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OF THE NEW ENGLAND WATER ENVIRONMENT ASSOCIATION

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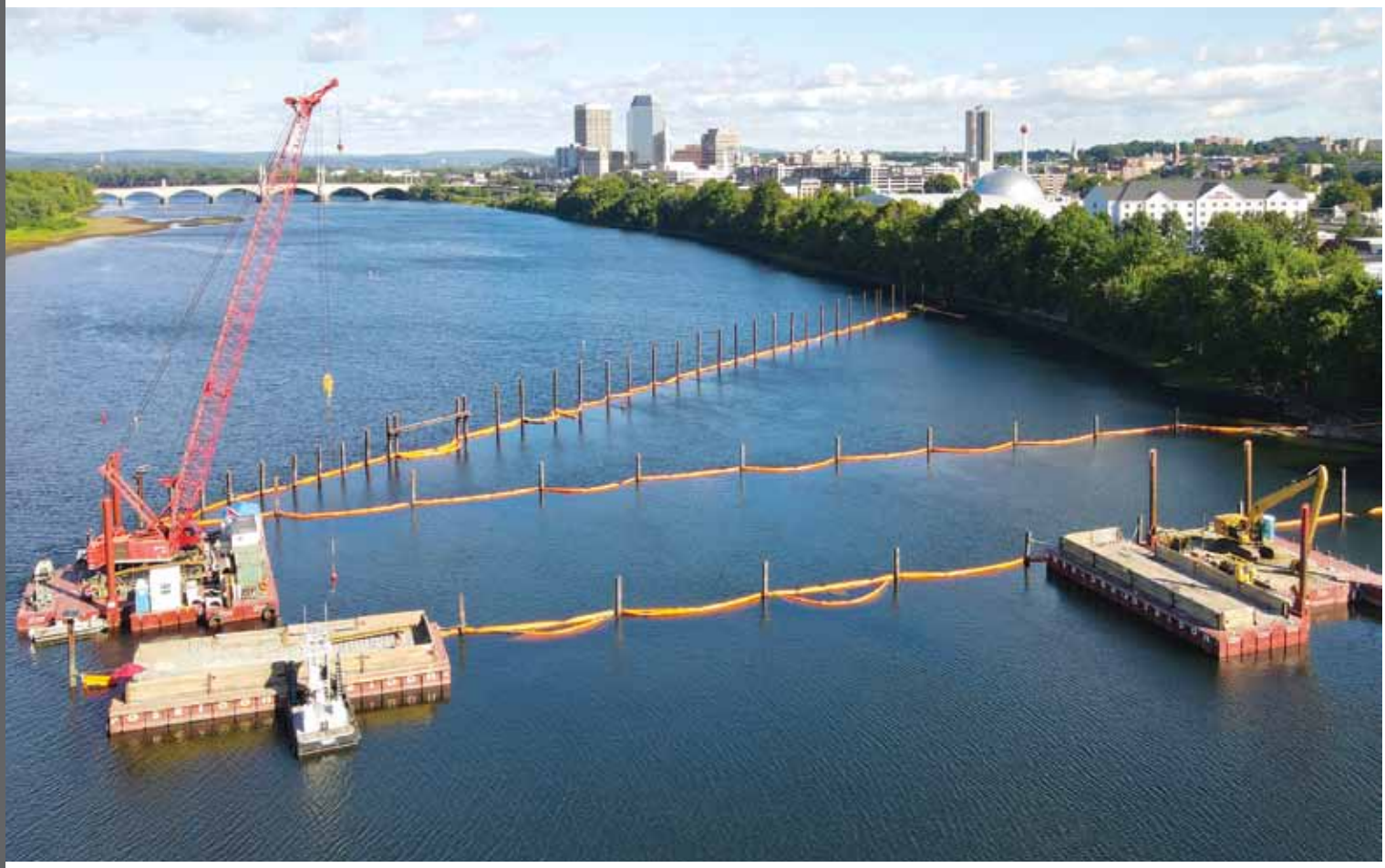

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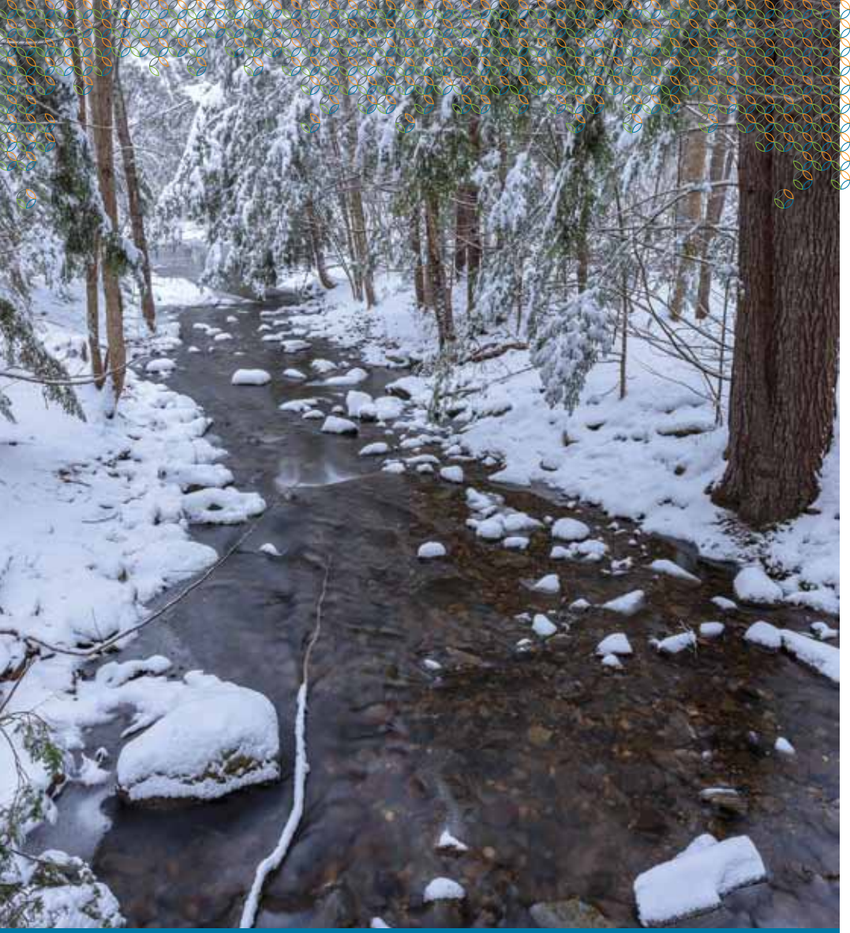

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NEWEA
WORKING FOR WATER QUALITY

OUR ASSOCIATION WAS ORGANIZED NINETY-THREE YEARS AGO in Hartford, Connecticut, on April 23, 1929, with the objectives of advancing the knowledge of design, construction, operation and management of waste treatment works and other water pollution control activities, and encouraging a friendly exchange of information and experience. From 40 charter members, the membership has steadily grown to more than 2,000 today. Membership is divided into the following classes:

Professional Member—shall be any individual involved or interested in water quality including any manager or other officer of a private waste treatment works; any person engaged in the design, construction, financing, operation or supervision of pollution control facilities, or in the sale or manufacture of waste treatment equipment.

Executive Member—shall be an upper level manager interested in water quality and who is interested in receiving an expanded suite of WEF products and services.

Corporate Member—shall be a sewerage board, department or commission; sanitary district; or other body, corporation or organization engaged in the design, consultation, operation or management of water quality systems.

Regulatory Member—this membership category is a NEWEA only membership reserved for New England Environmental Regulatory Agencies, including: USEPA Region 1, Connecticut Department of Energy and Environmental Protection, Maine Department of Environmental Protection, Massachusetts Department of Environmental Protection, New Hampshire Department of Environmental Services, Vermont Department of Environmental Conservation, and Rhode Island Department of Environmental Management.

Academic Member—shall be an instructor or professor interested in subjects related to water quality.

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Student Member—shall be a student enrolled for a minimum of six credit hours in an accredited college or university.

WEF Utility Partnership Program (UPP)—NEWEA participates in the WEF Utility Partnership Program (UPP) that supports utilities to join WEF and NEWEA while creating a comprehensive membership package for designated employees. As a UPP a utility can consolidate all members within its organization onto one account and have the flexibility to tailor the appropriate value packages based on the designated employees' needs. Contact WEF for questions & enrollment (703-684-2400 x7213).

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2022 RATES ($)

Professional	190
Executive	360
Corporate	420
Regulatory	50
Academic	190
Young Professional	75
PWO	110
Dual	50
Student	15

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Total distribution		1,903	1,875
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President's Message

Welcome to NEWEA's winter issue of the *Journal* and my final President's Message. In this issue we focus on perhaps our industry's most critical success factor, sustainable funding. No matter how passionate our membership is, no matter how efficient and effective our new equipment is, no matter how innovative our new designs are, they are not fully realized without the financial resources to support them. Sustainable funding is required for the programmable maintenance, upgrading, and replacement of our environmental infrastructure efficiently and cost-effectively. The water industry, generally administered and owned by public sector municipalities and authorities, has never charged self-sustainable fees as our colleagues in private sector utilities do. The consequences of this?

Aging and failing infrastructure, noncompliance with regulations, a lack of sustainable sources of funding, and an underpaid, underappreciated, and diminishing workforce. Studies have concluded that reactive repairs to environmental infrastructure in a failure situation cost three to five times more than the same repairs made proactively before failure. Sustainable funding is an issue that almost every New England utility continuously struggles with.

The water industry has recognized this problem and is conducting public information campaigns such as "Water's Worth it" to educate the public on the financial value of clean water and the services we provide. Many utilities are moving from quarterly billing to monthly billing so the public can compare "apples to apples" when comparing their water and wastewater bill to electricity, natural gas, telephone, and internet monthly bills. My water and sewer bill, as one example, is 17 percent of my monthly entertainment/internet bill. This is truly disproportional because humans can live without the internet, humans can live without TV, humans can even live without electricity. But humans cannot live without clean water!

The goal of many utilities now is to implement small to moderate rate increases annually. This is a sustainable business practice that ensures steady and dependable income, allowing for long-term planning and project execution. This issue of the Journal has several articles that examine various aspects of funding that affect our ever-growing

Over the past 50 years NEWEA has been the professional forum, the technical resource, and a driving force behind one of the greatest engineering achievements of the past century—the cleaning of New England's polluted waterways

and diversifying clean water industry. The Springfield Water and Sewer Commission was the first utility in Massachusetts to receive Water Infrastructure Finance and Innovation Act (WIFIA) from EPA and, to the best of its knowledge, the first in the nation to apply it to an entire capital improvement program. The Commission shares an article about its WIFIA experience and lessons learned from this first-in-the-nation program. Another article discusses funding options for climate adaptation and building community resilience across New England. It focuses on Massachusetts' creation of the Municipal Vulnerability Preparedness Grant Program dedicated to funding climate resilience in New England.

NEWEA's Enhanced Innovative/Alternative Onsite Wastewater Treatment Systems Task Force shares an article on the productive collaboration among innovators, water utilities, and regulators to enable viable solutions to be brought to market faster and more economically. The article further discusses public-private partnerships and programs that use pay-for-performance financing. With insightful funding information, "A Piece of the Pie—Grants and Funding for Cybersecurity," focuses on details of federal and state funding assistance to water and wastewater utilities to support cybersecurity for business and control systems.

NEWEA's Innovation Council presents an article on the challenges of securing funding in the water industry. The article focuses on alternative funding pathways for water innovators within organizations that include accelerators, incubators, and consultancy groups. Finally, Peter Garvey, NEWEA senior delegate to WEF, talks about WEF's Water Advocates Program that empowers the water industry to share our knowledge and expertise to inform government decision-makers about the importance and value of water. Our water advocacy again links the importance clean water to quality of life and the need to fund this critical necessity.

As I complete my final President's Message, I reflect back over the past year of my presidency of this great organization, my 41-year career in the water industry, and our industry's long and storied history and conclude that my presidential theme "50th Anniversary of the Clean Water Act…a job well done!" still rings out loud and true. Over the past 50 years NEWEA has been the professional forum, technical resource, and a driving force behind one of the greatest engineering achievements of the past century, the cleaning of New England's polluted waterways. I shared my personal success story in our summer issue of the *Journal* about the Merrimack River, upon whose banks I write this article, and how it was transformed from one of the 10 most polluted rivers in the country to its best condition in over 150 years. The rivers in Maine and northern New Hampshire, once so polluted by the pulp and paper industry that they struggled to support aquatic life, are now brimming with game fish and river recreation. The success of the CWA and the cleaning of America's polluted waterways is fully as great an achievement as the Eisenhower Administration's construction of our interstate highway system in the 1950s and NASA putting a man on the moon in the 1960s. CWA's success is truly a monumental engineering achievement for our industry and our country to celebrate!

In closing, I want to thank NEWEA for the opportunity to serve one of our nation's leading clean water associations. I also want to thank the City of Manchester and its Department of Public Works for their support during my term as your president. Special thanks to our superbly talented NEWEA team of Mary, Janice, Jordan, and Heather, who have all contributed to the success of my tenure. And last, I want to thank you, our NEWEA membership. You are the reason I was first drawn to NEWEA over 20 years ago, you were the reason I wanted to contribute to NEWEA, and you were the ones who made this such a fun and fulfilling experience. Thank you and I hope to see you in Boston for our Annual Conference in January.

From the Editor

I would be remiss to begin this Letter from the Editor without a huge thank you to the Journal Committee, especially vice-chair James Barsanti and guest editors Allie Greenfield and Michael Sullivan. While I was on parental leave, busy figuring out how to fund a seemingly never-ending supply of diapers and setting up a college savings plan for the little one, these three stepped in and coordinated "funding the work" themed articles for this edition of the *Journal*. I am not sure they knew what they were getting into in my absence, but they pulled together another amazing edition of the *Journal*. Thank you, again, Jim, Allie, and Mike!

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ABBA said it best: "All the things I could do, if I had a little money." Fortunately, the water industry is experiencing its most significant federal investments since the 1970s.[1] This year, we celebrate the first year of accomplishments under the Bipartisan Infrastructure Law. To name a few: $4 billion in water infrastructure funds were awarded to states, Tribes, territories, and the District of Columbia under State Revolving Fund (SRF) programs to provide low-cost financing for water and wastewater infrastructure projects; 20 state capitalization grants were awarded for lead service line identification and replacement; and a $5 billion non-competitive grant program was created for small and/or disadvantaged communities to address emerging contaminants, including PFAS, in their drinking water systems.[2] It sure is an exciting time to be a water professional!

ABBA said it best: "All the things I could do, if I had a little money."

The Bipartisan Infrastructure Law isn't the only game in town these days. The articles in this issue highlight just a few of the unique opportunities to obtain funding for projects in New England, as well as several projects successfully funded through these federal, state, and private programs. The first article, by Jaimye Bartak, Darleen Buttrick, and Joshua Schimmel, describes the Springfield Water and Sewer Commission's achievements through the EPA's Water Infrastructure Finance and Innovation Act (WIFIA) Program. The next article, authored by Stephanie Alimena, provides a concise history of and outlook for the Massachusetts Vulnerability Preparedness Program. I was surprised to learn that the program has set the stage for similar programs in in Maine, Rhode Island, and Connecticut! The third article, by Bruce Walton, discusses the pathways for adoption of enhanced innovative/alternative onsite wastewater treatment systems on Cape Cod and elsewhere, including their strategy for sustainably funding the systems. The final article, by Stacy Barna, Jim Livermore, and Bob George, highlights opportunities for water and wastewater utilities to fund cybersecurity for their business and control systems. I am impressed by the diversity of articles in this issue. Perhaps you'll be inspired to apply for one of these funding programs? Just think of all the things you could do, if you had a little money.

One theme consistent across articles is the importance of broad community engagement when planning a sustainable, resilient water project. At least 2 million people in the United States do not have running water or a working toilet in their homes.[2] Many of these households are in cities, close to a networked supply. Moreover, these households are more likely to be headed by people of color and earn lower incomes.[3] On September 24, 2022, EPA Administrator Regan announced the establishment of the Office of Environmental Justice and External Civil Rights (OEJECR), a new national program office charged with advancing environmental justice and civil rights compliance. This office's goal includes improving and enhancing the EPA's ability to infuse equity, civil rights, and environmental justice principles and priorities into all their practices, policies, and programs, as well as increasing support for community-led actions. This is a great step toward ensuring that funding for our nation's water infrastructure projects is equitably distributed, and I look forward to seeing the OEJECR's impact on water access in New England.

1. *Closing the Water Access Gap in the US: An Action Plan.* https://www.digdeep.org/close-the-water-gap. Accessed 11/15/2022.

2. *Bipartisan Infrastructure Law: EPA's Year One Anniversary Report.* https://www.epa.gov/system/files/documents/2022-11/BIL_Anniversary_Report_11142022.pdf. Accessed 11/15/2022.

3. Meehan, K., Jurjevich, J. R., Chun, N. M. J. W., Sherrill, J. (2020). Geographies of insecure water access and the housing-water nexus in US cities. *Journal of the Proceedings of the National Academy of Sciences* 111 (46).

Industry News

As part of the 50th anniversary of the Clean Water Act celebration tour, EPA showcased Boston Harbor's successful cleanup and future investments at an event in East Boston in early October

Bipartisan Infrastructure Law to Provide Nearly $500 Million to New England

EPA awarded over $484 million in Bipartisan Infrastructure Law funding to New England states for water infrastructure improvements. The fiscal year 2022 allocation is the first of five years of $43 billion in dedicated EPA State Revolving Fund (SRF) funding that states throughout the United States will receive through the new law.

"The historic Bipartisan Infrastructure Law is funding critical water infrastructure projects across New England, especially in places that have been historically underserved," said EPA Regional Administrator David W. Cash. "No one should be worried when they turn on their tap. Ensuring clean drinking water and safe wastewater services to communities across the region is essential. We are proud to work with states, Tribes, and communities in making these unprecedented investments."

EPA's SRFs are part of the Justice40 initiative, which aims to deliver at least 40 percent of the benefits from certain federal programs to underserved communities. Furthermore, nearly half the funding available through the SRFs must be grants or principal forgiveness loans that remove barriers to investing in essential water infrastructure in underserved communities across rural United States and in urban centers.

The announced funding represents fiscal year awards for states that have submitted and obtained EPA's approval of their plans for use of the funding. Capitalization grants will continue to be awarded, on a rolling state-by-state basis, as more states receive approval throughout the fiscal year; states will also receive awards over the next four years.

Below is a representative list of projects to be funded:

Rhode Island: $66 million—Lead line replacement projects in Bristol and Providence, as well as PFAS treatment projects at the University of Rhode Island and the West Gloucester Elementary School.

Vermont: $63 million—Lead line replacement projects in Springfield and Northfield, as well as projects to address PFAS contamination in Killington and Bennington.

Connecticut: $53 million—Lead line replacement projects in New London and Waterbury, as well as PFAS treatment projects in New Fairfield and Danbury.

New Hampshire: $72 million— Lead Line replacement projects in Hanover and Claremont, as well as PFAS treatment projects in Londonderry and Jaffrey.

Maine: $39 million—Water line replacement projects in Limerick and South Berwick, as well as water system upgrades for PFAS treatment at the Houlton Mobile Home Park and in Brunswick.

Massachusetts: $188 million—Lead line replacement projects in New Bedford and Lowell, as well as PFAS treatment projects in North Attleboro and Townsend.

Note: All EPA industry news provided by EPA Press Office

Further Water Quality Protection in Three Boston-area River Watersheds

EPA announced action to control unregulated stormwater pollution from entering unchecked into the watersheds of the Charles, Mystic, and Neponset rivers. This is the first time EPA has exercised its residual designation authority under the Clean Water Act on such a broad scale to address watersheds in a major urban area. The effort is expected to dramatically improve water quality throughout the watersheds, as well as reduce localized flooding and increase recreational opportunities through healthier river systems in historically disadvantaged neighborhoods.

Beginning in 1995, with the Clean Charles River Initiative, work has been ongoing to restore water quality in the three major Boston-area urban rivers. These efforts have enhanced water quality in portions of all three watersheds, especially by reducing bacterial contamination. However, stormwater pollution continues to be the largest uncontrolled source of phosphorus, nitrogen, and bacteria—harming water quality in each of the three river watersheds; nitrogen and phosphorus also lead to toxic algal blooms in hot weather events.

With EPA exercising its residual designation authority, certain commercial, industrial, and institutional properties with 1 ac (0.4 ha) or more of impervious area (hard surfaces like parking lots, roofs, and roadways that make it difficult for stormwater to soak into the ground) will be required to obtain coverage under an EPA Clean Water Act permit. Once permits are issued, property owners will have to reduce pollutants in stormwater.

The eventual new permit will rely on Best Management Practices (BMPs)—including leaf litter pickup, parking lot sweeping, rain gardens or other infiltration practices, tree planting, pavement reduction or use of pervious pavement—to reduce stormwater discharges into waterways and increase infiltration of stormwater back into the earth. These BMPs will have a direct and measurable benefit to local communities by reducing the amount of polluted stormwater that reaches waterways as well as secondary benefits such as less impervious pavement, more green infrastructure, and reduced local heat island effect.

Municipal governments in these watershed cities and towns are already subject to EPA permits that require pollution reduction in stormwater, and they have made significant investments to do so. However, much of this pollution comes directly from stormwater originating from certain commercial, industrial, and institutional sources, such as office parks, industrial parks, shopping centers, private colleges and universities, and hospitals, which are not currently required to be covered under an existing permit. This new permit action places responsibility for cleaning up pollution on those responsible, reducing the burden faced by cities and towns throughout these watersheds.

Large impervious areas are one of the last major unregulated sources of water pollution, and a chief culprit in dramatic algal blooms—including toxic cyanobacteria—as well as high bacteria levels that have plagued the Charles, Mystic, and Neponset rivers in recent years. Extensive impervious cover also aggravates the severity of flooding because those areas diminish the amount of land that can naturally absorb and filter rainwater.

Effective, common sense stormwater control also mitigates the potential for flooding during major precipitation events. Stormwater controls such as those envisioned by EPA to comply with this future permit will help reduce the severity of flooding. Capturing stormwater for infiltration back into the land helps ensure a clean and safe water supply, replenishes depleted groundwater, and filters contaminants out of stormwater before it enters lakes, ponds, rivers, or streams. By employing residual designation authority, EPA is addressing one of the last unregulated sources of pollution harming the rivers.

EPA Environmental Merit Awards—New England

EPA recognized 11 individuals involved in water environment activities in New England at the virtual 2022 Environmental Merit Awards ceremony in October. The awardees were among 20 recipients across New England honored for contributing to improving New England's environment.

