

The Water Report

Water Rights, Water Quality & Water Solutions in the West

In This Issue

Framework for Multi-Benefit Water Transactions _____ 1

Implementing Stream Restoration Under New Legislation _____ 9

Evaluating Laws and Policies for Equitable, Climate-Resilient Water and Sanitation _____ 15

Water Briefs _____ 20

Calendar _____ 23

Upcoming Stories

Using Predictive Modelling for Lead Service Line Identification

Collating and Utilizing Water Data for Better Decision-Making

Using Excess Algae in Water Treatment for Energy Production

& More!

CHARTING A NEW FRAMEWORK FOR WATER TRANSACTIONS

BESSEMER FARMLAND CONSERVATION PROJECT CASE STUDY

by Rebecca Jewett, President and CEO (Palmer Land Conservancy)

In today's water-scarce American West, traditional "willing buyer, willing seller" water transactions lead to too many unintended winners and losers. What's missing is a framework that puts on equal footing benefits and impacts to agriculture, cities, and the environment. These three pillars can create a path towards real win-win-win solutions. Palmer Land Conservancy's Bessemer Farmland Conservation Project charts an instructive course for communities throughout the West, providing lessons in resilience, conservation, and growth.

Introduction

Those who live in the western United States know that land, water, and life are intrinsically connected. As an organization with its roots in land preservation, situated in the largest river basin in Colorado—the Arkansas—Palmer Land Conservancy has been working in the water space for decades. Much of the land Palmer holds under conservation easements features water, or connectivity to water, as a core component of its conservation value. Palmer is committed to monitoring, enforcing, and stewarding those resources in perpetual partnerships with the landowners we work alongside. In the past decade, the organization has gone beyond traditional conservation easement work to develop methods for allocating and managing water most efficiently to support agricultural and municipal demands within a greater community-wide context.

The Intermountain West does not have enough water, and this fact is not news. Due to extensive national coverage, most Americans have some familiarity with the over-allocation of Colorado River water rights. The result is a familiar math problem: too little water and too great demand. While the Colorado River crisis is important because of its impact on 40 million people across seven states, water scarcity is a problem that affects every river basin in Colorado. In fact, the over-allocation of the Colorado River Basin directly impacts other river basins on Colorado's Front Range that rely on transmountain diversions.

Justice Gregory Hobbs, the esteemed former Colorado Supreme Court Justice, is posthumously quoted in Colorado's 2023 Water Plan: "The 21st century is the era of limits made applicable to water decision making. Due to national Western water scarcity, we are no longer developing a resource. Instead, we are learning how to share a developed resource." Colorado's population is forecasted to increase by as much as fifty percent by 2050; combined with the increasing impacts of a shifting climate, the supply-and-demand math problem will only become harder to reconcile.

Ninety percent of Colorado's population lives on the eastern side of the state, while eighty percent of the water falls on the western side. Given this mismatch, much of the water consumed on the Front Range is moved from the Colorado River Basin on Colorado's western slope via a complex system of transmountain diversions totaling 500,000 acre-feet per year. According to [Colorado's Water Plan](#), ninety percent of water use in the

The Water Report
 (ISSN 1946-116X)
 is published monthly by
 Sky Island Insights LLC

Editor In Chief
 Shaina Shay

Phone
 602/ 456-2127

Email
 Info@TheWaterReport.com

Website
 www.TheWaterReport.com

Subscription Rates
 \$299 per year
 Multiple & Electronic
 Subscription Rates
 Available

Postmaster
 Please send address
 corrections to:
 The Water Report
 3615 W. Hills of Gold Dr.
 Tucson, AZ 85745

Copyright© 2024
 Sky Island Insights LLC

Land & Water

Agricultural History

state is attributed to agriculture. One can very quickly see how, in the face of population growth, water reallocation efforts will target agriculture. The Colorado Water Plan paints a bleak picture when it estimates that municipalities risk water shortages of up to 740,000 acre-feet statewide by 2050 during drought conditions. The pressure on agriculture becomes worse when you consider that across Colorado, there is already an average unmet agricultural demand of twenty percent.

Pueblo, Colorado

Water becomes more tangible at the local level. Pueblo, Colorado, located 115 miles south of Denver along the Interstate 25 corridor, is a special place. Pueblo represents a fusion of cultures with a deep-rooted tradition in agriculture. The railroad was the area’s initial economic driver after General William Jackson Palmer connected the city to the rest of Colorado’s Front Range in 1872. General Palmer opened the steel mill in 1882—later Colorado Fuel and Iron—which capitalized on the proximity of coal, limestone, and the railroad for coal operations and steel works.

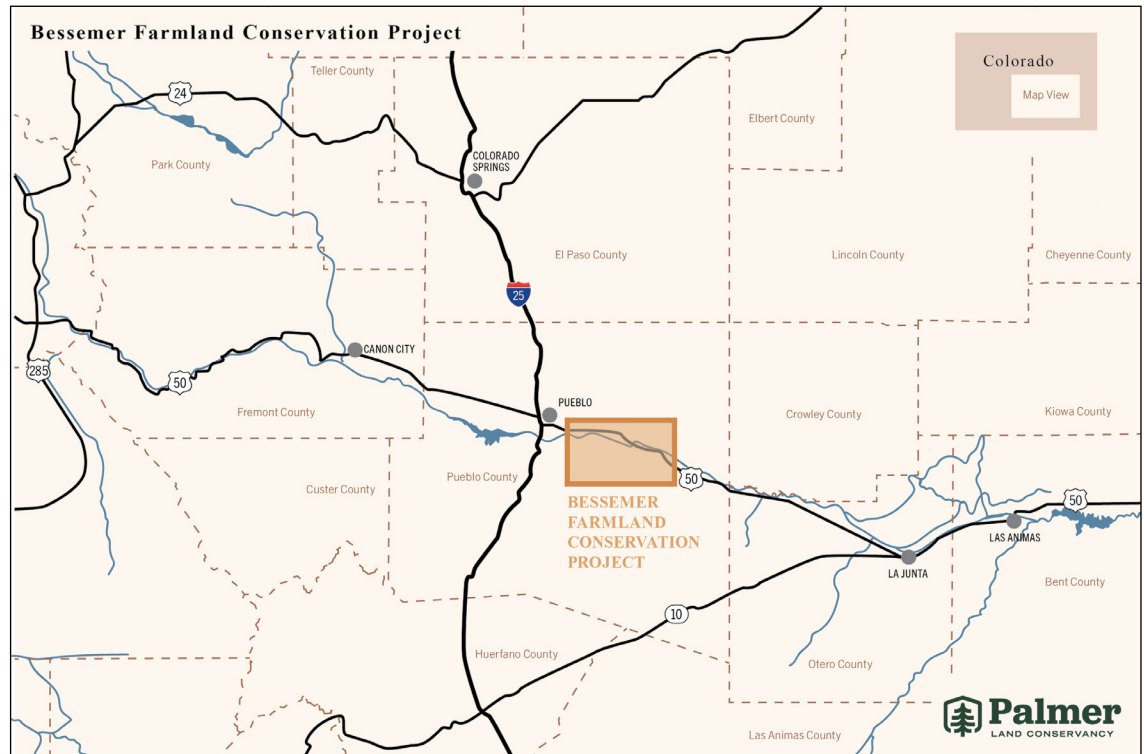


Figure 1: Geographical Context of the Bessemer Farmland Conservation Project

Pueblo became one of Colorado’s most diverse cities, as immigrants and domestic migrants came to work at the mill. It is estimated by some records that by 1922, as many as one in five Pueblo citizens were of Italian or Sicilian descent in a melting pot that also included Croats, Greeks, Irish, Mexicans, Serbs, and Slovenians. Pueblo’s Steelworks Center of the West reports that more than 40 different languages were spoken at the mill in the early 1900s.

As immigrants moved west in search of labor work, these families also brought agricultural practices as a means of maintaining cultural heritage and providing sustenance. With eastern Pueblo County’s prime, productive soil located so close to the region’s biggest urban areas, immigrants would often purchase and cultivate small plots of nearby farmland. Originally cultivated for family and neighborhood use, these farms expanded, resulting in today’s multigenerational farming operations that supply food across the state of Colorado and beyond.

The unique combination of topography, soil quality, reliable water supply, and diurnal temperature swings from hot days to cool nights creates an environment ideal for vegetable production. The region’s rich agricultural industry includes production of the Pueblo Chile, the carefully cultivated pepper that originated in Mexico and evolved into its meaty, spicy, modern-day form. The intoxicating smell of roasting chiles is a marker of fall in southern Colorado.

The most common and popular strain of Pueblo Chile, Mosco, was developed from Mirasol stock by Dr. Michael Bartolo—retired senior research scientist at Colorado State University’s Arkansas Valley Research Center in Rocky Ford, Colorado, and former board trustee of Palmer Land Conservancy.

Land & Water**Mosco Chile**

Dr. Bartolo developed the Mosco chile from seed stock given to him by his late uncle, Harry Mosco—for whom the chile is named—who was a farmer in eastern Pueblo County. The Mosco chile is a relatively recent variety; it was released to growers in 2005.

Thick fruit walls make the Mosco ideal for roasting, the traditional method for preparing Pueblo chiles. The variety's meaty exterior makes it less prone to splitting during roasting, ensuring the juices don't seep out and evaporate. As a result, Mosco chiles maintain their rich flavor much better than other types of chiles. Because the Mosco chile was grown and developed in Colorado's Arkansas Valley, it is uniquely adapted to the climate. Attempts to grow the chile in other regions have not been successful.

Each year, the Pueblo Chile and Frijoles Festival attracts over 150,000 people to celebrate the role that local food production plays in the region, shining a spotlight on the beloved chile that is (ahem) superior to a certain chile hailing from a state south of Colorado. Staples such as corn, beans, pumpkins, squash, beets, watermelons, cantaloupes, and also hay are grown in the county, as well.

Pueblo's rich history and strong agricultural legacy have been passed through generations but are currently threatened by the pressures exerted in a water-scarce and rapidly growing environment. Without continued access to water, Pueblo is at risk of losing the heart of its economy and culture. This unique city became the cornerstone site of Palmer's innovative water efforts beginning in 2015.

The Arkansas River Basin

The Arkansas River begins in the high mountains above Leadville, Colorado, where elevations exceed 14,000 feet. On its journey toward the Mississippi River, it moves from mountains to foothills to grassland, eventually leaving Colorado and entering Kansas at an elevation of 3,300 feet. The Arkansas River Basin is Colorado's largest basin geographically and a historical focal point for municipal acquisitions of water that leave dried-up farmland in their wake—transactions that locals and experts alike refer to as “buy-and-dry.”

Cautionary Tale

The story of Crowley County, located southeast of Colorado Springs, is often mentioned as a cautionary tale of the devastating impacts inflicted by the selling of water rights to thirsty cities. Once a hub of agricultural production, today, Crowley is largely barren and empty. In the 1970s and 1980s, roughly ninety percent of the water rights were sold to growing cities on the Front Range. The county now contains nearly as many inmates as residents since the prison industry moved in during the 1990s. The loss of irrigated agriculture left nothing but devastation behind—environmental devastation from poor land restoration and economic devastation from the loss of its primary industry.

Water availability in Crowley County was struck by the dual impacts of a growing population and decreased supply due to hydrologic variability. Other counties in the Arkansas River Basin could face a similar fate. Already considered a water-scarce basin, the area is further impacted by declining groundwater levels, an increased demand for augmentation water, and a reliance on supplies imported from the Colorado River. Furthermore, the interstate Arkansas River Compact complicates water rights administration. These factors compound the need for creative solutions that don't leave rural communities, and especially farmers, bearing the brunt of Colorado's water challenges.

Why Preserve Agriculture?

There are a lot of opinions about agriculture. It is easy to vilify or lambast the industry for its sizable water consumption, its ecological impacts, and its detrimental effects on water quality. But it is imperative to remember two things: agriculture is not a monolith, and agriculture feeds us. According to the USDA's 2023 Colorado Agricultural Statistics report, over eighty percent of farms in Colorado are run by individuals, often multigenerational families with deep-rooted connections to the land. In the lower Arkansas Valley in southeastern Colorado, home to 220,000 acres of farmland, many farms continue to be owned and managed by small family operations where the margins are slim.

