

VOLUME 52 NUMBER 1 | ISSN 1077-3002 SPRING 2018



#### **OPERATOR PERSPECTIVES**

Major challenges for collection system operators

What is Operations Challenge?

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Rochester, New Hampshire successfully reduces total nitrogen discharges by changing operations

NEWEA's Operator Exchange program



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SPRING 2018

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**On the cover:** The Ocean State Alliance Team competes at the 2017 WEFTEC Operations Challenge, Chicago—photo by Michael Spring



The concepts, ideas, procedures and opinions contained in the articles in this publication are those expressed by the various authors who submit the material for publication. The New England Water Environment Association, its executive committee, the editors, the executive director, and administrative staff hereby assume no responsibility for any errors or omissions in the articles as presented in this publication, nor are the concepts, ideas, procedures and opinions in these articles necessarily recommended or endorsed as valid by NEWEA, its executive committee, the editors, the executive director or staff. References to specific products or services do not constitute endorsement of those offerings by NEWEA. The Journal's committee reserves the right to make any editorial changes as deemed necessary for publication of submitted papers.

#### NEWEA Journal ISSN #1077-3002

Published four times annually by New England Water Environment Association, Inc This is Volume 52 Number 1 Periodical postage paid at Woburn, MA

01801, and at additional mailing offices

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OUR ASSOCIATION WAS ORGANIZED EIGHTY-NINE 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.

Young Professional Member-shall be any individual with five or fewer years of experience in the water quality industry and who is less than 35 years of age.

Professional Wastewater Operations Member (PWO)-shall be any individual who is actively involved on a day-to-day basis with the operation of a wastewater collection, treatment or laboratory facility, or for facilities with a daily flow of <1 million gallons per day. Membership is limited to those actually employed in treatment and collection facilities.

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 guestions & enrollment (703-684-2400 x7213).

New England Water Environment Association   Statement	of Ownership, Management and Circulation
Publication Title	The NEWEA Journal
Publication	#24559
Issue Frequency	Quarterly (four per year)
Annual Subscription Price	\$20 (included with membership dues)
Complete Mailing Address, Known Office of Publication, General Business Office, Editors and Owner	
(non profit organization)	NEWEA, 10 Tower Office Park, Suite 601, Woburn, MA 01801
Contact Person/Managing Editor	Mary Barry, NEWEA Executive Director
Tax Status	No change during the preceding 12 months

#### **BECOME A NEWEA MEMBER**

- Complete and mail the membership application form on pages 87-88
- Download a membership application from **newea.org** by clicking— How Do I Join?
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#### **2018 RATES**



Issue date for circu	lation data below: 07/24/2	017	
Publication title: The NEWEA Journal	Extent and nature of circulation: Technical/ Educational/ Environmental	Average no. copies each issue during preceding 12 months	No. copies of single issue published nearest to filing date
Total numbe	r of copies	2,500	2,500
Legitimate paid and/or requested distribution	Outside county paid/requested mail subscriptions	0	0
	In-county paid/ requested mail subscriptions	2,200	2,200
	Sales through dealers & carriers	8	8
	Requested copies distributed by other mail classes	0	0
Total paid and/or requested circulation		2,208	2,208
Total nonrequested distribution		0	0
Total distribution		2,208	2,208
Copies not distributed		292	292
Total		2,500	2,500
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Janine Burke-Wells Executive Director of the Warwick Sewer Authority City of Warwick, Rhode Island Janine.Burke-Wells@warwickri.com

### **President's Message**

Hello NEWEA! I am honored and excited to serve as your president for 2018. I have big shoes to fill, but I am really looking forward to this year.

Have you ever had that experience of reading the right book at the right time? Being a bibliophile (at least back when I had time to read), I was always interested in people's stories about books that changed them somehow, changed the way they looked at things. One such book was Help, Thanks, Wow: The Three Essential Prayers by Anne Lamott. I read it exactly when I needed to read it. Although I have not read the book lately, I will never forget what I learned from it, and it applies perfectly again now as I lead NEWEA.

#### HELP

This will be my mantra this year. Our industry is at a critical stage, so it is all hands on deck for clean water! NEWEA's senior management team has endorsed Water's Worth It as a great message. This vear, Let's Go All In!

What do you think about the meaning of these words for NEWEA? I would love to know. NEWEA is yours, and we need everyone to be engaged at this critical time for our water environment (not to mention our society). Water's Worth It says it all, as I was reminded by NEWEA Vice President Jennifer Lachmayr and WEF Delegate Susan Sullivan. Program Chair Amy Anderson, Executive Director Mary Barry, and NEWEA's marketing consultant, Sara Kaminski, also helped point me in that direction, and we decided to add Let's Go All In! as a war cry this year. I think we need one.

You can help us spread the Water's Worth It message. Consider joining us on our trip to Washington, D.C., on April 17 and 18 for our annual national Water Week activities, which include meetings with your federal delegation to talk about important issues. Our industry and our society need help now, and this congressional contact is an important opportunity for advocacy. Speaking of help for our society, please consider attending or donating to this year's Water for People Kentucky Derby Gala, a NEWEA joint event with the New England Water Works Association, to be held at the Dane Estate at Pine Manor College in Chestnut Hill, Massachusetts, on May 5. The mission of Water for People is to develop high-quality drinking water and sanitation services, accessible to all people, and sustained by strong communities, businesses, and governments.

NEWEA also needs your help. I am aware of several committees in need of assistance, including the Sustainability, Website, and Journal committees, but there are many other committee opportunities to discover. Look at newea.org/about-us/committees to find your favorite way to join us, and then contact the NEWEA office to find out how.

If you cannot help us with your time, just use your voice to talk about what you do. Make connections. Educate others about the value of water.

#### THANKS

I have so many people to thank; I will not be able to list them all here. First and foremost, I need to thank Jim Barsanti for being an exceptional coach and mentor, and for his touching welcome to me as president. I hope I can live

up to the billing. I want to thank President-elect Ray "Sonny" Vermette for everything he did to help me last year. He will be a great president next year. I also want to thank 2016 President Ray Willis, a fellow Rhode Islander, who gave me advice (some of which I did not take) but which I appreciated greatly.

I appreciate all the NEWEA Executive Committee members and the leaders of our organization. Thank you, also, to all who contribute to our committees or in any way advance the

THANKS ESSENTIAL PRAYERS

mission of NEWEA. NEWEA will thank you at our annual Committee Member Appreciation event this summer at Kimball Farm in Westford, Massachusetts. It is a great family event, so please consider joining us when you get the invitation. Want to come along? Join a committee!

And, I want to recognize all of you reading this who work every day in this great industry; thanks for your hard work, and thank you for thinking of ways to increase public awareness of the importance of what we do. Thanks for joining us in promoting our passion for clean water and a healthy environment, and for being all in with us in facing the challenges that our occupation is up against.

#### WOW

When you take a step back and look at NEWEA, it is awesome, and it is remarkable what we are getting done through our councils and committees.

In the Wow category is the rest of the senior management team during my tenure, including Treasurer Priscilla Bloomfield and Executive Director Mary Barry. It is great to look back at how far we have progressed from just a few years ago, even while noting that there is still so much work to do.

Wow is the collaboration between committees. In consideration of the increasingly limited resources and time available to our members to participate in professional development and association activities, NEWEA committees continue to offer valuable learning opportunities to our members. Please take advantage of the specialty conferences NEWEA has planned for 2018 (see page 84).

