US Water Alliance

# AN EQUITABLE WATER FUTURE

## A National Briefing Paper

# PREFACE

Water is essential to prosperity and progress. The sad reality is that water challenges disproportionately affect the most vulnerable in America. At the same time, smart and equitable water management can foster opportunity for all people and communities.

This report presents a water equity framework, drawing on the wisdom and innovation of hundreds of leaders from across the public, nonprofit, and private sectors. It spotlights promising strategies for ensuring that all people have access to safe, clean, affordable water, benefit from water infrastructure investment, and are resilient in the face of a changing climate.

The members and staff of the US Water Alliance are committed to advancing equitable water management. We stand ready to work in partnership to support, scale, and sustain the promising practices that are catalogued in this report. Together we can build stronger communities and a more equitable America.

**One Water, One Future.**

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# INTRODUCTION

Water is the defining issue of our time—it has been steadily rising as a top-of-mind concern for community, business, and political leaders across the globe. In fact, the World Economic Forum identifies water crises as one of the greatest risks we face in this decade. Water shapes economic growth, the environment, and the very social fabric of our communities. Ensuring that all people have access to safe, reliable, and affordable water and wastewater systems is the cornerstone of a sustainable and prosperous nation.

This national briefing paper examines the interconnections between water management and vulnerable communities in the United States. Too often, when we think of vulnerable communities that struggle with water-related challenges, we think of places like sub-Saharan Africa, Southeast Asia, and other developing regions. The overall high quality of water systems in America—one of our most monumental achievements as a nation—obscures the fact that water challenges are a daily reality for some communities.

All people need access to the basics—water, food, shelter—in order to participate fully in society. When these basic conditions are met, our communities and our economy thrive. Water systems that do not deliver clean, affordable water to all people can exacerbate inequality and undermine our nation's future prosperity. Vulnerable communities that face various forms of water stress are held back from full participation in the economy, lowering productivity and competitiveness. Moreover, as water utilities work to fund the maintenance and operations of their systems, they need financially stable ratepayers.

The good news is that progress is happening on multiple fronts. A range of stakeholders are pioneering equitable and inclusive approaches to water management. Public and private utilities are implementing low-income assistance programs and workforce development strategies, as well as utilizing capital projects to foster neighborhood revitalization. Community-based organizations are building local capacity to engage in water planning and policy making, nurturing a new generation of leaders. Environmental organizations are incorporating community considerations into their ecological work. A growing number of philanthropic organizations are bringing equitable water strategies into their investment portfolios. Businesses are engaging in efforts to restore watersheds and enrich the communities in which they operate. Investors are redefining risk and considering the

resilience of communities when contemplating infrastructure investments. Research institutions are partnering with communities to shine a light on the complex interconnections between water, climate, and socioeconomic vulnerability.

The US Water Alliance developed this briefing paper to expand national understanding of the water-related challenges that vulnerable communities face. This paper is inspired and informed by the contributions of diverse stakeholders—utility managers, policymakers, community leaders, advocacy coalitions, direct service providers, and more. It spotlights the promising practices that have emerged to make water systems more equitable, and offers recommendations for their implementation. The audiences we address and the scope of topics we tackle in this paper are intentionally broad. At the US Water Alliance, we believe that all stakeholders have a vital role to play in securing an equitable water future for all.

The report is organized in the following manner:

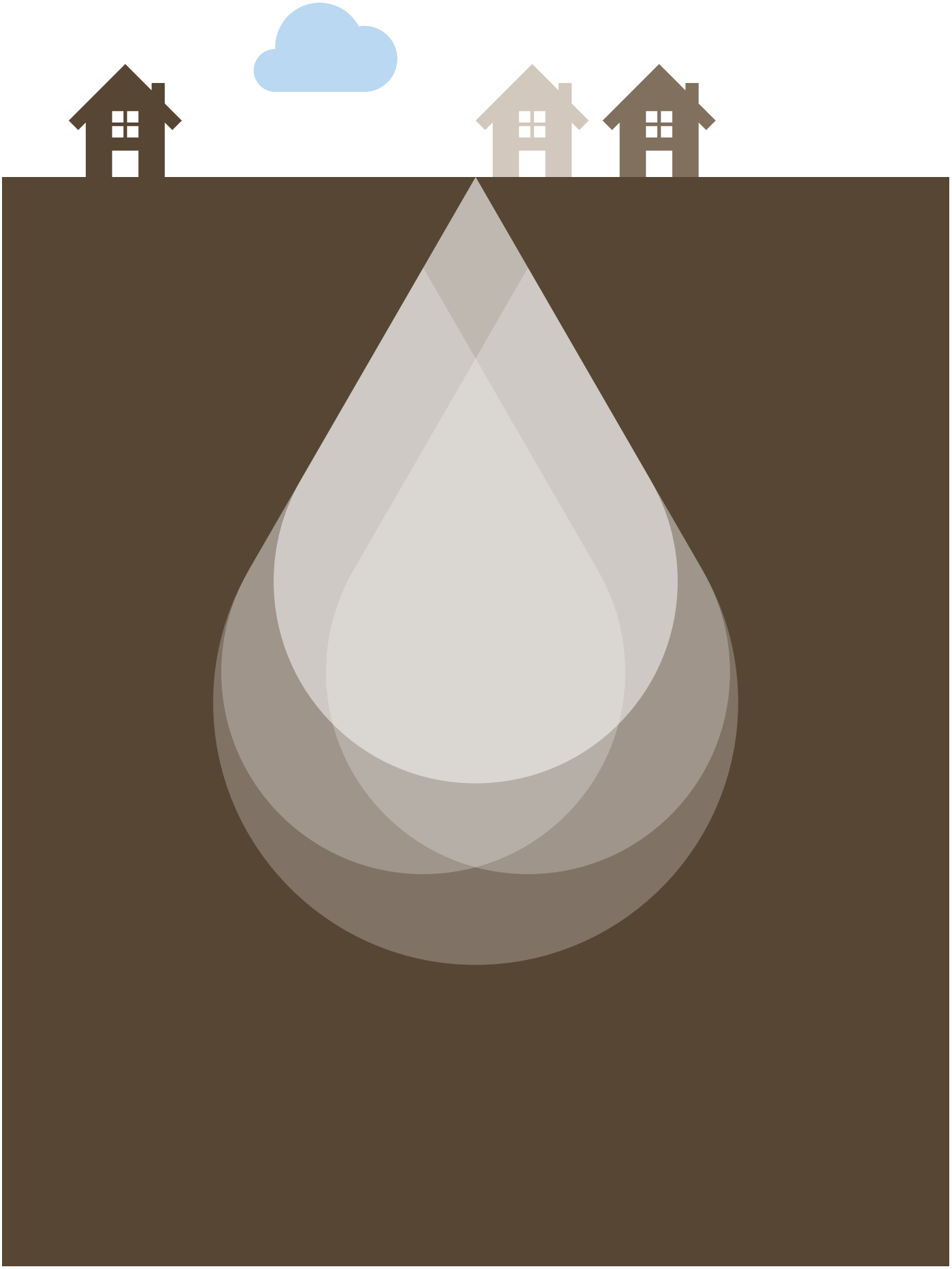
- **Part One: Water Stress and Vulnerable Communities** describes the critical challenges facing the water sector and how they impact vulnerable communities; and

- **Part Two: The Pillars of Water Equity** describes promising practices and strategies in three key arenas showcasing the diverse ways that organizations can advance water equity in the US.

**Research Methodology**

This paper is informed by a national scan conducted by the US Water Alliance to better understand, catalog, and accelerate the adoption of promising programs and policies that improve outcomes for vulnerable communities through equitable water management. The components of this research include:

- Over 125 discussions with stakeholders, including leadership at utilities, government agencies, community-based organizations, national policy organizations, philanthropy, and research institutions;
- In-depth surveys of utilities and research institutions;
- Comprehensive literature review;
- Secondary source research on over 250 organizations; and
- Consultative sessions with the US Water Alliance's One Water Council.



# PART ONE
## Water Stress and Vulnerable Communities

As a nation, we face multiple water resource challenges. Despite recent rainfall, water scarcity is widespread in California, where more than one million people lack access to safe and reliable drinking water. Across the Midwest, Northeast, and Southeast, flooding and extreme weather damage homes and communities. We have seen recent water quality challenges, such as the algal bloom in Lake Erie that affected half a million people in Toledo, Ohio, or the lead crisis in Flint, Michigan, that endangered 90,000 people.[1] Our water infrastructure is in urgent need of repair. Many water and wastewater systems have outlived their intended lifespan. The changing climate puts added stresses on water systems. Rising sea levels and extreme storms flood neighborhoods and inundate systems with corrosive salt water. Population increases in some regions pose capacity and water supply challenges, while population decreases in others reduce the revenue that utilities need to operate and maintain water systems.

While these water-related challenges affect all communities, those that are already overburdened with economic, environmental, and health challenges are especially vulnerable. Those most affected are often lower-income people, communities of color, children, and the elderly, among others. The impacts of water stress on physical and mental health, child development, and economic mobility are cumulative, and often compounded by underlying challenges such as poverty and unemployment.

Part One of this paper describes the water challenges that vulnerable communities face, and explores how they affect different regions across the country.

**Defining Terms**

These are some key terms that will be used in this paper. These definitions represent our framing of the following concepts, drawing from a range of sources.

**Water equity:** Equity refers to just and fair inclusion—a condition in which everyone has an opportunity to participate and prosper. Water equity occurs when all communities have access to safe, clean, affordable drinking water and wastewater services; are resilient in the face of floods, drought, and other climate risks; have a role in decision-making processes related to water management in their communities; and share in the economic, social, and environmental benefits of water systems.

**Water stress:** Water stress occurs when individuals and communities face difficulty in accessing water services. It can include inadequate access to drinking water, wastewater, and stormwater services for everyday needs, whether due to lack of infrastructure, difficulty paying for services, or poor water quality. Water stress encompasses water-related climate impacts such as floods, droughts, and rising sea levels. Facilities like wastewater treatment plants can cause stress to residential communities in the surrounding areas. Water stress also affects people that rely on water for their livelihood, such as farming communities.

**Vulnerable communities:** Vulnerable communities face historic or contemporary barriers to economic and social opportunities and a healthy environment. The principal factors in community vulnerability are income, race or ethnicity, age, language ability, and geographic location. This may include low-income people, certain communities of color, immigrants, seniors, children, people with disabilities, people with limited English-speaking ability, rural communities, tribal communities, people living in unincorporated areas, people living in public housing, and currently or formerly incarcerated people.

**Resilience:** Resilience refers to the ability of an individual, community, or system to respond and adapt to crises, and to treat them as opportunities for transformation and improvement. It encompasses the capacity of all people—including vulnerable communities—to respond to shock and trauma of all kinds. In the context of water, resilience is generally discussed in terms of vulnerability to climate impacts and natural disasters.

# The Challenges

## Aging and inadequate infrastructure

Much of our nation's water infrastructure was built over a century ago, and is in desperate need of repair today. Many water systems need significant investment to maintain a state of good repair and prepare for changing climatic conditions and population shifts. We lose hundreds of millions of gallons of water each year due to water main breaks and leaks. Upgrading our deteriorating water systems will cost approximately $1 trillion over the next 20 years.[2]

Water systems are in a double bind: they must continue to deliver the high-quality service they have historically provided, while simultaneously rebuilding deteriorating systems with diminished federal support. The passage of the Clean Water and Safe Drinking Water Acts over 40 years ago was accompanied by federal funding to support local investment. Over the past few decades we have seen a steady decline in federal funding: the federal government has gone from contributing 63 percent of total capital spending on water infrastructure in 1977 to only nine percent in 2014. In comparison, the federal government's spending on transportation infrastructure remained constant over the same period.[3]

Today, most water infrastructure projects are funded by the local ratepayer base, which makes investment in water infrastructure projects particularly challenging for water utilities that have high concentrations of low-income people in their service territory. In addition, maintenance costs for some systems are compounded by decades of neglect and deferred investment. In many cases, regulations are driving increased capital spending, exacerbating fiscal challenges.

## Lack of infrastructure

While aging or inadequate water infrastructure is a challenge in some parts of the country, other areas have never had centralized water and wastewater systems to begin with. According to the 2000 US Census, 1.7 million people lack access to complete plumbing facilities.[4] African Americans are more than twice as likely as whites to live without modern plumbing.[5] Rural communities, unincorporated areas surrounding cities, and tribal lands in particular lack water and wastewater infrastructure. People in areas without infrastructure often must pay for alternatives to centralized water service, such as

household septic systems, bottled water, and water tanks. These replacement costs can create a significant financial burden for lower-income people and become a source of inconvenience and anxiety. Lack of infrastructure can stifle economic development, creating a cycle of diminished opportunity in these areas.

Lack of infrastructure can take many forms. Some areas have piped water but lack indoor bathrooms, while others depend on public taps or wells. Other areas have adequate infrastructure in individual houses but lack overall wastewater treatment or stormwater systems, which can cause flooding and contaminate water sources. Poorly maintained septic systems can also overflow and cause bacterial contamination of source water. Some service area boundaries may reflect discriminatory policy decisions that failed to extend infrastructure to low-income communities.[6] Particular areas that lack infrastructure include Native American lands; Latino communities in the Rio Grande Valley of Texas and the Central Valley of California; communities in Appalachia that are mostly home to white farm households; and areas in the deep South and along the Mississippi Delta with a majority African-American population.

## Affordability

Water affordability is an issue at both the household and utility level. The rates that utilities charge their customers are the primary funding source for day-to-day utility operations and investments in system improvements. Utilities need to raise rates to keep up with the rising costs of labor and materials, and to make debt service payments on bond-financed capital improvements. While water and wastewater service is generally affordable for most Americans, water rates can be too expensive for lower-income people: the lowest 20 percent of earners pay almost one-fifth of their monthly household income for water.[7] Utilities in lower-income cities, rural areas, and jurisdictions with declining populations struggle to keep water affordable while financing maintenance and complying with regulations. In Baltimore, one of the country's poorest cities, water rates will go up by about 10 percent per year for three years to finance infrastructure upgrades.[8]

While many utilities are committed to assisting low-income families, finding a balance between financial management of the utility and the needs of vulnerable communities can be difficult. When rates go unpaid, the utility must enforce payment or find another way to make up the difference. Shutting off water service is one of the primary mechanisms that utilities can use to enforce payment. In some jurisdictions, they can even place liens on ratepayers' houses for failure to pay. Unpaid water bills can also lead to foreclosure. Water shutoffs and liens have detrimental effects on the health and wellbeing of already vulnerable people. In some states, children can be separated from their families and placed in foster care if water service is shut off.[9] There are few policies in place to protect vulnerable households with small children or disabled, pregnant, or elderly people from shutoffs.

## Fragmentation

Fragmentation in the water sector makes it especially difficult for small systems to provide high levels of service at affordable prices. There are over 51,000 water providers in the United States, compared to only 3,000 electricity providers.[10] Of these 51,000 systems, 83 percent serve populations of less than 3,330 people, and an astonishing 55 percent serve less than 500 people.[11] For these small systems, it is often difficult to attract investment to help meet the need for capital driven by the cost of making repairs and meeting regulatory compliance mandates. As a result, raising rates is often the only option for funding maintenance and improvement. Given that some of the most low-income areas in the country are rural areas served by small systems, this creates a serious cost burden.

In California's Central Valley, many vulnerable communities rely on bottled water due to inadequate infrastructure and water quality challenges. *Photo credit: Community Water Center.*

## Water quality

Access to water is not enough; that water must be safe and clean enough for human consumption. In some parts of the country, drinking water is contaminated with heavy metals, agricultural or industrial runoff, or untreated wastewater.

Lead, a toxin that causes brain and nerve damage, is one of the most common sources of water contamination in this country. Up to 10 million homes, primarily in the Midwest and Northeast, are in areas with lead pipes.[12] Chemical additives in many water treatment systems are intended to provide protective coatings that help prevent corrosion, but lead can still enter the water supply when lead pipes or solder are physically disturbed, or when they corrode due to age or changes in the chemical make-up of the water, as occurred in Flint. Children are most vulnerable to lead poisoning because it can affect their neurological development.[13] Many utilities across the country are in the process of addressing lead risks, and it is a time-consuming, expensive process.

Groundwater contamination is also a concern. For example, uranium in groundwater is a challenge in the Southwest, especially on the Navajo Nation, where a Center for Disease Control study found that almost a third of residents have high levels of uranium in their urine.[14] Stormwater runoff from urban areas can sweep contaminants and debris from gas stations, factories, and other industrial facilities into groundwater. Agricultural runoff—nitrates, pesticides, and nutrients—pollutes lakes, rivers, and aquifers that provide drinking water in California, the Midwest, and elsewhere. Nutrient runoff creates toxic algal blooms that contaminate drinking water sources in many areas, including the Great Lakes region, the Gulf Coast, and the Northeast. Bacterial contamination occurs when wastewater enters water sources, and can pollute drinking water supplies and recreational beaches. In low-income areas, such as rural Alabama, West Virginia, and along the Texas-Mexico border, untreated wastewater discharges into water bodies and causes water-borne illnesses. Combined sewer overflows can also be a source of bacterial contamination.

Extreme storms such as Hurricane Sandy, along with other climate impacts, put coastal communities at risk.

