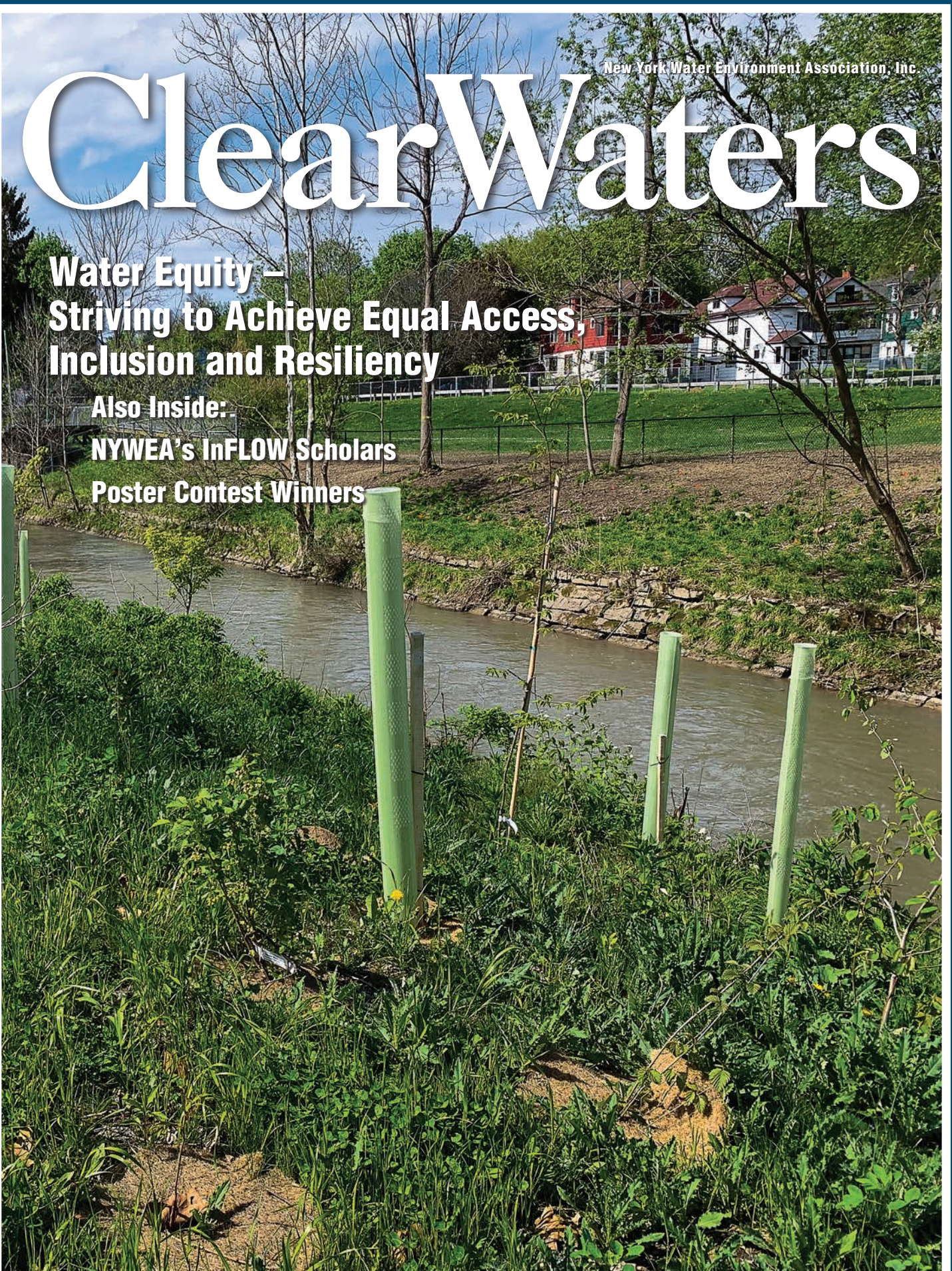


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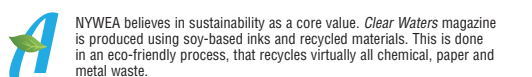
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Cover: Newly planted seedlings line the shores of Onondaga Creek, a historically neglected waterway that runs through the City of Syracuse's Southside. Onondaga Earth Corps' youth installed the plants along this new stretch of the Creekwalk, a recreational and transportation greenspace that connects city neighborhoods. Through projects such as this, Onondaga Earth Corps' youth are empowered to be active participants in creating positive change for their communities and the environment. Onondaga Earth Corps

The concepts, ideas, procedures and opinions contained in the articles in this publication are those as expressed by the various authors who submit the material for publication. The New York Water Environment Association, its board of directors, the editor, the executive director, and administrative staff hereby assume no responsibility for any errors or omissions in the articles as presented in this publication; nor are the concepts, ideas, procedures and opinions contained in these articles necessarily recommended or endorsed as valid by NYWEA, its board of directors, the editor, the executive director, or staff.

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I am writing to you today for the first time as the president of NYWEA. I am excited for this role and have been looking forward to it, and thinking about it, for the past few years.

Adapting to Change

That said, who knew we would have experienced everything that we've seen in the past couple of years? We saw a once-in-a-lifetime global pandemic (which is regrettably still very much with us) as well as divisiveness and civil unrest to a scale that I have never seen before in my youthful 45 years. Many, many changes have taken place, vulnerabilities have been exposed and we, both as a society and as individuals, have had to pivot, change and, well, evolve, just like the coronavirus.

I think NYWEA has gracefully pivoted and changed through all these challenges. Like many other organizations, businesses and institutions, NYWEA has created a Diversity, Equity & Inclusion Committee (DE&I) to address some of the long-standing, latent and no-longer tolerable inequities in the United States that have been laid bare, especially over the last couple of years. There is a role for NYWEA and its members in this discussion and the DE&I Committee, led by Walt Walker and Michelle Hess, makes NYWEA one of the most proactive WEF member associations in this regard. I congratulate and join them.

Year of the JEDI Warrior

Now, I ask that you join too. Yes, you! I want you to join us as we enter NYWEA's Year of the JEDI Warrior!

To support the great work of our DE&I Committee, we use this acronym – JEDI – that has been adopted by many other organizations to promote Justice, Equity, Diversity and Inclusion.

Since its inception NYWEA's DE&I Committee has been moving forward with alacrity. They have six core focus areas:

- 1) Foster a sense of belonging among all members of the water sector.
- 2) Assume responsibility to make the InFLOW program a success.
- 3) Encourage operator engagement.
- 4) Encourage engagement and look for partnerships with other professional organizations that act on behalf of under-represented populations.
- 5) Seek partnerships with community organizations in marginalized neighborhoods and among underrepresented populations
- 6) Promote equity with Civil Service.

I wanted to highlight the DE&I Committee's efforts, both to acknowledge how far they have come and to engage all of you in their work and in taking the next steps to make the work of JEDI your work. We can find ourselves siloed away in our separate committees focusing on specific subject-matter areas that not everyone understands or relates to. But I think we should all care about and relate to the principles that support JEDI. So, this year I want to shine a light on the idea that JEDI is not just a committee-level responsibility, but it is also an individual responsibility. For NYWEA, it represents a change in culture, the way we interact with each other, the folks we work with and – simply put – for the way we do business.

In This Issue

One way we are doing that is through this issue of *Clear Waters* magazine. The focus on water equity is certainly a JEDI issue. *The Changing Landscape of Social Justice in the Water Sector*, written by NYWEA member Tess Clark, discusses ways that JEDI affects the communities we serve, the challenges that they face and how they can be better served. Articles such as *Water Equity: A Water Utility Manager's Perspective*, written by Angela Licata-Misiak, provides some perspective to our utility manager members. An article written by Averil Davis explores what the nonprofit world is doing related to water equity, and is based on her discussion with George McGraw, the founder of DigDeep. DigDeep is an organization that works to bring clean water to the more than 2 million Americans who do not have water service.

With Gratitude

Finally, I stand on the shoulders of those who paved the way and would be remiss if I did not thank the NYWEA presidents that came before me. I would like specifically to thank Water Ambassadors Bill Nylic and Lauren Livermore whose presidencies were faced with the global pandemic. Bill's "Year of Personal Connection" was ironically faced with the need for us to all socially distance. Lauren's year of "Reflect. Protect. Connect." found ways to work through the uncertainties and challenges of the pandemic; it is hard to connect when you can't get together. I thank them for muscling through the pandemic snags and was happy to support them as best as I could. To the greatest extent possible, I intend for "my year" to honor and build upon their themes of connection through JEDI.

Join us as we look for ways to encourage our members and friends to take ownership over JEDI in our own lives. Please share with us any opportunities, thoughts and ideas you come across that might help move us forward toward that goal. After all, JEDI is all about inclusion, so let's do that.

A handwritten signature in black ink, appearing to read "Khristopher Dodson". The signature is fluid and cursive, written on a light blue background.

Khristopher Dodson
NYWEA President



Water Equity

As you read this issue of *Clear Waters*, it may become clear that water equity issues are more prevalent in America than many people realize ... especially for those of us who turn on the tap or flush the toilet multiple times a day taking it for granted and without a second thought.

During the planning of our "Women of Water" event in 2021, I must admit my shock at learning about the horrible issues of improper or non-existent sanitation in the low-income regions of Lowndes County, Alabama. That's where author Catherine Coleman Flowers grew up, and she details the effects of sanitation infrastructure neglect and environmental injustice there in her book, *Waste: One Woman's Fight Against America's Dirty Secret*. The book does a great job of revealing the disparities in clean water and sanitation issues across low-income communities everywhere, and is heralded by *Smithsonian* magazine as one of the 10 best science books of 2020. Clearly, water equity issues are everywhere.

Averi Davis picks up on this theme in her interview with George McGraw, founder of DigDeep, a human rights-based nonprofit working to improve clean and safe water and sanitation access in the U.S. (page 36). A report by DigDeep and the US Water Alliance reveals that more than 2 million Americans live without basic access to safe water and sanitation. Such numbers are eye-opening, to say the least.

In this issue of *Clear Waters* are other insightful articles that cover the gamut of water equity issues, from Tess Clark's article on the changing landscape of social justice in the water sector (page 10) to Walt Walker's article on the private sector's role in water equity (page 33). The articles on green infrastructure (page 42) and

strategic designs for urban greening (page 46) both discuss the long-standing environmental injustices in urban communities that often take the brunt of pollution and disaster impacts, and how urban ecosystem improvements can increase resilience, sustainability and livability.

There is help available! Did you know that the Office of Temporary and Disability Assistance is providing eligible individuals and families with one-time payments of up to \$5,000 total for drinking water arrears (\$2,500), and sewer arrears (\$2,500) to help avoid service interruptions? This program is currently undersubscribed! Find out if your municipality is signed up by visiting the link in Andrew Byrk's article (page 31). New York State is also fortunate to have hardship funding in place through the Clean Water State Revolving Fund, as described in William Brizzell's article (page 23), where interest rates as low as 0% are offered to municipalities that qualify for hardship financing.

As we focus on water equity, we are tremendously proud of the work that is being carried out by NYWEA's Diversity, Equity and Inclusion (DE&I) Committee. From the InFLOW program to promoting equity in Civil Service and many other activities in-between, NYWEA has led the way on the issues of DE&I. Many thanks to Steve Sanders, Walter Walker, Michelle Hess and the members of the committee who have advanced these great initiatives.

Speaking of which, don't miss the Opening Session during NYWEA's Spring Technical Conference (June 6) where President Dodson will share his Justice, Equity, Diversity & Inclusion insights in a broader context with attendees. We are sure you will be enlightened!

Our appreciation is extended to the members of the Publications Committee and all the authors for their contributions!

Patricia Cerro-Reehil

Patricia Cerro-Reehil, pcr@nywea.org



Members of NYSDEC, NYSEFC and NYWEA recently met to discuss the Operator Certification Program. Front row (l-r): James Tierney, Carolyn Steinhauer, Ed Hampston, Patricia Cerro-Reehil, Basil Seggos, Lauren Livermore and Erica Ringewald. Back row (l-r): Erik Schmidt, William Brizzell, Jr., Khris Dodson and Sean Mahar.

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Water Views | Spring 2022



Investing in Clean Water for Everyone

New York state is investing billions of dollars in clean water infrastructure with the goal of clean water for drinking and recreating for everyone. Funding to renew our state's infrastructure is the first step, but we must also ensure that every community has an equal opportunity to tap into this funding. Extra efforts need to be made to assist and include hardship communities.

In 2021, President Biden signed the Bipartisan Infrastructure Law, which provides for an historic investment in our nation's infrastructure. About \$428 million will be coming to New York this year to strengthen our drinking water and wastewater systems. Implemented by the U.S. Environmental Protection Agency, Administrator Michael Regan is asking states to prioritize the distribution of funds to disadvantaged communities. NYSDEC and our partner, Environmental Facilities Corporation (EFC), have taken steps to help remove barriers that have prevented these communities from accessing funding in the past.

NYSDEC's Office of Environmental Justice (OEJ) has been addressing environmental issues affecting primarily low income and minority communities for many years. For example, their Community Impact Grants provide funding to address environmental and public health threats in low-income and minority communities. Now OEJ is embarking on new initiatives to help address environmental equity and the impacts of climate change in

all neighborhoods. Their guidance will reach to all NYSDEC programs, including infrastructure funding opportunities.

Recently, the Division of Water awarded over \$145 million for 62 projects that will improve water quality in EJ communities or positively impact drinking water serving EJ communities – comprising 53% of the \$272 million in grants awarded. EFC also considers financial hardship in its financing opportunities. In 2021, EFC awarded \$17.9 million for 13 green infrastructure projects in EJ communities and will provide \$2.5 million to help 56 communities afford and start the planning process for water infrastructure projects.

NYSDEC is using its funding programs to address water issues that frequently plague EJ communities in older urban communities, such as Albany, Mount Vernon and Buffalo. A common issue is combined and/or sanitary sewer overflows, often a result of leaky and failing collection systems. Another related issue in these communities is failing sanitary systems affecting separate stormwater sewer systems and causing impacts to water quality. NYSDEC has prioritized the refurbishing of these aged systems.

With the millions being invested in water infrastructure, New York can help communities afford the critical work that will improve and protect water quality for drinking and recreating.

DEC's Environmental Justice webpage: <https://www.dec.ny.gov/public/333.html>

– James Tierney, Deputy Commissioner for Water Resources
New York State Department of Environmental Conservation

Focus on Safety | Spring 2022



Occupational Asthma

One of the health hazard categories of the Occupational Safety and Health Administration Hazard Communication Standard (29 CFR 1910.1200), is *sensitizer*. A respiratory sensitizer can cause **occupational asthma**. If an adult experiences new-onset asthma, it is recommended that occupational asthma be suspected. Symptoms include wheezing, shortness of breath, chest tightness, cough and sputum

production – similar to asthma that is not work-related.

The extent of exposure triggering asthma symptoms can vary widely as to the amount of allergen needed to trigger the asthmatic attack or the amount of time the person has been doing the job with exposure. For some sensitizers and workers, symptoms may occur upon first exposures to the sensitizer; for others, symptoms may not appear until after a latency period. Latency could range from weeks to years after the first exposure. Exposure occurs at the job, but symptoms may appear at the beginning of the work shift, toward its end, or even in the evening after working hours. Typically, on days away from work, a person will improve or have no symptoms. Shiftwork can disrupt circadian rhythm and, among its many adverse effects, may also affect asthma symptoms and/or the performance of asthma medications.

Job hazard analysis for potential sensitizers should include gases, vapors, aerosols, fumes, dusts or fibers. Unfortunately, even several years after removal from exposure, approximately 70% of people with occupational asthma can still experience asthma symptoms. **So, the best approach is to be diagnosed early, before the asthma becomes severe, and to identify the allergen and reduce/stop the exposure.** Using the hierarchy of controls, solutions could include:

- an alternative chemical to the allergen
- changing from a dry to a wet process for dust control
- local exhaust ventilation to capture and remove/dilute the allergen
- enclosing the work process to capture the allergen
- decreasing the likelihood of a chemical (or dust) leak or its impact
- using respiratory protection
- placement in a different job, away from the allergen

These could be reasonable accommodations under the Americans with Disabilities Act (ADA). An allergic person may respond at an air concentration below its regulatory limit (if the chemical even has a regulatory limit). However, air monitoring could show whether a control measure is reducing exposure. A worker with occupational asthma should be evaluated as an individual – a person's experience of their asthma can vary as to how quickly or severely they are affected and what these could mean for job performance.

– Nellie J. Brown, MS, CIH, ILR School, Cornell University

Stewarding More Equitable Water for All

by Victoria Johnson

As the COVID-19 pandemic has uncovered the chronic needs of underserved communities nationwide and the federal government has made historic investments in infrastructure, many are saying, “This is water’s moment.”

While this is true, how do we meaningfully work together to ensure this moment becomes a movement that will create safe, sustainable and more equitable water for current and future generations? As we tackle our most complex challenges around climate action, environmental social governance (ESG) and perfluoroalkyl and polyfluoroalkyl substances (PFAS), how do we integrate the social impact to the most vulnerable among us?

As the U.S. economy strives to recover from the pandemic, the water sector is in a unique position to serve diverse urban and rural communities in three critical roles:

- 1) As an *economic engine* jump-starting the economy by creating jobs
- 2) As an *environmental justice* steward prioritizing water quality, sustainability and climate resilience
- 3) As a *water equity champion* addressing historic disparities and inequities among marginalized communities

The challenges we face today are complex so our responses cannot recycle the solutions of our past. Our actions must be intentional, integrated and multidisciplinary across sectors as we work together to steward more equitable water for all.

For meaningful implementation of these priorities, a new paradigm of collaboration is essential across the public and private sectors, government and regulatory agencies, and nonprofit and philanthropic organizations to realize broader outcomes. Multisector partnerships, as illustrated in the US Water Alliance’s *Water Equity Network*, are critical to fostering peer exchange, collaboration and information sharing.

International exchange with our global peers facing similar challenges all over the world including Canada, Europe, the Middle East, Africa, Asia, Australia and New Zealand are also key partners in tackling these challenges from a global perspective. Exploring concepts such as ESG, climate resilience, social value, measurement and evaluation, and green infrastructure from an international perspective provides a myriad of best practices and lessons learned that can benefit diverse communities across geographies. It will take all of us working together globally across sectors to steward more just and transformational infrastructure.

Current State of Infrastructure

It’s no secret that water infrastructure in the U.S. is in desperate need of rehabilitation and repair, with the greatest need in our most disadvantaged communities. In 2021, the American Society of Civil Engineers (ASCE) graded America’s infrastructure a C-minus, where there is a water main break every two minutes, and an estimated 6 billion gallons of treated water lost each day in the U.S. (ASCE 2021). From rural towns to struggling cities, the \$550 billion Infrastructure Investment and Jobs Act (Bipartisan Infrastructure Law) will invest \$55 billion in water infrastructure to expand access to clean water for everyone, including in Tribal Nations and disadvantaged communities that need it most. This is the largest federal infrastructure investment in generations and a critical piece of legislation that will strengthen our nation’s

resilience to extreme weather and climate change while reducing greenhouse gas emissions, and expanding access to more sustainable, safe, clean water. Water utilities throughout the country are responding to this need by proactively adopting water equity, and social, racial and environmental justice initiatives that prioritize community benefits through capital investments in water, wastewater and stormwater assets.

With a heightened awareness of social justice and racial equity nationwide, the Biden administration’s inclusive policies via the Bipartisan Infrastructure Law, Justice40 and the Racial Equity Plan illustrate legislation that promotes people-centered infrastructure. This legislation is an unprecedented opportunity for the water sector to play a pivotal role in addressing historic redlining and long-term disparities in our service areas nationwide, while restoring our underfunded, aging infrastructure. These policies demonstrate an integrated approach to infrastructure through inclusive, interagency and multisector partnerships.

Why is History Relevant Today?

As our society becomes more socially conscious, some may ask, “What does our history have to do with today? It’s in the past.” According to American journalist, author and playwright James Baldwin (1986), we must acknowledge the present harm from our past in order to create a better future. “One of the things that has always afflicted the American reality and the American vision is this aversion to history,” says Baldwin. “History is not something you read about in a book. History is not even the past; it’s the present.”

Nathaniel Smith, founder and chief equity officer of Partnership for Southern Equity, shares that in order to realize a more equitable future for all, we must center racial equity in the American community development agenda. The reality is everyone is affected by history as we speak. Some of us are reaping the benefits of historic laws and public policy, and others are suffering undue hardships, burdens and exclusion from community benefits and overall well-being. The impact is based heavily on race, gender and income not only in larger society, but in the water sector as well. Our diverse service areas, comprised of affluent, middle-class and low-income neighborhoods, illustrate disparities in how funding and resources are allocated, directly impacting ratepayers based on their ZIP codes.

The U.S. Environmental Protection Agency (USEPA) Administrator Michael Regan and Assistant Administrator Radhika Fox, have made environmental justice a top priority, directly addressing chronic injustice among minority, low-income and First Nations communities. USEPA defines *environmental justice* as the “fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to environmental laws, regulations and policies.” Historically disinvested communities in the U.S. have been affected by a legacy of redlining and urban planning and bear a larger burden of water-related factors such as water quality, storms and flood events, as well as barriers to participating in local infrastructure workforce and contracting opportunities.

According to the National Skills Coalition and Business Leaders United for Workforce Partnerships, infrastructure should be people-centered: built for the people, by the people. Through

infrastructure, we transform the communities we live and work in through community wealth building, environmental justice, water equity, sustainability and resilience. As we invest in rebuilding our water infrastructure, this is not only water's moment, but also our generation's call to action to rebuild purpose-driven, transformative and thriving communities for all of us.