Keep your eyes on our calendar, as we have other committees working on conferences in 2018 and beyond to exchange information and experiences on important water issues, including collection systems, public education, residuals management, water reuse, safety, and others.

Finally, also in the Wow category, are our sponsors. I continue to be humbled by the support of our sponsors who allow NEWEA to put on



the high-quality conferences and events where we are afforded the opportunity to exchange information for the common good. These firms understand the important aspects of our industry—seek them out when you need services or equipment. They are important members of the New England water environment team, and they can help us achieve our goals (or mandates, depending on how you look at it).

So, getting back to Help...NEWEA is yours. It is ours. It is what we make it.

More people making, even small, contributions will add up quickly, and we will accomplish ever more together. If you do not raise your hand, you may get a tap on the shoulder if I think you can help NEWEA this year; and help goes both ways-the more you help, the more NEWEA can help you.

Perhaps our biggest challenge is that people and customers do not understand what we do. What we do is amazing, and I assume you agree. We make water great again. And we need to speak more loudly, more often, and in greater numbers about how Water's Worth It. Let's go all in!

As NEWEA president, I get a big soap box to stand on, and I promise to take advantage of it. Although I am sometimes told I could use a podium when I get to the lectern, in my mind I believe I am tall enough to deliver this message to the mountaintops. I know I am preaching to the choir of NEWEA members, but we really need to step up and educate the public so it will support rate increases and badly needed capital funding to address our aging infrastructure.

Even if you do nothing else to help NEWEA this year, you can all be public emissaries about the important work we do. When someone complains to you about how high their water or sewer bills are, make sure to mention that you know what goes into providing those critical services that we all use every day and that for them, for you, and for the future, Water's Worth It.

Again, I am honored to be the leader of this terrific organization in 2018. I am at your service!

### From the Editor

s regular readers know, articles in the Journal are typically based on themes. In 2018, we offer something different. Instead of a theme-based approach, we will focus on professional categories or disciplines,

and rather than suggesting topics, we hope important issues will emerge organically (Now you can include me as one who has incorporated this sometimes overused word!). In this regard, Journal articles should be opened to a wider range of technical items, industry trends, and personal observations, or whatever is on the minds (within reason!) of content contributors. Please refer to the table below, showing the various discipline categories for 2018. The Journal team is excited about this new concept, and we are eager to see how our vision for the format plays out.

As shown in the table (below), first up are operators followed by engi-

neers, so I offer some thoughts here on the sometimes complex relationship between these two disciplines.

Journal themes & submission deadlines

Spring 2018—Operators (December 2017)

Summer 2018—Engineers (March 30)

Fall 2018—Public Works/Municipal (June 29)

Winter 2018—Young Professionals (September 28)

When the word "operator" is used, most people think of wastewater treatment plant operators, but let us not forget collection system operators, who are also important to the water environment field. Whether treating wastewater or making sure it gets to the treatment facility, most operators interface with engineers regularly, but this relationship at times is unfortunately tense, especially when engineers are designing or have designed facilities that their fellow professionals must operate. The relationship is not as strong as it could be because of a lack of communication and collaboration during design. From this standpoint, here are some observations and suggestions for improvement from my perspective as an engineer:

Observation: Engineers and operators sometimes fail to seek enough input from each other. I think this is the root cause of the issue, and it is compounded because most often facility upgrades typically require

current components and materials to be replaced or a new process added that must work seamlessly with what is already on site.

Suggested improvement: Frequent workshops during the study, piloting (if applicable), and design phases



Joe Boccadoro, P.E. Associate Vice President-Water AECOM Joe.Boccadoro@aecom.com

would help. Engineers must understand the intricacies of the facilities under upgrade, and operators must be open to different ideas based on the engineers' experience in completing designs in other locations. Workshops are one way to foster communication and collaboration, and promote teamwork. This approach could add cost and extend the schedule, but it would hopefully result in facilities that engineers want to design and operators want to operate.

Observation: Despite the efforts above, a relatively small number of staff on both sides will see the details unfold over regular intervals. It is

difficult for operators and engineers who are important to the project, but not as connected to the process, to visualize new facilities or understand the changes to existing facilities. This could result in missed opportunities or key changes that are costly to incorporate because they are realized late in design or during construction.

Suggested improvement: Depending on project size, details, and available budget, three-dimensional drafting and virtual tours of facilities could benefit everyone on the team, especially the important stakeholders who are not as close to the project as others.

Again, this is my point of view as an engineer. I welcome input and suggestions from operators. After all, operators and engineers want the same thing-to be part of a cost-effective project that meets its goals, is enjoyable, allows input, and results in mutual satisfaction. Sometimes inherent biases and perceptions prevent this desired outcome, but with more communication and interaction, and use of tools that help better visualize what is designed, operators and engineers can work effectively and harmoniously throughout any project. In closing, this spring edition features articles and other content written by operators. I encourage all of

you, especially engineers, to read their words with care. The Journal team hopes you enjoy the new discipline approach for 2018. Please share your thoughts with us.

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### **STORMWATER CONFERENCE: Enhancing Stormwater Resilience** in the Built Environment

May 7–8, 2018 • Portsmouth, New Hampshire

he Enhancing Stormwater Resilience in the Built Environment Specialty Conference is aimed at showcasing projects, strategies, and case studies by public and private entities preparing to effectively manage stormwater and build resilient networks in an uncertain climate with significant physical and financial constraints. This two-day conference will focus on flood and disaster preparedness and mitigation projects using green and gray versatile designs that can increase resilience and provide water quality and other community benefits. The conference will also focus on financial tools, strategies, and opportunities to help fund these multi-purpose, resilient projects and initiatives in the years to come.

The audience for this conference includes municipal, state, and federal employees as well as private consultants, contractors, and researchers involved in flood mitigation, stormwater resilience, and stormwater management initiatives. Those interested in learning more about financial strategies, tools, and funding opportunities to help finance the new demands of building a more resilient future should also attend this conference.







### EPA Awards More than \$1.3 Million to New England States to Protect Wetlands

David Deegan, EPA Region 1 News Release
 EPA has awarded \$1.345 million in grants to strengthen
 the capacity of the states to protect and restore wetlands.
 The Wetland Program Development Grants provide states,
 interstate agencies, and tribes with funding to develop and
 refine comprehensive state and local wetlands programs.
 Supplemental funding for these projects will be awarded in
 fiscal year 2018, but the amounts will be budget-dependent.

"These grants are a good example of our productive relationship with state partners, achieving meaningful environmental benefits for American communities by working collaboratively," said Deb Szaro, acting regional administrator for EPA's New England office. "Protecting wetlands is a cost-effective way to help communities take advantage of the significant benefits provided by healthy wetlands: buffering from storms and flooding, filtering stormwater, protecting habitat, and offering recreational enjoyment."

This year, EPA has awarded funding for 10 projects to protect, manage, and restore wetlands. These grants assist state, tribal, and local government agencies in building programs that protect, manage, and restore wetlands. The funded grants are discussed below.