Food & Culture

The farms that Palmer works to preserve are operations with rich histories of working with the natural landscape to produce a variety of crops. These are crops that feed the community, stimulate the local economy, and are strongly tied to local culture. As Colorado's state preservation officer and executive director of History Colorado, Dawn DiPrince, eloquently explains about agriculture, “the word culture is just sitting there, big and proud, in the middle of the word, and so you really can't separate the practices of agriculture from our culture itself.”

Agriculture in Colorado is a \$47 billion industry, according to the Colorado Legislative Council. Nationally, Colorado ranks in the top ten producers for several commodities, including producing 64 percent of all proso millet sold in the country. Two billion dollars of agricultural products are exported from Colorado each year, and almost every county in the state has some form of agricultural production.

Land & Water

Conservation
Toolbox

Water Transport

Portfolio

Palmer Land Conservancy prioritizes agriculture, alongside other core conservation goals that include wildlife and habitat protection, public open space and outdoor recreation, and large landscape-scale preservation. In valuing agriculture and the conservation of its associated natural resources, land, and water, Palmer’s ultimate goal is to keep communities intact, local food production vibrant, and the environment resilient against the impacts of a changing climate. The unique and complex nature of western water laws necessitates expanding the traditional conservation toolbox and focusing on a solutions-oriented perspective rooted in engaging growing cities in the solution. This approach exemplifies Justice Hobbs’s description of water in the 21st century: “...we are learning to share a developed resource.”

Much of the water scarcity crisis centers on supplying growing cities with needed water and *mitigating* the subsequent impacts on agriculture. But mitigation often leaves farmers and, ultimately, communities, at a significant loss. If challenges are approached from the perspective of identifying solutions that can benefit agriculture, growing cities, and a resilient environment, thereby creating resilient communities, then multi-pronged positive outcomes can become a reality.

The Bessemer Project

After the Arkansas River leaves the mountainous terrain of its headwaters, it collects in Pueblo Reservoir at Lake Pueblo State Park just west of the City of Pueblo. From there, it begins a journey through southeastern Colorado’s irrigated agricultural heartland. An intricate system of ditches and canals diverts water from the Arkansas River to fields that bring Coloradans diverse produce such as asparagus, green onions, cilantro, squash, and iconic crops like the Pueblo chile and Rocky Ford melons. The region also grows grains and forage crops predominantly used for cattle production, a sector that accounts for over half of Colorado’s agricultural output.

The Bessemer Ditch delivers irrigation water from its diversion point at Pueblo Reservoir across the farm communities of Saint Charles Mesa, Vineland, and Avondale in eastern Pueblo County. Comprised of surface supplies natively from the Arkansas River, the ditch provides some of the most senior and reliable water anywhere in Colorado’s Arkansas River basin, while irrigating some of the state’s best agricultural lands.

In 2009, the City of Pueblo’s municipal water provider, Pueblo Board of Water Works (Pueblo Water), acquired 5,540 Bessemer Irrigating Ditch Company shares, representing approximately twenty-eight percent of the shares on the ditch. Sixty percent of Pueblo’s water portfolio relies on supplies from the Colorado River Basin. In the face of threats to these water supplies due to the impacts of climate change and overallocation discussed previously, purchasing senior, native water serves as a form of insurance against vulnerability for Pueblo’s municipal water.

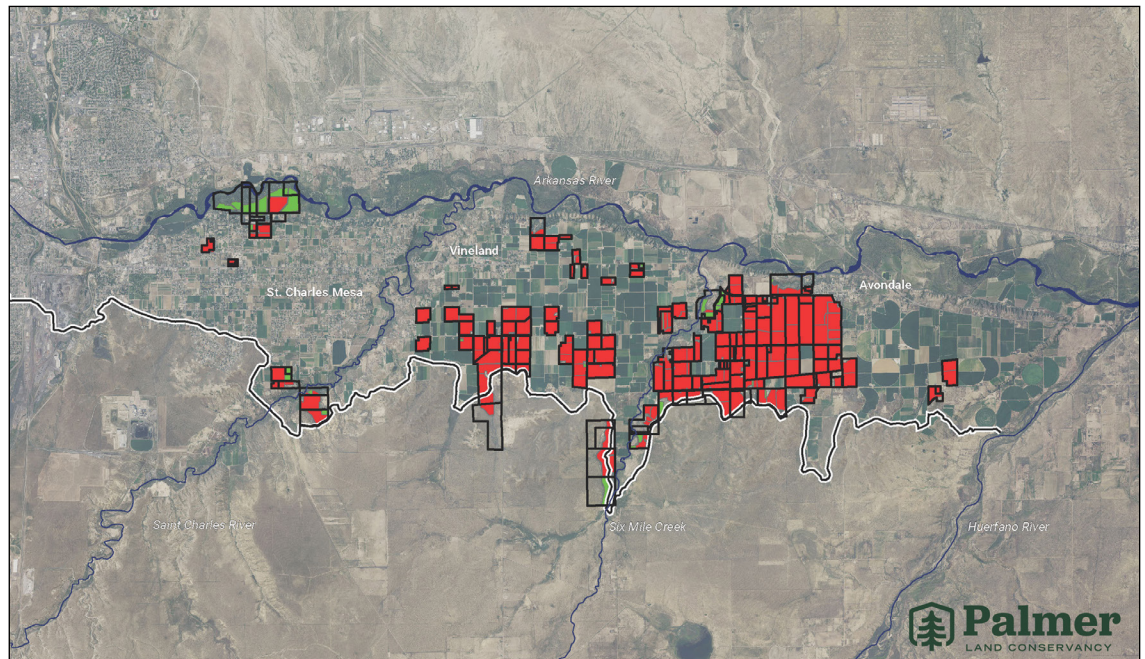


Figure 2: The outlined parcels show where Pueblo Water purchased water shares in 2009, totaling approximately 28% of the water shares of the Bessemer Ditch. The farms are currently operating under water lease agreements with Pueblo Water.

Land & Water

Two key questions set the Bessemer Farmland Conservation Project in motion in 2015: 1) how can this community mitigate the impacts of an impending dry-up of farmland, and 2) is there a path that can lead to a positive community outcome that includes a resilient agricultural base *and* municipal water security? Through a series of community and regional stakeholder convenings, the Bessemer Project was born. Project partner Innovative Conservation Solutions (ICS) completed the 2017 plan, titled [Navigating the Wake of Municipal Water Sales: Alternatives to Improve Agricultural and Ecological Outcomes on the Bessemer Ditch](#), which outlined an alternative path for dry-up predicated on legal mechanisms enabling strategic dry-up in order to achieve multiple community outcomes.

Critical Production Areas

The ICS report identified that when Pueblo Water activated its water transfers, more than one-third of the potential dry-up would occur on farms identified in Pueblo County as Critical Production Areas (CPAs). Though Pueblo Water's shares are currently being leased back to farmers, these agreements, set to expire in 2039, include the possibility of lease termination with one year's notice. This situation puts these highly productive farms at risk of being lost forever, as demands on water supplies will only increase.

SUBSTITUTION OF DRY-UP**Strategic Fallowing**

Central to the Bessemer Project is a legal concept that turned into reality during Pueblo Water's process to change its water rights from agricultural to municipal use. From 2016 to 2019, Palmer and fellow project proponents worked with Pueblo Water to establish a provision in its decree that would enable a "substitution of dry-up" (District Court, Water Division 2, Colorado Case Number 17CW3050, 2019, Section 6.2.4). The substitution of dry-up provision establishes an expedient foundation for strategic, alternative fallowing of farm ground.

Benefits

Per Colorado water law, water transfers from agricultural to municipal use must include the permanent dry-up of the previously irrigated farmland. This ensures no injury to other water users in the system. But this approach is inherently counter to taking a landscape-scale or ditch-wide perspective of a farming community. Taking a strategic approach allows for better outcomes that support farmers and agricultural production. Strategic fallowing that maintains irrigation of target farms can achieve goals such as: 1) permanently retaining high-quality production ground in agriculture; 2) helping farmers increase their production potential while expanding or consolidating holdings; 3) reducing reclamation costs for fallowed land; 4) achieving better socioeconomic and land use outcomes; and 5) measurably improving water quality and restoring ecological systems.

The substitution of dry-up provision identifies a retained jurisdiction process. From the outset, a goal of the provision was to outline a procedure that ensures no injury or excessive burden to other water rights holders. The substitution of dry-up provision enables remaining farmers and conservation groups to purchase identified CPAs that would otherwise be dried and restore water to those lands by substituting less productive areas for dry-up. These Dry-Up Candidate Areas (DCAs) are marginal farmlands with lower production yields, where non-point source impairments can be mitigated and wetlands, riparian corridors, and native ecosystems can be restored. The approach is voluntary and market-based.

WATER-SHARING FRAMEWORK

Ultimately, the substitution of dry-up provision enables an efficient water allocation framework. Following five years of formative planning—and extensive work with farmers, Pueblo Water, and Colorado's Division 2 Water Court—an innovative market mechanism was established that helps retain a resilient agricultural base by making better use of limited water resources.

Goals

This water-sharing framework aims to achieve the following:

1. Protect farmlands of national importance based on USDA criteria: Under the Farm and Protection Policy Act (7 U.S.C. 4201 et seq, implementing regulations 7 CFR Part 658, of the Agriculture and Food Act of 1981, as amended), the USDA identifies priority agricultural land. Palmer incorporated the USDA's criteria in its mapping and analysis of farmland productivity on lands irrigated by the Bessemer Ditch.
2. Support more strategic application of limited water supplies: The framework recognizes that water resources are limited and that municipal water security must be achieved alongside agricultural preservation, and vice versa. A strategic approach taking into account agricultural, environmental, and municipal needs and impacts allows for the most efficient allocation of this limited resource.
3. Restore native ecosystems: The water-sharing framework includes restoring the native ecology on DCA candidate parcels where positive environmental outcomes can be leveraged. Improper or non-strategic restoration efforts can cause poor environmental outcomes such as overgrowth of weeds and loss of critical topsoil. Returning DCAs to a natural state provides benefits to the

Land & Water

greater community by improving scenic views and providing ecosystem processes such as pollutant filtration.

Land Value & Use

4. Improve water quality in river systems: Many DCAs are located along the four riparian corridors in the Bessemer service area. The strategic revegetation of these riparian-adjacent farms expands and enhances existing natural habitat and ecosystems. Restoring wetlands on these DCA farms results in water quality benefits by reducing nutrient loading from farm runoff.
5. Increase farm real-estate values: Substituting water rights from DCAs to CPAs has the potential to increase the property value of a CPA by bringing permanent water back to highly productive farms. In some cases, this increase in value can exceed the diminished value of the DCA that loses water rights.
6. Increase per-acre production yields: Identifying and attaching water rights to CPAs enables the most productive agricultural land to operate to its highest potential.
7. Support new practices in regenerative agriculture and soil carbon capture: The process of working with farmers to bring owned water back to the most productive farmland lends itself to further practices that incorporate sustainable farming methods that can achieve positive environmental outcomes.
8. Create resilience in farm communities and agricultural-economic systems: The water-sharing framework sets farms up to operate perpetually without the risk of dry-up, providing much needed stability to the local economy and surrounding community.

Voluntary Transactions

These voluntary transactions will enable the most productive farmland to remain in operation by ensuring that water rights are attached to these properties, while returning less productive farmland to a natural state. The project won't restore lost acreage, but it can ensure the retention of a resilient agricultural base, with the best lands permanently preserved in irrigated agriculture.

The legal and regulatory framework that enables a conservation market to exist—created by the substitution of dry-up provision in Pueblo Water's decree—is geographically specific, applying only to lands historically irrigated by the Bessemer Ditch. However, three aspects of the Bessemer Project model hold promise for replicability in water-short regions across the West, whether these regions are impacted by rising municipal demand (as in Pueblo County's case) or are affected by drought contingency planning and demand management efforts (as is the case across the Colorado River Basin).

Key Takeaways

1. The Bessemer Project model integrates a scientific framework with a market-driven approach to create alternatives to buy-and-dry scenarios which usually support urban growth at the expense of rural communities. Importantly, the model creates new business and land access opportunities for farmers who wish to remain in farming.
2. Considering the incredible planetary need to improve soil health, increase soil carbon capture, and improve water quality, the model holds inherent potential to create more impactful and permanent conservation outcomes when compared to other alternative transfer mechanisms (e.g., lease-fallow)—provided the model results in a critical mass of productive lands being permanently retained in agriculture (a key goal of alternative transfer mechanisms).
3. Finally, the Bessemer Project establishes new legal precedents for this work. The concept of a substitution of dry-up is not unique. The project's legal work identified other decrees in Colorado, in Water Divisions 1 and 2, that include substitution of dry-up provisions. However, what *is* unique in Pueblo Water's change decree are the detailed procedures, included in the provision, for substitution approval by water court. Additionally, given the extensive analysis of economic, agricultural, and environmental benefits of substitution conducted through the course of the project, there are clearer standards to which a dry-up substitution can be applied.