Victoria Johnson is the social value/equity practice leader for Jacobs Engineering. In this role, she advises public agencies nationwide on large infrastructure programs throughout the United States. She sits on a global leadership team of her peers, providing leadership and advisory on social value and equity in infrastructure across sectors, including water, transportation, transit, aviation and the built environment. She is a proven expert delivering innovative solutions to address the urgency of infrastructure challenges in overburdened communities through her work on capital improvement programs exceeding \$4 billion and redevelopment programs of more than \$20 billion. In recognition of her leadership on a variety of equity-focused initiatives, Victoria was appointed to serve on a national Industry Recovery Panel to advise the Biden administration and 117th Congress on federal recovery policies, including the Bipartisan Infrastructure Law and the Build Back Better Plan. Victoria may be reached at Victoria.Johnson@jacobs.com.

Baldwin, James. 1986. *The World I Never Made*. Presented at the National Press Club luncheon, Dec. 10. Library of Congress archive recording <https://www.loc.gov/rr/record/pressclub/baldwin.html>.

Business Leaders United for Workforce Partnerships. <https://www.businessleadersunited.org/>

Justice40. <https://www.thejustice40.com/>

National Skills Coalition. <https://nationalskillscoalition.org/>

Partnership for Southern Equity. <https://psequity.org/>

USEPA Environmental Justice. <https://www.epa.gov/environmental-justice>

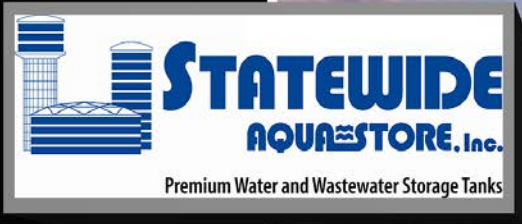
Water Equity Network, US Water Alliance. <http://uswateralliance.org/waterequitynetwork>



References and Resources

ASCE. 2021. *2021 Report Card for America's Infrastructure, A Comprehensive Assessment of America's Infrastructure*. American Society of Civil Engineers. March 3, 2021. https://infrastructure-reportcard.org/wp-content/uploads/2020/12/National_IRC_2021-report.pdf

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The Changing Landscape of Social Justice in the Water Sector

by Tess Clark

What is water equity? What is environmental justice? These concepts are inextricably linked, and are used by government agencies, water sector groups, and environmental justice advocates in subtly different ways. These terms did not originate in a vacuum; the environmental justice movement originated in the 1950s, championed by Black Americans and evolving alongside the civil rights movement. In recent years, equity in drinking water and water resource recovery processes have risen to the forefront of policy discussions in the wake of lead crises in Flint, Michigan, and Newark, New Jersey. As social justice movements shift and grow, these concepts are also evolving and growing. As water professionals, it is worthwhile to see how leaders in the water sector define water equity and justice, and how we might expect to see them manifested in policy.

Federal Environmental Equity and Justice Trajectory

After many years of advocacy from environmental justice activists and growing concerns from Black members of Congress, in 1992 the U.S. Environmental Protection Agency (USEPA) established the Office of Environmental Equity. This office, renamed the Office of Environmental Justice in 1994, defined *environmental justice* as:

“... fair treatment and meaningful involvement of all people regardless of race, color, national origin or income, with respect to the development, implementation and enforcement of environmental laws, regulations and policies.”

In this definition, “fair treatment” means no group of people should bear “a disproportionate share of ... negative environmental consequences.” This definition, it is important to note, has been criticized by some environmental justice advocates who point out that fair treatment amounts to merely redistributing everyone’s “fair share” of environmental burdens, instead of striving to eliminate the systemic root causes of environmental inequalities through technological advancement, policy changes or pollution reduction.

Although the Office of Environmental Justice has existed since the 1990s, the federal government’s emphasis on equity, justice and water has accelerated in recent years. In 2020, the Biden administration established a White House Environmental Justice Advisory Council and created the Justice40 initiative, which commits 40% of relevant federal investments to disadvantaged communities. In November 2021, the Infrastructure Investment and Jobs Act (Bipartisan Infrastructure Law) was signed into law, prompting agencies like the USEPA to quickly begin preparing for broad and sweeping increases to water infrastructure funds.

In December 2021, USEPA Administrator Michael Regan issued a letter to governors directing them to prioritize the needs of disadvantaged communities, writing that:

“... every state in America has disadvantaged communities – rural, urban, suburban – that have deeply-rooted water challenges, whether it is too much, too little or poor-quality water ... through the Bipartisan Infrastructure Law, states have an unprecedented opportunity to correct this disparity.”

Throughout his letter, Regan refers to environmental justice communities, and the “systemic barriers” that environmental justice communities disproportionately face. As further guidance is released on Justice40 later in 2022, we can expect to see more information on how environmental justice and equity is viewed, measured, and understood in terms of water infrastructure.

A New Vision for Water Equity from the US Water Alliance

Beyond the USEPA, how do other water sector groups define water equity? The US Water Alliance is a leading water sector advocacy group with an established framework explicitly for water equity. In their 2017 national policy brief, *An Equitable Water Future*, the US Water Alliance states that water equity:

“... occurs when all communities have access to safe, clean, affordable drinking water and wastewater services, share in the economic, social, and environmental benefits of water systems, and are resilient in the face of floods, drought and other climate risks.”

These three pillars – access to safe and affordable water, shared social benefits and resiliency to climate risks – are the backbone to the US Water Alliance’s strategies and approaches. Informed by the environmental justice movement, this framework



Lead pipe removal in Flint, MI.

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highlights the nexus between disparities in clean water access, infrastructure and workforce trends, and climate change to bring a much-needed sense of urgency to these deeply interconnected issues.

The momentum around water equity continues to grow. In 2018, out of a shared desire to address disparities in access to clean water as well as disparities in climate change vulnerability, a diverse group of water organizations established the Water Equity and Climate Resiliency Caucus. Led by PolicyLink and the Gulf Coast Center for Law and Policy, the caucus has focused on securing safe and affordable drinking water for all communities, advancing workforce development and training in low-income communities, and supporting communities affected by rising water, flooding and drought. The caucus also put pressure on the Biden administration to include both men and women of minority groups in their cabinet and agency positions. Ultimately, Radhika Fox, a caucus member and former CEO of the US Water Alliance, was appointed to head the Office of Water at USEPA.

Reflections on Water Equity and Environmental Justice

As water professionals, reflecting on the meaning and history behind environmental justice and equity, especially as the movement expands and grows, will allow us to move into the future with the communities we serve in mind. We can also acknowledge that today's exciting and promising water equity efforts have been driven by decades of advocacy by environmental justice advocates and civil rights leaders. In his *Letter from a Birmingham Jail*, Martin Luther King writes, "Injustice anywhere is a threat to justice everywhere."

To learn more about the environmental justice efforts in our state, you can consult the websites and publications of the organizations below, in addition to those mentioned previously in this article.

- 1) WE ACT for Environmental Justice (weact.org)
- 2) UPROSE: New York's oldest Latino Community-based organization (uprose.org)
- 3) PUSH Buffalo: People United for Sustainable Housing (pushbuffalo.org)

Tess Clark is a program manager with the Syracuse University Center for Sustainable Community Solutions Environmental Finance Center and may be reached at pclark@syr.edu.



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USEPA Administrator Michael S. Regan's Journey to Justice Tour

by Madison Quinn

In November 2021, Michael S. Regan, administrator of the U.S. Environmental Protection Agency (USEPA), took a tour of communities across the South in Mississippi, Louisiana, and Texas to bring attention to residents' environmental justice concerns in historically marginalized communities that have been overburdened with the impacts of pollution. This tour also provided an opportunity for the administrator to discuss the benefits of the recent Bipartisan Infrastructure Law and the Build Back Better agenda.

This strategy had Administrator Regan meeting people where they live to learn about their experiences – walking through neighborhoods, talking to children in their schools, and meeting residents on their front porches to hear about how they've been affected and understand the unmet environmental and public health needs in their neighborhoods that USEPA could help to address.

"There is no higher priority for USEPA, or for me personally, than ensuring all people in this country have clean air to breathe and clean water to drink," said Regan in a video recapping the Journey to Justice. "These actions are a first step toward delivering on our promise to do things differently. Our journey to justice is just getting started."

For example, Administrator Regan intended to meet students and faculty at Wilkins Elementary School in Jackson, Mississippi, but school was canceled due to low water pressure. This shines a spotlight on the serious water infrastructure challenges and the impacts these problems have on the community including children at this school. In response to these observations, USEPA issued a Notice of Noncompliance to the city for failure to repair and maintain equipment for reliable drinking water. Administrator Regan followed his visit with correspondence with elected officials to emphasize the need to utilize federal infrastructure funds allocated to Mississippi in the Bipartisan Infrastructure Law. These resources

can be used to solve dire water needs in Jackson and other communities across Mississippi.

In Louisiana, Administrator Regan met with residents in St. John the Baptist Parish, St. James Parish, and Mossville, where he witnessed the impacts of industrial pollution, climate change and crumbling water infrastructure. Following the visit, USEPA announced a new Pollution Accountability Team and an investment in mobile air pollution monitoring equipment that will also increase transparency with real-time data that will be publicly shared. Additionally, in response to industrial pollution from various plastic and steel production facilities, Regan has pressed for greater monitoring and protections and USEPA issued Notices of Violation or Potential Violation to several companies operating facilities in these environmental justice communities. USEPA has pledged its Office of Enforcement and Compliance Assurance to collaborate with the Department of Justice to seek additional relief for the residents exposed to pollution near these industrial facilities.

Administrator Regan visited Gordon Plaza in New Orleans, Louisiana, where he went on a walking tour with residents and listened to stories of their experience living in the affordable housing development built on a toxic landfill including a high incident rate of cancer and other serious diseases. Following the visit, USEPA expedited their review of the site to begin in March 2022 (originally slated for 2023). He also committed to working with Mayor LaToya Cantrell and Dr. Beverly Wright of the Deep South Center for Environmental Justice to achieve shared goals implementing community-based solutions for the Gordon Plaza residents.

In Texas, the Journey to Justice tour had stops throughout Houston, including the 5th Ward, Kashmere Gardens and the Houston Ship Channel. Administrator Regan spoke with residents about the community impacts of air and water pollution



Administrator Regan, center, visits Houston, Texas, communities subjected to pollution and environmental injustice during the Journey to Justice Tour, November 2021.

Eric Vance, USEPA



Administrator Regan, center right, walks with Concerned Citizens of Mossville in Mossville, Louisiana, during the Journey to Justice Tour, November 2021.
Eric Vance, USEPA

from nearby facilities. In response to meeting with community members, USEPA took various actions including rejecting the Texas Commission on Environmental Quality (TCEQ) insufficient standard for ethylene oxide, reviewing a proposed railroad permit renewal, and corrective actions to remediate contamination at the Houston Wood Preserving Works site. USEPA is also overseeing TCEQ's installation and operation of additional air monitors to capture the pollution faced by residents.

Administrator Regan has stated that the effort does not end here – this is just the beginning of the USEPA's concerted efforts to address environmental injustices in communities across the nation. Administrator Regan brought what he learned back to Washington, D.C., and USEPA followed up with both specific actions in the communities he visited and broader policy actions across the USEPA to enable the agency to more readily address concerns raised by residents in underserved, overburdened neighborhoods across the nation.

"The pollution concerns have been impacting these communities for decades," said Regan. "Our actions will begin to help not only the communities I visited on this tour, but also others across the country who have suffered from environmental injustices."

Broad policy actions included committing USEPA to aggressively use its authority to:

Conduct unannounced inspections of facilities, as needed to protect public health.

Expand air monitoring capacity by mobilizing agency resources to invest in community air monitoring to better protect people and public health.

Press state and local elected officials to take urgent action to better protect vulnerable communities.

Hold companies more accountable for their actions in overburdened communities with increased monitoring/oversight of polluting facilities.

Apply best available science to agency policymaking to safeguard public health and protect the environment.

Madison Quinn is the communications manager and scholarship program administrator for the New York Water Environment Association, Inc., and may be reached at madison@nywea.org.

Resources

USEPA. 2021. "ICYMI: On his Journey to Justice, EPA Administrator Michael S. Regan Toured Historically Marginalized Communities in the American South, Highlighted Benefits of Bipartisan Infrastructure Law." *News Releases: Headquarters/Office of the Administrator*. U.S. Environmental Protection Agency Press Office. Nov. 22, 2021. <https://www.epa.gov/newsreleases/icymi-his-journey-justice-epa-administrator-michael-s-regan-toured-historically>

USEPA. 2022a. "Journey to Justice." *Environmental Justice*. U.S. Environmental Protection Agency website. Accessed Jan. 31, 2022. <https://www.epa.gov/environmentaljustice/journey-justice>

USEPA. 2022b. "EPA Administrator Regan Announces Bold Actions to Protect Communities Following the Journey to Justice Tour." *News Releases: Headquarters/Office of the Administrator*. U.S. Environmental Protection Agency Press Office. Jan. 26, 2022. <https://www.epa.gov/newsreleases/epa-administrator-regan-announces-bold-actions-protect-communities-following-journey>

New Regional Administrator Appointed for USEPA Region 2

Lisa Flavia Garcia serves as regional administrator for U.S. Environmental Protection Agency's (USEPA) Region 2 office covering New Jersey, New York, Puerto Rico, the U.S. Virgin Islands and eight federally recognized American Indian nations.

In a Nov. 18, 2021, press release, USEPA Administrator Michael S. Regan said, "Lisa's leadership will be instrumental to EPA's work addressing the complicated intersection of environmental and economic challenges in Region 2. She brings a wealth of experience in fighting for climate justice and equity that will be invaluable as we deliver on our mission to protect communities from Puerto Rico to the U.S. Virgin Islands, and in New Jersey and New York from pollution."

"I am honored to be appointed as regional administrator for EPA Region 2, and to help advance President Biden's and Administrator Regan's priorities to integrate environmental justice in all we do to tackle climate change, ensure all communities have clean drinking water and reduce toxic pollution in our air, water and soil," said Garcia. "With the passage of the historic infrastructure deal in Congress, I stand ready to serve with the amazing EPA staff and take action toward a more just and resilient planet."

Garcia, an environmental lawyer, has advocated for environmental and climate justice for 20 years in various roles including:

- Associate administrator/senior adviser, Environmental Justice (USEPA)
- Director of Environmental Justice and Indian Affairs (NYSDEC)
- Assistant attorney general, Environmental Protection Bureau (New York State Attorney General's Office)
- Associate professor (Rutgers Law School, New Jersey)
- Vice president for Litigation for Healthy Communities (Earthjustice).

She has served on the boards of El Puente, The Fund for New Jersey, Eastern Environmental Law Center, the David Rockefeller Fund, Governors Island Trust, Palisades Interstate Park Commission, and the Nature Conservancy.

Source: USEPA website



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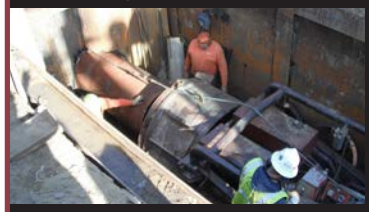
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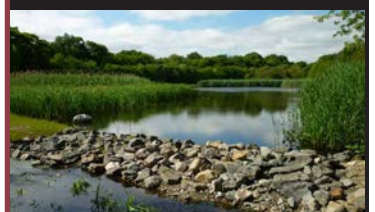
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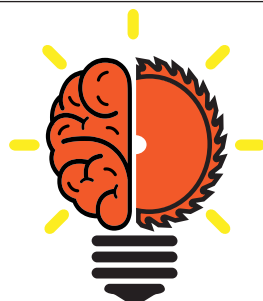
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Worker inspecting valve for filtering water.

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Short-Term Federal Funding from ARP Can Jumpstart Long-Term Water Infrastructure Improvements

Note: This post was originally published on [brookings.edu](https://www.brookings.edu) by Joseph W. Kane.

The pandemic has hit many households hard, but perhaps none more so than those who have struggled to access and afford water. Falling behind on water bills, lower-income households and communities of color have struggled the most, not only dealing with economic pain, but also challenges protecting their health and safety. While many states and localities have prevented water shut-offs and offered to help cover these bills, they lack the economic certainty and fiscal capacity to develop lasting solutions in the months and years to come.

Struggles to pay water bills do not just hurt economically vulnerable residents and communities now. These struggles underscore a challenge to invest in reliable, affordable water infrastructure over time, which can hurt all of us. Our drinking water, wastewater, and stormwater systems provide essential services that require ongoing maintenance and repairs. Investing in pipes, plants, and other facilities is not a choice for state and local leaders – it’s a necessity. And it’s costly, since states and localities are responsible for 95% of the country’s total public spending on water infrastructure annually (*Kane 2016*). Water utilities – the primary owners and operators of all this infrastructure – depend on consistent, predictable revenues from individual households and other ratepayers to cover these costs; yet the past year has been anything but consistent and predictable, resulting in project delays and many other concerns.

These water affordability and investment challenges have been festering for years, and the COVID-19 pandemic has tipped many people and places over the edge. However, the \$1.9 trillion American Rescue Plan (ARP), signed in March 2021, offers much needed federal funding for states and localities, including an emphasis on water infrastructure. While \$500 million in the ARP will provide assistance to low-income households struggling to afford water – building off previous COVID-19 relief measures – \$350 billion comes in the form of flexible state and local aid, which

can include water investments that “produce high-quality infrastructure, avert disruptive and costly delays, and promote efficiency ... [in addition to supporting] strong employment opportunities for workers.” (*Department of Treasury 2022*)

Additional federal funding for water offers some stability for households and communities, but state and local leaders need to prioritize and recognize the larger infrastructure opportunity facing them: a need to build off ARP funding to accelerate planning and investment. Receiving flexible federal funding for water infrastructure is rare – let alone getting federal attention – and leaders should not punt on their water needs by assuming that future federal legislation might come through. They need to seize the current ARP opportunity, which can allow them to boost their climate resilience, enhance long-term affordability, and prepare and protect essential workers.

Recognizing the Water Infrastructure Opportunity

Our water infrastructure frequently lacks visibility until disaster strikes, whether it’s Hurricane Harvey overwhelming Houston’s sewers, lead poisonings resulting from Flint’s outdated pipes, or a lack of clean, affordable water during a pandemic. The scale and nuance of water challenges has gained greater attention in recent months, but they have been mounting for decades. A lack of coordinated planning, proactive investment, and other capital and operational pressures – including a changing climate – have added up over time and resulted in an estimated \$740 billion in drinking water and wastewater investment needs in the next two decades alone (*USEPA 2018, USEPA 2016*).

While the pandemic helped expose these longstanding challenges, the ARP offers an opportunity: the chance to provide short-term stability while accelerating lasting infrastructure improve-

continued on page 20

ments. As federal leaders scaled back direct water funding in the past few decades, many utilities have tried to innovate on their own – pursuing new designs, integrating new technologies, and launching new programs focused on affordability and workforce development. And now, since many utilities are regional authorities (not part of a county or city), they may not be eligible to receive direct ARP funding; they are likely depending on other state and local leaders to give them money, who may not view water as a priority.

State and local leaders need to work closely with their utility partners to maximize the reach of ARP funding, enhance their fiscal and technical capacity, and strive toward meeting several pressing needs:

- Rethinking capital projects to reduce risks and costs
- Improving water access and affordability
- Protecting and preparing essential water workers

Rethinking Capital Projects to Reduce Risks and Costs

A backlog of infrastructure repairs and upgrades has put many utilities – and local residents – at risk of service interruptions, system failures, and health and safety risks, especially amid a more extreme climate. Rather than simply relying on the same approaches – patching pipes, diverting runoff and building massive, centralized treatment facilities – additional, flexible federal funding has the potential to accelerate lead pipe removals, expand distributed green infrastructure designs, and embrace new digital data and technologies. From San Diego to Syracuse, utilities have been rethinking the types of projects they pursue to accelerate repairs, use water and energy more sustainably, and boost their ability to adapt to economic and environmental fluctuations. The ARP comes at an advantageous time for many states, too – from California to Texas to Minnesota – as they reassess their capital needs and consider new types of investments.

Improving Water Access and Affordability

As the need for water investment has increased, so too has the need for higher water rates in many places, resulting in widespread affordability concerns, particularly for lower-income households and communities of color. In some localities, rates have increased by 50% or more since 2010 (*Frostenson 2017*). The COVID-19 pandemic and recession exacerbated these concerns, leading to water shut-offs and disruptions in urban and rural areas. However, local customer assistance programs can help lower or cover household bills, and moratoria on water shut-offs – from Detroit to Baltimore – have offered some relief to the most vulnerable households. ARP funding can give utilities the funding and flexibility they need to develop more lasting assistance solutions. For instance, these solutions can build off new state and local affordability initiatives that aim to more precisely measure and direct future support, which can benefit from ongoing federal resources.

Protecting and Preparing Essential Water Workers

Building and maintaining our water systems involves 1.7 million workers across 212 different occupations nationally, including water treatment operators, plumbers, engineers, managers and more (*Kane and Tomer 2018*). Vital to protecting our environment and public health, they are also essential workers. While not as visible as essential workers in hospitals, grocery stores, and other sectors of the economy, they share many similar challenges – as they have risked their own health without usually receiving extra pay or protection. ARP funding can help do just that by providing greater

hazard pay, extended leave and other benefits, similar to efforts led in cities such as Atlanta. It can also aid in ongoing recruitment and retention efforts by encouraging local hiring and training, as already evident in cities such as Louisville and Camden that have connected more and different types of workers to water careers with higher pay and growth potential.