#### Connecticut

Connecticut Department of Energy and Environmental Protection ( DEEP was awarded \$97,500 to advance and improve Connecticut's wetland condition through planning, regulatory, and outreach approaches that increase the knowledge of wetland stakeholders. DEEP will refine its wetland program plan to be aligned with the department's recent restructuring. Final products of this grant include: 1) a redeveloped Wetland Program Plan; 2) refined DEEP Land and Water Resources Division standard operating procedures that address the integration of inland and tidal wetland regulatory functions; 3) workshops and educational materials for municipal officials to improve knowledge and increase skills facilitating consistent management and protection of wetlands and watercourses; 4) a report, including maps and policy recommendations, assessing the regulatory viability of tidal wetland setbacks; 5) a workshop discussing expected response of Connecticut's 20 largest coastal wetland complexes; 6) GIS data sets identifying significant coastal

marsh migration areas, road flooding frequencies, and suitable areas for creating new marsh; and 7) a marsh migration land conservation plan describing ecological significance, threats, and opportunities to accommodate migration. **Massachusetts** 

The Massachusetts Department of Environmental Protection (MassDEP) was awarded \$75,000 to better protect wetlands and aquatic resources. MassDEP will undertake tasks to align Massachusetts state stormwater standards, requirements, and certifications with the EPA Municipal Separate Storm Sewer System (MS4) General Permit, which will come into effect on July 1, 2018, for 249 communities. The following major tasks will be accomplished: 1) perform research, analyze options, and evaluate choices for aligning the Massachusetts Wetlands Protection Act and MS4 General Permit requirements; 2) convene a Stormwater Management Technical Advisory Committee to provide input in resolving Wetlands Protection Act and Water Quality Certification inconsistencies; 3) conduct outreach and provide technical assistance with MS4 communities and statewide stormwater coalitions; 4) update and revise the Massachusetts Stormwater Management Handbook and the Massachusetts Hydrology Manual; and 5) provide workshops and training for towns and coalitions.

Massachusetts Coastal Zone Management Office was awarded \$73,803 to use modeling data to characterize coastal wetland migration corridors and to use this information to improve land use planning in the area. This project will expand the areal scope of existing site monitoring and mapping by integrating historical image data and performing change analysis on the image data.

The University of Massachusetts (Amherst) was awarded \$148,660 to collect wetlands data during critical times and test the potential of using various sensors to assess vegetation health and stress, and physical characteristics of salt marshes. The collected data will be calibrated, and assessments validated, using data collected on the ground. The goal is to use unmanned aerial systems to assess the physical and biological condition of salt marshes. **Maine** 

The Maine Department of Environmental Protection (DEP) Biological Monitoring Program (BMP) was awarded \$174,597 for using wetland biomonitoring results to support

agency decision-making. The biological monitoring program proposes to develop and refine the state's wetland program in accordance with the Maine Wetland Program Plan. The goal is to enable water quality protection agencies and programs to better access and use biological monitoring and assessment results to inform regulatory and management decisions. Major elements include: 1) developing and refining numeric aquatic life use criteria, including completion of phytoplankton criteria for emergent wetlands; 2) upgrading Maine DEP's water quality and spatial databases to include new automated functionality for data analysis, monitoring reports, and biocriteria attainment results. Information will be made publicly available on the BMP web pages and Google Earth site: 3) continuing development of vegetative indicators, assessment protocols, and condition metrics, including for forested wetlands and aquatic macrophytes; 4) refining the process and criteria for identifying high-quality reference (minimally disturbed) wetlands throughout the state for use in a long-term monitoring network; and 5) identifying appropriate restoration, mitigation, and protection sites to evaluate based on state aquatic life use criteria.

The Maine Department of Agriculture Conservation & Forestry was awarded \$198,573 to: 1) develop a monitoring and assessment strategy consistent with elements of a state water monitoring and assessment program; 2) implement a sustainable monitoring program consistent with the wetlands monitoring strategy; 3) continue to consistently define restoration and protection goals throughout the state; and 4) protect wetlands from degradation or destruction. **New Hampshire** 

The New Hampshire Department of Environmental Services was awarded \$175,000 to perform activities from the New Hampshire Wetland Program Plan (NHWPP) that build on recent work relative to updating baseline wetlands data, monitoring and assessment, and outreach. The main objectives are to update and enhance the information on the extent of wetlands across the state, to identify high-value wetland resources and exemplary natural communities, to develop tools to assess wetland condition, and to disseminate this information to stakeholders. The workplan will: 1) update and enhance wetland resource data and tools, including NWI+ maps (a data-enhanced National Wetlands Inventory mapping product prepared by the U.S. Fish and Wildlife Service and the Association of State Wetlands Managers), and create high value wetland maps for decision-making relative to permitting, land protection, and assessment or protection of high-value wetland and aquatic resources; 2) update natural plant community information to develop Floristic Quality Assessment thresholds for wetland condition and support the development of wetland-specific water quality standards; and 3) disseminate the updated information for professionals, wetland scientists, and land use planning and land protection personnel.

#### Rhode Island

The Rhode Island Department of Environmental Management was awarded \$170,985 to develop a statewide reference guide for salt marshes and a freshwater wetland condition reference gradient to enhance interpretation

 and application of field data to improve prioritization of future projects. These projects include the creation of local tidal datums for 20 sites that will help support a vulnerability analysis, as well as protocols, reports, and technical memoranda.

#### Vermont

The Vermont Department of Environmental Conservation (DEC) was awarded \$192,868 to develop its monitoring and assessment core element of the Vermont Wetland Program Plan, focusing on improving wetland mapping in the state. Actions include field monitoring of Vermont wetlands and integrating Vermont Wetlands Program monitoring and assessment with other Vermont DEC efforts. Regulatory actions include adopting regulations or rules to implement statutes, public outreach, and cooperation with federal partners to ensure a unified regulatory approach.

A second grant of \$38,014 to the Vermont DEC will help the state of Vermont assess and map wetlands within the Missisquoi Basin to prioritize sites for restoration and conservation to ameliorate phosphorus pollution in Lake Champlain. The main tasks are to produce high-quality NWI+ level mapping of the Missisquoi subbasin, field review the accuracy of the mapping, and create outreach materials for local municipalities. The updated maps will be used by entities currently creating conservation and restoration modeling in the Lake Champlain basin.

For more information on wetlands, visit: epa.gov/wetlands.

#### Sites in Massachusetts and Connecticut on EPA's Superfund Redevelopment Focus List

 Emily Bender, EPA Region 1 News Release
 On January 17, 2018, EPA released its initial list of Superfund National Priorities List (NPL) sites with the greatest expected redevelopment and commercial potential, including two sites in New England: New Bedford Harbor in New Bedford, Massachusetts, and Raymark Industries Inc. in Stratford, Connecticut.

"EPA is more than a collaborative partner to remediate the nation's most contaminated sites; we're also working to successfully integrate Superfund sites back into communities across the country," said EPA Administrator Scott Pruitt. "Today's redevelopment list incorporates Superfund sites ready to become catalysts for economic growth and revitalization."

Alexandra Dapolito Dunn, EPA regional administrator, added: "EPA plays a very important role coordinating closely with local and state partners to help New England communities pursue redevelopment opportunities at Superfund sites that can spur both improved community health and economic revitalization. New Bedford Harbor and Raymark Industries are two sites that we are focused on bringing back into productive reuse."

Superfund redevelopment has helped countless communities reclaim and reuse thousands of acres of formerly contaminated land. Superfund sites on the list have significant redevelopment potential based on previous outside interest, access to transportation corridors, land values, and other critical development drivers.