## Climate impacts

Climate change threatens water systems that were designed for conditions that no longer exist—notably, predictable snow and rainfall patterns and steady sea levels. Extreme storms such as Hurricanes Katrina, Rita, and Sandy broke historical records and overwhelmed existing infrastructure. There is evidence that changing temperatures are increasing the frequency, unpredictability, and destructive force of wildfires, hurricanes, and rainstorms.[15] Sea level rise, combined with land subsidence, makes storms more destructive and puts coastal areas at risk of permanent inundation. A recent study found that the oceans could rise by up to 6.5 feet by the end of the century.[16] These are serious challenges that the Gulf, Mid-Atlantic, and Southern Atlantic coasts face. As utilities struggle to fund maintenance of existing infrastructure, they must also redesign system capacity to accommodate a more uncertain future. Climate planning is still in its early stages and is not yet common practice in all communities facing climate risks.

Vulnerable communities are often the hardest hit by climate challenges, especially water-related challenges. The impacts of a changing climate are stark in California, where the state recently endured the most severe drought in 1,200 years.[17] Tribal, rural, and farming communities face more serious water shortages than other areas. While torrential rains have returned to some parts of the state, California—and the US as a whole—will likely experience cycles of increasingly extreme droughts and floods.[18] This will pose a more serious threat to vulnerable communities where underfunded utilities are not prepared to adapt to changing climatic conditions.

## Flooding

Flooding is a challenge for communities across the nation. Coastal areas are at risk of flooding due to sea level rise and extreme storms. Urban flooding occurs when shifting precipitation patterns overwhelm existing systems, or in places with insufficient stormwater infrastructure. In areas with combined sewer systems, untreated wastewater can overflow into streets, parks, and water bodies, and even back up into people's homes during intense storms. Large commercial areas with impervious paving, such as parking lots or shopping centers, can make flooding worse in the surrounding areas.

Vulnerable communities are often heavily affected by flooding because they are more likely to live in risk areas, and lack the resources and infrastructure to prepare for and recover from storms. Many low-income communities are in low-lying areas or near bodies of water, and are subject to frequent flooding that damages homes, discourages economic development, and creates public health risks. English Avenue, a low-income neighborhood bordering Atlanta's Proctor Creek, has been challenged with regular flooding for years, due to inadequate stormwater infrastructure.[19] Disinvested urban neighborhoods often have a concentration of impervious surfaces and abandoned buildings, and lack green spaces that could absorb flood water. Wastewater can overflow in communities without adequate treatment facilities, like Lowndes County in Alabama, spreading water-borne disease.[20] A compounding challenge is that vulnerable communities do not always receive the aid and relief funding they need to recover from flood events.

## Siting of hazards

The siting of hazardous facilities and land uses in low-income neighborhoods and communities of color creates public health disparities. For example, Waterfront South, a low-income, majority African-American neighborhood in Camden City, New Jersey, is the site of a wastewater treatment plant, a solid waste facility, polluting factories, two Superfund sites, and 28 contaminated sites—all within one square mile. Hazardous sites and land uses often pose water threats for vulnerable communities through compromised drinking water, risk of contamination during floods, or ambient pollution from wastewater treatment facilities. The concentration of hazards in Waterfront South exposes residents to high levels of lead, arsenic, and manganese.[21]

Drilling, mining, and fracking pose ongoing threats to water supplies. On the Standing Rock Sioux Reservation in North Dakota, the proposed Dakota Access Pipeline could contaminate the tribe's water supply and threaten their way of life. Native American lands around the country, from the Great Lakes to the Southwest, are compromised by pipelines and mines. Water supplies in rural West Virginia are contaminated by coal mine runoff. The oil industry's operations along the Gulf Coast create environmental burdens for low-income people and communities of color, and hinder traditional livelihoods and fisheries.

## Public participation

The ecosystem of water governance is complex: multiple agencies hold responsibilities over different issues, the subject matter is highly technical, and decision-making processes can have long time horizons. This makes meaningful public participation in decision-making and governance difficult, along with other obstacles. Language barriers can be an issue as well: meetings are often conducted only in English. There is little technical support or training for people interested in running for and serving on water boards or citizens' advisory councils. In some places, owning property is a requirement for running or even voting in a water board election.

In addition, some vulnerable populations have been systematically disenfranchised and excluded from policy making throughout American history. These past experiences affect how these communities view and interact with government agencies today. High-profile incidents like the Flint water crisis exacerbate the underlying distrust vulnerable communities feel toward the government. It can take decades for government to regain public trust once it has been compromised, especially as it relates to water, which is so intimately tied to health and wellbeing.

## Water Stress in Different Regions

Vulnerable communities experience water challenges in diverse ways depending on geography, history, and local context. This section describes different types of water stress and gives examples of regions with these conditions.

### Disinvested urban areas

Aging, inadequate water infrastructure and economic distress create enormous challenges for disinvested urban neighborhoods, particularly those in postindustrial cities with shrinking populations. Neighborhoods that have been neglected for decades are more likely to have water quality issues and deteriorating infrastructure, and low-income communities cannot afford the rate increases needed to improve conditions. In cities across the country, water bills are unaffordable for people living in poverty. High vacancy rates and blight make it more difficult for utilities to maintain systems.

For example, many communities in the Great Lakes have either stagnant or shrinking populations that erode the fiscal base of cities like Erie, Gary, Youngstown, and Detroit. The Great Lakes region has more cities with declining populations than the rest of the country, and it faces high poverty and unemployment rates, making water unaffordable to many.[22] Aging infrastructure has exacerbated serious public health crises such as lead and algal blooms.[23]

### Rural areas

Rural areas face challenges in financing and extending water infrastructure. Most of the poorest counties in America are rural, and their utilities often lack the resources to connect all residents to a centralized system. Utilities in isolated areas are often responsible for serving large geographic areas with small populations, posing technical challenges that they may not be equipped to solve.

In parts of Alabama and Mississippi that are home to primarily African-American populations, small rural counties have extremely poor access to wastewater infrastructure. In Lowndes County, Alabama, one of the poorest counties in the country, only about 20 percent of residents are connected to the municipal sewer system. The rest are required by state law to pay for their own septic systems, and failure to do so can result in arrest—a serious burden considering that median household income is $26,000.[24] In other parts of the region, wastewater is treated by constructing lagoons and spray fields, where it is supposed to percolate into the ground but can overflow into neighboring streets and houses.[25]

Similar challenges exist in Appalachia, one of the nation's poorest regions. Many households lack drinking water and wastewater service. McDowell County, West Virginia, typifies the region's challenges. Many families moved to the area generations ago to work in the coal industry, but unemployment has been high since the industry declined, and the median income is $22,000.[26] Utilities are financially strapped and cannot extend services to low-density rural areas, leaving households responsible for their own wells and septic systems. In some areas, wastewater is discharged directly into creeks that are used for fishing, recreation, and drinking water. Decades of mining has left source water contaminated with lead, nickel, and other heavy metals.[27] Many families spend money on bottled water that they can hardly afford or depend on tiny local food banks.

### Unincorporated areas

Unincorporated areas often lack adequate infrastructure because they lie outside of municipal boundaries, and it is unclear which government entity is responsible for providing water and wastewater services.

Flooding can cause severe damage, such as this sinkhole that formed during a 100-year flood in Milwaukee, Wisconsin. *Photo credit: Milwaukee Metropolitan Sewerage District.*

In the Central Valley, one of the most productive agricultural regions in the world, industrial farm runoff contaminates the water supplies of millions of Californians, increasing their risk of cancer and reproductive health problems.[28] Water infrastructure was never installed in some unincorporated areas of the Central Valley, and the primarily low-income, Latino, and immigrant communities living there rely on individual wells or bottled water. Small farming communities in Tulare County have been forced to use old, contaminated back-up wells, as drought dries up safer wells. In the San Joaquin Valley, 95 percent of people use contaminated water for domestic uses.[29] Water is expensive in the Central Valley despite its low quality. In a region where median income is just $14,000, some households must dedicate 20 percent of their income to water expenses.[30]

Colonias—informal settlements built along the US-Mexico border, many in unincorporated areas—are home to more than half a million people living without adequate water or wastewater infrastructure. About 96 percent of residents are Hispanic/Latino, 42 percent live in poverty, and only half are formally employed.[31] Many households lack drinking water and wastewater infrastructure. Flooding and water-borne disease are widespread due to poor drainage and reliance on small septic systems. While state governments are in the process of upgrading water infrastructure, it can be prohibitively expensive due to the small size and remoteness of the communities.

## Coastal areas

Coastal areas around the country are subject to flooding due to sea level rise and extreme storms. Saltwater intrusion can compromise underground infrastructure and contaminate aquifers. Along the Gulf Coast and the southeastern coast of the US, many low-income people and communities of color are at extreme risk of hurricanes, sea level rise, and land subsidence. Isle de Jean Charles, an island off the Louisiana coast that has been inhabited by Native Americans for generations, is becoming uninhabitable as salt water kills off vegetation and hurricanes sweep away the land.[32] Opa-locka and Hialeah, two cities in Miami-Dade County whose residents are majority low-income and people of color, experience regular sunny-day flooding due to sea level rise and the rising water table.[33] In other parts of the county, saltwater intrusion is threatening drinking water supplies, making agriculture infeasible, and affecting the livelihoods of farmworkers.

## Native American lands

Native American lands have some of the poorest water infrastructure in the country: 13 percent of homes on reservations lack access to clean water or sanitation, a significant number compared to 0.6 percent for non-Native Americans. On the Navajo Nation, home to 250,000 people, 40 percent of people lack access to running water and depend on water deliveries or wells contaminated by radioactive industrial waste.[34] In Alaska, some native villages lack any water infrastructure, and traditional fisheries are being threatened by water contamination. Geographic isolation, extreme temperatures, and lack of funding make infrastructure in these villages prohibitively expensive. Across the country, Native American lands are often subject to environmental injustices like dumping and pollution, as well as hazardous sites and high-risk facilities such as mines and pipelines.

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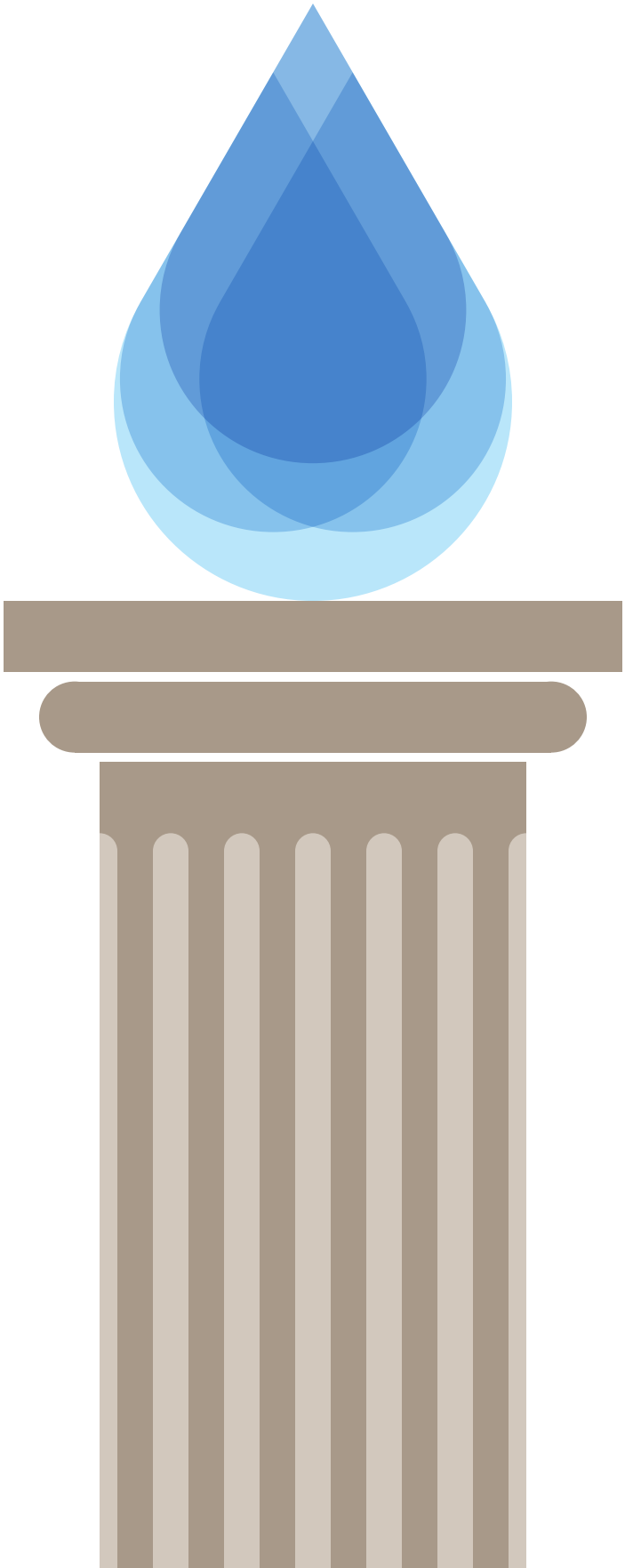
The challenges described in Part One are vast and deeply rooted. At the same time, this is an exciting moment. Innovative practitioners and organizations are harnessing water as a force for progress and community improvement. Part Two showcases how courageous and collaborative water leaders are advancing water equity, now and for future generations.

On the Navajo Nation, many residents lack water infrastructure and depend on water deliveries. *Photo credit: Heather Gildroy for DIGDEEP Water.*



# PART TWO
## The Pillars of Water Equity

In Part One we described the multiple ways that vulnerable communities experience water stress. It is equally important to recognize the cumulative, reinforcing, positive impacts of equitable water management. Part Two of this report is a framework to advance water equity in America, organized around three pillars where progress is being forged:

1. Ensure all people have access to clean, safe, affordable water service;
2. Maximize the community and economic benefits of water infrastructure investment; and
3. Foster community resilience in the face of a changing climate.

Within each of the three pillars we characterize why this area of work is essential for advancing water equity, describe key strategies and policies, and spotlight promising practices from diverse regions around the country. The three pillars cover a range of approaches for advancing water equity, ranging from affordability policies, to workforce and contracting programs, to climate action plans that incorporate equity considerations. Taken together, these three pillars demonstrate how a focus on equity and inclusion can strengthen our nation's water systems.

While the strategies and practices highlighted in this report are placed within one of the three pillars, they are interconnected and overlapping. Many of the examples presented here could easily align with more than one pillar. For example, the climate resilience initiatives we discuss in Pillar Three are also opportunities to create community benefits. These strategies and practices can achieve multiple positive outcomes for individuals and communities.

## PILLAR ONE

Ensure all people have access to clean, safe, affordable water service

| Issue areas | Strategies | Case studies |
|---|---|---|
| **Affordability** | • Expand affordability programs at the local, state, and federal levels<br>• Increase funding and support to utilities with financial challenges<br>• Improve affordability data<br>• Pace the implementation of regulatory compliance mandates | • **Philadelphia Water:** *Equitable rate structures to support a thriving city*<br>• **Tucson Water and Sonoran Environmental Research Institute:** *Partnering to bring sustainable infrastructure to vulnerable communities*<br>• **Southeast Rural Community Assistance Project:** *Connecting rural communities in the Southeast to safe and sustainable water systems*<br>• **Community Water Center:** *Empowering community leaders to build equitable water systems in the Central Valley*<br>• **EPA Urban Waters Program:** *Connecting the next generation of water leaders to an urban refuge in Albuquerque* |
| **Access to Infrastructure** | • Explore consolidation of small utilities<br>• Scale up successful community-centered direct service programs<br>• Incorporate successful international models<br>• Deploy technology solutions for communities without infrastructure | |
| **Water Quality** | • Harness waterfront revitalization to bring multiple benefits<br>• Advance water quality goals through citizen science<br>• Support tribal governments in source water protection<br>• Explore restorative justice and reconciliation to rebuild trust | |

## PILLAR TWO

Maximize the community and economic benefits of water infrastructure investment

| Issue areas | Strategies | Case studies |
|---|---|---|
| **Workforce Development** | • Build a water career pipeline for youth and adults<br>• Use proactive, inclusive hiring requirements for construction and non-construction careers<br>• Align workforce training with employer needs at a regional level | • **Seattle Race and Social Justice Initiative:** *Institutionalizing equity into the fabric of the utility*<br>• **National Green Infrastructure Certification Program:** *Water Environment Federation facilitates utility partnership*<br>• **San Francisco Public Utilities Commission Community Benefits Program:** *Building partnerships, deepening social impact*<br>• **DC Water Business Development Plan:** *Growing opportunities for local small businesses*<br>• **Clean Water Partnership:** *A community-based public-private partnership in Prince George's County*<br>• **Space to Grow Chicago:** *Maximizing environmental and community benefits by transforming schoolyards*<br>• **Camden Collaborative Initiative:** *Putting neighborhoods and the environment at the center of cross-sector partnerships* |
| **Contracting and Procurement** | • Break up large contracts to create opportunities for small, minority-, and women-owned businesses<br>• Partner on business accelerator and development programs<br>• Create incentives within the contracting process for community benefit outcomes | |
| **Neighborhood Revitalization** | • Create synergistic benefits between multiple infrastructure investments<br>• Channel green infrastructure to disinvested neighborhoods<br>• Cultivate resident and community stewardship of water projects | |

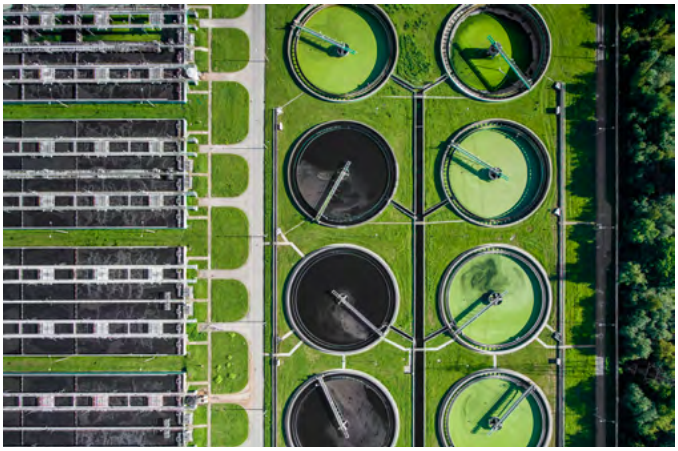
## PILLAR THREE

Foster community resilience in the face of a changing climate

| Issue areas | Strategies | Case studies |
|---|---|---|
| **Planning and Assessment** | • Include community considerations in climate vulnerability assessments<br>• Incorporate community vulnerability assessments into climate planning tools<br>• Connect community-based organizations to climate planning efforts | • **Milwaukee Metropolitan Sewerage District and Sixteenth Street Community Health Centers:** *Partnering to build climate resilience in the Kinnickinnic River Watershed*<br>• **Sewerage & Water Board of New Orleans and Resilient New Orleans:** *Leveraging climate adaptation to create opportunity for vulnerable communities*<br>• **Catalyst Miami:** *Fostering resident engagement in climate planning*<br>• **California's Cap-and-Trade Program:** *Dedicating climate mitigation dollars to disadvantaged communities*<br>• **Cleveland Climate Action Fund:** *Investing in neighborhood revitalization to foster climate resilience* |
| **Funding** | • Dedicate adaptation, mitigation, and disaster relief funding to vulnerable communities<br>• Fund community development initiatives to build climate resilience<br>• Build partnerships with the flood insurance industry | |
| **Project Delivery** | • Leverage climate adaptation projects to create economic opportunity for vulnerable communities<br>• Prioritize vulnerable communities in physical adaptation | |

Waterfronts provide healthy, open spaces that are accessible to all.