Seizing the Water Infrastructure Opportunity

The sizable water challenges – and opportunities – facing the country demand federal, state and local action. While the ARP offers a baseline of federal funding to jump-start action, using these funds in ways that address short- and long-term needs at a state and local level depends on better coordination and planning than has traditionally occurred in the water sector. With more than 50,000 water utilities nationally, our water infrastructure is highly localized and fragmented; the easy option for many utilities (assuming they even get ARP funding) is to plan in isolation, dump more money toward the same types of projects, and make hires for immediate job openings. But an infusion of federal support offers the potential to improve capital planning, operational performance, and workforce development as part of a more enduring economic recovery and 21st century national infrastructure vision.

The ARP, after all, is one of many federal proposals addressing infrastructure, and states, localities, and their utility partners need to navigate how to best qualify for and deploy any additional funds. The Coronavirus Aid, Relief and Economic Security (CARES) Act, signed in March 2020, and the Consolidated Appropriations Act, signed in December 2020, both included water infrastructure-related elements, the most notable of which was \$638 million to establish a new Low-Income Household Water Assistance Program (LIHWAP) administered by the Department of Health and Human Services. Meanwhile, the Biden administration's American Jobs Plan (March 2021) proposed: \$56 billion for drinking water, wastewater and stormwater improvements; \$45 billion to replace all lead pipes; and \$10 billion to address contamination, among several other measures. Finally, in April 2021, Congress advanced the \$35 billion Drinking Water and Wastewater Infrastructure Act, including additional project funding and technical assistance.

With so many different federal proposals emerging, state and local leaders may assume utilities – and our water infrastructure systems more broadly – do not need ARP funding. But the ARP can provide an initial pot of funding to give utilities the flexibility and certainty they need to support long-term fiscal stability, environmental sustainability and economic equity. In much the same way my Brookings colleagues and I recommend for federal leaders, three steps can help state, local, and utility leaders seize this infrastructure opportunity:

- 1) Improve measurement and planning.

Water utilities vary widely in their service areas and populations, capital and operational needs, and financial and technical capacities. However, regional collaborations, including more integrated “One Water” planning approaches, can better define goals among multiple local partners and better evaluate progress over time. Combined with improved asset management and lifecycle cost accounting, utilities can also better identify and adapt to evolving system needs. And developing more consistent measures around water affordability, water use, and water investment can inform future-looking policies that promote economic equity and efficiency.

2) Modernize existing assets.

Armed with more comprehensive plans and detailed measures, utilities can proactively address repairs and upgrades across their entire systems. Replacing leaking pipes, fixing combined sewers, and pinpointing other existing system issues are crucial to providing safe, clean water. Incorporating climate costs and benefits in how we manage water – including projects focused on energy and wastewater reuse – can improve operational efficiencies and support a more resilient built environment. Revising procurement strategies, emphasizing projects with multiple benefits, and considering new management approaches can also attract more funding and revitalize outdated infrastructure.

3) Experiment with new designs, technologies and programs.

Utilities cannot just settle for the same types of plans, projects and outcomes; they need to keep testing new ideas and take new risks. That means looking toward new designs and technologies, including green infrastructure and digital upgrades, but also trying out new financial tools and collaborations, including new types of bonds and community partnerships. Cross-agency coordination and engagement is essential here, too, especially as water utilities partner with educational institutions, labor groups, and other employers to hire and train the next generation of talent.

Looking Ahead

The ARP injects timely and necessary federal funding for current water infrastructure needs, but it also sets the stage for more lasting improvements – if state and local leaders recognize water as the short- and long-term priority it is for all of us. Although interest continues to build around the American Jobs Plan and other federal infrastructure proposals, it would be shortsighted to assume that our water needs can simply wait until then and that utilities can manage fine without ARP funding. Additional stability in the short term around affordability programs and protections for essential workers are helpful but fail to address other mounting needs.

State and local leaders, working alongside utilities, can support a more equitable and resilient recovery by creating new plans and measures, staying ahead of existing repairs and upgrades, and pursuing new designs, technologies and collaborations. Federal

funding from the ARP – or any other proposal – should not simply be a lifeline; it should be enhancing future-looking infrastructure investments across the country and providing greater financial flexibility in a sector that has often lacked such support.

Joseph W. Kane is a Fellow at Brookings Metro. He can be reached through the Brookings website at <https://www.brookings.edu/experts/joseph-kane/>. This article was originally published May 19, 2021, on [brookings.edu](https://www.brookings.edu) by Joseph W. Kane and may be viewed in its original online version at <https://www.brookings.edu/research/short-term-federal-funding-from-arp-can-jumpstart-long-term-water-infrastructure-improvements/>.

References

- Department of Treasury. 2022. “Coronavirus State and Local Fiscal Recovery Funds – Final Rule” 31 CFR Part 35 RIN 1505–AC77. *Federal Register* 87(18): 4338-4454. Jan. 27, 2022. <https://www.govinfo.gov/content/pkg/FR-2022-01-27/pdf/2022-00292.pdf>
- Frostenson, S. 2017. “Water is getting much, much more expensive in these 30 cities.” *Vox*. May 19, 2017. <https://www.vox.com/science-and-health/2017/5/19/15477702/map-30-us-cities-water-price>
- Kane, J.W. 2016. “Investing in water: Comparing utility finances and economic concerns across U.S. cities.” *Brookings Metropolitan Infrastructure Initiative*. Dec. 14, 2016. <https://www.brookings.edu/research/investing-in-water-comparing-utility-finances-and-economic-concerns-across-u-s-cities/>
- Kane, J.W. and A. Tomer. 2018. “Renewing the water workforce: Improving water infrastructure and creating a pipeline to opportunity.” *Brookings Metropolitan Infrastructure Initiative*. June 2018. <https://www.brookings.edu/research/water-workforce/>
- USEPA. 2016. *Clean Watersheds Needs Survey 2012, Report to Congress*. EPA-830-R-15005. January 2016. https://www.epa.gov/sites/default/files/2015-12/documents/cwns_2012_report_to_congress-508-opt.pdf
- USEPA. 2018. *Drinking Water Infrastructure Needs Survey and Assessment, Sixth Report to Congress*. Office of Water (4606M) EPA 816-K-17-002. March 2018. https://www.epa.gov/sites/default/files/2018-10/documents/corrected_sixth_drinking_water_infrastructure_needs_survey_and_assessment.pdf

ARP Coronavirus State & Local Fiscal Recovery Funds

The Coronavirus State and Local Fiscal Recovery Funds (SLFRF), a part of the American Rescue Plan, delivers \$350 billion to state, local, and Tribal governments across the country to support their response to and recovery from the COVID-19 public health emergency. The program ensures that governments have the resources needed to:

- Fight the pandemic and support families and businesses struggling with its public health and economic impacts.
- Maintain vital public services, even amid declines in revenue.
- Build a strong, resilient, and equitable recovery by making investments that support long-term growth and opportunity.

Under the SLFRF program, funds must be used for costs incurred on or after March 3, 2021. Further, funds must be obligated by Dec. 31, 2024, and expended by Dec. 31, 2026. This time period, during which recipients can expend SLFRF funds, is the “period of performance.”

In addition to SLFRF, the American Rescue Plan includes other

sources of funding for state and local governments, including:

- *Coronavirus Capital Projects Fund* to fund critical capital investments including broadband infrastructure
- *Homeowner Assistance Fund* to provide relief for our country’s most vulnerable homeowners
- *Emergency Rental Assistance Program* to assist households that are unable to pay rent or utilities
- *State Small Business Credit Initiative* to fund small business credit expansion initiatives

Eligible recipients are encouraged to visit the Treasury website for more information (<https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/state-and-local-fiscal-recovery-funds>).

Source: U.S. Department of the Treasury. Coronavirus State & Local Fiscal Recovery Funds: Overview of the Final Rule. Published January 2022, revised March 2022. <https://home.treasury.gov/system/files/136/SLFRF-Final-Rule-Overview.pdf>, accessed April 2022.



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Hardship Funding through New York's Clean Water State Revolving Fund

by William A. Brizzell, Jr.

Background

For the last 50 years, the federal government has taken an active role in promoting the construction of wastewater infrastructure to improve water quality and enable public access to clean water. The Construction Grants Program was established in 1972 and later transitioned into the current Clean Water State Revolving Fund (CWSRF). The goal of the CWSRF, like the Construction Grants Program before it, is to provide a financial incentive for municipalities to undertake wastewater infrastructure projects to improve water quality. This financial incentive could be considered the “carrot,” whereas enforcement is considered the “stick.” Since its inception, New York’s CWSRF has been managed by the Environmental Facilities Corporation (EFC) in partnership with the New York State Department of Environmental Conservation (NYSDEC).

Construction Grants Program

The Construction Grants Program was originally created to provide grants to municipalities to improve their wastewater facilities. Billions of dollars were allocated to the Construction Grants Program in the 1970s and 80s. This program made it possible to fund infrastructure projects that helped construct or repair thousands of miles of sewers and new or upgraded treatment plants across the state.

Under the Reagan administration funding to the Construction Grants Program was reduced. Through an amendment to the Clean Water Act in 1987, the CWSRF was created as a loan program to replace the Construction Grants Program.

Clean Water State Revolving Fund

New York receives federal funds each year in the form of a capitalization grant from the U.S. Environmental Protection Agency (USEPA). These funds are combined with a required State Match (typically \$1 for each \$5 in capitalization grant), to capitalize the corpus of the CWSRF. New York has received over \$4 billion to date from USEPA for the CWSRF.

The premise of the CWSRF is to provide loans to municipalities at a reduced interest rate. For example, EFC sells bonds at say 4%. To make the loan more affordable to municipalities, the market interest rate is subsidized by half, and the municipality is only charged a 2% interest rate. Thanks to AAA ratings, EFC can sell bonds at a lower interest rate than many municipalities could on their own, providing savings through both the lower interest rate and by subsidizing the interest rate. In today’s low interest rate environment, the savings are less, but still an attractive alternative to municipalities financing on their own, particularly on larger infrastructure investments. As municipalities repay their loans, the money “revolves” and becomes available to loan to another municipality.

New York state is home to a diverse array of communities and municipalities, with vastly different water quality infrastructure needs. Some municipalities constructed wastewater collection and treatment systems over 120 years ago, while others are in need of developing an infrastructure plan today. The variety of water-



sheds within the state result in different treatment standards, requiring existing system upgrades in certain locations. Economic indicators, such as the Median Household Income (MHI) or population served also tend to vary greatly between municipalities. With the many variations between municipalities, it is easy to argue that some municipalities may need an enhanced financial incentive to undertake their water quality projects than others. The subsidized interest rate made wastewater infrastructure projects affordable for many municipalities across the state, while others found that constructing a project to meet their needs was simply not economically viable.

CWSRF Hardship Financing

To make funding more affordable, thus incentivizing municipalities to undertake wastewater infrastructure projects, EFC created a new project category for certain projects – hardship. Interest rates as low as 0% are offered to municipalities that qualify for hardship financing.

Hardship financing, also known as interest-free financing, is available to those who most need it. A variety of statistics are used to determine whether a municipality should be considered for hardship financing.

Communities generally charge residents for wastewater service through property taxes, meaning that a calculated user charge is based on the charge to a single property, or commonly, one household. Because of this, the EFC Hardship Policy has always used statistics based on households or families, not based on individuals in the community. Further, EFC has always sought readily available and commonly used statistics for use in determining hardship eligibility.

Two pieces of data used for the hardship evaluation are readily available from the U.S. Census Bureau’s American Community Survey (ACS). More specifically, EFC uses ACS’s five-year estimates, which represent data collected over a five-year period. In surveying American residents each year, ACS collects household income data that is used to calculate the MHI and Family Poverty Rate (FPR). EFC updates this information every other year.

Perhaps the most common indicator of the economic health of a community is the MHI. The MHI is the income amount that divides a group of households into two equal groups, half having an income above that amount, and half having an income below that amount. It may differ from the mean income. The Family Poverty Rate is more complicated, as the income level used as the poverty threshold varies by the size of the family and the age of family members. ACS uses data collected in municipalities to estimate the percentage of families with an income below the poverty threshold.

Another common statistic used when working with sewer and water districts, though no longer used by EFC, is the Equivalent Dwelling Unit (EDU). An EDU is considered a typical single-family home and often used as a measurement for water or sewer service. All other structures in the municipality – multiple family homes,

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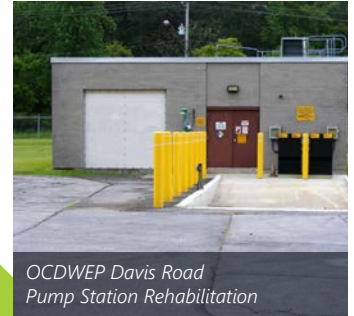
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apartment buildings, businesses, etc. – are converted, based on wastewater flow, to EDUs. Depending on the size of the community and the accuracy of data regarding existing buildings, the determination of the EDU count can be a time-consuming and onerous process.

History of the Hardship Program

Recognizing that an enhanced financial incentive would allow certain communities to undertake needed wastewater infrastructure projects, EFC initiated the Hardship Program in the mid-1990s. From its inception until 2015, communities were required to complete an application to request hardship funding. A hardship application required the applicant to submit substantial documentation used to establish a count of all the EDUs in the municipality. The EDU count and the overall cost of the project were used by EFC to calculate the anticipated user charge per EDU. Using the MHI, EFC established a Target Service Charge (TSC) for the municipality that was generally 1 to 2% of the MHI. If the anticipated user charge per EDU was greater than the TSC, the municipality qualified to receive interest-free, or hardship, financing. This process was labor-intensive for the municipality and EFC. Furthermore, communities with larger populations, even though they had low or very low MHIs, often did not qualify for hardship. In these cases, the project cost was spread over many households, resulting in an anticipated user charge per EDU below the TSC. Since 2015, EFC no longer requires an application and determines those municipalities that may be eligible for hardship financing, generally based on MHI and FPR.

There are situations where the municipality believes the published ACS data is not representative of their community or the area served by the project. In order to accommodate concerns of inaccurate data, EFC has always accepted an alternative to relying on the published data. A municipality may conduct an income survey to establish an alternate MHI within the area being served. Income surveys are most common in town or county sewer districts where the population of the sewer district represents a segment of the overall population. In these cases, the residents of the sewer district may have very different economics from the town or county as a whole. The income survey provides a more accurate assessment of household income within the sewer district. EFC does not allow the use of surveys to establish an alternate family poverty rate.

Conducting an income survey requires outreach to all households within the sewer district to achieve the required minimum response rate based on the population of the sewer district. In nearly all cases, follow-up will be needed in order to meet the minimum response rate, potentially including door-to-door canvassing of residents. Assistance may be available to municipalities undertaking an income survey. Organizations such as the non-profit RCAP Solutions or other similar entities are available to provide this assistance.

American Recovery and Reinvestment Act

In 2009, a new type of funding was added to the CWSRF – additional subsidy. Through the American Recovery and Reinvestment Act (ARRA), states were authorized to provide grants, principal forgiveness (PF), or negative interest rate loans to help fund wastewater infrastructure projects. CWSRF loans are at an interest rate below the market interest rate, thus providing “subsidy” to the community. Going beyond a subsidized interest rate, the new

“additional subsidy” provided money that did not need to be paid back. Obviously, this helped to make projects more affordable.

New York has since provided additional subsidy to municipalities in the form of grants and PF. With PF, the municipality closes a short-term loan for the entire cost of the project. It should be noted that because the short-term financing is for the full project cost, the municipality must pass a bond resolution for the full project cost. At the end of construction, before converting to long-term financing, the PF portion of the loan is forgiven and is not included in long-term financing. An advantage to providing additional subsidy in the form of PF is that certain federal requirements applicable to grants are not applicable to PF. In the long run, PF can simplify the financing process.

The ability to provide additional subsidy made projects more affordable by reducing the cost to the municipality. Communities that would have needed grants from other sources found they could afford to undertake their project with all necessary funding from EFC. In other cases, the additional subsidy allowed the municipality to expand the scope of their wastewater infrastructure project, resulting in a greater water quality benefit.

Through ARRA, EFC provided additional subsidy of up to 80% of the project cost to hardship projects. In 2010 and 2011, the federal government again authorized additional subsidy through the CWSRF. EFC provided this funding to many municipalities, with a preference toward hardship communities.

Water Resources Reform and Development Act

The Water Resources Reform and Development Act of 2014 (WRRDA) opened the next chapter in hardship financing at EFC. Whereas ARRA was one-time funding, WRRDA amended the Clean Water Act such that states could use a portion of their annual capitalization grant from USEPA for additional subsidy. WRRDA allows the use of additional subsidy on two types of projects – hardship projects and projects meeting USEPA’s Green Project Reserve criteria. Further, USEPA stipulated that states create criteria, known as Affordability Criteria, for providing additional subsidy to hardship projects.

In 2015, EFC drastically changed the Hardship Program, greatly simplifying the process. Instead of submitting volumes of documentation for review, EFC determined if a municipality qualified for hardship financing simply based on the MHI and Family Poverty Rate of the municipality.

EFC recognizes that while many downstate areas have higher MHIs, they also have a higher cost of living. The higher MHI in downstate counties resulted in very few projects qualifying to hardship in these counties under the new policy. To address this disparity, in 2018, EFC implemented a regionally adjusted MHI. Using Regional Cost Factors from the New York State Department of Education, EFC calculated Regionally Adjusted MHIs for Suffolk, Nassau, Westchester, Dutchess, Orange, Putnam, Rockland, Sullivan and Ulster counties. The Regionally Adjusted MHIs allow EFC to reach more communities and more fairly determine hardship eligibility.

Environmental Justice

In October 2020, EFC incorporated Environmental Justice into the Hardship Program. As stated on the USEPA website, “Environmental justice (EJ) is the fair treatment and meaningful involvement of all people regardless of race, color, national origin,

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or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies.” EFC’s Hardship Policy reaches many EJ communities around the state.

As discussed previously, the ACS data represents the entire municipality. There may be population pockets within an otherwise affluent municipality that meet EJ criteria. EFC uses data available through NYSDEC’s website to determine areas that qualify for EJ. Potential EJ areas are U.S. census block groups of 250 to 500 households each that, in the census, had populations that met or exceeded at least one of the following statistical thresholds:

- 1) At least 52.42% of the population in an urban area reported themselves to be members of minority groups;
- 2) At least 26.28% of the population in a rural area reported themselves to be members of minority groups; or
- 3) At least 22.82% of the population in an urban or rural area had household incomes below the federal poverty level.

Using these thresholds and the ACS five-year data for New York, NYSDEC identified potential EJ areas within New York.

The areas on NYSDEC’s map identified as potential EJ areas are census blocks, the statistical areas used as building blocks for the U.S. Census. EFC’s Hardship Policy recognizes that municipal projects may serve both EJ and non-EJ areas. Municipalities may qualify for interest-free financing if at least 50% of the project cost or scope positively serves, protects, or benefits an identified EJ area. This policy helps to ensure that most of the benefit from the interest-free financing is realized by the residents of EJ communities.

In addition to the economic impact of hardship financing, EFC encourages communities to involve the residents in decision making. Historically, residents of EJ areas may not have had their voices heard, adding to their concerns when facilities such as wastewater treatment plants are located in or near their communities. With this in mind, community engagement is heavily encouraged and recognized as essential to a successful project.

For projects that may qualify for interest-free financing through EJ criteria the project is subject to a value engineering (VE) review. Value engineering is a systematic, organized review of a project to ensure the necessary functions of a project are being provided at the lowest cost. The VE review helps to provide the municipality with the peace of mind that the project proposed by their consultant is the best solution to their water quality issue. The VE review is funded by EFC, and the municipality is required to incorporate the recommendations from the review into the project.

Current Hardship Policy

In its current form, EFC determines hardship eligibility based on screening criteria. Municipalities eligible for hardship financing are notified each fall after completion of the annual Intended Use Plan. Municipalities with an MHI below 80% of the statewide MHI qualify for interest-free financing. Those between 80% and 100% of the statewide MHI qualify if their FPR is greater than the statewide FPR. To ensure the hardship financing program remains sustainable, a project must be listed above the Hardship Subsidy Line established in the Intended Use Plan, the municipal population (or population served/responsible for project costs) must be less than 300,000, and hardship financing per



municipality is limited to \$25 million. EFC’s Hardship Financing and Additional Subsidy Eligibility Policy is available on EFC’s website.



During 2021, EFC engaged with one municipality, the Town of Southampton, interested in hardship financing for a project serving an EJ area. At no cost to the town, EFC provided VE services to review the engineering report prepared by the municipality’s consultant. The evaluation provided a thorough review of the proposed project, where many questions were raised, discussed and resolved. The end result is an improved plan for the project, and peace of mind for the municipality that the project is the best alternative to address their water quality issue.

“Participating in EFC’s Value Engineering Process was an engaging and collaborative experience that gave the town access to seasoned professionals that were able to critically review our plans and provide insight and recommendations that will significantly improve our sewage treatment project in terms of overall value, viability and long-term functionality. The EJ Hardship pathway will provide us with the means to finance the STP and associated infrastructure that is so critically needed to revitalize the economically depressed Riverside area while simultaneously improving the overall water quality and total nitrogen loading in the Peconic Estuary. The town of Southampton is so grateful to EFC for creating this process and providing us access to their knowledgeable and helpful staff along with the engineering professionals that EFC contracts with to provide EJ hardship services.”