#### **New Bedford Harbor**

EPA is working closely with the city of New Bedford and the commonwealth of Massachusetts on a number of redevelopment opportunities for the New Bedford Harbor. These include studies on potential reuse of EPA shoreline support facilities, coordination of the city's plans for a "riverwalk" with EPA's cleanup of the Upper Harbor shoreline, and integration of the EPA authorized/state-sponsored navigational dredging with the construction of port facilities.

New Bedford Harbor is a busy commercial port, leading the nation in dollar value of its annual fishing catch. The historic improper disposal of wastes from several capacitor manufacturing plants caused the harbor to be listed as one of EPA's largest Superfund cleanup sites. The harbor is an 18,000 acre (7,300 ha) urban estuary that contains sediment highly contaminated with polychlorinated biphenyls (PCBs) and heavy metals.

EPA is coordinating with the city and commonwealth to return the New Bedford Harbor environment to a healthy state once again. Prior to the start of the full-scale dredging program in 2004, EPA and the Army Corps of Engineers performed targeted cleanup actions within the harbor and along the shoreline that removed some of the highest levels of PCB contamination. In 2013 EPA finalized a \$366 million settlement with the main responsible party at the site. EPA estimates most of the cleanup will be complete within about five years. Approximately 425,000 yd<sup>3</sup> (325,000 m<sup>3</sup>) of PCB-contaminated sediment has been removed from the Upper Harbor as of December 2017. Dredging of approximately 220,000 yd<sup>3</sup> (168,000 m<sup>3</sup>) of less-contaminated sediment in the Lower Harbor and Upper Harbor was completed in 2016 and 2017, followed by placement in the Lower Harbor confined aquatic disposal (CAD) cell. Another 25,000 yd<sup>3</sup> (19,000 m<sup>3</sup>) of contaminated sediment cleanup has been completed by EPA along the harbor's shoreline. **Raymark Industries Inc.** 

For decades, until the late 1980s, Raymark Industries, Inc., operated in Stratford, Connecticut, as a manufacturer of friction automobile parts including brakes, brake linings, and clutches. The manufacturing process used many hazardous substances including asbestos, heavy metals such as lead, and PCBs. Waste materials from the facility were offered and distributed to residents as free "fill" and were also placed in many (dozens) of low-lying municipal and commercial locations. The remedy for the former Raymark facility was completed in 1999, and that property has since been redeveloped; however, many other locations are still in need of a cleanup.

In 2016, EPA, working closely with the Connecticut DEEP, the town of Stratford, and residents, decided that the remedy, once implemented, would address many of the remaining potential human exposures to Raymark waste in soil. This significant milestone moves the cleanup forward at many of the long-contaminated commercial properties and allows the material to be consolidated at the abandoned ballfield associated with the former facility (a.k.a., the "consolidation remedy"). The reuse opportunities at the Raymark site include: 1) incorporating a developer's plans to construct a



self-storage facility (or similar) on a parcel that is intended to be capped in place; and 2) future reuse of the ballfield following the consolidation remedy. Both parcels are municipally owned.

EPA has and continues to work closely with DEEP, the town of Stratford, and residents to solicit input on the least disruptive remedy implementation as well as to identify potential redevelopment opportunities to incorporate reuse planning into the remedies.

In July 2017, the Superfund Task Force released its recommendations to streamline and improve the Superfund program, including a focus on redevelopment training, tools, and resources that could be applied to sites on the NPL. EPA plans to work with developers interested in reusing these and other Superfund sites, identify potentially interested businesses and industries to keep them apprised of redevelopment opportunities, and continue to engage with community groups in cleanup and redevelopment to ensure the successful redevelopment and revitalization of their communities.

Administrator Pruitt has set the expectation that there will be a renewed focus on accelerating work and progress at all Superfund sites across the country. The Superfund program remains dedicated to addressing risk and accelerating progress at all its sites, not just those on the list.

For more information, visit: epa.gov/superfund-redevelopment-initiative/superfund-redevelopment-focus-list.

#### EPA Makes up to \$3 Million Available for **Local Environmental Education Grants**

– Press Office, EPA National Headquarters

EPA announced that up to \$3 million in funding for locally focused environmental education grants is available under the 2018 Environmental Education (EE) Local Grant Program. EPA will award three to four grants in each of EPA's 10 Regions, for no less than \$50,000 and no more than \$100,000 each, for a total of 30 to 35 grants nationwide. Proposals were due March 15, 2018.

In addition to other environmental topics, the 2018 EE Local Grant Program includes support for projects that reflect the intersection of environmental issues with agricultural best practices, conservation of natural resources, food waste management, and natural disaster preparedness. Funded

projects will increase public awareness of those topics and help

participants to develop the skills to make informed decisions. "By recognizing these locally based learning and awareness opportunities, EPA is taking both a local and national leadership role in promoting sound agricultural conservation practices, environmental disaster preparedness, adequate food waste management, and other important environmental best practices," said Administrator Scott Pruitt. "Environmental education starts locally in our own backyards, in classrooms, and in the fields of farmers who work the land directly, and I'm proud to play a role in enhancing such learning opportunities."

Through this grant program, EPA intends to provide financial support for projects that design, demonstrate, and/or disseminate environmental education practices, methods, or techniques that will serve to increase environmental and conservation literacy and encourage behavior that will benefit the environment in the local community in which they are located.

Since 1992, EPA has distributed between \$2 million and \$3.5 million in grant funding per year under this program, supporting more than 3,700 grants.

#### EPA Launches Second Phase of Technology Challenge for an Advanced Septic System Nitrogen Sensor

– Emily Bender , EPA Region 1 News Release

On December 15, 2017, EPA and its partners announced the second phase of a technology challenge for an advanced septic system nitrogen sensor. The goal is to inspire innovators to develop a sensor to monitor nitrogen discharged from advanced septic systems.

In Phase I of the Advanced Septic System Nitrogen Sensor Challenge, launched in January 2017, EPA partnered with The Nature Conservancy, U.S. Geological Survey, and others to challenge entrants to design a nitrogen sensor for use in advanced onsite wastewater treatment systems, also known as advanced septic systems, to monitor their long-term performance.

In Phase II, sensor developers applied to have their sensor prototypes screened and field tested. The challenge opened on December 18, 2017, with an informational webinar, and submissions were due by the end of January 2018.

Preliminary screening is occurring at the Massachusetts Alternative Septic System Test Center (MASSTC) in March 2018. Sensors that meet the performance goals will undergo six months of field testing at MASSTC. EPA will award International Organization for Standardization's (ISO) Environmental Technology Verification (ETV) 14034 reports for up to three sensors.

Conventional septic systems are not designed to remove nitrogen, which can lead to problems like nitrogen loading to waterways. This issue is especially important to coastal communities, where excess nitrogen causes toxic algal blooms leading to beach closures and degrades water resources. EPA estimates that 2.6 million existing systems could be good candidates for advanced septic systems that treat the nitrogen due to their location in nitrogen-sensitive watersheds. Adding nitrogen sensors to these advanced septic systems will help manufacturers, homeowners, and local and state governments

#### WEF Applauds Decision to Integrate Water **Research Foundations**

– Travis Loop, WEF News Release

WEF congratulates the Water Environment & Reuse Foundation (WE&RF) and Water Research Foundation (WRF) on their decision to merge into one water research organization. The two foundations each have a rich history of effective and impactful research supporting the water profession and sector, and their integration will create more synergy and partnerships.

