

# Colorado Water

January/February 2019

**ENVIRONMENTAL  
JUSTICE**

## Features — Environmental Justice

- 2 Stories of Water Equity and Environmental Justice**  
*By Melinda Laituri and Stephanie A. Malin*
- 4 The Water Crisis and Environmental Justice in Flint: A View From the Ground**  
*By Michael Wenstrom*
- 8 Water and Environmental Justice at the U.S.-Mexico Border**  
*By Stephen Mumme*
- 11 A Case of Spatial (In)justice: The Dakota Access Pipeline**  
*By Melinda Laituri*
- 14 Joining Voices to Be Heard**  
*By Lorelei Cloud*
- 16 Reaching Families in Bolivia with Safe Water**  
*By Dana de Andres*
- 20 Water and the Amahoro (Peace) Project: Building Sustainable Peace and Development in Post-Conflict Burundi**  
*By Bill Timpson*
- 24 Impacts of Natural Resource Mismanagement on Food Security and Development in Sub-Saharan Africa**  
*By Woldezion Mesghinna*
- 28 Water and Social/Environmental Justice in the Himalayas: The Multiple Roles of Rivers**  
*By George Taylor II*
- 31 An Indigenous Perspective on Development and Water Management**  
*By Dave Archambault II*



On the Cover:  
©iStock

- 33 Water Equity and the Pursuit of Justice**  
*By Sarah Romano*
- 40 Public Drinking Fountains and Bathrooms: A Human Right**  
*By Cheryl Distaso and Sarah King*

## From our Water Experts

- 36 Bringing More Diversity to Colorado's Water Policy Decision-Making Table**  
*By MaryLou Smith*

## From our Cooperators

- 38 Environmental Justice in the Colorado Borderlands**  
*By Patricia Rettig*

References can be found in the online version of this newsletter at <http://cwi.colostate.edu/newsletters.asp>

Cooperators include the Colorado State Forest Service, the Colorado Climate Center, and CSU's Water Resources Archive.

The contents do not necessarily reflect the views and policies of these agencies, nor does mention of trade names or commercial products constitute their endorsement by the U.S. Government and Colorado State University. CSU is an equal opportunity university.

# COLORADO WATER

## Volume 36, Issue 1

*Colorado Water* is a publication of the CSU Water Center. The newsletter is devoted to highlighting water research and activities at CSU and throughout Colorado.

**Published by**  
Colorado Water Institute  
Reagan Waskom, Director

**Editors**  
Melissa Mokry  
Catie Boehmer

**Design**  
Emily Pantoja

**Production Director**  
Nancy Grice

## Supported by

This publication is financed in part by the U.S. Department of the Interior Geological Survey, through the Colorado Water Institute; the Colorado State University Water Center, College of Agriculture, Warner College of Natural Resources, Agricultural Experiment Station, and Colorado State University Extension.



[watercenter.colostate.edu](http://watercenter.colostate.edu)



[cwi.colostate.edu](http://cwi.colostate.edu)

## Director's LETTER



*With liberty and justice for all...* Words schoolchildren in the U.S. grow up reciting in the Pledge of Allegiance. “Justice for all” is a big concept, an ideal for an idealistic people, and arguably a fundamental concept for any truly great society. Justice is a social contract: the concept that everyone is held to the same set of rules and is treated fairly and equitably under those rules, regardless of color, creed, or class. Notwithstanding our Pledge of Allegiance, we know justice in our great country is not always certain or equitable, yet our collective social conscience bends us in that direction. To misquote the oft-cited Martin Luther King, Jr. quote: *the arc of the moral universe is long, and thus we must bend it toward justice*. There is no guarantee that our society will automatically become more just or equitable with the passage of time—unless we collectively decide it should be so and make changes accordingly.

This issue of *Colorado Water* addresses the topic of environmental justice, specifically focusing on its intersection with water. Environmental justice refers to fair and equitable treatment for all people with respect to the environment, regardless of race, origin, or socioeconomic status. The fundamental premise of environmental justice is that no community should be saddled with more environmental burdens or fewer environmental benefits than any other. In particular, disadvantaged communities should not have to bear a disproportionate share of the negative environmental consequences from industrial or commercial activities or the legacy of those activities.

The concept of environmental justice emerged in the 1980s, as it became apparent that under-served communities were more likely to suffer from the legacy effects of industrial pollution and waste. Warren County, North Carolina, is often cited as the birthplace of the environmental justice movement. Following illegal midnight dumping of toxic PCBs along a roadside in the late 1970s, the state, with EPA approval, decided to dispose of the PCB-contaminated soil at a landfill site in the county with the highest percentage of black residents and nearly the lowest per capita income in the state. The local residents rebelled, lawsuits ensued, and when the trucks laden with contaminated soil rolled into the community in 1982, they were met by citizens who were resisting by laying across the highway to block truck access. The state prevailed, citizens were arrested, and the landfill was realized, although it later became a legacy environmental cleanup for the state. In direct response to the Warren County case, the U.S. General Accounting Office issued a report in 1983 revealing that three out of four hazardous waste sites in the southeast U.S. were located in primarily black communities.

The environmental justice movement addresses a statistical fact: people who live, work, and play in America's most polluted environments are more likely to be people of color and the poor. Environmental organizations have long focused on wilderness, wildlife, and unique ecosystems, rather than pollution and waste impacts on the health of inner city poor, communities of color, tribes, and other minority groups. Historically, they have been less involved in the struggles of disadvantaged people impacted by nearby hazardous waste landfills, waste transfer stations, incinerators, smokestack industries, livestock processors, oil refineries, and chemical manufacturers. Social activists, rather than environmental activists, drove the environmental justice movement. In 1994, the Office of Environmental Justice (OEJ) was established at the EPA, following an executive order by President Bill Clinton. Embedded among the pillars of environmental justice is the concept of equal access to inclusion in the decision-making process in environmental determinations and administration.

Access to adequate supplies of safe, clean water seems fundamental in a country as wealthy as the U.S., yet a number of examples of water-related environmental injustice remain. Water contamination, pipeline routes, and drinking water safety are among recent headlines. Perhaps closer to home here in Colorado, the issue of access to drinking water and bathrooms for individuals experiencing homelessness has recently arisen as an issue. Aging infrastructure needs are apparent across the U.S., but in particular, we see drinking water supply and sanitation infrastructure needs in poorer communities, especially in Native American communities.

This newsletter is a result of recent activities of the CSU Environmental Justice Working Group, led by Professors Stephanie Malin, Dimitris Stevis, and Melinda Laituri. These articles document the ongoing work to achieve better health outcomes, economic opportunities, and living conditions for all communities, regardless of socioeconomic status.

*Reagan Washam*  
Director, Colorado Water Institute



STORIES OF

# WATER EQUITY & ENVIRONMENTAL JUSTICE

Melinda Laituri, Ecosystem Science and Sustainability, Colorado State University;  
Stephanie A. Malin, Sociology and Colorado School of Public Health, Colorado State University

*In October 2017*, Colorado State University's Environmental Justice Working Group and the CSU Water Center co-hosted a one-day symposium centered around issues of water justice and environmental equity. Water is a critical issue of the 21st century, wherein access and equity will need to be negotiated against the backdrop of climate change and socio-economic challenges. To explore these issues through the lens of environmental justice, the Environmental Justice Working Group (supported by CSU's School of Global Environmental Sustainability (SoGES)) and the Water Center designed the event to bring together diverse networks and stakeholders. Presenters were encouraged to tell stories rather than present the typical lectures that dominate conferences. The results were inspiring, and we are grateful to be able to share some especially engaging narratives from the Symposium in this issue of *Colorado Water*.

In this issue, our authors utilize a combination of narrative and photo essays. The variety of pieces allows us to address critical stories of the human right to water, water privatization and access, the role of rivers in human communities, and water equity for indigenous and under-represented groups. These water stories span the globe and feature transnational research, activities, and community-centered approaches to resolving water conflicts. Presenters raised provocative questions such as "Who speaks for the river?" to address how natural systems, including rivers, watersheds, and oceans, can be given legal standing and, more broadly, recognition to ensure environmental integrity.

The products of this Symposium showcased here represent the natural synergy between water issues and environmental justice. Environmental justice is the view that all people deserve a healthy and safe environment in which to live, work, and play—regardless of their race/ethnicity, class status, age, gender, citizenship, and other social variables. Environmental injustice is widely recognized as a persistent and systemic problem around the world. Injustices can include distributive aspects, such as inequitable exposure to toxicants and hazards in polluted environments—as in cases of water contamination—or they can be more procedural, such as inequitable access to information about potential risks or not having a seat at the table to participate in making decisions about water use or access. Importantly, bio-


diversity and ecological well-being are increasingly vital parts of environmental justice—with the focus on all beings rather than just human beings.

Water privatization became a central focus for this event because it represents one of the keenest barriers to environmental justice and democratic access to natural resources. Water privatization refers to the practice of commodifying water, which means making it a marketed good to buy and sell, which in turn creates significant barriers to public access to this vital resource. Water can become inaccessible to the poorest and most vulnerable in society when privatization occurs. How? Research has shown that once water privatization commences, private companies can increase rates for water users, often cut utility jobs, side-step safety precautions including adequate water treatment to preserve quality, and even self-monitor their regulatory compliance (eg., see Bakker 2010, 2007, 2004). These new owners are, after all, private entities accountable not to members of the public but to their shareholders.

Yet, as we all know, human beings require water to live. Therefore, commodifying and privatizing water can have devastating impacts on daily quality of life, water access, and water quality—all vital aspects of environmental justice. Flint, Michigan, provides a familiar example. While Flint's lead contamination disaster has become notorious, few of us understand that privatization acted as a key mechanism driving the public health disaster. Veolia—a private water company and the largest provider of water services worldwide—had a contract with the city of Flint to improve water quality (Lerner and Hosea, 2018). At that time, they helped make decisions that privileged their bottom line first—as any private company can be expected to do!—and cut costs by deciding not to treat the water with an anti-corrosive agent that would have helped prevent the lead contamination. As this case illustrates, when water is privatized, the bottom line becomes the central concern—even as access, quality, and public health can be sacrificed as mere externalities. Cases like this are becoming more common in the U.S. and other countries of the Global North as public utilities suffer from inadequate budgets and crumbling infrastructure, and in the Global South as powerful multinational lending agencies, such as the World Bank, increasingly demand water privatization or public-private partnerships as part of their loan conditions (Goldman 2007, 2005).

To address these seemingly intractable environmental problems and promote discussion and action on environmental justice, the SoGES Environmental Justice Working Group

was created in 2009. The main goal of the Environmental Justice Working Group is to create space for engaged interdisciplinary scholarship, training, teaching, and community-building around issues of environmental injustice. We aim to make Colorado State University a central node for environmental justice scholarship and practice in the American West, nationally, and globally. The group works to build a rich and collaborative community of scholars, practitioners, non-profit partners, and community members passionate about building a better society, in which all people can feel safe and healthy where they live, work, and play and our socio-economic systems serve and sustain our planet.

These stories of water equity provide a sampling of the rich context of water issues within Colorado and around the world. They demonstrate the power of stories and the people who are dedicated to resolving water equity and access for the future. Even in the face of daunting challenges such as climate change, these stories highlight the ways that hope, equity, and community can provide invaluable tools to build something better—where everyone has access to clean, healthy, and affordable water. 



“  
ALL PEOPLE  
DESERVE A  
HEALTHY AND SAFE  
ENVIRONMENT IN  
WHICH TO LIVE,  
WORK, AND PLAY  
”

*Symposium attendees.  
Photo by Katie Powlen.*





# THE WATER CRISIS AND ENVIRONMENTAL JUSTICE IN FLINT

## A VIEW FROM THE GROUND

Michael Wenstrom, Environmental Justice Region 8,  
U.S. Environmental Protection Agency

**O**n October 18, 2017, Colorado State University sponsored a symposium featuring stories of water equity and environmental justice. My colleague Diane Russell, from EPA Region 5, and I shared our perspectives on the water crisis in Flint, Michigan. My portion of the presentation was in the form of a pictorial essay. The following is a written re-creation of that presentation. It is difficult for me to recreate the power of the pictures in written form. I hope the accompanying pictures will enliven this narrative as well.

Flint played a powerful role in the development of the American automobile industry. The roots of that development are found in Flint's history as the home of America's carriage industry. That work set the stage for the evolution of the city into a center for the manufacture of automobiles. This history helps to explain both the rise and fall of Flint, which has been tethered in multiple ways to the automobile industry and especially General Motors.

Flint was home to nearly 200,000 residents by the 1960s, during the peak of the automobile production boom in the U.S. Flint's population is now below 100,000 residents, following the decline of domestic auto production in Michigan. At its peak, some historians count direct employment in the automobile industry at about 80,000 of these residents. Cur-



*Municipal pipes (Left to Right) a lead pipe, a corroded pipe, and a pipe treated with orthophosphate. Photo by U.S. EPA Region 5.*

rent estimates show those numbers are down to approximately 8,000 employees. For Flint, the economic, social, and cultural consequences of this downsizing are profound.

### **A Brief History of the Flint Water Crisis: Context for the EPA's Response**

On April 25, 2014, the city of Flint changed their municipal water supply source from Detroit-supplied Lake Huron water to the Flint River. For a variety of reasons, the switch in the water did not incorporate an orthophosphate treatment into the Flint River water source. This resulted in the corrosion of the water distribution pipes and leaching of lead and other contaminants into municipal drinking water. The city of Flint issued a lead advisory on September 25, 2015, that

advised residents to use water only from the cold-water tap for drinking, cooking, and making baby formula. On October 1, 2015, the Genesee County Board of Commissioners and Genesee County Health Department declared a public health emergency and advised residents of Flint not to drink the municipal water unless it had been filtered. On October 15, 2015, funding was authorized to switch the municipal water source back to Detroit-supplied Lake Huron water. At the height of the crisis, the EPA had more than 50 staff members on the ground.

In January 2016, the EPA issued an emergency order to take action on the Flint water crisis. EPA emergency response teams deployed to Flint to assist state and local authorities and scientists in understanding the problem and instituting steps to resolve it. Work included extended lead sampling at hundreds of homes, chlorine monitoring across the city, and testing point-of-use filters to make sure they were filtering lead out of drinking water.

Community engagement was a top priority since many residents received confusing and mixed messages during the crisis. EPA staff developed information materials, attended community meetings, and held several open houses to connect the community with the information they needed to keep themselves and their families safe.