– Janice Scherer, Town Planning & Development Administrator,
Town of Southampton, New York.

The Savings Are Real

Communities realize substantial savings through interest-free financing, even in today’s low-interest economy. A municipality

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financing a \$10 million project would, of course, pay back only \$10 million over the life of the loan. At EFC's subsidized rate from fall 2021, the community would pay approximately \$12.38 million in principal, interest and fees. If they financed on their own, the community would pay approximately \$14.25 million in principal and interest. When paid for by the small population base in many upstate communities, the savings per year can be substantial.

The Hardship Policy also contains criteria regarding additional subsidy available to hardship communities. In recent years, the states have been required to use a minimum of 10% of the annual capitalization grant in the form of additional subsidy provided to recipients. EFC has typically offered additional subsidy of 25% of net eligible project costs. In the \$10 million project example above, the community would receive a \$2.5 million grant. With the additional subsidy provided, the cost to the community is substantially decreased. Compare the remaining loan principal of \$7.5 million to the overall cost of EFC's subsidized financing or "on your own" financing and the benefit becomes obvious.

The success of realized financial benefits from the New York CWSRF Hardship Program has resulted in years of growth. In federal fiscal year (FFY) 2021, EFC closed 47 projects for approximately \$219 million in interest-free hardship financings. This was 28% of EFC's total CWSRF financings for the year. For FFY 2022, EFC has money allocated nearly \$290 million for new hardship financings.

New York's hardship financing is reaching many municipalities with low MHIs across the state. Through the CWSRF additional subsidy or with funding from New York state's Water Infrastructure Improvement Act grants, the state is providing

grant benefits to many municipalities to further offset the cost to taxpayers. Many of the municipalities that qualify for interest-free financing contain aging infrastructure; for example, sewers built with clay pipe that are now a significant source of infiltration. Projects in these communities would not move forward without interest-free financing or additional subsidy. With additional state and federal infrastructure funds on the horizon, EFC anticipates reaching a record number of low-income municipalities across the state in the next several years.

William A. Brizzell, Jr., P.E., is the director for the Division of Engineering with the New York State Environmental Facilities Corporation. He may be reached at William.Brizzell@efc.ny.gov.

Links

NYSEFC: <https://efc.ny.gov>

NYSEFC Hardship Policy: https://efc.ny.gov/system/files/documents/2022/02/hardship-financing-policy_2022-ffy_final_0.pdf

NYSDEC Potential EJ areas (ArcGIS Webmap): https://www.arcgis.com/home/webmap/viewer.html?url=https://services6.arcgis.com/DZHaqZm9cxOD4CWM/ArcGIS/rest/services/Potential_Environmental_Justice_Area__PEJA__Communities/FeatureServer&source=sd

American Community Survey: <https://www.census.gov/programs-surveys/acs>



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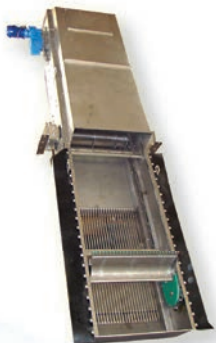
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Low-Income Household Water Assistance Program

by Andrew Bryk

Low-income New Yorkers who are behind on their water or sewer bills can now access up to \$5,000 to pay off these arrears via the Low-Income Household Water Assistance Program.

Administered by the state Office of Temporary and Disability Assistance (OTDA), the program is providing eligible individuals and families with one-time payments of up to \$2,500 for drinking water arrears and \$2,500 for sewer arrears to help them avoid service interruptions. While roughly 5,800 New Yorkers have applied to this vital program since it opened in December, tens of millions of dollars remain available.

So far, the program has paid out nearly \$5 million in total assistance for an average benefit of \$1,432 per household. While the program has also either restored service or prevented the imminent shut-off for dozens of households, OTDA still has roughly \$47 million in assistance remaining.

As of March, the program has enrolled approximately 200 vendors to participate. While this participation has been welcome, the agency is hoping to enlist many more vendors to utilize this critical funding opportunity.

The program is expected to help roughly 45,000 households statewide pay down accumulated water and sewer arrears, and the agency intends to fully distribute this funding. Households with service bills that are at least 20 days past due are being targeted, with the assistance paid directly to the utility provider.

Particularly targeted are those low-income households paying a high proportion of their income for drinking water and sewer services. Program eligibility is modeled after the Home Energy Assistance Program (HEAP), and takes into consideration household income, size, and the amount owed in arrears.

The application process is streamlined for New Yorkers already enrolled in HEAP, the Supplemental Nutrition Assistance Program, Temporary Assistance, or living alone and receiving Supplemental Security Income. Alleviating a portion of these past-due utility charges relieves financial pressure and improves financial stability of eligible households, which may consequently decrease their reliance on community assistance or services.

Likewise, the program can help communities themselves, since many vendors are municipalities – cities, towns and villages – that rely on their infrastructure and personnel to provide water and sewer services to residents. When a significant number of households fall behind on water or wastewater bills, these arrears can deprive communities of much-needed operating funds.

OTDA continues to spread the word about this critical funding in an effort to reach all eligible households. For more information, including how to apply, visit the website: www.otda.ny.gov/lihwap.

The agency has developed outreach materials, including posters, palm cards, and brochures and is planning a statewide marketing campaign this Spring.

Additionally, those drinking water, sewer, and combined drinking water and sewer providers that are interested in becoming a vendor for this program can sign up at the website: <https://waterassistancevendors.otda.ny.gov/>.

For additional information on how to become a vendor, call 518-486-4786 or email NYSLIHWAP.vendor@otda.ny.gov.

Andrew Bryk is the director of the Home Energy Assistance Program and the Low-Income Household Water Assistance Program with the New York State Office of Temporary and Disability Assistance and may be reached at Andrew.Bryk@otda.ny.gov.



The Low-Income Household Water Assistance Program benefits eligible households who have fallen behind on their water or sewer bills. *istockphoto.com*



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The Private Sector Role of Water Equity and Environmental Justice

by Walt Walker



Water Equity Practice logo.

Greeley and Hansen

The water industry private sector must intentionally contribute an equity-centered community design approach that addresses the historically underserved low-income class, working class and communities of color. As defined by the Creative Reaction Lab, equity-centered community design is the intersection of community development, designed-based problem-solving and equitable outcomes. Regardless of professional role, whether you are an engineer or technology company or work in public relations or advocacy, we all can be equity designers.

Private sector involvement in water equity can serve a unifying theme to

broaden the smart investment dialogue that leads to multiple benefits around race, regionalism, equitable development, housing, land use, healthy food, economic justice, and dignity to have a quality of life. This is critical because the way we invest in water infrastructure affects social, economic and racial justice outcomes.

While the public sector must fairly represent the interests of populations impacted by a given development, there is an incredible opportunity to support and uplift communities by water infrastructure work that produces triple-bottom line outcomes – positive social (people) and environmental (planet) leads to economic (profit) impacts beneficial to the community and the sector. There is a cost of not investing in this work for the benefit of the utility and community and providing equitable outcomes for underserved areas.

Water can be a force for equity and opportunity. It can revitalize and strengthen communities, making them more inclusive and resilient. Investments in water infrastructure can stimulate jobs and local economies. No one entity can solve these challenges or harness these opportunities alone. As stated by the US Water Alliance, building more equitable water systems will require leaning on the diverse talents and resources of water utilities, environmental groups, nonprofits and philanthropy, community-based organizations and pressures from like-minded investors and residents. Water equity is about forging coalitions on the path to water justice – building authentic relationships across sectors and requiring commitment to sustained engagement and sharing power with underserved communities to co-create shared priorities.

The private sector's role in workforce investment, in our own workplaces and communities, must not be neglected in this conversation. Our water industry workforce needs to be more reflective of the communities we serve. A diversity, inclusion, and belonging mindset considers a population of people historically not addressed in the water workforce and breaks down barriers for those interested in the water sector.

Representation, lived experiences and active listening matters. Therefore, we need to expand our reach through mentoring, onboarding, internships, education programs, storytelling, outreach, and building a sense of shared purpose.

Having been educated with a traditional civil/environmental engineering background but also having the experience of local community civic service and organization, as well as over 15 years

as a volunteer member of Engineers Without Borders-USA, I've been on a personal mission to connect infrastructure with understanding root-causes of environmental injustices with communities. The result of that has expanded my work to look at planning, policy, partnerships, community trust/voices/power/opportunity. To me, water equity means, *justice in design rooted in public service*.

Therefore, the private sector must be innovative and intentional in its impact and prioritize the value of doing good. The collective of water equity private sector leaders in this paper unites to doing the work of designing another world that is possible. To recover from decades of neglect in some instances and position for increased investment, we have to do more with less as we catch up with full investment and better recognize the history of harm through de jure and de facto environmental injustices.

Call for Action: Private Partnership and Innovation Are Needed

The time has never been greater to partner with other stakeholders to create meaningful change. There is an enormous willingness and desire for collaboration between private, public and nonprofit entities. Especially as federal dollars are soon to be used at a level that hasn't ever been seen before. This presents an incredible opportunity for uniting shared interests, building trust and progressing equitable policy initiatives, an opportunity now to rebalance investments and prioritize historically underserved areas, and to designing another world that is possible for all of us. Relationships are everything in a water-equity mindset.

We must be intentional in our planning and actions. This will require the private sector of the water industry to be innovative, and to think outside of the traditional infrastructure service framework. Understand that water equity is not simply a term to be siloed or focused as a singular project. The framework is a core mindset that must be threaded in all the work we do.

Water equity is not limited to your "contractual design phase". It is a focus during hiring, planning, contracting, bidding and project execution/construction. Water equity requires coalition with a shared-services and multiple-benefits mindset. You do not have to be an engineer to play a part.

The Infrastructure Investment and Jobs Act (Bipartisan Infrastructure Law), the single-largest investment in U.S. water infrastructure ever, invests more than \$50 billion through the U.S. Environmental Protection Agency's highly successful water infrastructure programs. When applying for and receiving loans and grants through the State Revolving Fund (SRF), the private sector can provide technical assistance and management services to help disadvantaged communities overcome barriers (information access, lack of staff, etc.). Forty-nine percent of funds from the Clean Water and Drinking Water SRFs budgets will be provided to communities as grants or principal forgiveness loans.

Reflect your company's core values and promote a civic mindset among your employees to establish roots in the community and build relationships and connections. Attend community meetings, build relationships, and see how the economic struggle connects to the struggles of the community. Engage with the community on important issues, such as infusing your climate action planning with a community-inclusive vision. Bring community-driven, community-led implementation, rooted in trust and transparency, into

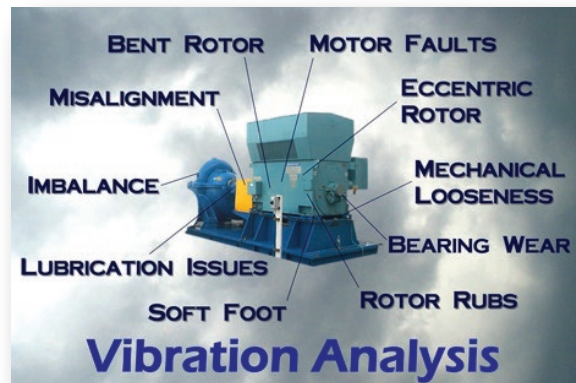
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lead service line replacement programs.

Within your organization, support employee participation in professional societies that advance diversity, equity, inclusion, and belonging in the water profession. Explore collaboration with your company's other internal practice groups (architectural group, social value group, marketing, business operations). Establish internal Employee Resource Groups (ERGs) or Employee Impact Groups (EIGs) to advance internal equity measures that reflect the commitment to equity within your firm, and to the communities you serve and support. Examples of employee-led ERGs/EIGs include gender equality; diversity, inclusion and belonging; and volunteerism/civic activism – topics where employees can have a say on the future of the company they want to work for and how they can be engaged to tell their stories to others.

The private sector can be an advocate and leader to facilitating Diversity, Equity, Inclusion, and Belonging in the water workforce, influencing who is aware of and/or has access to those opportunities. Invest in mentoring youth and young professionals, as well as adults looking to make a career change. Seek to design or support mentoring and training programs to increase business opportunities for qualified minority- and women-owned business enterprises (M/WBEs) and small businesses.

Remember: *equity* is not the same as equality. Striving for equitable outcomes can lead to equality in the future.

A Force for Good

The water industry private sector can be a force for delivering and making progress against many of the challenges that our country faces right now – the pandemic, the need for community

economic recovery, the challenges around racial equity and justice, our climate crisis, and developing pathways where we can all play a part in a better future. The water industry private sector must lead by practicing a social equity-centered design mindset to clean, safe, affordable water service; maximize the community and economic benefits of water infrastructure investment; and foster community resilience in the face of a changing climate.

Walt Walker, PE, ENV SP, is the Water Equity Practice Leader at Greeley and Hansen and is chair of NYWEA's Diversity, Equity and Inclusion Committee. He may be reached at wwalker@greeley-hansen.com.



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Digging Deep into Water Inequity with DigDeep Founder George McGraw

by *Averi Davis*

For many of us in the United States, clean running water and indoor plumbing is something we have come to expect. While this convenience is often viewed as universal, over 2 million Americans today still do not share that luxury. Though analysis of water access inequity often focuses overseas, DigDeep and founder George McGraw quickly realized the problem occurs in our own backyard.

DigDeep is a human rights-based nonprofit working to improve clean and safe water and sanitation access in the U.S. through advocacy, research and community-led work. While their work began in East and West Africa, founder George McGraw switched his efforts in response to the largely invisible water crisis in the U.S. “We didn’t start in the U.S.,” McGraw said. “We started abroad, then only several years later we were introduced to the size and scope of the problem in our own backyards. It really turned our attention here at home.”

Closing the Water Access Gap in the U.S.

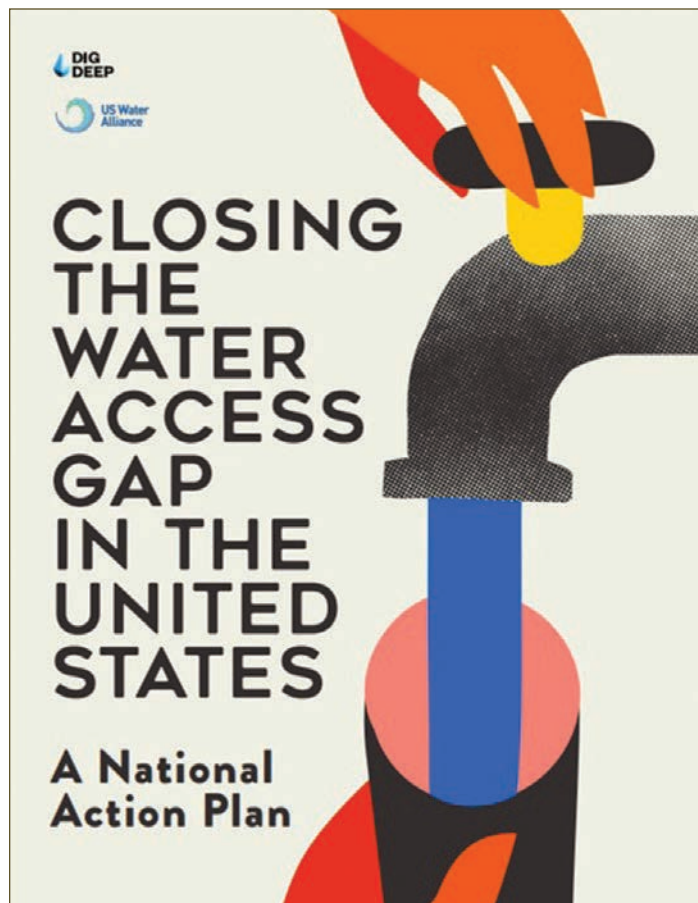
Seeking to change the narrative and increase visibility of water access struggles in the U.S., DigDeep and the US Water Alliance released the *Closing the Water Access Gap in the United States* report in 2019, representing the most comprehensive water and sanitation access analysis in the U.S. to date. Using quantitative data analysis and on-the-ground exploration of six U.S. regions experiencing water access challenges, the report put forward an action plan to

spark water equity efforts in the U.S.

The report reveals that more than 2 million Americans live without basic access to safe water and sanitation, including 1.4 million people in the U.S. and 250,000 residents of Puerto Rico without access to indoor plumbing and 553,000 people who are homeless. It also highlights major racial divides when it comes to water and sanitation access. “Race is the strongest indicator of whether or not you and your family will have a working tap or a toilet in your house. If you’re Indigenous, you’re 19 times more likely than a white family to not have running water. If you’re Black or Latino, you’re twice as likely,” said McGraw.

Though water access struggles in the U.S. may seem like isolated events, the report reveals that inadequate water and sanitation infrastructure negatively affects entire communities. On the Navajo Nation, some residents experience such low groundwater supplies that some must drive up to 40 miles to collect water. In fact, the report estimates approximately 30% of residents do not have access to running water. Inadequate water supplies lead to a plethora of challenges, including additional stress on already strained budgets, inadequate hygiene, hindered food preparation and high rates of diabetes as sugary beverages are more accessible than clean water.

While similar cases exist across the U.S., many are still under the impression that everyone has adequate clean water and sanitation access. “That’s the misconception we spend most of our time fighting against,” McGraw said. “Just the invisibility of these communities and how little support they have because they’re not seen, and they’re not understood.”



When incorporating new technology into the water sector, such as artificial intelligence or Internet of Things, how do you balance the trade-offs when there’s over 2 million people still trying to get basic water access?

I don’t know if there is a trade-off there. I think the water sector is big and smart enough to do both at once. I think the important thing is if we are going to do both at once, there’s a clear hierarchy in terms of what is the priority. The priority is to build a system where we have truly universal access, and then, to continuously improve upon that system so that it delivers better, more efficient service over time that is sustainable in the face of things like climate change and population shifts. I am not at all suggesting that everyone drops what they’re doing to focus on this problem – I don’t think that’s what it’s going to take. In fact, if we stop thinking about things like new technology and artificial intelligence and infrastructure alternatives and decentralization, if we stop thinking about any of those things, the number of people without access is probably just going to grow, if anything. More people are going to fall into that gap. Both are really essential, and I think it’s just a matter of prioritization and that’s where we’re misaligned now. Most people, even in the water and wastewater sector, don’t know about the U.S. water gap. They don’t understand its dynamics. They don’t see it every day in their work, but when they do, they’re motivated to change it.

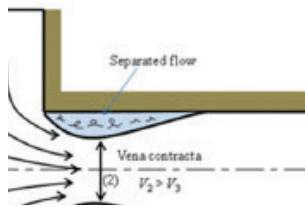
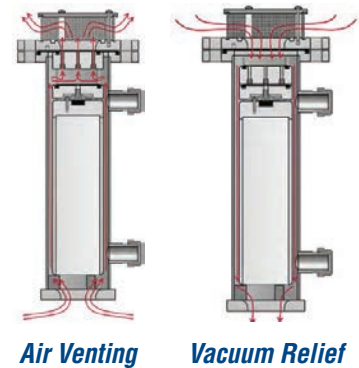
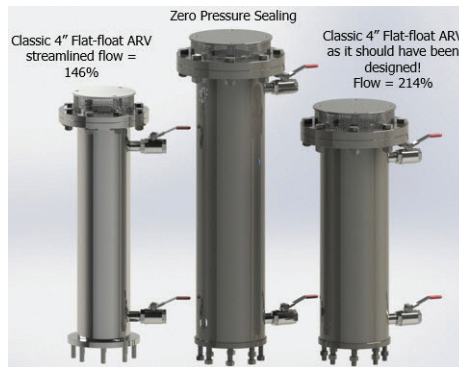
– DigDeep founder and CEO, George McGraw

The report is available on the web at <https://static1.squarespace.com/static/>

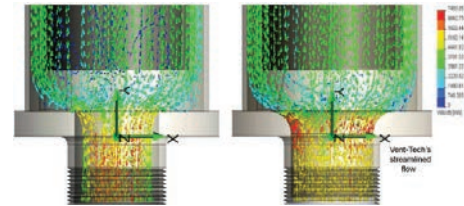
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What We Can Do About It

As some regions in the U.S. work to improve water and sanitation access, many others are backsliding, and progress is uneven. While the issue may seem overwhelming, DigDeep and the US Water Alliance have laid out several action items based on their research.

First, they suggest that the solution should be defined and reimagined. Those affected by water access challenges are often invisible. Their struggles need to be seen and understood, and the public emergency they are facing needs to be defined. Challenging site conditions in many of these communities often make traditional infrastructure options unviable, but technological innovation and temporary mitigation measures can help fill those gaps.

Next, the report asks us to look at the way resources are distributed. Traditions of financial self-sufficiency for water and wastewater systems puts those with water access challenges at a structural disadvantage. They require additional funding to support maintenance and operations. Nonprofits and the private sector can also alleviate this issue through technical assistance and innovative funding sources.

To ensure solutions remain equitable, DigDeep believes leadership should remain in the communities that experienced the most impacts. "All of our project managers and directors are from the communities in places that they serve. It's really community-directed work that DigDeep just kind of facilitates. That's something I'm really proud of – how deep our connections to communities go and how community really leads all of our work and

really owns the impact, the pride and the improvements to daily life that come with that," McGraw said.

What Water Industry Professionals Should Understand about Water Equity

"The thing I want water industry professionals to understand is that there is an equity component to this. Most of my colleagues in the industry are so focused on the technical side of the work, and so fascinated by the sort of intricacies of getting this to people that sometimes it's hard to pull back and look at the way the system operates wholesale and understand that there are winners and there are losers," McGraw said. "My advice would be that the beauty of our work is that it's not something you experience in 2022 on a computer or in an office. It touches the real lives of people in a very intimate and very daily way. Do everything you can in the beginning of your career to connect with those folks to get in those communities and see how your system is actually impacting people's lives, because the more you do that, not only the more you will be motivated to do good work, but the more rewarded you will be about the incredible impact you're having on people's lives."