New England's annual Environmental Merit Awards go to community leaders, scientists, government officials, business leaders, schools, and students who represent different approaches, but a common commitment to environmental protection. The categories include individual; business (including professional organizations); local, state, or federal government; and environmental, community, academia, or nonprofit organization. Each year EPA also presents lifetime achievement awards for individuals.

"EPA is proud to recognize and congratulate these awardees for their great accomplishments and their continued efforts towards combatting climate change, bringing cleaner air and water to neighborhoods, and ensuring our underserved communities' voices are being heard," said EPA's Dr. Cash. "Their ingenuity and commitment truly make a difference in our New England communities."

IRA LEIGHTON "IN SERVICE TO STATES" AWARD

Every year, one individual in New England receives the Ira Leighton "In Service to States" Environmental Merit Award. It is a tribute to Ira Leighton, who passed away in 2013 after serving 41 years at EPA demonstrating a dedication and passion for protecting the environment. Commissioner **Melanie Loyzim of the Maine Department of Environmental Protection** (MEDEP) received the 2022 award.

Over the past two decades Ms. Loyzim has been a leader in promoting environmental protection and maintaining a viable economy. Ms. Loyzim has spent most of her career at state agencies. Joining Maine's MEDEP in 2006, she started in the Oil Enforcement Unit of the Bureau of Remediation and Waste Management, and rose to supervisor in the Air Bureau, to director for the Bureau of Air Quality, then director for the Bureau of Remediation and Waste Management, and finally deputy commissioner, before becoming commissioner last year.

Ms. Loyzim has supported efforts that contributed to a broader multi-state understanding of air pollution, emphasizing ground-level ozone and regional haze trends. She also participated in the Northeast States for Coordinated Air Use Management, working with air director colleagues to improve air quality regionally. This included adopting California low emissions vehicle standards in Maine and other participating states. She continues to participate in regional air quality issues as an officer of the Ozone Transport Commission.

As director for the Bureau of Remediation and Waste Management, Ms. Loyzim was also a board director for the Northeast Waste Management Officials' Association, where she worked with colleagues in other nearby states on issues such as hazardous waste, petroleum and other cleanup sites, brownfields, materials management, product stewardship, pollution prevention, emerging contaminants, and toxics in products.

Under her leadership, Maine is investigating PFAS soil and water effects from application of biosolids. This effort is helping the nation better understand the links among PFAS, application of biosolids, and impacts to agriculture.

LIFETIME ACHIEVEMENT AWARDS

Ed Bassett of the Passamaquoddy Tribe in Pleasant Point in Perry, Maine, retired from his job as multimedia specialist in December 2021, leaving a legacy of environmental protection, restoration, and stewardship. For over 40 years, Mr. Bassett has served in leadership roles, including Tribal vice chief, Tribal council member, Tribal game warden, Tribal cultural program director, and Tribal fish and game committee member.

He helped build the capacity of the Tribe's Environmental Program through his management of its General Assistance program for 20 years. Mr. Bassett advanced environmental protection on Passamaquoddy territory through restoration of Tribal lands and waters, focusing on improving water quality and removing barriers to restoring Tribal cultural aquatic species.

Through his expertise in digital media technology, he communicated critical environmental issues facing the Tribe and helped advance the Tribe's restoration efforts.

Environmental Merit Awards go to community leaders, scientists, government officials, business leaders, schools, and students who represent different approaches, but with a common commitment to environmental protection

Mr. Bassett has devoted much time to mentoring younger staff and youth. He was director of the Tribe's Camp Waponahki Youth Program, helped with the Wabanaki Wilderness Program, and was assistant director of the Tribal Vocational Education Program. He is also a traditional Passamaquoddy birch bark canoe builder, knowledge he has shared with others.

His possibly most lasting achievement was co-founding the Schoodic Riverkeepers, with its mission to improve public understanding of the Indigenous perspective. Focused on restoring the Schoodic River (the Passamaquoddy name for the St. Croix River) watershed, Mr. Bassett has been integral in educating the Tribal community and public on the importance of alewife restoration, leading to the opening of the alewife passage at Grand Falls Dam during the spawning season.

In retirement, Mr. Bassett continues to serve by developing a safe public drinking water location for the Tribal community that will eliminate the Tribe's need to travel for drinking water. His lifelong investment in environmental leadership and cultural preservation will have a lasting impact on Passamaquoddy Tribal members.

Martin Suuberg, commissioner of the Massachusetts Department of Environmental Protection (MassDEP), has more than 30 years of experience in federal and state environmental and natural resource agencies. During that time, he has been effective and innovative in administering environmental laws.

Mr. Suuberg became commissioner in 2015 after serving as undersecretary for environmental affairs in the Executive Office of Energy and Environmental Affairs. As commissioner, he launched a critical investigation into PFAS, which led to stringent maximum contaminant levels for PFAS compounds in drinking water and rules for soil and groundwater cleanup. As a leader in climate change efforts, he was president and on the board of the Regional Greenhouse Gas Initiative and promoted the Electric Vehicle Incentive Program to increase charging stations statewide.

Mr. Suuberg championed environmental justice (EJ) within MassDEP, diversifying the workforce and expanding its mission statement to commit to advancing EJ. For example, he expanded the network of air monitoring stations in EJ communities to better protect these populations.

Mr. Suuberg, a lawyer, also served as general counsel to MassDEP in the Executive Office of Environmental Affairs and as deputy commissioner in the former Department of Environmental Management. Before moving to Massachusetts, he was a lawyer at the U.S. Department of the Interior in Washington, D.C., where he addressed natural resource damage and endangered species issues.

Judith Swift, the retiring director of the University of Rhode Island Coastal Institute in Narragansett, is a leader dedicated to interdisciplinary collaboration, science communication, and creative solutions to help ecosystems across New England.

Among the initiatives Ms. Swift has led are the North Atlantic Coast Cooperative Ecosystem Studies Unit, a consortium of federal partners, universities, and nonprofit organizations; Scientific Support for Environmental Emergency Response, a network of URI personnel and resources for environmental emergencies; *Rhode Island's Ocean and Coastal Magazine*, a state coastal and ocean magazine, where she was writer, editor, and co-publisher; "The State of Narragansett Bay and Its Watershed," a report analyzing 13 sectors in the Narragansett Bay watershed that rely on natural resources; and a federal program addressing the threat of PFAS to human health.

Ms. Swift's contributions to the bistate Narragansett Bay Estuary Program span many years. Over a decade ago, with support from EPA, she improved the program's reputation at local, state, and federal levels. Guided by historical perspective and an understanding of the parties involved, she steered the program through a lengthy process that led to the scientific report, "The State of Narragansett Bay and Its Watershed." She led a conference to fulfill the plans laid out by consolidating under one host organization, improving relationships between Rhode Island and Massachusetts, emphasizing science, enhancing partnerships, aligning the budget, prioritizing staffing, and strengthening the governance structure. As the persevering and dedicated chair of the program's steering and executive committees, Ms. Swift devoted countless hours to discussions with the former host, the New England Interstate Water Pollution Control Commission, to reinvigorate the program.

Ms. Swift's role as chair ended in 2019, but she continues to serve the region with commitment to the interconnected ecosystem and indirectly through the work of her successors, students, and mentees.

George Loomis retired this fall after 36 years with the University of Rhode Island (URI) Cooperative Extension in Kingston.
A soil scientist by training, Mr. Loomis dedicated his career to leveraging the latest scientific knowledge to advance on-site wastewater treatment systems. In 2018, he and Jose Amador published the book "Soil-Based Wastewater Treatment" for on-site industry professionals.

Throughout his career, Mr. Loomis brought together politicians, developers, engineers, land surveyors, septic installers, septage haulers, septic and home inspectors, advanced technology vendors, realtors, and, most importantly, homeowners to change and improve Rhode Island's on-site wastewater treatment industry. In doing so he helped build trust among public officials, builders, contractors, realtors, engineers, and land surveyors.

As director and creator of the New England On-site Wastewater Training Program at URI, Mr. Loomis trained thousands of professionals. He directed the design and installation of around 70 innovative on-site systems under the federal- and state-funded demonstration projects in Rhode Island and worked with several communities to develop wastewater management programs and ordinances to establish inventories and inspection programs. He led development of the Rhode Island Septic System Check-Up Handbook to standardize system inspections, helping to protect consumers. He also coauthored the state's sand filter guide, the bottomless sand filter guide, and the pressurized drain field guide, which have since become part of state regulations.

Having served on local and national committees, Mr. Loomis helped establish new regulations and training curricula across the northeastern United States and the U.S. Virgin Islands. His contributions and impact as an industry leader, teacher, mentor, collaborator, researcher, and advocate for environmental protection are immeasurable.

Meg Kerr of the Audubon Society of Rhode Island, North Kingston, Rhode Island, long a staunch advocate for the environmental movement, retired in 2021 after a career of climate leadership and service to the state.

Raised in Westchester County by parents who were environmentalists even before Earth Day existed, Ms. Kerr began her career as a scientist. She worked for EPA across North Carolina, Virginia, and Washington, D.C., where she partnered with states to standardize water quality reporting aligned with the Clean Water Act.

Returning to Rhode Island, she established herself as a prominent environmental advocate in roles at the Rhode Island Rivers Council, the Narragansett Bay Estuary Program, and Clean Water Action. Ms. Kerr finished her career with five years as senior director of policy at the Audubon Society of Rhode Island.

She helped found the Rhode Island Green Infrastructure Coalition, launch the Providence Stormwater Innovation Center (a partnership between Audubon and six other organizations), and founded the annual Land and Water Conservation Summit, which for over a decade brought together hundreds of environmentalists from the region. Ms. Kerr is passionate about pollinators and organized a rally at the State House to bring attention to threats faced by bees.

Paul Susca, who retired in August from the New Hampshire Department of Environmental Services (NHDES), had a three-decade career in state service that left an indelible mark on the state's protection of drinking water resources. As an administrator in the state Drinking Water and Groundwater Bureau, Mr. Susca oversaw the Source Water Protection Program, the Environmental Lab Accreditation Program, state private well initiatives, and an education program focused on water.

His work with partners has helped "move the needle" in protecting drinking water. For example, he helped found the Salmon Falls Collaborative, an interstate partnership nationally recognized in 2012 by the Clean Water America Alliance. This collaborative includes EPA, NHDES, the Maine Drinking Water Program, the University of New Hampshire, watershed communities, and land trusts, all of which combined resources to protect the Salmon Falls River watershed.

Mr. Susca has helped lead New Hampshire's conservation of water supply lands. In 2017, he helped New Hampshire's Drinking Water and Groundwater Trust Fund Commission create the Source Water Protection Land Grant Program. His involvement was instrumental in commission decisions to allocate over $5.5 million to conserve more than 11,500 ac (4,650 ha) of critical water supply lands.

Throughout his career, Mr. Susca led a series of public health-related initiatives. In 2018, the legislature urged NHDES to determine the economic costs and health benefits of a more stringent arsenic standard; Mr. Susca, armed with expert opinions from EPA and NHDES health-risk assessors and cost data from contracted health economists, presented data pivotal to policymakers cutting the arsenic standard in half. This was the first reduction of state standards to below federal standards in New Hampshire, and for this effort he received the NHDES Employee of the Year Award in 2019.

INDIVIDUAL AWARD

Brian Byrnes, deputy superintendent of Providence Rhode Island Parks and Recreation, was recognized for his leadership at the Providence Stormwater Innovation Center in Roger Williams Park. He is also being honored for demonstrating the use of green infrastructure to reduce stormwater impacts and monitoring the results of the watershed's water quality improvements.

Mr. Byrnes helped establish the stormwater center, partnering with the Audubon Society of Rhode Island and other environmental organizations and professionals. He oversaw the installation of many stormwater treatment practices in the park and hosted trainings and webinars for municipal public works staff.

The Providence Stormwater Innovation Center monitors the effect of the stormwater practices on water quality downstream. Data collected on dissolved oxygen, water temperature, chlorophyll-a, pH, alkalinity, nutrients, and bacteria help observers understand the eutrophication process. Cyanobacteria blooms are being monitored in Roger Williams Park ponds, with volunteer monitoring days throughout the summer. Smartphone images of algae blooms and of microscopic samples help experts identify the species.

Mr. Byrnes has shared his passion and knowledge with other state municipal officials and the stormwater design community. The center displays nature-based stormwater practices, provides green infrastructure training, and tests innovative treatment technologies, all to improve urban water quality while beautifying the landscape and creating natural habitat for wildlife.

ENVIRONMENTAL, COMMUNITY, ACADEMIA, NONPROFIT AWARD

Barnaby Evans and Peter Mello for their work with WaterFire Providence. The recurring river sculptural art events that are organized by WaterFire Providence have brought over 10 million visitors to Rhode Island's capital. Ms. Evans and Mr. Mello are, respectively, founder and executive artistic director, and managing director of WaterFire. They have shown that artistic vision, innovative economic strategies, and meaningful community engagement can inspire environmental outcomes.

WaterFire regularly includes paddling events in its lightings that celebrate the cleaner water and return of fish resulting from a sewer improvement project. The organization continues to partner with the underrepresented Olneyville/Valley neighborhood.

One highlight has been WaterFire's leadership in Providence's 2017 Brownfields Areawide Planning project for Woonasquatucket River Valley neighborhoods. Neighboring property owners have since done their own cleanup and renovation projects.

In 2012, WaterFire helped secure over $700,000 in state and federal brownfields funding for redevelopment of a site with a vacant industrial building. The organization bought the vacant building requiring extensive cleanup during renovations. When unexpected PCB contamination threatened the project, the organization made sure tax credit and bond funding remained available. The resulting 37,000 ft² (3,400 m²) arts center opened in 2017 with its historic beauty intact and sustainable building techniques incorporated, earning an award from the Providence Preservation Society.

GOVERNMENT AWARD

Jeff Diehl, for his work with the Rhode Island Infrastructure Bank in Providence. The bank has been integral to addressing the state's public health and natural environment challenges. Last year, it created and supported over 2,300 jobs and closed $105.9 million in grants and loans, including $54 million in clean water and drinking water loans. The bank also developed Resilient Rhody, a statewide climate resilience strategy that brought together 54 members from state agencies, organizations, and research institutions to come up with 61 recommended actions addressing the impacts of climate change.

In November, the bank released a three-year impact report that showed all of Rhode Island's municipalities now have or are updating hazard mitigation plans, 20 municipalities have partnered in the Municipal Resilience Program, and $19.5 million in new funding has gone to climate resilience projects.

Also with the bank's help, Newport received $49 million through both the Clean Water State Revolving Fund and the Efficient Buildings Fund to improve the Newport Water Pollution Control Plant. The Efficient Buildings Fund allowed for solar panels to be installed that will reduce the amount of energy required to operate the facility.

Financing a drinking water and wastewater capital improvement program with EPA's WIFIA

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ABSTRACT | The Springfield Water and Sewer Commission (the Commission), a public, regional drinking water and wastewater utility serving 10 communities in the lower Pioneer Valley region of Massachusetts, was the first utility in Massachusetts to receive financing from EPA's Water Infrastructure Finance and Innovation Act (WIFIA) Program, and, to the best of our knowledge, the first in the nation to apply it to an entire capital improvement program. Absent large grants of the sort available in the 1970s, for utilities with fundamental planning mechanisms in place (and in an environment of favorable interest rates) WIFIA may be one of the few funding sources available to accelerate infrastructure renewal on a system-wide, programmatic scale while maintaining affordability for ratepayers.

KEYWORDS | Water infrastructure, water affordability, financing, capital improvement program, WIFIA

Recently the failure of entire water and wastewater systems has increasingly made national headlines. These stories tend to follow intense storm events that pushed the limit of what water infrastructure already at its end of life could withstand. Jackson, Mississippi, was granted perhaps the most prominent headline in 2022 after its residents were left without reliable drinking water and wastewater service for weeks, highlighting decades of underinvestment. Later in 2022, hurricanes in Puerto Rico and Florida left communities without safe and reliable water service due to inundated infrastructure. For maybe the first time since the 1970s when the federal government was heavily investing in the nation's water sector, the plight of water systems in the United States has once again become a national conversation.

Despite the recognized need for reinvestment, wholescale renewal of drinking water and wastewater systems is no longer as straightforward as it was in prior generations. To enable critical, system-wide renewal in a timeframe that also reduces exposure to the risks from aging infrastructure and climate change, the Springfield Water and Sewer Commission (the Commission) pursued an aggressive and creative financing plan. In 2021, the Commission was chosen among a field of national applicants to receive a $250 million Water Infrastructure Finance and Innovation Act (WIFIA) loan from EPA. The award to the Commission was the fifth largest amount in the nation and the first to be awarded in Massachusetts.

The Commission is an independent, regional public utility that provides retail and wholesale drinking water and wastewater service to approximately 250,000 people in 10 communities in the lower Pioneer Valley. The Commission's drinking water plant was built in 1909 and last modernized in 1974; its wastewater plant was built in 1939 and last modernized in 1972. Each facility relies on infrastructure dating from both eras. Additionally, approximately 40 percent of the Commission's distribution and collection piping is greater than 75 years old.

The Commission's WIFIA loan is uncommon; it is one of the first in the nation to be used for a capital program rather than for one large project. WIFIA financing was competitive, and in receiving it the Commission was rewarded for its prior investment in comprehensive asset management, master and facilities planning, and financial planning over the past decade. In addition, low prevailing interest rates and the potential to use the State Revolving Fund (SRF) as a match converged to make WIFIA the key to accelerating large-scale infrastructure renewal cost-effectively. Owing to the flexibility and low-interest rate of the Commission's WIFIA loan, ratepayers will save approximately $60 million in borrowing costs over 30 years compared to traditional bond markets. In addition, the rate impact will be stretched over decades after construction is complete. In the absence of large grants like those available in the 1970s, for utilities with planning mechanisms in place (and in an environment of favorable interest rates) the WIFIA Program may be one of the few funding sources available to accelerate infrastructure renewal on a system-wide, programmatic scale while maintaining affordability for ratepayers.

The WIFIA loan coincided with historically low interest rates, reducing the borrowing costs for ratepayers

WIFIA PROGRAM

Established in 2014 and administered by EPA, WIFIA aims to accelerate investment in the nation's water infrastructure by providing long-term, low-cost supplemental credit assistance for regionally and nationally significant projects. Eligible borrowers include local, state, tribal, and federal government entities; partnerships and joint ventures; corporations and trusts; and Clean Water and Drinking Water SRF programs. The Commission qualified as an independent public water utility established in accordance with Chapter 40N of the Massachusetts General Laws.

Various projects are eligible for WIFIA funding, including any that qualify for the Clean Water and Drinking Water SRF programs; those that enhance energy efficiency at drinking water and wastewater facilities; water supply projects; drought prevention, reduction, or mitigation; and land acquisition (if related to a project or proven to produce environmental benefits). WIFIA financing can be applied to all project phases, including planning, preliminary design, environmental review and mitigation, and engineering, as well as to financing costs, such as application and loan fees, and reserve requirements according to bond resolution covenants. The Commission's portfolio covers the design and construction of a new drinking water treatment plant, energy- and treatment-efficiency upgrades to its wastewater treatment plant, and distribution and collection system upgrades, including investment in smart meters. The cost of the proposed portfolio as submitted to WIFIA was over $550 million.

Projects supported by WIFIA are large, with a minimum project ranging from $5 million for small communities (population of 25,000 or less) to greater than $20 million for large communities. WIFIA loans approved to date range from $13.8 million to $699 million. In addition, the WIFIA Program funds a maximum of 49 percent of a project (or 80 percent for systems serving less than 25,000 people), requiring 51 percent matching funds from the applicant. Compared to other traditional financing streams for water projects, it has flexible repayment terms; debt repayment can be deferred for up to five years and then extend up to 35 years past a project's date of substantial completion. Repayments can also correspond with anticipated revenue and expenses, allowing time for the Commission to retire older debt before beginning to repay the WIFIA loan. Much of the Commission's customer base is disadvantaged, so affordability and modest rate increases while renewing critical were essential. For this reason, WIFIA's flexible debt-sculpting provisions ultimately proved the most valuable for the Commission.

Timing can determine how advantageous a WIFIA loan will be. The rate, set on the date of the loan closing, is based on the Treasury Direct State and Local Government Series (SLGS) Daily Rate Table Time Deposit Rate plus 0.01 percent. This rate will be fixed throughout the life of the loan. According to the WIFIA Program, WIFIA loan rates are reduced somewhat due to the weighted average life (WAL) rather than the loan maturity date. (WAL essentially calculates the average time the principal amount on a loan remains unpaid and does not consider interest payments to the loan.) At the time of the Commission's loan, rates were at historic lows and were lower than the SRF's standard 2 percent rate. The Commission secured its loan for $249,986,207 on August 19, 2021, at a rate of 1.85 percent.

The $250 million WIFIA loan awarded to the Commission will finance the accelerated design, construction, and implementation of critical upgrades for the water and wastewater systems. These projects are essential for system reliability, renewal of aging infrastructure, regulatory compliance, and climate

resiliency. One benefit for ratepayers is system renewal in a condensed timeframe; instead of an incremental approach over 20 years as set out by the original Capital Improvements Plan (CIP), projects begin to come online in six years, while the rate impact stretches 35 years beyond. This reduces the near-term risk of failure or costly non-compliance with state or federal regulations, avoids large variations in year-to-year rate setting, and reduces borrowing costs (compared to market-rate bonds).

COMMISSION'S WIFIA APPLICATION

Prior to the adoption of its Integrated Wastewater Plan (IWP) in 2014, the Commission's CIP was heavily weighted toward combined sewer overflow (CSO) remediation due to compliance with an administrative order first issued in the early 2000s. Over time, escalating proportions of rate increases were driven by this narrow category of infrastructure investment that did not renew the Commission's other aging infrastructure. As a press release issued by the Commission in June 2014 explained, "The Commission understands that rate increases are becoming a burden to residents. Unfortunately, these increases are primarily driven by unfunded mandates to reduce CSOs in the city.... However, since there is a lack of funding from federal and state agencies, the burden of funding our efforts falls on the ratepayers."

