snows each spring.

In most springs, runoff from the river fills each water right to the brim and then some. The McKinley Ditch headgate that sits upstream of the ranch controls the delivery of water from the river to irrigate hay and cattle operations in place since 1886, when the water was first appropriated. Water from the Little Cimarron eventually joins the Cimarron River, then the Gunnison River just ahead of its journey through the Black Canyon of the Gunnison National Park, and finally the Colorado River.

As summer turns to fall, the Little Cimarron can often run dry for more than a mile once snow melt is no longer flowing from the mountains and as a result of diversions that lap the very last drops from the stream. Fish upstream and down lose passage or get trapped in pools in the middle.

The challenge is how do we do better? If we want to make sure fish are wet, fields green, and rivers blue, what do we do differently? Colorado is asking broad iterations of this question all over the state. How can we get the most out of every drop of Colorado's water for people and nature?

CHANGING THE STORY

In the late 2000s, the ranch's owner put the ranch up for sale in 35 acre lots and offered the subdivided land and water for purchase, but eventually lost to Montrose Bank. This is where the story gets interesting.

Instead of being broken apart, the entire ranch was purchased intact from the bank by ***Western Rivers Conservancy*** ((WRC) in partnership with the ***Colorado Water Trust*** (the Trust). WRC specializes in conservation purchases of riparian lands in the West. The Trust works to restore and protect flows using voluntary, market-based tools in Colorado. Included with the ranch was more than 18% of the water decreed to the McKinley Ditch. WRC sold those water rights, some very senior, to the Trust.

In Colorado, water rights can be permanently devoted for instream flows through agreement with the ***Colorado Water Conservation Board (CWCB) and Water Court approval—more about that later.*** CWCB is a state agency within the

Department of Natural Resources. Together with CWCB, the Trust and WRC are creating the first permanent agriculture and instream flow sharing agreement in Colorado.

If successful, this agreement will result in irrigation continuing until July or August, when the water use will switch to instream flow use by the CWCB. In the driest years, all of the water may stay in the river for the entire season. In the wettest years, irrigation may continue through September.

To add water to a river long-term in Colorado is a two-step process. The CWCB Board of Directors must first approve the agreement and then the instream flow use of the water right must approved under Colorado's adjudicative ***Water Court*** system, an adversarial process designed to protect other water users from injury resulting from new use. Roadblocks can include opposition in the court case, along with infrastructure challenges, such as measurement and delivery.

Now that the Trust is a stakeholder among water rights holders from water flowing through the Little Cimarron River, it must also fulfill its obligations as a community member. This year, when the ditch blew out, the Trust paid its share of the repair cost.

THE REST OF THE STORY

This project complements two other instream flows—one upstream and downstream of this one. One stretches from just upstream of the McKinley headgate 16 miles up to the Little Cimarron's headwaters—a reach managed by ***Colorado Parks and Wildlife*** as Wild Trout Water. The other protects flows on the Cimarron River from its confluence with the Little Cimarron River to the Gunnison River. These environmental protections were secured in 1984, 101 years after the first pioneer diverted water from the Little Cimarron. Instream flow use wasn't a legally protectable use of water in Colorado until 1973, putting environmental flows more than 100 years behind other water users in priority. Adding instream flow use to existing senior water rights, however, puts senior priority water back into streams.

Of course, the legal side is just one piece of the puzzle. Prior to advancing the agreement to the CBWC in partnership with WLC, the Trust spent two years studying this system and gaining an understanding of how changes in flow effect specific reaches of the river as well as fish and other species. As a result, the Trust developed a good understanding of baseline conditions (where we stand today), what will happen with improved instream flows, and a plan for tracking ecological response (part of the Trust's formal stewardship program). The Trust expects the project to add several cubic feet per second of water to the driest reaches with benefits continuing to accrue as far as ten miles downstream.

Many unanswered questions remain, including how the yearly allocation between instream flows and ranch operations and irrigation will work. Flexibility will be key at each step to achieve success, rather than a rote adherence to what we think might work today.

Last September, at the CWCB Board meeting, one Board member told the Trust, "It takes gumption to irrigate." It takes gumption to change the way we manage water too.

*Submission adapted by permission from the author and the Colorado Foundation for Water Education (originally published in the March 2015 issue of by Your Water Colorado Blog).

ENVIRONMENTAL WATER TRANSACTIONS

Enabling conditions for environmental water transactions
by Season Martin

Throughout modern history, laws have defined the right to divert water from our rivers and lakes (and even from beneath the ground) with little regard to what these systems need to remain healthy. Over-appropriation, the state and federal government's issuance of water rights that exceed available water supply, compounded by lack of enforcement of regulations, has left our rivers last in line to receive water.