"The integration of WE&RF and WRF is a forwardfocused, positive change that will bring tremendous value to the water sector, including WEF and its members," WEF Executive Director Eileen O'Neill said. "WEF's close partnerships with the water research community will continue, and the integration of the two foundations will certainly provide new and exciting opportunities to advance our mission."

WEF and its members supported the original founding in 1989 of the Water Environment Research Foundation (WERF), WE&RF's predecessor, showing WEF's longstanding commitment to research and innovation. WEF has maintained a close relationship with WERF and then with WE&RF, including nominating representatives to its boards of directors. In fact, at WEFTEC 2017, the WEF board approved a \$75,000 donation to support WE&RF research.

"All parts of the water sector and WEF members including utility managers, plant operators, engineers, scientists, regulators, and students share in the benefits of research and innovation," said WEF President Jenny Hartfelder. "Together, we need to support science and advocate for research funding."

ensure that these systems are performing as intended and protecting valuable coastal resources.

For more information about the Challenge, visit: epa. gov/innovation/advanced-septic-system-nitrogen-sensorchallenge-phase-ii-prototype-testing.

#### **\$1.29** Million Awarded to Improve the Health and Ecosystem of Long Island Sound

– Mike Smith, National Fish and Wildlife Foundation, and Dave Deegan, EPA Region 1

On November 16, 2017, top federal and state environmental officials announced 20 grants totaling \$1.29 million to local government and community groups to improve the health and ecosystem of Long Island Sound. Eighteen projects, totaling \$1.2 million, benefit Connecticut. Two projects totaling \$83,000 benefit Massachusetts, New Hampshire, and Vermont. The projects, funded through the Long Island Sound

Futures Fund, will restore 39 acres (16 ha) of habitat for fish and wildlife including coastal forest, grassland, river, and tidal marshes. This grant program combines funds from EPA, and the National Fish and Wildlife Foundation (NFWF).

"Protecting Long Island Sound is a priority for EPA" said Deb Szaro, acting regional administrator, EPA, Region 1. "These projects will support vital and diverse initiatives throughout

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the region. We must all work to improve water quality and reduce pollution in the Long Island Sound watershed, while involving the public in protecting one of our natural treasures."

The Long Island Sound Futures Fund 2017 grants will reach more than 870,000 residents through environmental and conservation education programs. Water quality improvement projects will treat 439,000 gallons (1,662 m<sup>3</sup>) of water runoff, reducing more than 15,600 pounds (7,100 kg) of nitrogen and collecting 2,800 pounds (1,270 kg) of floating trash. The grants will be matched by \$1.1 million from the grantees, resulting in \$2.45 million in funding for on-theground conservation in Connecticut and New England.

"One of the greatest environmental challenges facing our nation and its communities is the protection and restoration of highly productive estuaries," said Jeff Trandahl, executive director and CEO, NFWF. "This year, funded projects will help youth become stewards of the outdoors and introduce them to wildlife in their schoolyards. Additionally, work will help restore the health of our rivers, coastal marshes, forests, and grasslands for the benefit of fish and wildlife, and enhance the strength of coastal communities."

The Long Island Sound Study initiated the Long Island Sound Futures Fund in 2005 through EPA's Long Island Sound Office and NFWF. The Futures Fund has invested \$17 million in 380 projects. With grantee match of \$33 million, the program generated \$50 million for locally based conservation. The projects have opened up 157 river miles (253 km) for fish passage, restored 1,090 acres (440 ha) of critical fish and wildlife habitat and open space, treated 202 million gallons (765,000 m<sup>3</sup>) of pollution, and educated and engaged 3 million people from communities surrounding the Sound.

"Long Island Sound is one of Connecticut's most treasured natural resources, and DEEP is committed to preserving and protecting the Sound for the benefit of all Connecticut residents as well as those who live, work, and recreate in its watershed," said Robert Klee, commissioner, Connecticut DEEP. "Today, we are honored to celebrate with our watershed partners in the awarding of over \$1.29 million to 20 recipients in Connecticut and the upper watershed. We are also pleased that the 18 Connecticut projects leverage over \$1.1 million in additional local funding sources. These projects will build on our efforts to protect and improve the health of Long Island Sound by fostering environmental stewardship and public awareness and education, habitat restoration, and water quality improvements, and identifying Ecologically Significant Areas in Connecticut and New York for the Long Island Sound Blue Plan."

Long Island Sound is an estuary that provides economic and recreational benefits to millions of people while also providing habitat for more than 1,200 invertebrates, 170 species of fish, and dozens of species of migratory birds.

The Long Island Sound Study, developed under the EPA's National Estuary Program, is a cooperative effort between EPA and the states of Connecticut and New York to protect and restore the Sound and its ecosystem. To learn more about the Long Island Sound Study, visit longislandsoundstudy.net.

#### **UNLEASHing the Sustainable Development** Goals Platform—Eight WEF Young Professionals explore global issues

- Fidan Karimova, Water Technology Collaboration Manager Water Environment & Reuse Foundation (Alexandria, VA)

#### Water Environment Federation the water quality people®

This year, an inaugural event, called UNLEASH (unleash.org), brought together more than 1,000 talented individuals from around the world to address the United Nations' seventeen Sustainable Development Goals\* (SDGs). WEF sponsored eight Young Professionals to attend the event in Denmark to represent the North American water sector.

After several days of a facilitated innovation process, in which solutions were conceived and tested with leading experts and companies, one of the WEF-sponsored professionals, Fidan Karimova, received the Most Visionary award. American actor Ashton Kutcher presented this award in front of thousands of attendees, including the Princess of Denmark. WEF's Role and Contributions

Although North American countries are not automatically associated with vulnerable water sources, the Flint, Michigan water crisis in the United States and radioactive particles in northwestern Ontario in Canada prove that no region is immune from water issues. WEF was established exactly for this reason—to protect public health and the environment through increasing the awareness of the effect and value of water. WEF supports Young Professionals in the water industry and encourages them to take on more proactive roles in the industry.

This team, led by Ms. Karimova, proposed an alternative source of energy at water resource recovery facilities. The proposal calls for harvesting pollutant plastics from the ocean and using them as a fuel source via the process of gasification. The idea originated with Ms. Karimova's organization, Global Water Girls (globalwatergirls.com), and the UNLEASH group developed it further.

The group is continuing to work on the project after the UNLEASH event and hopes the solution will eventually help to stimulate changes in the waste and energy industries. Why seek the Sustainable Development Goals? Water and sanitation are keys to thriving communities in promoting the growth of future healthy generations and access to a cleaner environment. These goals gain even more importance when considering that 1.8 billion people globally use a source of drinking water that is fecally contaminated, and 2.4 billion people lack access to basic sanitation services, such as toilets or latrines, according to the United Nations. Since 1990, however, 2.6 billion people have gained access to improved drinking water sources, so progress has been made.