In April 2016, the EPA's Office of Environmental Justice expanded engagement efforts by deploying eight EPA Environmental Justice (EJ) Navigators to assist with the federal Flint Water Crisis Response and Recovery. The EJ Navigators conducted outreach about the water response to residents, representatives of community-based organizations, and a variety of businesses and faith-based organizations. The Navigators also engaged federal, state, and city officials to gain an understanding of community assets, concerns, and opportunities.

### **Engaging Environmental Justice on the Ground in Flint**

It is here that my direct story begins. As a Navigator, I was charged with the tasks listed above. I had never been to Flint. I knew no one within the community and was entering a place that has been traumatized for decades. I could not even safely use their municipal water, and I soon found that this trauma multiplied community anger and frustration. It engendered a belief among the minority and low-income communities of Flint that they were intentionally targeted by the water crisis. It was, therefore, not surprising that my (and my colleagues') encounters with community members usually opened with anger at government.

I quickly learned about the reality of living in Flint. Each resident generally used two cases of bottled water for necessary daily functions. In the case of a family of four, eight cases of water were required. Bottled water was available at no cost. However, you had to go get the water from fire stations, churches, and other organizations that hosted water distribu-



*Flint Public  
School Water  
Fountain  
Photo by  
Michael  
Wenstrom.*

tion. If you are a working single mother with three children, how do you make this happen? It was a daily challenge. Do you have a car? Can you carpool? Do you need to ride the bus—every day? For a commodity that your city has promised to supply, which you now cannot use, but for which you still have to pay.

Most of my work was in northeast Flint. These neighborhoods are largely African-American. While my colleagues and I were greeted politely, it quickly became apparent that community members had absolutely no trust in government, at any level. There were many reasons for this lack of trust, the water crisis simply exacerbated a long history of patterned experiences of deliberate oppression among minority community members. To wit, the Michigan Civil Rights Commission published a report in February 2017 entitled *Systemic Racism Through the Lens of Flint*. The commission stated that, “We must come to terms with the ongoing effects of ‘systemic racism’ that repeatedly led to disparate racial outcomes as exemplified by the Flint Water Crisis. This can no longer be ignored (Civil Rights Commission Report, pg. iii).”

In minority communities in Flint, the water crisis served to amplify and showcase environmental injustices that plagued much of the community; for them, it showed that disparate outcomes were to be expected.

When I was posted to Flint for two weeks in April 2016, I landed amid these complex and historically laden circumstances. I had no idea what to expect. In my twenty years of working in communities for the EPA, I had often experienced a lack of trust in government, but never so deep nor so broad as in Flint. Generally, if you approach people with a willingness to listen, to understand and to seek real solutions, trust can be built. It takes time and a willingness to follow through, but it is possible. And, as a cautionary note, trust can also be destroyed in an instant. In this case, I knew that I could not predict the outcome of my intervention.

But at the end of my first day, in a meeting with community members in Flint, I came away with a critical understanding: there was a glimmer of hope in the residents. For all of the anger, disappointments, and challenges of life—I saw hope.

My work has taught me that you can bring much to a community—money, physical improvements, and training. However, if the people you are serving have no hope, the consequences of your work will soon disappear. Accordingly, when I attended the EPA daily morning status meeting and was asked what I learned in my first day on the ground, I shared that I learned: that there is hope in this community and that, with hope, there are good things we can do. That understanding set me free to work with Flint’s communities.

### **Continuing EJ Work in Flint**

Subsequently, I offered to return to Flint in support of our Region 5 EJ program. I returned multiple times. Much of my work was with churches in the northeast and eastern neighborhoods





(Top) A water distribution center.  
(Bottom) Weekly Food and Water Distribution at Foss Avenue Baptist Church. Photos by Michael Wenstrom.

of Flint, working with the African-American and Latino communities. Among other things, we worked with community and colleges (University of Michigan, Michigan State, and Kettering University), initiating projects between the colleges and the community. For example, Kettering worked with one neighborhood to begin to improve a local park. Flint has multiple parks, but virtually no personnel to maintain those parks.

Myself and other EPA officials also worked with community members to bring in additional resources to Flint to address some of these systemic inequities. One church was gifted with a “pop-up store”—a van that brought fresh fruits and vegetables into the neighborhood to sell. The church was seeking assistance from the U.S. Department of Agriculture, and their request was turned down. My colleagues and I investigated and learned that the church had requested the wrong form of assistance. We redirected the church’s request, and they were successful


in their subsequent request. Now, the “store” is able to sell its produce, which can be paid for with SNAP coupons, used by many individuals in the neighborhood, given the absence of cash among residents.

---

**“ I HAD OFTEN EXPERIENCED A LACK OF TRUST IN GOVERNMENT, BUT NEVER SO DEEP NOR SO BROAD AS IN FLINT ”**

There are other stories to tell, but the ones above illustrate how one can identify and implement the possible. Large changes are necessary to move Flint forward. But baby steps such as the pop-up store are still significant steps, as they serve to nurture the flickering flame of hope that lives within most communities.

We were fortunate to be able to serve the residents of Flint.

As the water issue is resolved, we need to focus on engaging in consistent and sustainable collaborations between government and community and other stakeholders. This work should seek out and make real the changes, which are necessary to help the community grow and thrive in more equitable ways. 

Water and Environmental  
Justice at the

# U.S. — Mexico Border

Stephen Mumme, Political Science,  
Colorado State University

**N**o other natural resource defines the U.S. boundary with Mexico as does water, with much of the region classified as arid. As border historian Oscar Martinez observes, the availability and access to water is much the measure of the development divide between the two countries. Mexico's less abundant water resources throughout much of the border region contrast sharply to those north of the border, perhaps most evident in lower per-capita potable water consumption (Mexican border cities use roughly a third the per-capita volume of water compared to their U.S. sister cities) and in the well-manicured lawns and golf courses that dot U.S. border cities, in contrast to their Mexican counterparts. The boundary itself is sharply discernable from the air by the green fields to the north and brown fields to the south.

This state of affairs traces, of course, to the shared history of the two contiguous countries. Mexico lost nearly half of its national territory to the U.S. in 1848, including the water-rich headwaters of the Rio Grande and Colorado Rivers. Later, water agreements arguably favored the U.S., at least on the upper Rio Grande and the Colorado Rivers. The result accounts to a large degree for the waterscape we see today at the border.

The contemporary concern for environmental justice along the boundary is embedded in this structural reality. Environmental justice may be seen as a specific application of the larger notion of environmental equity in human affairs. Environmental equity emphasizes the value of fairness in the allocation of social and natural burdens and benefits issuing from environmental conditions. Environmental justice, in turn, speaks to the process of attaining and the attainment of a fair distribution of burdens and benefits related to an environmental state of affairs.





Attention to hydrological justice along the border is a fairly recent concern, traceable on the U.S. side of the boundary to the Clinton administration's environmental justice directive in 1994. That directive, interestingly, coincided with the establishment of newly created binational environmental institutions intended to mitigate the expected adverse effects of the North American Free Trade Agreement (NAFTA) on cities and communities straddling the international boundary. These new institutions—the Border Environment Cooperation Commission (BECC), the North American Development Bank (NADB), new programs implementing the 1983 La Paz Agreement on Environmental Cooperation, and new federal advisory bodies on environmental affairs in each country—joined the long established International Boundary and Water Commission (IBWC) in addressing well-known water and sanitation deficiencies along the border.

Even so, it took a while for environmental justice concerns to become well-embedded in the practice of environmental cooperation in the border region. Part of the problem was tied to the historic asymmetries in national financial resources available for addressing the problems of water provision and sanitation along the border. The other part of the problem was the sharp difference in administrative practices available for addressing issues of environmental (hydrological) justice in the border region.

The former problem was longstanding. The IBWC had historically drawn more heavily on U.S. funds to build binational sewage plants at the boundary, justifying the practice by budgeting construction and operations on the basis of assigning costs proportional to benefits—arguably a subsidy to Mexico that recognized its lesser capacity to pay. While the new NAFTA-based institutions were established on the basis of equal national contributions to their operations, the asymmetrical economic capacity problem remained. This was partially addressed after 1996 by dedicated funds directed through the U.S. EPA to NADB for deployment in BECC's water and sanitation projects. Over 280 projects have been certified since 1994, nearly equally distributed between the U.S. and Mexican sides of the border. These projects have significantly improved water conservation, potable water provision, and sanitation and wastewater management in poor communities along the border, although the rapid pace of border area urbanization still outstrips hydrological capacity in cities like Tijuana, Mexicali, Nogales, and Nuevo Laredo, among others.

Administrative practices in the two countries also pose challenges to the implementation of environmental (hydrological) justice along the boundary. The U.S. system places considerable weight on the justice system to remedy environmental inequities. In Mexico, remedies are more likely to be sought by means of appeals to responsible state and federal environmental authorities. Moreover, Mexico's approach to achieving environmental justice is more heavily predicated on the provision of basic services to its needy communities rather

than the adjudication of criminal violations and civil disputes. In 2012, for example, Mexico recognized the human right to water in its national constitution, adding force to its effort to supply Mexican citizens with reliable water services.

These national administrative differences made it difficult to explicitly embrace environmental justice in binational cooperative programs under the aforementioned La Paz Agreement, as it was seen as a U.S. concept. Instead, beginning in 2003, the Border 2012 program adopted as one of its guiding principles the imperative of addressing “disproportionate environmental impacts in border communities.” This guiding principle is carried over in the current Border 2020 environmental cooperation program.

Achieving environmental (hydrological) justice in the context of historical asymmetries between the two countries remains a herculean task, but the fact that the problem is now better recognized by both countries is an important start.

A major focus of the La Paz Programs in recent years has centered on mitigating and eliminating the contamination of transboundary rivers and streams as well as transboundary aquifers along the border. This is a tall order, as many of the toxic chemicals used in industrial applications by Mexico’s many border assembly plants go unaccounted for each year—drained illegally to sewers and drains or dumped in desert arroyos. Since 2001, the two countries have unofficially embraced a watershed approach to managing transboundary rivers and streams, evident in recent water resource agreements in the lower Colorado River basin (IBWC Minute 323, signed in 2017) and on the Tijuana River (IBWC Minute 320, signed in 2015). Such measures may be limited in scope, but add to the tools environmentalists can wield to address the adverse effects of industrial contamination on scarce water resources and the vulnerable communities who depend on them.

The recently merged NADB/BECC institutions continue to target the poorest communities along the border for sanitation and potable water improvements, assisting with project development

and financing. A new community assistance fund enables NADB to now offer grants instead of loans to facilitate project improvements along the border, although the funds available remain well below the catalogued needs of communities on both sides of the boundary. In general, the level of U.S. support for border environmental programs, including the La Paz Programs, has sharply declined over the past decade.

Other challenges remain. In 2006, for example, the U.S. unilaterally moved to line the All-American Canal on the boundary with Baja California with concrete, eliminating groundwater seepage to Mexico and taking as much as 1,200 hectares out of production. As many as 30 small towns’ water supplies may be adversely affected. Mexico’s protests went unheeded. Elsewhere along the border, in Mexico and the U.S., large commercial water systems are draining scarce groundwater on which neighboring communities depend.

In sum, the border region remains one of the most environmentally and hydrologically challenged regions in North America. The region’s rapid growth, much of which is trade-driven, and the enduring economic asymmetry between the two countries ensure that environmental and hydrological justice will remain on the binational agenda for decades to come. 🌍

Sources for this article are available from Dr. Stephen Mumme on request at [stephen.mumme@colostate.edu](mailto:stephen.mumme@colostate.edu).



*The border between San Diego, California (left) and Tijuana, Mexico (right). Photo by Sgt. First Class Gordon Hyde.*

# (IN)JUSTICE

A CASE OF **SPATIAL**

# JUSTICE

## The Dakota Access Pipeline

Melinda Laituri, Ecosystem Science and Sustainability,  
Colorado State University

**T**he keynote address at the Stories of Water Equity and Environmental Justice Symposium was presented by David Archambault II, Chairman of the Standing Rock Indian Reservation. In 2016, the world was riveted by demonstrations from the Standing Rock Sioux Tribe against the construction of the Dakota Access Pipeline (DAPL) in North Dakota. Throughout the year, the anti-DAPL campaign grew, with activists from around the world joining the Sioux Tribe, culminating in the largest gathering of Native Tribes in the past 100 years. Central to these events was the protection of water, specifically the Missouri River that flows through the reservation and is the source of its water supply. Rather than protesters, activists called themselves “water protectors,” whose aim was to protect Native people living near the Missouri River from potential contamination due to the pipeline and non-Native people living in nearby towns. The protection of water is essential as it is the source of life.

The Standing Rock Protector movement reveals the myriad aspects of spatial (in)justice. Archambault’s keynote address used a series of maps to demonstrate the relationship of power, protest, and politics situated within the historical context of colonialism. The series of maps tell a compelling story of the shrinking boundaries of the Sioux Nation based upon U.S. government treaties and policies. These maps expose the geographies of the inter-related spatial dimensions of human rights and democracy within the context of neo-colonialism, economic drivers, and cultural dissonance. The relationship between the cultural perspective of places (homes, sacred sites, and communities) and the spatial reality of government and corporate encroachment on these places through policy and infrastructure projects (e.g., railroads, highways, and pipelines) reveal the geography of (in)justice.