Averi Davis is a program associate with the Syracuse University Environmental Finance Center and may be reached at adavis02@syr.edu.



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Water Equity: A Water Utility Manager's Perspective

by Angela Licata-Misiak

Water by nature is terribly promiscuous, yet water equity by nurture is often elusive. Equity is central to the existence of a fair and just society. Therefore, it is imperative to consider the influence of the water utility to enhance the equity in our communities. For a utility to be sustainable it should give equal weight to the environment, socio-economics and equity. Balancing these three factors is paramount in my role as the deputy commissioner for sustainability at the New York City Department of Environmental Protection. (NYC DEP). Each factor is equally important for making decisions about investments and priorities with limited and competing needs for resources. Let's look at these factors one by one and evaluate how we knit them together.

The Environment

A healthy environment is crucial for our well-being and quality of life. Safe potable drinking water, stormwater management and wastewater treatment are critical components of public health and safety. We have made significant improvements since the 1970s as a result of environmental protection statutes and tremendous investments. The air quality and receiving water quality in our harbor, embayments and tributaries are better than they have been in over 100 years (Figure 1). Our efforts in water supply watershed protection have meant that New York City is one of the few remaining jurisdictions with a waiver for drinking water filtration.

We already know that enhanced environments lead to improved vitality for all living things. Therefore, we must remain vigilant and plan for more investments in the face of climate change and ongoing natural disasters. Alas, we are approaching a period of diminishing return on our investments, which makes it more expensive to achieve greater pollutant reductions (Figure 2).

Socioeconomics

Although access to clean water ought to be a basic human right, it is not free. Necessary storage and treatment to achieve drinking water standards and meet consumer demands is costly. Delivery of potable water, management of stormwater and removal, and drainage and treatment of wastewater can combine to a sizable bill for customers. Many state laws require uniform rates among all customers in like classes (i.e., Tax Class 1 properties in New York City should receive the same billing schedule regardless of their income levels). This makes water bills another example of an expense that disproportionately impacts mid and low-income customers.

New York City, like most ultra-urban areas, is characterized by households with income extremes. There are more than 1.5 million people below the federally defined poverty level in New York City (Figure 3). In recent years there has been more attention for customer assistance programs through strong advocacy by utilities to be heard by all levels of government. Just recently, through the COVID-19 pandemic, we saw the first recognition for federal assistance through the low-income homeowners' water assistance program, which came in addition to longer-standing federal recognition for shelter, food and medical costs. Socioeconomic conditions in the service area are a significant consideration for utility rate setting. Ensuring that affordable rates and needed investments are simultaneously met is a real challenge.

Equity

We must not rest on our laurels, but instead we must strive for enhanced benefits, because we haven't achieved equitable levels of improvements. Equitable water quality and demand management mean that households must have the means to replace antiquated plumbing, replace lead service lines (not owned by the utility) and have more control over water savings, including for renters and other residents that do not receive a direct water bill. A more equitable future will see more public investment in lead service line replacement regardless of ownership for socioeconomically disadvantaged households and buildings. This article is not written to cover the legislative and regulatory initiatives, and capital planning is beyond the scope of this article, but there are several alternative approaches for how this could be managed and financed.

Water quality improvements for neighborhood-scale waterways and stormwater management must also provide for equitable levels of service. New York City has been evaluating this issue through its long-term control plans and green infrastructure programs for investments in combined sewer overflow abatement. More recently we are evaluating these same issues for the separate storm sewer areas.

Most significantly, we will be evaluating our investments for enhanced resiliency through our cloud-

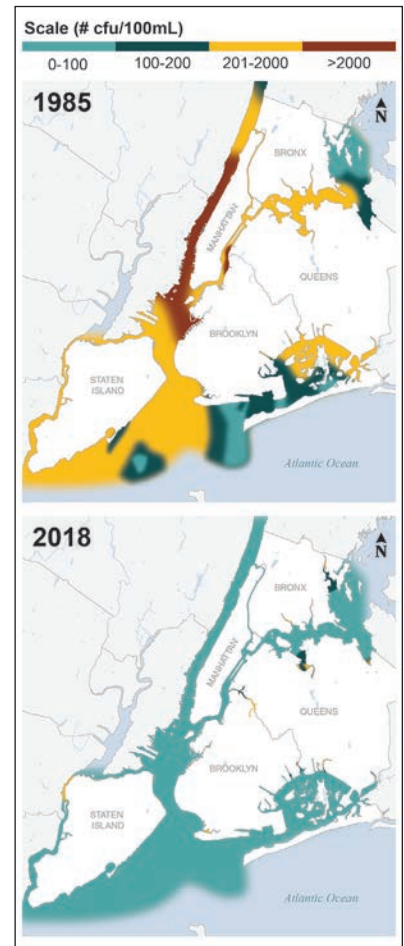


Figure 1. New York Harbor water quality is the best it has been in over 100 years thanks to the NYC DEP investments, the Clean Water Act and other protections. NYC DEP

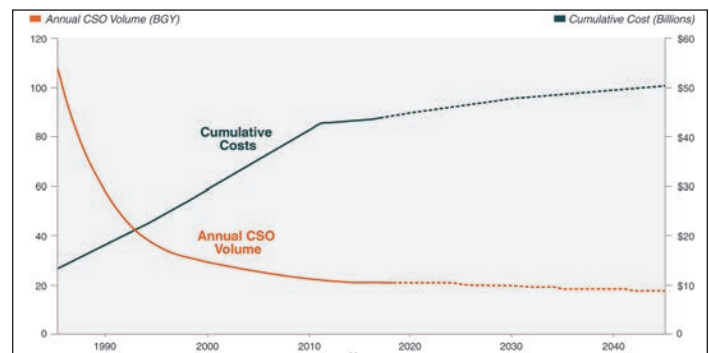


Figure 2. New York City made great gains in reducing CSO. Now, NYC DEP, as with many utilities, finds that reducing CSO volume is increasingly expensive for each gallon avoided. NYC DEP

burst and extreme weather events as it relates to environmental justice communities.

A water utility's rate structure is another vital element of an equitable utility. NYC DEP's charges are largely consumption based and assigned proportionally to drinking water and wastewater needs. NYC DEP is currently studying its rate structure with input from community and other stakeholders.

Sustainability

Declining consumption has enhanced resiliency, begging questions about alternative rate structures. For illustration, consider a modern high-rise in Manhattan with many units that are occupied for just several weeks of the year with low water consumption and yearly bills. Is that enough contribution to the utility that has an obligation to meet immediate calls for demand when the premise is occupied? Although higher occupancy, higher demand house-

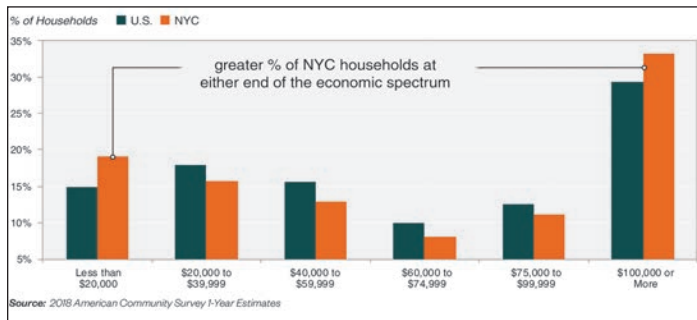


Figure 3. New York City has greater income disparity than the national average, which exacerbates water, wastewater and other financial challenges for residents. NYC DEP

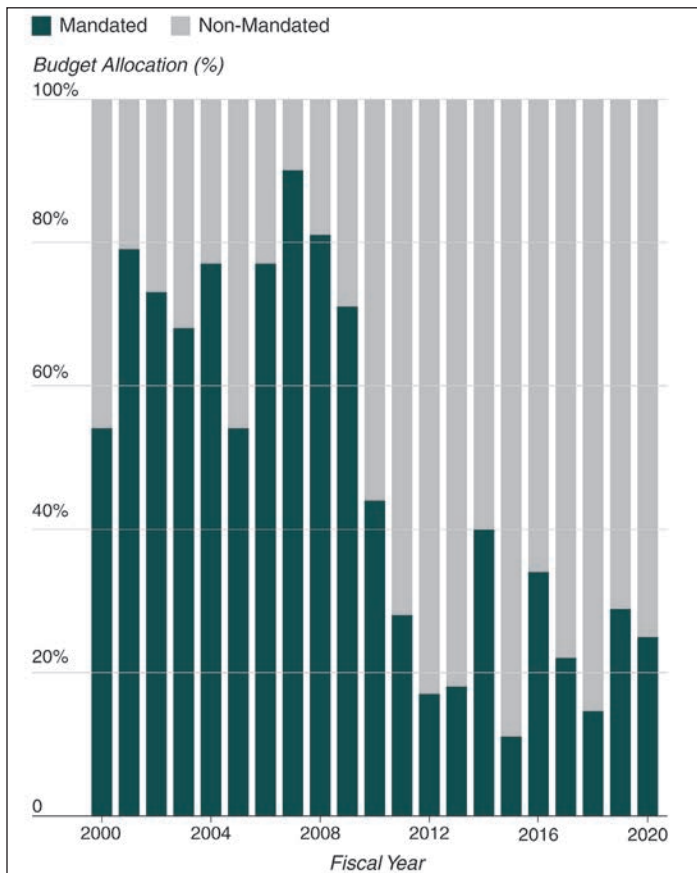


Figure 4. NYC DEP contributed 50% or more of its capital budget to mandated projects for nearly a decade, and then spent the following decade catching up on non-mandated investments, including many state-of-good-repair investments. NYC DEP

holds receive much higher consumption-based bills, these are not always driving the comprehensive revenue needs of the utility. The facilities and supporting infrastructure must be operated and maintained year-round to treat and deliver the potable water and remove and treat the wastewater, regardless of the variability in building occupancy.

Balancing state-of-good-repair, improvements in aging infrastructure and mandated investments is another key factor in maintaining a sustainable utility (Figure 4). As we seek to improve our levels of service, we must not lose sight of maintenance for all the infrastructure we have built and that provides the enhanced environmental outcomes that we have already achieved. This may be especially important in some of our socioeconomically disadvantaged communities where our facilities are located. These facilities must be high performers with respect to air, noise and odor emissions and must be viewed as assets to the community.

Equity for the water practitioner is all about balancing the sustainability principles for access to a healthy environment through clean water and affordable resources. Reducing the environmental burden of major facilities in urban areas means upgrading and investing in state-of-the-art facilities. We must ensure unbiased levels of service with parity for all customers. Utilities too often face competing needs for services and raising the bar on investment may be the highest priority. This is the way forward.

Angela Licata-Misiak is a deputy commissioner with the New York City Department of Environmental Protection and may be reached at AngelaL@dep.nyc.gov.

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Green Infrastructure Equity in the City of Buffalo

by Rosaleen B. Nogle, Colleen Makar and María Nariné Torres Cajiao

Our modern cities are made up of diverse neighborhoods defined by race, ethnicity, and income, each with their own level of access to resources that contribute to the health of their community. This segregation – by race, ethnicity, and/or income – has left some communities more vulnerable than others to the environmental effects of hazardous waste disposal, lead exposure, urban heat islands, poor air quality and flooding. Green infrastructure (GI) can serve these vulnerable communities, as part of the overall urban ecosystem, to increase the resilience, sustainability and livability of these neighborhoods, so that everyone has equal access to a healthy environment.

Background: Buffalo, New York

As a city that developed from a frontier outpost into a bustling metropolis in a relatively short period of time between 1865 and 1900, much of the City of Buffalo's development came at the expense of the environment and human health at a time when regulations of labor conditions, waste disposal, and housing standards were few and far between. From the start, the poorest residents bore the brunt of these impacts; a reality that was clear when cholera epidemics swept through the tenement housing along the harbor and canals where the city's poorest residents made their homes.

These most vulnerable residents also faced displacement when public projects were undertaken for the "good of all." The Buffalo Sewer Authority's Bird Island facility is located on land that was once populated by a small community of people too poor to afford their own land – or to even rent – who constructed substandard homes on a narrow strip of land in the middle of the Niagara River. The area called "Canalside" today, where the Memorial Auditorium once stood, used to be home to tenement housing. In both cases, the populations were forcibly removed, and the homes demolished to make way for progress under New Deal projects in the 1930s.

While on a broader scale, these and other New Deal projects are often remembered for creating major public investment in communities, addressing long-standing needs in communities, and providing jobs and incomes to families at a time when starvation and homelessness were very real prospects for much of the population of the United States, what is often forgotten is that to pass through Congress, much of the New Deal legislation included racially based discriminatory language. When the minimum wage was established in 1938, domestic and farmworkers were specifically exempted at a time when these jobs were held predominantly by African Americans in the South and recent immigrants in the North.

Consequence of Redlining

When maps were drawn up to allow for investment by the federal government in mortgages, not only the general physical condition, but the ethnic and racial makeup of neighborhoods were analyzed using unbelievably racist language for African Americans, recent European immigrant communities, and others (*Mapping Inequalities 2022*). The map of Buffalo included infamous "redlines" around many city neighborhoods, labeling them as "Hazardous" and "Definitely Declining" and effectively cutting

them off from any investment by the federal government or banks in new homeownership. But even in many of the neighborhoods that were labeled "Still Desirable," notes were included in the map that recommended caution and only short-term investment as they were not considered sustainable long-term investments.

Mortgage Availability

In the years after World War II and later the Korean War, when service members returned home, white veterans were greeted with low-interest, GI Bill-backed mortgages that relied heavily on these maps (*Rothstein 2017*). This meant that even when Rosaleen Nogle's white grandparents tried to purchase a home in the City of Buffalo in 1960, they were denied a GI Bill-backed mortgage because the property was in one of those "Definitely Declining" or "Still Desirable" neighborhoods. Black veterans were denied the benefits of the GI Bill altogether, returning home from liberating Europe from the Nazis to face the horrors of Jim Crow in the South and rampant discrimination in the North as well.

The denial of mortgages for many city properties meant that the once thriving farmlands in the areas surrounding the city quickly were sold off and built up as suburban residential developments, many of which were on lands upstream from and at elevations higher than the city. The housing was sold to almost exclusively white families, including Rosaleen's grandparents. Stormwater from these developments was sent to the Buffalo Sewer Authority's system or by surface flow into the city neighborhoods, causing flooding where it once had been unknown.

To facilitate travel from these new suburbs into the city office and business buildings in the downtown core, massive highways were laid including the infamous Kensington Expressway, which includes six to eight lanes of highway cut 40 feet deep into what was once a Frederick Law Olmsted designed parkway. Together with those lanes of traffic came the addition of impervious surface, which contributed a further burden during wet weather days on neighborhoods that were already reeling from being cut apart by the highway itself.

Left Behind

As white families left the city in droves to follow the dream of homeownership that was only open to them in the suburbs, the residences that they left behind became rental properties owned by increasingly distant landlords or that were purchased at reduced values with cash on hand by Black families and others who had been denied mortgages altogether. Without the benefit of mortgages these families struggled to maintain their homes, which were older and thus more likely to have lead paint and water service lines. These older homes also had other issues that required more, not less, investment when compared with those in the suburbs. In the case of the rental properties, many were not maintained at all, simply serving as a source of income for the property owners until decayed to the point of no longer being habitable and then left to the wrecking ball.

As a result of these historical realities, Buffalo's majority-minority residents have a disproportionate exposure to environmental risks including hazardous waste sites, lead exposure, urban heat island impacts, poorer air quality and flooding.

Buffalo Sewer Green Infrastructure

Today, equity is a central pillar in our day-to-day operation at Buffalo Sewer. As we continue to expand and evolve, it is crucial all communities throughout Buffalo are not just supported, but that the historical imbalances in infrastructure investment and environmental hazards are corrected. Recent green infrastructure (GI) investments have allowed the community to think about the storm and wastewater collection systems as part of a greater urban ecosystem with both aesthetic and water quality impacts in targeted neighborhoods and throughout the entire city.

Rain Check 1.0 and 2.0

In spring 2018, Buffalo published Rain Check 1.0, which presented a comprehensive review of GI projects conducted by Buffalo Sewer over the previous five years. GI is the use of engineered systems that emulate and restore the pre-development hydrological processes to drain and store stormwater sustainably. GI includes such practices as green roofs, permeable pavements, filter strips, vegetated swales, rain gardens, impervious surface removal and tree pits. Through the Rain Check 1.0 projects, Buffalo Sewer began their public outreach and engagement with homeowners by piloting proactive downspout disconnections and rain barrel installations. The Rain Check 1.0 report and public-facing resources presented to the community the challenges of stormwater management and the benefits that GI could bring including neighborhood investment, urban green space, improved public health and safety, and the creation of new green jobs.

In 2019, Buffalo Sewer began planning for the next generation of GI, and published the Rain Check 2.0 Opportunity Report. The report examines the stormwater challenges that Buffalo faces and presents opportunities to include community members, while setting a goal to incorporate equity as a critical element in the decision-making process and maximizing economic, social and environmental benefits of GI. Buffalo Sewer is also making a continued commitment to engage with stakeholders on GI benefits and implementation.

Funding Sources

Over the next five years, Buffalo Sewer's commitment to GI will be funded through a \$54 million Environmental Impact Bond (EIB) and \$40 million funding from the American Rescue Plan (ARP) Act. Through the EIB and ARP funds, Buffalo has committed to combining the installation of new GI with the replacement of traditional aging combined sewer and public water infrastructure as well as the replacement of private lead water service connections to maximize community impacts within each of the council districts while prioritizing combined sewer overflow (CSO) basins with the most frequent overflow events and greatest issues of inequity. These projects will combine to prevent excess water from entering the sewer system, remove nutrients and grit from the system, manage water more effectively, and create greater capacity within the existing gray

system for larger and more intense events while also increasing the resilience, sustainability and livability of these neighborhoods.

Climate Change

It is now widely accepted within the scientific community that anthropogenic climate change is being observed throughout the world as increased average temperatures. In the United States, all the states have become warmer in the last century, but temperature rise has been more pronounced in the northeastern states (e.g., New York state reported an increase of 2.4 degrees Celsius [NOAA 2022]).

In Buffalo, the impacts of these widespread changes are forecast to be primarily an increase in more extreme heat and precipitation events, a shift from snowfall toward rainfall, and increasing seiche activity on Lake Erie.

GI is known for providing environmental benefits such as flooding regulation, air quality improvement, temperature regulation and recreation. These benefits are of particular note when considering climate change impacts as they increase community resilience to flooding, heat island impacts and promote alternative transportation usage.

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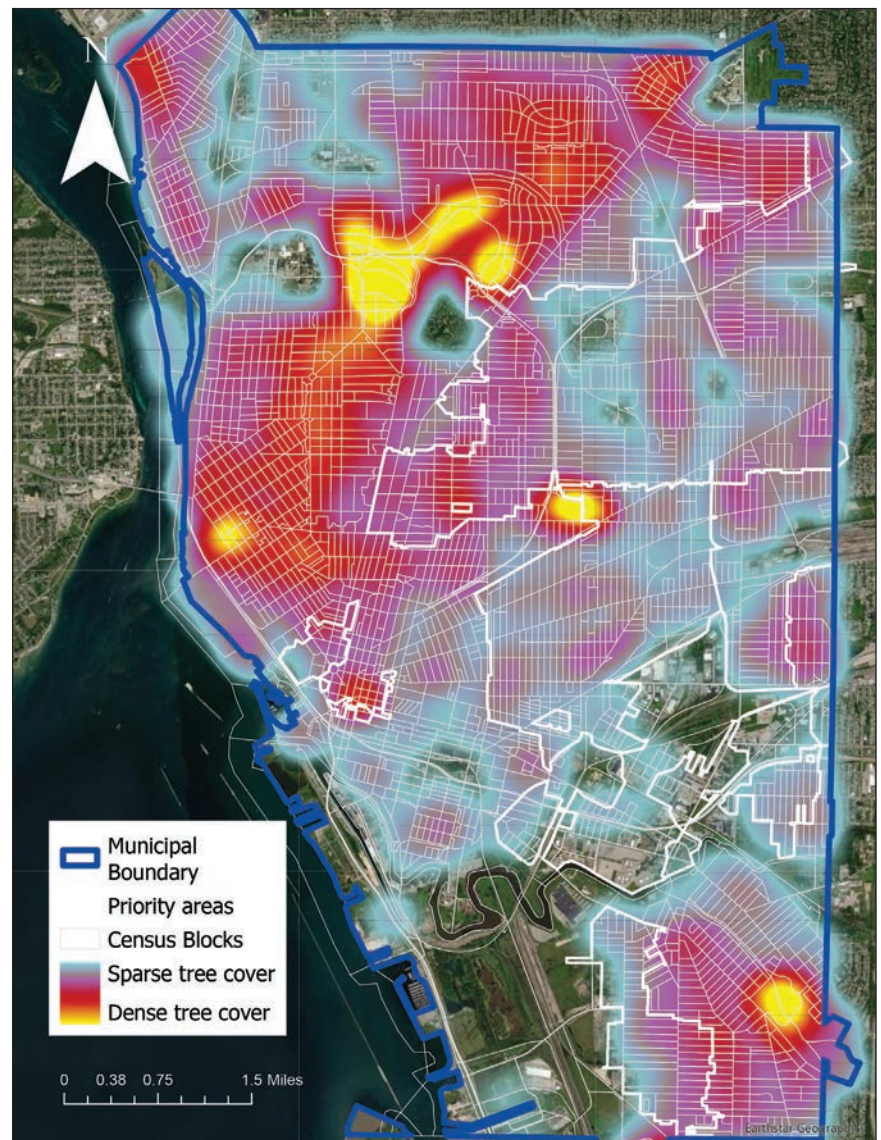


Figure 1. Tree density in the city of Buffalo (visualization using kernel density).