Water utilities play a role in building strong, prosperous communities.



# PILLAR ONE

## Ensure all people have access to clean, safe, affordable water service

### Context

The investment made in water infrastructure in the last century is one of the most remarkable accomplishments in America. This achievement provided hundreds of millions of people with safe, reliable, affordable, 24/7 water and wastewater services, improving public health and quality of life. The overall effectiveness of water systems in the US obscures the urgent water crises occurring in parts of the country. Millions of people living in America lack access to life's most essential resource: some areas have never had adequate infrastructure in the first place, and others struggle with deteriorating systems, unaffordable rates, and source water contamination.

Access to water not only supports our baseline health and wellbeing, it is central to recreational, cultural, and spiritual practices. Lakes, rivers, and beaches provide free, healthy public spaces and leisure activities. Vulnerable communities without other recreational options are particularly affected when water bodies and coastlines are threatened.

Creating an equitable water future means providing all people with access to clean, safe water at a price they can afford. This means strengthening our water systems and protecting our water sources. To achieve this, collaboration and co-investment by all levels of government, water providers, the private sector, community-based organizations, and others is critical.

## PILLAR ONE

Ensure all people have access to clean, safe, affordable water service

| Issue areas | Strategies | Case studies |
|---|---|---|
| **Affordability** | • Expand affordability programs at the local, state, and federal levels<br>• Increase funding and support to utilities with financial challenges<br>• Improve affordability data<br>• Pace the implementation of regulatory compliance mandates | • **Philadelphia Water:** *Equitable rate structures to support a thriving city*<br>• **Tucson Water and Sonoran Environmental Research Institute:** *Partnering to bring sustainable infrastructure to vulnerable communities*<br>• **Southeast Rural Community Assistance Project:** *Connecting rural communities in the Southeast to safe and sustainable water systems*<br>• **Community Water Center:** *Empowering community leaders to build equitable water systems in the Central Valley*<br>• **EPA Urban Waters Program:** *Connecting the next generation of water leaders to an urban refuge in Albuquerque* |
| **Access to Infrastructure** | • Explore consolidation of small utilities<br>• Scale up successful community-centered direct service programs<br>• Incorporate successful international models<br>• Deploy technology solutions for communities without infrastructure | |
| **Water Quality** | • Harness waterfront revitalization to bring multiple benefits<br>• Advance water quality goals through citizen science<br>• Support tribal governments in source water protection<br>• Explore restorative justice and reconciliation to rebuild trust | |

# Strategies

## Affordability

Water affordability is a growing challenge in America. Programs and policies for water affordability include assistance programs, rate structures, and water conservation measures. Assistance programs reduce the water cost burden on individual households through fixed discounts, payment plans, and forgiveness of arrears. Assistance programs may also include conservation measures, such as installing more efficient plumbing fixtures that can lower individual household water bills by reducing usage. Some utilities provide audits to assess in-home water efficiency, or rebates and incentives to offset the cost of installing high-efficiency fixtures.

While assistance programs can provide immediate relief for those in need, utilities can take further steps to make rates more affordable. Some utilities are incorporating affordability considerations into their rate structures. Inclining block rates, as well as income-qualified rates, can promote long-term affordability for low-income residents. While these alternative rate structures have significant administrative requirements, they are a powerful tool for making water more affordable. Utilities can also lower their overall rates by increasing their operating efficiency, reducing water loss, optimizing water sources, and, potentially, consolidating or regionalizing utility operations.

Affordability programs should be tailored to each locality's circumstances and the characteristics of its lower-income communities. For example, a city with a high proportion of residents below the poverty level may have different affordability needs than a generally affluent community with isolated areas of poverty. Key considerations may include the distribution of poverty, homeownership rates, and the community's existing social service network. In some jurisdictions, there are legal barriers to certain rate structures and bill assistance options. These restrictions need to be understood and addressed in order to make the appropriate approaches viable.

## Expand affordability programs at the local, state, and federal levels

Affordability initiatives, including assistance programs, can be implemented at all levels of government.

### Improve affordability at the utility level

Because water is generally administered at the local level, it is important for utilities to develop assistance programs. When developing these programs, utilities should consider that water, wastewater, and stormwater rates can all contribute substantially to the cost burden on lower-income ratepayers. Linking eligibility to existing assistance programs that use household income data—such as the Low Income Home Energy Assistance Program (LIHEAP)—can minimize administrative work.[35] Utilities can develop a suite of affordability options to cover all circumstances, from rate assistance and water efficiency grants to forgiveness of arrears. They can also safeguard low-income ratepayers from cost burden by not applying drought surcharges to basic water use. Recognizing that unpaid water bills indicate that households are struggling, utilities can partner with other local service agencies and organizations to offer more holistic, wrap-around services to low-income residents who have a range of critical needs, as well as getting them on manageable payment plans before their water is shut off.

The **San Antonio Water System** introduced an array of assistance services to protect at-risk customers from shutoffs as rates increase. These include discounts, plumbing repairs, and fee waivers. Detailed eligibility criteria account for the complex socioeconomic factors that make water unaffordable; for example, fee waivers are available to senior citizens, people with disabilities, and victims of domestic violence.[36]

Where approved by state authorities, American Water state subsidiaries offer vulnerable households one-time emergency grants or discount payment programs. For example, **New Jersey American Water** offers a comprehensive assistance program called H2O Help to Others, which includes payment assistance and discounted rates for qualified applicants.

### Advance affordability programs at the state level

State governments can also create programs to advance equitable water service. Recent legislation requires that the **California State Water Resources Control Board**, a body that allocates water resources and regulates water quality, develop a statewide low-income ratepayer assistance program for water. The Water Board will produce a plan that identifies funding sources, such as fees on capital projects or utility bills, anticipates and resolves legal barriers to rate assistance, and shares best practices. Legal barriers could include laws such as California's Proposition 218, which prohibits government agencies from charging more for a service than it costs to provide—essentially preventing ratepayers from subsidizing low-income assistance programs.[37] In states that do not allow agencies to provide direct payment assistance, assistance must go through a third party such as a nonprofit or faith-based group. Policy advocacy organizations can work to change or remove legal barriers to affordability and assistance programs.

### Create a federal low-income assistance program for water service

As a nation, we share a common belief that all people should have access to food, electricity, and shelter. The government upholds these American values through federal programs like the Supplemental Nutrition Assistance Program (SNAP), LIHEAP, and housing initiatives. It is time to extend these same protections to water, through the establishment of a federal water assistance program under the aegis of the US Environmental

Water affordability policies ensure that all people can access clean, safe water.

Protection Agency (EPA). Such a program should include assistance for rural areas where households are responsible for financing their own septic systems and for regions with water quality issues where communities pay the replacement costs of buying water or filters. It should also incorporate water efficiency upgrades, similar to LIHEAP's weatherization component.

## Increase funding and support to utilities with financial challenges

Assistance programs directed towards individual ratepayers are an important intervention, but they do not address the underlying cause of unaffordable rates. Since federal funding for water infrastructure has dwindled over the past few decades, local utilities are responsible for funding 98 percent of infrastructure, creating a serious challenge for utilities with small or shrinking ratepayer bases. Small rural utilities and urban utilities in disinvested areas are often caught between infrastructure investment costs and the need to keep water rates affordable; therefore, direct state or federal assistance to struggling utilities is essential.

Local leaders are also considering the role of innovative financing through partnering with private capital markets to help fund infrastructure investment in the twenty-first century. There is capacity in private markets to invest in water infrastructure projects throughout the country. Advancing equitable investment models that strike the right balance between the interests of investors, taxpayers, and vulnerable communities is critical.

Government agencies and larger organizations can also support underfunded utilities through capacity building and skills training. The **National Rural Water Association** and its state-level affiliates employ experienced water and wastewater operators called Circuit Riders to work on-site with small, rural utilities to make operational improvements, respond to emergencies, and assess technological alternatives. They also offer courses and trainings to utility professionals.

## Improve affordability data

One of the major challenges to the widespread use of affordability programs is the lack of sufficient, accurate data. Many communities lack a detailed, quantitative understanding of who is served by existing assistance or affordability programs, how many people in need are not covered, and how affordability is measured in different jurisdictions. In some cases, the communities affected by affordability issues are not always those that one might expect. A clearer understanding of the demographics would highlight disparities and help utilities and others target assistance to those most in need. Using consistent methodology to collect granular data around affordability is the first step to crafting truly effective policy.

For example, the **Northeast Ohio Regional Sewer District** collected detailed data on vulnerable populations in their jurisdiction, giving them a better sense of how many people use their affordability programs and which services are most in demand. Contrary to expectations, they found that many households in the suburbs struggle to pay their water bills, not only those in the inner city. They use this data to create maps of their customer base, giving them a better sense of whether programs reach the communities that need them most.

Data can also empower communities to understand and analyze affordability challenges, as well as present their findings to decision-makers. **We the People of Detroit**, a community organization which engages in participatory research, took a data-driven approach to the water affordability crisis faced by low-income Detroit communities in 2014. We the People saw the impact of water shutoffs on quality of life, but they also saw the need to quantify the scope and impact of the problem. They partnered with the **University of Michigan** and the **Detroit Public Health Department** to lead community-based research on the public health impacts of unaffordable water. We the People conducted surveys, gathered government data, and created maps, all showing the health effects of the shutoffs. This project leveraged institutional resources to involve the community in data collection and analysis around affordability and water quality, promoting a clearer understanding of the challenges and illuminating potential solutions.

### Pace the implementation of regulatory compliance mandates

Compliance with federal Clean Water Act requirements can mean that a community must invest in costly programs to modify or redesign existing utility systems—for example, expanding its collection systems and wastewater treatment capacity to deal with sewer overflows. In enforcing Clean Water Act compliance, the US EPA assesses a community's financial capability to implement a major compliance program. Since the costs for these programs can run into hundreds of millions or even billions of dollars, they can intensify a community's rate pressures and affordability problems. EPA could mitigate the financial impact of these programs by redefining its metric for financial capability. The metric currently used is median household income, but this approach has been criticized for obscuring nuances in the population that falls below the median. Using a metric that can misrepresent a community's financial capability risks subjecting communities to regulatory mandates with aggressive implementation schedules that will cost more than the communities can realistically afford. Instead, a more nuanced approach should be used to capture more detail, such as household income by quintile and other socioeconomic factors.

Some states are currently expanding their affordability metrics to encompass the many factors that affect affordability. For example, the **North Carolina State Department of Environmental Quality** uses unemployment, poverty rates, home values, and median income to measure community-level affordability.[38]

## Access to Infrastructure

Building an equitable water future means providing water and wastewater services to areas that have never had the infrastructure that is common in the rest of the country. Extending water services is a very different challenge than improving existing systems, and the issues vary enormously depending on the context. While constructing centralized systems is a good option in many cases, it may not be forthcoming in the short term for low-income, low-density areas. Other solutions are needed to improve access to water and wastewater service. While there are significant challenges in bringing infrastructure to water-stressed areas, there is no shortage of promising ideas and proven models that can be scaled up.

### Explore consolidation of small utilities

For many rural areas without centralized water infrastructure, restructuring and reconfiguring existing systems can be a path to expanding water services. In California's San Joaquin Valley, most unincorporated communities that lack water infrastructure are close to public water systems. In these cases, consolidating them with nearby systems makes more sense than developing alternative solutions.

In 2015, California passed legislation granting the **State Water Resources Control Board** the authority to mandate physical or managerial consolidation of water systems that are unable to provide safe drinking water.[39] While the Water Board also encourages voluntary consolidation, mandatory consolidation is a valuable tool in bringing water service to vulnerable communities that lack a strong political voice.

A voluntary consolidation recently occurred in an unincorporated area called East Porterville, where persistent drought dried up local wells. About 500 households in the low-income, majority Latino community went without running water for several years, relying instead on water delivery, public taps, and mobile showers. A state-funded project is in the process of connecting East Porterville residents to the water system in the neighboring town of Porterville.[40,41]

Consolidation can also help small, struggling utilities with infrastructure costs. In some cases, large utilities can join with small or rural utilities through consolidation to achieve economies of scale, where consolidation is desired by and beneficial to small utilities. In others, several small utilities can join together. **Tacoma Water** in Tacoma, Washington creates special-use districts to support small rural utilities that are unable to make infrastructure investments. As a wholesale provider, Tacoma Water can provide infrastructure upgrades to smaller utilities without their rates increasing. Consolidation processes should benefit both the smaller utility and its ratepayers.

### Scale up successful community-centered direct service programs

Many small community-based organizations offer crucial direct services like water delivery, filters, septic systems, and rate assistance in extremely stressed low-income areas. They are often the only thing standing between vulnerable communities and lack of access to water

services. For example, the **Alabama Center for Rural Enterprise (ACRE)** works in impoverished rural communities that lack wastewater systems and are subject to flooding. With ACRE's assistance, residents build decentralized water treatment systems, improving local water quality and facilitating economic development.

Although they provide essential services, frontline organizations are usually underfunded and understaffed, sometimes running solely on volunteer labor and dependent on small grants and donations. Many of these organizations play multiple roles in communities—they double as food banks or faith-based organizations, and connect clients to other social services. Government, philanthropy, and larger organizations looking for intervention points in underserved areas can have a powerful impact by supporting these effective, but under-resourced, community-based organizations.

## Incorporate successful international models

In terms of access to infrastructure, places like rural West Virginia or the colonias in the Southwest have more in common with informal settlements in developing countries than with the rest of the US. Despite the similarities, there is very little overlap between organizations that work in water-stressed areas in America and those that operate in other nations. International water organizations are developing solutions and strategies, such as decentralized wastewater treatment systems, that could be effective domestically. They can expand their portfolios by partnering with community-based organizations to adapt these innovations to the domestic context. Both sectors stand to benefit from more dialogue and knowledge exchange.

The partnership between **DIGDEEP**, a nonprofit focused on water access, and **St. Bonaventure Indian Mission and School**, a Catholic organization that serves the Navajo Nation, illustrates this. DIGDEEP spent years constructing drinking water infrastructure in the developing world. When the organization recognized the similarity between conditions abroad and on the Navajo Nation, they partnered with St. Bonaventure to install cisterns in low-income households and improve drinking water access. DIGDEEP plans to expand its work to regions that lack adequate infrastructure around the US, using the expertise they've gained on the Navajo Nation and abroad.

## Deploy technology solutions for communities without infrastructure

Some areas that lack water infrastructure, particularly low-income rural communities, are unlikely to receive centralized water systems in the near future due to technical, financial, and political obstacles. While it is crucial to advocate for long-term infrastructure solutions, it is also important to extend water service to these communities as soon as possible. Communities without connections to centralized systems can implement technologies like decentralized wastewater treatment and rainwater harvesting, which may be more affordable and sustainable than traditional infrastructure.

In West Virginia, for example, where many drinking water sources are contaminated with heavy metals and local governments lack the resources for a large-scale cleanup, decentralized water remediation offers a cost-effective way to address water quality. Larger organizations or anchor institutions could partner with community organizations to prototype and implement these projects.

In an example of bringing innovative solutions to communities without infrastructure access, the **Cold Climate Housing Research Center** partnered with the **Alaska Native Tribal Health Consortium** to develop decentralized, mobile wastewater infrastructure for rural villages.[42] These villages will eventually need to relocate due to melting permafrost and rising seas, making it harder to justify investing in permanent water systems.