Spatial justice “involves identifying those instances and events of systemic injustice that may be of a racial, gender, ethnic, or economic origin...that are caused by the economic, social, and political production of space, both physical and social, that evolve over time” (Soja, 2000). Spatial (in)justice is exhibited in this case in three distinct ways: 1) the power dynamic between indigenous communities and the U.S. over

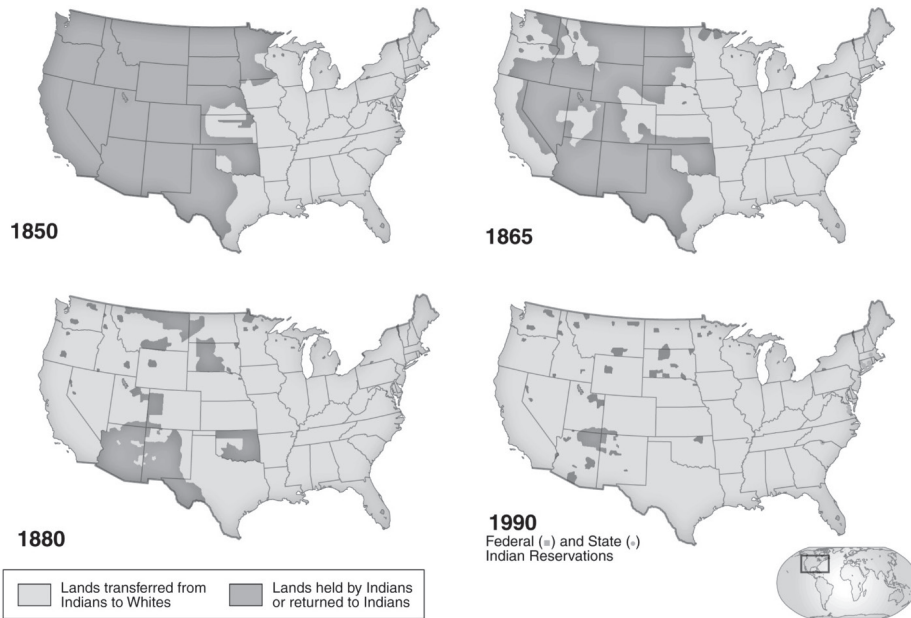
*Protesters march against banks involved in fossil fuel projects like DAPL. Photo by Jake Conroy, Rainforest Action Network.*

time as represented in historical maps; 2) the re-routing of a pipeline from a predominately white city to closer proximity to tribal lands; and 3) the juxtaposition of sensitive environments and cultural sites with the pipeline project.

Archambault eloquently traced the history of Standing Rock Indian Reservation through a series of maps (1784 –

1954) that depict different treaty boundaries where the spatial extent of Sioux lands is systematically eroded (see keynote presentation from “Stories of Water Equity and Environmental Justice”, <https://watercenter.colostate.edu/waterstories/>) despite U.S. government recognition of Sioux sovereignty. Figure 1 is a map of the changing extent of Native lands in the U.S.

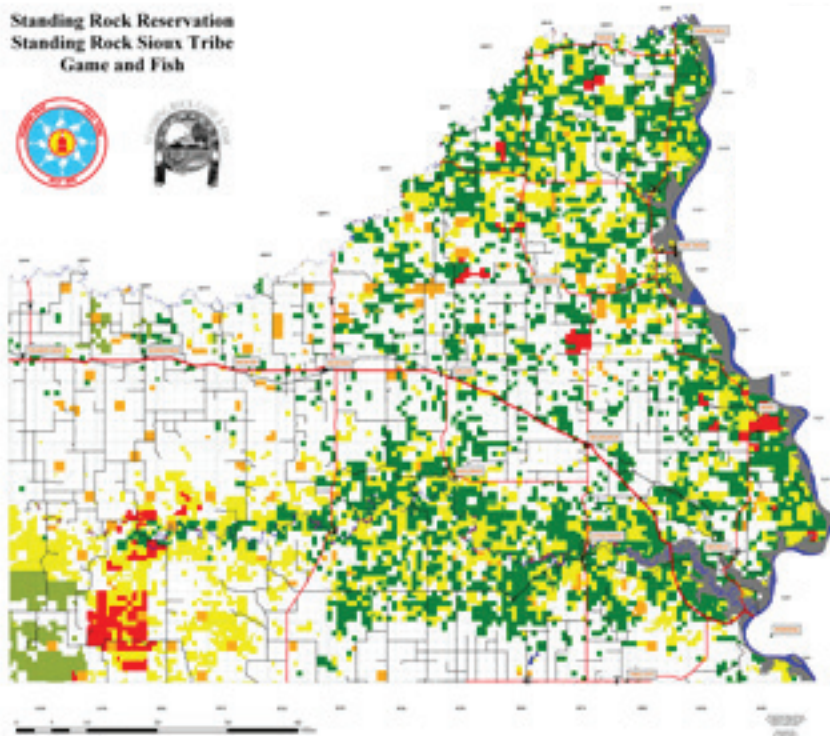
(Top) Figure 1. Map of Native lands, 1850 – 1990. Map by [cbsd.org](http://cbsd.org).  
 (Bottom) Figure 2. Map of Standing Rock Sioux Tribal Lands, Standing Rock Sioux Tribe Game and Fish 2008. Accessed at [http://gameandfish.standingrock.org/image/cache/SRST\\_Game\\_andFish24by20.pdf](http://gameandfish.standingrock.org/image/cache/SRST_Game_andFish24by20.pdf)



from 1850 to 1990. These treaties were built upon U.S. government priorities linked to economic drivers that ensured western expansion, access to resources (e.g., most notably the 1877 discovery of gold in the Black Hills), and networks of infrastructure that necessarily criss-cross Native lands. These networks include a transportation complex of railroads and the interstate highway system, the electrical grid inclusive of dams for hydropower, and pipelines to move oil and natural gas. This intrusion upon the lands of the Native tribes has resulted in a fragmented, checker-board landscape of ownership and truncated connection to sacred sites and cultural areas (Figure 2).

The DAPL, known as the “black snake” by protectors, crosses a major waterway made up of the Missouri River and Lake Oahe, upriver from the Standing Rock Sioux Tribal Area. The location of the pipeline route further demon-

**Standing Rock Reservation  
 Standing Rock Sioux Tribe  
 Game and Fish**



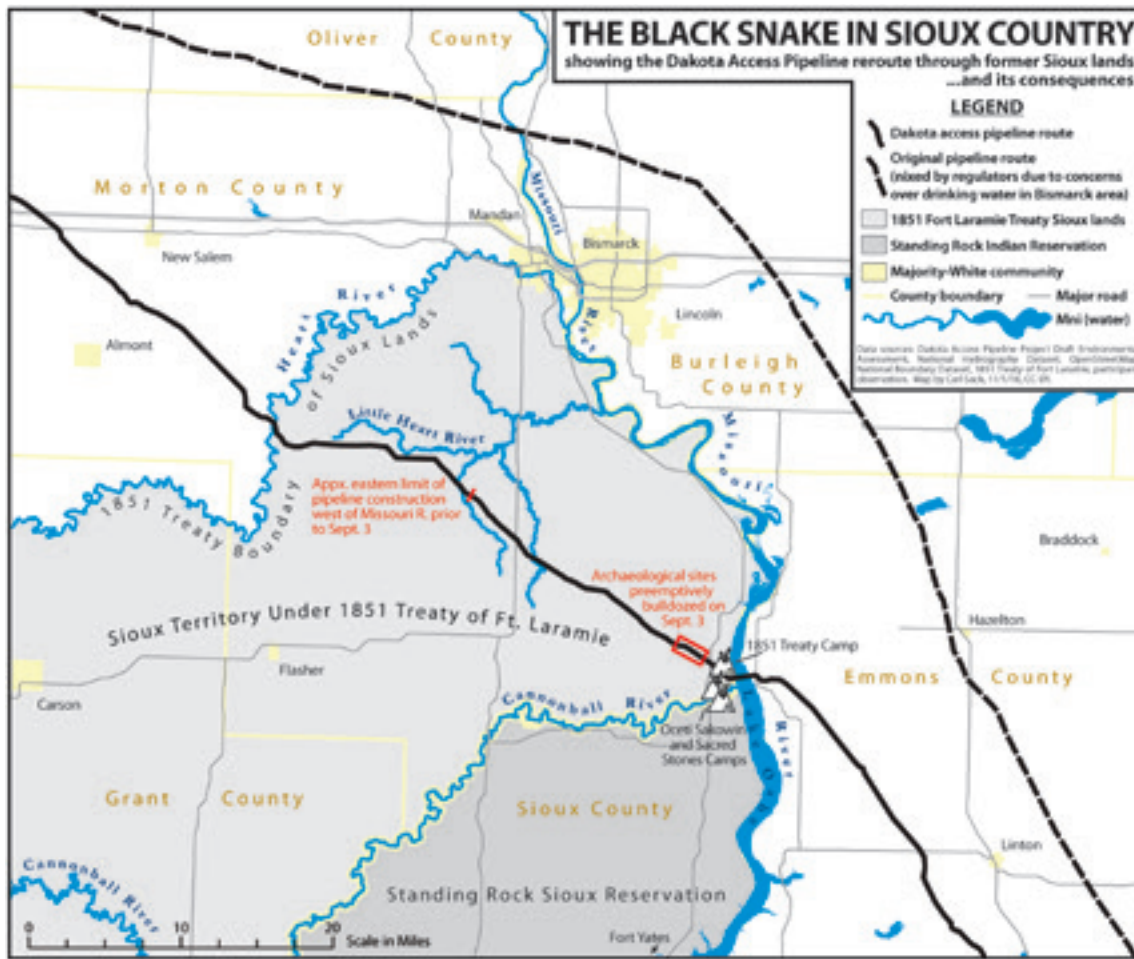


Figure 3. The Black Snake in Sioux Country.

Transportation Pipeline and Hazardous Materials Safety Administration report reveals that there have been 201 major incidents due to pipeline ruptures over the last ten years. The DAPL spills have been described as minor and of little environmental or safety consequence. This

strates spatial (in)justice (Figure 3). In October 2016, Jesse Jackson (<http://nativenewsonline.net/currents/jesse-jackson-dapl-ripest-case-environmental-racism/>) characterized this realignment as “the ripest case of environmental racism I’ve seen in a long time.” Environmental racism refers to the disproportionate impact of environmentally hazardous areas on people of color and low-income groups. The original proposed pipeline would have been located upriver of the town of Bismarck’s water intake and passed through critical wellhead source areas. The U.S. Census Bureau (<https://www.census.gov/quickfacts/fact/table/nd/PST045217>) tallies Bismarck as 88% white. The rerouted pipeline passes near Native lands where concerns for water supply and cultural sites are paramount. A *New York Times* November 2016 editorial noted that, “the Dakota and Lakota of the Standing Rock Tribe would hardly be the first American Indians to pay the price for white people who want to move environmental hazards out of sight, out of mind, and out of their water faucets” ([https://www.nytimes.com/2016/11/04/opinion/time-to-move-the-standing-rock-pipeline.html?\\_r=1&referer](https://www.nytimes.com/2016/11/04/opinion/time-to-move-the-standing-rock-pipeline.html?_r=1&referer)).

In 2017, the DAPL became operational. Within six months, the pipeline had five spills that did not extend beyond the project easements. A 2012 U.S. Department of

presents another aspect of spatial (in)justice and cultural collisions. Native perspectives are embedded in a holistic socio-ecological framework situated within a multigenerational timeline—the long view. Winona LaDuke comments that while individual spills may be minimal, “accumulation of the little things is pretty significant,” and damage to cultural resources is both unquantifiable and often cannot be mitigated (The Intercept, January 9, 2018, <https://theintercept.com/2018/01/09/dakota-access-pipeline-leak-energy-transfer-partners/>). Spatial (in)justice occurs not only for humans but for all the things that cannot speak—animals, soil, water, and air, the landscape upon which we are dependent.

Archaumbalt closed his talk with a call to defend indigenous people, develop indigenous communities in a sustainable manner, and to decolonize and break free from oppressive systems that disconnect indigenous communities from healing and growth. Recrafting spatial (in)justice into spatial justice will be challenging; essential to this effort is engaging youth, creating cultural exchange, and building local, regional, and global equity.

Visit the NDN Collective at [www.ndnaction.org](http://www.ndnaction.org) and the Thunder Valley Community Development Corp at [www.thundervalley.org](http://www.thundervalley.org) to learn more about how you can become involved.

# JOINING VOICES

## TO BE HEARD

Lorelei Cloud, Tribal Council Member and Treasurer,  
Southern Ute Indian Tribe

It is not news to anyone that tribes are often left out of decisions that affect them or, if a tribe is consulted, their input is ignored. Historically, that can be said of treaties, the establishment of reservations, and decisions about whether to divide up communally held tribal lands. Often, a tribe alone suffers the consequences of being ignored, but when it comes to natural resources shared between tribal and non-tribal communities, the results of disregarding tribal rights and input can extend beyond the tribal community. This issue persists to this day. This brief story is about the Southern Ute Indian Tribe, the Colorado River (the River), the Ten Tribes Partnership, and how tribes have been working together to ensure that their voices—and their rights—are not drowned out in the management of the Colorado River.

This story begins in 1868, when the Southern Ute Indian Tribe negotiated its treaty with the U.S. Fast forward to 1908, when the U.S. Supreme Court issued its decision in *Winters v. United States*. In that decision, the Court decided that a tribe's reserved water right (rights implicitly created by the establishment of the reservation) has a priority date as of the date of establishment of the tribe's reservation. That means that for many tribes, tribal water rights are often the highest priority rights in their respective river systems. My Tribe—the Southern Ute Indian Tribe—has water rights that date back to 1868. The members of the Ten Tribes Partnership (Ute Indian Tribe, Ute Mountain Ute Tribe, Southern Ute Indian Tribe, Jicarilla Apache Nation, Navajo Nation, Fort Mojave Indian Tribe, Chemehuevi Indian Tribe, Colorado River Indian Tribes, Quechan Indian Tribe, and Cocopah Indian Tribe) all have water rights or unresolved claims (even when a tribe has a reserved right, it must be adjudicated and quantified, either through litigation or negotiation and settlement) on the Colorado River and its main stem tributaries to divert or deplete more than 2.7 million acre-feet per year. Most Indian reserved water rights pre-date the negotiation of the major compacts



*Ute Indians crossing the Los Pinos River. Photo courtesy of Denver Public Library, Western History Photographic Collections, photo by H.S. Poley, P-57.*

governing the River. It stands to reason that the tribes should be at the table when decisions are made regarding the management of the Colorado River system.

Historically that has not been the case. In 1922, the seven Colorado River basin states joined together in what has been characterized as very intense negotiations. They divided up the water in the River and negotiated a compact under which the states in the Upper Basin were obligated to “not cause the flow of the river at Lee Ferry to be depleted” below 75 million acre-feet over any period of ten consecutive years. The compact, which came to be known as the 1922 Compact, also recognized and protected present perfected rights in the Colorado River system and declared such rights to be unimpaired by the compact. Present perfected rights are water rights on the Colorado River that predate the compacts, making them the most senior on the River. The 1922 Compact also provided that “[n]othing in this compact shall be construed as affecting the obligations of the United States of America to Indian tribes.” The same can be said for the Upper Colorado River Basin Compact of 1948, which apportioned the water in the Upper Basin among five states. It provides the same caveat that nothing in the compact





WHEN IT COMES TO NATURAL RESOURCES SHARED BETWEEN TRIBAL AND NON-TRIBAL COMMUNITIES, THE RESULTS OF DISREGARDING TRIBAL RIGHTS AND INPUT CAN EXTEND BEYOND THE TRIBAL COMMUNITY”

shall be construed as affecting the obligations of the U.S. to Indian tribes.