Maria Nariné Torres Cajiao

To maximize community benefit, accelerate the timeline and simplify implementation, the next generation of GI in Buffalo will be a combination of tree plantings, concentrated bioretention installations and permeable pavements. These strategies together will provide stormwater attenuation, aquifer recharge, urban heat island effect mitigation, reduced flooding risk, and an increase in aesthetic value (Chen et al. 2020).

To site projects for maximum impact and equity, the areas of the city with the greatest opportunity for benefits from GI practices were identified using Buffalo Sewer's geographic information system (GIS). For tree planting and bioretention siting, for example, existing canopy and vegetative cover (see *Figure 1*) were used to identify locations that would benefit most from these treatments. The tree canopy data were used to identify where existing tree cover is scarce, the vegetative cover data set was used to supplement this data with shrub, grass, and garden areas where additional tree canopy and/or bioretention would have lessened impacts.

Air quality information, specifically particulate matter and ozone level were used to identify areas of the city in highest need of air quality improvement (another environmental benefit of urban trees). Temperature was also included in the analysis in recognition of the ability of GI, in general, to mitigate the urban heat island.

Permeable pavements are attractive for their versatility, as they work well on large, uneven surfaces like streets and parking lots, bicycle lanes and sidewalks. These pavements are also recognized for their multifunctionality and for their ability to maintain existing land uses. Permeable pavements can also improve water quality by filtering contaminants before they reach surrounding water bodies, prevent ponding of rainwater, and improve snow and ice melting. Additionally, simulations using the Buffalo's stormwater management model showed that permeable pavement installation in the City of Buffalo has the potential of reducing 2% to 31% of CSO volume, with higher efficiencies corresponding to rainfalls with shorter return periods and durations (Roseboro et al. 2021).

Identifying the Most Vulnerable Populations

The same detrimental environmental conditions can have dramatically different impacts on residents depending on the demographic circumstances of those residents. For instance, lead whether present in drinking water or being ingested through backyard dirt or peeling paint within a home can result in permanent and irrevocable brain damage in small children, but the impact on older persons is not nearly as prominent.

Additionally, certain populations may have lower levels of resilience to environmental disruptions such as flooding or heatwaves. For example, persons experiencing unemployment and those who rent, may not have access financially or physically to air conditioning or the ability to rebuild after a flood event (depending on willingness of building owner to facilitate this recovery process). In a similar manner, for people who speak a language other than English in their homes, communication can be a barrier to access to emergency and recovery services.

In recognition of these realities, U.S. census data were used to spatially identify areas with higher concentrations of families and individuals with small children, unemployment, older members, and other criteria associated with greater vulnerabilities. It should be noted that race was specifically not used to site practices due to legal concerns with the use of this criterion.

Due to the historic segregation of the City of Buffalo and the

Western New York region, both population vulnerability and environmental impact tend to be greatest in those neighborhoods with predominantly global majority populations. As a result, the siting of these GI practices in these neighborhoods represents a significant step toward an equitable future for our city and region.

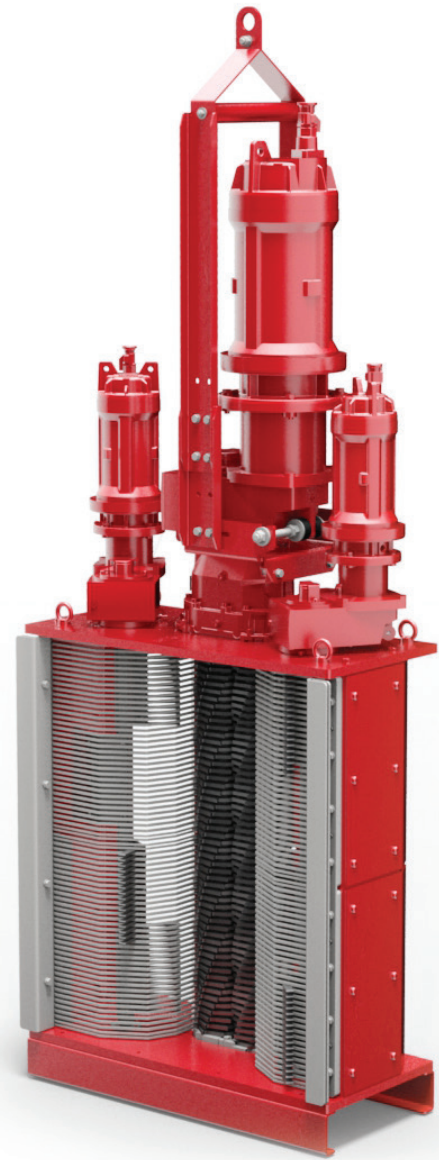
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References Cited

- Buffalo Sewer Authority. 2019. *Rain Check 2.0 Opportunity Report: The Next Generation of Green Infrastructure in Buffalo*, retrieved Jan. 24, 2022, from <https://raincheckbuffalo.org/rain-check-1-0/>
- Chen, S., Y. Wang, Z. Ni, X. Zhang and B. Xia. 2020. "Benefits of the ecosystem services provided by urban green infrastructures: Differences between perception and measurements." *Urban Forestry and Urban Greening*, 54 (October 2019). <https://doi.org/10.1016/j.ufug.2020.126774>
- Mapping Inequality: Redlining in New Deal America*. University of Richmond's Digital Scholarship Lab. Retrieved March 7, 2022, from <https://dsl.richmond.edu/panorama/redlining/#loc=12/42.874/-78.947&city=buffalo-ny&area=C3&adview=full>
- NOAA. 2022. *Climate at a Glance: Global Time Series*, National Centers for Environmental information, published January 2022, retrieved Jan. 24, 2022, from <https://www.ncdc.noaa.gov/cag/>
- Roseboro A., M.N. Torres, Z. Zhu and A.J. Rabideau. 2021. "The Impacts of Climate Change and Porous Pavements on Combined Sewer Overflows: A Case Study of the City of Buffalo, New York, USA." *Front. Water* 3:725174. doi: 10.3389/frwa.2021.725174
- Rothstein, Richard. 2017. *The Color of Law: A Forgotten History of How Our Government Segregated America*. Economic Policy Institute. Published 2017. Retrieved March 7, 2022, from <https://www.epi.org/publication/the-color-of-law-a-forgotten-history-of-how-our-government-segregated-america/>

Other Resources

- Blatio, Anna. "A City Divided: A Brief History of Segregation in Buffalo." Partnership for the Public Good and Open Buffalo. Published April 2018. Retrieved March 7, 2022. https://ppgbuffalo.org/files/documents/data-demographics-history/a_city_divided__a_brief_history_of_segregation_in_the_city_of_buffalo.pdf
- Brecher, Erica. "A legacy of racism: How past practices affect segregation in Buffalo today." WIVB. Published Aug. 10, 2020. Retrieved March 7, 2022. <https://www.wivb.com/news/top-stories/a-legacy-of-racism-how-past-practices-affect-segregation-in-buffalo-today/>
- Cichon, Steve. 2016. "The slow death of Humboldt Parkway for the 33 and the 198." The Buffalo News. Published May 8, 2016. Updated Aug. 3, 2020. Retrieved March 7, 2022, from https://buffalonews.com/news/local/history/the-slow-death-of-humboldt-parkway-for-the-33-and-the-198/article_a33f13e6-363d-5e55-84f3-cc6f0628f62e.html
- Weaver, Russell. 2019. *Erasing Redlines: Part 1-Geographies of Discrimination*. ILR Buffalo Co-Lab. Published August 2019. Retrieved March 7, 2022. https://ppgbuffalo.org/files/documents/erasing_red_lines.pdf



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i-Tree Tools Assist with Strategically Designing Tree Cover and Improving Community Resilience

by Theodore A. Endreny

Ecological Engineering as a Design Approach to Improve Sustainability

Ecological engineering involves the intentional design with nature to convert pollution into resources such as fiber, fuel, food, and a nurturing climate for the well-being of biodiversity and humans (Endreny, Santagata et al. 2017). Human creation of a new geologic epoch, the Anthropocene, attests to the disfigurement of global air, land and water resources through designs uncoupled from nature (IPCC 2022). Planet Earth in the Anthropocene unleashes natural disasters with increasing ferocity, is no match to human-created pollutants (e.g., carcinogenic forever chemicals), and has awakened our humility to ask how can we restore balance (Nelson, Bledsoe et al. 2020).

Balance will involve addressing environmental injustices characterized by an unequal distribution of pollution and disaster, with the most vulnerable communities taking the brunt of impact (Hoffman, Shandas et al. 2020). This is our challenge: to improve the world by chasing down sustainability, defined to include environmental, social and economic justice.

The aim of this article is to explain how i-Tree tools can help us design sustainable communities with strategic use of tree cover and related nature-based systems.

Supported i-Tree Tools and Utilities for Use in Tree-based Designs

The i-Tree tools and supporting utilities are freeware (www.itree.org) developed through a peer-reviewed process with the goal of assisting individuals and communities obtain ecosystem services and benefits based on the science of trees.

The benefits of trees accrue largely from the system of ecosystem services occurring during photosynthesis. Ecosystem services have been placed into four broad categories:

- 1) provisioning (e.g., food, fiber, fuel, water)
- 2) regulating (e.g., climate, flood, pollution and disease control)
- 3) supporting (e.g., pollination, soil formation, nutrient cycling)
- 4) cultural (e.g., spiritual and recreational, noting that just seeing green improves health [Millennium Ecosystem Assessment 2005])

While the i-Tree tools can estimate benefits totaling billions of dollars annually for some regions (Endreny, Santagata et al. 2017), these monetary benefits are typically limited to air pollutant removal (carbon monoxide, nitrogen dioxide, ozone, particulate matter, sulfur trioxide), stormwater runoff avoided, building energy savings, and carbon dioxide sequestration and avoided emissions; hence, these tools are known to underestimate by not including many services. The underestimation is not intentional, but instead society has not yet quantified values for many beneficial services trees contribute to human well-being. Uncounted ecosystem services of disease prevention and recovery, school and student performance, and happiness are connected to society's greatest expenses of health care, education and defense (Endreny 2018).

i-Tree Landscape Tool

The i-Tree Landscape tool is a good place to start for landscape designs, as it provides a rapid assessment of existing, aka base-case,

tree cover using classified aerial and satellite imagery, and then recommends priority planting to maximize benefits and reduce pollution. The user defines objectives and constraints to guide the prioritization, such as addressing:

- a) racial, economic or other inequities as categorized by the U.S. census data
- b) health risk such as pollution exposure threats
- c) forest risk such as pests
- d) present and future climate threats
- e) much more, including plantable space

i-Tree Landscape develops its prioritization by cross-comparing two or more polygon analysis areas, which include census block groups, places (e.g., towns), congressional districts, and watersheds organized by 12-digit hydrologic unit codes (HUC) and river basins. i-Tree Landscape reports the benefits of tree cover in scientific units (e.g., mass of greenhouse gas sequestered or volume of stormwater avoided) and in monetary units based on established prices for carbon, water, energy and health care markets.

i-Tree Species Utility Tool

The i-Tree Species utility tool guides users in selecting the optimal tree species for a planting, based on taking inputs of location (e.g., suitable hardiness zone), height constraints (e.g., avoid utilities), and preferences for many functions, which include services and disservices. The selectable functions within i-Tree Species include air pollutant removal, lowering the disservice of volatile organic compound emissions (which can be reduced given they vary by species), carbon storage, wind reduction, air temperature reduction, UV radiation reduction, building energy reduction, streamflow reduction and low allergenicity. In locations with suitable deciduous and evergreen trees, the evergreen trees, which photosynthesize all year, will generate more benefits. If a species of interest is not present within this utility tool, there is the i-Tree Database utility tool for recommending new species to include. Similarly, if the region of interest is not present then users can use this utility tool to update the location database with weather and pollution data.

i-Tree MyTree Tool

The i-Tree MyTree tool is a good place to start improving the world for property designs, with the tool's focus on analyzing a specific tree or group of trees at one address. The i-Tree MyTree tool retrieves information on tree location, species (accepting common names), condition (e.g., crown health), size, sun exposure and distance from a building, identifying the tree as a new planting, removal, replacement, a special class such as heritage, memorial or specimen, or whether it is part of a larger planting. In an effort to make model output easy to digest, the benefits are presented in a format similar to nutritional labels on food packaging, reporting scientific and monetary values.

i-Tree Eco Tool

The i-Tree Eco tool is for projects involving field collected data for individual trees, noting their location, species, structure (e.g., diameter at breast height [DBH], canopy volume), condition

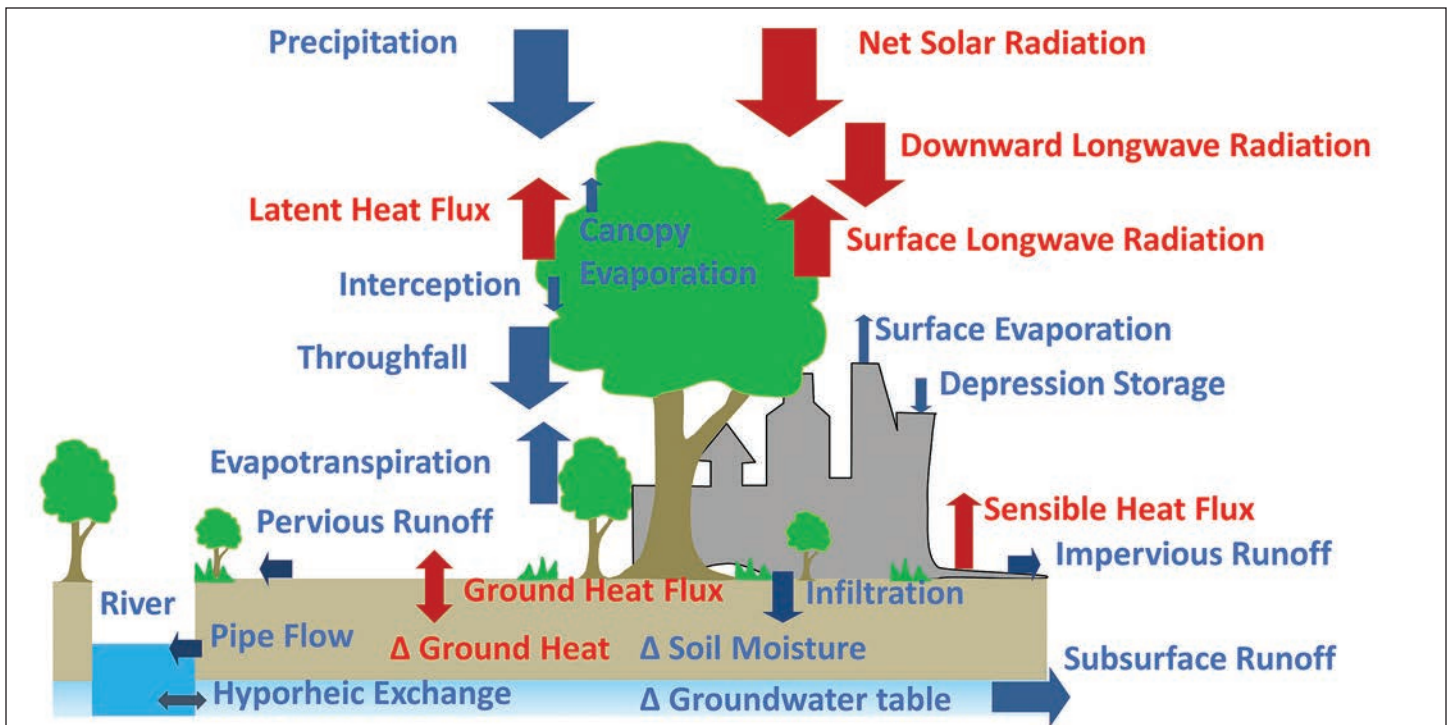


Figure 1. Conceptual model of i-Tree HydroPlus tool, showing its simulated fluxes and storages of water and energy overlaid on a cross section of Earth's critical zone. By solving the equations in this model, the tool can determine tree planting strategies.

Image by T. Endreny

(e.g., dieback, pruning), ground cover, tree pests, recommended management (e.g., correcting sidewalk or utility interference), and more. i-Tree Eco data are collected using either a complete inventory (e.g., every tree with a DBH greater than 1 inch), or from random plot samples, which include the option to include understory shrub inventories relevant to bird habitat. The i-Tree Eco tool contains the Forecast model, which can simulate new plantings and mortality rates based on tree condition, as well as due to pest outbreaks and severe weather (e.g., hurricanes and ice storms). The monetary benefits from trees reported by i-Tree Eco simulations are as accurate as the data collection.

i-Tree Design and Planting Tools

The i-Tree Design and Planting tools simulate tree benefits, including tree-building interactions, at a spatial scale overlapping or exceeding the i-Tree MyTree tool, but do not extend out to i-Tree Landscape scale. The i-Tree Design and Planting tools will simulate new tree plantings, removal and replacement. The i-Tree Design and Planting tools begin by collecting location data, handling areas with multiple buildings, such as a neighborhood block or school campus. Tree species, size, light exposure and condition are then selected by users.

The i-Tree Design tool enables users to place these trees as icons within a color-coded map of optimal planting polygons about a building. The i-Tree Planting tool replaces the map with a spreadsheet, asking users to enter the compass bearing and distance from tree to building. Tree distance and direction from a building affect heating and cooling costs; in New York, planting within 20 feet of the southwest side of the building typically brings additional winter heating costs, even for deciduous trees due to the shadow cast by their limbs.

The benefits predicted by i-Tree Design and Planting are reported in scientific and monetary units for each and any year, as well as for any duration between 2 and 99 years. To the delight of those wishing to see the future, the i-Tree Design tool graphically

presents tree crown growth on the map, revealing interaction with other plantings and the building, which some may consider priceless information.

i-Tree Canopy Tool

The i-Tree Canopy tool is for collecting the highest accuracy data on land cover via photointerpretation in Google Maps and requires the most work of the above tools. The i-Tree Canopy tool allows the user to draw a sampling polygon about the area of interest or select from the same polygons used in i-Tree Landscape. Depending on perspective, the work or pleasure then begins, with the user classifying the land cover at a randomly placed crosshair, repeating this process hundreds of times, ending when the standard error of the estimate is deemed acceptable, e.g., less than 2%. Obtaining a final value for spatial extent of tree cover then allows the i-Tree Canopy tool to sample its database and estimate the scientific and monetary value of ecosystem services.

Research Suite i-Tree Tools and Utilities for Use in Nature-based Designs

The i-Tree tools can assist with restoration designs beyond tree plantings, such as installation of green infrastructure, mitigation of urban heat islands, rewilding of rivers, and treatment of non-point source runoff. These tools are within the i-Tree Research Suite, which is freeware designed with peer-reviewed theory to inform nature-based design, like those tools described earlier, but without technical support from the i-Tree consortium.