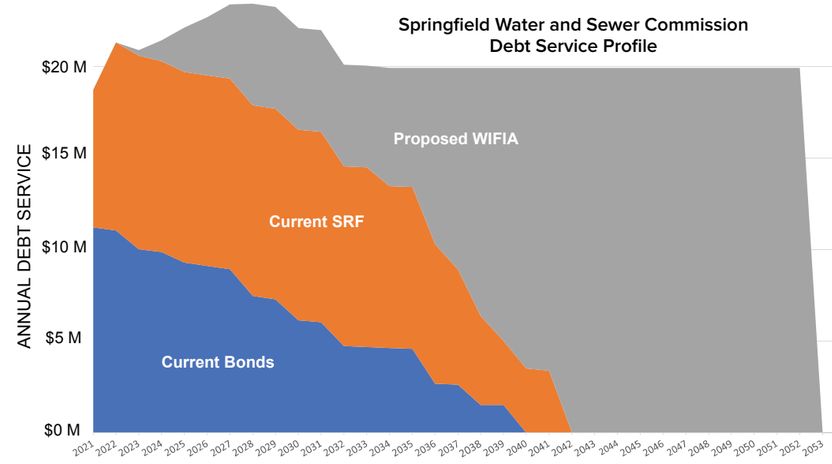
Without a course correction, most of the Commission's reinvestment went to unaffordable CSO remediation while other needs went unmet. The IWP, which followed a new EPA model, sought to put CSO obligations in the context of all wastewater needs, including aging infrastructure, updated regulatory requirements, maintenance of new infrastructure, and rate affordability. The IWP demonstrated the need for greater flexibility in its CSO compliance schedule and included a financial capability assessment based on EPA's 1997 *Guidance Methodology for Financial Capability Assessment* and alternative methods developed by the U.S. Conference of Mayors. The assessment went beyond EPA's guidance to look at micro-community (Census tract) impacts on sewer bills and found that lower-income households would bear an inordinate financial burden by continued CSO obligations: "This financial capacity section [of the IWP], with enhanced weighted average calculations on a micro-community level, provides solid evidence of the pending financial instability of the utility and the increasing level of unaffordable sewer bills placed on lower income households." (Springfield Water and Sewer Commission Integrated Wastewater Plan, 2014)

Meanwhile, in 2015 the Commission also began a facilities plan of its West Parish Filters Drinking Water Treatment Plant (WPF), which like the wastewater plant had not been significantly modernized since the early 1970s. Compliance with the Stage 2 Disinfection Byproduct (DBP) Rule was a known risk due to the plant's dated direct filtration technology and the reservoir's evolving raw water quality owing to more extreme precipitation patterns. Soon enough, record precipitation in 2018 initiated multiple consecutive quarters of DBP non-compliance, bringing more focused and urgent attention to the condition and future needs of the Commission's drinking water treatment infrastructure.

After pilot plant and half-plant trials, the identified solution to DBP compliance was a new clarification process (dissolved air flotation [DAF]). Further planning and assessment identified several other areas of risk at the plant, including 1970s backwash filter pumps with no redundancy or available replacement parts; chemical storage facilities in need of modernized safety; reduced raw water transmission paths from the reservoir due to asset failure; and limited rapid sand filter capacity to support the DAF. Therefore, the project scope expanded to include a new treatment plant with additional modernization to reduce risk of failure; the decision was later validated in early 2022, when one rapid sand filter bed ruptured due to clogged aeration nozzles, temporarily increasing reliance on 1920s-era slow sand filters during the peak summer season. This type of malfunction had never been experienced in decades of continuous use; the failure showed the escalating risks of aging infrastructure.

These large investments were added to the Commission's CIP, which was built using the input from the IWP, the WPF Facilities Plan, and the Asset Maintenance and Management Program (established in 2008 to conduct regular, proactive cleaning and assessment of the collection system). In addition, the Commission adopted financial policies in 2016 to help guide future borrowing and rate-setting along with establishing key parameters such as a debt service ratio benchmark. The Commission had already been conducting financial modeling since IWP development; the model was developed internally and independently verified. The modeling helped the Commission determine the best sequencing of projects to stabilize rates in the coming years.

The adoption of financial policies as well as the internal and third-party financial modeling contributed to the Commission receiving two consecutive ratings upgrades from Standard and Poor's, which would in turn support its eventual WIFIA application. As an independent public utility established in 1996, the Commission faces greater scrutiny for creditworthiness than municipal structures due to its sole reliance on rate revenue. Upon its first bond issuance in 2001, the Commission obtained an A rating from Standard and Poor's, and upgrades to AA- in 2014 and AA with Stable Outlook in 2017 that were directly attributable to its financial policies as well as the third-party verification model. Because of its reliance on rate revenue driven by delivery of water and sewer services, the ratings also underscored the Commission's operational soundness.



Modeling of existing and future SRF, and sculpted debt service used in the WIFIA application

By 2020, the Commission's CIP included the most critical projects. When traditional financing was applied, modeling showed double-digit rate increases for multiple fiscal years on top of a 20-year timeline for execution. The flexibility of WIFIA's financing terms opened a new path forward. WIFIA allowed the Commission to borrow at a low fixed interest rate (due to the rate environment at the time), defer principal payments for five years after project completion, and leverage SRF-funded projects as a match. The Commission realized that deferring repayment would shorten CIP implementation, as there would be time to retire debt while new projects were underway, an option not available with SRF or revenue bonds.

The Commission's financial objective was to support the CIP while keeping annual rate increases below 10 percent and adhering to bond covenants and fiscal policies while maintaining affordable rates. While considering WIFIA, the Commission's financial modeling layered its existing and future SRF, and sculpted WIFIA debt service to minimize it in any future fiscal year. The chart above models the layering of all current and future debt service that supports the Commission CIP. The Commission also spoke with other WIFIA recipients as well as WIFIA staff to further understand the program. As a regular user of SRF funding, the ability to use SRF financing was also advantageous. This included the funding for existing projects under construction, such as the SRF-financed, $127 million York Street Pump Station and Connecticut River Crossing Project, a cornerstone of the 2014 IWP. These factors, as well as the historic low-interest rates at the time, support using WIFIA for large-scale, programmatic renewal.

APPLYING FOR WIFIA

The WIFIA application process is a commitment in preparation and cost. Applicants submit a letter of interest (LOI) with detailed project and financial documentation. EPA then selects submittals to fund and invites applicants to submit a full application. The application fee for larger communities (population greater than 25,000) is $100,000.

Evaluation criteria for both the LOI and full application phases are organized by categories—project impact, project readiness, and borrower creditworthiness. The criteria are numerous, but applications must demonstrate that projects are well-planned and technically feasible, benefitting the public; that WIFIA would enable the project(s) to proceed on an accelerated schedule; and that the borrower is creditworthy and demonstrates their plan and ability to repay the financing over time.

As the Commission crafted its WIFIA application, it knew no one project would have as transformative an impact sought by the criteria as CIP selection. The Commission's CIP was informed by over a decade of asset management programs, facilities plans, and financial planning. These efforts organized the CIP by prioritized projects that maximized their impact by complementing one another and meeting several goals at once. For example, the Locust Street Transfer Project would upgrade neighborhood sewer pipes and add a debris settling basin to improve system reliability together while constructing a new "transfer" connection to the under-construction York Street Pump Station, which in turn is intended to reduce CSOs with its increased pumping capacity.

Once it assembled a portfolio of 28 prioritized projects that supported WIFIA's criteria, the Commission crafted a five-, seven-, and ten-year model to finance planning, design, and construction. Some projects were already financed or even under construction but would be eligible for the 51 percent match. Upon submission of the LOI in October 2020, the Commission submitted a final application for the five-year model. At that point, the Commission had obtained new information indicating the construction period of the new drinking water plant would

New clearwell under construction in October 2022 at the Commission's drinking water treatment plant in Westfield, Massachusetts

One of the secondary treatment basins at the Springfield Regional Wastewater Treatment Facility was drained in late summer 2022 for the replacement of aeration nozzles

be six years, not five. The Commission conferred with WIFIA officials and agreed to apply for a six-year completion for a cost of $500,181,394. The final application, submitted on February 16, 2021, became known as the Commission's Water and Wastewater Infrastructure Renewal Program.

Following its submittal, the Commission entered negotiations with EPA over the final architecture of the loan. During this time, the Commission relied on its bond counsel to help shape the agreement. The agreement's most stringent stipulation is that the projects within the Water and Wastewater Infrastructure Renewal Program may not change substantially from what was in the final application. Since several projects were not fully developed or were conceptual at the time, the Commission knew there was cost uncertainty. The Commission negotiated the ability to reduce or eliminate projects and reallocate funding to other higher-priority projects.

The loan agreement requires completion of all projects by December 31, 2027. The Commission must submit a quarterly report on the status of each project, any delays in government approvals that could affect project completion, and any other changes that could cause a "material adverse effect." In addition, a detailed schedule update is required if substantial completion may be later than noted in the original schedule. Details must be provided in the report outlining the impact, including the revised date of substantial completion.

IMPLEMENTATION

Recognizing that the Water and Wastewater Infrastructure Renewal Program would be unprecedented for the Commission, many strategies were implemented to set up the program for success, including the following:

Strategic hires. Several new key roles were identified and hiring began well before the signing of the loan agreement. These positions included director of legal affairs and procurement, assistant procurement officer, director of engineering, and several additional engineering staff. These hires were necessary to supplement current staff and strategically steer the Commission through its largest portfolio of infrastructure renewal projects in generations.

On-call consultant contracts. The Commission developed a comprehensive consultant selection process for on-call engineering services. The goal was to create lists of qualified consultants in each of the five common categories of engineering services to support the Commission with numerous projects. This selection process occurred prior to the signing of the Loan Agreement, allowing the Commission to quickly execute task orders with consultants for the various projects once the loan was signed. On-call contracts were executed with 20 consultants across five areas:

1. Water distribution, wastewater collection system, CMOM (capacity, management, operation, and maintenance) support, green infrastructure, and traffic management
2. Water and wastewater treatment facilities, pump stations, storage tanks, and related facilities
3. Dam, geotechnical, and environmental licensed site professional services
4. General facilities improvements
5. Planning and engineering support services

Management of consultants. Execution of the project portfolio within the timeframe allotted will require expedited design and construction schedules. This requires aggressive management of consultants with less flexibility in schedule upsets than may have been previously allowed, particularly with the water treatment plant due to its ongoing water quality regulatory exceedances. The Commission communicates with its consultants upfront regarding its expectations, schedule constraints, and the importance of key milestones.

WIFIA administration. In addition to hiring key individuals, the Commission has also hired consulting firms to supplement staff in strategic areas related to project delivery, including WIFIA project management, peer reviews, value engineering, constructability reviews, and owner's project

The York Street Pump Station and Connecticut River Crossing Project under construction in September 2022

manager services. Consulting firms also assist with WIFIA reporting and other loan obligations, including reports, reimbursement packages, and interpretation of requirements.

Now underway, WIFIA financing supports some of the largest, most mission-critical projects in the Commission's portfolio. These are described below.

New West Parish Filters Water Treatment Plant

The Facility Improvements Plan for the WPF Water Treatment Plant was completed in 2021 and identified a multi-phase approach to replace aging infrastructure and maintain regulatory compliance for DBPs. The planning process also identified that an additional raw water clarification step provided by DAF is required to achieve modern drinking water standards, particularly for DBPs. The first phase of the approach, the construction of a new clearwell and backwash pump station, broke ground in late 2021 and completion is expected in 2023. Meanwhile, design of a new drinking water treatment plant is underway. Construction of the new plant is anticipated over the next five years to reduce risk of failure and meet evolving drinking water regulations.

York Street Pump Station and Connecticut River Crossing Project

The York Street Pump Station and Connecticut River Crossing Project is a cornerstone of the Commission's IWP and CIP. A new wastewater pump station now under construction will increase pumping capacity. The project includes three new wastewater conveyance pipes across the Connecticut River, adding redundancy to the two existing pipes that have been in continuous service since 1938 and 1974. The original York Street Pump Station, constructed in 1938 and still in use, will be repurposed as a flood control station.

The project broke ground in 2019 and will continue through 2023. It is being constructed through construction manager at risk (CMAR) delivery. With this delivery method, rather than designing a project and sending it to bid for construction, CMAR incorporates the construction manager earlier in the process to help identify risks that may arise in the construction phase due to design. This garners more price certainty and minimizes project delays due to unforeseen circumstances. The York Street Pump Station and Connecticut River Crossing Project is financed by the SRF for $127 million and served as a match in the WIFIA application.

The new York Street Pump Station will also tie into the Locust Street Transfer Project. Together these two projects are important to the Commission's CSO abatement plan, which will reduce CSO discharges into the Connecticut River during storm events and provide resiliency, redundancy, modernization, and better service to a critical segment of the wastewater infrastructure.

Biological Nutrient Removal and Wastewater Treatment Facility Improvements

The Springfield Regional Wastewater Treatment Facility (SRWTF) is on Bondi's Island in Agawam, Massachusetts, and treats approximately 40 mgd (150 ML/d) of wastewater, serving seven communities in the Lower Pioneer Valley. The SRWTF is thus critical infrastructure, not just for Springfield but for the region.

In 2021, supported by WIFIA financing, the Commission began upgrading the SRWTF to modernize it and meet new NPDES permit limits. The work includes four new grit removal tanks, upgrades to the grit cyclones, replacement of primary clarifier traveling bridges, and new piping and diffuser heads to improve secondary treatment efficiency.

As these projects have moved forward, external pressures such as supply-chain issues and increased materials costs have escalated project estimates. The Commission's negotiation of flexibility in the portfolio of WIFIA-financed projects can allow for the re-allocation of funds among projects to offset some of these anticipated escalations. In addition, the Commission is striving to maximize SRF funding

to further offset anticipated escalations. The passage of the Bipartisan Infrastructure Law in late 2021 provides additional debt forgiveness with SRF borrowing and may further reduce principal and interest costs over the life of the SRF loans.

CONCLUSION

As water systems increasingly experience the stressors posed by end-of-life infrastructure and climate change, large-scale, accelerated renewal may become more necessary than incremental, piecemeal approaches. EPA's WIFIA Program offers flexibility unlike any other financing stream available for water infrastructure projects. The Commission's experience shows that sculpting WIFIA repayment around anticipated revenues and existing debt repayments, as well as using SRF financing for matching, enables utilities to maintain affordable rate increases while embarking on large-scale renewal projects. Obtaining WIFIA financing, however, requires a capital plan based on sound project and financial planning. Regardless of whether WIFIA makes sense for a utility at a certain point, thorough comprehensive and financial planning will always provide a solid foundation upon which to pursue any financing or grant opportunity.

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- Joshua Schimmel has served with the Commission since 1993, rising to director of wastewater operations before becoming executive director in 2016. Mr. Schimmel is the current chair of the NEWEA CSO/Wet Weather Issues Committee and serves on the National Association of Clean Water Agencies Board of Directors and its Affordability task force.

Funding climate resiliency through the MVP program—successes over the last five years and future outlook

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ABSTRACT | Massachusetts' creation of the Municipal Vulnerability Preparedness (MVP) Grant Program was revolutionary in dedicating funding to climate resilience in New England. This article focuses on funding options for climate adaptation and community resilience building across New England through the MVP program, with an emphasis on the history and framework of the program and its improvements for 2023.

KEYWORDS | Municipal Vulnerability Preparedness (MVP), grant, funding, climate adaptation, climate resilience

New England's tight-knit but diverse landscape, from the coastal waterfront communities with a vibrant seafood culture to the beautiful mountains with winter sports, and everything in between, attracts and houses a diverse, engaged, and resilient citizenry. Regardless of location, much of New England culture is directly connected to the nature around it; even the urban hub of Boston is connected to its natural environment through its bustling waterfront.

Climate change is a constant threat to New England, with the promises of unreliable winters, unpredictable and more frequent flooding, and rising temperatures that will eventually impart changes to the diverse and beautiful landscape many of us may take for granted.

Understanding these risks and maintaining the infrastructure, ecosystem, and economy in New England is costly and daunting. Simply sustaining the aging assets that help define historic communities can stretch most municipal budgets. The added burdens of climate change—flooding, increasing temperatures, droughts, etc.—add to the costs for communities to maintain their infrastructure and remain safe and resilient for all demographics.

New England sits at a unique intersection of competing drivers. Not only does it contain some of the oldest, and therefore most costly to maintain infrastructure in the country, but a recent 2021 study illustrated that climate impacts are more pronounced here. Specifically, an analysis of air temperature data between 1900 and 2020 shows New England temperatures are rising faster than the rest of the country.[1] Thus, an already pervasive reality is proving to be even more dire for our communities.

Climate change impacts both infrastructure and the community at large. Historically marginalized populations often live in areas where risks such as flooding and aging infrastructure failure are highest, and these groups often lack the attention from and the access to decision-makers to change these issues. To prevent further inequities from our changing environment, municipalities must find ways to fund infrastructure improvements and protection measures equitably and proactively.

HISTORIC FUNDING OPTIONS

This article highlights one of the most targeted funding sources for addressing these climate risks: the Municipal Vulnerability Preparedness (MVP) Grant Program in Massachusetts. Prior to this program, few historic funding opportunities were available for New England communities to proactively plan for and address climate change. The State Revolving Fund (SRF) programs in each state have been reliable loan sources to fund many clean water and wastewater projects, which can include shoring up infrastructure to be resilient to extreme weather events, but they were not specifically designed to address climate change challenges.

Starting in 2014, some of the coastal states introduced climate-focused grants for coastal resilience including New Hampshire's Coastal Resilience Grants Program and Massachusetts' Coastal Zone Management (CZM) Grant Program. However, these programs are limited to coastal communities. In Massachusetts, this amounts to 78 municipalities (23 percent of 351 total municipalities). Nevertheless, these programs have been transformative for eligible communities, offering funding for resilience planning, public outreach and engagement, vulnerability and risk assessments, infrastructure retrofits, and shoreline restoration.

More recently, other state and federal funding options have become available, including the Federal Emergency Management Agency's (FEMA) grant program for Building Resilient Infrastructure and Communities (BRIC), which funds "proactive investment[s] in community resilience."[2] This funding source and many other local and state funding options tend to be geared toward funding the design and implementation of resilient infrastructure solutions. In these scenarios, upfront community engagement, vulnerability assessments, and planning are often implied. The robust planning that leads to eventual implementation projects has been funded by the municipalities, and has often competed with other obligations and objectives. Including funding for these planning stages is one way the MVP program began to set itself apart.

CREATION OF MVP—A UNIQUE AND REVOLUTIONARY SOLUTION

Massachusetts became a leader in funding climate resilience starting in 2016 when Governor Baker issued Executive Order 569, which required a framework to identify and assess climate vulnerabilities and mitigate these vulnerabilities.[3] Mr. Baker's order tasked the Office of Energy and Environmental Affairs (EEA) with creating a framework for cities and towns to assess their vulnerability to climate change and extreme weather events, to identify adaptations to address these vulnerabilities, and to provide technical assistance. To execute this, EEA partnered with The Nature Conservancy (TNC), which developed the community resilience building framework central to the MVP program. This framework extends beyond the data challenges of identifying and assessing climate risks and folds in community priorities and proven methods of community building and equitable engagement, all of which are now at the core of the MVP program.

In its inaugural year in 2017, the MVP program awarded a then unprecedented $1 million in grant funding to 71 communities.[4] The program evolved in two phases. The $1 million available in the first year focused initially on resiliency planning, coined as the Planning Grant; the second round of funding was made available for project implementation through the Action Grant. This critical second funding phase was inspired by the successes and inherent geographic limitations of Massachusetts' CZM program; with the inception of the Action Grant, these types of funds were now made available across the state.

With 71 communities receiving funding in the inaugural 2017 Planning Grant cycle, the interest and dedication to both resiliency planning and action were clear. This enabled EEA to kick off the Action Grant in 2018 with $5 million to fund the implementation of projects developed through the Planning Grant. Action Grant proposals are measured against the program's nine core principles when being evaluated for funding.

MVP PROGRAM'S NINE CORE PRINCIPLES

1. **Furthering a community-identified priority action to address climate change impacts**
2. **Utilizing climate change data for a proactive solution**
3. **Employing nature-based solutions**
4. **Increasing equitable outcomes for and supporting strong partnerships with environmental justice populations and climate vulnerable populations**
5. **Conducting robust community engagement**
6. **Achieving broad and multiple community benefits**
7. **Committing to monitoring project success and maintaining the project into the future**
8. **Utilizing regional solutions toward regional benefit**
9. **Pursuing innovative, transferable approaches**

In addition to the creation of the Action Grant in 2018, EEA also launched the "resilient MA Climate Clearinghouse," a website that provides communities with direct access to current climate change data and technical assistance. As the EEA engaged with TNC for the community resilience building framework, it partnered with UMass Amherst Northeast Climate Center and Northeast States for Coordinated Air Use management to develop the Climate Clearinghouse. This resource fortified the program's commitment to equity and data accessibility by providing key climate data including temperature, precipitation, and sea-level-rise projections to the public.

The MVP program has become an important funding option for many Massachusetts communities looking to build consensus around vulnerabilities and to identify a path toward more resilient infrastructure. The program's growth over the past five years has matched the continued and ever-increasing need for climate adaptation; this year, $33 million was awarded to communities across Massachusetts. Through both the Planning Grant and Action Grant, the program is supporting communities as they move toward a more resilient future while simultaneously building capacity and engaging the community.

GROWTH AND CONTINUED SUCCESS

Most of the communities in Massachusetts (97 percent, or 341 communities) are enrolled in the MVP program, and thus have received funding through the MVP Planning Grant. Also, over 300 Action Grants have been awarded to support a subset of those communities with project implementation. These awards have covered a wide range of projects addressing resiliency from creating climate resilience through land use language, to restoring floodplain connectivity and constructing wetlands for improved ecosystem habitat, to creating a detailed and multi-pronged five-year climate action plan; the program has been leveraged in many other ways to address the needs and goals of most Massachusetts communities.

Engaging diverse constituencies, especially marginalized groups, as core partners in resilience planning and action continues to be a program goal and an opportunity for its continued growth and improvement

The EEA team that administers the MVP program has grown as well with seven staff as of this writing. This team can work as a project partner with many communities, guiding grantees about resources for more successful community engagement; it also works with the communities that have not been through the program to understand their needs and how the program can benefit them.

With a unified vision and attention to the details of the wide-ranging planning and action grants awarded and executed, EEA is using this five-year milestone as an adaptive management marker of sorts for the grant itself, reflecting on its successes and creating opportunities for improvement within the program. While 97 percent of Massachusetts communities have completed the planning process, only about half have pursued and received an Action Grant. It is a goal of the program for all communities that complete the Planning Grant to also complete the Action Grant. Engaging diverse constituencies, especially marginalized groups, as core partners in resilience planning and action also continues to be a program goal and an opportunity for continued growth and improvement. Even the communities who have been awarded Action Grants still have work to execute in this space, and many communities are wondering about what happens next and how they can continue to update their plans and build resiliency within their communities beyond completion of the Action Grant.