DIGDEEP partners with St. Bonaventure Indian Mission to bring water access to households on the Navajo Nation. *Photo credit: Heather Gildroy for DIGDEEP Water.*

# Water Quality

Equitable water management requires addressing water quality issues and protecting source water for future generations. Many water sources that communities rely on for drinking water and recreation are contaminated due to infrastructure shortfalls or industrial pollution. Threats to source water affect communities in the surrounding area and throughout the watershed. Of course, the Clean Water Act and Safe Drinking Water Act are the foundations of water quality protection, and supporting utilities in implementing them is key. It is also important to empower communities to engage on water quality. Emphasizing the link between environmental protections at the source and drinking water quality is crucial, especially in urban areas where overall watershed health is not always prioritized.

## Harness waterfront revitalization to bring multiple benefits

Many vulnerable communities live near polluted rivers, streams, and creeks. Water bodies in urban areas are subject to industrial discharge, stormwater runoff, and wastewater overflow, threatening drinking water quality and reducing access to water bodies for recreation. Revitalization and remediation projects focused on urban riverfronts, lakes, bays, deltas, and ports are an opportunity to address water quality issues and create benefits for vulnerable communities. While waterfront remediation can spur gentrification and displacement in some cases, if it is done with the support and participation of surrounding communities it can provide multiple benefits: better access to green spaces, improved public health, and economic development, in addition to improved water quality.

**Groundwork USA** is working in communities across the nation to clean up brownfields in disadvantaged communities and turn vacant land into something of value by installing green infrastructure, daylighting creeks, and creating greenway parks along waterways. These projects can generate significant ecological, cultural, and economic gains for a community. A river daylighting project in industrial Yonkers, New York, created 14,000 square feet of new aquatic habitat and public parkland that hosts educational tours and a seasonal farmers market. These developments have sparked redevelopment, including nearly $50 million in renovations to abandoned buildings.

## Advance water quality goals through citizen science

Citizen science—the practice of training the general public to engage in scientific data collection and analysis—is gaining traction as a strategy for addressing water quality issues. Determining the extent and geography of water contamination is a challenge, and citizen science allows residents to monitor their water. Citizen science recognizes that people know the water context in their communities better than any outsider. Training community members can help fill research gaps where government-sponsored water monitoring is not available or accessible. Opportunities exist for larger organizations, universities, and hospitals to lend their research capacity and expertise to develop citizen science projects. They can train communities to monitor their water, collect samples, perform tests, and provide materials and support.

For example, the **Bronx River Alliance** collaborated with the **US EPA** to pilot a citizen science program around river pollution. The program trains individuals and school groups to collect samples of river water and perform basic tests to gather baseline data on water quality. Citizen science programs that monitor water quality can collect important data that can be used to advocate for regulatory action.

## Support tribal governments in source water protection

Source water on tribal lands is often threatened by industrial contamination, typically from oil, gas, and mining operations. This threatens drinking water supplies and traditional fisheries that provide food and livelihoods. While many places face source water pollution, tribal governments have specific mechanisms to protect the water bodies and fisheries on their lands, through legal and regulatory means. Invoking tribal rights is a potentially powerful approach to source water protection. Environmental and philanthropic organizations can help protect source water by supporting tribal governments. This can involve researching precedents, identifying legal opportunities, raising funds to support court cases, providing legal counsel, and supporting the development of alternate land use plans.

The **Department of Justice** has charged mining companies responsible for contaminating water supplies on the Navajo Nation with uranium and has won settlements for the community.[43] Taking another approach, the **Minnesota Chippewa Tribe** is preparing its own Environmental Impact Statement around a proposed oil pipeline that could affect their water supply; working to ensure that tribal concerns and rights are included in Environmental Impacts Statements is a promising approach.[44]

### Explore restorative justice and reconciliation to rebuild trust

Trust is essential in the water sector—health, well-being, and even life depend on access to safe, clean water. When the public trust is broken, as in the case of Flint, it can take decades to rebuild, making effective communication and partnership difficult. This breach of trust can have a ripple effect; when water quality is compromised in one place, communities around the country worry about their own water supply. In response, community leaders in places like Flint are exploring the concept of restorative justice or reconciliation. Restorative justice is a process grounded in the idea that when harm has been done, all stakeholders must come together, identify the harm and its impacts, and take steps to repair trust. The parties at fault acknowledge their role, recognize the scope of harm that was done, and commit to making amends. This approach has been used as an alternative to standard disciplinary and juvenile justice procedures by **Restorative Justice for Oakland Youth**, an organization that partners with public schools and courts. Their work has successfully reduced school suspensions and provided alternatives to youth incarceration.[45] Restorative justice has the potential to build a foundation for strong, lasting partnerships around water equity.

## Pillar One: Case Studies

**Philadelphia Water Department**

*Equitable rate structures to support a thriving city*

Philadelphia, like many American cities, faces serious water affordability challenges. It has the highest poverty rate of the ten biggest cities in the country, partly due to a declining industrial employment base, with 25 percent of adults and 38 percent of children living in poverty.[46] Almost half of the households in the city make less than $35,000 a year, even as overall income increases.[47] Philadelphia's poverty rates also reflect racial disparities: 58 percent of low-income families are African American, as opposed to 22 percent white.[48] As a result of the city's socioeconomic challenges, many low-income residents struggle to pay their water bills.

In response, Philadelphia's Water Department is set to launch an income-based rate structure in July 2017. In 2015, legislation was approved to create the Income-Based Water Revenue Assistance Program, or IWRAP. The program is now known as the Tiered Assistance Program (TAP). The program offers low-income customers payment plans based on a percentage of their income, with lower rates available for households at or below 50 percent of the federal poverty line. Seniors will be eligible for additional discounts. The program will also connect struggling ratepayers to housing advocates who can help ensure that they avoid foreclosure over unpaid bills.[49] Once customers are enrolled in a payment plan, they will be eligible for forgiveness of penalties and protections from shutoffs with consistent monthly payments. TAP is predicted to reduce the need for collections, because more customers will be able to pay the new, more affordable rates.[50] The Water Department estimates that approximately 60,000 customers will be eligible for assistance under the program.[51]

Philadelphia's program takes a proactive and compassionate approach. By connecting homeowners at risk of foreclosure to resources and support, the program has the potential to stabilize families, reduce displacement, and prevent vacancy and blight. It also has the potential to refocus the utility's energy and budget on improving its infrastructure, rather than collecting unpaid bills or reacting to crises. Easing the burden of water bills on the city's most vulnerable communities is an important step in building stability and prosperity.

### Tucson Water and Sonoran Environmental Research Institute

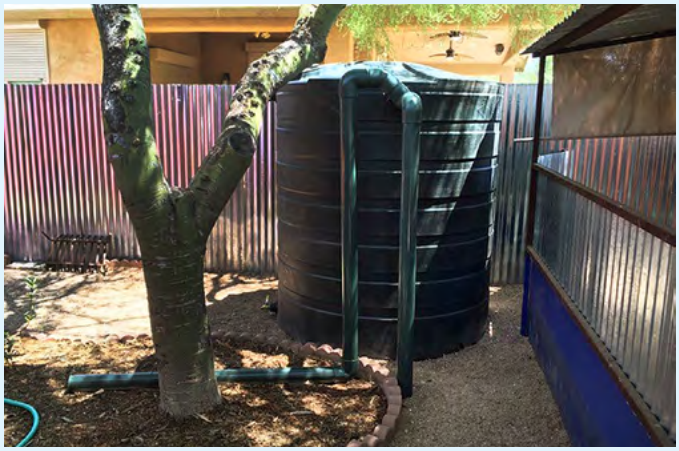
*Partnering to bring sustainable infrastructure to vulnerable communities*

As a desert community, Tucson's water supply challenges go back decades, to the population boom in the mid-twentieth century. After groundwater supplies were over-drawn and surface water was no longer perennial, Tucson Water became a pioneer in water conservation and reuse. The conservation ethic developed in the 1970s and 1980s remains today, with an expanded view encompassing alternative water supplies. However, as the climate gets hotter and drier, water scarcity is still a risk. There is a need for increased investment in water systems, but this must be balanced with initiatives to keep rates affordable for vulnerable communities.

One in five families in Tucson lives below the poverty line, and there are clear racial disparities: 30 percent of Latino households are in poverty as opposed to 18 percent of white households.[52,53] The city is also home to a large undocumented immigrant community.[54] Warming temperatures create urban heat-island effects, often in neighborhoods that are home to vulnerable communities.

Rainwater harvesting is a simple, sustainable strategy with the potential to create multiple benefits, including lowering water use, reducing the risk of flooding, and irrigating plants that keep the air cool. Tucson Water offers its customers rebates and technical assistance to install their own rainwater harvesting systems. In order to make it easier for low-income and minority households to participate in rainwater harvesting, the community-based organization Sonoran Environmental Research Institute (SERI) created a pilot program aimed at low-income communities. This program was developed by SERI in partnership with Tucson Water and the University of Arizona, and supported by an EPA Environmental Justice grant. The pilot program was very well-received, and served as a model for Tucson Water's Low-Income Rainwater Harvesting Program.

Tucson Water and SERI assist low-income communities in Tucson, Arizona with the installation of rainwater harvesting systems. *Photo credit: Tucson Water.*



The Low-Income Rainwater Harvesting Program offers qualifying households zero-interest loans to build systems, in addition to being eligible for the existing rebate. Very low-income families—at or below 50 percent of the area median income—are eligible for grants as well as loans. SERI conducts outreach and education around the benefits of rainwater harvesting, using its longstanding connections to vulnerable communities to make sure the program reaches the households that need it most. The organization guides customers through each step of the process, from design and purchasing materials to hiring local contractors to install the systems.

The partnership between Tucson Water and SERI taps the expertise of the utility and the community organization to connect low-income households to the resources they need to build rainwater harvesting systems. Neighborhoods benefit from more greenery, as it reduces the urban heat-island effect. As more customers supplement their water use through rainwater harvesting, there is the potential to lower water bills and reduce overall pressure on the drinking water supply.

### Southeast Rural Community Assistance Project

*Connecting rural communities in the Southeast to safe and sustainable water systems*

Across the Southeast, low-income rural communities still lack basic infrastructure like running water, indoor plumbing, and wastewater treatment systems. Rural counties in the Southeast are some of the poorest areas in the country, with poverty levels reaching 30 percent, and this is reflected in and reinforced by the lack of water services.[55] While there are water utilities in some of these areas, they do not have the funding to extend infrastructure to everyone who needs it, and they struggle to improve services without raising their rates to unaffordable levels. Households that lack running water

generally rely on individual wells and septic tanks, but wells can get contaminated by agricultural runoff and wastewater.

The Southeast Rural Community Assistance Project (SERCAP) brings essential water and wastewater infrastructure to these rural communities. Started in the 1960s with funding from the federal Office of Economic Opportunity, along with branches in other parts of the country, the project is guided by the belief that providing infrastructure is one of the best ways to bring people out of poverty. SERCAP offers a wide array of services, from directly constructing infrastructure, to providing financing and loan options, to offering technical training. These services are available to individuals—for example, assisting a family with digging a well or installing an indoor toilet—and to small rural governments. SERCAP partners with existing utilities to strengthen and scale up services by training local residents to become water system operators and monitor water quality. By offering a menu of services and financing options, SERCAP is flexible enough to address a wide range of challenges.

SERCAP's model has proved to be extremely effective: the project has brought infrastructure to more than 450,000 people in in Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida. The organization brings services and infrastructure directly to the communities that need them most, and provides residents with the technical skills they need to maintain their systems. SERCAP's work paves the way for economic development in struggling rural areas.

SERCAP brings essential water infrastructure to rural communities, such as this water tank in South Carolina. *Photo credit: Southeast Rural Community Assistance Project.*


## Community Water Center

*Empowering community leaders to build equitable water systems in the Central Valley*

It is estimated that more than one million people in California are exposed to contaminated water at home and in public places.[56] Small water systems face especially serious water quality challenges: almost 300 small systems in the state have not been able to provide their communities with safe drinking water for several years, and in some cases more than a decade.[57] In the Central Valley, these water quality challenges converge with lack of infrastructure and water scarcity to create a water access crisis that disproportionately impacts low-income communities and Latinos. As many as one in four schools in the Central Valley have been impacted by unsafe water.[58] Many unincorporated areas are served by small, underfunded water systems, and some have never had centralized water infrastructure at all, relying instead on shallow domestic wells.

Community Water Center (CWC) is a grassroots environmental justice organization founded with the vision of ensuring that all communities have access to safe, clean, and affordable water. The organization uses community organizing, policy advocacy, and public education to bring community voices to water governance and decision-making. For communities that currently lack access to water due to inadequate infrastructure, groundwater contamination, or drought, CWC provides assistance until more long-term solutions can be developed. CWC has supported projects that help households and schools with short-term water solutions, including installing water

CWC brings water access to Central Valley communities through infrastructure projects like this water tank in East Porterville, California. *Photo credit: Community Water Center.*

vending machines, installing point of use filters for taps and drinking fountains, conducting private well testing, and conducting outreach to facilitate bottled and hauled water delivery. Alongside their work to bring immediate relief to the hardest-hit communities, the organization advocates for greater engagement in water decision-making processes among low-income communities of color. CWC provides educational materials and organizes communities to advocate for local, regional, and statewide solutions.

Community Water Center's approach addresses both the effects and the causes of inadequate infrastructure by bringing services to underserved areas and working towards greater accountability and participation in water governance. Their work empowers vulnerable communities to take a central role in building equitable water systems. Since it opened in 2006, CWC has worked with 80 water-stressed communities and provided technical and legal assistance to over 15 local water boards. Thousands of residents have been trained as water advocates, spreading their expertise throughout their communities. Small, low-income communities with struggling water systems have worked with CWC to secure $17 million in state funding for sustainable drinking water projects, benefitting about 13,340 people in the San Joaquin Valley.[59] CWC's model demonstrates the importance of community knowledge and participation in building equitable water systems.

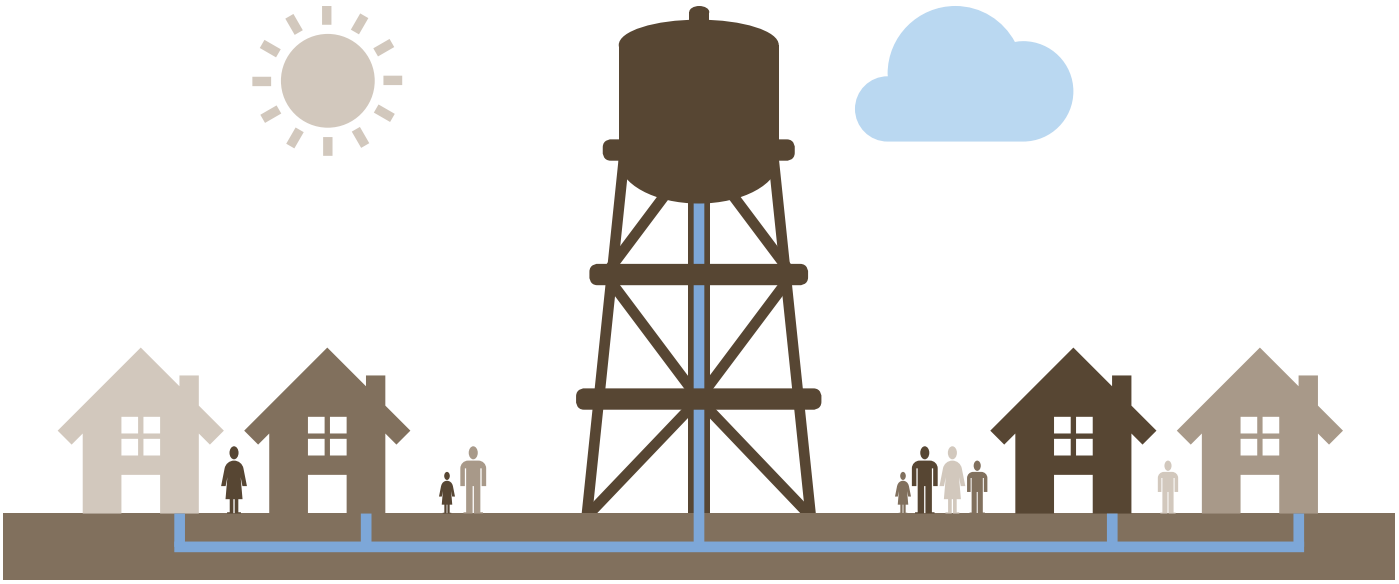
### EPA Urban Waters Program

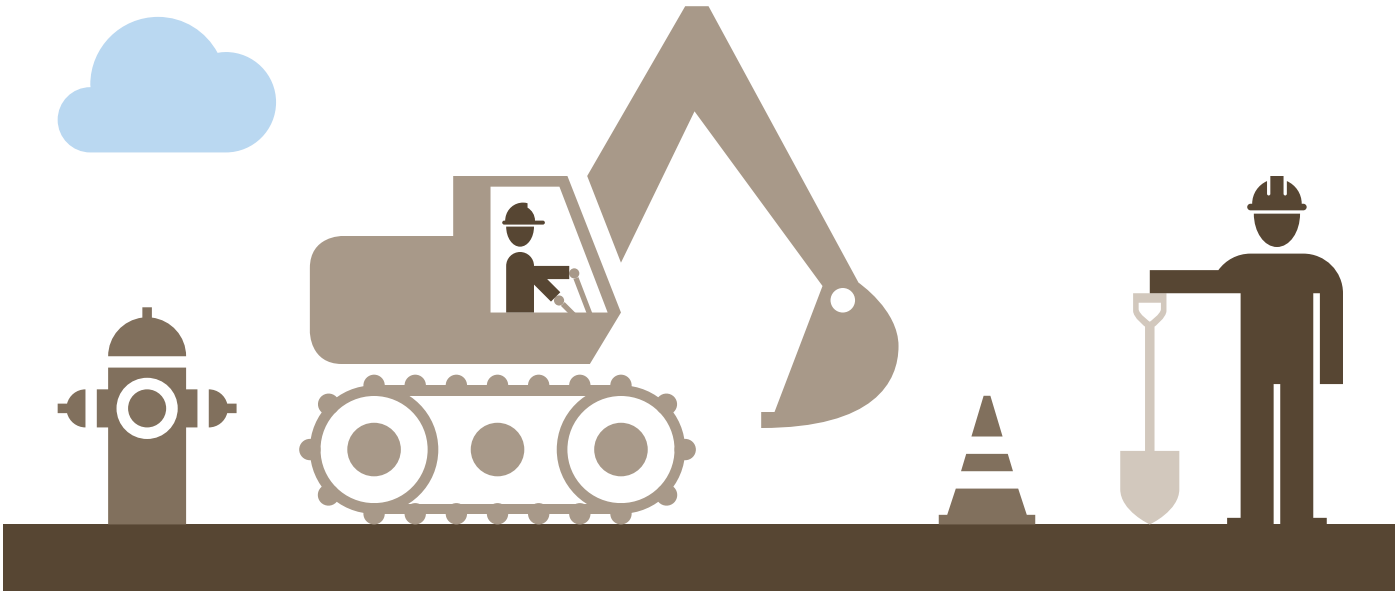
*Connecting the next generation of water leaders to an urban refuge in Albuquerque*