The i-Tree HydroPlus tools of i-Tree Hydro, i-Tree Cool Air, i-Tree Cool River and i-Tree Buffer generally require greater effort to obtain inputs, run simulations, and translate scientific values into monetary benefits. These tools share a common starting point in modeling the hydrologic cycle and its interactions with energy and biogeochemical cycles (Figure 1). Managing water resources to provide drinking water, sanitation, hygiene, food, and energy

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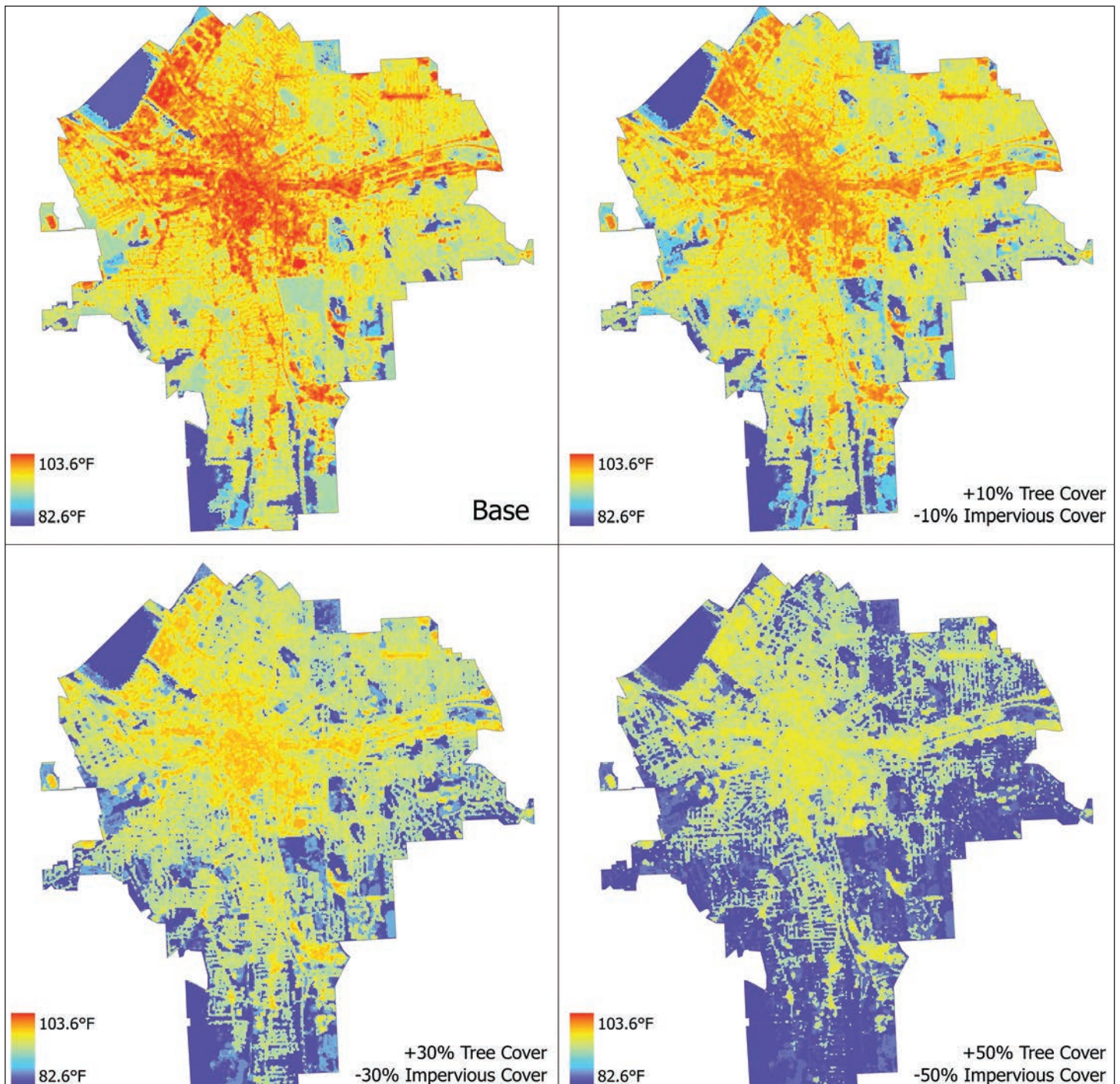


Figure 2 Heatwave maps of air temperature created by the i-Tree Cool Air model for Syracuse, New York, at 3 p.m. July 9, 2020, when the weather station recorded 95° F. The upper left map is for actual land cover, and proceeding clockwise the maps show potential cooling through increased tree cover and decreased impervious cover, starting at 10% changes and extending to 50% changes. *Image by T. Endreny*

allows communities to take the next steps in sustainable development of reducing poverty, increasing peace and prosperity, and improving biodiversity (WWAP 2018).

In the past few decades, the management of stormwater runoff systems has undergone major changes, shifting from limited-focus plans (e.g., flood control) to approaches with multiple objectives to keep water on-site and deliver improved environmental, economic, social and cultural outcomes (Fletcher, Shuster et al. 2015). Runoff is kept on-site using green infrastructure, or equivalent measures such as sustainable drainage systems, low-impact development and best management practices. These devices have the common feature of receiving runoff from upslope contributing areas or direct rainfall to satisfy other needs, including a chance

for the water to infiltrate into native soils and replenish groundwater systems. One reason for the limited adoption of green infrastructure, both rural and urban installations, is the need for design plans that address local site concerns and operate effectively at a range of scales (WWAP 2018). Hence the development of the i-Tree Research Suite.

i-Tree Hydro Model

The i-Tree Hydro model simulates the water and pollutant balance for watersheds or smaller parcels using base-case and alternative scenarios, such as with changes to tree cover or the installation of green infrastructure. The i-Tree Hydro green infrastructure options include bioretention cells, swales, rain gardens,

infiltration trenches, porous pavement, green roofs, rain barrels, and rooftops disconnected from storm sewers; most options can also interact with groundwater and be used to remove pollutants.

The model is run from a command line interface, with inputs organized via an XML configuration file. The required inputs include weather or storm data, elevations, land cover and soils data. Land cover data often come from the i-Tree Canopy tool. Weather station data are typically collected at a one-hour time step, but the model accepts finer resolution data, while design storm data, such as intensity-duration-frequency rainfall, improves analysis of small parcels during intense events. Elevation maps are needed to create a topographic index of wetness likelihood for moving groundwater laterally, and land cover and soils data are required for determining canopy interception, surface ponding, infiltration, pollutant loads, and the interaction with weather for estimates of evapotranspiration. The model comes with reference pollutant concentration values (biological oxygen demand, chemical oxygen demand, copper, phosphate, nitrate, lead, total Kjeldahl nitrogen, total phosphorus, total suspended solids, zinc) provided by federal agencies.

The model offers simulations that are deterministic, spatially lumped or distributed, single event or continuous, and can run a one-year analysis in seconds. The i-Tree Hydro output options include hydrographs, pollutographs, summary mass balances of water budgets (e.g., depth of water intercepted or evapotranspired by the tree canopy) and pollutant loads, and detailed performance data on any green infrastructure device with respect to water stored in its vertical layers, runoff avoided, and pollutants removed.

i-Tree Cool Air Model

The i-Tree Cool Air model simulates the urban heat island phenomenon (*Figure 2*), which is characterized by disproportionately warmer nighttime and daytime air temperatures over developed versus natural land surfaces. This warming is due to how radiation is partitioned between latent and sensible heat (e.g., trees transpire water and use radiation that would otherwise warm the air), as well as differences in heat transfer properties and anthropogenic sources of heat.

The i-Tree Cool Air model simulates watersheds or smaller parcels using base-case land cover and alternative scenarios, such as increased tree cover and water availability. The required inputs include weather station data, typically at a one-hour time step, maps of census block groups, elevation, tree cover, impervious cover and land cover classes (e.g., Class 21 is developed open space), as well as soil and surface parameters regulating the water and energy cycle. The model comes with reference heat transfer parameters for most National Land Cover Data classes, with parameters representing the urban canyon effect on amplifying longwave radiation.

The i-Tree Cool Air map pixel size determines the spatial resolution of the model simulation, with 10 to 300-meter resolutions proven to work well. The simulations are deterministic, spatially distributed, single event or continuous, and can run a one-day analysis in minutes to tens of minutes depending on city size and pixel resolution. The i-Tree Cool Air output options include air temperature maps, time series and statistics including maximum temperatures, heat indices and wind chill, along with water and energy balances. The model uses the census block group maps, or equivalent maps, to statistically organize some outputs by neighborhoods.

i-Tree Cool River Model

The i-Tree Cool River model simulates the temperature of surface waters, which is often a limiting condition to supporting fishing, drinking and swimming standards for waterways. The water temperature is simulated as a function of riparian shade, upstream inflows, lateral inflows including from warm reservoirs or stormwater discharges, groundwater inflows including from green infrastructure recharge, hyporheic flux (e.g., mixing of surface and subsurface water), and the radiation from sky and land surfaces. The required inputs include weather station data, upstream river discharge and water temperature, discharge and temperature for any lateral inflow, channel geometry and substrate data for each cross-section, and associated riparian geometry or its effect on water surface shade.

The model uses one-dimensional simulation to model single reaches or longer river channels using base-case and alternative scenario configurations of river geometry and riparian conditions. The river geometry can represent restoration of pools and riffles, which will induce hyporheic exchange and contribute to thermal refugia and more suitable habitat, and a dynamic boundary can be used to determine the restoration length needed to achieve target temperatures. The simulations are deterministic, spatially distributed between cross-sections, single event or continuous (e.g., dynamic storm events), and can run a one-day analysis in seconds to tens of minutes depending on river length and cross-section resolution. The i-Tree Cool River output options include water temperature data as a function of river distance or time, as well as energy balance data on how incoming radiation partitioned between latent and sensible heat.

i-Tree Buffer Model

The i-Tree Buffer model simulates the spatial distribution of phosphorus and nitrogen runoff across the landscape to identify nonpoint source pollution hot spots and nutrient loading to receiving waters, assisting with total maximum daily load regulations. The nonpoint source runoff is simulated as a function of edge-of-field nutrient loads available for runoff to receiving waters, the runoff likelihood of each map location, and the interaction of runoff flow paths with nutrient filtering via wetland trapping and vegetation uptake. The required inputs include maps of elevation, tree cover, impervious cover, land cover, soil cover and river networks; for stochastic estimates of nutrient loads, a decade or more of daily average discharge data are used to generate probabilities.

The i-Tree Buffer model comes with reference edge-of-field nutrient loads, in the form of export coefficients, that are selected based on National Land Cover Data class and watershed 8-digit HUC. The model offers simulations that are deterministic or stochastic, spatially lumped or distributed, single event or continuous, and can run one year or longer analyses in seconds. The i-Tree Buffer output options include maps of nutrient hot spots, maps of vegetative buffers, and data tables of loads to receiving waters.

Putting Ideas into Action to Improve the World

Restoration opportunities are available globally, including rural areas, where strategic designs with nature can deliver ecosystem services and improve human health and well-being. Currently, the trend is declining tree cover due to climatic disruption forces and anthropogenic forces, including the woeful act of intentional tree removal to expedite designs without nature in mind. The time to

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act is now, by protecting existing resources and establishing new plantings that need time to mature to increase their own resilience and that of surrounding communities. Tree cover and associated ecosystems improve biological diversity, climate change adaptation, climate change mitigation and pollutant removal. Risks to human health and well-being are increased by climate change, which brings unprecedented interactions of heat waves, infectious disease, and pollution to a population that is growing with respect to head count, inequities and vulnerability. The i-Tree tools are available to help those responding to these challenges with nature-based solutions.

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References

- Endreny, T., R. Santagata, A. Perna, C.D. Stefano, R.F. Rallo and S. Ulgiati. 2017. "Implementing and managing urban forests: A much needed conservation strategy to increase ecosystem services and urban well-being." *Ecological Modelling* 360: 328-335.
- Endreny, T. A. 2018. "Strategically growing the urban forest will improve our world." *Nature Communications* 9(1): 1160.
- Fletcher, T.D., W. Shuster, W.F. Hunt, R. Ashley, D. Butler, S. Arthur, S. Trowsdale, S. Barraud, A. Semadeni-Davies, J.-L. Bertrand-Krajewski, P.S. Mikkelsen, G. Rivard, M. Uhl, D. Dagenais and M. Viklander. 2015. "SUDS, LID, BMPs, WSUD and more – The evolution and application of terminology surrounding urban drainage." *Urban Water Journal* 12(7): 525-542.
- Hoffman, J.S., V. Shandas and N. Pendleton. 2020. "The Effects of Historical Housing Policies on Resident Exposure to Intra-Urban Heat: A Study of 108 U.S. Urban Areas." *Climate* 8(1): 12.
- IPCC. 2022. *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press.
- Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well-being: Synthesis*. Washington, DC, Island Press.
- Nelson, D.R., B.P. Bledsoe and J.M. Shepherd. 2020. "From hubris to humility: Transcending original sin in managing hydroclimatic risk." *Anthropocene* 30, June 2020, 100239. ISSN 2213-3054.
- WWAP. 2018. *The United Nations World Water Development Report 2018: Nature-based Solutions for Water*. UNESCO. Paris, United Nations World Water Assessment Programme)/UN-Water.



In urban communities, tree cover and related nature-based systems provide benefits that include air pollutant removal, temperature regulation and disease prevention, contributing to overall human well-being.

istockphoto, James Andreas

Congratulations to Our 2023 “Watershed Superheroes” Poster Contest Winners!

NYWEA continues our partnership with the New York State Department of Environmental Conservation (NYSDEC) for the 2023 “Watershed Superheroes” Calendar Contest! This contest engages middle school students in Grades 6 to 8 from across New York state to learn about their role in their own watershed. Students created fantastic artwork around the theme of conserving and protecting our watershed and water resources – now and for future generations. NYWEA members and NYSDEC staff selected the top 14 posters to be included in a 2023 calendar, which will be distributed to NYWEA members and others in the Fall.

Contest Winners

1. **Cover: Sudan Belnavis**, Valley Stream South High School, Valley Stream, NY
2. **Cayden Fabian**, P.S. 229 Dyker School, Brooklyn, NY

3. **Grace Lin**, P.S. 229 Dyker School, Brooklyn, NY
4. **Supreet Singh**, P.S. 266, Queens, NY
5. **Arali Albano-Yanick**, Our Lady of Mercy, Rochester, NY
6. **Ashley Moran**, Mildred E. Strang Middle School, Yorktown Heights, NY
7. **Gina Goodyear**, Our Lady of Mercy, Rochester, NY
8. **Shayla Rampersad**, JFK Middle School, Port Jefferson, NY
9. **Maddalena Mennucci**, Our Lady of Mercy, Rochester, NY
10. **Maya Neville**, Ray Middle School, Baldwinsville, NY
11. **Jennifer Lopez**, I.S. 145Q, Jackson Heights, NY
12. **Norah Sweet**, William S. Hackett Middle School, Albany, NY
13. **Heidi Juarez Garcia**, I.S. 145Q, Jackson Heights, Staten Island, NY
14. **Sharon Victor**, I.S. 145Q, Jackson Heights, NY



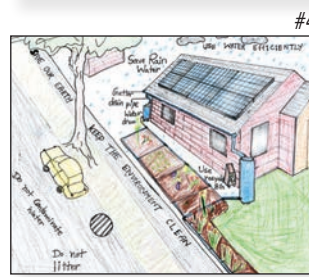
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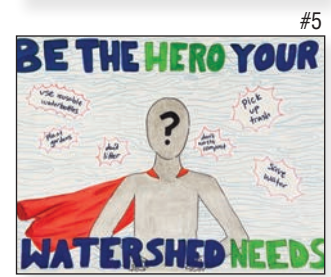
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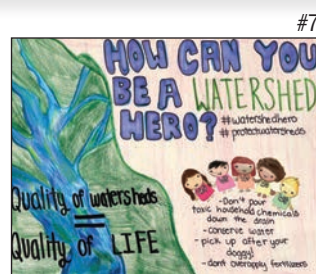
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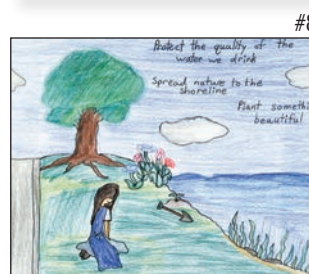
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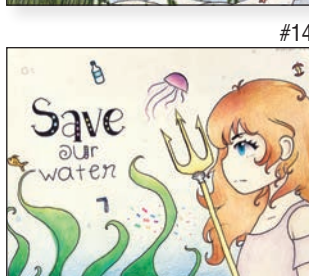
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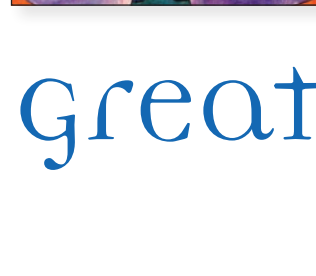
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#14

great job, superheroes!

Reaching Everyone with Water and Sanitation Leaving No One Behind

by Jhonny Perez

I am a civil engineer by profession, and eight years ago I joined the Water For People team in Bolivia. Water For People is a nongovernmental organization whose mission is to reach *Everyone* with water and sanitation. In the model, equity and social inclusion take precedence, leaving no one behind. This is my story within the world of water and sanitation development in Bolivia, as a young professional.

Doña Vicenta

I immersed myself in the sea of water and sanitation needs, and the first story I came across is that of Doña Vicenta. She is a blind elderly woman from the community of Uchuchi Cancha in the municipality of Tiraque. This woman told me about the daily journey she would take to get water from a spring in the middle of the community. She traveled about 2 kilometers, which took about 90 minutes of her time. She walked carrying two 10-liter cans on her back in her *aguayo*, a 5-liter can in one hand, and a cane in the other. The cane is her guide to cross that long road, with obstacles due to the terrain and, even more so, the difficulty of not seeing. The need for water outweighs Doña Vicenta's physical limitations.

With a lump in my throat, I continued the work with the moral commitment to improve Doña's quality of life so that she would have better days. After the technical and social work, in coordination with Tiraque's Municipal Sanitation Department, the project identified all the families that are permanent residents of the community. The project was implemented with a mixed water system, including catchment work, a pumping system to a storage tank in the upper part of the community, and household connections with micrometering, thus guaranteeing the sustainability of the water system. At present, all the families in the Uchuchi Cancha community have access to water regardless of their physical or social condition or the topographic location of their house. There will always be a technical solution to supply water, either through a piped system, a protected spring or by harvesting rainwater.



Leaving no one behind means reaching the most rural, sometimes oldest, members of a community. An elderly woman washes clothes with the water now accessible at her home. *Water For People*

Yacu Runas

In Convento Pampa, a community in the municipality of Arani, I came across another story. An elderly couple who, despite their age, participated in community works along with the other families in the community. If you wonder what motivated this elderly couple in their 80s to carry out excavation work, it is simply the desire to have a water faucet right on their property.

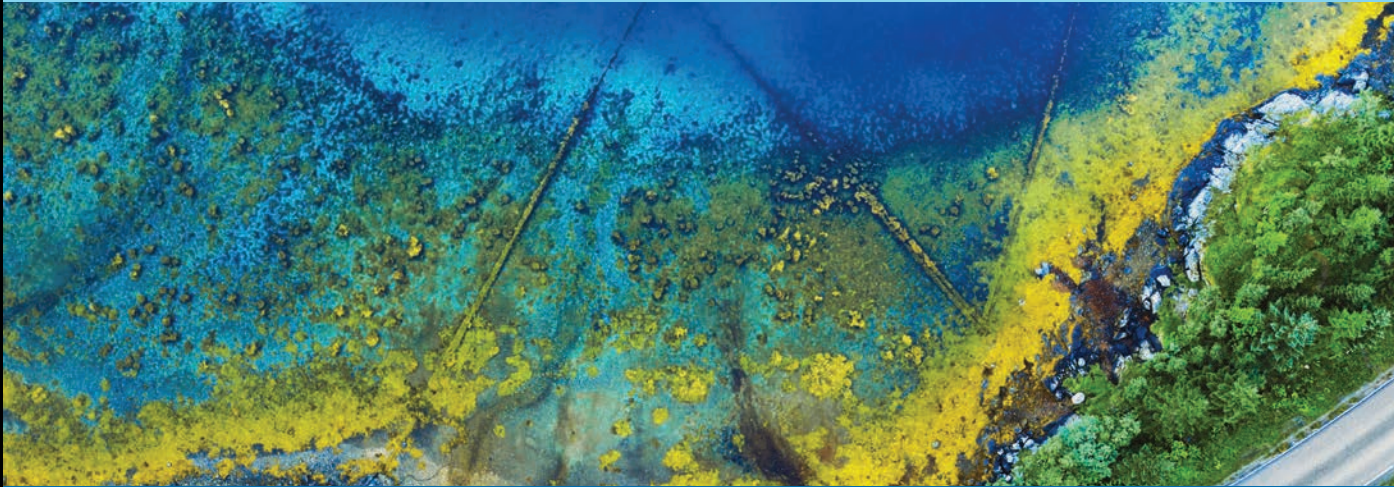
After several days of work and fatigue, the community decided to hold the inauguration ceremony for the water system at the elderly couple's house. After words of thanks from the authorities, there was a scene that remains engraved in my mind. It was something that perhaps went unnoticed by others, and it was seeing the joy of the elderly couple when opening the faucet and ... wow! What for them was unattainable came shooting out – a jet of water. At the same time, tears from the old woman fell, making her eyes, already tired by the years, shine. With wrinkles on her hands, she brought the first stream of water to her face to refresh her skin. She was clearly pleased to have a faucet on the property at more than 80 years of age. But it wasn't just her eyes that were bathed in tears, but also those of us who could feel her gratitude when she saw the water coming out of the faucet. She called us *yacu runas* (water man) and finished by saying, "Thanks to you, I have water."

Without a doubt, water and sanitation work is exciting. It is comforting to help improve the quality of life of many families and ensure that all people on earth have water and sanitation services. This must be what moves us all to work with the objective of achieving the Sustainable Development Goals (SDGs), especially the one I am most passionate about: SDG-6 Ensure access to water and sanitation for all.

Jhonny Perez is a Sustainable Sanitation Officer with Water For People Bolivia and may be reached at jyperez@waterforpeople.org. This article, which first appeared as a Water For People blog post published Dec. 16, 2021, was a finalist in the first Water For People blog competition among colleagues from around the globe.



An elderly member of the community washing hands at his home in Arani, Bolivia. *Water For People*



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Successful Flood Project Benefits Small Village and NYC Miles Away

by JoAnne Castagna

Matthew Krzyston grew up in the Village of Delhi, a rural community located in Delaware County, New York.



Matthew Krzyston with his two sons at Reservoir Park. *Matthew Krzyston*

“I grew up half a mile downstream from Reservoir Park. As a young kid, my parents would take me there to picnic and play in Steele Brook. It was a special place that people of all ages loved to visit. However, during storm events, extreme eroding of the streambanks caused trees and clay sediment to fall into the stream. This created flooding in the village and made it impossible to even enter the park and it was basically forgotten.”

Four decades later, Krzyston is part of a team of people that helped to change this. Today he’s a Member of Council with the Town of Delhi and a member of Delhi’s Joint Flood Mitigation Committee. The committee, with the help of the U.S. Army Corps of Engineers, New York District, restored Steele Brook’s banks and as a result, there is less flooding, improved water quality, and it’s giving new life to Reservoir Park.

“Now the park is more accessible and more beautiful than it ever was before. I was excited to bring my boys – ages 13 and 15 – back



Matthew Krzyston and other members of Delhi’s Joint Flood Mitigation Committee having a discussion at Reservoir Park while work was in progress, November 2021. *Delhi’s Joint Flood Mitigation Committee*

to the same park where my parents had brought me. When we entered, they were amazed that they had never seen this hidden gem that is right up the road. My youngest looked around and said it felt like we were in a National Park. We will be returning often,” said Krzyston.