As explained by other articles in this newsletter, voluntary, market-based transactions that transfer water rights from historic "out-of-stream" uses to "instream" environmental uses are showing increasing promise. Such transaction may be more appropriate in circumstances where comprehensive legal or regulatory reform to achieve sustainable water management for people and nature is politically impossible. Indeed, environmental water transactions are lauded as an integral management strategy in the face of increasing demand and decreasing supply.

A necessary precursor to pursuing environmental water transactions is knowing precisely what aspects of instream flow you are most concerned about replacing, restoring, or protecting. You should be prepared to articulate the volume of water you need over a certain duration of time (e.g., how many cubic feet of water per second and for how long). A detailed environmental flow assessment can identify river reaches targeted for flow restoration or protection. Based on the key stressors impacting instream flows, different types of environmental water transactions or other tools can then be used to achieve the flow targets.

The following additional considerations can help further determine whether environmental water transactions are an appropriate tool for you and the unique circumstances of your river:

- **LAWS AND POLICIES THAT RECOGNIZE INSTREAM FLOWS:** Water law, particularly the Prior Appropriation Doctrine common in the West, was designed to allocate water to people not rivers. Some states have taken steps to recognize instream flows as beneficial use and developed administrative processes to support transferring water rights from out-of-stream use to water in rivers. But in other states, water left in the river is not considered a beneficial use, and even if it is legally possible to leave water in the river, cumbersome administrative processes inhibit buying water rights and designating them as instream rights.

- **FEDERAL PROGRAMS AND INCENTIVES:** Environmental water markets in the Pacific Northwest were in large part driven by Endangered Species litigation, which prompted Bonneville Power Administration to develop restoration initiatives to support instream flow transactions. The involvement of the federal government clarified the demand for instream flows and therefore drove the development of the market. In other parts of the US, there isn't a federal agency or program driving the instream flow transactions.

- **CULTURAL ACCEPTANCE OF WATER FOR RIVERS:** Since water has historically been used for agriculture, many individuals are threated by water rights purchases. They are worried that water will become less available, and that their way of life will collapse if water is traded to either urban or environmental users. Additionally, many water users are not in compliance with the terms of their water right, so it is risky to initiate a transaction that could expose non-compliance issues. Unlike land conservation easements, which can be adopted without significantly changing land use, water rights require individuals to give up water, which can impact daily life and operations. Therefore, many rural communities are afraid of water grabs and water transactions.

- **KNOWLEDGE OF THE TRANSACTION PROCESS:** Many water right holders are hesitant to participate in instream flow transactions because they are unfamiliar with the process. There is a lack of awareness about the importance of instream flows and the potential process by which water transactions could benefit river ecosystems. Additionally, water rights holders don't understand the potential benefits including financial compensation and avoiding the threat of regulatory action. Testing the transaction process and mechanisms provides opportunities to educate landowners on the transaction potential and also allows for documentation of institutional ineffectiveness. Sharing lessons learned from transactions both within and between states could increase the number of instream flow transactions.

- **PRESENCE OF MAJOR ENDANGERED SPECIES OR CULTURAL ISSUE:** In the Pacific Northwest salmon restoration efforts drive environmental water transactions. The presence of an iconic and endangered species that has cultural value for Native Americans creates a regulatory framework and political climate that supports transactions.

If you're interested in learning more about environmental water transactions, Bruce Aylward of Ecosystem Economics published ***"Environmental Water Transactions: A Practitioner's Handbook"*** in 2013, which is an extensive resource. For examples of successful projects, see this newsletter's stories about the McKinley Ditch in Colorado and the article on water markets, or check out examples from the Pacific Northwest available through ***The Freshwater Trust***.

PROTECTING OUR NATION'S WATERSHEDS

A corporate perspective

by Jonathan Radtke

What is the role of a corporation in helping restore or maintain water in rivers or supporting thriving communities? Of course, the answer depends on the corporation, its mission, sense of corporate responsibility, and relationship to water. At Coca-Cola, corporate understanding and commitment has evolved considerably over the past 20 years. Today, Coca-Cola has a goal of becoming water neutral by 2020 and a comprehensive water stewardship program.

Coca-Cola's water stewardship program focuses on three primary areas: reducing the amount of water used to manufacture our products; recycling water where possible and ensuring process water is returned to the environment at a level suitable for aquatic habitat; and replenishing 100 percent of the water used in beverages through locally relevant community water projects.

IMPROVING OPERATIONS

Within the four walls of each bottling plant, Coca-Cola strives to be as efficient as possible in its water use. Since 2005, Coca–Cola has saved more than seven billion gallons of water in the United States through innovative facility improvements such as the installation of air rinsers for our bottles and cans, water reclaim loops, switching to dry lubricant on conveyor lines, and robust leak detection programs. Not only does this reduce costs, but it also helps reduce stress on local water resources.