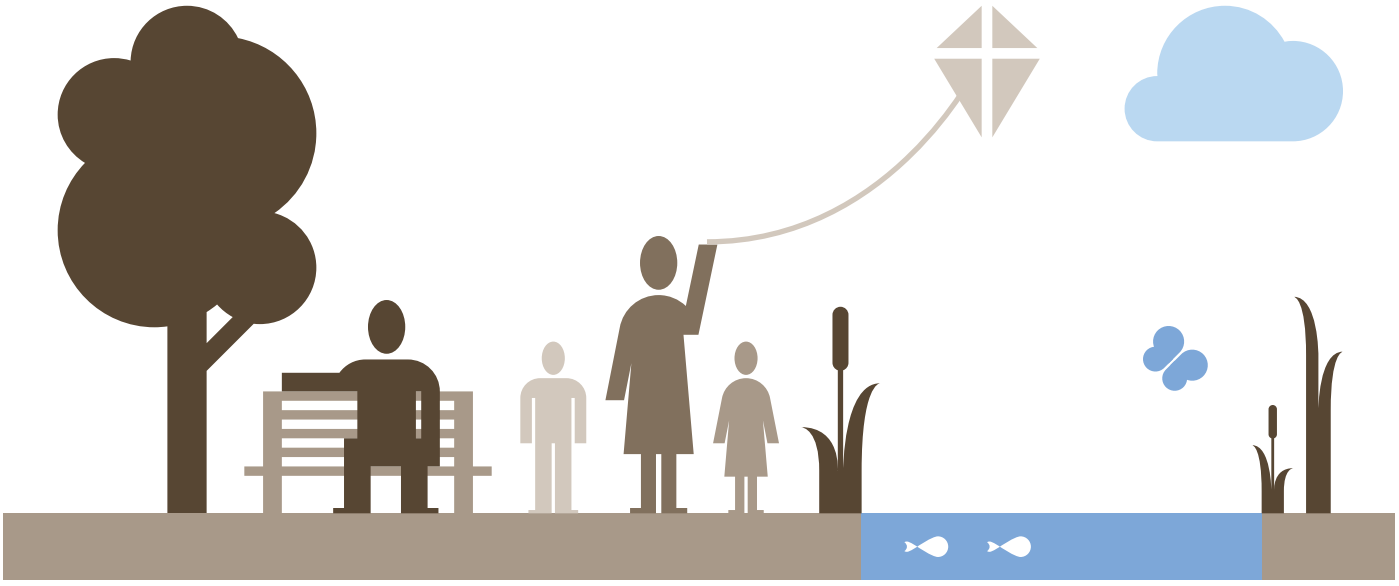
South Valley, an unincorporated area on the outskirts of Albuquerque, New Mexico, faces a range of environmental hazards. Industrial land uses, including warehouses, scrap yards, factories, petroleum storage facilities, and the wastewater treatment plant for all of Albuquerque, put residential communities at risk of asthma and cancer. The population is 80 percent Latino, and median household income is below $33,000. One-quarter of residents live below the poverty line.[60] The area hosts two Superfund sites, and groundwater is contaminated with chemicals from a railroad and jet-engine plant.[61] For years, residents used private wells, but in the 1980s the area was connected to the city's water system, thanks to the efforts of local activists. South Valley is home to a thriving community of environmental justice organizations that have grown in response to the concentration of health risks.

The Rio Grande runs through South Valley, and the environmental justice community has spent years organizing to protect remaining wilderness areas on its banks from industrial development. The Valle de Oro Wildlife Refuge was designated an "urban refuge," as part of an effort run by multiple federal agencies to reconnect urban neighborhoods with nature and bring cultural heritage to wilderness areas. The EPA's Urban Waters Program funded a citizen science program in the Valle de Oro Refuge to monitor water quality and engage local youth in environmental justice. The program, which was collaboratively organized by several community-based organizations, trained students from nearby schools to take water samples and test for heavy metals, nutrients, and E. coli. The students that took part in the program are heavily impacted by contamination issues and lack opportunities to experience nature; many had never even seen the river before.

The program consisted of 12 events and reached hundreds of students. It had a dual objective: introduce students from vulnerable communities to environmental health issues and scientific responses, and advocate for better water quality. The events and trainings clarified the connections between hazardous industries and health risks, building students' potential to advocate for water quality measures such as using green infrastructure to clean stormwater that runs through the Valle de Oro Refuge. The samples collected provided baseline water quality data, and demonstrated the importance of long-term monitoring. They will also help local stormwater systems meet EPA water quality regulations. The South Valley program shows that citizen science is an essential tool for building community capacity around water equity issues and holding authorities accountable.







# PILLAR TWO

## Maximize the community and economic benefits of water infrastructure investment

### Context

While nature provides water, it takes pipes, pumps, and people working 24/7 to deliver clean water to homes and businesses, and to remove and treat wastewater. The infrastructure we rely on is aging and in need of renewal. On top of that, impacts from demographic, economic, and climate shifts put additional stress on water and wastewater systems. Across the country, utilities and municipalities are investing billions of dollars to address America's infrastructure crisis and bring systems to a state of good repair.

As utilities undertake capital projects, they can advance water equity at every stage of the process. Nothing is more localized than our water and wastewater systems—utilities are place-based anchor institutions that safeguard public health, protect the environment, and foster economic vitality. They are also employers. The water sector provides solid, living-wage jobs that are excellent stepping stones to the middle class. Tremendous potential exists to leverage water investments for local employment and career pathways, business development and contracting opportunities, educational programs, and neighborhood improvements. Partnering with community-based organizations, nonprofits, labor unions, and philanthropic organizations can maximize these outcomes.

## PILLAR TWO

Maximize the community and economic benefits of water infrastructure investment

| Issue areas | Strategies | Case studies |
|---|---|---|
| **Workforce Development** | • Build a water career pipeline for youth and adults<br>• Use proactive, inclusive hiring requirements for construction and non-construction careers<br>• Align workforce training with employer needs at a regional level | • **Seattle Race and Social Justice Initiative:** *Institutionalizing equity into the fabric of the utility*<br>• **National Green Infrastructure Certification Program:** *Water Environment Federation facilitates utility partnership*<br>• **San Francisco Public Utilities Commission Community Benefits Program:** *Building partnerships, deepening social impact*<br>• **DC Water Business Development Plan:** *Growing opportunities for local small businesses*<br>• **Clean Water Partnership:** *A community-based public-private partnership in Prince George's County*<br>• **Space to Grow Chicago:** *Maximizing environmental and community benefits by transforming schoolyards*<br>• **Camden Collaborative Initiative:** *Putting neighborhoods and the environment at the center of cross-sector partnerships* |
| **Contracting and Procurement** | • Break up large contracts to create opportunities for small, minority-, and women-owned businesses<br>• Partner on business accelerator and development programs<br>• Create incentives within the contracting process for community benefit outcomes | |
| **Neighborhood Revitalization** | • Create synergistic benefits between multiple infrastructure investments<br>• Channel green infrastructure to disinvested neighborhoods<br>• Cultivate resident and community stewardship of water projects | |

# Strategies

## Workforce Development

Skilled workers are needed to build, maintain, and operate the many components of our nation's water and wastewater systems. According to the United Nations, almost one percent of the total workforce in both developed and developing countries currently work in the water sector, including jobs in water management, construction, infrastructure maintenance, water supply, and sanitation.[62] The opportunity to develop the next generation workforce for the water industry is tremendous, as utilities prepare for a wave of retiring workers, invest billions of dollars in capital improvements, and develop innovations that will generate new workforce demands.

Besides new positions generated from capital investments, perhaps the largest workforce opportunity is filling permanent, mission-critical positions vacated by retiring workers. Nearly one-third of the existing water utility workforce is currently eligible for retirement in the United States.[63] Positions range from construction and engineering to customer service and accounting. This is an important opportunity to target workforce training and recruitment specifically to vulnerable communities.

By intentionally expanding opportunities for more diverse populations to enter the water workforce, we move the water industry toward being more reflective of the communities it serves. This is a unique moment for utilities, labor organizations, community-based organizations, and educational institutions to come together to prepare the next generation of water workers. Partnership will be critical to the success of diverse and inclusive workforce development programs.

### Build a water career pipeline for youth and adults

Career pipelines guide individuals from education and training to employment. Successful career pipelines must begin early and track beyond apprenticeships and entry-level positions, giving workers opportunities for advancement into positions with greater responsibility and higher pay. Collaborations among utilities, schools, and labor unions can connect students and trainees to jobs in the water sector and create linkages between

academic curricula and work-based learning. Educators are a key link between students and career paths.

**Greater New Orleans, Inc.**, and the **Greater New Orleans Foundation** host Future Building Fridays to inform student influencers (counselors, teachers, and parents) about water sector career and training opportunities available to their students. This is especially important for students from low-income families or communities of color that may not have early exposure and access to STEM (science, technology, engineering, and math) careers. Similar to how the energy and advanced manufacturing sectors have supported advancements in STEM education, the water industry can invest in STEM programs in local middle schools and high schools to spark young people's interest in water-related careers. From there, educational programs can feed into technical education, pre-apprenticeships, and internships targeted toward youth who historically face challenges in accessing workforce opportunities.

It is equally important to create on-ramps for adults to enter the water industry workforce. Utilities can partner with labor unions to create adult workforce development programs that include pre-apprenticeship training for individuals with little experience and barriers to employment, such as formerly incarcerated adults. Pre-apprenticeship programs teach trainees industry skills through hands-on work experience and help them qualify for registered apprenticeship programs in the skilled trades. Apprenticeships with local labor unions are solid pathways into permanent employment in the trades on which the water industry relies.

For example, **Los Angeles Alliance for a New Economy (LAANE)** works with the **Los Angeles Department of Water and Power** and a local chapter of **International Brotherhood of Electrical Workers** on a pre-craft training program for entry-level positions in energy efficiency and clean energy installation at the utility. This is the type of model that can be expanded to the full spectrum of water-related careers. It's also important that pipelines expand beyond entry-level positions. A robust water workforce career pipeline includes mid-career and post-career opportunities for retirees to become educators and trainers for the next generation.

## Use proactive, inclusive hiring requirements for construction and non-construction careers

As more utilities embark on water infrastructure investments, many agencies and municipal governments are adopting local hiring goals and requirements to ensure that local residents and other populations can benefit from their construction. However, many civil service hiring regulations can make it challenging for local government agencies to implement local hire requirements or preferences for permanent, non-construction positions.

To assist local residents in accessing permanent positions, utilities and municipalities can adopt policies that give graduates of workforce development and trainee programs priority for new permanent openings at the utility. They can also proactively recruit individuals from the neighborhoods that are most affected by their operations. Additionally, utilities are working to remove certain barriers for vulnerable communities by advertising job postings in community centers, places of worship, and neighborhood newspapers, as well as hosting hiring fairs, pre-qualification exams, and interviews within the community.

Investments in water infrastructure are an opportunity to create jobs that support economic mobility.

### Align workforce training with employer needs at a regional level

For training programs to succeed, they must be aligned with specific workforce needs that will arise in the future. For many utilities, detailed data is needed on the positions being vacated, when those positions will be vacated, the skills needed to fill those positions, and whether there is a supply of qualified laborers in the market. With this data, utilities can work with local or regional community-based organizations, community and technical colleges, labor unions, and workforce boards to tailor pre-apprenticeship and apprentice programs to meet their workforce needs and prepare vulnerable communities for open positions. Utilities operating within the same labor market can partner on understanding staff needs, succession planning, and joint workforce training. Partnerships like these can be incredibly successful in aligning training program curricula with the on-the-job skills needed to fill future positions.

For example, **BAYWORK** is a collaboration of 28 water and wastewater agencies in the San Francisco Bay Area that work together on research, workforce development programming, and recruitment for positions. The group has conducted research with the **California Community Colleges** on current and future labor needs in mission-critical job categories to inform the development and implementation of effective programs. BAYWORK also serves as a collective resource for job seekers to find training and employment opportunities in the region. While the opportunity is significant, utilities must also be realistic in conveying the jobs available to the public, thus setting reasonable expectations with the community and prospective workers.

Utilities can work with partners across the supply chain to remove barriers to contracting opportunities for small, minority-, and women-owned businesses.

## Contracting and Procurement

Like the ability to create jobs, capital investments in the water industry are an opportunity to generate economic benefits for local, small, minority-, and women-owned businesses in professional service and construction contracts. Many utilities and municipal departments already have programs to address this; however, the challenges that hinder successful participation persist. In many cases, these businesses can meet anticipated needs, but challenges such as receiving prompt payment and navigating the bureaucratic processes of government agencies can inhibit participation in public works projects, including water infrastructure improvements. In other cases, local enterprises need to hone skills, expand expertise, and build their portfolios to be competitive for future contracting needs.

There are many opportunities for making contracting more inclusive, in addition to direct contracts with utilities or municipalities. Utilities can work with local businesses, large firms, and nonprofits across the supply chain to remove barriers to contracting opportunities for small, minority-, and women-owned businesses, identify and communicate future contracting needs, and build capacity for local enterprises. These business enterprises are more likely to hire from underemployed communities, so expanding their contracting opportunities can exert a double-bottom-line impact: increasing wealth for minority- and women-owned businesses and increasing employment in communities where employment rates are lower than elsewhere.

### Break up large contracts to create opportunities for small, minority-, and women-owned businesses

Many public utilities, public works departments, and transit agencies responsible for large capital investments have established participation goals for local, small, minority-, and women-owned businesses. Many utilities also provide discounts or incentives to these enterprises to help them be more competitive in the bidding process.

As these goals become widespread, it is crucial that the implementation and expansion of such programs genuinely make contracting practices more inclusive. Utilities with local and disadvantaged business enterprise programs can strengthen their programs by conducting research to identify the barriers to participation facing local businesses and subsequently implementing solutions to address those barriers.

For example, one of the largest barriers for small and minority- or women-owned business participation in water capital projects is having the up-front capital to cover the costs necessary to complete major capital projects. Therefore, a promising approach is to break large contracts into smaller contracts that match the right-sized contractor with each subproject. By doing this, utilities can direct contracting opportunities to existing local small businesses. In addition, small firms need access to insurance coverage and fair credit to carry operations until they receive payment from the contracting agency. Providing local credit access through Community Development Financial Institutions or community credit unions can be a critical component to successful expansion of disadvantaged business participation. Contractor-controlled insurance and bonding programs, wherein a primary contractor provides insurance and bonding capacity for smaller subcontractors, are also promising strategies.

### Partner on business accelerator and development programs

Utilities, national nonprofits, community-based organizations, and large firms can support the advancement of small, minority-, and women-owned businesses by creating programs for these enterprises to build the skills and expertise that make them more competitive. Academies, formalized training programs, or resource centers can help hone the business acumen of small firms that want to do business with city agencies. Partners can bring the expertise of larger firms to build capacity and increase opportunities for small, minority-, and women-owned businesses.

For example, **Propeller** is a New Orleans–based nonprofit organization dedicated to growing and supporting entrepreneurs tackling environmental disparities. Born out of the **Greater New Orleans Foundation** and **Idea Village**'s Water Challenge Program to spark innovative water solutions, Propeller accelerates small businesses and entrepreneurs by giving them the tools and resources to develop market-based solutions that will improve water quality, water retention, and restoration of coastal environments. This is a model that can be applied to infrastructure investments as well. Local nonprofits and foundations can develop accelerators for small firms that need support to become competitive in securing capital procurement opportunities with utilities and city government.