INTRODUCING MVP PLANNING 2.0

In response to these critical questions and the success of the MVP program thus far, a new and improved version is on the horizon. It will continue to transform the state's ability to fund critical climate resilience work. Targeted for release in the spring of 2023, the updated MVP program will revisit best practices and refocus on the goals that drive the program's success. The objective of updating the Planning Grant is to continue to fund important community building, vulnerability screening, and resilience-based work in Massachusetts, while improving the equitable engagement, implementation access, and resources shared through the program. The following three areas are being developed for the updated program: equity and environmental justice, action, and resources.

Equity and Environmental Justice

A reimagined and improved community engagement framework will require more diverse community participation at all stages. To achieve this framework, EEA is directly engaging both an equity council and review panel in envisioning the updated program. The equity council comprises 10 representatives across community-based organizations, social justice advocacies, and municipal diversity, equity, and inclusion staff. The council will strive to ground the re-tailored approach in a deep equity framework. Key takeaways through this council so far, as shared by EEA, include the following:

- The work of listening to, building relationships with, and collaborating with environmental justice and socially vulnerable populations is critical to the updated program. More creative and flexible engagement is needed, including going to where people already gather rather than hosting traditional public meetings.
- The community liaison or "promoter" model is recommended, in which a group of community leaders from environmental justice or socially vulnerable communities receive training in topics that support their outreach (e.g., climate resilience, climate justice, and outreach approaches). The trained liaisons would then lead outreach within the community and act as liaisons to the municipality in identifying and advocating for community needs.

The review panel is also critical. It consists of 75 program leaders from across the state representing both municipal and non-governmental organization voices. Desired program improvements identified by the review panel so far, as shared by EEA, include the following:

- Greater participation by the wider community, particularly from environmental justice or socially vulnerable groups or their advocates, as well as youth
- More collaborative and community-led planning
- Flexibility in the information gathering and engagement process
- Reduced planning fatigue with more of an emphasis on defining actionable project ideas to move from planning to implementation

Action

To move more communities from the Planning Grant toward the Action Grant, EEA is evaluating how to transform the former's final deliverables to transition communities more effectively into an implementation plan and competitive Action Grant. MVP Planning 2.0 will provide more guidance and resources to make this happen.

Resources

EEA has partnered with groups over the years developing resources to update climate data and decision support tools, and these resources will be integrated into the next phase of the MVP program. The climate data will involve a new statewide climate assessment with updated climate impacts across the state's five sectors and seven regions. This information is intended to better assist communities in answering the following questions:

1. What are the top impacts in your region, and what do they mean for your community?
2. How can you address those impacts in a way that moves your community forward?

More case studies, strategies, and resources on equitable engagement will also be included in these enhanced resources, including the lessons learned through the program over the past five years.

CONCLUSION

Funding the maintenance and improvement of New England's infrastructure, ecosystem, and economy are daunting yet critical tasks, and in Massachusetts, the MVP program has proven revolutionary. The program's progression and continued improvement have both changed the landscape of resiliency approaches in Massachusetts and set the stage for other New England states. Both Maine and Rhode Island have modeled programs after Massachusetts' MVP program, and most recently in 2022, Connecticut announced its own state grant program for climate change resilience. Called the DEEP Climate Resilience Fund, first-year funding is anticipated to be $10 million.[5] Developments such as these suggest continued improvement in finding mechanisms that facilitate and fund resiliency improvements across the region.

ACKNOWLEDGMENTS

Thank you to the team at EEA for its willingness to discuss the MVP program, offer its perspectives, and ensure the data are accurate and dependable.

ABOUT THE AUTHOR

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I/A OWTS task force update—exercises in collaboration

BRUCE H. WALTON, CHAIR, I/A OWTS task force

ABSTRACT | This article is an interim report on the distributed innovative/alternative (I/A) on-site wastewater treatment systems (OWTS) task force formed in April 2021. The task force's charge is to collaborate with stakeholders evaluating decentralized/distributed alternatives for reducing nitrogen loads in Cape Cod watersheds and other coastal areas. A new generation of enhanced I/A septic systems is going through the rigorous Massachusetts permitting process. They appear to be cost-effective when managed as infrastructure through a responsible management entity (RME). Once permitted for General Use and supported by an RME, they could become a significant "tool in the toolbox" alongside sewers to reduce nitrogen loads. This is not a technical article. It is about how we have moved things along and lessons learned, with emphasis on funding and financing targets and approaches.

KEYWORDS | Innovative/alternative (I/A), on-site wastewater treatment systems (OWTS), distributed, decentralized, wastewater, Title 5, nitrogen sensitive area, task force, nutrient pollution, Cape Cod, responsible management entity (RME)

Cape Cod and Rhode Island coastal waters suffer from nutrient pollution, which over-fertilizes our waters, damaging streams, ponds, embayments, and coastal zones while threatening drinking water sources. According to the Massachusetts Department of Environmental Protection (MassDEP), nitrogen from septic systems causes 85 percent of this problem. Seventy-four percent of Cape Cod homes use septic systems, as do 30 percent of Rhode Island homes.

Responding to the Clean Water Act mandate to reduce nitrogen loading by half, Cape Cod towns have embarked on 30-year sewer plans that will cost $4 billion but cover less than half of the area. What about the other half? And how can we accelerate the cleanup? If something works and is cost-effective, the tool needs to be used.

In Massachusetts as well as in Suffolk County, New York, researchers and practitioners are evaluating a new generation of enhanced innovative/advanced (I/A) on-site wastewater treatment systems (OWTS). These decentralized systems show promise for improving nitrogen reductions affordably, but most have not yet completed the evaluation process. If these systems continue to perform well, they may complement municipal sewers, particularly where housing density is low, and sewers are relatively more expensive. The challenge for bringing the next generation of I/A OWTS to the Massachusetts market is getting the systems through expensive ($1.5 million per system), time-consuming (at least five to six years) permitting. The Massachusetts Alternative Septic Systems Test Center (MASSTC) has identified eight such promising technologies. A NEWEA task force formed in the spring of 2021 is collaborating with stakeholders to move these technologies forward.

HISTORY OF I/A, NEWIN, AND NEWEA

When Cape Cod's 208 Plan to satisfy Clean Water Act requirements was finalized around 2015, a study conducted on the I/A systems concluded that many did not work well at the standard of 19 mg/L effluent nitrogen. Sewers were a clear winner. The towns' comprehensive wastewater management plans (CWMPs) naturally took a path toward sewers and centralized treatment.

Given the need to reduce nitrogen loads to Cape Cod estuaries by 50 percent and that the 19 mg/L standard is only about 33 percent less than the assumed concentration from an ordinary Title 5 septic system, it is difficult to see how the original I/A septic systems could be part of a solution. Simple, back-of-the-envelope calculations indicate that decentralized systems must perform at levels at or below 10 to 12 mg/L to have a sufficient impact on watershed nitrogen loads. MASSTC found about eight technologies that appear to meet the 10 to 12 mg/L target, including two that were operating at or below 5 to 7 mg/L.

NorthEast Water Innovation Network's (NEWIN) focus on I/A went back to before 2014. Its mission was to accelerate technology innovation in the water industry. In 2017, NEWIN helped put together an Innovation Showcase at the OneCape Summit in Hyannis. Five I/A vendors participated. When NEWIN merged into NEWEA in early 2020 to help create the Innovation Council, I/A continued to be a theme. A consumer primer article was published on the Innovation Council website in October 2020, and a webinar highlighting the Barnstable Clean Water Coalition (BCWC) Shubael Pond project was held in November 2020.

MassDEP clearly would not, and should not, bet on one vendor or technology to drive a standard change. That puts too much risk in one basket. At least three to four viable solutions are needed to support a regulatory or practice change.

Stakeholders who must implement and live with new solutions would like to see perfect engineering. That is unrealistic. Any technical or management innovation will have a learning curve and problems to be solved. Part of the social agenda is working within that framework and helping stakeholders become comfortable that risks are manageable. As Zee Crocker, executive director of BCWC paraphrased, *We cannot let perfection become the enemy of good.*

Thus, NEWEA cannot pick a winner, but we can highlight promising solutions. At each vendor webinar an explicit statement was made that we are not endorsing any one technology or vendor.

STRATEGY AND TACTICS

NEWEA does not have the resources to solve a problem such as this. We can be a convening authority that brings relevant stakeholders together and starts or continues conversations leading to better understanding and common strategies. EPA has engaged with stakeholders to explore and evaluate solutions to Cape Cod's nitrogen problem. We worked to amplify the lessons learned and expand the conversation through our network via webinars and other means.

Webinar Marketing

One thing we learned after the first webinar was the need to broaden our event marketing. The first webinar was promoted only to the Massachusetts Health Officers Association. Subsequently, we promoted our webinars to over 30 organizations, inviting them to spread the word. It made a difference in the attendee counts and where attendees came from. In fact, we had registrations from 21 states.

Task Force Basics

NEWEA's charge to the I/A OWTS task force is as follows: ***The I/A OWTS task force works to create a regulatory and market environment favorable to advancing technologies and adoption of enhanced I/A OWTS to protect our communities. The task force aims to facilitate collaboration among innovators, water utilities, and regulators to bring viable solutions to market faster and more economically.***

The group's objective is to be ready with multiple, General Use permitted solutions when the comprehensive wastewater management plan (CWMP) five-year adaptive management reviews start coming around in 2025. Once Massachusetts issues General Use permits for multiple I/A OWTS and approves an associated management process, it can be a model for the rest of the country.

Our regulatory structures face several pressures to expand watershed protections and recovery. In June, MassDEP announced plans to expand Title 5 to include nitrogen sensitive areas (NSAs). For Cape Cod this would include 30 estuaries with established total maximum daily loads (TMDLs). As of this writing, MassDEP is working toward public comment with a target to finalize regulations in early 2023.

Complex issues characterize this situation. A conversation may start with one topic, but multiple tangential issues get brought up. As a result, often no progress seems to be made. Part of the task force's agenda therefore is to isolate items that could be discussed and moved forward without much reference to the other complexities. In this case, and with a lot of discussion, the issues are as follows:

- Which technologies and/or vendors are promising enough to consider?
- How do we manage them to ensure they will work to specification over 30 years?
- How do we fund and finance them, both for permitting and adoption?

Five webinars and a charrette addressed these three issues over the past year.

State, towns, counties, consulting engineers, and utilities are all risk averse. These important decisions are, if wrong, difficult and expensive to undo. We must ensure that permitted systems will perform as promised.

The range of stakeholders includes the following:

- Massachusetts Department of Environmental Protection
- EPA Region 1 and its Southeast New England Program
- EPA Office of Research and Development
- Massachusetts Alternative Septic Systems Test Center of Barnstable County
- The Nature Conservancy
- Barnstable Clean Water Coalition
- Cape Cod Commission
- Buzzards Bay Coalition
- Pleasant Bay Alliance
- Association to Preserve Cape Cod
- NEIWPCC (New England Interstate Water Pollution Control Commission)
- National On-site Water Recycling Association
- Yankee On-site Wastewater Association
- Massachusetts Health Officers Association
- Town department of public works and water leaders
- Consulting water engineers
- Vendors
- Academics
- NEWEA

Resources Web Page

Early on it was clear that individual conversations and webinars would not be enough to effect change. We created a web page (newea.org/resources/innovation/resources) to capture information. We posted videos as well as slide sets and a charrette readout, along with articles and links for self-education for both professionals and consumers.

"There are many, many tasks on the 'to do' list to successfully address nitrogen impairment of water quality in southeastern Massachusetts. The I/A task force's efforts help build a coalition of interested parties, people who can tackle various parts of the problem, and expand the number of issues, and the depth of those issues, that we can work on. The I/A task force's emphasis on a responsible management entity (RME) helped the understanding of how to develop a functional RME, fund it, and run it. The I/A task force helped MassDEP and the municipalities that may be involved come together and work on the topic. Ultimately, this greatly expands the capacity, and increases the likelihood that a functional RME can be created, funded, and operated successfully."

– Lealdon Langley, Director, Division of Watershed Management, MassDEP

EPA SNEP and Webinars

In late 2020 EPA Southeast New England Program (SNEP) expressed a desire to collaborate more with the private sector. At its request in January 2021, we provided input to SNEP's strategic five-year plan and to a three-day workshop that the program was planning on I/A systems for June 2021. To publicize these developments, in September 2021 we held a webinar to present the results of the June EPA workshop. MASSTC had identified eight promising technologies from its research. We then held a series of three webinars in November, December, and January to enable each vendor to present, answer questions, and prepare a spreadsheet that collected common data. We also highlighted nitrogen sensor developments from EPA's Sensor Challenge. A sensor developed at Stony Brook University (Long Island, New York) won the challenge and subsequently went through a rigorous, successful, six-month ISO testing protocol at MASSTC. It is now being made into a product and field-tested under a corporate name.

OM&M—RME Charrette

To address operations, maintenance, and monitoring (OM&M), we conducted a charrette at the January 2022 NEWEA Annual Conference. Thirty senior water professionals convened (live and on Zoom) to consider how to manage I/A. As a starting point stakeholders embraced EPA's concept of a responsible management entity (RME) to manage OM&M. How do you guide its creation and structure? Taking to heart EPA's suggestion to listen before talking, we invited presentations from core stakeholders at the federal, state, county, town, and regional levels (including Long Island) to share their perspectives. Then we broke into four study groups and debated questions that included a vision for I/A in 10 years. We had solicited from key participants the most impactful questions, right up until the week before the charrette. The key concept was to manage I/A as infrastructure. Other regions have learned that leaving it to the homeowner to manage an advanced OWTS has often proven ineffective. It is too easy, for instance, to turn off a blower inadvertently, and then you have lost the performance value of the I/A system. Based on WEF's definitions, systems managed centrally via RME would be considered distributed systems, so we will use that term going forward in this article.

Funding and Financing

In early May 2022 we hosted a webinar on funding and financing I/A, again inviting presentations from federal and state agencies. We also received a presentation from a "B Corp" focused on architecting and raising funds from impact investors. This organization focuses on developing public–private partnerships (PPPs) and programs that use pay-for-performance financing. In such cases, investors expect a return that includes a social component, and based on the program's performance compared to the social agenda, investor returns could be greater or lesser. This is important to fit the best solution to the need and not rush to the cheapest solution only.

OTHER ACTIONS

Task Force—Start by Listening

In March 2021 a core team presented to the NEWEA Government Affairs Committee on our efforts. NEWEA leadership formalized our activities under a task force to help "nurture" our activities. NEWEA has provided great support. Since formation, the task force has grown to about 25 participants, including several members new to NEWEA. We have monthly conference calls. Members include water engineers, town department of public works employees, vendors, academics, MASSTC, and other key players. We found that talking regularly with key stakeholders helped identify high-value activities.

Mailings and Inquiries

Over the past few years, the author had developed a mailing list of around 250 consumers and water professionals, mostly around Cape Cod. The mailing philosophy was "infrequent and irregular" so as not to overwhelm people. In describing to consumers why we were doing this, we told them that we needed them to be educated and would eventually need their voices to be heard. This mailing program was a way to achieve that in a light-lift mode. As a measure of success, only one consumer has opted out over the past year. As a result of the visibility from these mailings, we have received several consumer inquiries about how they could proceed on their own properties. We have tried to be responsive, again without picking winners and by connecting them to appropriate engineering firms that could provide guidance.

FUNDING THE WORK

Funding is a work in process. We are building a sustainable strategy, including public and private sources, to fund Cape Cod's water quality path to nitrogen load reduction. The first step was the webinar in May 2022 on funding and financing I/A. That set the table and was notable in the number of clarifying questions asked by water professionals.

Estimated Capital Needs

The initial, approximate capital needs are as follows:

$10 million over three to five years to achieve General Use permitting for promising I/A solutions:

- The objective will be to achieve General Permit status for at least three to four systems.
- The vendor's cost to permit a system in Massachusetts is high. Once in Provisional Use status, the state calls for three years of monitoring and manual data collection on 50 systems before awarding a General Use permit. Towns have been reluctant to embrace I/A until a system has a General Use permit. Vendors cannot afford over $1.5 million and five to six years just to get permitted. They go to other states where the only requirement is a National Science Foundation certification (assurance that a trusted independent certification organization has tested a product). Thus, little progress has been made in permitting. We need large chunks of external (generally federal, state, or non-governmental organization) money to move pilots forward. For example, the BCWC has already spent $500,000 on the Shubael Pond project (see BCWC website) along with support from EPA, U.S. Geological Survey (USGS), and The Nature Conservancy (TNC). It was helped by a previous Massachusetts Clean Energy Center (MassCEC) $150,000 grant to a promising vendor. The grant helped it move through the Pilot Use permit phase to a Provisional Use permit in May 2020.
- We are working to accelerate permitting with new, remote sensor-based data collection approaches, but that is a long road, too; this estimate assumes no change to current regulations.

$3 million over five years to stand up a pilot RME to manage I/A installations as infrastructure. MASSTC will manage the pilot. At scale it would be self-sustaining through user fees, but the initial standup will require investment funding.

$100 million to $150 million per year starting in four to five years to finance adoption on the order of 3,000 to 5,000 systems per year in Cape Cod. That system number is simply the current annual number of Title 5 installations. Nantucket, Martha's Vineyard, and the southern coast have similar problems and would significantly add to these numbers.

Growth capital for small companies ramping up an order of magnitude above current revenue levels.

Funding Sources

As of October 2022, MASSTC has received grant funding to help stand up the pilot RME, including an initial $100,000 from TNC and $1.15 million from EPA SNEP over the next five years. That is less than one-fourth of the projected standup cost.

Some funding will come from Clean Water State Revolving Funds (SRF) and other federal and state programs such as Barnstable County's Community Septic Management Loan Program, soon to be renamed AquiFund. A challenge will be to put distributed systems on the SRF map. Over the last two decades, while 25 percent of the state's homes are on septic systems, only about 2 percent of SRF funds have gone to distributed systems. Nationally, 24 percent of the nation's 26 million homes use septic systems. Of those 6.2 million homes, 10 percent drain into impaired water bodies, yielding at least a $21 billion market. This may explain why WEF recently announced the creation of a national task force on distributed systems.

Ultimately, we will need to access private funds, with the amount to be determined. We are evaluating impact investment advisors to create a sustainable funding and financing architecture for Massachusetts. We will emphasize performance-based pricing to drive focus on best-performing systems rather than simply the cheapest ones. That is expected to be challenging, so one deliverable will be a compelling investment

Task Force Activities and Links

Distributed Nitrogen Removing I/A Septic Systems Webinar
November 20, 2020

Update on a New Generation of Enhanced I/A Septic Systems Webinar, September 15, 2021

I/A On-site Wastewater Treatment Technologies Webinars
November 16, 2021, December 14, 2021, January 11, 2022

Annual Conference Charrette on I/A OWTS OM&M (RME)
January 24, 2022

I/A Septic Systems Funding and Financing Webinar
May 3, 2022

RME Charrette Readout: newea.org/wp-content/uploads/2022/03/I_A-RME-Charrette-Readout-.docx-3.pdf

Primer Article: newea.org/2020/10/09/distributed-nitrogen-removing-i-a-septic-systems-a-2020-primer-for-cape-cod/

Task Force Events and Links: for details see—newea.org/resources/innovation/resources/

thesis for impact investors. And we will seek a partner to tap impact investment markets; the RME will oversee this exercise.

Hopefully, our approach will be a model for other areas with similar nutrient pollution problems, such as North Carolina, Florida, the Chesapeake Bay, and Hawaii. Long Island is already moving down this path, and we are learning from each other.

OUTCOMES

How do you measure success? That is always a question in exercises such as this. One metric is webinar attendance. We attracted over 500 webinar attendees from 21 states and two foreign countries. The average webinar attendance was 100, with a range of 70 to 168. We identified 375 separate registrants. This forms the core of a database of interested parties for future outreach.

Another metric is website activity. As of early October, 750 individuals had accessed the Task Force Resources website with 1,075 page views, and 1,350 individuals had accessed the Consumer Primer article with 1,775 page views. This article was posted to the Innovation Council website a year before the Task Force Resources page was created.

According to Lealdon Langley, director of MassDEP's Division of Watershed Management, our efforts have helped create "momentum" for I/A systems and helped answer some questions the division had. We sense more towns are considering I/A systems within their CWMPs, including in some cases financial incentives to homeowners for installing them. MASSTC has noted increased interest from new vendors who want their systems tested.

System Cost and Price Performance Picture

Everyone is interested in cost and price performance. Cost is a challenging topic. It is site specific. It is also complex and must focus on capital, operating, and financing issues and assumptions. For this article the cost figures are based on the author's conversations and website reviews, not on any formal quotes or a definitive study.

For a two- to three-bedroom home, and based on recent projects, it appears a fully installed I/A system today should cost $30,000 to $35,000; inflation is of course affecting both I/A and sewering costs. The best performing systems may cost more. For a retrofit installation, where the septic box and leach field are preserved, the number may be in the mid to upper $20,000s. OM&M in the Provisional Permit stage could run $1,200 to $1,400 per year, dropping to about $800 per year with a General Use Permit. With an RME in place and effective management, that cost could be driven down to the $500 per year range.

Estimated average new sewer costs to a town range from $70,000 to $110,000 per home. As a reference point, the Town of Barnstable 2020 CWMP noted an average sewer charge of $400 per year, growing at 3 percent annually.

Acknowledging that I/A systems at 10 to 12 mg/L are not performing at the level of a centralized treatment plant, where the author understands average sustained performance to be 5 to 7 mg/L, the I/A capital costs appear to be 25 to 50 percent the capital cost for sewers; one-third seems a fair number. Operating costs will be marginally higher for I/A, but not high enough to catch up with "centralized" treatment on a 20-year basis. For example, assuming $800 per year I/A OM&M cost versus a $400 per year sewer bill, over 20 years I/A costs only $8,000 more, much smaller than a capital cost differential of $35,000 to $75,000.

Adjusting for performance differentials, I/A is still cost-effective and seems a good tool.

LESSONS FROM THE PAST YEAR'S COLLABORATION

- Get great people involved, then listen to them
- Let multiple voices shape the deliverables
- Be flexible and open to change as the conversation develops
- Engage all stakeholders, including the doubters (they sharpen the discussion)
- In a situation of great complexity, focus on issues where you can make progress

WHAT'S NEXT?