Despite these caveats that the compacts did not impact present perfected rights, the tribes with rights on the River and its main stem tributaries recognized that they needed to work collaboratively on technical, legal, economic, and practical issues related to the management and operation of the Colorado River. Those tribes have distinct languages, culture, traditions, and ways of honoring the spirit of the water. Despite their differences, because of their shared goals and shared natural resources, they joined together in 1992 to form the Ten Tribes Partnership.

When tribal water rights have been overlooked, or are in danger of being overlooked, the Partnership tribes can join voices. In 2012, for example, the Bureau of Reclamation completed the Colorado River Basin Supply and Demand Study, but the study did not fully reflect current and future tribal water use in the basin. It did not include an assessment of tribal water demand; it did not show the potential impact on water


supply if presently unused or unquantified tribal water is put to use by the tribal water rights holders; and it did not account for currently unused tribal water being used by other entities. The Partnership tribes worked together to demand another water study that would parallel the Basin Study and address these oversights. The Bureau of Reclamation agreed to complete a tribal water study that would build on the technical foundation of the Colorado River Basin Supply and Demand Study and more fully address tribal water rights.

The Partnership is working closely with the Bureau of Reclamation to complete the Tribal Water Study, which is intended to address those factors that the 2012 study failed to address. The Tribal Water Study is a sizeable but crucial undertaking. Performing the study has required a significant amount of staff time and legal and technical work from all parties involved. Developing and using uniform quantification and modeling methods that complement those used in the

2012 Supply and Demand Study is crucial to ensuring that the Bureau of Reclamation and the Upper Basin states can incorporate the results of the Tribal Water Study into future planning and management efforts. Aside from the results of the study, the process alone has been valuable. Through working so closely with the Partnership, Bureau staff better understand issues faced by the tribes, and the tribes have gained greater knowledge of how the Bureau performs its accounting, modeling, and planning of Basin operations.

We may have banded together for a stronger voice, but our message is still not being heard in Basin decision-making circles. Just last year, the United States and Mexico negotiated a new Minute (a sort of mini-agreement that allows for updating and amending the treaty without a complete rewrite and ratification) to their 1944 treaty regarding the utilization of water in the Colorado and other trans-border rivers. Other stakeholders

on the River were consulted, but the tribes with some of the most significant holdings in the Basin were not.

The Colorado River touches many lives in its 1,450-mile journey through the western United States, but it's been touching some stakeholders' lives for longer than others. To reiterate, Partnership tribes have rights or unresolved claims to divert or deplete more than 2.7 million acre-feet per year, and many of those rights pre-date the negotiation of the compacts that govern the River. Given the magnitude of those rights, for the benefit of all stakeholders, the tribes must be at the table when decisions are being made about managing the Colorado River system. 

# Reaching Families in Bolivia with

# SAFE WATER

Dana de Andres, Water for People

**WATER FOR PEOPLE** is a nonprofit organization working in nine countries globally to promote sustainable water and sanitation services. The organization's impact model is called Everyone Forever, which means that every family, clinic, and school in the areas where they work will have water and sanitation that is sustainable for generations to come. One of the communities they support is the small town of Capellania in rural Bolivia.

"Before we had water, life was hard," said Miguel, president of the water committee in Capellania. "My children were suffering because of it. Every morning we would have to go and collect water from the river."

With support from Water For People, Miguel and his fellow water committee member Amadeo helped change life for their community by advocating for water systems that would serve all of Capellania's 46 families.



◀ The town of Capellania, Bolivia, is surrounded by fields of cactus amidst dusty brown foothills. This water tower is the first water system ever built in the town and serves 29 families. The well was sufficient for water supply until the town started growing. Seventeen more families had moved to Capellania.



◀ Miguel and Amadeo are members of the town's water committee. The town began to grow as the quality of life improved—families no longer had to walk to the river for water, and waterborne illnesses decreased. The committee decided to dig another well and build another water tower with a 20 cubic meter capacity to ensure every family would have drinking water.



▶ One of Amadeo's tasks is cleaning the inside of the well. He is lowered 50 meters down into the bottom of the well to ensure everything is clean and functioning properly.

▶ The water committee Miguel and Amadeo lead is also responsible for cleaning the inside of the water tanks and doing monthly inspections of the entire system. They read each family's micrometer and collect monthly tariffs for water usage, which supports the sustainability of water services. The average family uses seven cubic meters of water each month, which costs approximately \$2.50 USD.





< Miguel's wife and his children have benefitted from the town's water system. Before it was completed, they would have to walk 30 minutes to a nearby river three times a day to collect water. The river water often made their family sick.



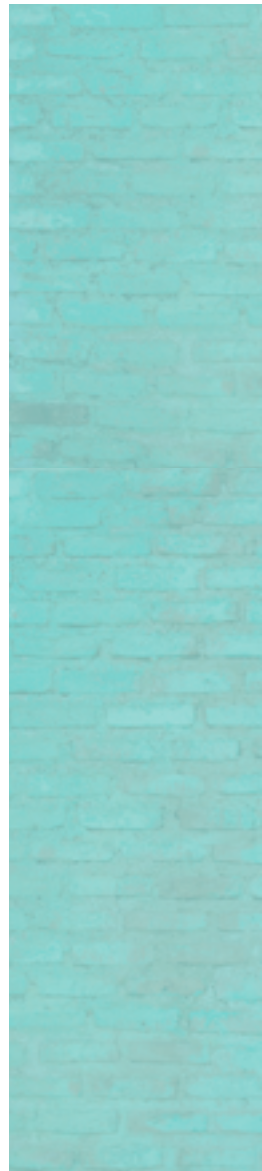
^ With the two water systems completed, the water committee is promoting better sanitation services for the town. Miguel's family is one of the first to construct a new bathroom.



< Having a household tap has saved Capellania community member Marleny hours each day. She no longer has to fetch water for cooking, cleaning, and bathing.

> Amadeo and Miguel review the community members' monthly payments. They set the tariff using a tool Water For People developed called AtWhatCost. AtWhatCost helps communities understand all the costs associated with operation and maintenance of their system and make sure finances are available for future repairs.

✓ Each year, the district of Arani where Miguel and Amadeo live holds a drinking water fair. The water committee's work on Capellania's water services has won awards for its sustainable approach.



*Photos provided by Water For People, photos by Tony Adams, 2017 (Capellania, Bolivia).*



Water and the  
**Amahoro**  
(Peace) **Project**

Building  
Sustainable  
Peace and  
Development in  
Post-Conflict  
Burundi

Bill Timpson,  
School of Education,  
Colorado State University

*All photos by Bill Timpson*



“Amahoro” is the Kirundi word for peace. After independence from German and then Belgian colonial rule that began in the late 1800s, impoverished Burundi predictably experienced a civil war, which erupted in 1962. In a classic strategy of divide and conquer, these colonial powers had established the minority Tutsi as the privileged ruling elite, but they were forever dependent on colonial firepower to stay in power. With the departure of the Belgians, the majority Hutu began pushing back against the privileges that hierarchy always bestows. Forty years of fighting engulfed most of Burundi, during which as many as one million citizens died, and another one million individuals fled as refugees.

This small but fast-growing nation of 11 million, one of the poorest in the world, is attempting to find a transformative educational approach that will support sustainable development while nurturing a new generation of leaders. Founded in 1999 with a commitment to reconciliation, the University of Ngozi (UNG) is the first private university in Burundi, and it hopes to become a laboratory for peace-building and sustainable development. With its overwhelming reliance on subsistence agriculture, as well as its historic poverty, access to water has played a key role in Burundi’s environmental, economic, and societal health. The country is a classic example of the workings of the “Triple Bottom Line” of sustainability.



*(Left top) A relatively new Rotary Club in Ngozi, Burundi, celebrate their first community service project that allowed isolated villagers to better protect their spring-fed water source, which had been often contaminated by cattle. (Left bottom) Coming together for the completion of this local water protection effort, villagers dance and sing with Rotary Club members from the city of Ngozi.*

For its role in this story, Colorado State University (CSU) draws on its historic tradition as a major land-grant research university and an eagerness to share its academic and research strengths with others in the world. After serving as a Fulbright Specialist in sustainable peace and reconciliation in 2011, I returned to CSU and talked with many about the challenges in Burundi. With the support of colleagues across campus, we developed and signed an International Memorandum of Understanding (IMOU) between CSU and UNG. Since then, I have been able to revisit Burundi on three occasions in an effort to mobilize resources, try new ideas, and disseminate success stories—all in an effort to make peace and sustainable development a centerpiece of the curriculum at the University of Ngozi and a base for reaching out into the schools and community.

Those committed to the Amahoro Project believe that any notion of sustainable development must wed with educational innovation to ready new leaders and professionals who can help heal and foster civil society while addressing basic infrastructure needs. Representing varied faiths and backgrounds, the Hutu, Tutsi, and Twa students at the University of Ngozi collaborate with young people from neighboring nations in East Africa (Uganda, Rwanda, Kenya and Tanzania) to share their stories of resilience, rebirth, and sustainable peacebuilding with others. For its part, CSU's School of Global Environmental Sustainability (SoGES) stands poised to join this effort at sustainable peace and development. Working through the curriculum development process, we have created an interdisciplinary graduate minor in Sustainable Peace and Reconciliation Studies at CSU.

The goals of the Amahoro Project for peace and sustainable development include: (1) reworking the curricula to emphasize appropriate technology and participatory case studies, and (2) project-based learning which, in turn, can help link communities with the innovations that can help people address basic needs.

We also want to infuse the University of Ngozi's existing disciplines of health, agriculture, communications, law, business, and computer sciences with new curricula that emphasize content mastery and what we refer to as the skills of peace building (i.e., the civic skills of effective cross-cultural communication, consensus-building, negotiation, cooperation, conflict mitigation, critical and creative thinking).

Building on what we know about cooperative learning, we also want to create multi-tribal teams and project groups to showcase the benefits of teamwork for unlearning hatred and prejudice. Currently, we are using three graduate education courses to provide the professional development needed by instructors at the University of Ngozi to meet these goals.

With its stated priority of promoting peace, the Rotary Foundation has also proven to be an enthusiastic partner in this work. Beginning with local support within the Fort Collins Rotary Club, we cultivated financial help from others in Colorado and in the greater Rotary District 5440 that includes northern Colorado, Wyoming, and eastern Nebraska.

With our first Rotary Global Grant focused on creating case studies that address different content and emphasize the peacebuilding skills of improved communication, cooperation, and critical and creative thinking, we now want to extend these efforts out to schools and church communities in a second Global Grant. We remain convinced that transformational education will be needed to aid the shift toward long-term stability and prosperity.

We also remain convinced that what proves viable in Burundi, East Africa, and the developing world could also have benefits for communities in the industrialized world, where conflict, violence, polarization, and the costs of security create tensions. We hope that over the course of this project, the UNG-CSU partnership will establish itself as a viable center for research and development in sustainable peace and development. Leaders from around the world—in schools and higher education, community organizations, government, and business—will come to join with UNG and CSU in this work.



*University leaders from several campuses in Burundi meet with Professor William Timpson from Colorado State University to discuss ways that they could collaborate further on efforts toward promoting sustainable peace and reconciliation. Addressing water issues is one of the keys.*




*Village children were used to competing with cattle and clothes washing for water for drinking and cooking.*



In Burundi, water will inevitably be central to our work. The Ngozi Rotary club, following the spirit and call to service of Rotary, took action for its first major project to focus on addressing the needs of clean water access in rural communities. After identifying a community nearby in the hills outside the city, plans were drawn up to address their historic problems at the water's source, a spring fed pool that had also been used by animals and for washing clothes. It was no surprise that this community had been suffering with chronic illnesses directly associated with this contaminated water supply.

Embracing an ethic of sustainable peace and development requires everyone to accept a broader picture than what traditional “siloes” disciplines promote. In the project assessment of environmental health, we also had to include an analysis of societal health and economic realities. Without this kind of interdisciplinary and multidisciplinary thinking—what we also refer to as “transdisciplinary” thinking—

our efforts at peacebuilding would be limited to the managing of conflicts and the mediating of short-term resolutions without the necessary attention to underlying suffering.

Everyone involved with our Amahoro Project has taken great pride in this water project, making tangible this first step toward more sustainable peace and connecting the mission of the University of Ngozi with the needs of the community. With this kind of effort, we have also taken more seriously our hopes to be a model for others in the region and the world. Through the fire of violence that defined Burundi for forty years, we believe that we are helping to forge a recovery and a rebirth of spirit, a reconciliation of wounds, differences, rivalries, prejudices, and hatreds. We want to deepen our resolve to understand the truth of the past, fix the present, and prepare for a better future. We also are committed to the resilience we will need to rebuild an impoverished, post-colonial nation and its diverse communities. 



Impacts of  
**Natural Resource  
Mismanagement**  
on Food Security  
and Development in  
Sub-Saharan Africa

Woldezion Mesghinna, Natural Resources Consulting Engineers, Inc.

Photo by CIAT

## Profile of Sub-Saharan Africa (SSA)

Sub-Saharan Africa is part of the continent of Africa located south of the Sahara Desert. The total land mass of the subcontinent is about 24 million square kilometers. The climate of SSA varies from arid to humid. Presently, the population of the subcontinent is about 1.2 billion. SSA is endowed with a tremendous amount of natural resources—including the largest amount of undeveloped arable lands in the world—but is characterized by dated agricultural practices and uneven distribution of rainfall, which inhibit the subcontinent from farming successfully.

## The Current State of SSA

By the end of the 1960s, SSA was a net exporter of agricultural products. Yet, fast forward 50 years and despite its bounty of natural and human resources, the subcontinent presently faces ever-worsening food insecurity, environmental crises, widespread malnutrition, hunger, and extreme poverty. More than 40% of the SSA population lives in extreme poverty and survives on less than \$1.25 per capita per day (World Bank, 2014). So, what happened?

Globally, the number of people living in extreme poverty has declined from 1.9 billion in 1990 to only 836 million in 2015 (United Nations, 2014). This is a huge success, because the share of population living in extreme poverty has been reduced by more than half. Unfortunately, the statistics from SSA are not as encouraging.