Vision

The Bessemer Farmland Conservation Project seeks to maintain a critical mass of productive agricultural lands while still providing for Pueblo's municipal water needs. This is a simple but bold goal given Colorado's water law framework. The ultimate vision is that of Pueblo County being home to a resilient and prosperous agricultural community with opportunities for specialization and economic growth, as well as a water-secure metropolis that is attractive for business and residents. Today, Palmer Land Conservancy is advancing the first dry-up substitution projects and identifying strategies to scale the approach.

Land & Water

Lessons Learned in Developing a New Market-Based Framework

Big Picture

Palmer Land Conservancy is solution-oriented and focused on developing water-sharing programs and innovative approaches to create positive outcomes under difficult circumstances. Water work includes many tangential threads, and thus, it requires a diverse toolbox of strategies. As communities tackle water challenges, they must consider urban water conservation, water quality, watershed health, wildfire mitigation, green infrastructure, and other related issues. Were they not to take the bigger picture into account, they would lose sight of the connectivity that exists between human development, secure water supplies, and the health of the larger ecosystem.

Multi-Faceted Approach

Palmer's work builds on the established work of farmland trusts, which have long recognized the importance of a protected land base that preserves farms and the economic viability of farming communities. Established in 1977, it is one of the oldest land conservancies in Colorado, and traditional land conservation tools such as conservation easements and fee acquisition continue to serve critical roles in ensuring long-term preservation. However, in the face of increasing challenges and urgency, the toolkit and problem-solving framework must also expand.

We discovered that a multifaceted approach is needed to solve water's multifaceted challenges. As a non-governmental organization with a place-based approach and a sophisticated toolbox, we aim to bring a new lens to traditional, two-dimensional water transactions. Effective solutions that deliver multiple positive outcomes require a framework that takes the seller-buyer transaction and turns it into an outcomes-focused framework that puts agriculture, cities, and the environment on an even playing field.

This three-dimensional framework requires a trusted and credible partner that can bring the process, tools, expertise, and values to bear on a project to navigate it towards positive outcomes. The following lessons have been learned over nearly fifty years of project experience in land conservation and a decade of hard-won experience on the Bessemer Project.

Project Principles

We have established a new approach to land and water conservation which guides our strategy, actions, and, ultimately, outcomes. This approach is rooted in the following guideposts:

1. Local—The most impactful solutions start at the local, community level and are driven by community-expressed needs and desires.
2. Market-Driven—Market-driven solutions to solve conservation and community challenges can align incentives between many stakeholders.
3. Nonpartisan—A love of land and place is uniting. Conservation work brings people together through a nonpartisan and mutual love of the land.
4. Permanence—Permanent conservation solutions benefit current and future generations.
5. Voluntary—We support private property, landowner rights, and voluntary conservation solutions for landowners.

Tools to Use

The following tools have been utilized to achieve results throughout the years:

On-the-Ground Conservation: Traditional real estate tools including conservation easements, fee ownership, and, to a lesser extent, covenants and deed restrictions, have an important place in securing land and water for restricted purposes for the long term. The gold standard and most legally binding tool is perpetual conservation easements. Colorado has a strong conservation easement tax credit program that incentivizes the use of this tool. Conservation easements have limitations including their palatability for some landowners, as well as challenges with providing adequate valuations proportional to the significant restrictions owners of irrigated lands accept.

Law and Policy: Utilizing legal structures to allow key conservation outcomes, for example, the substitution of dry-up provision described above, may be a necessary component of projects. Additionally, state and local policy can have a significant impact on project pathways and, ultimately, outcomes. For example, Colorado's 1041 permit process authorizes counties to regulate activities of state interest through a local permitting process, including the development or expansion of domestic water supply systems and resulting impacts to agricultural land. The 1041 process can be an important tool in better managing the local impacts of water transfers.

Quantitative Data: The Bessemer Project's framework relies on quantitative data in the form of in-depth mapping, economic impact analyses, and modeling around various dry-up scenarios to provide better analytical understanding of the on-the-ground impacts from agricultural preservation versus agricultural loss.

Storytelling and Community Engagement: Palmer Land Conservancy has a saying: "People make conservation happen." The more communities and individuals understand the importance of water decisions, the more people can be rallied to ensure positive outcomes at the community level are achieved. Palmer undertook a bold goal in the last two years, working with a nationally recognized

Land & Water**Win-Win-Win
Solutions**

environmental and adventure filmmaker, Ben Knight, to create a documentary, *Mirasol, Looking at the Sun*. While the goal of the film was to shed light on the challenges facing farmers under growth and development pressure, it is more precisely a human story about community, heritage, food, culture, and love of place. In the words of Pulitzer Prize-winning novelist Richard Powers, “The best arguments in the world won’t change a person’s mind. The only thing that can do that is a good story.”

Conclusion

Securing water for municipal providers, agriculture, and the environment is the greatest natural resource issue of modern times in the West. Thoughtful, innovative solutions that achieve win-win-win solutions are possible but not guaranteed, or even intuitive, given existing frameworks. Water appropriations in Colorado are largely decoupled from economic considerations and impact, community development, environmental needs, and overall land use planning. The Bessemer farming communities provide an excellent insight into this disassociation. The land is zoned as agricultural. Water is needed for agriculture. A critical mass of agricultural land is needed to sustain the industry and support related businesses. Furthermore, Pueblo’s very identity and branding as the home of the Pueblo chile is rooted in its agricultural base. And yet these facts have no bearing on how water is removed from agricultural land in the county. A framework that benefits growing cities, allows agriculture to thrive, and supports resilient and healthy environments is the water framework we need as we enter the mid-21st century.

About Palmer Land Conservancy

Palmer Land Conservancy is a 501(c)(3) nonprofit corporation with a mission to protect land and water for the wellbeing of nature and people. Originally formed nearly fifty years ago to establish and protect public open spaces and parks in Colorado Springs, Colorado, as the city faced rapid land development and fragmentation, the organization today is a Colorado conservation leader and oversees a wide range of land and water conservation initiatives that reflect the diverse values of the communities it serves. Since its incorporation in 1977, the organization has conserved more than 220 square miles, including 20 public parks and open spaces, critical farm and ranchland, wildlife habitat, and scenic corridors. Palmer has four core conservation priorities: land for people, land for food, land for nature, and water for life. Its successful conservation model focuses on working within communities, providing strategic project management, real estate and transaction expertise, coalition building, and facilitation skills to achieve highly impactful on-the-ground conservation results that improve the public health, quality of life, and economies of the communities it serves. Learn more at palmerland.org.

Special thanks to Scott Campbell of Innovative Conservation Solutions for his partnership on the Bessemer Farmland Conservation Project.

For Additional Information

Rebecca Jewett, 719/ 941-9504, rjewett@palmerland.org

Rebecca Jewett is the President and Chief Executive Officer of Palmer Land Conservancy and has over 15 years of experience leading and managing the implementation of complex water and land conservation initiatives. Her expertise is leveraging innovative funding, tools, and partnerships for conservation impact. Rebecca has extensive leadership experience, holding executive and board member positions at numerous organizations, including founding or restructuring multiple companies and nonprofits. She serves on the national Land Trust Alliance Leadership Council and is the founding chair and current board member of Keep it Colorado. She received her Master of Environmental and Natural Resources Law & Policy (MRLS) from the University of Denver and a Bachelor of Arts in Political Science from Colorado College.

Restoration



COLORADO STREAM RESTORATION



NAVIGATING WATER RIGHTS AND ECOLOGICAL RECOVERY UNDER NEW LEGISLATION

by Abby Burk (Western Rivers Program for Audubon Rockies) and
Jacquelyn Corday (Corday Natural Resources Consulting)

Introduction

Stream restoration in Colorado is essential for improving degraded water quality and wildlife habitats, as well as building resilience to natural disasters such as floods, droughts, and wildfires. However, these efforts can face tension within Colorado's complex water rights system. The state's strict "prior appropriation" doctrine—which grants water rights based on seniority—often raises questions about the effects of restoration efforts, for example, will the restoration cause any changes to downstream water rights?

Water rights holders are legally required to use only "that amount of water that is reasonable and appropriate under reasonably efficient practices to accomplish without waste the purpose" of their water appropriation (CRS 37-92-103(4)). Restoration activities that aim to restore a stream's historic natural functions—such as reestablishing channel complexity, the natural frequency of floodplain inundations, and native riparian vegetation—can raise concerns among downstream users. Senate Bill 23-270 (SB23-270) was enacted in 2023 to address this tension by creating a legal framework that, while respecting water rights, acknowledges the multiple benefits of healthy functioning streams and helps to facilitate the restoration work needed in Colorado to restore stream health.

This article will delve into the necessity for stream restoration and the specific provisions of the new Colorado legislation SB23-270, and it will share the practical steps being taken to implement new restoration strategies. The objective is to share valuable lessons from Colorado with water users and managers from other Western states grappling with similar challenges and demonstrate that it is indeed possible to restore our streams while respecting the rights of those who rely on them.

The Need for Stream Restoration

Every Coloradan inherits a state whose lands and waters have been shaped by their predecessors. Though we often forget this fact, most of Colorado's streams look nothing like they did 100 years ago. Colorado has over 105,000 river miles. Approximately 61 percent of smaller streams and 97 percent of major rivers in the state have had their floodplains altered by humans for different purposes (e.g., development, agriculture, transportation infrastructure, and dams/channelization for water use), rendering them partially or wholly non-functional.

Healthy stream systems improve wildfire and drought resilience, flood safety, water quality, and riparian and aquatic habitats. These shared benefits support local economies and working lands, and they protect public safety and contribute to environmental health and welfare. Colorado's rivers and streams have historically been critical to the state's legacy, ecology, and economy. However, decades of development, industrial activity, certain forest and agricultural practices, and climate change impacts have significantly degraded these waterways. Increased sedimentation, nutrient loading, channel simplification, floodplain disconnection, and habitat destruction have adversely affected aquatic and riparian life and the quality of water available for human consumption and irrigation.

Moreover, climate change has intensified these challenges. Altered precipitation patterns, earlier hydrograph peaks, increased temperatures, drought, and wildfire impacts have put additional stress on Colorado's already vulnerable natural water systems. The degradation of Colorado streams not only greatly reduces wildlife habitat but it also deprives water users and local communities of critical environmental services.

The need for clarity around stream restoration and water rights administration before SB23-270 was approved in 2023 was threefold.

First, prior to 2023, Colorado water administration created substantial regional variability, uncertainty, and even barriers to restoring the valuable natural processes of stream corridors. Legal clarity for stream restoration was needed to reduce barriers for important multi-benefit projects to get off the ground.

Secondly, the success of stream restoration projects in improving human and environmental health had to be considered. The majority of our stream corridors have been degraded by more than two centuries of hydrologic modification, development, channelization, and climate-driven disasters. Case studies from stream restoration projects in Colorado and other Western states have demonstrated success in improving environmental health and reducing vulnerability to fire, flood, and drought. Thus, it was critical to clarify

Waterway Health

Degradation

Legal Clarity

"Natural Condition"

Restoration**Funding**

how stream restoration could be done without needing to obtain a water right to restore a stream to its natural condition (i.e., the stream's condition prior to the degradation occurring). The uncertainty around water rights was causing many Colorado projects to be put on hold.

Thirdly, there was (and is) a once-in-a-generation opportunity to receive funding from federal programs for stream and watershed restoration. Leveraging these funds is critical to ensure healthy streams and rivers for decades to come.

The state's rivers are lifelines for wildlife, communities, and agriculture. Without ongoing intervention, proactive management, and conservation, the future of these vital ecosystems will continue to decline, to the detriment of Coloradans and their environment.

The Ecological and Economic Benefits of Stream Restoration

Stream restoration has become increasingly important as Colorado faces the impacts of climate change, variable hydrologic conditions, changing demographics, and water demands. Healthy stream systems are essential for sustaining biodiversity and maintaining the natural processes that regulate water cycles. These shared benefits support local economies and working lands, protect public safety, and contribute to environmental health and welfare.