- Develop an investment thesis, including pay-for-performance structures, for impact investors; help go to market with it on behalf of the RME
- Help draft a roadmap for integrating new, data-rich, sensor-based approaches into systems management and eventually into permitting
- Identify and engage political champions
- Engage with WEF's new Distributed Water Infrastructure task force
- Add phosphorus to the task force agenda, because of its impact on freshwater ponds

ACKNOWLEDGMENTS

Many people have contributed to this task force. Thank you Marianne Langridge, Brian Baumgaertel, Scott Horsley, Maggie Theroux Fieldsteel, and the NEWEA support team. Beyond the task force many have engaged deeply, including Alison Bowden (TNC), Zee Crocker (BCWC and team), Lealdon Langley (MassDEP and team), Tim Gleason (EPA Office of Research and Development), Mary Jo Feuerbach, Ian Dombroski, and Adam Reilly (EPA Region 1). We appreciate all their efforts and look forward to continuing progress.

ABOUT THE AUTHOR

Bruce Walton is a third-generation Cape Cod homeowner with an interest in water quality. He chairs NEWEA's I/A OWTS task force. Recently retired, he spent almost 40 years as an executive recruiter in Boston focused on family-owned, mid-cap industrial and technology businesses. Most recently he was a partner with Battalia Winston after positions with startup Conley and Company and global recruiters Heidrick and Struggles and Russell Reynolds Associates. He was a former board member of the NorthEast Water Innovation Network.

A piece of the pie—grants and funding for cybersecurity

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ABSTRACT | Cybersecurity has moved to the forefront of utility concerns. With this newfound awareness comes not only the need to plan and implement cybersecurity improvements but also to fund them. Fortunately, both federal funding and state funding are available. This article highlights opportunities available to water and wastewater utilities to fund cybersecurity for business and control systems.

KEYWORDS | Cybersecurity, funding, federal, Infrastructure Investment and Jobs Act (IIJA)

Cybersecurity has moved to the forefront of utility concerns. Devastating ransomware attacks against utilities and municipalities highlight the potential for widespread disruption of even the most mundane computerized systems. The Covid-19 pandemic forced utilities to consider previously unthinkable remote access to sensitive business and operational systems. In recent months, the potential for critical infrastructure attacks by nation-state actors has become the major focus of cybersecurity planning.

Drinking water utilities completed risk and resilience assessments (RRAs) to comply with the mandate identified in Section 2013 of the 2018 America's Water Infrastructure Act (AWIA) identifying potential consequences associated with natural and malevolent threats. Utilities recognize that even ordinary computerized systems must be protected. Utilities need to fund improvements as well as plan and implement them. Both federal funding and state funding are available, providing opportunities for water and wastewater utilities to invest in cybersecurity for business and control systems.

INFRASTRUCTURE INVESTMENT AND JOBS ACT

The Infrastructure Investment and Jobs Act (IIJA) was passed into law in November 2021 and includes state, territory, tribal, and local government cybersecurity funding under three programs: 1. State and Local Cybersecurity Grant Program; 2. Rural and Municipal Utility Advanced Cybersecurity Grant and Technical Assistance Program; 3. Cyber Response and Recovery Fund.

1. State and Local Cybersecurity Grant Program

The State and Local Cybersecurity Grant Program (SLCGP) was established by the Cybersecurity and Infrastructure Security Agency (CISA) under the IIJA that will distribute $1 billion in installments over four years, beginning with approximately $185 million in 2022. Grants help finance state, county, tribal, and local government cybersecurity programs. Funding is allocated by states. Only designated state administrative agencies (SAAs) may apply directly for SLCGP funding. Counties, cities, and towns must apply to their SAA. SAAs may partner with one or more other SAAs as a multi-entity group, with no limits to the number of participating entities. The Federal Emergency Management Agency (FEMA) will coordinate with the CISA to administer the program. Funding in 2022 is focused on "recipients standing up a Cybersecurity Planning Committee, and developing, approving, and submitting a statewide security plan." Each state and territory must create a Cybersecurity Planning Committee to coordinate, develop, and approve a cybersecurity plan and prioritize projects.

Once the plan is approved, funding is available for implementation of known cybersecurity best practices, training, and other activities linked to the plan. Water utilities are eligible for funding for developing, updating, and implementing cybersecurity plans, addressing imminent threats, managing and administering the grant program, and any other activities the Department of Homeland Security (DHS) deems appropriate. For fiscal year 2022, the published application deadline for states was November 15.

Plans will be approved for two years, with subsequent plans approved annually and building on investments from prior years. Cybersecurity Planning committees must include representatives from state and local government, and public health education institutions. FEMA will distribute these funds by using the following formula for baseline funding: 0.25 percent to territories, 3 percent to tribes, 1 percent to each state.

Remaining funds to each SAA will be distributed as follows: 50 percent to the states by total population, including 25 percent to rural areas; 50 percent to state's rural population.

For each approved plan, the SAA must distribute funds as follows: at least 80 percent to local governments, 25 percent to rural entities, and a distribution of funds within 45 calendar days of receipt.

SAAs must meet the following requirements: Applicants provide 10 percent of project funding requirements, local governments apply to the SAA for funding, and local projects align with state cybersecurity plans.

Cybersecurity Planning committees must describe how the following four cybersecurity elements are addressed in their plans:

1. **Governance and planning**, including governance structures, cybersecurity plans, incident response, and continuity of operations plans
2. **Continuous assessment and evaluation**, including cybersecurity posture and identification of needed improvements
3. **Mitigation of risk** through security protections commensurate with risk
4. **Workforce development** providing cybersecurity training commensurate with job responsibilities

Applications should include the following:

- A cybersecurity plan
- Proposed projects aligned with the plan
- An established Cybersecurity Planning Committee comprising the applying entity, chief information officer (or equivalent) of the entity, representatives from counties, cities, towns, and local governments, public education and health institutions, and rural, suburban, and high-population jurisdictions, as appropriate, within the applying entity (state). At least half of the committee representatives must have professional experience relating to cybersecurity or information technology.

Specific topics addressed in the plan should include the following:

- Management, monitoring, and tracking of information systems, applications, and user accounts
- Monitoring, auditing, and tracking of network traffic between information systems, applications, and user accounts
- Plans for the preparedness, response, and resiliency of information systems, applications, and user accounts to address and mitigate cybersecurity threats
- Application of vulnerability assessments and threat mitigation to information systems, applications, and user accounts

In September 2022, FEMA released the Fiscal Year 2022 State and Local Cybersecurity Grant Program Notice of Funding Opportunity: Connecticut, $2,681,116; Maine, $2,666,932; Massachusetts, $3,173,589; New Hampshire, $2,499,170; Rhode Island, $2,190,484; and Vermont, $2,310,302.

Applications are still being accepted for funding and may slip into 2023; interested applicants should check with the applicable SAA regarding availability. SAAs for New England may be contacted at the following agencies:

- Connecticut Department of Emergency Services and Public Protection
- Maine Emergency Management Agency
- Massachusetts Executive Office of Public Safety and Security
- New Hampshire Department of Safety
- Rhode Island Emergency Management Agency
- Vermont Department of Public Safety – Homeland Security Unit

2. Rural and Municipal Utility Advanced Cybersecurity Grant and Technical Assistance Program

This smaller program is administered by the Department of Energy (DOE) and directed at securing rural and municipal electrical systems. It is primarily of interest to combined utilities. This program provides $205 million over five years to deploy cybersecurity technologies and information sharing. More information was scheduled to be released late this year.

3. Cyber Response and Recovery Fund

The Cyber Response and Recovery Fund will aid state and local governments recovering from a cyberattack. CISA will administer this program and distribute $100 million over five years among federal, state, local, and tribal agencies identified by the DHS as affected by a cyber incident under an emergency declaration. Funds may be used for hardware, software, and technical support. More information was released at the end of fiscal year 2022.

Additional information on IIJA is available at grants.gov, and from FEMA and CISA.

AMERICAN RESCUE PLAN ACT OF 2021 TECHNOLOGY MODERNIZATION FUND

The American Rescue Plan Act (ARPA) was passed into law in 2021 to facilitate the economic impact of lost tax revenue due to the Covid-19 pandemic. ARPA rule changes were made in early 2022 to expand focus on cybersecurity upgrades and broadband construction. Rule changes enacted in April broaden the scope of "government services" to include information

technology (IT) upgrades, cybersecurity modernization, and broadband infrastructure construction as acceptable uses of funding. Thus far, over $245 billion of the $350 billion state and local relief fund has been awarded. This includes hardware, software, and protection of critical infrastructure, with $130.2 billion allocated in this area for counties, cities, and smaller governments. Application must be submitted by December 31, 2024, for projects scheduled for completion by December 31, 2026.

CLEAN WATER STATE REVOLVING FUND

The Clean Water State Revolving Fund (CWSRF) is funded annually by federal capitalization grants, state match contributions, and loan repayments to programs operating in each state. Additionally, the IIJA provided a supplemental capitalization grant of $11.7 billion over the next five years with 49 percent loan forgiveness, or grant, to fund additional projects. The CWSRF provides low-interest loan and other assistance to public, profit, or non-profit agencies for water infrastructure projects. Publicly owned treatment works (POTWs) are eligible for funding for the development of cybersecurity measures and practices. This funding provides low-interest loans for water quality projects that are repaid to the CWSRF to fund future eligible projects.

The CWSRF varies based on state priorities. States use Intended Use Plans (IUPs) to describe the intended program goals, operations, and compliance with public and EPA requirements:

- CWSRF funds may be provided to POTWs for vulnerability assessments, contingency and emergency response plans, and the development and initial presentation of workshops, seminars, and other training-related cybersecurity awareness and response.
- CWSRF funds may be used to acquire system upgrades and equipment, including system and software updates, backups, and cybersecurity of IT and operational technology (OT) systems. Supervisory control and data acquisition (SCADA) systems have been identified for CWSRF funding, including on-site backup power generation, threat detection, and monitoring systems. POTWs may also fund physical security measures such as physical barriers (e.g., locking doors, cabinet intrusion alarms, and cable conduit) as well as electronic access control systems to protect IT and OT systems.

For more information on eligibility, contact your state CWSRFs:

Connecticut
- Department of Energy and Environmental Protection
- Office of the Treasurer

Maine
- Maine Municipal Bond Bank
- Department of Environmental Protection

Massachusetts
- Massachusetts Clean Water Trust
- Department of Environmental Protection
- Executive Office of Administration and Finance

New Hampshire
- Department of Environmental Services

Rhode Island
- Rhode Island Infrastructure Bank
- Department of Environmental Management

Vermont
- Department of Environmental Conservation
- Vermont Municipal Bond Bank

More information is available at epa.gov/cwsrf.

DRINKING WATER STATE REVOLVING FUND

The Drinking Water State Revolving Fund (DWSRF) is funded annually by federal capitalization grants, state match contributions, and loan repayments to programs operating in each state. Additionally, the IIJA provided a supplemental capitalization grant of $11.7 billion over the next five years with 49 percent loan forgiveness, or grant, to allow funding for additional projects. EPA provides low-interest loans and other assistance to publicly and privately owned, and non-profit community water systems for drinking water infrastructure projects which either facilitate compliance with the national primary drinking water regulations or significantly further the health protection objectives of the Safe Drinking Water Act. Each state operates its own DWSRF program. Loan repayment begins one year after project completion, with loan terms of up to 30 years, or potentially 40 years for disadvantaged communities as determined state by state. A portion of capitalization grants may be "set-asides" to improve technical, managerial, and financial capabilities:

- DWSRF funds may be used to develop and implement drinking water cybersecurity practices and improvements, including cybersecurity assessments, improvement programs, emergency response plans, equipment (including IT and OT upgrades), and operator and staff training.
- States and third-party contractors may develop and present workshops, seminars, and other training events, and conduct tabletop and full-scale exercises related to cybersecurity awareness and response.
- DWSRF may be used for system equipment and upgrades, hardware and software updates, backups, and IT and OT cybersecurity improvements. SCADA systems have been identified as candidates for DWSRF funding, including on-site power generation, threat detection and monitoring, and construction of physical barriers (e.g., door locking and cabinet intrusion alarms) and access control to protect IT and OT systems.

For more information on eligibility, contact your state DWSRF for details. More information can also be found on the EPA's Water Resilience website at epa.gov/water-resilience and epa.gov/dwsrf.

U.S. DEPARTMENT OF AGRICULTURE RURAL DEVELOPMENT PROGRAMS

The U.S. Department of Agriculture (USDA) Rural Development (RD) Program promotes economic development in rural communities through loans and technical support. The Rural Utilities Service (RUS) Water and Environmental programs (WEP) provide technical assistance and financing for drinking water and water disposal systems for rural communities. RUS provides affordable financing to improve water, sanitary sewer, wastewater drainage, and solid waste disposal systems through grants from Rural Development Apply (RD Apply), an online application system. More information on these programs can be found at rd.usda.gov/about-rd.

The American Water Works Association (AWWA) provides free self-paced e-Learning courses to aid in applying for RD assistance for small water systems:

- Optimizing Performance and Accessing Funding to Improve Small Systems (EL280) instructs students on conducting a system-wide operations self-assessment, identifying improvement priorities eligible for USDA funding, and initiating the funding process.
- Introduction to RD Apply (EL281) instructs students on applying for loans and grants under the RUS program via RD Apply. This course includes starting an application, uploading data, reviewing, and verifying.

More information can be found in the AWWA Water Sector Cybersecurity Risk Management Guidance for Small Systems available at awwa.org/cybersecurity.

PLANNING FOR FUNDING CYBERSECURITY PROJECTS

Drinking water utilities can leverage information captured during RRAs to meet the 2018 AWIA requirements. Wastewater utilities can use a similar process for key business and SCADA assets, identifying the consequences of temporary or permanent loss of an asset due to natural disasters or malevolent attacks. By evaluating critical assets and risk, utilities can prepare not only for ongoing compliance mandates but also for funding assistance requests.

As you continue to evaluate the security of your business and SCADA systems, include application for funding as part of your ongoing cybersecurity planning. Develop a plan to identify and apply for eligible funding:

1. Contact your state CWSRF or DWSRF.
2. Contact your SAA for SLCGP applications.
3. State Municipal Leagues advocate for cities, towns, and villages with the SAA. They encourage states to apply for funding and advocate for planning state committee membership. Contact your State Municipal League to identify interest.
4. If you operate a small system, apply for funding via the RD Apply website.
5. Identify critical assets. Existing AWIA RRAs should have captured much of the information required for the funding request. Identify critical systems and assets along with the potential consequences associated with each.
6. Conduct a cyber and physical vulnerability and infrastructure assessment for business, SCADA, and industrial control systems. Evaluate information systems, applications, and user account management and tracking. Identify network flows between systems, and how they are monitored, audited, and tracked. Evaluate on-site backup power generation for SCADA systems. Evaluate physical security protections. CWSRF may provide funding for assessment and planning.
7. Identify how recurring vulnerability assessments and threat mitigation will be applied.
8. Identify physical and cyber improvements, including plans, threat mitigation, and administration. Identify hardware, software, and critical infrastructure improvements. Prepare initial and subsequent year improvement plans. Identify how plans mitigate specific threats and consequences, and the capital and recurring costs for each.
9. Engage in a Cybersecurity Planning Committee and participate in state cybersecurity plan development.

By clearly identifying your needs, you can improve your chances of qualifying for and receiving much needed funding.

ABOUT THE AUTHORS

- Stacy Barna is CDM Smith's funding discipline leader and has helped many clients throughout the country receive $1 billion of low-interest loans and grants for their infrastructure projects. Ms. Barna has 27 years of experience in drinking water, wastewater, and financial assistance programs. Her experience and specialties include water system regulatory compliance, project planning, project financing, asset management, and sustainability initiatives.
- Jim Livermore is CDM Smith's director of information security, responsible for the security at 83 offices globally. Mr. Livermore is a senior information technologist with 30 years experience in IT operations, compliance, security, audit, and risk management. He has extensive experience guiding and supporting many organizations on security risk assessments, compliance requirements, policies and controls, data protection, design and hardening of systems and networks, emerging technologies, and security awareness training.
- Bob George is CDM Smith's cybersecurity discipline leader, conducting cybersecurity assessments and delivering complex network infrastructure design and implementation projects to utility customers throughout North America. He has over 35 years of experience in the design, management, and support of IT and SCADA/Industrial Control System networks. He has conducted network security assessments and penetration testing, and designed and implemented cybersecurity controls for large and small water and wastewater utilities as well as electrical utilities.

Innovation Highlights

Navigating the Water Innovation Funding and Support Ecosystem: Accelerators, Incubators, and Consultancy Groups

For water innovators and entrepreneurs, finding money and other resources can be the biggest challenge. The traditional ways of acquiring funding have included pitching to investors, networking to find customers and partners, participating in industry events, and applying for grants and low-cost debt. Acquiring funding to support water innovations can be difficult because water is often undervalued by many who do not see its monetized potential or are wary of small investment returns. Water is our most precious resource, and by overlooking or undervaluing its importance, society risks losing critical services that support environmental and public health. If an innovator cannot find the right connections with investors who see an opportunity, securing funding can become a challenge. Thinking outside the box to overcome funding challenges is crucial to drive innovation and make progress.

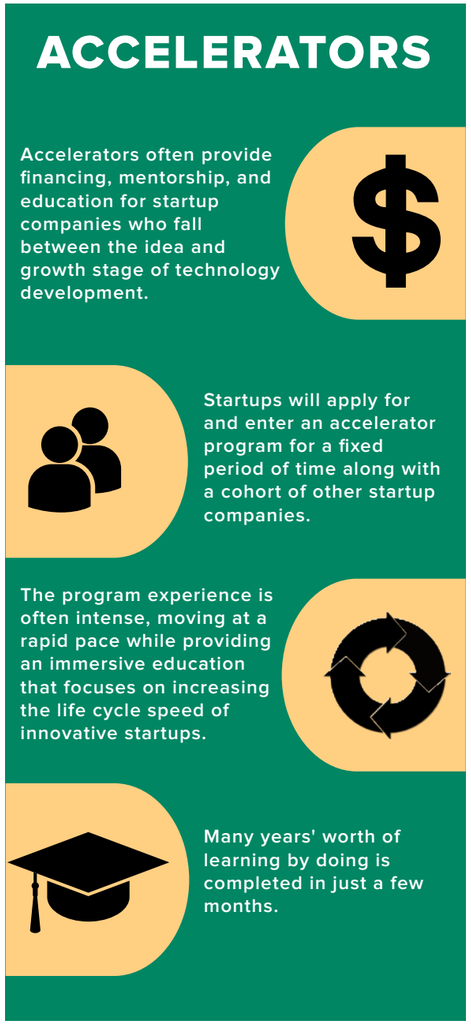
"Water plays a critical role in every business in the world. The next wave of leading technology companies will be in water innovations. That's where we come in!"

— Didier Gogniat, Water Innovation Advisors

Alternative funding pathways for water innovation do exist. Certain organizations—accelerators, incubators, and consultancy groups—align their missions with water- and environmental-focused innovations. It can be daunting for innovators just starting out to discover these funding opportunities. The Innovation Council has identified and cataloged over 100 funding resources in water innovation that are available to NEWEA members. The resources were organized according to their primary support type and include accelerators, incubators, office/testing space, consultancy groups, business development, grants, loans, research funds, investments, investment services, and investment strategy. Below we discuss some of these funding and support opportunities that can help innovators pinpoint which type may be helpful for their organization.

Accelerators

The accelerator concept has been around for many years. Accelerators often provide financing, mentorship, and education for startup companies, and programs may focus on certain technologies or niche markets. Startups need to apply for and be accepted—often a highly competitive process—into an accelerator program. Most programs guide a cohort of startup companies through an immersive education that shortens the time to commercialization and increases the sustainability of the startups.



Many years of learning by doing is completed in just a few months.

Despite the wide range of accelerators available across technologies, fewer accelerators are available to startups within the water industry. They do, however, exist. These accelerators often have an environmental focus that includes water. Water technology innovators will still find value with a traditional accelerator but may discover additional benefits when selecting one with more network connections within the environmental field. The Innovation Council has identified several accelerators that support water innovation.

WATER INNOVATION SUPPORT ORGANIZATIONS

Company Name/ Support Type	Website
Elemental Excelerator/ Accelerator	elementalexcelerator.com
Imagine H2O/ Accelerator	imagineh2o.org
Cleantech Open/ Accelerator	cleantechopen.org/en
MassChallenge/ Accelerator	masschallenge.org
Brew 2.0 Accelerator (The Water Council)/ Accelerator	thewatercouncil.com/programs/brew-accelerator
SeaAhead/Incubator	sea-ahead.com
Greentown Labs/ Incubator	greentownlabs.com
Lever/Incubator	leverinc.org
North Shore InnoVentures/ Incubator	nsiv.org
VentureWell/Incubator	venturewell.org
Water Innovation Advisors/Consultancy	waterinno.com
BlueTech Research/ Consultancy	bluetechresearch.com
Bluefield Research/ Consultancy	bluefieldresearch.com
PreScouter/ Consultancy	prescouter.com/home
Thales Water Advisors/ Consultancy	thales-water.com

Incubators

An incubator is a collaborative program for startup companies to help them succeed. Incubators often provide workspace, mentoring, seed funding, and training from professionals in an industry of interest. Incubators can be nonprofit organizations, universities, or public and private entities. Their purpose is to help founders grow their business. Important to note is the overlap that can exist between services provided by accelerators and incubators; innovators must identify their primary business needs before selecting an organization that can best support those needs.

Consultancy Groups

In the water innovation funding and support ecosystem, consultancy groups can vary greatly. These groups can do several things, including generating reports, facilitating relationships with specialists, conducting economic and workforce research, conducting market research analyses, assisting with mergers and acquisitions, and developing strategic plans to initiate business success (see diagram on next page). Consultancy groups can help not only startups with their expertise and services but also more established companies.

Finding the Right Funding or Support Group

Tapping into the immense water funding and support ecosystem and filtering through the many

organizations can be overwhelming. The Innovation Council can assist NEWEA members with various funding and support-related requests. These include helping to select the most beneficial funding and identifying loans, grants, water investment companies, incubators, accelerators, consultancy groups, and other support. Additionally, NEWEA can match and connect entrepreneurs with funding collaborators and partners. The water innovation ecosystem is a vast network of entities that all strive to improve water quality, and funding organizations are a necessary and important aspect. Groups are available to help innovators who aim to positively disrupt the water sector, improve the water that we all rely on, and uphold the Clean Water Act.