### Create incentives within the contracting process for community benefit outcomes

Utilities can require or incentivize contracted firms to meet certain local hiring goals, participate in workforce or business development programs, or provide subcontract opportunities for small, minority-, and women-owned businesses. This concept can be applied to contracts and memoranda that define partnerships with other municipal agencies, businesses, national organizations, or community-based organizations. Two key ways of expanding contracts and procurement include awarding future work based on past performance of hiring disadvantaged workers or firms and conducting field monitoring of actual work hours and contracted time. City agencies can also include community benefits in professional service, procurement, and construction contracts. Commitments can take the form of financial contributions, volunteer hours, educational investments, or in-kind contributions. Additionally, city agencies can embed community benefits agreements in large-scale contracts.

In Portland, Oregon, a group of community, labor, business, and equity partners established the **Metropolitan Alliance for Workforce Equity (MAWE)** in 2011 to advocate for community development agreements that would diversify workforce and businesses working on major city construction projects exceeding $15 million. MAWE worked with the city to establish a model Community Benefits Agreement (CBA) that was incorporated into two **Portland Water Bureau** projects: the Kelly Butte Reservoir and the Interstate Maintenance Facility. Under the CBA, both projects were completed under budget and ahead of schedule, and exceeded the target goals of increasing participation of women and people of color as apprentices and journeyworkers.

# Neighborhood Revitalization

Despite the fact that most water and wastewater infrastructure is out of sight, it can be a tool for neighborhood transformation. As utilities make needed improvements to their facilities, there is an opportunity to simultaneously address environmental challenges, protect public health, and strengthen neighborhoods. For example, many utilities, national environmental groups, and community-based organizations use green infrastructure to achieve multiple benefits. Unlike traditional pipes and pumps, green infrastructure solutions emulate the natural process of filtering, retaining, and managing stormwater where it falls. Not only can this be an engineered solution for flood reduction and water quality protection, it can also can provide green streets, open space, public parks, reduced heat island effects, improved air quality, and health benefits.

While green infrastructure may be the most easily identifiable way that water investments can improve neighborhoods, it is not the only way to leverage infrastructure dollars to provide physical benefits to disinvested neighborhoods. As private investments follow public investments, upgrades to other forms of water infrastructure, like the pipes and pumps that deliver safe and reliable water and wastewater service, can bring new economic growth, especially in historically underinvested areas. Additionally, many utilities have partnered with community groups and local artists to transform utility assets by incorporating local artwork into projects, as well as creating green space, recreational facilities, and educational training centers. It is important to note that whether investment is spurring new economic development or expanding green space in disinvested places, it has the potential to contribute to gentrification and displacement. Community participation is essential to strengthening and stabilizing neighborhoods.

## Create synergistic benefits between multiple infrastructure investments

Coordination across water, transportation, education, clean energy, and public space investments occurring within a community presents the opportunity to maximize the benefits to residents and minimize disruptions. For example, as municipalities undertake improvements to roads or public transportation, utilities can partner with other city departments to make any subgrade infrastructure repairs and limit disruption to neighborhoods. At the same time, they can develop above-ground assets such as green infrastructure in the public right-of-way as streets are repaved. Similarly, utilities can work to incorporate water into the upgrades and retrofits included in school or park bonds. These can be opportunities to leverage funding and partnerships to create schoolyards and public spaces that double as stormwater management assets and environmental education gardens, or to install new drinking fountains that provide clean water for children. Park departments can work with utilities to fund community green space above such water infrastructure components as pumps and tanks. There is an enormous opportunity to pool resources to achieve multiple benefits.

For example, **PUSH Buffalo** works to reclaim empty lots and abandoned homes in Buffalo, New York, and redevelop them with local workers to create affordable housing for low-income residents. PUSH Buffalo saw an opportunity to transform vacant land into green infrastructure and launched PUSH Blue, an initiative with the **Buffalo Niagara Riverkeeper** and the **Buffalo Sewer Authority**

In Buffalo, New York, green infrastructure projects transform vacant *land and provide environmental education opportunities. Photo credit: PUSH Buffalo.*

to promote stormwater management and green jobs in the disinvested neighborhoods of Buffalo. Collaborative projects like PUSH Blue leverage a city's assets to create multiple benefits for communities.

## Channel green infrastructure to disinvested neighborhoods

Rain gardens, bioswales, permeable pavement, and other forms of green infrastructure are attractive approaches to stormwater management. Targeting and maximizing green infrastructure benefits for disinvested communities will require implementation on public and private properties driven by utilities, community-based organizations, private developers, and philanthropic organizations.

As utilities conduct planning and design for green infrastructure projects, site selection is driven by engineering, system needs, topography, and other physical site conditions. By conducting triple-bottom-line analysis, utilities can consider the environmental, economic, and social impacts, as well as the engineering impacts, when selecting sites for green infrastructure. By incorporating indicators that consider the cost-benefit to vulnerable communities into the analysis, investments can advance equitable water management and be transformative for communities.

At the same time, community-based organizations and nonprofits have been advancing green infrastructure to address flood concerns and beautify the neighborhoods they serve. Organizations including **The Trust for Public Land** and the **Center for Neighborhood Technology** bring their expertise to install green infrastructure in communities. Others, like **Verde**, a social enterprise in Portland, engage low-income people and communities of color to be ambassadors of green infrastructure projects, ensuring that they benefit directly from investments. Community-based organizations can also be key partners to make sure that water improvements don't displace residents. For example, **Enlace Project** in San Juan, Puerto Rico, is a model for how to use community land trusts and participatory planning to create development projects that are responsive to community needs while creating jobs and supporting small businesses.

## Cultivate resident and community stewardship of water projects

Water projects, especially those in disinvested neighborhoods, will be most successful when the interests, needs, and culture of the community are incorporated into project design and implementation. Utilities should consider diverse models for engaging community leaders in the design and delivery of community assets, whether green infrastructure, art investments, community space, or revitalization of blighted areas. Partners in the community can help facilitate exchanges that result in community support for projects and long-term stewardship of water assets.

For example, the **Los Angeles Bureau of Sanitation** has partnered with **The Trust for Public Land** and **Equipo Verde** to develop 900 miles of green alley pilot projects across Los Angeles' most disadvantaged communities. The organizations work with local residents to marry community goals, such as beautification and public art, with water management goals, such as stormwater infiltration and drought-tolerant planting. Public engagement is essential to the development process, just as community stewardship is essential to preserving these spaces long after the construction is complete.

Meaningful public participation is an important factor in creating water infrastructure projects that strengthen and stabilize communities.

# Pillar Two: Case Studies

### Seattle Race and Social Justice Initiative

*Institutionalizing equity into the fabric of the utility*

When Seattle's former Mayor Greg Nickels first ran for office in 2001, he asked constituents if they felt that the city government was working for them. The difference in responses demonstrated a racial divide: white people tended to feel engaged and well served by the government, while people of color tended to feel disengaged and poorly served. In response, Mayor Nickels launched the Race and Social Justice Initiative (RSJI) with the goal of transforming city government and ending institutional racism. Under the initiative, city departments were directed to draft RSJI work plans and create "change teams" to help guide and support the department's work plan implementation and to bolster its RSJI activities. For the first four years, the initiative focused on the city's own programs and services in order to address internal institutional racism as a necessary first step before engaging the community more broadly.

In 2005, Seattle Public Utilities (SPU) launched its change team and created the Environmental Justice and Service Equity (EJSE) division to support the utility in realizing its RSJI goals. The change team has averaged eight to ten people and EJSE currently has 12 people on staff. Some of the initiative's early accomplishments include providing mandatory trainings on race and other key topics for over 1,300 SPU employees; creating and applying Racial Equity Toolkits for identifying and addressing racial inequities in the utility's policies, programs, and services; embedding racial equity questions into planning processes; and developing partnerships with community-based organizations to effectively engage customers, particularly people of color, immigrants, and refugees.

In 2014, the utility adopted a Service Equity Action Plan that called for embedding equity in all SPU work. By 2016, SPU launched Branch Equity Teams to support this commitment. This new focus includes aligning RSJI with the business needs of the branch, and ensuring that supervisors and managers lend their staff out as Branch Equity and Change Team members. Branch Equity and Change Team members serve three-year terms with an average annual commitment of 100 hours per person. There are currently 77 staff serving on branch equity teams, and 14 staff serving on the new change team. EJSE has also expanded its community partner program to better orient community partners to utility business. This program provides training, tours of facilities, and key messages on utility priorities, as well as creating greater flexibility in contracts so that other work groups can utilize community partner services.

### National Green Infrastructure Certification Program

*Water Environment Federation facilitates utility partnership*

Within the last decade, utilizing green infrastructure in tandem with existing "gray infrastructure" for stormwater management has become increasingly popular with local utilities and municipalities. As utilities and municipalities embrace the many environmental advantages of implementing green infrastructure, such as helping alleviate the stress on combined sewer overflows (CSOs), they also have the opportunity to create jobs through the installation, maintenance, and inspection of green infrastructure assets, especially in economically disadvantaged communities. Green infrastructure jobs typically only require a high school education and technical training, presenting an opportunity for vulnerable populations to enter the water workforce. Technical skills training programs can ensure that applicants are competitive for future green infrastructure jobs.[64]

National Green Infrastructure Certification Program includes field training and interactive educational activities. *Photo credit: DC Water.*

To address the green infrastructure workforce gap, the Water Environment Federation (WEF), along with DC Water and 15 additional partner water and wastewater utilities, developed the National Green Infrastructure Certification Program (NGICP). The program promotes green infrastructure construction, inspection, and maintenance jobs by creating national industry-specific standards for its development. One of the goals of the NGICP is to create stable jobs for local residents to build, inspect, and maintain green infrastructure (GI) projects by working with professional service firms, contractors, and utilities. The NGICP's standardization of GI training will equip many people with professional and technical skills, and, given that water sector jobs are in such high demand, the program will help connect its trainees with jobs well-suited to their skills.

In late 2016, the NGICP trained its inaugural class of candidates. Administered by seven NGICP partners across the country, the exam tested trainees' understanding of green infrastructure fundamentals, construction methods, and maintenance procedures. The first class of 62 certified green infrastructure workers received their certificates in January 2017 and will be joined by more after the program opens publicly to additional utilities and municipalities in 2018.[65] While still in the early stages of implementation, the National Green Infrastructure Certification Program will increase access to technical training, facilitate GI-based job creation for local residents, and catalyze installation of green infrastructure solutions. Industry-led programs like the NGICP will further professionalize the green infrastructure field and accelerate job growth, especially when targeted toward unemployed or under-employed communities.

National Green Infrastructure Certification Program participants receive specialized training in green infrastructure construction, inspection, and maintenance.


**San Francisco Public Utilities Commission Community Benefits Program**

*Building partnerships, deepening social impact*

San Francisco is a tale of two cities. Vast numbers of people and businesses are moving in, driving stunning economic growth and prosperity. At the same time, San Francisco has one of the nation's largest income disparities.[66] As the first public utility to adopt an Environmental Justice Policy in 2009 and Community Benefits Policy in 2011, the San Francisco Public Utilities Commission (SFPUC) has led the way in showing how public water and wastewater utilities can serve as good neighbors to all whose lives or neighborhoods are affected by their water, wastewater, and power operations, and benefit some of the region's most disadvantaged communities.[67,68]

The San Francisco Public Utilities Commission's Community Benefits Program demonstrates how a utility can serve as a catalyst for expanding economic inclusion, creating job opportunities, revitalizing low-income neighborhoods, and building community resilience. The Community Benefits Program includes a broad range of initiatives focused on education, adult and youth workforce development, economic development, land use and neighborhood revitalization, and arts and culture that are engrained into the three utility enterprises—water, power, and sewer.

In collaboration with its social impact partners, the SFPUC exposes over 1,000 students to careers in the water sector every summer. *Photo credit: Robin Scheswohl/SFPUC.*

As the utility invests billions of dollars to upgrade the regional water system and sewer system, the SFPUC has been able to ensure that capital improvements simultaneously strengthen the communities they are serving. One of the ways the SFPUC's Community Benefits Program has been able to maximize these investments is through its Social Impact Partnership Program, which embeds community benefits requirements into all professional service and alternative design request-for-proposals of $5 million and above. Contractors have the opportunity to receive incentive points by including voluntary, firm, and measurable community benefit commitments in their proposal. To date, the SFPUC has 58 contracts that include commitments to local nonprofits and schools in the form of direct financial contributions, volunteer hours, and in-kind donations throughout the life of the contract.

By institutionalizing programs such as the Community Benefits Program and its Social Impact Program, the SFPUC is ensuring these values are embedded in all aspects of the utility business and leaving a legacy of benefits behind for the communities most impacted by their service.

**DC Water Business Development Plan**

*Growing opportunities for disadvantaged business enterprises*

The District of Columbia Water and Sewer Authority (DC Water) procures approximately $600 million annually for construction and for the purchase of goods and services to provide safe and reliable water and sewer services in the District of Columbia and the surrounding jurisdictions. DC Water is mindful of the role it plays in promoting and growing regional business enterprises. In 2009, DC Water unveiled its Business Development Plan in the effort to further promote economic and business development within the region.

The mission of the plan is to foster the growth and competitiveness of certified local businesses, local small business enterprises, and disadvantaged business enterprises, including minority-owned business enterprises (MBE) and women-owned business enterprises (WBE); help remove barriers to participation in DC Water procurements; and assist the development of firms that can compete on an equal footing in the marketplace and have a positive impact on the regional economy. While this plan is intended to strengthen and grow local and small businesses, the plan also serves to create more competition in the marketplace and thereby reduce the impact on ratepayers.

For construction projects supported by federal assistance, such as US EPA grants, it is the policy of DC Water that certified Disadvantaged Business Enterprises (DBE), as defined by regulations, shall have a fair opportunity to compete for and to participate in federally assisted contracts and subcontracts. As of September 30, 2016, DC Water had 15 active construction projects supported by $280 million in federal grants, with $99.6 million (35.5 percent) awarded to certified MBE firms and an additional $17.2 million (6.13 percent) awarded to certified WBE firms.

DC Water intends to build upon these results by broadening its outreach efforts to qualified MBE and WBE firms. The utility now annually conducts sessions around the District targeting those certified businesses that may have an interest in the work being solicited. These sessions are also an opportunity to make prime contractors aware of the DC Water DBE requirements, as well as enter into partnerships with qualified subcontractors. DC Water also employs a compliance team that is dedicated to alerting primes and subs of upcoming procurements and ensuring that certified firms have an equitable opportunity to participate in those projects. In all these ways, DC Water is committed to promoting and supporting certified businesses in achieving a fair share of work being offered. Growing small businesses to compete with larger, more established contractors helps DC Water keep its costs down while also improving the local business economy.

## Clean Water Partnership

*A community-based public-private partnership in Prince George's County*

In order to make necessary upgrades to its stormwater infrastructure and meet federal regulations, Prince George's County in Maryland plans to retrofit up to 15,000 acres of impervious area with green stormwater by 2025—an ambitious goal to address stormwater challenges that are costly to the community and affect quality of life. To meet these goals, the Department of the Environment has entered into a community-based public-private partnership with Corvias Solutions to launch the Clean Water Partnership (CWP).

Under the partnership, Corvias Solutions and Prince George's County have committed to creating benefits for the local economy through a range of performance requirements including subcontractor utilization, local subcontractor development and mentorship, workforce utilization and development, and community outreach. As opposed to a traditional procurement model, the public-private partnership shifts many of the program's risks to the private sector, while the county retains ownership over the program and ensures accountability to community interests. This allows Prince George's County to access private sector efficiencies and expertise, while providing county residents with higher quality stormwater services at minimal tax-dollar investment and enhancing local business participation in the county's infrastructure projects.

One of the performance requirements established by the CWP is to utilize county-based minority- and women-owned businesses for 30–40 percent of the total project scope, with 50 percent of that participation being county-based small businesses. Creating a greater volume of contracting opportunities for local small and disadvantaged businesses throughout the program creates a more competitive environment for these businesses. The contract includes economic incentives for Corvias to remove barriers to entry for small businesses, offer skills training, and use these firms on subcontracts. In the first option phase of the agreement, CWP is exceeding these social economic performance metrics, with 77 percent participation coming from county-based businesses, small businesses, and minority-owned businesses, and 95 percent of that participation from county-based small businesses.

The Clean Water Partnership is a model that redefines how a local government can meet federal clean water quality compliance and provide the greatest return to the community. The Prince George's County leadership created the Clean Water Partnership to transform a regulatory mandate from a liability into an opportunity that achieves compliance while creating sustainable economic and community impact.

Clean Water Partnership is exceeding its goals to utilize local small, minority-, and women-owned businesses for 30-40 percent of the total project scope. *Photo Credit: Prince George's County Department of the Environment.*

Clean Water Partnership is not just about meeting a mandate—it's about driving community and economic development. *Photo Credit: Prince George's County Department of the Environment.*

**Space to Grow Chicago**

*Maximizing environmental and community benefits by transforming schoolyards*

When utilities invest in water infrastructure improvements, they can partner with other initiatives—such as school and transportation improvements—to create mutually beneficial gains. With environmental sustainability in mind, Space to Grow transforms underutilized schoolyards in many of Chicago's low-income communities into attractive, purposeful spaces for students to learn, play, and enjoy the outdoors. Most CPS school yards are covered in asphalt, and 10 percent of the city's population, primarily in the lowest quarter of median household income, does not live within half a mile of a park.[69] Space to Grow schoolyards support a healthy and active lifestyle by creating spaces for students to play outside, offering educational opportunities for students to learn about the environment in their own schoolyard, and establishing lively spaces for people to come together as communities after school and on the weekends.