From an economic perspective, the benefits of stream restoration are not just environmental, they are also financial. These efforts enhance local economies through improved recreation opportunities and increased tourism. Business for Water Stewardship commissioned a study in 2019 to characterize outdoor recreation on or along waterways within Colorado. The study found that river-related recreation is a major economic driver for the state, with over \$10 billion spent each year and nearly \$19 billion in overall economic output. Another study from the University of Oregon found that every \$1 million invested in watershed restoration creates 16 new or sustained jobs on average. This is a clear indication of the economic benefits that stream restoration can bring.

Despite these many environmental and economic benefits, Colorado's water law does not always recognize these values of stream restoration. Traditionally, water laws have focused on consumptive uses, such as agriculture and municipal water supply, with limited legal recognition for ecological function and environmental benefits such as stream restoration.

Laws v. Values**The Evolution of Stream Restoration and Process-Based Restoration (PBR)**

When restoring Colorado's stream systems, there is not one tool that works in all situations. Instead, there are many active or passive recovery tools to address stressors, reduce causes of degradation, and support the functions and dynamics of the river ecosystem. For the past three decades, one of the most popular restoration methods has involved using heavy equipment to reconfigure stream channels to a predetermined and stable channel type. The goal of this approach was increasing channel sinuosity and complexity, often achieved by placing large boulders and wood in-channel to improve fish habitat. In the past 15 years, stream restoration has evolved to include Process-Based Restoration (PBR), a method that targets the root causes of ecosystem stress. By restoring natural processes like hydrology, sediment routing, and nutrient cycling, PBR aims to enable rivers to self-heal.

Low & High Tech

PBR methods match the watershed context and human setting of the natural system. There are both "high-tech" and "low-tech" methods, depending upon the circumstances. Low-tech PBR involves using simple, low-cost, temporary structures made of natural materials to slow a stream's flashy run-off flows and catch sediment to allow it to reconnect with its floodplain. High-tech PBR approaches usually involve heavy equipment and requires planning and engineering analysis to design and adaptively manage; examples include dam removal and replacing undersized road culverts with floodplain-spanning bridges or low-ford crossings in appropriate low road-use locations.

Self-Healing Waterways

PBR projects look different because they are not typical of the past thirty-plus years of traditional engineered river design and maintenance that often kept streams confined to a single channel or specific purpose of use. PBR enables the natural processes that maintain riverscape ecosystems and allows a waterway to self-adapt and sustain itself. The increasing popularity of PBR presents an enormously important opportunity for Colorado and the Intermountain West to innovatively restore its degraded ecosystems.

Restoration**Water Rights and Restoration: The Need for a Legal Balancing Act**

Before SB23-270 was passed in 2023, Colorado's water laws did not sufficiently accommodate the ecological and public benefits of stream restoration. The state's strict prior appropriation system, which grants water rights based on seniority, raised questions about restoration efforts aiming to restore natural stream functions. Restoration activities, such as increasing stream channel complexity and reconnecting floodplains to restore the natural frequency of floodplain inundation and riparian vegetation, raised concerns among some downstream water rights holders who worried about potential changes to their water supply, for example, changes in delivery timing and/or water quantity. It is important to acknowledge and address these concerns. Thus far, science is showing that harm to downstream water users from these projects should not be assumed. Case studies have documented that, if done properly while following best management practices (discussed later in this article), PBR does not harm water rights, and it benefits people and nature.

Administering Rights

Colorado's Division of Water Resources (DWR) has been under the strain of administering water rights while dealing with the reality of increasing climate change impacts such as twenty-plus years of drought, higher temperatures, and variable snowpack that results in earlier and less runoff. In addition to interstate compact issues, the DWR has had to closely examine many aspects of water administration, including human-made ponds and stream restoration projects (*see <https://dwr.colorado.gov/services/water-administration/pond-management-restoration-projects>*). Due to myriad of factors over the past five years, clarity on where and how stream restoration can occur without being subject to water administration was needed, not only for stakeholders who supported and organized stream restoration projects but also for the DWR's staff.

Negotiations

Fundamentally, a solution was needed to balance restoration with legal water rights protections. That solution came from legislation led by Colorado's Department of Natural Resources (DNR). The DNR, the Colorado General Assembly, conservation organizations, restoration practitioners, and the water community took on the challenge of considering the balance between stream restoration's large-scale benefits relative to the potentially small impacts to water rights. Discussions included the disproportionate cost and effort of acquiring, or potential inability to acquire, a decreed water right or plan for augmentation for a restoration project that might have little to no measurable change to stream flow.

The bipartisan SB23-270 legislation titled *Projects To Restore Natural Stream Systems* was vigorously negotiated and, ultimately, unanimously supported as amended. It charted the path forward by providing clear legal guidelines for stream restoration that safeguarded water rights while facilitating environmental and public safety benefits.

SB23-270 and the Colorado Water Law Framework**Exemptions**

SB23-270 created an exemption to obtaining a water right for certain types of stream restoration projects that was added to the many other statutorily created exemptions under Colorado Revised Statute (CRS) 37-92-602(9). CRS 37-92-602 creates exemptions to typical water rights administration for certain water uses because the legislature has deemed these uses "essential" and unlikely to cause material injury, but many rules apply to each of these exemptions that are detailed in the statute. Examples of other CRS 37-92-602 exceptions include rural residential wells of 15 gallons per minute or less, wells used exclusively for fire-fighting purposes, wells used exclusively for monitoring purposes, rain barrels for collecting rainwater from a residence for indoor/outdoor use, stormwater detention/infiltration facilities, and post-wildland fire facilities. Six Minor Stream Restoration Activities have now been included under the CRS 37-92-602 exemptions as specified in SB23-270. These exemption activities facilitate stream restoration projects, such as installing erosion mitigation structures made of natural materials (e.g., wood, rocks, native sod) to capture sediment to slowly aggrade an incised stream and enable reconnection of floodplains, which improves stream function without significantly altering downstream water flows.

Purpose

Understanding the context and purpose of the bill is essential when interpreting the language. Quoted from the legislative declaration of the bill, *"The general assembly therefore declares that, because of the vast amount of benefits that natural streams provide the state's communities and environment, the state should facilitate and encourage the commencement of projects that restore the environmental health of natural stream systems."*

Stream Restoration Criteria and Definitions

In order for a stream restoration project to qualify for the CRS 37-92-602 exemption, there are several requirements, including meeting the definition of a Stream Restoration Project as stated in SB23-270:

(IV) “STREAM RESTORATION PROJECT” MEANS A PROJECT THAT IS DESIGNED AND CONSTRUCTED:

(A) WITHIN A NATURAL STREAM SYSTEM; AND

(B) FOR THE PURPOSES OF WILDLAND FIRE MITIGATION; FLOOD MITIGATION; BANK STABILIZATION; WATER QUALITY PROTECTION OR RESTORATION; HABITAT, SPECIES, OR ECOSYSTEM RESTORATION; SOURCE WATER PROTECTION; INFRASTRUCTURE PROTECTION; OR SEDIMENT AND EROSION MANAGEMENT.

The bill identified six categories (quoted below as (A)-(F)) of restoration activities that can proceed without water rights administration.

(I) “MINOR STREAM RESTORATION ACTIVITY” MEANS ANY OR ALL OF THE FOLLOWING ACTIVITIES:

(A) STABILIZING THE BANKS OR SUBSTRATE OF A NATURAL STREAM WITH HARD, BIOENGINEERED, OR NATURAL MATERIALS THAT, UNDER LESS THAN EXTREME FLOW CONDITIONS, ALLOW WATER TO FLOW DOWNSTREAM, DO NOT CAUSE THE WATER LEVEL TO EXCEED THE ORDINARY HIGH WATER MARK, AND MAY INCIDENTALLY INCREASE SURFACE AREA OF THE NATURAL STREAM;

(B) MECHANICAL GRADING OF THE GROUND SURFACE ALONG A NATURAL STREAM SYSTEM IN A MANNER THAT DOES NOT RESULT IN GROUNDWATER EXPOSURE, DIVERSIONS OF SURFACE WATER, OR THE COLLECTION OF STORM WATER;

(C) STABILIZING AN EPHEMERAL OR INTERMITTENT NATURAL STREAM BY INSTALLING DEFORMABLE AND POROUS STRUCTURES INTO THE BANKS AND SUBSTRATE, WHICH MAY INCIDENTALLY AND TEMPORARILY INCREASE SURFACE AREA OR INFILTRATION;

(D) DAYLIGHTING A NATURAL STREAM THAT HAS BEEN PIPED OR BURIED;

(E) REDUCING THE SURFACE AREA OF A NATURAL STREAM TO ADDRESS REDUCTIONS IN HISTORICAL FLOW AMOUNTS; AND

(F) INSTALLING STRUCTURES OR RECONSTRUCTING A CHANNEL IN A NATURAL STREAM SYSTEM FOR THE SOLE PURPOSE OF RECOVERY FROM THE IMPACTS OF A WILDLAND FIRE OR FLOOD EMERGENCY.

SB23-270 bridges stream restoration and the water rights goals by adding a key definition to Colorado water law. For many decades, CRS 37-87-102(b) has defined a **Natural Stream** as “a place on the surface of the earth where water naturally flows regularly or intermittently with a perceptible **current between observable banks**, although the location of such banks may vary under different conditions.” SB23-270 added a new definition of **Natural Stream System**: “NATURAL STREAM SYSTEM” INCLUDES THE ACTIVE CHANNEL(S), GEOMORPHOLOGIC FLOODPLAIN, AND ASSOCIATED RIPARIAN AREA.” The addition of a natural stream system” definition was essential for stream restoration so that streams are not just recognized as water conveyance ditches, but dynamic biotic fluvial systems with floodplains that change over time.

It is up to the stream restoration team (which includes the private or public landowner and, often, many partners such as state and federal land, water, and wildlife agencies), to determine if they want to fit their project under one or more of the six Minor Stream Restoration Activities in order to qualify for the exemption to water rights administration. In other words, SB23-270 did not create a mandatory rule for all future stream restoration. Thus, another important inclusion in the bill is language stating there is no presumption of harm to water rights by projects that do not fit within the criteria of the six minor stream restoration categories: NOTHING IN THIS SUBSECTION (9): CREATES A PRESUMPTION OF INJURY FOR ANY ACTIVITY THAT DOES NOT MEET THE DEFINITION OF A MINOR STREAM RESTORATION ACTIVITY PURSUANT TO SUBSECTION (9)(b)(I) OF THIS SECTION. For projects that would potentially fall outside of the six minor stream restoration categories, project proponents can proceed as if before the law and work to minimize risk to downstream water users through the application of best management practices or seek augmentation water if necessary or available.

The passage of SB23-270 reflects Colorado’s evolving approach to water management, which has adapted over time to accommodate the changing needs of climate change–influenced hydrology and demographics. Colorado water law has historically been modified to address new challenges, such as the

Restoration

Requirements

Activities

Natural Stream Definition

Flexibility

Restoration

introduction of statutory exemptions for household wells, stormwater detention ponds, and gravel pits. SB23-270 continues this tradition by carving out space for environmental stream restoration within the state's legal framework for water use.

Uniting Stream Restoration Policy and Practice Through Training People

SB23-270 can “*facilitate and encourage commencement of projects that restore environmental health of natural stream systems*” only if people, project proponents, and the DWR understand the capabilities of the new law. Following the legislative session, Audubon contacted the Department of Natural Resources to discuss the next steps and learned that no state training on SB23-270 was planned. Due to the significant discussion, rapid-fire changes, and amendments to the bill, stream restoration proponents were uncertain about proceeding with projects even under the new law.

SB23-270 Training

The Colorado Healthy Headwaters co-chairs, attorney Jacquelyn Corday and Abby Burk from Audubon, and Julie Ash P.E., senior river restoration engineer at Stillwater Sciences, came together to develop and present a three-hour in-person SB23-270 training. This unique initiative aimed to bridge the gap between stream restoration applications and water law vocabularies, making the new law's capabilities accessible to all interested parties. The training covers a range of topics, including the types of restoration projects that align with SB23-270's Minor Stream Restoration Activities, activities that may not, options for both scenarios, key legal language in the bill, and guidelines to mitigate potential conflicts for restoration projects.