The Steele Brook Streambank Stabilization Project is one of many the Army Corps has performed under its New York City Watershed Environmental Assistance Program. Rifat Salim, project manager, New York District, U.S. Army Corps of Engineers said, “This program funds projects that are protecting the water quality of New York state’s watersheds that provide drinking water to millions of New York City residents and businesses.”

A watershed is an area of land that catches rain and snow that drains or seeps into a marsh, stream, river, lake or groundwater. This water eventually gets stored in reservoirs, a place where water is collected and kept for use when wanted, such as to supply a city.

Steele Brook flows into the West Branch Delaware River that is located in the heart of the Village of Delhi. The West Branch flows into the Cannonsville Reservoir, one of several that supplies almost 97 billion gallons of water to the New York City water supply system.

If a streambank is eroding and trees and clay sediment are falling down the streambank and into the waterway, this can reduce the quality of the water that will eventually become the public’s drinking water and it can also cause flooding.

A portion of Steele Brook’s streambank was showing a great deal of erosion. During storm events, trees and clay sediment washed down from the banks, into the stream and down the waterway. This debris got lodged under bridges within the village causing the water to over top and cause extreme flooding for the residents and businesses, impacting a population of approximately 3,100.

Krzyston said, “I witnessed flooding within the Village, stemming from Steele Brook, on two occasions. Two important bridges were almost completely blocked with woody debris that had eroded from the riverbank. Floodwater jumped the banks, flowed down main street, and entered residential, businesses and municipal properties. Municipal workers and local businesses took emergency action, using heavy equipment to remove the woody debris that was blocking the bridges. This action allowed Steele Brook to pass under the bridges and water levels to subside back within the river’s banks.”

In order to restore the streambank to reduce flooding and improve water quality, several agencies collaborated including the Army Corps, the New York State Department of Environmental Conservation, the New York City Department of Environmental Protection, the Village of Delhi and Delhi’s Joint Flood Mitigation Committee, the Delaware County Department of Watershed Affairs, and the Delaware County Soil and Water Conservation District.

The streambank stabilization work included clearing the falling trees and debris from the 632-foot-long Steele Brook and its 21-foot-high slopes to stabilize the streambanks.

Along the edges of the stream, loose stones were placed. The stones slow down the stream and reduce potential damages downstream.

Also, along the stream border, a stacked rock wall was built. This was done to prevent sediment from running off the slopes into the stream during storm events.

Above the stacked rock wall, 8,414 feet of the bank that was eroding was revegetated with native plants including native willow live stakes.

Graydon Dutcher, stream program coordinator with the Delaware County Soil and Water Conservation District said, “The plants’ roots stabilize the soil and prevent the soil from running into the river. The vegetation also traps and absorbs sediment and pollutants, like harmful phosphorus and nitrogen particles, from entering the stream.”

These pollutants can come from nearby roads. Dutcher said, “When streambanks are eroded, it makes it easier for soil and pollutants to travel from roads to bodies of water. During storm events, water on roads can sweep up contaminants and transport them to bodies of water, such as a stream, adversely affecting the water that will eventually become a part of the water supply. Now with the newly planted vegetation, the flood water will drain from the road and filter through this vegetation before entering the stream.”

Another way to prevent pollutants from traveling from roads to the stream is by making sure there is a healthy floodplain. The stream was realigned to include a floodplain. A floodplain is an area of low-lying ground that is adjacent to the stream that keeps a river clean by filtering the water that runs from roads into the stream and absorbing pollutants before they enter the stream. Floodplains also provide space for water to spread out and slow down during big storm events. Because of Steele Brook’s steep side slopes, there was little to no floodplain, so the water ran straight into the stream without getting filtered.

Preventing sediment from entering the stream is not only beneficial to the public’s water supply, but also to aquatic habitats. Clay sediment can reduce oxygen in the water suffocating aquatic wildlife.

To further protect aquatic habitats, a mixture of deep and shallow water depths was created in the stream to support different types of fish and invertebrate life.

Deep water – or pools – were created. Pools have slow moving water that are favorite places for certain species of fish, such as trout, to hang out.

Shallow water – or riffles – were created. Riffles are faster moving sections of a stream, where rocks break the water surface. When

continued on page 56

New York City Watershed System

The New York City watershed region encompasses approximately 2,000 square miles of land north of New York City.

The land includes three watershed systems – the Catskill, Delaware, and Croton systems – that are located in the counties of Greene, Schoharie, Ulster, Sullivan, Westchester, Putnam, Dutchess and Delaware.

A watershed is an area of land that catches rain and snow that drains or seeps into a marsh, stream, river, lake or groundwater.

This water eventually gets stored in reservoirs, a place where water is collected and kept for use when wanted, such as to supply a city.

The New York City Watershed System provides more than 90% of New York City’s water supply. This comes to approximately 9.5 million people.

New York City makes sure that this water is safe by treating it at the source rather than building a costly filtration plant. The source is the land that surrounds the streams, rivers, lakes and reservoirs.

“In 1996, all of the municipalities in the New York City watershed region came to an agreement. They wanted to avoid the creation of a huge filtration plant. Instead of a plant they agreed to have small projects throughout the region to provide the public with clean water with minimal filtration. This is how our New York City Watershed Environmental Assistance Program came about,” said Rifat Salim, project manager, New York District, U.S. Army Corps of Engineers.



Members of multiple agencies that collaborated on the completion of the Steele Brook Streambank Stabilization Project, November 2021.

USACE

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the water rushes over the rocks it adds oxygen to the water. These are good places for certain insects to live.

In addition, this project has given the public access to Reservoir Park once again and the village is encouraging visitors. According to the mayor of Delhi, picnic tables and grills will be placed in Reservoir Park to encourage not only locals to enjoy the area, but also visitors from New York City.

Krzyston added, “The flood commission members are very grateful to the Army Corps for the role they played in this project. I considered this to be an emergency. We have the local know-

how and energy to address these types of emergency situations. However, it is very difficult – sometimes even impossible – to implement these projects without support from the Army Corps. While the project was designed to ensure public safety, the social and recreational benefits to the local population are immeasurable. There will be many family memories made at Reservoir Park.”

JoAnne Castagna, Ed.D., is a public affairs specialist and writer for the U.S. Army Corps of Engineers, New York District. She can be reached at joanne.castagna@usace.army.mil.



Before the project got started, the stream's banks were eroding, causing trees and clay sediment to fall into the stream. June 2017.

Delaware County Soil and Water Conservation District



The completed project on Steele Brook, which includes a stacked rock wall to retain the slope and reduce sediment loading to the stream during storm events. November 2021.

Delaware County Soil and Water Conservation District



As part of the project, the fallen trees and debris needed to be cleared from Steele Brook and its 21-foot-high sloped banks. June 2017.

Delaware County Soil and Water Conservation District



The completed project on Steele Brook included loose stones placed along the stream edges to slow the stream and reduce potential damages downstream. November 2021.

Delaware County Soil and Water Conservation District



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Spotlight on the Inaugural Class of NYWEA's InFLOW STEM Path Scholars

by Madison Quinn

In conjunction with NYWEA's 94th annual meeting, the Diversity, Equity and Inclusion (DE&I) Committee launched the NYWEA Introducing Future Leaders to Opportunities in Water (InFLOW) Program's STEM Path track with an inaugural class of five bright scholars interested in learning more about career opportunities in the water sector.

NYWEA's DE&I Committee modeled the program after the very successful Water Environment Federation (WEF) InFLOW Program, which began in 2018. Both programs aim to enhance diversity and inclusion in the water workforce. In conjunction with the 2021 Spring Meeting, the DE&I Committee had a pilot of the Career Tech InFLOW track, partnering with Onondaga Earth Corps in Syracuse, New York. The 94th annual meeting offered an opportunity to launch the STEM Path track of the program.

To begin the STEM Path InFLOW Program this year, the committee reached out to five schools in New York City where NYWEA had student chapters, seeking students from backgrounds underrepresented in the water sector. Our outreach yielded five impressive STEM scholars from two schools: Lexcy Alexis from Brooklyn College, and Nina Björkman, Cassandra Cortes, Isabel Vasquez and Guadalupe Zamata Ovalle from Manhattan College.

Meet the Scholars



Lexcy Alexis

Photo provided by Lexcy Alexis

Lexcy Alexis is a Brooklyn College undergraduate, J.K. Watson Fellow, and Opportunity Network Fellow '23. Lexcy's major is environmental science/geology. Lexcy is interested in becoming a hydrologist or water quality specialist to research efficient wide-scale desalination and water recycling techniques.

Her love for water came from Grenada, a small Caribbean island. The waters there are

crystal clear, always the right temperature and seem endless when looking out to sea. In recent years, once the island became more developed, she noticed changes in water quality, height and appearance. The once clear, fiercely flowing river that gave a neighborhood the name "River Road" and provided water for everyone in the neighborhood to use, is now almost completely dry, with only a small, brown stream of water traveling through when it rains. The towering fruit trees that grew there are gone, and the once heavily vegetated area is now completely lifeless.

Seeing how little by little the river disappeared along with the life that surrounded it is what narrowed Lexcy's career trajectory to water quality and hydrology. She wants to aid in preserving the health of waterways around the world, and hopes to inspire those around her to do the same.

Nina Björkman is a senior in the Environmental Science program at Manhattan College. She is an international student from Västerås, Sweden, and an athlete in the school's track and field team.

Nina is a board member of the Manhattan College honors society Kappa Alpha Omicron, and a member of the school's honors society Epsilon Sigma Pi. Nina has expressed an interest in wastewater as a resource to recover, such as biogas/biofuel among other opportunities.



Nina Björkman

Photo provided by Nina Björkman

Isabel Vasquez is a senior graduating from Manhattan College this May with a degree in civil engineering, a concentration in applied mathematics, and a minor in environmental engineering.

Her research is rooted in making membrane-based filtration in industrial sectors more sustainable and efficient. Isabel is looking forward to connecting her future career as an engineer to environmental justice. In her free time, she mentors high school students through Engineering Tomorrow, and encourages them to consider pursuing careers in engineering with the hopes of inspiring the next generation of engineers while increasing diversity in the industry.

Isabel is a member of the Epsilon Sigma Pi and Tau Beta Pi engineering honors societies and has been involved in Manhattan College's chapter of the Society of Hispanic Professional Engineers and Engineers Without Borders. She has also worked at the Multicultural Center and the Women & Gender Resources Center on campus with the goal of providing more support to underrepresented students in STEM.

Cassandra Cortés is a senior undergraduate chemical engineering student with a double minor in chemistry and environmental engineering at Manhattan College. They participated in the Jaspers Summer Scholars program, which allowed them to facilitate research alongside a faculty adviser.

Their project focused on pollution from hair dye chemicals



Isabel Vasquez

Photo provided by Isabel Vasquez



Cassandra Cortés

Photo provided by Cassandra Cortes

in the rinse water and involved testing the water for concentration levels of certain chemicals. This project allowed them to further connect chemical and environmental engineering concepts in order to come up with innovative solutions.

Cassandra is working toward going into the wastewater industry to further improve areas such as hazardous waste and energy conservation.



Guadalupe Zamata Ovalle

Photo provided by Guadalupe Zamata Ovalle

Guadalupe Zamata Ovalle is a chemical engineering student in her senior year at Manhattan College. She came to the United States from Cusco, Perú, in 2015. Guadalupe has a breadth of experience in the field, including an internship with Tarte Cosmetics; she currently works at Momentive Performance Materials, and plans on interning at ECOLAB this summer.

Guadalupe is researching the capability of cacao waste to be a sustainable source of energy. She aims to use her prior experience to find new ways to incorporate chemical treatment into sustainable waste practices; her hope is to bring these practices back to her home country, providing individuals in underprivileged areas with access to better water treatment.

InFLOW Program Highlights

The DE&I Committee first held an orientation via Zoom to share more information about NYWEA and the upcoming conference, highlight some of the programming that may be of interest to the scholars and to learn about the scholars' areas of interest.

InFLOW Scholars were invited to attend as many technical sessions and networking events as their schedules would allow and were matched with individual mentors from the DE&I Committee to serve as a point of contact to guide them as they navigated the virtual conference and exhibition. There were two additional events held especially for InFLOW scholars: a virtual Water Careers Panel and a site visit to a local water resource recovery facility.

The career panel included a variety of water professionals from the public, private and nonprofit sectors. The participating panelists were:

- Stephanie Castro, Arcadis
- Bernadette Drouhard, Black & Veatch
- Regina Harris, Buffalo Sewer Authority
- Danielle Hurley, Onondaga County Department of Water Environment Protection
- Denine Jackson, New York State Department of Environmental Conservation
- Madison Quinn, NYWEA
- Stephen Sanders, Environmental Training Center at SUNY Morrisville
- Walt Walker, Greeley & Hansen

Panelists spoke about their background and career path and the session concluded with open Q&A with the InFLOW Scholars.

The program concluded with an in-person field trip to Newtown Creek Water Resource Recovery Facility with a tour of the facility hosted by Pam Elardo, Deputy Commissioner of New York City



InFLOW Scholars, Student Chapter leaders, and DE&I Committee members tour Newtown Creek WRRF, led by NYC DEP Deputy Commissioner Pam Elardo (top of stairs).

Stephanie Castro

Department of Environmental Protection, followed by a walk along the nearby Newtown Creek Nature Walk led by Willis Elkins of Newtown Creek Alliance.

The InFLOW Scholars and the leaders of the New York City student chapters were invited to attend this event, which offered an opportunity for students to meet one another and meet environmental professionals working in the water sector while learning about water resource recovery processes and sustainability efforts at Newtown Creek.

The spring 2022 InFLOW Program will focus on the Career Tech track and the Committee is reaching out to community-based organizations in upstate New York to recruit interested scholars from job training programs and trade schools to introduce them to the opportunities in the many facets of the water quality sector. In the future, the DE&I Committee aims to expand the InFLOW Program to include scholars from across New York state in both the STEM Path and Career Tech tracks.

Madison Quinn is the communications manager and Scholarship Program administrator for the New York Water Environment Association, Inc., and may be reached at madison@nywea.org.

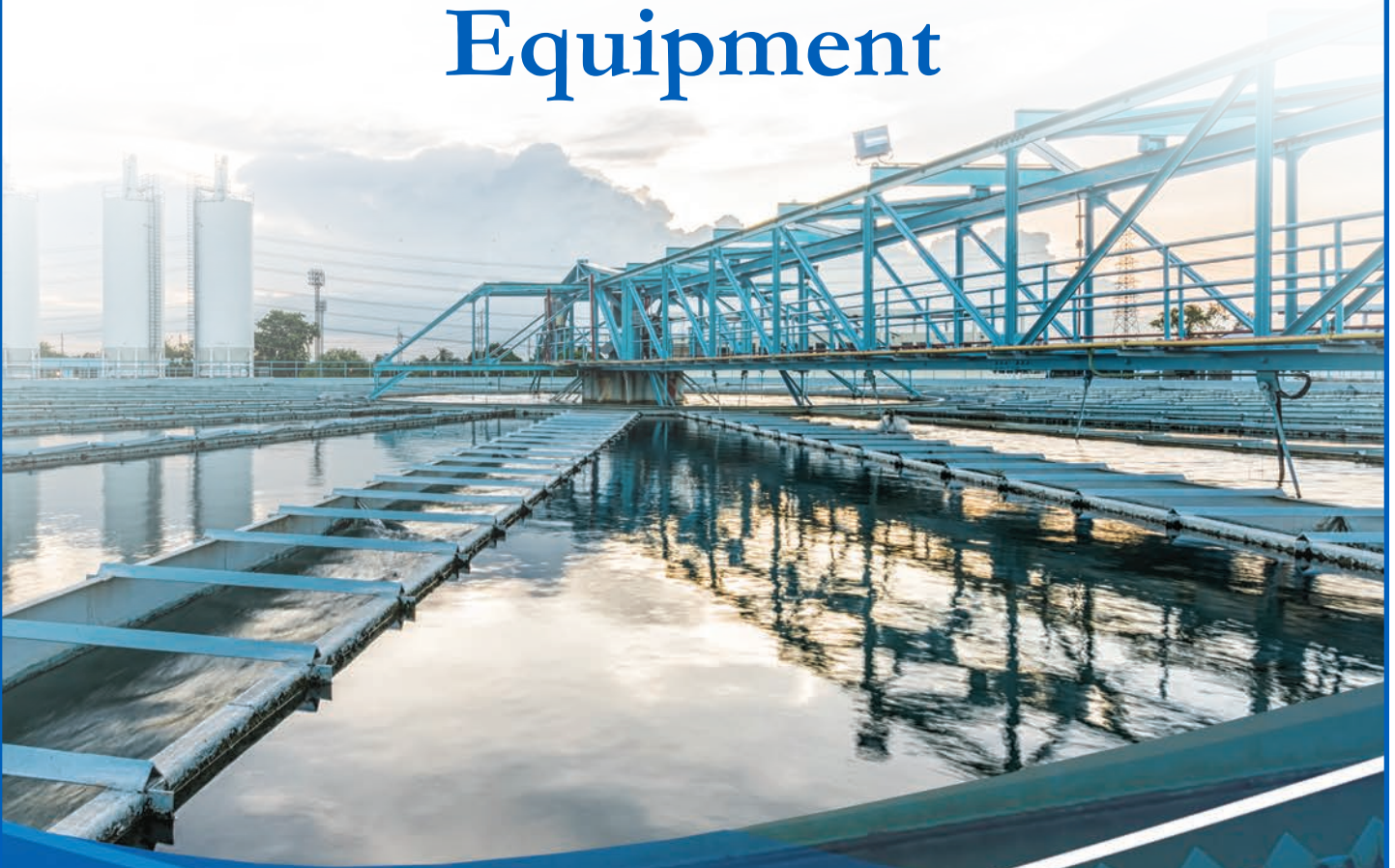
Reference

- “About WEF InFLOW.” Water Environment Federation website.
<https://www.wef.org/resources/for-the-public/wef-inflow-program/wef-inflow-program/>



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Operator Quiz Spring 2022 – Wastewater Characteristics

The following questions are designed for individuals/trainees pursuing certification as they prepare to take the ABC wastewater operator test. It is also designed for existing operators to test their knowledge. Each issue of *Clear Waters* will have more questions from a different process of wastewater treatment. Good luck!

- Determine the pounds per day of primary solids removed at a plant with a flow rate of 1.5 MGD and the following data:**
Influent TSS = 250 mg/L, Primary Effluent TSS = 150 mg/L, Final Effluent TSS = 12 mg/L
 - 1,101 lbs./day
 - 1,251 lbs./day
 - 982 lbs./day
 - 2,977 lbs./day
- An industrial plant has organic waste discharge that contains 1,450 mg/L of BOD and discharges 5,000 gallons per day into sewers. If the surcharge rate is \$1.00 per lb. of BOD above 250 mg/L then what will be the daily amount to charge this customer for excess BOD discharge?**
 - \$5.00
 - \$25.00
 - \$50.00
 - \$75.00
- Your treatment plant is operating at 50% organic design capacity. The plant is designed to process 2,000 lbs. of BOD per day. A food processing plant wants to bring 6,000 gallons per day of their waste with 12,000 mg/L of BOD for treatment at your plant. To determine if you have the capacity to treat this waste, what is their daily organic loading?**
 - 600 lbs.
 - 60 lbs.
 - 160 lbs.
 - 120 lbs.
- If a large dairy discharges a much higher than normal organic load to the sewer system, the operator's first indicator is:**
 - A decrease in the DO concentration in the aeration tank
 - Floatables in the final clarifier
 - BOD in final effluent has increased
 - Sludge production has increased
- If chlorine costs \$0.21/lb. what is the daily cost to chlorinate a 5 MGD flow rate at a chlorine dosage of 2.6 mg/L?**
 - \$21.34
 - \$18.95
 - \$31.22
 - \$22.77
- Toxic pollutants from industrial wastes must be controlled to prevent all of the following except:**
 - Increased operational costs of the POTW receiving the waste
 - Introduction of pollutants into a POTW that could interfere with its operation
 - Contamination of POTW sludge, which would limit its disposal practices or use
 - Passage of untreated pollutants through a POTW, which could result in NDPEs permit violations
- Which of the following wastewater sources contains the least amount of organic material?**
 - Tannery waste
 - Dairy waste
 - Cooling tower water from fruit and vegetable processing
 - Domestic wastewater
- Which activated sludge process could handle shock loads of dairy waste most effectively?**
 - Tapered aeration
 - High-rate activated sludge
 - Step feed
 - Conventional activated sludge
- Under snow and ice cover, BOD levels in ponds will normally:**
 - Remain the same
 - Increase slowly
 - Decrease rapidly
 - Decrease slowly
- A major characteristic of a metal plating waste is high:**
 - BOD
 - Toxicity
 - Organic matter
 - Suspended solids



Answers below.

For those who have questions concerning operator certification requirements and scheduling, please contact Carolyn Steinhauer at 315-422-7811 ext. 4, carolyn@nywea.org, or visit www.nywea.org.

Answers: 1. (b) 1,251 lbs./day 2. (c) \$50.00 3. (a) 600 lbs. 4. (a) A decrease in the DO concentration in the aeration tank 5. (d) \$22.77 6. (a) Increased operational costs of the POTW receiving the waste 7. (c) Cooling tower water from fruit and vegetable processing 8. (c) Step feed 9. (b) Increase slowly 10. (b) Toxicity

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