Space to Grow partners include Chicago Public Schools, the Chicago Department of Water Management, the Metropolitan Water Reclamation District of Greater Chicago, Openlands, and Healthy Schools Campaign. Through this partnership, Space to Grow has implemented green infrastructure in schoolyards that helps address flooding by capturing excess water and creating outdoor classrooms. Chicago Public Schools is one of the largest owners of impermeable surfaces in the city—it is estimated they own over 750 acres of blacktop alone—providing a previously untapped opportunity for changing the way stormwater is managed on public property.[70] Space to Grow schoolyards incorporate rain gardens, native plants, water storage under parking lots and turf fields, permeable asphalt, pavers, and rubber play surfaces to capture excess water. In doing so, the city not only recycles water—it also helps prevent sewage overflows, keeping the water supply clean.

Along with green infrastructure features, Space to Grow schoolyards include outdoor classrooms, edible gardens, turf fields, tracks, basketball and tennis courts, and playground equipment. Since many disadvantaged communities lack the resources and funding for school facilities, Space to Grow develops these much-needed spaces and works with the communities themselves to implement them through a months-long planning process. Teachers, parents, and other members of the community are actively engaged in the planning and implementation of Space to Grow projects in their communities, ensuring early buy-in and providing a base of support for using and maintaining the schoolyards in the long term. The partnership's work benefits Chicago's students, communities, and the local environment.

Space to Grow partners transform schoolyards into outdoor classrooms. *Photo credit: Tony Armour and Lisa Miller/Openlands Project.*

In Chicago, Willa Cather Elementary School's Space to Grow schoolyard includes sports fields, play equipment, and community food gardens. *Photo credit: MWRD.*

**Camden Collaborative Initiative**

*Putting neighborhoods at the center of cross-sector partnerships*

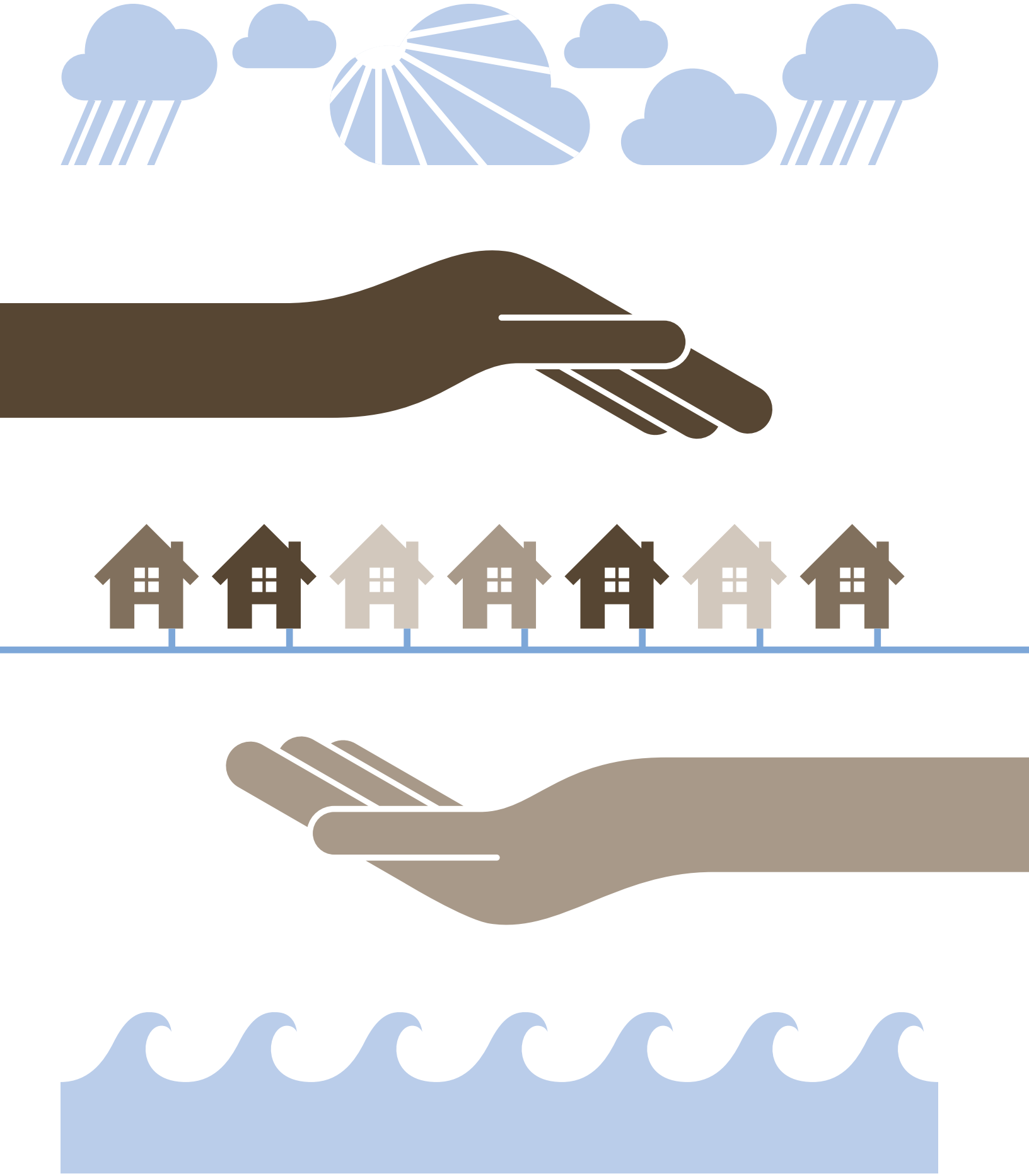
When cities and organizations work together and pool resources, communities are better able to address large-scale social and environmental challenges. Camden, New Jersey, is one of the most economically and environmentally distressed communities in the country. The city's industrial history means that it is home to hundreds of contaminated sites that pose a significant threat to any neighboring residents. These negative effects are most deeply experienced by Camden's minority populations and economically disadvantaged neighborhoods. In order to supplement Camden's limited resources, catalyze partnerships, and strengthen environmental outcomes for the community, the City of Camden joined with the Camden County Municipal Utilities Authority, the New Jersey Department of Environmental Protection, and the US EPA to form the Camden Collaborative Initiative in 2013.

Joined by over 50 environmental and community service nonprofit partners, the collaborative partners aim to improve environmental health, revitalize communities, and enrich the lives of Camden residents by collaborating on grants, plans, and project implementation in six areas of impact: air quality, waste and recycling, land and brownfields, environmental justice, environmental education, and stormwater management and resource training.

Camden SMART initiative is a cross-sector collaboration with the community to implement neighborhood-scale green and gray infrastructure projects and training programs to address combined sewage flooding and improve water quality in Camden neighborhoods. In conjunction with the land and brownfields working group, the Camden Collaborative Initiative is working to transform Camden's two Superfund sites and 114 known contaminated sites into community assets that enhance ecological health, provide public access, protect water quality, and spark economic development.[71] By leveraging resources and expertise, partners converted an abandoned factory with contaminated soil and runoff into a riverfront park adjacent to the wastewater treatment facility. The 10-acre Phoenix Park provides waterfront access, eliminates contamination to the Delaware River, and captures five million gallons of stormwater to reduce flooding.[72]

In just three years of collaboration, partners have worked together to create 50 green infrastructure projects and five riverfront parks, establish sustainability and water conservation ordinances, and remediate harmful brownfields.[73] Camden Collaborative Initiative demonstrates how water and wastewater infrastructure can impact many other aspects of a community, including parks and public space, air quality, economic development, and more. It is an impressive example of what we can achieve for our communities when we cultivate cross-sector partnerships to address water and environmental issues.

Phoenix Park in Camden, New Jersey provides ten acres of waterfront access adjacent to treatment plant facilities. *Photo credit: Camden County Municipal Utilities Authority*



# PILLAR THREE

## Foster community resilience in the face of a changing climate

### Context

The impacts of a changing climate are often experienced as water challenges. Changing precipitation patterns due to rising temperatures create droughts in some areas and floods in others. Heavy rainfall overburdens stormwater systems, flooding homes and neighborhoods. Extreme storms damage coastal communities and waterfronts. Droughts shrink the supply of water available for agricultural and domestic uses, potentially causing land subsidence and concentrating contaminants in remaining water. Rising temperatures accelerate snowmelt and melt permafrost. Sea level rise compromises water infrastructure and the quality of groundwater supplies.

Lower-income communities are often the most vulnerable in the face of a changing and unpredictable climate. Low-income people are more likely to live in low-quality housing, lack insurance, and have fewer resources to cope with the challenges associated with shifting climate patterns. In the aftermath of Hurricane Katrina, for example, low-income households lacked the resources to rebuild and recover from the disaster, and many never returned to their homes.

Climate planning at the utility, city, regional, and state level is a key strategy to prepare for the water impacts of climate change. A study of 28 climate action plans from US cities found that only a few included equity as a principal goal.[74] Moreover, climate plans generally do not include standards for assessing progress. This means that even plans that touch on equity considerations may not provide concrete recommendations or metrics for advancing climate adaptation in the communities that need it most.[75]

**Defining Adaptation and Mitigation**

**Climate adaptation:** Climate adaptation is the process of preparing communities and infrastructure to withstand the impacts of a changing climate. It can include building and upgrading physical infrastructure, such as sea walls; or changing systems and behavior; such as, limiting development in floodplains. The term refers to the planning process as well as the implementation of adaptation strategies.

**Climate mitigation:** Mitigation seeks to reduce the impacts of climate change by lowering greenhouse gas emissions. Mitigation measures can include investments in renewable energy, energy efficiency upgrades, hydropower, or changes in behavior, such as encouraging the use of public transit instead of cars.

## PILLAR THREE

Foster community resilience in the face of a changing climate

| Issue areas | Strategies | Case studies |
|---|---|---|
| **Planning and Assessment** | • Include community considerations in climate vulnerability assessments<br>• Incorporate community vulnerability assessments into climate planning tools<br>• Connect community-based organizations to climate planning efforts | • **Milwaukee Metropolitan Sewerage District and Sixteenth Street Community Health Centers:** *Partnering to build climate resilience in the Kinnickinnic River Watershed*<br>• **Sewerage & Water Board of New Orleans and Resilient New Orleans:** *Leveraging climate adaptation to create opportunity for vulnerable communities*<br>• **Catalyst Miami:** *Fostering resident engagement in climate planning*<br>• **California's Cap-and-Trade Program:** *Dedicating climate mitigation dollars to disadvantaged communities*<br>• **Cleveland Climate Action Fund:** *Investing in neighborhood revitalization to foster climate resilience* |
| **Funding** | • Dedicate adaptation, mitigation, and disaster relief funding to vulnerable communities<br>• Fund community development initiatives to build climate resilience<br>• Build partnerships with the flood insurance industry | |
| **Project Delivery** | • Leverage climate adaptation projects to create economic opportunity for vulnerable communities<br>• Prioritize vulnerable communities in physical adaptation | |

# Strategies

## Planning and Assessment

Climate change is an unprecedented phenomenon that requires us to rethink water infrastructure planning and investment. As its effects become more apparent, government agencies across the nation are developing extensive climate plans and reevaluating existing practices. Climate adaptation plans begin with an understanding of how a warming climate will affect a given area. Then, they assess climate risks and vulnerabilities and lay out recommendations for addressing them. In the water context, this encompasses physical changes to infrastructure, relocating people and infrastructure from high-risk areas, and disaster preparedness. Cities and states generally develop climate adaptation plans across several agencies, including water utilities, and some larger utilities also have their own plans. Incorporating equity considerations and community perspectives into the climate planning process is an important opportunity for advancing water equity.

### Include community considerations in climate vulnerability assessments

Conducting vulnerability assessments is the first step in developing climate adaptation plans. Vulnerability assessments analyze an asset, area, or system's exposure to and ability to adapt to climate impacts. Typically, assessments made around climate adaptation look at the vulnerability of infrastructure. For example, a sea level rise vulnerability assessment might determine the extent to which salt water intrusion would damage sewer infrastructure. The results of these assessments are used to allocate funding and prioritize adaptation measures. Considering socioeconomic vulnerability, in addition to weighing impacts on infrastructure assets, should be a standard practice. Vulnerability assessments can also consider the interconnected and cumulative impacts of climate change. For example, flooding could be especially hazardous in neighborhoods that are home to Superfund sites.

The **Pacific Institute**, in partnership with the **Oakland Climate Action Coalition**, developed a vulnerability index intended to inform the development of the **City of Oakland**'s Energy and Climate Action Plan.[76] They identified risk factors specific to local vulnerable communities, such as the number of residents living in group homes or shelters. The **City of Baltimore**'s Sustainability Plan includes a societal impact analysis as part of its vulnerability assessment; it anticipates the impact of climate and environmental crises on vulnerable populations like senior citizens and people with limited English-speaking ability.[77] While these processes are not directly focused on water, they offer models of vulnerability assessments that account for equity considerations. In addition, data from citywide vulnerability assessments can inform water-focused planning.

### Incorporate community vulnerability assessments into climate planning tools

Once community vulnerability assessments are completed, they can be used to develop tools and models that guide climate change funding and decision-making. Mapping tools can be especially helpful in communicating the demographics, environmental factors, and interconnected vulnerabilities in an area. For example, maps can visually illustrate that a neighborhood prone to flooding is also burdened by high poverty rates, poor air quality, and lack of amenities.

The **Union of Concerned Scientists** developed a tool that uses poverty, race, and educational attainment data to identify "hotspots," where coastal communities are likely to be hit especially hard by climate change. The tool is intended for use by federal agencies like the US Department of Housing and Urban Development (HUD) and Federal Emergency Management Agency (FEMA) to allocate funding and resources for climate adaptation. There are other tools for determining community vulnerability, such as the **US EPA**'s EJSCREEN and the **State of California**'s Cal EnviroScreen, that could be adapted for climate planning. The federal government can facilitate this work by providing research grants, technical assistance, data access, and other resources to help local practitioners develop tools and modeling methods.

Climate adaptation planning is a key strategy in addressing climate impacts like sea level rise in coastal communities.

### Connect community-based organizations to climate planning efforts

This is a crucial moment: planning departments at all levels around the country are developing climate adaptation plans. Now—before the plans are finalized—is the time to bring community perspectives into the process. The **State of Louisiana**'s Coastal Master Plan offers a good model of extensive community engagement in climate and sustainability planning. One of the plan's guiding principles and decision-making criteria is the preservation of traditional coastal culture, livelihoods, and lifestyles. The state conducted outreach through community groups including nonprofits, schools, tribal councils, and faith-based organizations, and more than a thousand people were engaged in the planning process.[78]

## Funding

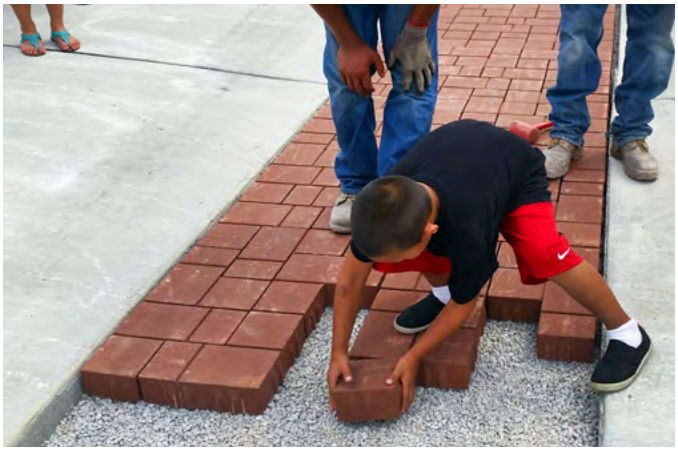
Dedicated funding sources are essential to implementing climate resilience measures, particularly around water infrastructure, given its vulnerability to phenomena like sea level rise, storm surges, and drought. Since poor-quality infrastructure is more common in low-income areas, there should be dedicated climate adaptation funding for these communities. Creating targeted funds and setting benchmarks for spending helps to include vulnerable communities in adaptation. For utilities, dedicated funding for climate adaptation is important because climate impacts can increase financial volatility. For example, increased conservation during droughts may mean reduced revenues.

## Dedicate adaptation, mitigation, and disaster relief funding to vulnerable communities

To address disparities, funds should be targeted to communities that bear the greatest burden of climate impacts, with the goal of building resilience. Several cities have been criticized for exacerbating existing inequalities or spurring gentrification by funding adaptation only in higher-income neighborhoods. The same pattern has emerged in the wake of natural disasters when wealthy areas receive relief funding first, despite their greater capacity to recover. Disasters like Hurricanes Katrina and Sandy have brought attention to disparities in disaster aid. The New Jersey nonprofit **Fair Share Housing Center** is collecting stories from residents hit by Sandy, with the goal of reforming FEMA guidance to distribute their relief funding in a more equitable manner.

During the height of California's record-breaking drought, the **Environmental Justice Coalition for Water (EJCW)**, a statewide coalition of grassroots water justice advocates, secured $250,000 in interim emergency drinking water funding from the State and regional water boards to pilot a water access program with the **Community Engineering Corps**. The program offered community-based engineering services from all-volunteer teams at no cost, which enabled a half-dozen low-income communities to receive funding for new water and wastewater infrastructure.