To quote Leonardo Da Vinci, "water is the driver of nature." Once we learn to better take care of our water systems, we will meet many of the other SDGs. The UNLEASH event helped highlight, once again, that SDG 6 (Clean water and Sanitation) is at the core of all the other issues. \*see list at un.org/development/desa/disabilities/envision2030.html)

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# Major challenges for collection system operators

PHILIP TUCKER, Assistant Superintendent, York Sewer District, York, Maine TRAVIS JONES, Regulatory Compliance Manager, York Sewer District, Maine

**ABSTRACT** | Two major challenges facing collection system operators today are aging infrastructure and public education. The average age of the nation's collection systems is just under a half a century. In the northeastern United States collection systems are much older. We must find a fast and efficient way to survey our systems and set priorities based on the information collected. Educating the public on what can and cannot go down the drain will go a long way toward saving time and financial resources.

KEYWORDS | Collection systems, FOG, aging infrastructure, education



A two-person crew with a CCTV can generally survey an average of 3,000 feet (914 meters) per week or almost 30 miles (48 kilometers) by the end of the year. It is not uncommon to find issues that require immediate attention, but generally the initial survey is used to collect data and identify needs for later repairs.

ur infrastructure is aging. In Lawrence, Massachusetts, the average age of the sewer system is approaching 100 years. To the north, Portland, Maine, has 70 miles (113 km) of pipe where the average age exceeds 70 years. These ages are not atypical nationwide; many of the nation's oldest cities have functioning sewer systems that predate 1900. There is a lot of work to be done to repair, rehabilitate, and maintain these sewer lines and nowhere near enough money to fix everything at once. How do collection system operators decide what gets fixed today and what can wait until tomorrow? As environmentalists at heart our first instinct is to fix a problem as soon as we see it, whether it is a cracked pipe, roots, a hole, or any number of other things that we find daily. Unfortunately, financial constraints do not allow for that.

To successfully manage a collection system, the owner must establish a comprehensive operations and maintenance manual including a plan for surveying the entire system. Sewer surveying technologies have evolved over the years, and today many technologies are available, but the most common and often the most cost-effective is a closedcircuit television (CCTV) inspection system. This system can be purchased by the collection system owner, shared with nearby communities, or used by a hired contractor, or it can be any combination of those. Before starting any survey, the goal should be well established. Striving to survey 20 percent of your system each year is something that should be possible for anyone with less than 150 miles (240 kilometers) of gravity sewer. A two-person crew with a CCTV can generally survey an average of 3,000 feet (914 meters) per week or almost 30 miles (48 kilometers) by the end of the year. It is not uncommon to find issues that require immediate attention, but generally the initial survey is used to collect data and identify needs for later repairs.

To truly combat FOG causes, we first need to make people aware of the problem though a targeted public outreach campaign. Instead of spending millions reacting to FOG, our industry should be proactive and combat the problem at its root.

When reviewing the results of the survey, it is important to use a comprehensive rating system with which pipes are rated from good to bad during inspection. The Pipeline Assessment Certification Program (PACP) is invaluable for training collection system operators on how to rate identified collection system defects. Also, camera inspection software packages based on image recognition can be used in this assessment. This software produces a searchable database that allows defects of the highest priority to be singled out.

Once the survey goal has been met, it is up to the operator to review the serious defects and decide which are most critical and identify the repair method(s) that will best rehabilitate the defect(s). Things to consider during the rehabilitation evaluation include the potential use of one of the many trenchless repair methods, public perception of the needed repairs, and the most cost-effective repair method. An operator may also check with similarlysized neighboring communities to see what has or has not worked in improving their systems.

With tightening discharge permits, the focus of has not worked in improving their systems. attention and money over the last two decades Perhaps the most commonly identified issue with has been on our treatment facilities. But much has every collection system is the presence of fats, oils, changed since the first collection systems were and greases (FOG). This seemingly innocuous mateinstalled, and it is time to refocus attention and rial can cause sewers to clog at significant cleaning money to our collection systems. By highlighting cost. It also causes pumps to overheat and puts extra the challenges collection systems face, cost-effective demand on treatment plant equipment. Collection solutions to reduce sewer overflows, cracked pipes, system owners spend millions of dollars each year in and premature equipment wear can be realized. FOG removal to keep our nation's collection systems These pipes may be buried and out of sight, but that working. Operators are bombarded with innovative does not mean that they can be forgotten. technologies for removing or preventing FOG



accumulation, but our best weapon against FOG has always been public education.

For the average consumer bacon fat and cooking oil pour easily down the drain, but few realize the problem that this can create down the line. At conferences and within our industry, literature circulates condemning FOG and proposing treatment and removal methods; however, with minimal public outreach (radio, television, newspaper, etc.) can greatly help to alleviate the havoc that grease causes in sewer systems. To truly combat FOG causes, we first need to make people aware of the problem though a targeted public outreach campaign. Instead of spending millions reacting to FOG, our industry should be proactive and combat the problem at its root. Fats, oils, and greases (FOG) cause sewers to clog and pumps to overheat



**NEWEA** 

### What is Operations Challenge?

TRAVIS PEASLEE, P.E. Assistant Superintendent, Lewiston Auburn Water Pollution Control Authority, Lewiston, Maine

> ave you heard people talk about, read in trade magazines, or possibly even watched an Operations Challenge competition but not really known what it was? In a nutshell, it is the wastewater version of the Olympics, where four-person teams of skilled wastewater treatment professionals compete in five events: Process Control, Laboratory, Safety, Collection Systems, and Pump Maintenance. Essentially, it involves some of the best wastewater collection and treatment personnel in the world displaying their skills at both regional and national

associations). To be qualified to compete, all team members must be employed by an operating water resource entity or agent. Team members must also be employed in the operations and/or maintenance of collection systems, treatment facilities, laboratories, or an industrial pretreatment program, and be in the field regularly.

Competition locations vary each year but are almost always at beautiful venues. For the regional competition, the location rotates among all New England states annually, and every fifth year is held jointly with the New York Water Environment



competitions. Winners are determined by a weighted point system for the five events, each designed to test the diverse skills required for the operation and maintenance of wastewater treatment facilities, their collection systems, and laboratories.

Each New England state is asked to form a team to compete at the regional event held each year at NEWEA's spring meeting. Teams generally train all year round in the hope of winning a spot to represent NEWEA at the national competition held each year at WEFTEC. The number of teams representing New England varies based upon the number of seats held by NEWEA in the WEF's house of delegates (which is, in turn, based upon NEWEA's membership number relative to the other WEF member

Association (NYWEA). Nationally, at WEFTEC, the competition alternates each year between Chicago and New Orleans.