Impact

Since September 2023, the SB23-270 training on how to move stream restoration projects forward under the new law has been given to, and received input from, more than 800 people across Colorado. Attendees have included the DWR leadership and staff, national, statewide, and local nonprofits, Colorado Water Congress in January 2024, local, state, and federal agencies, watershed groups, restoration practitioners, foundations funding restoration, and academics who research and support restoration.

Now distilled into a comprehensive 19-page core manual, the training serves as a crucial bridge between the DWR and the restoration community (*see https://rockies.audubon.org/sites/default/files/sb270_training_manual_version_1.0_june_2024.pdf*). The training aligns the interpretations of stream restoration project proponents and the DWR staff by providing a shared understanding of the new law's implications for on-the-ground projects. This alignment effectively thaws the ice dam of project hesitancy, empowering the community to proceed confidently with projects under and potentially beyond SB23-270.

SB23-270 and the training are shaping stream restoration's future in Colorado and informing water managers, government agency staff, watershed groups, restoration practitioners, academics, and others on how to move stream restoration projects forward under the new law. Lastly, due to the delivery and reception of the training, DWR leadership invited the interdisciplinary team to present the SB23-270 training to statewide DWR staff at a private training in March 2024.

Best Practices for Stream Restoration

Best management practices (BMPs) for stream restoration, outlined in resources such as the *SB23-270 Training Manual* and the suggested best management practices for stream restoration “4-pager” emphasize the importance of site-specific approaches that consider local ecological conditions, land uses, and downstream water rights holders (*see https://rockies.audubon.org/sites/default/files/bmp_4-pager.pdf*).

Considerations

Early conversations with partners and downstream water rights holders on project goals and how they can or cannot be met within one of the SB23-270 Minor Stream Restoration Activities is a critical first step. Choosing the appropriate Minor Stream Restoration Activity based on where the project is located (e.g., pre- or post-fire, perennial, intermittent, or ephemeral) and determining what restoration methods are needed is important. BMPs include documenting the baseline conditions of the stream type before project commencement, establishing photo points of the stream corridor during high and low flows, if possible, and documenting an Ordinary High Water Mark. It is also important to provide the best estimate of how the proposed restoration methods and project design will conform to SB23-270 criteria. Although not required by SB23-270, it is a highly suggested best practice to consult with local DWR staff for a review of your project against the SB23-270 criteria before project installation. Lastly, project results should be documented after installation, particularly where and how results relate to the SB23-270 criteria.

Restoration**Putting SB23-270 into Practice—Audubon Implementation Case Study**

Audubon is leading a project with a primary focus on restoring the valley bottom river-wetland corridor located on a ranch impacted by the 2020 Pine Gulch Fire. The fire dramatically impacted the stream corridor, which now experiences massive debris flows each year. This initiative, which spans a 1.7-mile reach near De Beque, CO, utilizes a blend of high- and low-tech PBR methods. The project—funded by state, federal, nonprofit, and private sources—also aims to improve water quality and enhance the quantity and quality of forage for livestock and wildlife. The project will address historical and current stream degradation causes through a series of strategic actions.

Project Actions

1. Utilize low-tech PBR methods to restore nearly two stream miles and address side erosion gullies that are contributing to the stream sediment loading (e.g., installing rock structures, woody debris/felled trees, post-assisted log structures, and beaver mimicry structures where appropriate).
2. The high-tech PBR part of the project is replacing an undersized ranch road culvert that contributes significantly to incision/erosion rates and impairs water quality. A low-ford crossing that, unlike the culvert, does not constrict and scour the stream will be installed.
3. Implement land and water ranch management BMPs for grazing, irrigation, and livestock watering to contribute to and maintain the success of the project.

Audubon convened an interdisciplinary team (Team) composed of an attorney, an engineering firm, and a stream restoration consultant to support due diligence for the private landowner and project success. The Team followed the suggested BMPs (cited above) and contacted the local DWR Division 5 Engineer to inform them about the project and the Team's intention for the proposed restoration design to fit within SB23-270, asking for a meeting if needed to discuss further details and answer questions. DWR indicated sufficient information was provided and concurred that the work proposed for 2024 "appears to fit the statutory criteria of a Minor Stream Restoration Activity as defined in C.R.S. § 37-92-602(9)(b)(I)(F)," which is the post-fire category.

Progress

Audubon acknowledges the rare privilege it is to work on SB23-270's development, passage, and, now, implementation of a project under the new law. The project fits within criterion (F) for post-fire emergency restoration within the natural stream system. In September 2024, for Phase 1 of a two-year implementation and adaptive management project cycle, 82 low-tech PBR structures were installed using more than a dozen different structure designs. Audubon looks forward to implementing the future phases of this project through 2026.

Challenges and Opportunities Moving Forward

While SB23-270 offers a structured pathway for balancing stream restoration and water rights, challenges remain. The state's growing population, changes in water use, and climate change impacts will continue to put pressure on stream systems, making it essential for restoration proponents to be aware of SB23-270, operate using suggested BMPs to reduce the risk of legal conflict, and, now, be mindful of HB24-1379, Regulate Dredge & Fill Activities in State Waters—Colorado's new wetland protection 404 program (*see* <https://leg.colorado.gov/bills/hb24-1379>). There are four areas where stream restoration could intersect with this new law, and the complexities will be delineated in a rulemaking process that will be concluded by December 2025.

Collaboration

As we look to the future, the success of Colorado's stream restoration initiatives will depend on our collective efforts. Collaboration among knowledgeable project proponents, reputable and skilled restoration practitioners, downstream water rights holders, and state agencies with DNR is crucial.

Equally important is the role of education, engagement, and training on SB23-270 and stream restoration BMPs. These initiatives are about fostering support for restoration projects with durable mutual gains and recognizing the value of healthy rivers. In the face of hydrologic variability and environmental degradation, this understanding should inspire and motivate efforts in stream restoration.

Conclusion

As stated in SB23-270's declarations: *"The general assembly therefore declares that, because of the vast amount of benefits that natural streams provide the state's communities and environment, the state should facilitate and encourage the commencement of projects that restore the environmental health of natural stream systems."*

SB23-270 represents a significant collaborative and bipartisan advancement in Colorado's efforts to restore and protect its rivers and streams while respecting the state's water rights system. By creating a legal framework that recognizes stream restoration as important for Coloradans, the bill opens the door for more effective, widespread ecological recovery projects. As Colorado continues to adapt to the

Restoration

challenges of climate change and population growth, the successful implementation of SB23-270 and stream restoration BMPs will support the long-term health of our waterways, ecosystems, communities, and economies. Through thoughtful, evidence-based collaboration across interests, Colorado can continue to lead the way in balancing water use with environmental stewardship, ensuring that human and ecological needs are met for future generations.

For Additional Information:

Abby Burk, Western Rivers Program at Audubon Rockies, 303/ 656-6496 or Abby.Burk@audubon.org

Abby Burk is the Senior Manager of the Western Rivers Program at Audubon Rockies and co-chair of the Colorado Healthy Headwaters Working Group. Before joining Audubon in 2014, she worked as an ecological landscape manager and practitioner for over eight years and taught biology and environmental science courses at the college level. Abby has expanded Audubon's involvement in Colorado water policy and management, particularly in connecting river ecology with water policy and restoration projects. She collaborates with numerous partners, including decision-makers, state and federal agencies, and various non-profit environmental organizations. Abby is an award-winning educator, a skilled river diplomat, and holds a B.S. in biology and an interdisciplinary master's degree with concentrations in ecology and hydrology.

Jacquelyn Corday, J.D., is the owner of Corday Natural Resources Consulting and is co-chair of the Colorado Healthy Headwaters Working Group and Riverscape Restoration Network. She works at the intersection of science, policy, and law, with a particular interest in synthesizing the latest science research to help inform policy. She received her J.D. from the University of Oregon School of Law and B.A. in environmental biology from Humboldt State University. Jacquelyn provided editorial review for this article.

Law & Policy

🌊🌊🌊 LAW AND POLICIES THAT ADDRESS EQUITABLE, CLIMATE-RESILIENT WATER AND SANITATION 🌊🌊🌊

WATER, SANITATION, AND CLIMATE CHANGE IN THE UNITED STATES, PART 2

by Shannon McNeeley and Morgan Shimabuku (Pacific Institute) and
Alexandra Campbell-Ferrari and Luke Wilson (Center for Water Security and Cooperation)

Editor's note: In October 2024, the Pacific Institute and the Center for Water Security and Cooperation—in partnership with Dig Deep—released the *Law and Policies that Address Equitable, Climate-Resilient Water and Sanitation Report*. This report examines the laws and policies in the US that govern the equitable delivery of water and sanitation in the face of growing climate change impacts. What follows is the executive summary of that report, which has been edited to better match The Water Report format. The full report, which offers a variety of law and policy examples, is available here: <https://pacinst.org/publication/law-and-policies-that-address-equitable-water-sanitation-and-climate-change/>

Introduction

In the United States, federal, tribal, state, and local laws and policies exist to govern the provision of water and sanitation services to communities and homes. The laws are designed to ensure the protection of public health and the environment; deliver sufficient, safe water for drinking, bathing, cooking, and other household needs; and remove and treat domestic (i.e., household) waste. People without complete plumbing or safe water live within the “water access gap.” As explored in the first report in this series, climate change—from extreme temperatures to droughts, floods, extreme storms, and wildfires—is making it hard to close this gap and keep it from growing. Water and sanitation systems in frontline communities already feel the disproportionate “first and worst” impacts of climate change to these systems and to their access to water and sanitation. Laws and policies should help anticipate and plan for the incremental and catastrophic impacts of climate change and protect those most harmed by the effects. Unfortunately, in most cases, the climate is changing faster than the law can respond, thereby leaving frontline communities' water and sanitation systems vulnerable to damage or destruction.

The following are key messages from the full length report (*see <https://pacinst.org/publication/law-and-policies-that-address-equitable-water-sanitation-and-climate-change/>*).

Water Access Gap

Law & Policy**Key Takeaways**

1. The law often does not proactively manage water resources in the context of climate change, especially groundwater use, or create a system where uses are weighed against each other or reviewed for their continued appropriateness for a given water source or basin. The basic rules governing water use and water rights are insufficient. As climate change alters precipitation patterns, which subsequently changes our use patterns and the broader availability of water, the laws will be insufficient to ensure there is sufficient water to meet our needs and sustain the environment.
2. Laws provide insufficient guidance on the design and siting of climate-resilient water and wastewater systems. Water and wastewater infrastructure is under threat from floods, droughts, saltwater intrusion, and wildfires. As the frequency and severity of natural disasters increases, our infrastructure may be unable to withstand storms and other extreme events, leaving communities without drinking water and/or wastewater services.
3. Access to water and sanitation infrastructure and services is inequitable, and the laws in the United States do not ensure the human right to water or sanitation, leaving some households without any safe or regular services and other households under constant threat of shutoffs. This is especially true for households in frontline communities who are affected first and worst by climate change, especially those who may not be able to afford to rebuild or repair their onsite or decentralized systems. This may leave homes and communities that lose access to their water and/or sanitation without recourse for regaining it, causing backsliding, and widening the water access gap.

Objective

In this report, we examine the laws and policies in the US that govern the equitable delivery of water and sanitation in the face of growing climate change impacts. The objective is to identify and understand whether and how laws manage, anticipate, or enable effective responses to climate change impacts on water and sanitation service delivery and infrastructure. This is intended to provide a foundation for a future, more comprehensive evaluation of the gaps and shortcomings that exist in law and policy to ensure the necessary steps can be taken to construct and rehabilitate the legal infrastructure to limit or avoid the impacts of climate change on water and sanitation service delivery. We pay special attention to laws that give visibility to and empower frontline communities and vulnerable households, both those without consistent water and sanitation access and those facing the greatest threat to their access from climate change.

Approach

The report is based on two considerations: 1) legal considerations related to climate change impacts on water resources, service delivery, and infrastructure, and 2) the categories of systems that provide drinking water and sanitation services that determine the applicable legal and regulatory requirements. We structured the report based on centralized drinking water systems, centralized wastewater systems, and decentralized, onsite drinking water and sanitation systems. Within each of those, we examine the laws and policies that address three types of climate change impacts on these systems—water scarcity, overabundance of water and flooding, and poor water quality. We also include a section focused on issues of equity in achieving universal, climate-resilient water and sanitation access for all in the US.