In 1990, SSA had 290 million people living in extreme poverty. This number was expected to decline to 145 million people by 2015. But instead, the number skyrocketed to 394 million. Despite great effort, the swathe of extreme poverty has dramatically increased, and the population of the subcontinent is getting poorer.

Definitions of what constitutes 'extreme poverty' vary from agency to agency.

In a study conducted by the U.S. Agency for International Development (USAID), extreme poverty considers the damage caused to human life, with specific attention to stunting and malnutrition in children (USAID, 2013). The term 'stunting' is defined as low height for age, primarily caused by long-term insufficient nutrient intake, which results in diminished



Figure 1. Sub-Saharan Africa constitutes the countries in dark green.

cognitive and physical development and productive capacity. Stunting makes it impossible for youth to exercise their full potential, and the damage is irreversible.

This unprecedented trend in SSA is causing a serious human crisis. In fact, according to the Alliance for a Green Revolution in Africa (AGRA, 2013), half of SSA children are stunted and five million people within SSA die every year because of hunger. This is incomprehensible and totally unacceptable in the 21st century. All major regions of the world have achieved food security or are very close to doing so, except for SSA.

### **Making a Living in SSA**

For about 70% of the SSA population, the primary means of living is subsistence farming. Oftentimes, this type of farming is family-owned and heavily reliant upon inconsistent and unpredictable rainfall patterns. It is rare for subsistence farming to produce enough crops to feed a family for the entire year, and even rarer for the farmer to profit from their harvest.

### **Transformation of Subsistence Farming to Surplus Crop Production**

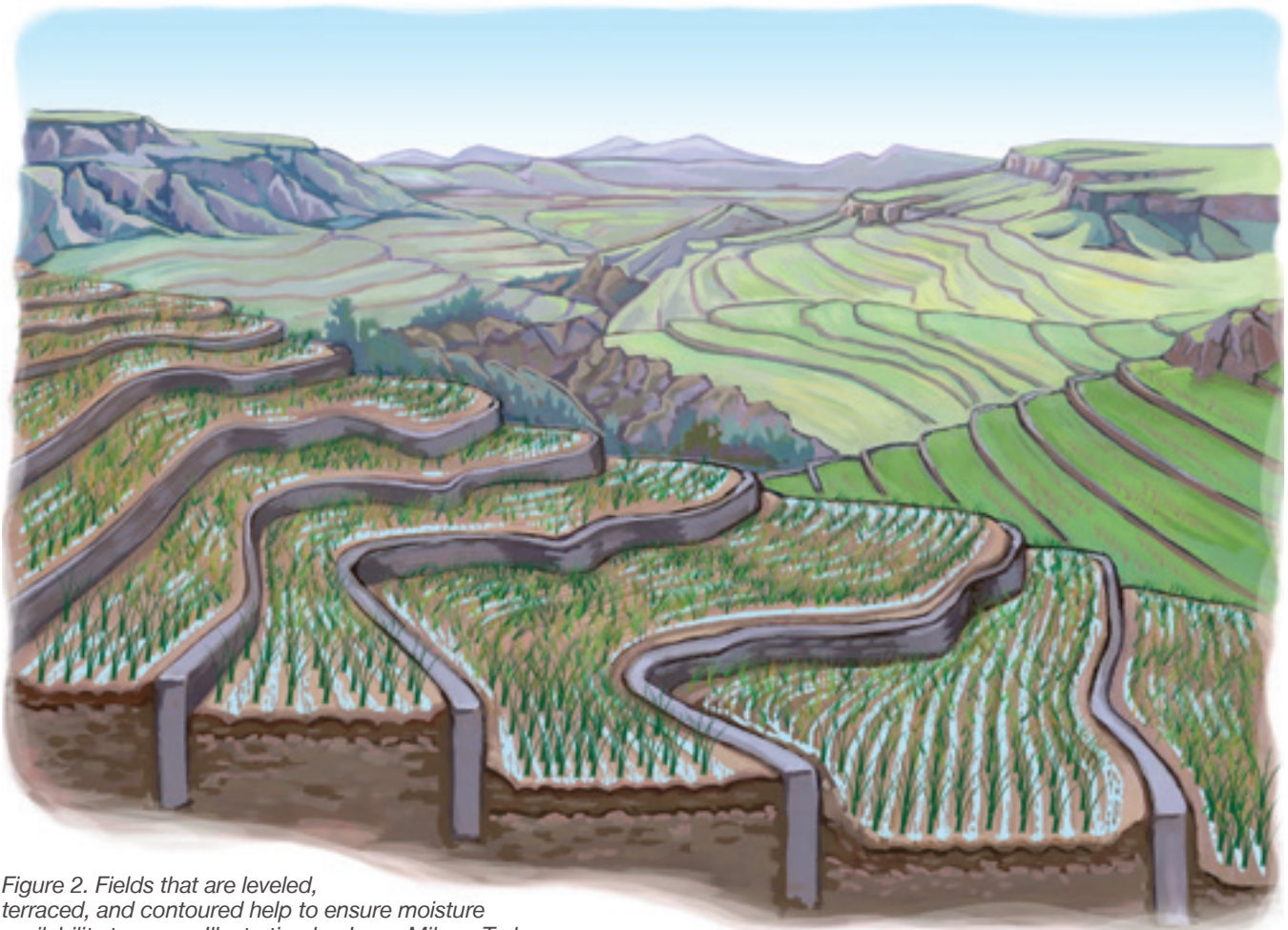
It is clear that the current system of agricultural production

is not working. This system must be converted to farming based on sound science and improved technological practices. To provide some perspective, presently the maize yield in the U.S. is about 8 tons/hectare, 5 ton/hectare in China, 3 tons/hectare within Latin America, and in SSA only 1 ton/hectare (Molden, 2007). It is no wonder SSA suffers in extreme poverty with such inadequate food production.

Yet with any tragic tale, there is hope. The World Bank has determined that for every increase of crop yields by 10%, extreme poverty can be reduced by 7% (Munang et al, 2015). This means if SSA crop yields were to increase from about 1 ton/hectare to 1.75 tons/hectare, it could eradicate extreme poverty in SSA.

### **Methods for Ensuring Adequate Water for High Crop Yield Production**

Subsistence farming in SSA is the type of farming system passed from generation to generation with little or no improvement to ensure moisture availability to crops. In SSA, more than 95% of the cropped land is farmed with rainfed agricultural systems, while less than 5% of the lands are irrigated. Crops lack necessary nutrients; have little or no



*Figure 2. Fields that are leveled, terraced, and contoured help to ensure moisture availability to crops. Illustration by Joyce Mihran Turley.*

control of pests, diseases and weeds; suffer from mismanagement of top soil; and lack high-yielding seeds. Farmers need to adopt practices to convert farming practices to attain successful crop production.

### Converting Farming Practices

To implement agricultural practices based on science and modern technology, farmers need to ensure moisture and non-moisture needs are available to crops during the entire growing season. The following measures must be taken:

1. To provide sufficient moisture to crops during the entire growing season, development of on-farm irrigation systems, reservoir systems, conveyance, and distribution systems is necessary. One of the primary constraints to the adoption of full-service irrigation systems in SSA is the excessive up-front capital investment necessary for system development. It is essential to find a solution in lieu of full-service irrigation to provide sufficient water to the crop.
2. SSA rural farmers could achieve substantially higher crop yields using direct rainfall to minimize irrigation by leveling, terracing, and contouring their farm fields to eliminate runoff and maximize infiltration.
3. Water must also be made available to the crop during low rainfall periods during the growing season. If direct, controlled rainfall fails to satisfy crop water needs, supplemental irrigation can be provided to the crops by harvesting runoff from nearby ponds. If these approaches still fail to satisfy the crop water requirements, these needs could be satisfied by a third source of water that comes out of small and/or medium sized dams.

In this water management scheme, the work of #1 and #2 above are accomplished by the rural farmers themselves. #3 requires the technical assistance of the offices of rural agricultural extension services (government agencies), in conjunction with labor from the farmers.

In addition to sufficient water and non-water needs at the farm during the growing season, there are other important needs such as well-maintained soils; ensuring nutrient availability primarily using organic matter, animal manure, and compost; use of high yielding seeds; controlling weeds, pests, and diseases; proper crop establishment; and when


necessary, input of synthetic fertilizers. Small rural farmers must be provided with financial credit and farm extension services; should stop post-harvest grazing; should manage farm lands such that soils are aggregated; and must shift to science-based farm practices.

### Case Study

In the areas of Zoba Maekel, located in the Central Highlands of Eritrea, many small rural farmers have worked to address low crop productivity issues by introducing farm practices that closely resemble the practices discussed above. According to an interview conducted in Asmara, Eritrea, in April 2015 with Mr. Asrat Haile of the Ministry

of Agriculture and agricultural consultant Mr. Fekadu Tesfamichael, wheat yields grew from an average of 1 ton/hectare to 2-5 tons/hectare after farmers participated in the intervention. Some farmers adopted only the initial steps of the intervention, such as making adequate moisture available to the crop during the growing season and addressed select non-moisture needs of the crop. These farmers witnessed a relatively smaller crop yield growth, closer to 2 tons/hectare, yet still proving that making the shift to the intervention techniques proved fruitful. Farmers that took a higher level of intervention by ensuring moisture and non-moisture needs of the crop produced crop yields from 3.5 to more than 5 tons/hectare. Realizing the power of this model, more and more farmers in Eritrea are trans-

forming their agricultural production from grain crops to high value crops such as vegetables. These small rural farmers are producing substantially higher crop yields and are no longer considered to be living in extreme poverty.

Improving farming practices is only one part of the solution. Instituting policy reforms that help achieve food security and transcend the economies of SSA countries from agrarian to diversified multi-sector economic systems is an essential next step. 

*Note: No financial support was received for the research of this article. The concepts listed herein are a short introduction to concepts presented in my book, How Sub-Saharan Africa Can Achieve Food Security, which is a culmination of knowledge from over 50 years of personal study and professional experience.*

---

“Half of SSA children are stunted and 5 million people within SSA die every year because of hunger. This is incomprehensible and totally unacceptable in the 21st century.”



# WATER AND **SOCIAL/ENVIRONMENTAL** JUSTICE IN THE HIMALAYAS

## The Multiple Roles of Rivers

George Taylor II, Colorado State University Water Center

There are many complex issues around water and social-environmental justice in the Himalayan region of South Asia. This brief essay examines that most primordial source of water—rivers—and the challenges of assessing, valuing, and making decisions about their use. The essay focuses primarily on Nepal, but links are made to work across the Himalayas in India and Bhutan, other regions of Asia, and around the planet.

### **Dreams and Realities: Harnessing Rivers for Hydropower**

Nepal is a land of rivers, some 6,000 in total, flowing from the high Himalayas (with some 90 peaks over 7,000 meters) to the lowlands of the Nepali Tarai and the Indo-Gangetic plain in the short space of 150 to 250 kilometers. For decades, the government of Nepal, international development banks, bilateral assistance organizations, as well as Nepali and expatriate investors have viewed these rivers primarily as a potential source of hydropower. Electricity production for both domestic consumption and export has been the central narrative. With the exception of agriculture and drinking water, the other uses of rivers have been relegated to mere footnotes. In recent years, following the political settlement of a long-running Maoist insurgency coupled with chronic shortages of electricity, hydropower has again risen, as both a key national priority aimed at addressing both local (primarily urban) requirements

and as a potential source of foreign exchange through the export of electricity to India.

### **Nepal National River Summits: Diverse Voices and Multiple Values**

A group of committed Nepali development experts, academics, and activists have been working together to promote a broader vision of rivers. This vision is rooted in environmental justice. It seeks to incorporate diverse voices, many of which have been excluded from government and donor narratives, and to highlight multiple values. The Nepal River Conservation Trust (NRCT) has been at the forefront of this effort. A series of Nepal River Summits has been among the fora used to support this broader vision.

The First National River Summit in Nepal was held on September 20-23, 2014 on the banks of the Sunkoshi River in eastern Nepal (<http://www.nrct.org.np/index.php/first-national-river-summit-2014>). The Second National River Summit was held on March 16-19, 2017 and focused on managing rivers to support life. The Summit was organized by the Nepal River Conservation Trust with a broad range of partners and collaborators. It was inaugurated in Kathmandu and continued on the Trishuli River in Central Nepal, first on 25 rafts and then at a tented camp along the banks of the river. There were more than 250 participants, including senior government officials, water experts, and advocates of river-dependent communities across Nepal. Additionally, a large, active group of young Nepali students also participated (<http://www.nrct.org.np/index.php/second-national-river-summit-2017>). The 3rd National River Summit is scheduled for the spring of 2019 on the banks of the Karnali River in Western Nepal.

## Special Concerns: Seismic Risk, Sedimentation, and the Potential for Glacial Lake Outburst Flood (GLOF) Events

The Himalayas are a young mountain range, still very active geologically and subject to periodic major earthquakes. The most recent of these was a devastating magnitude 7.8 earthquake that struck central Nepal on April 25, 2015. Seismic risk has not yet been given the careful, systematic attention it deserves in the planning of hydropower projects and related infrastructure. Related risks include the very high sedimentation rates of rivers in the young Himalayas, and the potential for GLOF events that have a history of causing serious damage to hydropower and other infrastructure as well as to downstream communities. Additional risks and special concerns that deserve attention are the impacts of climate change on water resources, including the viability and sustainability of hydropower schemes at all scales. These risks pose differential threats to and impacts on the varied human and natural systems across the Himalayas.

## Towards Social and Environmental Justice: Values Beyond Hydropower

The values of rivers beyond hydropower need to be more seriously and systematically considered in planning and implementing the “development” and “management” of Nepal’s water resources. These values include economic capital, natural capital, as well as social and cultural capital.

### Economic Capital

The use of rivers as sources of economic capital for both traditional livelihoods (e.g. by fishing communities) and newer livelihood opportunities (e.g. the large and rapidly growing adventure tourism industry that includes world class rafting and kayaking) need to be systematically considered.