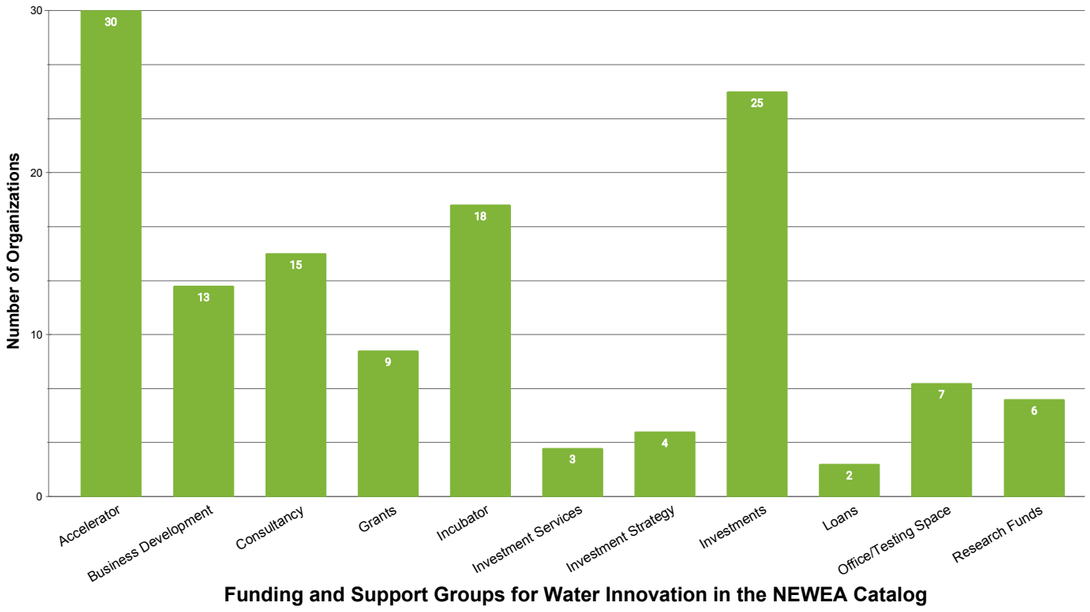
To learn more, please contact Megan Goldsmith at mgoldsmith@newea.org, or visit NEWEA's Water Innovation Partnership Network webpage at newea.org.

Acknowledgments

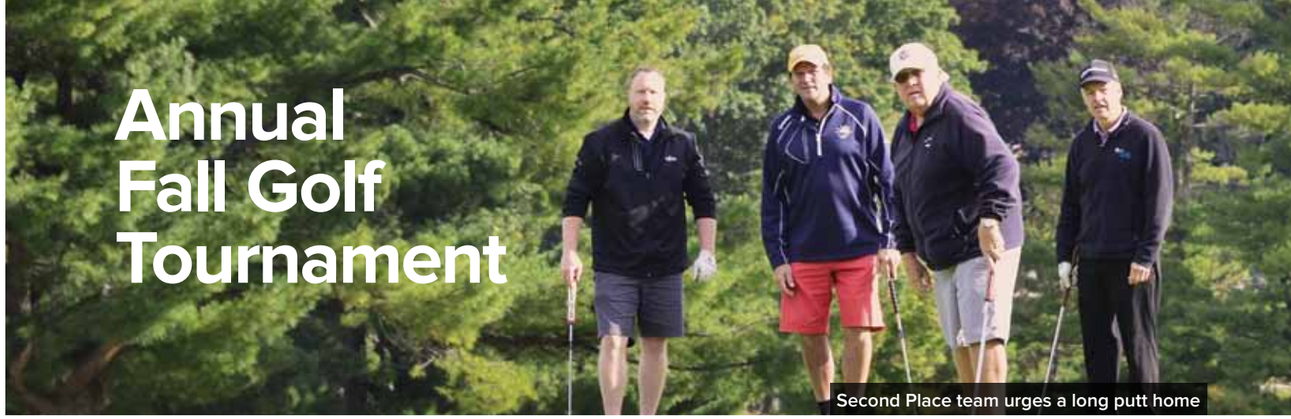
Thank you to Marianne Langridge, PhD, Innovation Council director, for providing direction and guidance, and to the NEWEA team members for their assistance and support. Also, thanks to the Water Innovation business partners for financially supporting this work and the goals of the Innovation Council.

About the Author

Megan Goldsmith has worked for the NEWEA Innovation Council for the past year and a half to identify and catalog the key players in the water innovation ecosystem. With over 3,500 entities cataloged so far, Ms. Goldsmith is helping the council find productive ways to break down the siloed water ecosystem and form partnerships among stakeholders in drinking water, stormwater, wastewater, water reuse, and other water-centric sectors.



Funding and Support Groups for Water Innovation in the NEWEA Catalog



Second Place team urges a long putt home

Winning team of UMass Lowell Alumni

Raffle winner Ryan Paul with his new driver

On an idyllic crisp and clear autumn day with the leaves just starting to reach their peak color, NEWEA hosted its annual fall golf tournament at the scenic Derryfield Country Club in Manchester, New Hampshire. Some 100 water professionals converged to share a day of comradery, laughter, food, drink, and some golf at this hilly, challenging, and well-maintained municipal course that opened in 1932.

The day started festively with a continental breakfast, plenty of practice on the putting greens, and reunions of old friends. License plates from every New England state filled the parking lot, a testament to the strength and support of our membership. At 9:00 AM 23 teams totaling 92 players headed out for 18 holes of fun-filled golf. As part of the outing, our ace team of volunteers, Annette Bonomo, Mario Leclerc, and Mike Patrick, hosted a putting contest after the 9th hole. Each team stopped by to test its putting skills with the old "flat stick" and take a crack at the winner's prize—and, more importantly, bragging rights.

Cheers of encouragement and groans of disappointment could be heard from every corner of the course throughout the morning as the teams tried to knock in birdies and chase the elusive eagles. Despite a few wayward shots, all the golfers survived their rounds and returned to the clubhouse for steaks hot off the grill for lunch. After lunch it was time for the awards ceremony.

Third place based on a tiebreaker at 66 went to the Infiltrator Water Tech Team of Evan Dalton, Dennis Healy, Joe Fayan, and Carl Thompson. Second place with a sizzling 65 was awarded to the team of Steve Perry, Scott Haynes, George Harrington, and Bob Winn. This year's winning team, with an amazing 59, was the University of Massachusetts (UMass) Lowell alumni team of Mike Sullivan, Ian Gervais, Deb Mahoney, and anchor Kevin Desjardins. The UMass Lowell alums were all proudly decked out in their school's colors and shirts.

After the winners were saluted, the skill prizes were awarded for longest drive (Laurie Perkins and Dennis Healy), straightest drive (Joe Fayan), and closest to the pin (Jake Sreca, Ian Gervais, and Rich "Boom-Boom" Davis). Team Victaulic won the putting contest with six shots holed. Over $2,000 in prizes were then raffled off, including clubs, bags, and other golfing goodies. Congratulations to all our winners and participants. As the crowd dispersed and the sun set over Derryfield's famous 19th hole deck, the last of the golfing gang reflected on a day of fun and comradery, all while supporting NEWEA.

As always, we thank all our generous sponsors. Their participation makes this and other events so successful for NEWEA. We look forward to seeing you once again at next year's fall golf tournament, already scheduled for September 29, 2023, again at Derryfield Country Club in colorful Manchester!

NEBRA Highlights

Record-breaking Joint Residuals Conference with NEWEA

Tour of Dover's water resource recovery facility solids handling processes, led by Ray Vermette

Shark Tank participant, Garrett Benisch

Todd Williams of Jacobs presents data regarding predictability of PFAS concentrations in biosolids compost

Tom Schwartz in panel discussion

Deb Mahoney addressing NEBRA members

The 2022 Northeast Residuals & Biosolids Conference held in Portsmouth, New Hampshire, November 1 and 2, had record attendance with nearly 180 people making their way to the conference. It started with a huge turnout (almost 90 registered) for the tour of Dover's water resource recovery facility (WRRF) solids handling processes. WRRF Supervisor Ray Vermette accommodated all visitors, showing them the facility's new screw presses and an ongoing pilot of an innovative desiccant drying technology to further reduce the volume of its wastewater solids and save the city money.

The conference reflects a long-standing collaboration between NEWEA and NEBRA with tradition calling for welcoming remarks from the NEWEA president. In this case, New Hampshire's own Fred McNeill welcomed the group and teed up the rest of the conference. Eric Spargimino, current chair of NEWEA's Residuals Management Committee, hosted the first day. Two technical sessions were held on thermal hydrolysis processes (THP), which recover resources from biosolids and can improve anaerobic digestion and other solids handling. Erik Larson of the Vaughan Company presented "Doing More with the Same? Effect of THP on Digester Mixing," while Stantec's Joe Uglevich presented "Maximizing the Value of Biosolids from THP at the Piscataway WRRF."

A panel discussion about biosolids master planning followed the THP presentations. Panelists included Charlie Alix of Stantec, Micah Blate of Hazen & Sawyer, Natalie Sierra of Brown and Caldwell, and Tom Schwartz of Woodard & Curran. Audience participation was high, especially regarding planning in the age of per- and polyfluoroalkyl substances (PFAS) uncertainties.

Mr. Schwartz, NEBRA's immediate past president, welcomed everyone to the second day and turned it over to NEBRA Executive Director Janine Burke-Wells to host the event. The day started with big-picture presentations, including "A Regional Biosolids Approach at a Western NY WPCF" by Amy Weils (Barton and Loguidice), Sara Martin (Critical Path Engineering Solutions), and Dennis Clough (Navitas). Next, Mr. Alix demonstrated "What Full-On Organics Digestion Looks Like" in a Canadian community. Attendees then learned about hydrothermal carbonization technology at the Borough of Phoenixville, Pennsylvania WRRF from Jeremy Taylor of SoMax Circular Solutions.

Right before lunch, the technical sessions turned to PFAS in biosolids, kicking off with "PFAS Considerations for Wastewater Professionals," by Kevin Custer from Pace Analytical Services. After lunch, Todd Williams of Jacobs presented "Predictability of PFAS Concentrations in Biosolids Compost"; he was followed by HDR's Ramola Vaidya with "Is it Possible to Remove PFAS from Biosolids? A Review of Different PFAS Removal Technologies." That led into the first-ever Technology Shark Tank event featuring Garrett Benisch of BioforceTech, Christopher Harrison of CTEC, and Susanne Feagin from NextRung Technologies. They discussed patented or patent-pending innovations for recovering resources from biosolids/residuals.

The 10 exhibitors included Carlsen Systems, Casella Organics, Denali Water Solutions, DN Tanks, Englobe, F.R. Mahony & Associates, PWTech, Resource Management, Inc., Tech Sales NE, The Hayes Group, and The Maher Corporation.

Biosolids Emissions Assessment Model Launches

The long-awaited greenhouse gas (GHG) emissions calculator specific to biosolids processing—the Biosolids Emissions Assessment Model—is available for downloading at biosolidsghgs.org. The Excel spreadsheet and associated User Guide are intended for a utility interested in reducing its GHG emissions. Updating the work of the Canadian Council of Ministers of the Environment from 2010, the Biosolids Emissions Assessment Model (BEAM*2022) uses the latest emissions factors, default values, and assumptions based on the most recent research to calculate net GHG emissions and sinks for different biosolids treatment and end-use options. BEAM*2022 has new spreadsheet tabs for additional unit processes, such as different landfill conditions and pyrolysis, and users can compare up to 10 scenarios side-by-side. To learn more about BEAM*2022, visit nebiosolids.org/resources#/greenhouse-gas-emissions. BEAM*2022 is available for download from the website for a fee, based on a recommended sliding-scale donation to support the ongoing annual reviews and website hosting. The website enables sharing of results, tips, and examples of BEAM*2022 usage.

PFAS in Biosolids Updates

NEBRA's Reg-Leg Committee (regulatory and legislative issues) continues to be active, contributing to comment letters on EPA's proposal to list PFAS as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)—also known as EPA's Superfund Program. The major concern is for liability, and NEBRA and others continue to ask for exemptions under CERCLA for public water utilities. Copies of the letters and other resources are available to NEBRA members at the Reg-Leg Committee—NEBRA (nebiosolids.org).

Among the topics the Reg-Leg Committee is tracking are the following:

- Environmental Council of the States (ECOS) announced in late October that it is assessing state environmental agency efforts on PFAS in biosolids. According to the press release, the survey "delves into each state's legislative and regulatory landscape, monitoring and treatment processes, testing and analysis protocols, and risk communication needs as they pertain to this challenging issue." ECOS (ecos.org) will report its findings soon.
- Also in October, the Interstate Technology & Regulatory Council—a project of ECOS and its research affiliate, the Environmental Research Institute of the States—released a Biosolids and PFAS Fact Sheet summarizing emerging technical information about risk and management of biosolids affected by PFAS. ITRC (itrcweb.org) has been studying PFAS and compiling information for use by regulators and others.
- The World Health Organization (WHO) issued a draft document (see link at NEBRA.org) with provisional guidance levels for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) in drinking water, recommending 100 ppm, individually. According to an article in "Greenwire," WHO's conclusions factored in "limited resources many countries have with regard to testing and remediation." There was not a consensus on health impacts, and WHO urged more research in this area. The final recommendations will guide countries as they address PFAS contamination.

Regional Biosolids Facilities Study Underway

Three New England wastewater utilities have teamed up to study the potential for a regional biosolids management facility that would address their solids handling needs. The Narragansett Bay Commission (NBC, Providence, Rhode Island), Upper Blackstone Clean Water (UBCW, Millbury, Massachusetts), and the Springfield, Massachusetts Water and Sewer Commission (SWSC) have signed a Memorandum of Understanding, paving the way for the study. The three water utilities will finance the study equally. The study is being driven by the region's lack of biosolids end-use and disposal capacity, with all four facilities (NBC has two) looking at solids management equipment and process replacements as well as service contracts that are expiring.

In June, the project partners contracted with a team of consultants. In phase 1 of the project the team will "determine the value proposition" of a regional facility, examining the issue, and providing enough information to decide if further investment is justified.

Together, the project partners serve about 860,000 people, including many commercial and industrial customers. The annual solids production for the four facilities is nearly 40,000 dry tons (36,000 tonnes) annually. If the project partners move forward, phase 2 will determine the economic viability and identify any legal, regulatory, or other roadblocks. With four facilities, three entities with three governing boards, and two states involved, it will be complex.

In addition to financial feasibility, the project team will evaluate non-financial considerations such as impact on climate change and finding a location for the facility. It will vet at least two technologies for processing wastewater solids. Currently, SWSC ships sludge off-site to landfill or incineration, UBCW has two multiple hearth incinerators, and NBC's Bucklin Point facility has anaerobic digesters with the remaining solids shipped off-site for incineration or landfilling, as are all the solids from NBC's Field's Point facility. A regional facility to treat all the solids from these three large utilities, and maybe others, could greatly benefit the region as landfill, incineration, and land application outlets dwindle.

NEBRA Annual Membership Meeting and Board Elections

NEBRA held its annual membership meeting on October 21 via Zoom with 26 member organizations, representing 25 percent of the membership, in attendance. The meeting discussed the strategic planning process initiated in late 2021 and 2022. Attendees also heard from all NEBRA's committees, including the ad hoc Bylaws Committee. The membership approved the board directors up for reelection for three-year terms: Michael Hodge (Synagro), Chris Hubbard (PWTech), Michael Lannan (Tech Environmental), Deborah Mahoney (Brown and Caldwell), and Tom Schwartz (Woodard & Curran). During the election of officers, Laura Marcolini (Fuss & O'Neill) was nominated for secretary to round out the list, which is headed by Ms. Mahoney and Lise LeBlanc (LP Consulting) for another year as board president and vice president, respectively. Art Simonian (The Mattabassett District in Connecticut) will continue for another year as treasurer.

NEBRA Celebrates 25th Anniversary

NEBRA alumni joined current NEBRA members on November 1 to look back on 25 years of improving biosolids use in the northeastern United States and Atlantic Canada. The anniversary fete began with a recorded welcome from Ms. Mahoney, reflecting on her experience with NEBRA, individuals she has met through NEBRA, and the need for NEBRA now more than ever. During the luncheon, Shelagh Connelly described the circumstances in 1997 that gave rise to NEBRA. Although she claimed no credit, Ms. Connelly was a prime driver in getting NEBRA started, and we thank her for that. Following Ms. Connelly, NEBRA's first interim board president, Ann Bosiak Randall, discussed how she became involved with NEBRA after growing up on a dairy farm in New Hampshire, one that used biosolids. Ms. Randall helped get NEBRA going following a trip with Ms. Connelly to a conference sponsored by the Northwest Biosolids Association in the Seattle area in June 1997.

John Donovan, a long-time active NEBRA Board member, now retired from CDM Smith, joined the festivities with his perspective, later even winning a bucket of Class A pellets from Bellows Falls, Vermont, in the raffle! Chip Chesley (City of Concord, New Hampshire), James Myers (retired, Synagro), Serge Loubier (Englobe), and Manuel Irujo (NEFCO) also shared memories of accomplishments and biosolids battles over the past 25 years. All the speakers talked about the need for NEBRA back in 1997 and the continued need for NEBRA in 2022.

During the reception, former NEBRA Executive Director Ned Beecher hosted a trivia contest. A raffle was held with great prizes—the most prized being the buckets of biosolids products brought in from around the region, including pellets and composts from Dover, Merrimack, and Resource Management, Inc., in New Hampshire; Greater Lawrence Sanitary

John Donovan wins a prize bucket of pellets while Chris Hubbard picks the next winner

District, Agresource (Ipswich), and NEFCO (Quincy) in Massachusetts; Casella (Hawk Ridge) and Sanford in Maine; and Bellows Falls, Bennington, and Springfield in Vermont.

To end the day, the band Biosolids Bill and the Nedettes treated attendees to a surprise performance. They sang a tribute "The Ballad of NEBRA Ned," to Mr. Beecher's surprise and embarrassment. The original tune, a collaborative effort led by former NEBRA President Andrew Carpenter, was catchy, complete with cowbell percussion! Mr. Carpenter was accompanied by fellow Nedettes, Anthony Drouin (New Hampshire Department of Environmental Services), Steve Nurme and Bill Max (RMI), and Bill Toffee, long of the Mid-Atlantic Biosolids Association (MABA), who made the trip from Philadelphia.

NEBRA is grateful to the sponsors of that anniversary celebration: silver anniversary sponsors Casella Organics, Englobe, and Resource Management, Inc., and additional sponsors PWTech, Synagro, and Woodard & Curran.

Read more at nebiosolids.org/news.

Committee Meeting Schedule

- **Carbon & Nutrient Trading:** 4th Tuesday of the month at 1 PM
- **Reg-Leg**: 3rd Tuesday of the month at 2 PM
- **Research**: 4th Wednesday of the month at noon
- **Residuals**: 3rd Tuesday of the month at 10 AM

Janine Burke-Wells, Executive Director
603-323-7654 / info@nebiosolids.org

For additional news or to subscribe to NEBRAMail, NEBRA's email newsletter, visit nebiosolids.org

25th Anniversary 1997–2022
nebra
North East Biosolids & Residuals Association

What a treat to catch up with John Donovan, James Myers, & Shelagh Connelly —my mentors & guides.

Thanks to all past & present NEBRA Boards & Committees.

A message from Ned Beecher...

Thanks to steady NEBRA members: Patty R., Mike H., Pat E., & Jeff M., Jamie, Conrad, Dan G., Mac R., Mark Y., Pat C., Serge & Nic, Marc H., Eric S., Scott F., Natalie, Jeff P., Manuel, Nick K., Jim J., Sarita, Geoff, Shelagh et al., Howard C., Tom S., Chip C., Josh T., Andrew, Sonny, Sharon M., Lise L., – too many to name all.

As I move on from NEBRA (but still **P**reaching **F**or **A**ppropriate **S**trategies), I am humbled by all you do & have done. –NB

Thank you, friends

Merci, mes amis

You, NEBRA and NEWEA people, are the best colleagues I can ever imagine.
You made my career at NEBRA stimulating and fun. You made NEBRA's efforts and successes possible. Thank you!!!

NEWEA supported me & NEBRA in so many ways! Thank you Mary Barry & all the Journal staff.

Thanks, Janice, for years of putting on a great annual biosolids conference.

Thanks, Janine, for all your support & carrying it on.

Thanks Charlie a huge source of expertise & help & photos!

And what a hoot, the surprise song at the Residuals & Biosolids Conference Nov. 1st. Another example of the many talents in this community. Thank you Andrew, Anthony, Bill (driving all the way from Philly!), Bill, & Steve.

Thanks to Marty, Charley, et al. at RMI – biosolids leaders for the region, who taught me so much. Let's do breakfast soon.

YP Spotlight—*Meera Patel*

Meera Patel is an environmental coordinator for the Town of Milton. She has been involved with the YP committee since the beginning of this year.

To be cliché, the stormwater profession chose me. I interned with the Town of Milton, Massachusetts, for a year and was then offered the position of environmental coordinator. My post-graduate degree at Northeastern University is in sustainable building—and as I started working, I wondered why stormwater had not been a bigger part of my studies. Energy usage, the orientation of buildings, and HVAC systems all have an important role in sustainable building, but the mitigation and use of stormwater had been only a small portion of my college curriculum when I believe it could have been an entire class. The concept and benefits of managing the stormwater created by the impervious surfaces of a new or retrofitted building should be part of the study of architecture and construction.

My current position with the Town of Milton is in the Engineering Department. One of our roles is to present various methods for managing stormwater when redeveloping a street. I have been in the stormwater industry for only a year, but I have already learned so much. The most surprising thing was how passionate stormwater professionals are when it comes to thinking outside the tree filter box (sorry). It is easy to blame the town for not providing a catch basin when a car drives too fast past you and sprays you with puddle water, but with experience you see the intricacies of Milton's infrastructure. A catch basin does not have to be the only way to prevent that puddle, and green and grey infrastructure could both have their place as holistic management practices.

This has become very clear while working with Milton Town Engineer Marina Fernandes. Civil and environmental engineer, diversity advocate, utility planner, project manager, water treatment plant designer, groundwater professional, and stormwater expert, Ms. Fernandes exemplifies what it means to have a varied background and how to create integrative solutions. Many of our stormwater initiatives are based on her expertise and experience in stormwater management, and it has made Milton's systems all the better for it. I went to my first NEWEA conference with her, and I am looking forward to going again!

I am excited to be involved with a project that is enabling those holistic practices. The Engineering Department is helping to implement a best management practice near a school. The design will treat nutrient, bacteria, and sediment pollution before it discharges into our brook. Cleaning our waterways is important, and we are using an infiltration basin as well as new and existing grey infrastructure to do so. I love that there is an educational component to having it near a school. Hopefully some of the students there will be the next young professionals in the field! I have enjoyed the public outreach, the engineering, and the interdisciplinary work to put it together—the picture is so much bigger than what we see.