Water Law and Climate Change**Adaptation**

While some laws may not explicitly mention climate change, they can be foundational to adapting to climate change impacts, for example, by providing oversight of water supply availability or setting drinking water quality standards. Having in place the basic laws necessary to manage water resources and service provision can inadvertently, indirectly, and fortuitously protect against climate impacts. There is also an increasing need for water laws to explicitly incorporate and consider climate change. Water laws, generally, were developed to provide predictability, yet climate change is making the natural water cycle highly unpredictable. Climate change is already exposing gaps in water law, water quality law, energy law, and environmental law. While better laws for water management and service provision inherently help to address the impacts of climate change on water and sanitation systems, laws increasingly need to intentionally consider the intersection of climate change to ensure that the impacts are properly anticipated and adequately addressed. Existing water laws are ill-equipped to adapt to climate change. Water laws will fall short if the basic structure of water management and service provision reflected in those laws is not based on an intentional consideration of the actual and anticipated impacts of climate change.

Here we summarize key findings and conclusions from our review of federal, tribal, state, and local laws and policies from across the US on whether they help achieve equitable, climate-resilient water and sanitation for frontline communities.

Law & Policy**Safe Drinking Water Act****Tribes****Prioritizing Domestic Use****Planning****Reduce Water Use****Centralized Drinking Water Systems**

Climate change through extreme heat, flooding, drought, rising seas, more extreme storms, wildfires, and other impacts, is already threatening the reliability and safety of drinking water access to frontline communities in the US. In the US there are approximately 300 million people that receive drinking water from centralized drinking water systems, which are the systems that collect, treat, and distribute water to multiple residential, commercial, and/or industrial customers within specifically defined geographical areas called service areas. Most centralized drinking water systems are governed by the Safe Drinking Water Act (SDWA). Changes to water quality from flooding, drought, rising temperatures, saltwater intrusion, wildfires, reductions in snowpack, and other climate events are disrupting and damaging centralized drinking water systems and are making it more challenging to ensure the water they deliver is safe.

In some cases, the way water laws are designed or implemented may exacerbate the challenges created by climate change. For example, Tribes are often legally entitled to more water than they can use, which is inconsistent with the state prior appropriation doctrine approach by which water rights are maintained through actual use (“use it or lose it”). This can create tensions between state and tribal entities, especially where climate change and other factors decrease the volume of available water resources. Also, climate change can exacerbate unsustainable groundwater uses and practices, especially in places where the law either allows for unsustainable groundwater use or does not protect groundwater sustainability. As climate change creates greater dependence on groundwater in some places, laws like California’s Sustainable Groundwater Management Act have the potential to provide an important management mechanism for protecting vulnerable groundwater supplies and contributing to more inclusive governance processes, however, implementation of this law has not yet proved to be completely successful in these goals.

Laws that prioritize available water resources for domestic purposes could become more imperative as climate change shifts precipitation patterns and reduces the availability of water in some geographies. There are examples of states with laws that both create automatic prioritization of domestic uses during droughts and authorize water managers to address emergency water shortages. Together, these provisions can help protect domestic needs when there is insufficient water to meet every demand. In some states, laws where prioritization between water uses is not clear, such as between domestic and agricultural uses, there may be potential for conflict between water uses during times of scarcity.

Some states have laws that mandate water resource management planning, which is a process whereby water managers (including those operating centralized drinking water systems) plan for future investments, like infrastructure upgrades and water supply needs. This is done by analyzing water supply availability, water quality, and use in concert with projected changes in population, the economy, and other factors that impact water demand. Increasingly, water resource management planning processes incorporate climate change considerations, but many do not. Some states have passed laws to create programs that provide technical assistance to small drinking water systems that often lack the capacity for water management planning and planning for climate change. While not specific to climate change, though with implications, drought planning laws and policies are approaches that have been used for requiring or incentivizing consideration of how water systems will function and adapt to water scarcity and supply constraints. Less than half of all states have laws that require drought preparedness plans for water systems.

As climate change alters precipitation patterns, populations continue to grow in urban centers, and costs of delivering water increase, instituting laws and policies that help reduce water use, improve water use efficiency, or permit and regulate using alternative water supplies can help communities adapt to these pressures. Demand management, reducing and making water use more efficient, is often applied through voluntary measures. However, there are several ways that laws and policies have led to long-term water demand reductions and supported adaptation to increasing water scarcity and more intense, prolonged periods of drought. Some key demand management laws and approaches have included: the Energy Policy Act of 1992, state-level laws that set standards for fixture water efficiency in building codes, requirements to upgrade to high-efficiency devices upon change of ownership of a property, and regulations for urban water suppliers to manage water demand. Laws that permit and regulate water reuse and recycling or rainwater and stormwater capture and use may contribute to improved water supply resilience by adding to the community’s supply portfolio or by freeing up freshwater to be used for other purposes.

Flooding is among the costliest climate disasters in the US, and climate change is causing the impacts of flooding to grow. Laws that help prevent and reduce the impact of flooding through system design and construction requirements are supposed to help keep centralized drinking water infrastructure safe from

Law & Policy**Flooding & Insurance**

these events. The National Flood Insurance Program (NFIP), created by the National Flood Insurance Act, has used historical flood event data for establishing insurance premiums and designating flood risk areas, which may not be applicable under future climate change as catastrophic flooding occurs more frequently. Existing drinking water systems and other infrastructure that were sited and designed based on NFIP's old, outdated maps may be at risk from flooding damage. Drinking water and wastewater systems in communities that are not eligible for the NFIP or are excluded by outdated flood maps that do not account for climate change may lack flood insurance. Even in communities that are participating in the NFIP, protection and disaster recovery have been inequitably distributed with costs disproportionately being placed on low-income neighborhoods. Some states have taken steps to go beyond the federal NFIP requirements, which may provide more protection against flooding events. But even these can fail to explicitly account for future climate change and more extensive flooding.

Centralized Wastewater Systems

Like centralized drinking water systems, centralized wastewater systems are at risk from the impacts of climate change through extreme heat, drought, flooding, damage from extreme storms, sea level rise, and challenges with maintaining their mandated level of treatment in places where water is becoming more contaminated or scarce. In the US, centralized wastewater systems are made up of networks of pipes, pumps, holding tanks, and wastewater treatment plants (WWTPs) that collect, transport, treat, and dispose of waste from approximately 75 percent to 80 percent of the population. WWTPs are governed by the Clean Water Act (CWA), which regulates the discharges from wastewater treatment plants and requires that the discharges meet certain standards that will protect the quality of the water resources into which the effluent is discharged.

System Updates

The siting, design, and proper construction of WWTPs can significantly impact the climate resiliency of these systems. Generally, state and local laws and regulations govern these engineering decisions. Once built, it is often many decades before updates or improvements are made to centralized wastewater systems. Due to drought and reductions in per capita water use, some wastewater systems have a mismatch between the volume of influent they were designed for compared to the volume that they now receive, yet there are few legal approaches for addressing this mismatch. While regulations can address the threat of floods and other climate impacts when building new wastewater treatment plants, changing existing plants may be harder.

Centralized wastewater systems that were sited and designed based on historical flood event data also may be at risk from the increased extent and severity of flooding damage. Current federal law exists to ensure new systems are in areas with lower flood risks, but these laws are still based on historical flood maps and do not protect existing wastewater infrastructure. While wastewater treatment systems are taking steps to protect their infrastructure from sea level rise and erosion, many of these changes are made purely voluntarily.

Aging Infrastructure

In many cities, even small rainstorms can pose problems for aging sewers that were built decades or centuries in the past and are too small or in such poor condition that they cannot effectively transport water. Aging and inadequate infrastructure can lead to homes and businesses experiencing backflows of water from the sewer. This is already occurring in many places like New York City, where sewer backups from rainstorms occur disproportionately in low-income communities and communities of color. But there are few, if any, legal recourses for homeowners whose sewers back up into their homes during flooding events. Climate change and the increase in extreme precipitation and storm events in many parts of the country will only worsen these types of inequities.

Clean Water Act

Untreated or insufficiently treated wastewater can threaten people's health and wellbeing if it comes into their home, but it can also degrade the quality of surface waters. If inadequately treated, wastewater effluent can degrade drinking water quality, public health, and the environment. The CWA provides a foundation for limiting the impact of wastewater effluent on water resource quality but is inadequate in explicitly requiring considerations of climate change in setting effluent limits. To meet the CWA standards and properly operate, consistently maintain, and periodically rehabilitate and update wastewater infrastructure requires ongoing financial resources and technical capacity. The impacts of climate change, such as degraded water quality and infrastructure damage, compound with these ongoing needs, especially for under resourced communities, exacerbating their efforts to meet regulatory requirements and provide safe, reliable services. Existing legal requirements and regulations were designed to improve pollution control from WWTPs, not to address the impact of extreme weather events and climate change.

Law & Policy**Decentralized, Onsite Drinking Water and Wastewater Systems**

Climate change is also impacting water and sanitation access for US households that rely on decentralized, onsite drinking water and wastewater systems, such as wells and septic systems. Based on the most recent study available (using pre-2010 data), approximately 23 million people—or 17% of the US population at the time—relied on domestic wells for drinking water. More than one in five households in the US use onsite septic systems or small community cluster systems to treat wastewater, and many of those are concentrated in the Northeast and Southeast. The use of septic tanks has continued to grow as more homes are built for people looking to live outside urban centers.

Reduced Oversight

One of the reasons why onsite water and sanitation access is at risk from climate change is because there is limited legal oversight of these systems. Onsite drinking water is largely governed and legislated at the state and local levels. There are often laws that govern the siting and construction of domestic wells, including, for example, a California law that requires domestic wells to be constructed so that flood waters cannot enter through the top and to ensure domestic wells are installed outside of historical floodplains. But these types of laws do not always account for changes to flooding severity or frequency due to climate change. At the same time there are few, if any, laws that require ongoing maintenance and inspection of existing domestic wells used for domestic drinking water purposes, let alone preparing for or responding to climate change. Some states or local entities require reinspection of septic systems post-disaster or during resale of a home. Post-disaster inspections may become more critical to ensuring these systems remain functional as more extreme weather events damage and disrupt onsite systems.

Maintenance

From a water resources perspective, state laws that seek to ensure groundwater availability for domestic wells and other users have, at times, been inadequate for achieving these goals. As climate change adds more water stress, these laws may not be sufficient. Allowing and developing regulations for the installation and use of waterless or greywater systems for onsite sanitation collection, treatment, and disposal will help to encourage their use, and possibly their replacement of water-based household sanitation systems. In regions where sea level is causing the groundwater table to rise, laws may be needed to address potential groundwater contamination from septic systems.

Testing

Domestic well quality testing regulations are potentially helpful for improving awareness of water quality in domestic wells, but they do not directly address the increasing risk of water contamination from climate change. Broad groundwater quality protection seeks to provide protection from human activity like agriculture, oil and gas development, or other forms of land use, but it does not offer explicit protection of groundwater from climate change phenomena. Few of the water quality laws governing management of decentralized, onsite drinking water or wastewater systems incorporate climate change.

Laws and Policies for Equitable, Climate-Resilient Systems**Human Right to Water**

Laws can help to ensure that safe, climate-resilient water and sanitation service delivery and infrastructure is available to all by creating rights and protections that enable greater and more equitable access to water and sanitation services. For example, laws can establish that water and sanitation are human rights. While the human right to water and sanitation have yet to be legally recognized at the federal level, some states have amended their constitutions in ways that could serve as a foundation for taking action to protect water resources if climate change causes harm to water quality or reduces water availability, even if not explicitly for the purposes of drinking water access. Furthermore, none of the existing state or local human right to water and sanitation laws or resolutions in the US explicitly address climate change. But when crafted well, these laws create an obligation on state or local governments to take steps to ensure every person has access to safe water and sanitation services now and into the future.

Climate change contributes to rising costs for the drinking water and wastewater utilities, which in turn are passed on to ratepayers, with the greatest impact on low-income households. Laws can create rules that disallow disconnections of water service for households that are unable to pay their bills. As one example, Washington has a law that provides legal protection for households that are struggling to pay their utility bills during hotter weather, ensuring they have access to water when temperatures are extreme and pose a risk to human health.

Funding Mechanisms

Laws also create funding mechanisms to help ensure that funding is equitably distributed to communities, especially overburdened and under resourced communities. Achieving the standards set out in the CWA and SDWA and ensuring water and wastewater infrastructure is climate-resilient requires federal funding, which is commonly authorized by laws. Two more recent examples of laws that include funding for climate-resilient water and sanitation projects are the Bipartisan Infrastructure Law and Inflation Reduction Act. Together, these provide historic levels of funding for federal, tribal, state, and local water projects, among other things.