### Natural Capital

Natural capital in the form of mountains, rivers, and the ecosystem services they provide also serves as a critical underpinning of Nepal’s economy, starting with the agricultural economy and including the most important sources of foreign exchange, regional, and international tourism. Another important dimension of Nepal’s natural wealth is its biodiversity, both terrestrial and aquatic. As Aldo Leopold noted: “To keep every cog and wheel is the first hallmark of intelligent tinkering.” Two Nepali institutions that have been at the forefront of identifying “every cog and wheel” are the Aquatic Ecology Centre at Kathmandu University (<http://www.ku.edu.np/aec/>) and the Centre for Molecular Dynamics-Nepal (<http://www.cmdn.org.np>).

### Social and Cultural Capital

Too often ignored by governments, development “experts,” and the private sector promoters of hydropower schemes,

social and cultural capital form the underpinning of all “sustainable development.” The International Centre for Integrated Mountain Development (ICIMOD) has recently developed an innovative framework for the assessment of cultural ecosystem services of sacred natural sites in the Hindu Kush Himalayas based on field work in the Mount Kailash Sacred Landscape regions of India and Nepal (see <http://lib.icimod.org/record/32317/files/icimodCES-framework016.pdf>).

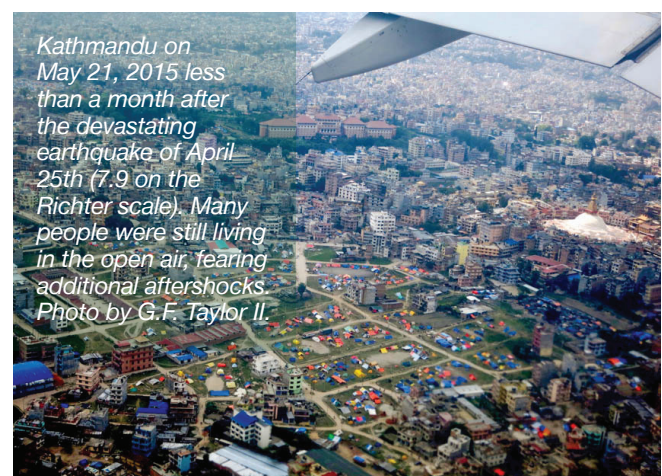
## Weaving the Strands Together with Particular Reference to the Karnali River

The many values of rivers in Nepal are currently being explored along the Karnali River in far-western Nepal as part of a scientific expedition organized by the NRCT and collaborators (details at <http://www.karnaliriver.org>). This builds on a very solid base of work on water issues across the country by Nepali scholars and others, as well as on the Karnali-specific studies by ICIMOD under the Kailash Sacred Landscape Conservation and Development Initiative.

The Karnali has been selected for urgent attention because it is the last major river in Nepal that does not yet have a hydropower dam across its main stem. Activists who oppose the Upper Karnali project are not against hydropower development and are not against the siting of hydropower projects in the Karnali watershed. They support and insist on setting aside the main stem of the last major free flowing river in Nepal for the “beyond hydropower” values. Some, but not all, also oppose large projects built by foreign companies designed to generate and export power. In their view, priority should be given to smaller projects built by Nepali companies designed to produce power for the domestic market.

## Monitoring and Promoting Rivers: River Keepers, Glacier Keepers, and Sister Rivers

One of the co-sponsors of the Second National River Summit was the Waterkeeper Alliance. The Alliance has an innovative system of designating River Keepers, individuals charged with monitoring developments along their river and advocating both for the river and for the multiple values that it represents. Five River Keepers have been designated in Nepal, one for each of Nepal’s major rivers (from east to west: the SunKoshi,



Bagmati, Trishuli, SetiGandaki, and Karnali). A second innovation is the designation of Glacier Keepers. This is currently operational in India, in partnership with the Buddhist Drukpa lineage. At the June 2018 Annual Meeting of the Waterkeeper Alliance, NRCT Chairman Megh Ale proposed a third innovation—a Sister Rivers program. Agreements are being finalized for the first two Sister Rivers programs linking the Trishuli with the Niagara and the Karnali with the Hudson.

### Free Flowing Rivers Across the Himalayas and Beyond

Another co-sponsor of the Second National River Summit, World Wildlife Fund (WWF), has been spearheading an effort to promote free flowing rivers across the Himalayas and beyond. This work has recently been formalized and gone global (<http://freeflowingrivers.xyz/about>). Among the case studies developed to date is one on the Karnali and another on rivers in the north Indian state of Uttarakhand. This will be presented by WWF, the Nature Conservancy (TNC), and others at the upcoming World Water Week in Stockholm (<https://programme.worldwaterweek.org/event/8009-free-flowing-rivers-global-status-and-solutions-for-securing-their-benefits>).

In addition to the work on free flowing rivers across the Himalayas, innovations in river management have been happening elsewhere in Asia and around the planet. For example, in northeast Thailand, communities along the Ing River have been harnessing traditional knowledge and religious traditions to protect and manage their river. Sixty-two fish sanctuaries have been established along the Ing River. In addition to local multi-stakeholder groups like the Ing Watershed People's Assembly, government officials have in some cases provided proactive support. Ms. Sopa Wongyai, Municipality Chief Officer of Sanmakha Municipality in Chiang Rai District, is an example. After a visit to Nan Province she returned to work with community leaders and Buddhist monks on forest “ordination” and river “sanctification” (<https://www.recoftc.org/sites/default/files/reports/EvaluationReportWebversion.pdf>; Annex D p.87-88). For an important example in New Zealand with echoes across Asia, see <https://phys.org/news/2017-03-zealand-river-recognised-legal-person.html>).

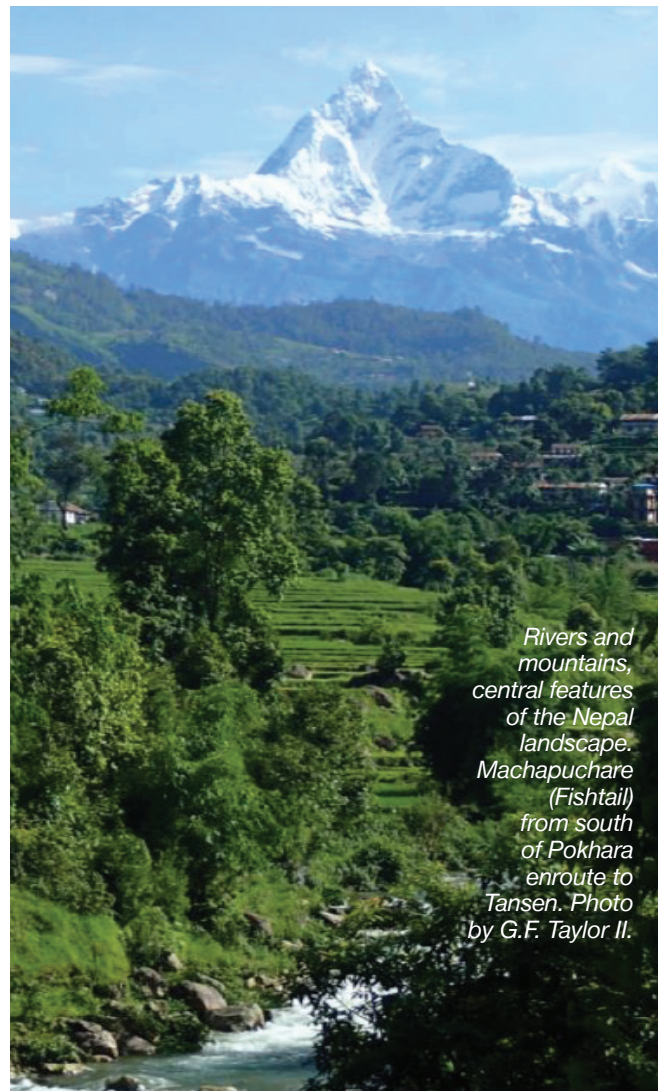
### Next Steps: Starting with a Note of Caution

There are many ways to think about rivers, water resources “management,” and social-environmental justice across the Himalayas and beyond. Regardless of one's predilections or point of view, it is important to listen carefully to the wisdom of Gus Speth (Co-Founder of the Natural Resources Defense Council, Founder of the World Resources Institute, Administrator of the United Nations Development Programme, and Dean of the Yale School of Forestry and Environmental Studies) when he sums up 30 years of experience as follows: “I used to think that

top environmental problems were biodiversity loss, ecosystem collapse and climate change. I thought that 30 years of good science could address these problems. I was wrong. The top environmental problems are selfishness, greed and apathy, and to deal with these we need a cultural and spiritual transformation.”

These sentiments and the concern for social and environmental justice that underpin them echo half a world away across the Himalayas, where the mystery, majesty and magic of these mountains—and the rivers that run through them—hang in the balance. 🌀

*The author participated in the Second Nepal River Summit in March 2017 and organized a panel on Experience Beyond Nepal with speakers from ICIMOD, ISET-Nepal, WWF/India, the Waterkeeper Alliance USA, and the NGO Gyanodaya from Madhubani, Bihar. Participation in the Summit was arranged as part of U.S. Department of Agriculture (USDA) Forest Service/International Programs support for USAID/Nepal's water resources program. Thanks also to CSU's School of Global Environmental Sustainability (SoGES) for providing a home base from which to learn about and engage on water issues across Asia from 2015-2017. For sources and additional background material please contact the author at [taylor.pss@gmail.com](mailto:taylor.pss@gmail.com)*



*Rivers and mountains, central features of the Nepal landscape. Machapuchhare (Fishtail) from south of Pokhara enroute to Tansen. Photo by G.F. Taylor II.*





An Indigenous

# PERSPECTIVE

on Development and Water Management

Dave Archambault II, First Peoples Investment Engagement Program

In 2016, when I was Chairman of the Standing Rock Sioux Tribe, I found myself in the middle of a movement. The Tribe opposed the Dakota Access Pipeline because it crossed our treaty lands and went under Lake Oahe, one of our main sources of drinking water. The movement drew thousands of water protectors to our community and gained global media attention. As I reflect on the movement, I realize it was a moment of unity in Indian country. It was the first time in modern history that there was a coming together of tribes from over 300 nations. We received prayers and letters of support from indigenous peoples across the country and around the world. Our message of *Mni Wiconi*—water is life—resonated with other indigenous peoples who were also fighting to protect our Mother Earth.

The Lakota teach that water is a source of life and that we are all related. From the business perspective, on the other hand, water is a resource and a commodity. Yet there may be a path forward that can bring the indigenous view into business and development decisions.

I was raised in the Lakota way of life. The lessons I learned from my elders shape who I am today and how I view the world around me. In the Lakota teachings, we learn that water is not a resource for development or consumption. Water is a source of life.

As I look out onto the prairie, I see and hear movement—the grasses sway, the trees dance, a deer flips her tail in alertness, and a bird chirps as the clouds float by. There is movement all around me. In the Lakota way, when we see movement, we say *taku skan skan*, which means there is some-

thing out there. If something moves, then it has a *nagi*, a life force or spirit. If something has a *nagi*, then in our way, we say *mitakuyasin*, or all my relatives. We are related to it. And if we are related to it, then we should treat it with respect, just like we would treat our own mother or child.

We also learn that there are four sources of life: water, air, sun, and earth. Not only do we demonstrate respect and love for our relatives, but we do the same for these sources of life, with the understanding that they too have a *nagi*. These sources nourish life so that our *nagi* can grow and mature within our bodies. They are part of *Tunkasila*, or the Creator. *Tunkasila* is not one being. *Tunkasila* is all around you. With every prayer and every ceremony, we give thanks to these four elements. We treat them with respect and understand that we are all connected and rely on each other. In this way, our ancestors understood sustainability before the term “sustainable development” ever existed. I have seen this understanding of connectedness echoed in indigenous communities around the world—in the Māori people of New Zealand, Indigenous Peoples in Brazil, and the Wangan and Jagalingou People of Australia. The connectedness is also increasingly recognized by science.

Today’s environmental problems and the mismanagement of water arise from the mistreatment of our relatives. Corporations and governments exploit our relatives because they

---

(Above) San Carlos Apache Tribal Council Member Wendler Nosie Sr. embraces David Archambault II at the Sacred Stone Camp. The Apache Stronghold are fighting to protect their sacred site, Oak Flat, from copper mining.

do not recognize how we are all connected. They extract and transport oil, take fossil fuels from Mother Earth, manufacture and create products that pollute the air, and exploit water, treating it as a resource rather than a source of life. The industry is blind to the environmental and social impacts of their projects because their decisions are based on money.

Money does not move. Money does not have a *nagi*. We are not related to money, and it does not provide a source of life. Money is fictitious, and yet people worship and crave it. People make decisions based on whether it will increase or decrease the amount of money they can obtain. They are so focused on money that they forget to respect the very things that give us life. As they continue to drift, there is a growing recognition that our environment is dying because of human actions.

This money-focused perspective was evident in the Dakota Access Pipeline controversy. In September 2014, a few months after the announcement of the Dakota Access Pipeline, the Standing Rock Sioux Tribal Council met with representatives from Energy Transfer Partners, the principal company behind the project. At this meeting, we expressed our concerns about the pipeline because it crossed our treaty lands and had potential impacts on our relatives, including our water, our burial grounds, and other sacred sites. The representatives listened but they did not internalize what we told them and moved forward with the project despite our concerns. I wonder if the investors, shareholders, and companies behind the Dakota Access Pipeline had fully listened to the Tribe and meaningfully brought our perspective into the process if they would have made the same decisions. Would they have more deeply considered our concerns about the crossing of our treaty lands and rerouted around the lake?

If the companies behind the project had taken our concerns more seriously, if they had considered it from a holistic perspective and viewed their project as having an impact on their community and their relatives, they would have also saved money. Their failure to conduct an Environmental Impact Statement and to fully consider the environmental and social impacts of the project led to a six month delay and manifested numerous costs. Our recent case study estimates that the project cost over \$7.5 billion—70% more than originally anticipated, that the banks financing the project lost at least \$4.4 billion in account closures, and that taxpayers and local stakeholders suffered costs that valued at least \$38 million. These are very real costs that stemmed from poor project management and a failure to account for the project's social risk.

I am not against development, I am not anti-pipeline, and I recognize the need for water projects. However, when governments and companies give indigenous people a voice at the table, they will only strengthen their projects, mitigate social risks, and prevent unnecessary costs. My hope is to see more water management projects that are led by Indigenous people and centered on community needs.

This is consistent with human rights principles found in

international instruments, including Article 32 of the United Nations Declaration on the Rights of Indigenous Peoples, which states that “states shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources.” This is also aligned with Goal Six of the Sustainable Development Goals to ensure access to water and sanitation for all.