Climate adaptation projects are especially beneficial to vulnerable communities. In Milwaukee, Kinnickinnic River Corridor residents help lay pavers in the city's Green Alleys. *Photo credit: Sixteenth Street Community Health Centers.*



## Fund community development initiatives to build climate resilience

Increasing overall funding to vulnerable communities is important to building resilience even when funding does not directly address climate impacts. Issues that may seem unrelated to climate, such as healthcare, public transportation, and affordable housing, are important components of resilience because they affect a community's ability to respond to crises. Funding for climate resilience should encompass initiatives that connect vulnerable communities to the resources necessary for day-to-day survival before a crisis occurs. Taking a holistic approach to resilience also makes it possible to secure funding from initiatives focused on housing, health, and other issues to supplement climate funding. The **City and County of San Francisco**'s resilience plan, produced with **100 Resilient Cities**, makes it clear that the city cannot recover from disasters without addressing equity challenges. While the plan focuses more on earthquake preparedness than water issues, it includes economic inequality as a risk factor. The plan recommends strategies like expanding healthcare services for the homeless and building more affordable housing, since stable, healthy populations are better able to weather crises.

## Build partnerships with the flood insurance industry

The flood insurance industry is a potential partner for funding and supporting climate adaptation as weather patterns become increasingly unpredictable and existing floodplain maps become obsolete. An analysis in Illinois showed that 92 percent of insurance claims related to urban flooding occurred outside the established floodplain.[79] Proactive partnerships with insurers can provide greater resilience and reduce expenses after a disaster hits. For insurers, it makes sense to use flood insurance preventatively to develop resilient structures, rather than to pay for recovery after a flood hits. The insurer **Swiss Re** has taken this approach, working with governments to develop climate-risk prevention and financing mechanisms. They have partnered with the **State of Alabama** and the **Miami-Dade County** public school system to develop hurricane insurance projects.

## Project Delivery

Once the planning process has been completed and funding has been secured, on-the-ground adaptation begins: building and implementing physical solutions to sea level rise, flooding, drought, and damage to water infrastructure. These efforts can entail building seawalls, expanding floodable green spaces, constructing canals, retrofitting underground infrastructure, expanding utility service, and even relocating entire neighborhoods. It also means developing disaster preparedness and emergency response networks, and raising awareness in communities that are at risk of climate impacts. The implementation of climate adaptation projects is still at an initial stage in most parts of the country, but it will accelerate as effects are felt more frequently. These efforts will create many opportunities for employment, neighborhood improvement, and innovation.

### Leverage climate adaptation projects to create economic opportunity for vulnerable communities

Preparing our nation's infrastructure to withstand climate change will require unprecedented expenditures and massive construction projects. Studies suggest that climate adaptation could cost hundreds of billions of dollars per year by the middle of the century—just protecting California's coastline from sea level rise could reach $30 billion annually.[80,81] As water resilience projects are undertaken, they can be leveraged to employ people who face barriers to entering the workforce, such as formerly incarcerated workers, bringing about greater prosperity alongside increased resilience. For example, **New York City**'s recovery program after Hurricane Sandy included workforce development provisions, such as local hiring, contracting with minority- and women-owned businesses, and training for unskilled workers, that specifically benefitted the communities most affected by the storm.

### Prioritize vulnerable communities in physical adaptation

Areas that face climate-related flooding, whether due to sea level rise, extreme storms, or wastewater overflow, will have several adaptation choices. They can build physical barriers, like seawalls or levees; expand wetlands and other natural infrastructure; raise buildings and infrastructure above the water level; increase the capacity of drainage infrastructure; or relocate to higher ground. Vulnerable communities should be prioritized for physical adaptation projects, especially since they are often situated in floodplains and high-risk areas, and lack resources to finance adaptation at the household level. Limiting development in floodplains is ideal, but since many low-income neighborhoods are already located in risk areas, adaptation plans should include options for these communities. For example, the **Gentilly Resilience District**, a neighborhood plan in New Orleans, uses canals and green infrastructure to allow rising sea levels into the city without causing flooding. The plan includes skills development and training as well as quality-of-life benefits for neighborhood residents.

As sea levels rise, flooding becomes more frequent, and changing conditions make traditional livelihoods impossible, some communities living in risk areas will be forced to relocate entirely. In this context, residents should receive compensation that matches the value of their homes, allowing them to find comparable housing, and accounts for relocation costs. In Fox Beach, a working-class community in Staten Island that was hit hard by Hurricane Sandy, residents were relocated to allow the area to become a wetland buffer zone. The **State of New York** used HUD funding and Community Development Block Grants to offer them the pre-storm value of their homes, as well as an additional 10 percent for relocation.[82]

In Louisiana, Isle de Jean Charles, an island off the coast that has been home to Native American communities for generations, will soon become uninhabitable as sea levels rise. More than 90 percent of the island's land mass has washed away since 1955, and traditional ways of life are becoming impossible, as saltwater kills off fruit trees and drives away animals that locals used to hunt. The community is increasingly isolated by flooding. **HUD** has given the island a $48 million grant, the first instance of federal funding being used to relocate an entire community facing climate risk, and will organize the relocation process.[83]

# Pillar Three: Case Studies

**Milwaukee Metropolitan Sewerage District and Sixteenth Street Community Health Centers**

*Partnering to build climate resilience in the Kinnickinnic River Watershed*

The Kinnickinnic River Watershed is Wisconsin's most densely populated urbanized watershed, with homes, businesses, and industrial land in its floodplain. The area is prone to flooding, partly because it is surrounded by impervious surfaces. The river flows through a concrete-lined channel, and the dense neighborhoods surrounding it have very little green space to absorb excess water during increasingly frequent storm events. The neighborhoods most impacted by the floodplain are home to primarily low-income, Latino, and Spanish-speaking residents. As climate change exacerbates the effects of flooding, vulnerable communities living near the river will be at greater risk.

The Milwaukee Metropolitan Sewerage District (MMSD) is undertaking an $80 million project that will remove the concrete that runs along the river and replace it with a more resilient alternative, reducing flood risk for the surrounding area and creating new green space. MMSD partnered with local nonprofit Sixteenth Street Community Health Centers (SSCHC) to engage residents in decision-making around this project. With a bilingual and diverse staff, SSCHC is a trusted local institution that addresses the built and natural environments where their 38,000-patient population lives, works, and plays.

Residents explore a restored reach of the Kinnickinnic River with researchers from the University of Wisconsin and staff from the Sixteenth Street Community Health Centers. *Photo credit: Sixteenth Street Community Health Centers.*

As a result of this utility-community partnership, MMSD is developing a watershed-specific green infrastructure plan to identify areas where this important stormwater management technique can have the greatest impact to reduce flooding, improve water quality, and restore green space along the river. The utility purchased some of the homes directly in the floodplain, creating space for a wider, slower channel and allowing homeowners in high risk areas to relocate. Concrete has already been removed in some areas, and the channel is becoming more hospitable to trout and salmon.

MMSD and SSCHC are broadening their partnerships with the city and other organizations to replicate the approach to continue to reduce the flood risk and improve the communities in the watershed. This project provides an opportunity for residents to have a voice in the future of their neighborhood, and shows how climate adaptation measures can improve quality of life for all.

**Sewerage & Water Board of New Orleans and Resilient New Orleans**

*Leveraging climate adaptation to create opportunity for vulnerable communities*

From sea level rise, to subsidence, to coastal erosion, nowhere is the impact of a changing climate more visible than in New Orleans. In fact, Louisiana is experiencing one of the highest rates of relative sea level rise in the world, projected to increase 4.3 feet by 2100. Climate change places additional stress on the city's already-overburdened water systems: it is estimated that $3.3 billion is needed to repair its aging infrastructure. In the years since Hurricane Katrina, city departments, federal agencies, businesses and community partners have come together to invest in building a more resilient New Orleans, with a focus on strengthening the city's water systems and advancing social equity goals. Under the leadership of Mayor Mitch Landrieu, New Orleans has made major strides on a path to environmental, economic and community-based sustainability.

The Sewerage & Water Board of New Orleans (SWB) has been a key partner in Resilient New Orleans, a comprehensive resilience strategy that began with support from 100 Resilient Cities, an initiative pioneered by the Rockefeller Foundation.[84] Today, the City of New Orleans Office of Resilience and Sustainability has joined other local agencies, state departments, nonprofits, and businesses to develop multi-dimensional resilience approaches that will allow the city to thrive in a changing climate. In addition to addressing environmental challenges specific to the coastal region, Resilient New Orleans is focused on building an equitable city. The plan reflects the belief that a resilient city enables all its residents to prosper, regardless of the economic and environmental stresses that they may experience in the future. It acknowledges that many communities suffer from unemployment, violence, and chronic poverty, and that these issues are compounded by environmental challenges, as low-income communities tend to be located in areas with a heightened flood risk. By prioritizing climate adaptation strategies like green infrastructure in vulnerable communities, SWB addresses some of these disparities. Green infrastructure provides multiple benefits to vulnerable communities, by beautifying underused spaces as well as reducing flooding.

SWB's climate planning considers how to leverage its response to environmental challenges to make New Orleans a stronger, more equitable city. This includes using investment in climate adaptation to connect vulnerable communities to economic opportunity. In an effort to address workforce gaps, unemployment, and aging infrastructure, SWB is partnering with Delgado Community College to create a workforce development program to train qualified adults to fill high-demand jobs working in water infrastructure and build a direct employee pipeline to SWB. By working with the City of New Orleans Office of Resilience and Sustainability and Delgado, SWB has shown that climate adaptation can improve quality of life and create opportunity in the communities most impacted by environmental challenges.

**Catalyst Miami**

*Fostering resident engagement in climate planning*

The impacts of a changing climate are evident in Southeast Florida, where sea levels are projected to rise 15 inches by 2045.[85] Miami-Dade County currently experiences about six high-tide flood events every year, and this number could increase to 380 in the next 30 years.[86] The region faces not only sea level rise and storm surge, but also sunny-day flooding due to the porous bedrock on which it sits. Saltwater intrusion into the county's Biscayne aquifer is impacting the agriculture industry and threatening the livelihoods of small farmers. In Miami, low-income and Latino communities are hit especially hard by storms and flooding. Residents face regular flooding and often have to wade through puddles to get to work.[87]

As government agencies develop resilience plans, it is crucial that all communities that are vulnerable to climate risk have a hand in shaping adaptation strategies. Catalyst Miami, a community organization that provides social services like health coaching and financial planning, is engaging vulnerable communities in climate initiatives. The organization offers a course that prepares residents to participate in the climate planning process. The course provides an overview of the effects of climate change in Miami; reviews adaptation strategies from around the country; and offers public speaking training for residents to prepare them to effectively communicate with public officials. Participants also learn community asset mapping, focused on identifying the existing characteristics of their neighborhoods that could build climate resilience.

Catalyst Miami offers a course that informs communities about the effects of climate change in Miami, and prepares them to participate in adaptation planning processes. *Photo credit: Martin Framez.*

Once the course is completed, some graduates develop grassroots climate initiatives, such as creating a community emergency preparedness plan.

Catalyst Miami partners with the city's Office of Resilience and the Southeast Florida Regional Climate Compact, a planning initiative spearheaded by several counties, to facilitate community engagement in climate planning. The Compact is currently updating its adaptation plan and developing a mitigation plan, and Catalyst Miami will work with the initiative to incorporate equity considerations. In these ways, Catalyst Miami is providing important enabling structures for residents to engage in climate planning. By incorporating the needs, goals, and ideas of the people whose lives will be impacted by a changing climate, the adaption plans will be stronger and more sustainable.

### California's Cap-and-Trade Program

*Dedicating climate mitigation dollars to disadvantaged communities*

While climate adaptation is a key component of the response to climate impacts, mitigation can also play an important role in strengthening vulnerable communities. In 2006 California passed AB 32, creating a cap-and-trade system in which entities can purchase allowances when they exceed state regulations limiting greenhouse gas emissions. Along with measures lowering overall emissions, cap-and-trade systems are a common approach to climate mitigation.

In California, emissions allowances generate significant revenue for the state. SB 535, passed in 2012, amends AB 32 to give the system an equity focus. It requires that 25 percent of the funds raised by cap-and-trade be spent on projects that benefit disadvantaged communities, with 10 percent dedicated to projects within the communities themselves.[88]

California's cap-and-trade program is the first in the country to explicitly target funding to vulnerable communities. The state EPA identifies disadvantaged communities using a tool called Cal EnviroScreen. The tool compiles environmental and demographic data to assess a community's overall vulnerability and determine where funding is most urgently needed. Factors include environmental hazards like groundwater contamination, toxic sites, and traffic density, as well as socioeconomic factors like unemployment, poverty, and population with limited English proficiency. Funding is allocated to affordable housing and public transit programs that benefit communities found to be the most vulnerable.[89]

While California's cap-and-trade program is not focused on water-related climate mitigation, it provides a promising model of how states can both generate funding to increase resilience, and target these resources to those who are most vulnerable. Cal EnviroScreen is a successful tool for incorporating socioeconomic factors into vulnerability assessments, and could be applied to climate planning in the water sector.

### Cleveland Climate Action Fund

*Investing in neighborhood revitalization to foster climate resilience*

The effects of a changing climate are visible in Cleveland, where heavy rainstorms have become more frequent, increasing the risk of urban flooding and sewer overflow.[90] Total annual precipitation increased by 25 percent between 1956 and 2012, and precipitation events have become heavier.[91] The city also experiences extreme temperatures, urban heat island effects, and heavy snowfall. Power outages can occur during extreme weather events, impacting water and wastewater systems. Cleveland faces socioeconomic challenges as well as climate challenges: more than 35 percent of the population lives in poverty, including half of the city's children.[92] Persistent poverty makes the city more vulnerable to climate risks; when residents are overwhelmed by other crises, they are less able to prepare for and recover from climate impacts.

To address these twin challenges, Cleveland's Office of Sustainability is including neighborhood revitalization as a core component of their climate adaptation strategy. The Cleveland Climate Action Plan, informed by engagement with more than 50 organizations, provides a foundation for building thriving and healthy communities. The Climate Resilience and Urban Opportunity Plan, an accompanying initiative led by Cleveland Neighborhood Progress, emphasizes the importance of neighborhood-level resilience projects. Finally, the city partnered with several local foundations and organizations to create the Cleveland Climate Action Fund. The fund allows companies and individuals to mitigate their carbon footprints by funding local climate mitigation and adaptation projects.

As part of the Cleveland Climate Action Plan, the city created a Neighborhood Climate Action Toolkit to guide residents and neighborhood groups in developing these projects. The toolkit was piloted in a participatory planning process led by community development corporations that represent neighborhoods with large low-income, senior citizen, and African-American populations. Residents can use the toolkit to identify neighborhood assets and challenges, develop project ideas, and apply for implementation funding from the Climate Action Fund.

Cleveland's approach to climate adaptation shows the importance of thinking holistically about resilience. It can mean focusing on food security, public health, youth leadership, and local businesses. Climate adaptation strategies should reflect neighborhood and community diversity. So far, the toolkit's approach has resonated with communities, creating greater social cohesion and dialogue around climate adaptation. Over the last couple years, the fund has awarded almost $100,000 to 25 neighborhood projects, ranging from rain barrels and community gardens to a program that hires local youth to work on sustainable landscaping.[93]

Cleveland Neighborhood Progress is working with four neighborhoods to explore the effects of climate change and develop local initiatives to address its impact. *Photo credit: Cleveland Neighborhood Progress.*

# CONCLUSION

The strategies highlighted in this report illustrate the promise and potential of equitable approaches to water management. Spreading, scaling, and sustaining these promising strategies will depend on building the capacity of all stakeholders to advance equitable water management.

Building community capacity is critically important. Residents and community-serving organizations have deep local knowledge and wisdom. Incorporating their perspectives can improve outcomes for vulnerable communities and strengthen water systems.

We must also build the internal capacity of organizations to engage with water equity. Utilities, government agencies, environmental organizations, philanthropy, and others can weave equity into the fabric of water initiatives by adopting policies that institutionalize inclusion as a core value.

Finally, we must build our collective capacity to engage in effective partnerships. The water challenges facing vulnerable communities are complex, and no one group can drive change on its own. Achieving water equity will depend on collaborative, mutually beneficial relationships among a range of stakeholders. Forming strategic partnerships, alliances, and coalitions maximizes the skill sets of different stakeholders to produce more equitable outcomes.

Every individual, every sector, every stakeholder group has a role to play. We hope this report will inspire everyone to take action for an equitable water future.

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# ABOUT THE US WATER ALLIANCE

The US Water Alliance advances policies and programs to secure a sustainable water future for all. Our membership includes water providers, public officials, business leaders, environmental organizations, community leaders, policy organizations, and more. A nationally recognized nonprofit organization, the US Water Alliance brings together diverse interests to identify and advance common ground, achievable solutions to our nation's most pressing water challenges. We:

- **Educate the nation about the true value of water and the need for investment in water systems.** Our innovative education and advocacy campaigns, best-in-class communications and media activities, high-impact events, and publications are educating and inspiring the nation about how water is essential and in need of investment.

- **Accelerate the adoption of one water policies and programs that manage water resources to advance a better quality of life for all.** As an honest broker, we convene diverse interests to identify and advance practical, achievable solutions to our nation's most pressing water challenges. We do this through national dialogues, knowledge building and peer exchange, the development of forward-looking and inclusive water policies and programs, and coalition building.

- **Celebrate what works and spread innovation in water management.** We shine a light on those who engage in groundbreaking work through story-telling, cataloguing and disseminating best practices, and spearheading special recognition programs that focus attention on how water leaders are building stronger communities and a stronger America.

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