REPLENISHING WATER

While Coca-Cola may know a lot about making beverages, it knows less about protecting and restoring watersheds, which constitute the majority of it's North American replenish projects. Therefore, Coca-Cola relies on partners from the NGO community and government agencies to help identify, design and implement these projects. The examples below demonstrate the diversity of these efforts:

- **Working with USFS and local groups to protect headwaters:** Coca-Cola has partnered with US Forest Service and local groups on nine projects in California, New Mexico, Washington, Michigan, Illinois, and Colorado to support healthy headwater streams, the source of drinking water to more than 60 million Americans. The projects include everything from invasive species removal to stream and meadow restoration to improved road crossing and fish passages.

- **Restoring water to the Colorado River through Change the Course.** In partnership with the National Geographic Society, Bonneville Environmental Foundation and Participant Media, Change the Course seeks to inspire thousands of people across North America to make a pledge to change personal diet, energy use and consumption behaviors to help lessen their individual water usage. Each pledge is matched with 1,000 gallons restored to the Colorado River by corporations, including Coca-Cola, who fund replenishment projects within the basin. These projects typically involve irrigation diversion improvements and/or leasing of water rights for environmental flows.

- **Engaging citizens toward greater water efficiency.** Many communities across the

nation want to learn how they can easily conserve and reuse water in their own homes and backyards. In partnership with local bottlers, we have donated more than 70,000 ingredient drums for re-use as rain barrels since 2008 to 90 local community organizations. River Network has been the major facilitating partner in this program by connecting local watershed groups to our bottlers and organizing community rain barrel workshops. By collecting rainwater that normally flows off a property, rain barrels save money on water bills, conserve water during dry periods and prevent polluted runoff into local watersheds.

- **Supporting restoration efforts on the Rio Grande/Rio Bravo.** The Rio Grande/Rio Bravo provides fresh water to more than 13 million people, including thousands of ranchers and farmers, as well as citizens of rapidly growing and thirsty cities, such as New Mexico's Albuquerque and Las Cruces and Texas' El Paso and Brownsville. Coca-Cola has partnered with the World Wildlife Fund (WWF) on a range of projects to improve instream flow and aquatic habitat. One of the areas of focus has been the removal of invasive species of trees along a 50 mile stretch of the river within the Big Bend National Park, creating an unnatural channel. Focus is now shifting to the middle and upper parts of the Rio Grande basin.

- **Improving watershed protection near bottling facilities:** Source water vulnerability assessments (SVA) conducted at bottling facilities, and resulting source water protection plans (SWPP), have informed direct investment in watersheds across the US (100+ facilities). For example, the SVA for one bottling plant identified rising nutrient concentrations in the local watershed, which provided both source water for Coca-Cola's manufacturing plant and an important eco-tourism attraction and recreational amenity for the local community. Through the SVA and SWPP processes, Coca-Cola was able to raise concern over water quality, rally the local government and community, and encourage area farmers to implement farming practices that reduced the nutrient load on the watershed.

Coca-Cola has replenished more than 60 percent of its total beverage volume in North America through its replenishment projects. Coca-Cola relies on a team of external consultants and NGOs to calculate the volume of water replenished and uses widely accepted tools and methodologies. These projects also provide opportunities to engage company associates in local community projects and raise the awareness of water issues. A joint, peer reviewed paper explaining this context and application can be found ***here*** or take a look at *Quantifying Water Replenish Benefits in Community Partnership Projects* posted ***here.***

Although Coca-Cola is energized by success to date, more work remains to achieve the goal of becoming water neutral by 2020. Not only must the outcomes of community water projects be sustained and progress toward our goal documented through monitoring and evaluation, but more projects will be necessary to reach this goal and beyond. *For more information, please visit the* ***sustainability*** *section of Coca-Cola's website.*

LESSONS FOR YOU

When identifying opportunities for keeping or restoring water in rivers, look for companies who have a vested interest in your community because of their operations or consumer base as well as companies who rely on waters that flow through your system for their products or services. Aligning interests is a key aspect of making a bigger difference. Coca-Cola is just one corporation among many that are engaged in shaping a more sustainable water future.

river NETWORK
connecting people · saving rivers

MISSION, VISION, AND FOCUS

River Network empowers and unites people and communities to protect and restore rivers and other waters that sustain all life. We envision a future of clean and ample water for people and nature, where local caretakers are well-equipped, effective and courageous champions for our rivers. Our three strategies for focused investment are strong champions, clean water, and ample water.

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