Law & Policy

Conclusion

In sum, climate change, by changing the availability of water and the frequency and severity of storms, will continue to make universal water and sanitation access difficult to achieve without legal protections in place. Without explicit consideration of how climate change will impact water availability, the operation of infrastructure, or the quality of surface waters, existing laws leave homes and communities, especially those on the frontlines, exposed and unprepared. Our current laws and policies are insufficient to provide water security, particularly with the significant impacts of climate change on the near horizon. Without changes to the law, more water and wastewater systems will fail and will do so more frequently, leaving entire communities without basic services they need to lead a healthy, dignified life.

Many communities struggling with water and sanitation access face other challenges as well. These include inadequate or unenforced laws, structural and systemic racism, fragmentation of decision making for water and climate change, institutional constraints, and lack of resources to begin and sustain adaptation efforts. A first step to overcoming these challenges and barriers is better understanding the key attributes of equitable, climate-resilient water and sanitation along with the barriers to and opportunities for achieving them. Our next report, Part 3 in this series, will provide a framework for equitable, climate-resilient water and sanitation in the US, as well as an overview of strategies and approaches that frontline communities are taking to create equitable, climate-resilient water and sanitation.

For Additional Information:

Sumbul Mashhadi, Pacific Institute, smashhadi@pacinst.org

See full report for author bios: <https://pacinst.org/publication/law-and-policies-that-address-equitable-water-sanitation-and-climate-change/>

WATER BRIEFS

PFAS REGULATIONS TOXICS RELEASE INVENTORY

US

On Oct. 2, the US Environmental Protection Agency (EPA) proposed adding 16 individual per- and polyfluoroalkyl substances (PFAS) and 15 PFAS categories representing more than 100 individual PFAS to the Toxics Release Inventory (TRI). It would also designate them as chemicals of special concern so they must meet more robust reporting requirements, including reporting even for small concentrations. This proposed expansion of TRI would advance the commitments of the Biden-Harris Administration and EPA's PFAS Strategic Roadmap to address the health and environmental impacts of PFAS by promoting pollution prevention, and informing the public about environmental releases of these so called "forever chemicals." This proposal also advances the Biden-Harris Administration's commitment to environmental justice as well ending cancer as we know it by helping to connect the public and regulatory agencies with data to help inform decision-making with regard to chemicals with toxicity, including cancer, concerns because people can use TRI data to identify sources of pollution in their communities and ways that facilities can eliminate or reduce such pollution.

TRI was created to help track the waste management of toxic chemicals and support actions to prevent pollution and safeguard public health. TRI requires regulated facilities to report annually to EPA the amount of these toxic chemicals released into the environment and managed through recycling, energy recovery and treatment. Facilities must also report on practices used to prevent or reduce the generation of these chemicals as waste. EPA makes the data publicly available to inform decision-making and support pollution prevention efforts.

These PFAS are being proposed for addition to the TRI based on their toxicity to human health, the environment, or both. Data shows that the PFAS being proposed are linked to health outcomes such as cancer; damage to the liver and kidneys; and damage to reproductive and developmental systems.

EPA is proposing to set a reporting threshold of 100 pounds for manufacture, processing and other uses. This is consistent with reporting requirements for other PFAS on the TRI list added pursuant to the National Defense Authorization Act for Fiscal Year 2020 (NDAA). If finalized as proposed, all of the PFAS in a given category would count towards the 100-pound reporting threshold for that category. This change would improve reporting on PFAS by ensuring that facilities would not be able

to avoid reporting on PFAS that are similar to one another if each PFAS does not meet the reporting threshold individually. For the same reason, EPA is also proposing to reclassify some PFAS that were previously added to the TRI individually as part of one of the 15 PFAS categories.

Finally, with this rule, EPA is also proposing to clarify how PFAS are automatically added to the TRI under the NDAA. The NDAA provides the framework for the automatic addition of PFAS to the TRI each year in response to specified EPA activities, including whenever the agency "finalizes a toxicity value." To assist stakeholders in understanding this automatic addition provision within the NDAA, EPA is proposing a list of different types of EPA toxicity values which automatically initiate the process of adding any PFAS associated with the toxicity value to the TRI list.

EPA will accept public comments on the proposed rule for 60 days following publication in the Federal Register via docket EPA-HQ-TRI-2023-0538 on <https://www.regulations.gov/>.
FOR INFO: <https://www.epa.gov/toxics-release-inventory-tri-program/addition-certain-and-polyfluoroalkyl-substances-toxics-release>

KLAMATH DAM REMOVAL **NW** COMPLETED

Oct. 2 marks the complete removal of the four lower Klamath hydroelectric dams. Kiewit, the dam removal contractor hired by the Klamath River Renewal Corporation to complete the construction elements of the project, has finished all work in the river.

Following the cofferdam breaches last month, a portion of the Iron Gate cofferdam and a temporary river crossing at Copco No. 1 were left in place to provide access to the far side of the river in order to remove diversion infrastructure. With all the diversion infrastructure, temporary bridges, and dam materials now fully removed from the river, the dam removal portion of the Klamath River Renewal Project is now complete. Restoration and recovery of the river will continue for the coming years.

Together, Copco No. 1, Copco No. 2, J.C. Boyle, and Iron Gate Dams had blocked fish passage and impaired water quality for more than a century. All four were hydroelectric dams that did not provide irrigation or drinking water and were not operated for flood control. Following decades of advocacy, led by area Tribes and supported by conservation advocates, commercial fishing organizations, and the States of California and Oregon, federal regulators approved the removal of the dams in November 2022. Ownership of the project was then transferred to the Klamath River Renewal Corporation (KRRRC), the organization that was created to oversee the removal of the dams and related restoration of the previously submerged lands.

Copco No. 2, the smallest dam, was removed in the summer of 2023. In January of 2024 the Copco No. 1, JC Boyle, and Iron Gate reservoirs were drained, and deconstruction began in the spring. Massive amounts of concrete, earth, rocks and clay was removed from the river channel as part of the dam removal process. With these obstructions now cleared from the mainstem river, fish once again have access to more than 400 stream miles, including in tributary creeks and streams, of habitat in the upper Klamath Basin.

While the dam removal portion of the project is now complete, work will continue for several years restoring the 2,200 acres of formerly submerged lands. As the reservoirs drained in January, native seed mix was applied to the reservoir footprints. This initial round of seeding was intended to stabilize sediments and improve soil

composition. This fall, restoration crews will turn their attention to amending soil conditions and will then perform another round of seeding and planting. Restoration crews will be onsite until vegetation success meets predetermined performance metrics. Restoration work is likely to continue for at least the next several years.

FOR INFO: <https://klamathrenewal.org/>

TECHNICAL ASSISTANCE **US** GRANT FUNDING AVAILABLE

On Oct. 4, the US Environmental Protection Agency (EPA) announced the availability of up to \$30.7 million in grant funding for technical assistance and training to support small drinking water and wastewater systems, many serving rural communities, and to help private well owners improve water quality.

In the United States, more than 90 percent of drinking water systems serve fewer than 10,000 people. While many of these small systems consistently provide safe drinking water to their customers, they can also face challenges including high operator turnover, aging infrastructure, and lack of financial resources. Wastewater systems serving small communities face similar challenges. This EPA grant program provides funding to organizations that work side-by-side with these systems, providing tools and training to ensure that drinking water is safe and that wastewater is treated responsibly.

EPA is seeking applications to fund grant projects that will benefit small and often rural communities. Eligible applicants for this competitive agreement are nonprofit organizations, nonprofit private universities and colleges, and public institutions of higher education. EPA expects to award four to five cooperative agreements totaling up to \$30.7 million in federal funds. The purpose of the agreements is to provide training and technical assistance to:

- Small public water systems to achieve and maintain compliance with the Safe Drinking Water Act (SDWA).
- Small public water systems on a wide range of managerial and/or financial topics to achieve and maintain compliance with the SDWA.
- Small publicly owned wastewater systems, communities served by onsite-decentralized wastewater systems to help improve water quality.
- Private well owners to help improve water quality.

Congress has funded this program annually, enabling EPA to provide more than \$170 million in funding to technical assistance and training providers since 2012. This program advances President Biden's Justice40 Initiative, which sets a goal that 40% of the overall benefits of certain federal investments flow to disadvantaged communities that are marginalized by underinvestment and overburdened by pollution.

This grant is part of the EPA's larger commitment through the Water Technical Assistance program (WaterTA), which aims to provide a range of assistance for communities to identify water challenges, identify solutions, and build capacity. Since 2022, approximately 5,000 communities have received technical assistance, ensuring they maintain or achieve Safe Drinking Water Act compliance and treat wastewater responsibly.

The application period for these competitive grants is now open. Questions about applying for EPA funding for training and technical assistance must be received by November 11, 2024, and applications must be received by 11:59 p.m. EST on November 25, 2024. EPA expects to award these cooperative agreements by summer of 2025.

This grant will be competed through a Notice of Funding Opportunity process. The funding opportunity will remain open for 60 days on Grants.gov.

FOR INFO: <https://www.epa.gov/dwcapacity/training-and-technical-assistance-small-systems-funding>

LEAD AND COPPER **US** FINAL RULE ISSUED

Oct. 8, the Biden-Harris Administration issued a final rule requiring drinking water systems across the country to identify and replace lead pipes within 10 years. The Lead and Copper Rule Improvements (LCRI) also require more rigorous testing of drinking water and a lower threshold requiring communities to take action to protect people from lead exposure in water. In addition, the final rule improves communication within communities so that families are better informed about the risk of lead in drinking water, the location of lead pipes, and plans for replacing them. This final rule is part of the President's commitment to replace every lead pipe in the country within a decade, making sure that all communities can turn on the tap and drink clean water.

Alongside the Lead and Copper Rule

Improvements, EPA is announcing \$2.6 billion in newly available drinking water infrastructure funding through the Bipartisan Infrastructure Law. This funding will flow through the drinking water state revolving funds (DWSRFs) and is available to support lead pipe replacement and inventory projects. Additionally, 49 percent of the funding must be provided to disadvantaged communities as grant funding or principal forgiveness that does not have to be repaid. EPA is also announcing the availability of \$35 million in competitive grant funding for reducing lead in drinking water. Communities are invited to apply directly for grant funding through this program. Additional federal funding is available to support lead pipe replacement projects and EPA has developed a website identifying available funding sources.

EPA estimates that up to 9 million homes are served through legacy lead pipes across the country, many of which are in lower-income communities and communities of color, creating disproportionate lead exposure burden for these families. Eliminating lead exposure from the air people breathe, the water people drink, and the homes people live in is a crucial component of the Biden-Harris Administration's historic commitment to advancing environmental justice.

The Lead and Copper Rule Improvements establish achievable, common-sense practices which have been implemented by several states and cities. The public health and economic benefits of the final rule are estimated to be up to 13 times greater than the costs, and together with this new funding under the Biden-Harris Administration's Bipartisan Infrastructure Law, water systems will be able to accelerate removal of lead pipes and create good-paying local jobs in the process.

The science is clear: Lead is a potent neurotoxin and there is no safe level of lead exposure, particularly for children. In children, lead can severely harm mental and physical development, slow down learning, and irreversibly damage the brain. In adults, lead can cause increased blood pressure, heart disease, decreased kidney function, and cancer. If someone is impacted by lead exposure, there is no known antidote, according to the Centers for Disease Control and Prevention. The Lead and Copper Rule Improvements strengthen nationwide requirements to protect children and adults from these

significant and irreversible health effects from lead in drinking water.

Communities across the country have already begun to tackle lead pipes. Investments in identifying lead pipes, planning for their removal, and replacing them will create jobs in local communities while strengthening the foundation of safe drinking water that supports economic opportunity.

FOR INFO: <https://www.epa.gov/ground-water-and-drinking-water/lead-and-copper-rule-improvements>

TRIBAL HATCHERIES US GRANT FUNDING

Tribal, federal, and state leaders gathered at the Tulalip Reservation on Oct. 3 to celebrate \$240 million in federal funding for tribal hatcheries. This Inflation Reduction Act investment will help 27 tribes from Northern California to Southeast Alaska meet urgent maintenance and modernization needs of tribal Pacific salmon and steelhead hatcheries.