The Bell Waterline Project is a great example of water projects that incorporate indigenous perspectives. It was pioneered by Wilma Mankiller, the first female chief of the Cherokee Nation. Prior to becoming Chief, she worked with the community of Bell, a small village on the Cherokee reservation, in the 1980s. She asked the community what they most wanted, and they said access to running water. She helped the community build an 18 mile-long water system and required that they contribute their own time and labor to build the project. Her work is a model for how water development projects can be successful when they are consensus-driven and community-led.

It is going to take a generation who cares to save our existence. *Tunkasila* and all our relatives will recover in time. Mother Earth will always find a way to heal and to recover. However, if we continue down this path of exploitation and destruction, we will continue to hurt our sources of life and to threaten our existence as a species.

Despite the Tribe's opposition, the Dakota Access Pipeline was built. Unfortunately, the Tribe will be the ones impacted when there is a spill and so, we continue the fight. Tribes across the country continue to face development projects that impact their treaty, land, and water rights including Keystone XL, Line 3, and the Liberty Pipeline. Our concerns about these projects are not going away. Instead of seeing this opposition as a problem, I hope companies start to see it an opportunity: an opportunity to learn more about how their projects are impacting our way of life and an opportunity to bring indigenous values into their planning, which will save money and prevent the negative environmental, social, and historical impacts to Indian communities. We are all related, after all. 🌊




*Dave Archambault II (Lakota: Tokala Ohitika) is the Senior Fellow for the University of Colorado's First Peoples Investment Engagement Program (FPIEP) and the former Chairman of the Standing Rock Sioux Tribe. To learn more about FPIEP, visit [colorado.edu/project/fpiiep](http://colorado.edu/project/fpiiep). To hear the full recording of the meeting between the Standing Rock Sioux Tribal Council and representatives from Energy Transfer Partners, visit [facebook.com/StandingRockST](https://www.facebook.com/StandingRockST).*

# WATER EQUITY

## and the Pursuit of Justice

Sarah Romano, Political Science and Global Studies, Lesley University



In the Stories of Water Equity and Environmental Justice Symposium, I sought to engage the following questions: How can environmental justice frameworks apply to and inform our understanding of water justice? How does environmental justice intersect with and support achieving greater water equity, including more equitable water governance? As a political scientist studying social movements, my primary interest has been the dynamics of procedural justice and the politics of recognition. In other words, who participates in water-related decision making, and how? Who is recognized as a legitimate authority? Who is excluded, and how? These are questions of governance that allow for examining various forms of injustice, as well as instances of collective state and societal action to achieve greater social and environmental justice.

Here, I would like to share some examples of water governance dynamics in Nicaragua, my research site for over a decade, followed by some commentary on water governance and justice informed by the Symposium presentations. Primarily, I emphasize that water is complex, most water problems are related to governance, and we all have roles to play in addressing local and global water inequities. Engaging with the concept of governance in relation to water equity and environmental justice brings the politics of water's complexity and its paradoxical nature into greater focus. Governance, or "how decisions about water resources are made, by whom, at what geographical scales, and to whose benefit" (Perreault, 2008, p. 835), is inherently political.

Politics and the power dynamics related to the "who and how" of decision-making determine the outcomes of water's use, management, and distribution. Not surprisingly, these outcomes are rarely equitable and oftentimes have the gravest effects on the most socially and economically marginalized populations—this includes those who have little to no

Photo  
by Sarah  
Romano



Photo by Sarah Romano



Photo by Thomas Lavanchy

“official” decision-making power. Governance thus politicizes water in ways that produce environmental injustice.

In Nicaragua, water is paradoxical. Known as the “country of lakes and volcanoes,” Nicaragua has abundant surface and underground freshwater, but over 30% of the population lacks access to “improved” or piped water sources. Moreover, many water sources suffer from contamination. This results from industrial processes (e.g., mining and livestock production), domestic uses (e.g., clothes washing and bathing), and natural occurrences of toxins like arsenic. Extreme storms and flooding also compromise water quality through turbidity and can eliminate water access when distribution systems themselves are damaged or destroyed. Lastly, situated in one of the regions most vulnerable to global climate change, Nicaragua experiences climatic variation that is worsening its regular bouts of severe drought. All of this means that access to clean water for essential daily uses can be elusive.

Confronting these difficult and complex circumstances in Nicaragua’s rural areas are the residents themselves. Organized into community-based Potable Water and Sanitation Committees (CAPS), residents have taken on the task of constructing, managing, and maintaining small-scale water systems like wells and gravity-fed systems for themselves and their neighbors. CAPS, however, have operated outside of formal legal frameworks since they started to emerge in the 1970s and hence occupy a legal gray area, despite securing water access for over one million Nicaraguans.

Anti-water privatization protests in the early- to mid-2000s in Nicaragua prompted new collaborations between and amongst CAPS, nongovernmental organizations (NGOs), and international agencies—such as multilateral organizations like the United Nations Children’s Fund (UNICEF). Supported by their urban-based allies, CAPS began to mobilize across their communities to assert their right to inclusion in policy processes, in addition to their legal recognition as water managers and service providers. A 2007 regional water forum in the northern highlands city of Matagalpa illuminated some of these dynamics, as CAPS and their allies engaged with local government officials and national policy makers. Water committee members who presented at the forum were especially interested in contesting their exclusion from the development of a new comprehensive freshwater law.

Undoubtedly to the surprise of lawmakers, rural residents were more familiar with the text of the draft water legislation than elected officials. As de facto water managers, CAPS were deeply invested in the evolution of the legal framework for water management in Nicaragua and had been studying the proposed legislation with their NGO and international allies for months. Yet they had not been invited to participate in ongoing consultations on the law (most of which took place in the capital, Managua), nor were they substantively integrated into the text of the law as water managers and service providers. CAPS’ sense of exclusion from formal, state-controlled water governance processes demonstrates that governance is contested, and that legitimate experts and sources of knowledge and authority may be different in practice than on paper. Passing new laws without the involvement of water managers produces water equity and justice issues—both procedurally and in terms of water management outcomes.

In 2010, three years after the passing of the above-referenced comprehensive water law, a special CAPS law passed in Nicaragua. This law was the product of consultation between and amongst water committee members, NGOs, international agencies, and lawmakers. It recognized rural residents as water managers and service providers, bestowing new legal benefits like the ability to receive reduced energy tariffs and to open a bank account in a CAPS’s name—providing an alternative to, as water committees have lamented, storing money “under beds.”

Several years after the law’s passing, water committees were experiencing the new CAPS law as a double-edged sword.

Meeting with rural development organization staff in Matagalpa in 2015, regional water committee leaders discussed many recurring issues and challenges of community-based water management, but much attention centered upon the new law's contradictory impacts. For example, it was a win in terms of official recognition and new legal rights, but a loss in terms of new burdens introduced, like cumbersome income-reporting requirements, which have been particularly challenging for those communities without internet access or who have CAPS leaders who are not literate. Moreover, the law did not address local-level conflict resolution, including "protection" of CAPS if they assert authority as service providers. This demonstrates that even when procedural justice is achieved, as was the case with water committee inclusion in policy formation, it does not guarantee greater equity. The new legal framework, although well-intentioned and collaboratively-produced, contributed to distributional injustice. This owes to the inequitable effects of the new law, including CAPS' varying capacities to take advantage of new benefits.

What is unique about water, and hence water equity and justice, in relation to environmental justice? Water is necessary for life and livelihoods for current and future generations; it is an integral and constituent component of ecological, cultural, and socio-political systems; and, across the globe, citizens and residents—as opposed to government actors—work as stewards and managers of their water sources. The question of "What is water justice?" must be answered through recognizing these important facets of water, as well as the notion of water itself having rights. Governing water in a way that supports equity and justice demands, for example, that we integrate community-based water managers into environmental policy processes and frameworks because of their unique expertise and knowledge of socio-ecological systems and dynamics. Equitable and just water governance also means looking beyond water as simply a resource—a common view in the U.S. and elsewhere—to recognize water's essential social and ecological functions.

In sum, we need to extend the concerns embedded in environmental justice research and activism to water. These concerns include the intersection of human and environmental protection and well-being. Taking this approach to water governance will require rethinking, reworking, and reframing our individual and societal relationship to water. For instance, developing legal frameworks that best protect water requires shifting our views of human rights in relation to non-human nature's rights—and recognizing that ecological "needs" co-constitute human needs.

Advancing climate change is heightening awareness of the complexities of water as it continues to produce detrimental impacts on water sources and users, most acutely in the Global South. In the U.S. and other Global North regions, the significance of freshwater—including what it means to have too much, too little, or compromised quali-

ty—is increasingly on the societal radar. Water is becoming visible in the U.S. in ways it often has not been seen or recognized before. The Flint water crisis illustrates this dynamic, as do similar crises unfolding across the country as localities grapple with the recognition and publicizing of, for instance, toxic drinking water flowing through city systems.

While many who work on the ground in intimate ways with water, like CAPS in Nicaragua, engage in the endeavor of linking water and environmental justice in their day-to-day work, there is more work to be done to stitch together the realms of research, policy, and activism that will support practical aspects of environmental justice. As researchers, continued exploration of water and environmental justice through a governance lens matters for creating change. Governance is malleable because there is potential for change in how people, organizations, laws and lawmakers, social structures, and institutions collectively shape water—including its use and misuse, distribution, conservation, and protection. We must continue to transcend a focus limited to outcomes like water quality and access to understand better the governance dynamics creating and perpetuating inequity and injustice. As researchers, we can also engage in public debates and policy making arenas, publish in open-access venues, and share our work in languages other than English.

As teacher-scholars, we can adjust our classroom teaching and engage in community-based teaching and learning as additional ways to make our justice-oriented work relevant and meaningful beyond the confines of the "ivory tower." Lastly, as concerned citizens and residents, we can leverage our voices through speaking up at city council meetings, calling or writing to public officials, and participating in actions and events in support of water and environmental justice. As academics, policy makers, concerned citizens, and activists concerned with achieving greater water equity and environmental justice, we all have a role to play in ensuring that dimensions of equity and justice pertaining to water are explored, recognized, and addressed. 🌍

Photo by Sarah Romano



Bringing More

# DIVERSITY

## to Colorado's Water Policy Decision-Making Table

MaryLou Smith, Colorado Water Institute

### **WATER:** who gets to use it and how safe is it?

In the past, most of us never thought about those questions, or we were content to let others answer them. As watery quantity and quality across the globe becomes a more critical issue, we need a greater diversity of people at the table understanding the challenges and opportunities, weighing in on the policies that affect us all.

The Colorado Water Institute (CWI) aims to convene stakeholders from all sectors to engage in dialogue about water. Whether the dialogue is between environmentalists and farmers or groundwater users and surface water users, whether it is about temporary leases of water from agriculture to meet urban demand or about state and federal entities working with urban and agricultural water users to design water quality guidelines, our goal is to move stakeholders from conflict to collaboration.

As we have convened and facilitated these dialogues over the past several years, there has been an increase in the number of environmentalists at the table, and we have also seen an increase in the number of women. However, there has not been an increase in ethnic diversity. We believe that we need the full spectrum of faces and voices from across Colorado communities as we tackle increasingly difficult questions regarding water quantity and quality policy.

How could we encourage such increased diversity?

Believing that the longest journey begins with a single step, in the fall of 2016 we launched a program called CSU Water Sustainability Fellows. CWI engaged with Paul Hellmund of CSU's School of Global Environmental Sustainability (SOG-ES) and Elias Quinonez at CSU's Community for Excellence (C4E) Programs. Hellmund brought passion for experiential learning, and Quinonez brought a group of CSU students from historically underrepresented backgrounds, such as first-generation students and undocumented students.

CSU Water Sustainability Fellows, now in its third year, has brought together such students in a small group setting to learn about water issues from a variety of water experts, to attend and even give presentations at statewide water con-



*Hugo Lezama, CSU Water Sustainability Fellow, teaching children about storm water at the 2018 Youth Water Expo in the North Denver community of Globeville.*

ferences, and to share their newly ignited interest in water with young people of color in North Denver neighborhoods through the National Western Center Youth Water Project.

The National Western Center redevelopment project, taking place in North Denver neighborhoods, provided context for CSU Water Sustainability Fellows to raise water awareness in communities of color. The National Western Center Youth Water Project has allowed nine of the Water Fellows over the past two summers to serve as paid interns to inspire underrepresented youth to engage and inform their peers about water-related issues and resources. This year's internship resulted in a Youth Water Expo, held at Argo Park in Denver's Globeville neighborhood on August 4th. A team of CSU students and North Denver neighborhood high school students planned the event, which drew more than 150 people.

One high school student who has participated both summers in the project is Aliyah Fard. When she joined the Expo planning team a year ago, she was interested in becoming a lawyer. Now, after two summers immersed in water issues, she is considering a career in water law or politics after college. Hugo Lezama, a senior in Civil Engineering at CSU, became intrigued in water issues as a CSU Water Sustainability Fellow and has attended several water conferences in the two years he has been in the program. He was one of the presenters at the Stories of Water



2018—2019 CSU Water Sustainability Fellows Class

“We need the **FULL SPECTRUM** of faces and voices from across Colorado”




All photos courtesy of MaryLou Smith

steps toward increasing ethnic diversity among those making decisions about water policy in Colorado. But we believe these small steps are an important contribution toward raising awareness about water issues

Equity and Environmental Justice Symposium, hosted by the CSU Water Center and CSU’s Environmental Justice Working Group in October 2017. Lezama took a leading role in organizing this year’s Youth Water Expo—largely because it fits well into his goals for the future. Lezama intends to pursue a Masters degree to equip himself for an engineering career, with a focus on water. “At some point, if I have enough money, I want to start my own foundation and start funding those kids [in the Latino community],” said Lezama. The foundation he envisions would provide internships, scholarships, networking opportunities, mentoring, and “everything you need to be successful.”

The CSU Water Sustainability Fellows program and the National Western Center Youth Water Program are small

and empowering people in all Colorado’s communities to participate in water policy decisions. 