#### HISTORY OF OPERATIONS CHALLENGE

In 1984, the Ohio Water Environment Association was a trendsetter when it offered up the first form of competition in their state that involved teams of four members competing in seven events-Laboratory, Maintenance, Safety, Operations, Process Control, Management, and Sludge Disposal. The local competition was so well received that a national level event was pitched to WEF in 1987 to provide value to operators by being active in the organization in addition to all its other members who would





WEFTEC Operations Challenge—2017 Chicago Photos by Michael Spring

#### WEFTEC National Operations Challenge **Competition History Highlights**



1988: first competition which involved 12 teams from across the country was held in Dallas, TX, and NEWEA (formerly NEWPCA) was represented by "Mainely New Englanders" who finished 6th overall

1989: Despite New England not finishing in the top 10 that year in Oakland, CA, all teams got their share of excitement as they experienced an earthquake during competition

1990: NEWPCA was represented by the "Vermont Green Mountain Boys"

1991: Once again the "Vermont Green Mountain Boys" won the regional competition and represented **NEWPCA** 

1992: Two teams were allowed to represent NEWPCA; the "Maine Force" and the "Vermont Green Mountain Boys"

1993: Two divisions were created at the national level due to the domination of some teams in the first 5 years. The events remained the same, however Division 1 was created for returning teams that finished in the top 10 overall or top 5 in any of the five events. The "Vermont Green Mountain Boys" took a respectable 8th place overall in Division 1



1994: "New Hampshire Syneraetics" finished 4th overall in Division 1. This was the first year that teams from Canada competed. The competition was visited by King Carl XVI Gustaf of Sweden who was given the tour by NEWEA's own Douglas Miller who served as the WEF Operations Challenge Committee Chair at the time

1995: "New Hampshire Synergetics" again finished 4th overall in Division 1

1996: "New Hampshire Synergetics" took 7th in Division 1 and "Maine Breakers" took 2nd in maintenance event in Division 2

1997: "MASS Balance" took 3rd and "Vermont Sewer Marines" finished 9th overall in Division 2

1998: "MASS Balance" finished 10th in Division 1 after moving up as a result of their top 3 finish the year prior

1999: Three teams represented NEWEA and finished admirably. The "Vermont Sewer Marines" took 2nd overall, "Maine Pump Fiction" took 5th overall, and "MASS Demolition" finished 10th in Division 2

2000: "Vermont Sewer Marines" moved to Division 1 and took 7th overall. "Maine Pump Fiction" took 3rd in Division 2



2001: Both NE teams were in Division 1 and the "Vermont Sewer Marines" took 7th overall while "Maine Pump Fiction" claimed 10th place

2002: The "Vermont Green Mountain Water Hammer" took 9th place in Division 1 while the "New Hampshire Crustaceans" took 3rd and the Stamford Connecticut Bafflers took 5th in Division 2. WEF created spirit awards this year for competitors in categories such as: Best Uniform; Best Hard hats; Team Congeniality; Best Effort; and the Team to watch out for the next year

2003: "Vermont Caustic Solution" coached by the late George Dow took 4th while the "New Hampshire Crustaceans" also represented well with an 8th place in Division 1

2004: "New Hampshire Seacoast Sewer Snakes" surprised everyone with a 1st place overall in Division 2

attend to watch and support. The concept quickly evolved, as the first competition was held just a year later, in 1988, at WEFTEC in Dallas.

The WEFTEC Operation Challenge was born with a slight change from that in the Ohio competition, with only five events run albeit still with teams of four members. The first competition had a few troubles such as "incompatible" equipment (e.g., flange faces of different sizes that were intended to connect), first-time judges, and rules being created on the fly, but it was an overall success. The events are still essentially the same today though they have been refined over the years. For instance, the first Collection System event began with team members watching a video and then identifying problems in the sewer. This event was replaced with clay pipe cutting and repair, which has evolved to the now long-running polyvinyl chloride (PVC) pipe cutting and repair. The Safety event started with simulating the repair of a chlorine leak while using supplied

air breathing apparatus but today includes an event with scaffolding, confined space entry, rescue, and many new elements. All events have evolved similarly, but the technical steps, judges' knowledge, and overall skills and preparation requirements have increased. Despite all the changes throughout the years, the heart of the competition remains the same: teamwork, networking, and knowledge development.

#### HOW TO GET INVOLVED

There are numerous ways to play a role in Operations Challenge at the state, regional, or national levels. Opportunities range from being a competitor, an event coordinator, a judge, a sponsor, or even a member of the Operations Challenge committee. All play important roles and are always in demand. If you are interested in being a competitor, contact your local state association Operations Challenge coordinator to see whether a team is already established and in need of team



while "Maine Pump Fiction" claimed the 9th spot in Division 2

2005: "New Hampshire Seacoast Sewer Snakes" continued impressing with a 6th place overall in Division 1 while "Force Maine" took home 5th and "Vermont Caustic Solution" took home 9th overall in Division 2

2006: "New Hampshire Seacoast Sewer Snakes" snagged 7th place overall in Division 1. Most impressively, the "New Hampshire Seacoast Sewer Snakes" took 1st place in the Process Control Event in Division 1 while "Force Maine" took 1st place in the Division 2 Process Control Event

2007: "Force Maine" shocked themselves by winning 1st place overall in Division 2

members. For all other involvement just reach out to the NEWEA Operations Challenge committee chair (newea.org/about-us/committees/operationschallenge-committee/) and express interest. No experience is necessary to join the volunteers who work together to organize an awesome event at the pays rewarding dividends both personally and professionally, so consider getting involved.

If you were to ask those currently or formerly involved with Operations Challenge, they will most spring meeting. Being part of such an amazing event certainly tell you it is life-changing. Building stronger professional networks, improving job skills, better appreciating co-workers, and boosting career morale are some of the reported benefits of being involved. WHY GET INVOLVED? Many have used Operations Challenge as a path to The friendships, camaraderie, and professional develhigher positions within their organizations as well opment from Operations Challenge are unmatched. as within NEWEA and WEF. Many NEWEA members Whether you are a competitor or support the have gone on to serve as NEWEA president, WEF challenge, you will build a network of friends and delegate, and even to the level of WEF president, professionals from all aspects of the industry while attributing part of that success to Operations experiencing a unique opportunity to demonstrate, Challenge. Simply, Operations Challenge is worth support, and publicize the role of the unsung water any level of effort you are willing to invest and offers professional heroes who protect our valuable water benefits that will pay immeasurable dividends for assets every day. The challenge is something you both personal and professional growth.

2008: No NE teams made the top 3 in either Division overall, however "New Hampshire Sewer Snakes" received 2nd place in the Process Control Event in Division 1. Argentina competed at WEFTEC for the first time

2009: "New Hampshire Seacoast Sewer Snakes" finished 3rd overall in Division 2

2010: "New Hampshire Seacoast Sewer Snakes" finished 3rd in Division 1 and also won the Process Control Event



2011: "New Hampshire Seacoast Sewer Snakes" won the Division 2 competition and repeated with a second 1st place in the Process Control Event

2012: This marked the 25th anniversary of national competition. "New Hampshire Seacoast Sewer Snakes" received 1st place in Division 1



process control and "Force Maine" took 1st place in Division 2 of the Process Control Event

2013: "New Hampshire Seacoast Sewer Snakes" took home 2nd place in the Process Control Event in Division 1 and "Force Maine" took home 1st place in the Process Control Event in Division 2

2014: "Force Maine" took 1st place in the Process Control Event and it was the first year of competition for lan Carter who was carrying on a family tradition as he is the son of Howard Carter, an Ops Challenge competitor through the late 1990s and early 2000s

2015: Two German teams competed for the first time and the "New Hampshire Seacoast Sewer Snakes" took 2nd in the Process Control Event and "Force Maine" claimed 3rd in that Event in Division 2

2016: "New Hampshire Seacoast Sewer Snakes" claimed 3rd place in the Process Control Event for Division 2

2017: Marked the 30-year anniversary of Ops Challenge. A new record 44 teams competed including teams from Argentina, Denmark, Ontario, and British Columbia truly making this a multinational competition. NEWEA was represented by "Force Maine," "Rhode Island Ocean State Alliance." and "Connecticut Franken Foggers"

really need to see to believe and experience. This fun competition fosters teamwork, mutual respect, pride, confidence, and personal job growth in all who participate.