Had I known about NEWEA before, I would have loved to apply for a scholarship and get involved sooner

The field can only move forward with such outreach, education, and new ideas, and that means new people. Had I known about NEWEA before, I would have loved to apply for a scholarship and get involved sooner. Outreach to campuses for these scholarships and increased scholarship amounts would help those who might not even know they want to be in this field yet.

Journal *What advice would you give to students or young professionals who are thinking about joining the NEWEA YP Committee?*

Meera: Why are you thinking? Join! Make new friends, a community, and a network.

■ *Tell us a fun fact about yourself.*

Meera: I speak five languages—English, Gujarati, Hindi, French, and Persian.

This is the second article in a series on water advocacy. In the previous *Journal*, we interviewed Peter Garvey (NEWEA senior delegate to WEF) about federal advocacy and WEF's Water Advocates Program. In this issue, we delve further into this topic with Mr. Garvey. Read on to learn more about the Water Advocates Program and WEF's new Water Advocacy work group.

Journal *In case anyone missed your article in the last* Journal *issue, would you remind us of what WEF's Water Advocates Program is all about?*

Peter: Happy to. WEF's Water Advocates Program empowers us to share our knowledge and expertise to inform government decision-makers about the importance of water. What does that really mean? It means that anyone who signs up as an advocate has access to a variety of resources that make it simple to reach out to your elected officials to make sure they are aware of the importance of key water issues. Anyone can sign up to become a water advocate. It's easy. Scan the QR code on this page which will take you to where you can then click on the Become a Water Advocate button. An email to WEF will be generated automatically for you, requesting you be added to the roster. You need only click Send.

■ *You're right, it is easy. In fact, I just did it! So now that I am a water advocate, what resources are available to me?*

Peter: There are generally several Calls to Action that advocates can participate in. The hot topics include PFAS, wipes, and continued support for annual encumbering of the authorized IIJA [Infrastructure Investment and Jobs Act] fund for water projects. (Yes, that's right; although the IIJA funds were authorized, lawmakers still need to encumber them each year.) For these topics, WEF has created templates of letters that can be sent to your local lawmakers requesting their support of these issues. You just add your personal details and ZIP code, and the letter is automatically sent to your representatives in Congress. It's important for our industry to stay in front of legislators. While many other industries have huge lobbying budgets, we don't, so grassroots outreach is key for water issues. Politicians take notice when they hear a consistent message from voters—remember, they work for us.

■ *Those pre-written letters are convenient!*

Peter: They are. The water advocacy platform also has a cool toolkit with helpful infographics and sample messaging text.

■ *Changing direction for a moment, what does the House of Delegates have planned for the next year on the advocacy front?*

Peter: I'm glad you asked. The focus for the next 12 months is broadening the approach from purely federal to governmental outreach at all levels. A new Water Advocacy work group has been convened, and I have been asked to act as co-chair. The key three themes for the work group are as follows:

- **State, local, and provincial advocacy**—gathering best practices from across Member Associations (MAs, such as NEWEA) for local government outreach, to share these across all MAs
- **Federal Advocacy**—coordinating with other organizations who advocate for water, promote the annual DC Water Fly-in, and continue to promote the Water Advocates Program
- **Priority issues and position statements**—identifying priority water issues and working with WEF to develop written position statements, so that when we find ourselves talking to lawmakers, we know exactly what to say

■ *Any final thoughts to share with our readers?*

Peter: If I could leave a final thought: Our infrastructure has seen significant underinvestment for decades. One of the best ways to support future investment is to reach out to your lawmakers using some of these tools. Consider participating in NEWEA's Government Affairs Committee, and maybe even participate in the DC Water Fly-in. Readers can reach out to me at pgarvey@dewberry.com for any further information or questions.

Please visit the Water Advocates website at http://bit.ly/wef-water-advocates and let your voice be heard, or email Amy Kathman at WEF to join the Water Advocates program: akathman@wef.org

Include your name, title, organization, address, e-mail, and telephone number. After you sign up, you will be in the Water Advocates program and receive important announcements about bite-size actions you can take to help, right from your computer.

WEF Delegate Report

Our WEF delegates recently attended the 95th Water Environment Federation Technical Exhibition and Conference (WEFTEC) in the great city of New Orleans. We were last in the Big Easy in 2018, and it was inspiring to be with our WEF colleagues from around the globe in one of our nation's most unique water cities with so much colorful and varied artistic culture and a cuisine second to none. WEFTEC began with a House of Delegates (HOD) meeting where WEF's 2022–2025 Strategic Plan was presented. The Strategic Plan highlights WEF's vision of a "life free of water challenges" and a three-year outcome statement to "amplify the stories of water to grow, strengthen, and diversify the water community." The plan includes WEF's strategic goals and core values (see wefwaterfuture.org).

We were also proud to be present to provide our support for the nomination of NEWEA Past President Howard Carter to the role of WEF vice president. Mr. Carter has been serving on the WEF Board of Trustees for the last three years, and we look forward to his leadership over the next three years, culminating with his WEF presidency beginning at WEFTEC 2024. We also recognize our good friend and NEWEA member John Trofatter who finished his three-year term on the WEF Board of Directors. Mr. Trofatter has been a tremendous leader, collaborator, and water advocate, and played a key role in WEF's Diversity, Equity, and Inclusion initiative.

Another important activity included WEF's rollout of the Member Engagement Transformation initiative that aims to create more volunteer opportunities and roles for WEF members serving on its various communities of practice. WEFTEC would not be complete without Operations Challenge, and New England was well represented with Connecticut Storm Surge, Mass CHAOS, and Rising Sludge all competing with spirit and gusto, with our Massachusetts team taking second place overall in Division III. The exhibition floor had over 700 companies showcasing their latest technologies and services for our NEWEA members to explore. And finally, WEFTEC provided networking opportunities for our delegates and NEWEA colleagues to reconnect with friends from other Member Associations (MAs) to share our professional and personal stories.

Peter Garvey

Time has flown by since I first started the delegate role. I now enter my third year in the role and take the reins as senior delegate from Jim Barsanti. Thank you to Mr. Barsanti for his leadership this past year, and for his other past (and future) participation in WEF and NEWEA.

My past period as delegate was dominated by my time at WEFTEC in early October and the HOD activity that was part of the conference. WEFTEC brought together 20,000 water professionals. For context, one could compare WEF's HOD to the U.S. Senate in the political world—where the delegates are like "water senators," representing their "states" (MA/NEWEA) at the federal level.

Highlights of my time at the WEF HOD meetings in New Orleans include the following:

- During the past year I participated in the HOD Budget Committee, which gave its final report at WEFTEC. The main remit of this committee is to review and rank funding applications from MAs for WEF's investment pool. It was so interesting reviewing the different requests, which ranged from providing administrative services to smaller MAs with no full-time staff to funding DE&I training for other MAs.
- My other major activity was with the Federal Advocacy work group, which also gave out its final report. As you may have seen in the interview from the Fall 2022 *Journal* and on page 51 of this issue, WEF's Water Advocates program has gained traction over the past year—the main goal of this work group. I supported the leadership of this work group during the year and look forward to serving as co-chair of the new Water Advocacy work group. This new work group will continue to focus on the Water Advocates Program and add further focus on local and regional advocacy. With my co-chair, we kicked off the work group's business with our team of 20 other delegates from across the nation (also from New Zealand and Mexico). Look for more about this work group's activity in future *Journal* issues.

I am enjoying my role as NEWEA delegate and recommend it to others who enjoy engaging with water professionals from across the nation. I look forward to supporting NEWEA leadership and the other delegates as I start my final year in this role. To learn more about the delegate role, feel free to contact me.

Ray Vermette

In my first year as a WEF delegate it was rewarding to take part in the WEF committee nomination process. The process matched qualified nominees to WEF standing committees, being always mindful of diversity, equity, and inclusion (DE&I). For my upcoming second

year, I was selected for the WEF Member Association Exchange (WEFMAX) Committee, which held its first meeting at WEFTEC. In 2023, three WEFMAX events are scheduled. The first will be in St. Louis, Missouri, on April 12–14, the second in Denver, Colorado, on May 3–5, and the final one on May 24–26 in Charlottetown, Prince Edward Island, Canada. The focus will be on the core values from WEF's new Strategic Plan: Lead Boldly, Collaborate, Focus on Customers through Empathy and Services, and Integrate DE&I. As NEWEA will host a WEFMAX in future, I look forward to observing how this event comes together.

At our HOD meeting, the Water Communications work group reported on the progress of the past year. Not only did we have monthly outside speakers urging us to develop advocates and allies among outside professionals, we also surveyed utility providers on their methods and platforms. This discussion dovetailed nicely with the WEFTEC Opening Session where Keynote Speaker Shama Hyder presented on communications, marketing, and branding to an enthusiastic full house to kick off the conference. In the upcoming year, I will be on the HOD of the Future work group. We will focus on three subgroups—HOD Structure and Function, Delegate Participation, and Planning for the Future. Throughout the year I will report at NEWEA Executive Committee meetings on the progress of this work.

I could not end my report without congratulating our own Susan Sullivan for her selection as a WEF Fellow. This speaks to her ongoing contributions to NEWEA, WEF, and our industry.

It was great to see everyone in New Orleans, take part in all the delegate activities, meet new people, and enjoy the great weather at this year's WEFTEC.

Janine Burke-Wells

I am happy to be back in a leadership position at NEWEA! I look forward to my new role as a pipeline for information connecting WEF and NEWEA. I am sure the pipe will flow both ways: information and guidance from WEF, and ideas and initiatives from NEWEA. Once again, I follow in the footsteps of Jim Barsanti, my predecessor as NEWEA president, who covered for me as I was unable to attend WEFTEC this year. My first assignment is on the HOD Strategic Planning work

Jim Barsanti (enjoying downtime at WEFTEC 2022) with artist Rickey Charles (left) in Jackson Square, New Orleans. Mr. Charles uses scraps of wood salvaged from Hurricane Katrina as his canvas and frames to create incredible images of New Orleans life.

group where I will help to roll out WEF's new Strategic Plan. It is a great vision with life free of water challenges. I am eager to help with that and look forward to further delegate assignments in the spring.

Jim Barsanti, retiring WEF delegate

As one gets older, the passing of time becomes more profound. It is hard to believe three years have elapsed, from the fall of 2019 when I entered as the incoming delegate at WEFTEC in Chicago, the home of the blues, to this fall of 2022 as the outgoing delegate at WEFTEC in New Orleans, the home of jazz. Time has moved, as they say, in the blink of an eye. I have thoroughly enjoyed serving as a WEF delegate. Delegate work provides an opportunity to serve with WEF colleagues on work groups with wide-ranging important topics, such as emerging leaders, strategic planning, federal advocacy, and communications, and on HOD standing committees such as DE&I, Budget, WEFMAX, and Nominating.

What I have found most fulfilling are the relationships that I have built with my WEF colleagues from

across the country while working on these work groups and committees and bringing this work back to share with our NEWEA membership. I highly recommend that our NEWEA members consider serving in this role. The WEF delegate role offers a two for the price of one opportunity to serve on NEWEA's Executive Committee, allowing one to help shape NEWEA's initiatives and activities, while also affording a chance to spread your wings and become a participant and leader nationally. I especially encourage our younger members to consider this role, as it can be a jumping-off point to a role as a NEWEA council director, state director, or even an officer in the presidential leadership track. I can assure you that experience serving in WEF will be satisfying, exciting, and relevant to your professional and personal career growth.

My WEF journey will continue. I will be serving on the WEF Committee Leadership Council as a community of practice director. This role in WEF is like our NEWEA council director role, and I will work with committees with an operations focus, including Operations Challenge, Operators Advisory Panel, Plant Operations, and Lab Practices. I was also appointed to the WEF Bylaws Subcommittee, which aligns well with my current role as NEWEA's bylaws chair.

Matt Formica, at-large delegate

As I enter my final year as a WEF delegate at-large, it is hard to believe how fast the time has gone by but also how many professional and personal relationships I have developed with

dedicated water professionals across the country as well as internationally throughout the industry. In the previous year, I served on the HOD Budget Committee. We successfully completed our goals for the year, including review of the WEF annual budget with an eye to alignment with WEF's Strategic Plan and the distribution of $100,000 in MA grants to support the MAs still feeling the financial impacts of Covid-19.

In the coming year I will serve on the HOD of the Future work group. HOD's current charges, goals, and organization were last reviewed and updated in 2008. With the release of WEF's new Strategic Plan, work is ongoing to align HOD's structure and function with the new plan. I also was nominated as one of two HOD representatives on the WEFTEC Advisory Committee. This committee enables WEFTEC stakeholders to review WEFTEC and recommend enhancements in an advisory role to the board of trustees. The committee's charge is to help set the strategic direction of WEFTEC, assist with a long-term vision in collaboration with all key stakeholders, ensure WEFTEC aligns with WEF's mission, critical objectives, and strategic goals, and recommend major changes to WEFTEC's format, schedule, or location. I look forward to both assignments to strengthen both the HOD and WEFTEC in the future.

New Members August–November 2022

Kamruzzaman Khan
University of Vermont
Colchester, VT (STU)

Alisa Morrison
Norwich Public Utilities
Norwich, CT (PWO)

Yue Sun
University of Massachusetts Amherst
Amherst, MA (STU)

Chuyen Nguyen
University of Massachusetts Amherst
Amherst, MA (STU)

Xuyen Mai
University of Massachusetts Amherst
Amherst, MA (STU)

Delaney York
Ayer Department of Public Works
Ayer, MA (YP)

Youssef Al Fahham, PE
Autodesk
Somerset, NJ (YP)

Bryan Chonko
Brunswick Sewer District
Brunswick, ME (PWO)

David Gleason
Hazen and Sawyer
Boston, MA (YP)

Aaron Thibeault
Northwood, NH (YP)

Ana Huberty
SDE
Lawrence, MA (PRO)

Meaghan O'Dwyer
SDE
Lawrence, MA (PRO)

Haley Rivers
Tighe & Bond
Westfield, MA (YP)

Brian Alexander Barrios
Middletown, CT (STU)

Audrey Lin
Riverside, CT (STU)

Tommy Pope
Darien, CT (STU)

Maya Elkadi
Bangor, ME (STU)

Snigtha Mohanraj
Ansonia, CT (STU)

Frances Cameron
Woodard & Curran
Northampton, MA (PRO)

Alexander Busko
Bangor, ME (STU)

McKayla Kendall
Bangor, ME (STU)

Akhila Ram
Lexington, MA (STU)

Michael Rennie
Manchester, NH (STU)

Megan Simonian
Trinnex
Boston, MA (YP)

Jack Segal
Providence, RI (YP)

Rob Jordan
Hayes Pump
Concord, MA (PRO)

Shelly Perenzin
Hayes Pump
Concord, MA (PRO)

David Ketchen
Littleton Water Department
Littleton, MA (PWO)

Matt Silverman
Littleton Water Department
Littleton, MA (PWO)

Doug Reed
Meridian Associates
Reading, MA (PRO)

Angela Schuessler
Woodard & Curran
Providence, RI (YP)

Nolan Chase
Arcadis
Arlington, VA (YP)

Ali Javadian
Wellesly, MA (STU)

Faith Archer
Town of Greenwich
Greenwich, CT (PWO)

Chris Brainard
Norwood, MA (YP)

Christopher Kowash
HDR
Brookline, MA (YP)

Academic (ACAD)
Affiliate (AFF)
Complimentary (COMP)
Corporate (COR)
Dual (DUAL)
Executive (EXEC)
Honorary (HON)
Life (LIFE)
Public Official (POFF)
Professional (PRO)
Wastewater Treatment Plant Operators (PWO)
Student (STU)
Utility Partnership Program (UPP)
Young Professional (YP)

Annual Conference & Exhibit Preview

January 22–25, 2023 • Boston Marriott Copley Place, Boston, MA

We are thrilled to be hosting our first all-in-person conference since January 2020. We appreciate our attendees, exhibitors, and sponsors for their continued support of our association as we have navigated several challenging years.

This year's event features 34 technical sessions, a Student Poster Competition showcasing the work of water quality undergraduates and graduates, the Innovation Pavilion, and two floors of exhibitors highlighting the industry's latest products and services.

The conference commences on Monday with six concurrent technical sessions each in the morning and afternoon. The Opening Session at 11:00 AM will convene attendees to hear from NEWEA and WEF leadership and our 2023 Keynote, EPA Region 1 Administrator Dr. David Cash. Undergraduate and Graduate students will present their research in the Student Poster Competition throughout the day. The afternoon winds down with the first of two Exhibit Hall receptions on the 3rd floor.

Tuesday offers another full day of exciting events. We celebrate and recognize operators by offering morning and afternoon Plant Operations technical sessions, as well as the midday Operator's Reception. To continue the conversation about the Clean Water Act and consider what's to come in the next 50 years, a keynote session will be held from 11:00 AM to 12:15 PM. Attendees can meet with emerging water industry innovators and learn about their technologies at the fifth annual Innovation Pavilion, taking place in the 3rd Floor Atrium from 8:00 AM to 4:00 PM. The day concludes with an Exhibit Hall Reception on the 4th floor.

The final day of the conference features a full day of technical sessions and exhibits, our lunch-time awards ceremony recognizing outstanding efforts in our industry, and the passing of the gavel to the 2023 NEWEA President, Robert Fischer of South Burlington, Vermont.

Frederick McNeill, NEWEA President
Lauren Hertel, NEWEA Program Committee Chair

Health and Safety Information

NEWEA's main priority is the health and safety of our attendees, exhibitors, volunteers, and staff. NEWEA will adhere to all official government and local authority guidance, as well as any venue or location-specific regulations. We will continue to monitor the evolving situation related to COVID-19 and all other public health situations and will update our strategy and guidelines as needed.

More information on our COVID Safety Protocols are available in our detailed guidelines: newea.org/events/health_safety/.

Conference Events

SUNDAY, JANUARY 22

YP Summit—4th Floor ..... 8:00 AM – 5:00 PM
Registration—4th Floor ..... Noon – 4:00 PM

MONDAY, JANUARY 23

Registration—4th Floor ..... 7:00 AM – 6:00 PM
Technical Sessions 1 – 6 ..... 8:30 – 10:30 AM
Exhibits ..... 10:30 AM – 6:30 PM
Opening Session ..... 11:00 AM – Noon
Technical Sessions 7 – 12 ..... 2:00 – 4:30 PM
Exhibit Hall Reception ..... 4:30 – 6:30 PM

TUESDAY, JANUARY 24

Registration—4th Floor ..... 7:00 AM – 6:00 PM
Exhibits ..... 8:00 AM – 6:30 PM
Innovation Pavilion ..... 8:00 AM – 4:00 PM
Technical Sessions 13 – 18 ..... 8:30 – 11:00 AM
Tuesday Keynote Presentation ..... 11:00 AM – 12:15 PM
Technical Sessions 19 – 24 ..... 2:00 – 4:30 PM
Exhibit Hall Reception ..... 4:30 – 6:30 PM

WEDNESDAY, JANUARY 25

Registration—4th Floor ..... 7:30 AM – 2:00 PM
Exhibits ..... 8:00 AM – 1:00 PM
Technical Sessions 25 – 29 ..... 8:30 – 11:00 AM
Awards Luncheon Ceremony ..... 11:00 AM – 1:00 PM
Technical Sessions 30 – 34 ..... 1:00 – 3:00 PM

Conference Exhibitors as of 11/23/2022

ABBA Pump Parts and Service
ADS L.L.C.
Aegion-Underground Solutions, Inc
APTIM
AQUA SOLUTIONS, INC.
Aquametrix by Water Analytics
AquaPoint
Asahi/America, Inc.
Atlantic Fluid Technology Inc.
Barton & Loguidice
BAU/Hopkins
BioChem Technology, Inc.
BMC CORP
Boyson and Associates, Inc.
Brenntag North America
Brown and Caldwell
C.N. Wood Co., Inc.
Carl Lueders & Company
Carlsen Systems, LLC
Casella Organics
Chadwick-BaRoss
Champlin Associates, Inc.
Coyne Chemical Environmental Services
Cretex Specialty Products
CSI Controls
CUES, Inc.
Denali Water Solutions, LLC
DN Tanks
Duke's Root Control, Inc.
Enereau Systems Group Inc.
Environmental Operating Solutions, Inc. (EOSI)
enz usa, Inc.
EST Associates
F.R. Mahony & Associates
Ferguson Waterworks
Flow Assessment Services
Flow Tech, Inc.
FlowWorks
Franzenburg Centrifuges
GA Fleet - Fleet Pump&Service
GeoTree Solutions
Green Mountain Pipeline Services
Hach
Hazen and Sawyer
Hobas Pipe USA
Holland Company
Hydro-Action
ILC Dover
Industrial Flow Solutions
Infiltrator Water Technologies
J&R Sales and Service, Inc.
Kemira Water Solutions
Kleinfelder
LandTech Consultants, Inc.
M.A. SELMON COMPANY
Maltz Sales Company
Mass Tank Inspection Services
Mechanical Solutions inc
Meridian Associates, Inc.
National Filter Media
National Water Main Cleaning Co.
New England Environmental Equipment, Inc.
NORESCO
Oakson
Omya Inc.
Orenco Systems
Orenco Water
POND Technical
Primex Controls
Pump Systems Inc
R.H White Construction Co., Inc./ WhiteWater
Rain for Rent
RCAP Solutions, Inc.
REA Resource Recovery Systems
Resource Management, Inc.
Righter Group, Inc. / Tnemec
Russell Resources, Inc.
Savy & Sons
Scavin Equipment Company LLC
SDMC AMERICA TECHNOLOGY INC
Sealing Systems, Inc.
SNF Polydyne
SPRAYROQ, INC
Stacey DePasquale Engineering, Inc.
StormTank
SULLIVAN ASSOCIATES/RITEC ENVIRONMENTAL
Synagro Northeast, LLC
Technology Sales
The Hayes Group/Hayes Pump/Walker Wellington/Atlantic Pump & Engineering
The MAHER Corporation
Truax Corporation
Trumbull Manufacturing
United Concrete - Building Group
United Industrial Products
USABlueBook
VEGA Americas
Veolia
VIR Proteus
VTScada by Trihedral
Wescor Associates, Inc.
Westlake Pipe & Fittings
Williamson Electrical Co., Inc.
Xylem Dewatering Solutions
Xylem Water Solutions - Flygt Pumps

CONFERENCE REGISTRATION
View the Preliminary Program and more information about the conference at annualconference.newea.org
Register online: pheedloop.com/EVETRCCNVVKTX/site/register/
Early registration rate before January 6