*Funding for the CSU Water Sustainability Fellows program and the National Western Center Youth Water Project include: the Mayor’s Office of the National Western Center, Denver Water, Metro Wastewater, the Gateway II fund of The Denver Foundation, Hunter Industries, CH2M Jacobs, the Walton Family Foundation, The Nature Conservancy, Community Foundation of Northern Colorado, and others.*

*Quotes in this article come from interviews conducted by Cyrus Martin for his July 26, 2018 article in SOURCE, “CSU, Denver Students to Raise Water Awareness in Communities of Color.”*

# Environmental Justice in the Colorado

# BORDERLANDS

Patricia J. Rettig, Water Resources Archive, Colorado State University Libraries

## Land. Water rights. Human rights.

The 1978 bylaws of the Land Rights Council define the organization's purpose as addressing these three areas (<https://hdl.handle.net/10217/187716>). Though the environmental justice movement was just beginning at the time, the Land Rights Council contributed its unique version to the effort.

The essential dispute can be characterized in a variety of ways: rich against poor, white against Hispanic, U.S. against Mexico, private versus communal property, resource exploitation versus sustainable use, and modernity against history. At the heart of the conflict, people's lives and livelihoods hung in the balance. Land, water rights, human rights, all tied together.

Before the challenge to their way of life arrived, inhabitants of the Sangre de Cristo Land Grant depended for more than 100 years on communal access to both La Sierra, a mountain tract east of the town of San Luis, and La Vega, a large meadow southeast of town. The "oldest town in Colorado," small San Luis proclaims largely on the land, with whitewashed rocks on a hillside beside the town, established April 5, 1851, in what was then New Mexico Territory and

is now Colorado's southern San Luis Valley. San Luis is predominately Hispanic, with direct ties to Spain's religious, cultural, and artistic traditions. The surrounding area is mainly agricultural.

In 1843 when the Sangre de Cristo Land Grant was established, what is now Costilla County was part of Mexican territory, and Mexican land grant laws recognized the land and its natural resources as communal in use. La Vega remains the only Mexican-era land grant commons in Colorado. Running through La Vega are Rito Seco Creek and Rio Culebra, along with San Luis People's Ditch, an original *acequia*. Built in 1852, a year after the town was founded, the gravity-fed irrigation system was eventually awarded the very first adjudicated water right in Colorado. *Acequias*, community-tended irrigation systems, rely on spring snow-melt flowing to the meadows and fields from the surrounding mountains, including La Sierra.

In contrast to La Vega's continued status as a commons, La Sierra became private property in 1960. North Carolina lumberman Jack Taylor purchased more than 77,000 acres of the original land grant, including the 14,069-foot



mountain Culebra Peak, with the intention of logging it, establishing the private Taylor Ranch.

Taylor, a wealthy white man, was eager to cast aside history and confirm the land as private property. This would allow him to deny anyone else access to La Sierra as well as to carry out his intent to log the land. Many in the San Luis community, including numerous people descended from the original land grant inhabitants, saw this as a violation of their communal rights as well as a threat to the sustainability of the water supply for their *acequias*.

They relied on what is called the Beaubien Document, which guaranteed that “all the inhabitants, will have with convenient arrangement to enjoy the benefits of the pastures, water, wood, and lumber, always being careful not to be prejudice with one another” (English translation from: <https://hdl.handle.net/10217/189721>). Carlos Beaubien, who became owner of the Sangre de Cristo Land Grant in 1847, guaranteed these rights in a deed in 1863, a year before his death. The last part of the phrase quoted is also translated as “taking care that one does not injure another,” essentially a requirement for sustainable practices.

Less than 100 years later, the San Luis community found their rights suddenly denied, a disruption to their economic and cultural practices. Some resorted to violence against Taylor, who soon brought a lawsuit to keep the locals out. Thus arose a complex series of litigation lasting for more than 50 years.

In 1978, the Land Rights Council formed as a grassroots advocacy organization and became the key player in the effort to protect the community’s rights. They focused on litigation supported by legal and historical research. To carry this out, they applied for grants, secured pro bono legal counsel, held educational workshops, and organized the community. The group, finding strength in the nationwide Chicano movement developing at the time, was also distinctive for having strong women in leadership roles.

In 1998, the *Lobato v. Taylor* trial retried the earlier *Rael v. Taylor* case in the Costilla County District Court. It ascended to the Colorado Supreme Court, which rendered a decision in favor of the plaintiffs in 2002, issued in 2016. Though Taylor passed away in 1988 and the land, now known as Cielo Vista Ranch, changed hands several times, the case is currently pending appeal. The Land Rights Council continues to work on expanding rights and ensuring equitable environmental governance to sustain a healthy ecosystem.

Understandably, the Land Rights Council highly values the records they have accumulated for 40 years in an effort to restore community rights. Their collection, donated to the Water Resources Archive in 2017, contains administrative, research, and legal files documenting their activities (see <https://lib2.colostate.edu/archives/findingaids/water/wlrc.html>). When the Council recognized they needed assistance to preserve their records, they cautiously and selectively chose to work with the Water Resources Archive. Because part of the

caution involved the geographical distance, the Archive agreed to digitize the bulk of the collection. Now online, the collection is easily accessible to anyone with an internet connection (see <https://hdl.handle.net/10217/187476>).

Efforts toward environmental justice are neither quick nor easy. This long-running and ongoing effort in San Luis involves not only gaining respect for cultural practices but also access to the land and resources and sustainable use of the same. Associated issues of land, water, and human rights continue to be addressed in the area. In 2009, Colorado state law recognized *acequias* for the first time with the Acequia Recognition Law, amended in 2013.

The Land Rights Council and its collection at the Water Resources Archive provide one perspective of the multifaceted story in the San Luis Valley. And this is just one community in Colorado. Preserving the documents that will allow people to learn from these situations into the future is important for purposes of justice. If there are other stories of struggles for environmental justice that need a home for their documentation, please inform the Water Resources Archive (970-491-1939; [patricia.rettig@colostate.edu](mailto:patricia.rettig@colostate.edu)). 🌍



(Top) Shirley Romero Otero, Junita Martinez, and Mathew Valdez, Land Rights Council board members. (Bottom) One box of the Land Rights Council’s records. Photos by P. Rettig. (Left) Crestone, Colorado © iStock.



# Public Drinking Fountains and Bathrooms A HUMAN RIGHT

Cheryl Distaso, Fort Collins Community Action Network;  
Sarah King, Fort Collins Community Action Network

The Fort Collins Community Action Network (FCCAN), a social justice organization, has been involved in local water justice issues for over ten years. Our interest was first piqued in 2002 at the New West Fest (NWF) music festival. In the vendor information packet that year, the Downtown Business Association (DBA) included language prohibiting nonprofits from giving away free water because it undermined the efforts of their festival sponsor, Pepsi, who was to be the main provider of all beverages. The Rocky Mountain Bullhorn, a local alternative newspaper, rented a booth at the NWF that year and chose to give away water. Technically, because they were not a nonprofit, they were not breaking any rules. And in the true fashion of the Bullhorn, they invited people via a megaphone to come and get their “contraband water” for free. The label of the bottles they distributed included the quote from the DBA’s vendor agreement. The Rocky Mountain Bullhorn exposed the absurdity of business entities’ attempt to control what should be a free and accessible resource.

Several years later, in June of 2008, while tabling at an event in Civic Center Park, we noticed that there were no drinking fountains in the park. Event organizers were selling bottled water for profit. On that hot summer day, many people were forced to purchase water, something we strongly believe should be freely available. FCCAN followed with a small but successful campaign to urge the Fort Collins Parks Department to install a drinking fountain at Civic Center Park. However, this fountain, like all of the others in the city at the time, had to be blown out and turned off in the wintertime.

In 2010, FCCAN revisited New West Fest, where the only free water was a drinking station privately set up at the Menonite Fellowship. As part of an educational campaign about corporate control of water, FCCAN engaged CSU student

volunteers to approach local downtown business owners prior to the festival. The students asked the business owners if they would allow people to fill up water bottles in their businesses during the NWF. We compiled and distributed maps indicating which businesses would allow people to fill up water bottles for free during the festival. The temperatures can fluctuate pretty significantly at the end of August, and this was a particularly hot NWF weekend. Our little campaign consisted of ten volunteers walking around for four hours during the NWF, providing information about where to obtain free water. We were very much appreciated, but our efforts did not put a dent in the water needs of the tens of thousands of attendees.

People did not have adequate access to water that day. Perhaps it was no coincidence that 2010 was the year of the NWF riot, in which 400 people took to the streets without any ascertainable provocation and threw bottles and broke windows at businesses, resulting in 13 injured and hospitalized ([http://archives.collegian.com/2010/08/21/082210\\_riot/](http://archives.collegian.com/2010/08/21/082210_riot/)). Alcohol is attributed to be a significant factor in that riot, and one has to wonder if the reason so much alcohol was consumed at the NWF that day was that it did cost significantly less to buy beer than it did to buy water throughout the sweltering day. The next year, two changes were made to the NWF. First, the NWF was scheduled one week earlier so as not to coincide with the start of CSU’s fall semester and the return of students to Fort Collins. This was presumably done to decrease the number of students drinking alcohol. Secondly, free water stations were set up at multiple sites around the festival.

Several years later, in 2015, Old Town Square underwent a \$3.9 million remodel. The upgrades included a vernal pool that attracts lots of attention in the summertime; it is a fun and attractive feature for families, children, and dogs to splash in the water. But we noticed that the drinking fountain was not reinstalled in Old Town Square.

FCCAN intern Sarah King asked Matt Robenault, the exec-

utive director of the Downtown Development Authority, why this was the case. Robenault responded in an email by saying: "...the drinking fountain did not meet current health and safety codes relative to its plumbing, and it was a seasonal feature that required shut down for a better part of the year to avoid freezing pipes. There are sinks in the OTS [Old Town Square] public restroom where water bottles can be filled during the hours of operation of 8:30 am until 10:00 pm daily."

Yet, several blocks away, at FoCo Café, a nonprofit-pay-what-you-can eatery, a Bachelor of social work intern named Kelly Connor spearheaded the effort to fund an outside hydration station accessible 365 days a year. It took over a year, but the ribbon was cut August 1, 2017. Unlike every other drinking fountain in the city of Fort Collins that existed at the time, the hydration station at FoCo Cafe is designed such that it does not need to be blown out and shut down in the winter. We had no idea that this sort of thing existed.

Why couldn't a similar hydration station be installed in Old Town Square?

Robenault's reply:

"It comes down to our inability to ensure a feature that will remain sanitary during the different phases of the day that attract patrons to OTS.

"The intensive use of OTS, which spans roughly 18 hours per day, is often frequented by patrons that do not adhere to societal norms for the deposit of bodily fluids, thus making it difficult to provide a drinking water feature that can be maintained in a safe, sanitary condition. Blood, vomit, and urine all find their way into the late night situations in OTS, which makes the management of the space very different than the management of a city park, rec center or even the private space at FoCo Cafe.

"We will not knowingly create a situation that repeats the same unsafe health condition again that we had previously with the former drinking fountain in OTS."

The Fort Collins Homeless Coalition, an affiliate of FCCAN, then contacted the Fort Collins Parks Department to inquire about the possibility of installing a FoCo Café style hydration station in Oak Street Plaza. The plaza is designated a park rather than a downtown property, so the Downtown Development Authority does not have jurisdiction over the area. The Fort Collins Homeless Coalition met with Mike Calhoon, Director of the Fort Collins Parks Department, to discuss the prospect of getting such a hydration station installed. Calhoon went to work to research the details necessary to install a hydration station. In May 2018, the Fort Collins Parks Department installed a year-round hydration station downtown in Oak Street Plaza. It includes a water bottle refill station, and continual access to clean and free drinking water. There were no barriers thrown up from the Parks Department; instead they jumped right into the project. The Fort Collins Homeless Coalition celebrated with "The People's Ribbon Cutting."

In addition to access to clean water, access to public bathrooms is a significant issue in Old Town as well as in the rest

of Fort Collins. The only 24/7 public bathroom in Old Town is located at the parking lot on Remington at the Oak Street Parking lot. This bathroom was closed every night before the Fort Collins Homeless Coalition lobbied for overnight access. There is another public bathroom in Old Town Square (the one in which Robenault invited us to fill up our water bottles), but it closes at 10:00pm.

The other public bathrooms in the downtown area include the North Transit Center, Aztlan Northside Community Center, and City Hall. Yet, they are only accessible when the buildings are open. On the perimeter of Old Town, the Gustov Swanson Natural Area (between Catholic Charities and the Fort Collins Rescue Mission) has a bathroom. This facility was closed for over two years. Through persistent lobbying from the Fort Collins Homeless Coalition, it reopened in June of 2016. Yet the bathroom is closed from dusk to dawn, and in the winter months, that is most of the time. The Fort Collins Homeless Coalition is working to extend those hours. The Coalition is also lobbying City Council to open a 24/7 public restroom at the Horsetooth MAX bus stop.

Access to water and sanitation is an essential human right. This right is enshrined in the Paul Simon Water for the Poor Act of 2005, emphasizing access to water and sanitation in developing countries. However, access to water and sanitation is an issue in our own backyard. Fort Collins has the resources to build more restrooms and year-round water fountains, yet we are still in a continuous battle to access these resources. Not having access to 24/7 restrooms is not only a human rights issue, but also a medical issue. According to the CDC, there have been several outbreaks of hepatitis A among the homeless populations of several U.S. cities that have been directly correlated to a lack of access to 24-hour restroom access (<https://www.cdc.gov/hepatitis/outbreaks/2017March-HepatitisA.htm>).

When people lack access to wash their hands, disease will spread. Using the restroom is something that all humans need and limiting access to clean water and 24/7 bathrooms does not change that fact. Rather, it creates issues of inequity and public health for communities. We, as a community, need to come together to fight against the blockades bordering our human rights for water and access to restrooms. 🌊



Members of the Fort Collins Homeless Coalition at "The People's Ribbon Cutting" at Oak Street Plaza, May 7, 2018. Photo by Laine Gebhardt.



### Colorado Water Online

Visit the CWI web site to access a PDF version of our current newsletter. To download past issues of our newsletter, click on *Newsletter Archives*.

### Attention Subscribers

Please help us keep our distribution list up to date. If you prefer to receive the newsletter electronically or have a name/address change, please visit CWI's website ([cwi.colostate.edu](http://cwi.colostate.edu)) and click on Subscriptions.

Colorado Water is financed in part by the U.S. Department of the Interior Geological Survey, through the Colorado Water Institute; the Colorado State University Water Center, College of Agriculture, College of Engineering, Warner College of Natural Resources, Agricultural Experiment Station, and Colorado State University Extension.

*Demonstration in San Francisco, California after multiple oil spills in the San Francisco Bay in 2010.*



©iStock