NOAA Fisheries partnered with the Interior Department's Bureau of Indian Affairs to disperse the funds. Initial payments of \$2 million are currently being distributed to each of the 27 tribes. The remaining \$186 million will be allocated by competitive grants in 2025.

Treaties with the US government in the 1850s promised many tribes hunting and fishing rights. However, the decline of salmon in Northwest rivers has left the hatcheries to provide many of the fish for tribal fisheries. The commitment of funding by the Biden-Harris Administration is a step toward delivering on the treaty promises that tribes would have fish to catch.

A Tulalip tribal color guard and singers and dancers kicked off the event, which Tulalip Chairwoman Teri Gobin opened with a prayer. Tulalip Vice Chair Misty Napeahi emceed. Speakers included Washington Governor Jay Inslee, US Representative Rick Larsen, and Bryan Newland, Assistant Secretary of Indian Affairs for the Department of the Interior.

Tribal leaders and elders from many of the 27 tribes attended the celebration on the shore of the Salish Sea. It was held at the reservation in Washington state, north of Seattle. Tribal representation from across the Pacific Northwest included the Metlakatla Indian Community of Southeast Alaska, as well as Columbia Basin Plateau, Puget Sound, and Washington coastal tribes.

The event continued with visits to Tulalip tribal hatchery facilities. The lower pond of Tulalip Creek teemed with coho salmon returning to their release site, as tribal fishing boats dotted the expanse of Tulalip Bay. Ninety-five percent of Chinook and coho salmon harvested by Tulalip tribal members come from tribal hatcheries, said Jason Gobin, Executive Director of Natural and Cultural Resources for the Tulalip Tribes.

While the hatchery is still productive, funding will help address deferred maintenance and update hatchery operations to the latest in hatchery science and technology. Decades-old hatchery infrastructure needs upgrades to release salmon smolts and the collection of broodstock with more efficiency and targeted timing, Gobin said.

Gobin presented initial plans for modernizing the Tulalip Tribes' Bernie Kai-Kai Gobin Salmon Hatchery. While the Tribe has already set aside funds for renovations, federal resources will kick-start the improvements. Most other eligible tribes, including the Nez Perce Tribe and the Lummi Nation, have identified specific plans for hatchery upgrades.

Tribal Pacific salmon and steelhead hatcheries help the US government fulfill its treaty obligations to tribal nations, while also removing fishing pressure on wild stocks. Some tribal hatchery programs have also led to the rebound of wild salmon. For example, the Nez Perce efforts have revitalized Snake River fall-run Chinook salmon; the Lummi Nation's hatchery program has restored spring-run Chinook in the Nooksack River.

Beyond treaty promises and conservation goals, tribal hatcheries drive tribal employment, nutrition, and the preservation of cultural traditions. The millions of Pacific salmon and steelhead produced by tribal hatcheries annually also support non-tribal commercial and recreational fisheries, sustaining tourism and working waterfronts.

FOR INFO: <https://www.commerce.gov/news/press-releases/2024/07/commerce-and-interior-departments-announce-240-million-president-bidens>

CALENDAR

November 14-15 WA

17th Annual Washington Water Code Law, Policy, and Planning, Tacoma. University of Puget Sound. Presented by The Seminar Group. For info: <https://www.theseminargroup.net/seminars/7301/register>

November 16 CA

Exploring Water Use and Sustainability in Contra Costa County, Concord. Bollman Water Treatment Plant. Presented by Contra Costa Water District; Water Education Foundation & Reclamation. For info: <https://www.watereducation.org/project-wet-event/contracoosta-county-4>

November 17-20 AZ

Colorado River Forum, Phoenix. Presented by CSG West. For info: <https://csgwest.org/event/colorado-river-forum-2/>

November 17-21 IL

2024 Water Quality Technology Conference, Schaumburg. Renaissance Schaumburg Hotel & Convention Center. Presented by American Water Works Association. For info: <https://www.awwa.org/event/water-quality-technology/>

November 18 WEB

Colorado Basin Roundtable, Virtual Event. Presented by Colorado Water Conservation Board. For info: <https://cwcb.colorado.gov/events/colorado-basin-roundtable-november-2024>

November 18-20 IL

Rate-Setting Essentials, Schaumburg. Renaissance Schaumburg Convention Hotel. Presented by American Water Works Association. For info: <https://www.awwa.org/event/rate-setting-essentials/>

November 19 WEB

Pipe Material Matters: Navigating the Latest, Virtual. Presented by American Water Works Association. For info: <https://store.awwa.org/Pipe-Material-Matters-Navigating-the-Latest-FREE-Webinar-Sponsored-and-Presented-by-DIPRA?quantity=1>

November 19-21 DC

33rd Annual Eastern Boot Camp on Environmental Law, Washington. Sidley Austin LLP. Presented by the Environmental Law Institute. For info: <https://www.eli.org/boot-camp/eastern-registration>

November 20-21 TX

The Annual US Water Treatment Conference, Dallas. Presented by LMN Assets. For info: <https://www.lmnpower.com/shop>

November 24-26 NE

2024 NeWRA/NSIA Convention, Kearney. Younes Conference Center South. Presented by Nebraska Water Resources Association/Nebraska State Irrigation Association. For info: <https://www.newra.net/convention-registration/>

December 2-4 OR

Oregon Water Resources Congress (OWRC) Annual Conference, Hood River. Best Western Hood River Inn. Presented by Oregon Water Resources Congress (OWRC). For info: <https://www.owrc.org/annual-conference/>

December 3-4 WEB

2024 Pretreatment Virtual Workshop, Virtual. Presented by National Association of Clean Water Agencies. For info: <https://www.nacwa.org/conferences-events/2024-pretreatment-virtual-workshop/#Register>

December 3-5 CA

2024 ACWA Fall Conference & Expo, Palm Desert. JW Marriott Desert Springs Resort & Spa. Presented by Association of California Water Agencies. For info: <https://www.acwa.com/events/2024-fall-conference-expo/>

December 4-6 NV

Colorado River Water Users Association 2024 Conference, Las Vegas. Paris Las Vegas Hotel. For info: <https://web.cvent.com/event/1ff2c387-ab28-4474-8100-dbebe6690e28/summary>

December 4-6 WA

Washington State Water Resources Association (WSWRA) Annual Conference, Spokane. The Historic Davenport Hotel. Presented by Washington State Water Resources Association (WSWRA). For info: <https://wswra.wildapricot.org/event-5844440>

December 5-6 IL

From Rules to Solutions: LCRI, PFAS, and Community Impact, Chicago. Hilton Chicago Hotel. Presented by American Water Works Association. For info: <https://www.awwa.org/event/from-rules-to-solutions-lcrist-pfas-and-community-impact/>

December 5-6 DC

P3 Government Conference, Washington. Westin Downtown. Presented by P3 Government. For info: <https://www.p3gov.com/>

December 9 NV

Well Evaluation, Troubleshooting, and Rehabilitation Short Course, Las Vegas. Westgate Las Vegas Resort & Casino. Presented by National Groundwater Association. For info: <https://www.ngwa.org/detail/event/2024/12/09/default-calendar/24dec9sc>

December 9 NV

Groundwater/Surface Water Interactions: Field and Mathematical Approaches Short Course, Las Vegas.

Westgate Las Vegas Resort & Casino. Presented by National Groundwater Association. For info: <https://www.ngwa.org/detail/event/2024/12/09/default-calendar/24dec9sc242>

December 10-11 OR

Business & the Environment: Conference & Expo, Portland. Holiday Inn Portland Columbia Riverfront. Presented by Northwest Environmental Business Council, State of Oregon Department of Environmental Quality, and Department of Ecology by State of Washington. For info: <https://necb.regfox.com/business-the-environment-attendee-registration-2024>

[com/business-the-environment-attendee-registration-2024](https://necb.regfox.com/business-the-environment-attendee-registration-2024)

December 10-11 CA

2024 NHA California Regional Meeting, Redding. Sheraton Redding Hotel. Presented by National Hydropower Association. For info: <https://www.hydro.org/event/2024-nha-california-regional-meeting/>

December 10-12 NV

Groundwater Week 2024, Las Vegas. Las Vegas Convention Center. Presented by National Groundwater Association. For info: <https://groundwaterweek.com/registration/>

December 10-13 ND

61st Annual Joint North Dakota Water Convention & Irrigation Workshop, Bismarck. Bismarck Hotel & Conference Center. Presented by North Dakota Water. For info: <https://ndwater.org/events/2024waterconventionirrigationworkshop/>

December 11 WEB

Financing Source Water Protection Through the Farm Bill & Inflation Reduction Act, Virtual. Presented by American Water Works Association. For info: <https://store.awwa.org/Financing-Source-Water-Protection-Through-the-Farm-Bill-and-Inflation-Reduction-Act?quantity=1>

December 12 CA

2024 CalWEP Winter Plenary, Sacramento. Presented by California Water Efficiency Partnership. For info: <https://calwep.org/events/>

December 17 WEB

PFAS: A Growing Problem for Agriculture, Virtual. Presented by Best Best & Krieger LLP. For info: <https://share.hsforms.com/114rGKilCTK2Je554I2N2uQe7xu3>

January 7-8 LA

Louisiana Ground Water Association Annual Convention, Marksville. Paragon Casino. Presented by Louisiana Ground Water Association. For info: <https://lgwa.org/>



CALENDAR

January 8-10 NV

Utah Ground Water Association 44th Annual Conference & Expo, Mesquite. CasaBlanca Resort & Casino. Presented by Utah GroundWater Association. For info: <https://www.utahgroundwater.org/events/#!event/register/2025/1/8/ugwa-conference-expo>

January 8-10 OK

Oklahoma Ground Water Association Conference, Stillwater. Wes Watkins Center. Presented by Oklahoma Ground Water Association. For info: <https://okgroundwater.org/events>

January 13-16 ID

88th Annual Convention, Boise. The Riverside Hotel. Presented by Idaho Water Users Association. For info: <https://www.iwua.org/event-5874876>

January 15-17 KS

KGWA 77th Annual Convention and Trade Show, Mulvane. Kansas Star Event Center. Presented by Kansas Ground Water Association.

For info: <https://www.kgwa.org/event-5912050>

January 21-23 ND

39th Annual Water EXPO, Bismarck. Bismarck Event Center. Presented by North Dakota Rural Water Systems Association. For info: <https://www.ndrw.org/water-expo/>

January 22-24 ID

Idaho Ground Water Association Annual Convention, Garden City. Riverside Hotel. Presented by Idaho Ground Water Association. For info: <https://igwa.info/event/igwa-annual-convention/>

January 26-28 MN

MWWA 103rd Annual Convention and Trade Show, St Cloud. Kelly Inn and River's Edge Convention Center. Presented by Minnesota Water Well Association. For info: <https://mwwa.org/event-5908658>

January 27 WEB

Colorado Basin Roundtable - January 2025, Virtual Event. Presented by Colorado Water Conservation Board. For info:

<https://cwcb.colorado.gov/events/colorado-basin-roundtable-january-2025>

January 27-30 NV

2025 NWRA Annual Conference Week, Sparks. Nugget Casino Resort. Presented by Nevada Water Resources Association. For info: <https://www.nvwra.org/2025-annual-conference-week>

January 28-30 TX

2025 TGWA Annual Convention, Lubbock. Lubbock Memorial Civic Center. Presented by Texas Ground Water Association. For info: <https://web.tgwa.org/events/2025-TGWA-Annual-Convention-33/details>

January 29-31 CO

Colorado Water Congress Annual Convention, Aurora. Hyatt Regency Aurora-Denver Conference Center. Presented by Colorado Water Congress. For info: <https://members.cowatercongress.org/calendar/Details/2025-annual-convention-1196737?sourceTypeId=Hub>

February 5-7 MT

MWWDA 80th Annual Convention and Trade Show, Helena. Delta Colonial Hotel. Presented by Montana Water Well Drillers Association. For info: <https://www.mwwda.org/event-5824925>

February 9-11 TX

AWWA/WEF Young Professionals (YP) Summit, Dallas. Hilton Anatole Hotel. Presented by American Water Works Association/Water Environment Federation. For info: <https://www.awwa.org/Events-Education/Young-Professionals-Summit>

February 11-14 TX

AWWA/WEF The Utility Management Conference, Dallas. Hilton Anatole Hotel. Presented by American Water Works Association/Water Environment Federation. For info: <https://www.awwa.org/Events-Education/Utility-Management>