EVENT HOTEL
Boston Marriott Copley Place Hotel
110 Huntington Ave., Boston, MA 02116
617-236-5800 • SINGLE—$214 • DOUBLE—$234
Reserve online: book.passkey.com/e/50345328

2023 Award Recipients

NEWEA Awards

Alfred E. Peloquin, CT ..... William Brink
Alfred E. Peloquin, ME ..... Mark Holt
Alfred E. Peloquin, MA ..... Aaron Fox
Alfred E. Peloquin, NH ..... Chris Perkins
Alfred E. Peloquin, RI ..... Peter Hassel
Alfred E. Peloquin, VT ..... Steve Perron
Asset Management ..... Megan Moir
Biosolids Management ..... Karla Sangrey
Clair N. Sawyer ..... Robert Rak
Committee Service ..... Alexandra Greenfield
Diversity, Equity, & Inclusion Leadership ..... Isabella Cobble
E. Sherman Chase ..... Sharon Lawson
Elizabeth A. Cutone Executive Leadership ..... Mickey Nowak
Energy Management Achievement ..... South Essex Sewerage District
Energy Management Achievement ..... Sharon Nall
Founders ..... Paul Dombrowski
James J. Courchaine Collection Systems ..... Joe Boccadoro
Operator, CT ..... John Torre
Operator, ME ..... Michael Courtenay
Operator, MA ..... Jason Swain
Operator, NH ..... Mark Corliss
Operator, RI ..... Dylan Chase
Operator, VT ..... Richard Chaput, Jr.
Operator Safety ..... William Smith
Past President's Plaque and Pin ..... Virgil Lloyd
Paul Keough ..... Thomas Shelvin
Young Professional ..... Tess Laffer
Youth Educator Award ..... Philip Tucker
Youth Educator Award ..... Theresa Tucker

NEWEA Recognition (Stockholm Junior Water Prize)

CT ..... Adam Kleshchelski
ME ..... Alexander Busko
MA ..... Akhila Ram
NH ..... Abhinav Avvaru
VT ..... Saksham Bhardwaj

WEF (presented at WEFTEC)

Operations Challenge Division III Second Place Overall ..... MASS Chaos
Wastewater Utility Management ..... Newmarket, NH, Environmental Services
Delegate ..... James Barsanti
Public Officials Award ..... Patrick Leahy
Quarter Century Operator Award ..... Kathy Perez
Quarter Century Operator Award ..... Raymond Vermette

WEF—MA Awards

George W. Burke, Jr. ..... Billerica, MA, WRRF
Arthur Sidney Bedell ..... Lauren Hertel
Laboratory Analyst Excellence ..... Kim Sandbach
WEF Fellow ..... Susan Sullivan
William D. Hatfield ..... Chelsey Little
Life Membership ..... Ray Bahr
Life Membership ..... Michael Bisi
Life Membership ..... Frank Cavaleri
Life Membership ..... John Hart
Life Membership ..... Clayton M. Richardson
Life Membership ..... Ronald Wade

2023 NEWEA Executive Committee*

*Proposed 2023 NEWEA Executive Committee—pending the election vote at the annual business meeting of the membership on January 22, 2023

PRESIDENT
Robert K. Fischer
South Burlington, VT

PRESIDENT-ELECT
Scott C. Goodinson
Narragansett, RI

VICE PRESIDENT
Deborah S. Mahoney
Andover, MA

TREASURER
David VanHoven
Boston, MA

PAST PRESIDENT
Frederick J. McNeill
Manchester, NH

EXECUTIVE DIRECTOR
Mary M. Barry

DIRECTORS—COUNCIL
Collection Systems and Water Resources
Scott W. Lander
Granby, CT

Communications
Philip J. Tucker
York, ME

Innovation
Michael A. Murphy
Somerville, MA

Meeting Management
Amy Anderson George
Wakefield, MA

Management Review
Frederick J. McNeill
Manchester, NH

Public Outreach
Colin P. O'Brien
Andover, MA

Treatment, Systems Operation and Management
Marina Fernandes
Milton, MA

DIRECTORS—STATE
Vanessa McPherson
Middletown, CT

Paula L. Drouin
Lewiston, ME

John M. Digiacomo
Natick, MA

Michael A. Trainque
Chester, NH

Edward J. Davies
North Kingstown, RI

Michael A. Smith
Waterbury, VT

WEF DELEGATES
Peter B. Garvey
Boston, MA

Raymond A. Vermette, Jr.
Dover, NH

Janine Burke-Wells
West Warwick, RI

Virgil J. Lloyd
Manchester, CT

Upcoming Meetings & Events

NEWEA ANNUAL CONFERENCE & EXHIBIT
Boston Marriott Copley Place Hotel Boston, MA
January 22–25, 2023

NEWEA/NYWEA SPRING MEETING & EXHIBIT
Saratoga Springs City Center, Saratoga Springs, NY
June 6–9, 2023

NEWEA GOLF CLASSIC
Derryfield Country Club, Manchester, NH
September 29, 2023

AFFILIATED STATE ASSOCIATIONS AND OTHER EVENTS

NHWPCA WINTER MEETING
The Oaks, Somerworth, NH
December 9, 2022

MWUA ANNUAL CONFERENCE
Augusta, ME
February 1–2, 2023

NHWPCA LEGISLATIVE BREAKFAST
Holiday Inn, Concord, NH
March 8, 2023

NEWWA SPRING CONFERENCE
DCU Center, Worcester, MA
April 5–6, 2023

NHWPCA TRADE FAIR W/BOARD MEETING
Sheraton, Nashua, NH
April 14, 2023

CTWEA SPRING WORKSHOP
Aqua Turf, Plantsville, CT
May 8, 2023

GMWEA SPRING MEETING
Killington Grand Resort
and Conference Center, Killington, VT
May 25, 2023

NEWWA ANNUAL CONFERENCE
Hilton Burlington - Burlington, VT
September 17–20, 2023

Measurement unit conversions and (abbreviations) used in the *Journal*

U.S.	International System of Units (SI)	U.S.	International System of Units (SI)
Liquid volume		**Length**	
gallon (gal)	liter (L)	inches (in.)	centimeters (cm)
cubic feet (ft^3)	cubic meters (m^3)	feet (ft)	meters (m)
cubic yards (yd^3)	cubic meters (m^3)	miles (mi)	kilometers (km)
acre-feet (ac ft)	cubic meters (m^3)	**Area**	
Flow		square feet (ft^2) or yards (yd^2)	square meters (m^2)
million gallons per day (mgd)	million liters per day (ML/d)	acre (ac)	hectare (ha)
for larger flows (over 264 mgd)	cubic meters per day (m^3/d)	square miles (mi^2)	square kilometers (km^2)
gallons per minute (gpm)	liters per minute (L/min)	**Weight**	
Power		pounds (lb)	kilograms (kg)
horsepower (hp)	kilowatts (kW)	pounds per day (lb/d)	kilograms per day (kg/d)
British Thermal Units (BTUs)	kilojoules (kJ) / watt-hours (Wh)	ton – aka short ton (tn)	metric ton or tonne (MT)
Velocity		**Pressure**	
feet per second (fps)	meters per second (m/s)	pounds/square inch (psi)	kiloPascals (kPa)
miles per hour (mph)	kilometers per hour (km/h)	Inches water column (in wc)	kiloPascals (kPa)
Gas		**Head**	
cubic feet per minute (ft^3/min)	cubic meters per minute (m^3/min)	feet of head (ft of head)	meters of head (m of head)

THANK YOU

TO ALL OUR 2022 ANNUAL SPONSOR PROGRAM PARTICIPANTS

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Gold
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Carlsen Systems, LLC
Englobe
Environmental Partners
F.R. Mahony & Associates
GHD, Inc.
Hayes Group
Hazen and Sawyer
HDR
Hoyle, Tanner & Associates, Inc.
INVENT Environmental Technologies, Inc.
Jacobs
The MAHER Corporation
MWH
Tighe & Bond, Inc.
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Silver
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CUES, Inc.
Fuss & O'Neill
Green Mountain Pipeline Services
Kleinfelder
Multiple Hearth Services
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Synagro Northeast, LLC
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Vaughan Company, Inc.
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Build relationships with water industry leaders *and* make a positive impact on the water environment

Join NEWEA's 2023 Annual Sponsor Program

NEWEA offers companies the opportunity to promote their products and services throughout the year by participating in multiple sponsorship activities. Annual Sponsorships include:

- NEWEA Annual Conference
- NEWEA Spring Meeting & Golf Tournament
- NEWEA Golf Classic
- A web presence on NEWEA.org's sponsorship program page
- The option to customize sponsorship levels by selecting to participate in up to eight additional unique NEWEA events plus additional activities

Sponsorship Benefits:

- Increased corporate visibility and marketing opportunities before a wide audience of water industry professionals
- Relationship-building access to key influencers involved in advancing water industry services, technology, and policy
- Recognition as an environmental leader among peers and customers

For more information
contact Jordan Gosselin
Email: jgosselin@newea.org
Phone: 781-939-0908

NEWEA
WORKING FOR WATER QUALITY

Advertiser Index

Upcoming *Journal* Themes

Spring 2023—**Water Reuse**

Summer 2023—**Small Systems**

Fall 2023—**Nutrient Control**

Winter 2023—**Innovative Solutions**

NEWEA/WEF* Membership Application

Water Environment Federation® the water quality people®

NEWEA WORKING FOR WATER QUALITY

Personal Information (please print clearly)

First Name | M.I. | Last Name | (jr. sr. etc)

Business Name (if applicable)

Street or P.O. Box (☐ Business Address ☐ Home Address)

City, State, Zip, Country

Home Phone | Cell Phone | Business Phone

Email Address | Date of Birth (mm/yyyy)

☐ Check here if renewing, please provide current member I.D.

☐ Check here if you do NOT wish to receive information on special offers, discounts, training and educational events, and new product information to enhance your career.

***NEWEA is a member association of WEF (Water Environment Federation). By joining NEWEA, you also become a member of WEF.**

ACQ. Code (for WEF use only) | WEF 22

Membership Categories (select one only)		Member Benefit Subscription	Dues
☐ **Professional**	Individuals involved in or interested in water quality	■ *Water Environment & Technology* ■ *Water Environment Research* (Online)	$190
☐ **Young Professional**	Water quality professionals, with fewer than five years working experience and under the age of 35, are eligible to join. This program is available for new member applicants and Student Members and is available for 3 years..	■ *Water Environment & Technology* ■ *Water Environment Research* (Online)	$75
☐ **Professional Operator**	Individuals in the day-to-day operation of wastewater collection, treatment or laboratory facility, or for facilities with a daily flow of < 1 mgd or 40 L/sec. License # _____	■ *Water Environment & Technology* ■ *Water Environment Research* (Online)	$110
☐ **Academic**	Instructors/Professors interested in subjects related to water quality.	■ *Water Environment & Technology* ■ *Water Environment Research* (Online)	$190
☐ **Student**	Students enrolled for a minimum of six credit hours in an accredited college or university. Must provide written documentation on school letterhead verifying status, signed by an advisor or faculty member.	■ *Water Environment & Technology* ■ *Water Environment Research* (Online)	$15
☐ **Executive**	Upper level managers interested in an expanded suite of WEF products/services.	■ *Water Environment & Technology* ■ *Water Environment Research* (Online) ■ *WEF SmartBrief* ■ Complimentary WEF Webcasts and more	$360
☐ **Corporate** (member benefits for one person)	Companies engaged in the design, construction, operation or management of water quality systems. Designate one membership contact.	■ *Water Environment & Technology* ■ *Water Environment Research* (Online) ■ *WEF SmartBrief* ■ Complimentary WEF Webcasts and more	$420
☐ **Dual**	If you are already a member of WEF and wish to join NEWEA		$50
☐ **Associate Membership**	This membership category is a NEWEA only membership reserved for the general public who have an interest in water and the environment but are NOT currently employed in the industry (e.g., attorney or supplier). Examples of Associate Members include: teachers; journalists who cover water quality issues; citizen samplers/members of various watershed/ sportsman/conservation organizations, etc.		$45
☐ **New England Regulator**	This membership category is a NEWEA only membership reserved for New England Environmental Regulatory Agencies, including: USEPA Region 1, CT Department of Energy and Environmental Protection, ME Department of Environmental Protection, MA Department of Environmental Protection, NH Department of Environmental Services, VT Department of Environmental Conservation, and RI Department of Environmental Management		$50

WEF Utility Partnership Program (UPP): NEWEA participates in the WEF Utility Partnership Program (UPP) that supports utilities to join WEF and NEWEA while creating a comprehensive membership package for designated employees. As a UPP Utilities can consolidate all members within their organization onto one account and have the flexibility to tailor the appropriate value packages based on the designated employees' needs. Contact WEF for questions & enrollment (703-684-2400 x7750).

Payment

☐ **Check or money order enclosed** Made payable to NEWEA 10 Tower Office Park, Suite 601 Woburn, MA 01801 For more information: 781.939.0908 Fax 781.939.0907 NEWEA.org	**Charge** ☐ Visa ☐ American Express ☐ Master Card ☐ Discover	Card #	Security/CVC
		Signature	Exp. Date
		Name on Card (please print)	
Billing Address (☐ check here if same as above)	Street/PO Box	City, State, Zip	

Depending upon your membership level, $10 of your dues is allocated towards a subscription to the NEWEA Journal.
By joining NEWEA/WEF, you acknowledge the WEF Code of Conduct (www.wef.org/wef-member-code-of-conduct) is applicable for all members.

NEWEA/WEF Membership Application

MEMBERSHIP PROFILE

Please take a few moments to tell us about your background and professional interests.

What is the nature of your ORGANIZATION? (select only one–required) (ORG)

1 Consulting, Contracting, Planning Services

2 Educational Institution

3 Industrial Systems/ Plants)

4 Manufacturer or Distributor of Equipment & Supplies (including representatives)

5 Non-profits/NGOs

6 Finance, Investment, and Banking

7 Laboratories

8 State or Federal Government

9 Utility: Wastewater

10 Utility: Drinking Water

11 Utility: Stormwater

12 Utility: Wastewater, Drinking Water, and Stormwater

13 Utility: Wastewater and Drinking Water

14 Utility: Wastewater and Stormwater

15 Other

_____

(please define)

What is your Primary JOB FUNCTION? (select only one) (JOB)

1 Executive Level

2 ManagementLevel

3 Elected or Appointed Official

4 Educator

5 Student

6 Consultant/Contractor

7 Engineering/Design

8 Operator

9 Scientist/Researcher

10 Legislator/Regulator

11 Analyst

12 Sales/Marketing

13 Manufacturer's Representative

14 Communications/ Public Relations

15 IT/OT

16 Other

_____

(please define)

What are your KEY FOCUS AREAS? (circle all that apply) (FOC)

1 Air Quality and Odor Control

2 Biosolids and Residuals

3 Climate

4 Collection Systems

5 Disinfection and Public Health

6 Drinking Water

7 Energy

8 Finance and Investment

9 Industrial

10 Intelligent Water Technology

11 Laboratory Analysis and Practices

12 Nutrients

13 Plant Operations and Maintenance

14 Public Communications and Outreach

15 Regulation, Policy, Legislation

16 Research and Innovation

17 Resource Recovery

18 Safety, Security, Resilience

19 Small Communities

20 Stormwater

21 Utility Management and Leadership

22 Watershed Management

23 Wastewater Treatment, Design, and Modeling

24 Water Reuse and Reclamation

25 Workforce

Demographic Information (Check box) The following is requested for informational purposes only.

Gender: ☐ Female ☐ Male

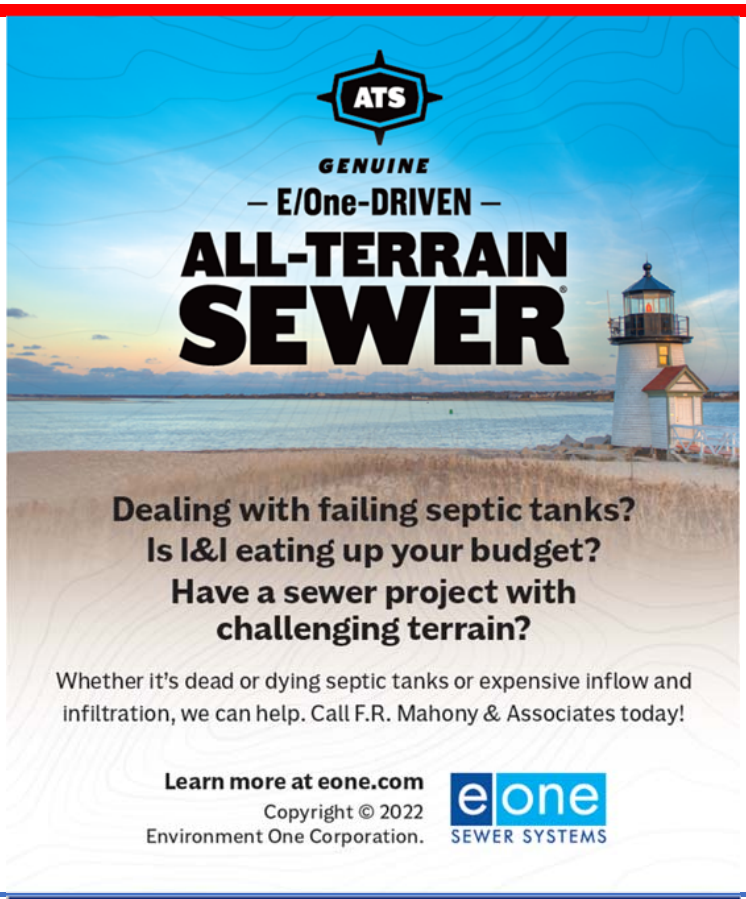
Education: ☐ Doctorate ☐ MA/MBA/MS ☐ BA/BS ☐ AA/AAS ☐ Technical School ☐ High School

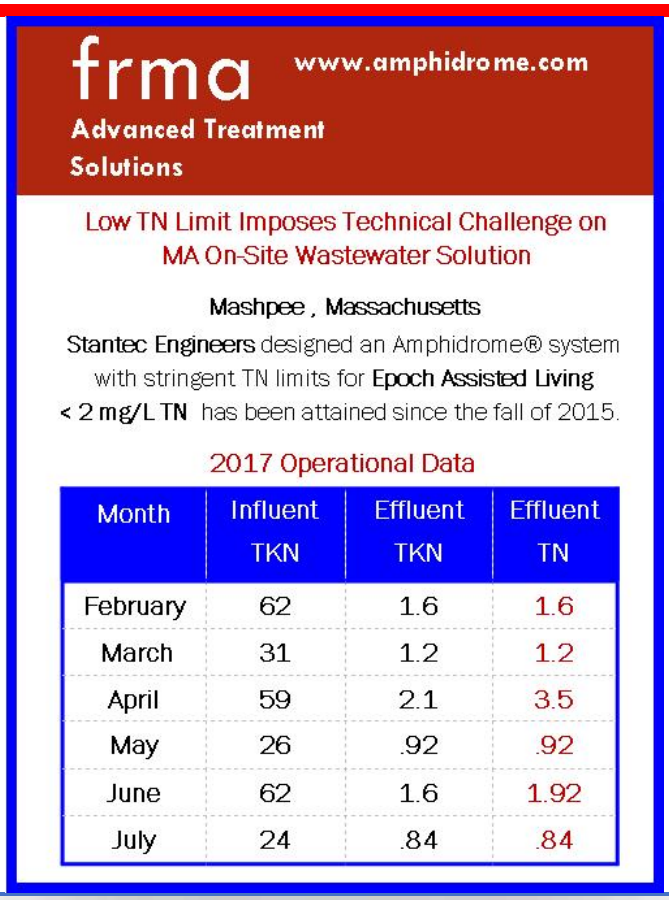
Race/Ethnic Origin (Check box) The following is requested for informational purposes only.

☐ African-American (Not of Hispanic Origin) ☐ American Indian or Alaskan Native ☐ Asian ☐ Caucasian ☐ Hispanic/Latino ☐ Pacific Islander or Native Hawaiian ☐ Other

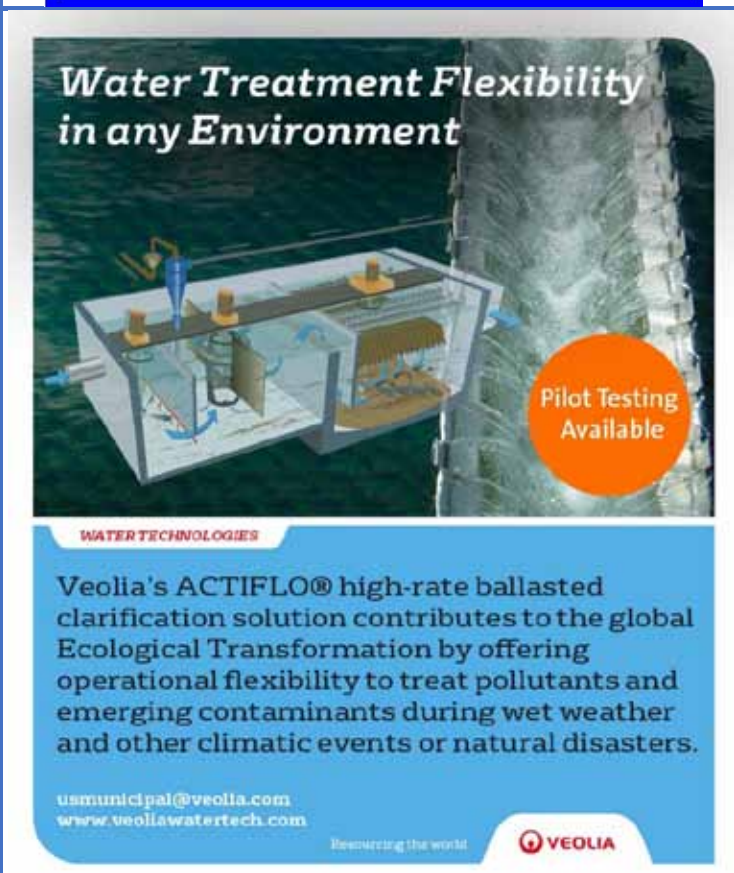
Did Anyone Recommend that You Join WEF?

Referring member's name: _____ Referring member's email: _____





Month	Influent TKN	Effluent TKN	Effluent TN
February	62	1.6	1.6
March	31	1.2	1.2
April	59	2.1	3.5
May	26	.92	.92
June	62	1.6	1.92
July	24	.84	.84



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- Grant administration

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