### **Empowering wastewater** operators to excel

GRANT WEAVER, PE, Wastewater Operator, President, CleanWaterOps, Boston, Massachusetts

After decades of promoting technological innovation as the solution for water resource recovery facility (WRRF) permit requirements, an increasing number of organizations—including EPA, WEF, and numerous state and local government entities—are recognizing the role that informed, empowered WRRF operators play in making the nation's waterways ever cleaner.





This increasing awareness comes when thousands of inexperienced operators are being hired to staff the nation's 18,000 municipal WRRFs. The Municipal Association of South Carolina quotes the American Water Works Association as stating that one-half of the nation's wastewater operators will retire by 2021. Meanwhile, the passing rate for higher levels of wastewater licensing is commonly 50 percent or less in many New England states. Is this a crisis? Or is it an opportunity?

Informed operators make a difference! The following tables of Montana wastewater treatment facilities show that skilled operators can improve water quality cost-effectively.

Table 1. Optimized conventional WRRFs in Montana*			
	Design Flow	Total Effluent-N	Total Effluent-P
Chinook	0.5 MGD (1.9 ML/day)	3 mg/L	1.2 mg/L
Conrad	0.5 MGD (1.9 ML/day)	7 mg/L	0.1 mg/L
Hardin	1.0 MGD (3.8ML/day)	5 mg/L	2.4 mg/L
Hamilton	2.0 MGD (7.6 ML/day)	3 mg/L	4.0 mg/L

Combined cost of optimization: \$20,000

\*Lavigne, P. & Weaver, G. (2017) Enabling operations; creative operational strategies as a stand-alone approach to significant nutrient reduction. Water Environment & Technology, 29(12)

With training and encouragement, the operators of the conventional WRRFs in Table 1 achieved the same level of nitrogen removal as operators at facilities designed for nutrient removal (Table 2), at a fraction of the cost.

As the accompanying case studies illustrate, similar improvements in nutrient reduction have been achieved at several New England WRRFs. These case studies support the same conclusion: an empowered workforce can often provide more cost-effective permit compliance than can facility upgrades. With the recent need to remove nutrients and other pollutants, along with an aging workforce and high

Table 2. Montana biological nutrient removal facilities*			
	Design Flow	Total Effluent-N	Total Effluent-P
Bozeman	8.5 MGD (32 ML/day)	5 mg/L	0.3 mg/L
Missoula	12 MGD (45 ML/day)	9 mg/L	0.2 mg/L
Kalispell	5.4 MGD (20 ML/day)	8 mg/L	0.2 mg/L
Lewistown	1.5 MGD (5.7 ML/day)	2 mg/L	1.0 mg/L

Combined cost of facility upgrades: \$70 million

staffing turnover, the time for educating, empowering, and expecting more from WRRF operators is now. A small cha in State Revolving Fund (SRF) policy to allow state regulat to allocate up to one percent of their state's annual SRF appropriations to viable education programs would provide resources for much-needed process control training and technical support.

Frequently, the biggest obstacle to capturing the potent that talented and experienced operators provide is an abu dance of well-intended regulatory policies and procedures that overlook the good work being done at the front line of pollution control. As we seek to empower operators, a discussion of how regulatory efforts to support innovation changing years of regulatory status quo is in order.

Historically, the regulatory standard has been a pass/fa system of permit compliance (pass) and non-compliance (fail). Nearly all our regulatory resources have been applied to issues of non-compliance, leaving it up to operators to



#### **CASE STUDIES**

#### Palmer, Massachusetts (population: 12,000)

Prior to any optimization, the blowers at the 5.6 mgd (21 ML/d) Palmer Water Pollution Control Facility (WP were equipped with variable frequency drives (VFDs and the blower speeds were controlled by dissolved oxygen (DO) probes in the aeration tanks. Under the direction of Superintendent Gerry Skowronek and Assistant Superintendent Ken Lord, timers were installed on the aeration blowers, and oxidation reduction potential (ORP) probes were installed in both the in-service complete mix aeration basins.

Believing it possible to provide total-nitrogen (TN) removal more cost-effectively than the \$320,000 facility volatile fatty acids (VFAs) are formed and consumed by modifications described in a 2015 NEIWPCC study, the PAOs. A percentage of the waste sludge is pumped Low Cost Retrofits for Nitrogen Removal at Wastewater back to the influent daily. As they migrate through the Treatment Plants in the Upper Long Island Sound aeration tank, the energized PAOs pull soluble phos-Watershed, the Palmer WPCF operators cycle the one phorus out of solution. in-service blower on for 4 to 6.5 hours and off for 3 to By optimizing biological phosphorus removal, Palmer 4 hours. The ORP probes monitor only; the results are has met its 1.0 mg/L total-phosphorus (TP) limit using reviewed every two weeks and the air-on/air-off times one-third the chemicals used prior to optimization. Given are adjusted to provide a peak ORP of +150 mV for the low alkalinity of the WRRF's wastewater and the

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d	optimize their facilities themselves. Operators, however, are
nge	generally risk averse. Once a WRRF has been "dialed in" and
tors	permit compliance becomes routine, it often takes encourage-
	ment for an operator to experiment with process changes.
de	In a pass/fail regulatory environment, little incentive
	exists to make modifications that may improve operations.
	Historically, operators have understandably been more
ial	concerned about risking permit violations than achieving
ın-	excellence.
S	In the past, many regulatory organizations have inadver-
	tently discouraged innovation by requiring that each compo-
	nent of a WRRF be operated in accordance with the operation
n by	and maintenance (O&M) manual prepared at the time of
	construction. These policies were enacted to ensure that
il	the public's investment was not squandered. However, the
	practical outcome is stagnant plant performance. For example,
ed	conventional plants must be operated for conventional treat-
	ment and not for nutrient removal.



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ammonia oxidation to nitrate and a minimum ORP of –100 mV for nitrate removal. Weekly effluent lab results confirm the appropriateness of the ORP targets and the air-on/air-off settings.

Over the past three years (2015 to 2017), effluent TN averaged 8.9 mg/L. Prior to optimization (2010 to 2013), TN averaged 17.8 mg/L.

Biological phosphorus removal is enhanced by recycling waste activated sludge (WAS) through the facility's gravity thickener and into aeration. Phosphate accumulating organisms (PAOs) that live in the aeration tank mixed liquor, and therefore in the WAS, are subjected to anaerobic conditions in the gravity thickener. There,

#### A small change in State Revolving Fund (SRF) policy to allow state regulators to allocate up to one percent of their state's annual SRF appropriations to viable education programs would provide resources for much-needed process control training and technical support.

Additionally, modifications to O&M manuals had to be written by engineers; the operator's role was to follow direction, not seek new and better ways of getting the job done. Now, progressive regulators are looking at O&M manuals more as owner's manuals, similar to those in the glove boxes of our cars. The modern regulatory position is to view O&M manuals as an invaluable resource containing information on the facilities we operate but of no value regarding process control. O&M manuals should not dictate how wastewater treatment facilities are operated; facility operations should instead be based on the experience of the facility operators.

Informed regulators encourage operators to strive for excellence. As the front line in water quality protection,

operators-their risk-averse nature notwithstanding-all take pride in doing good work. The first regulatory hurdle, therefore, is to change policies and procedures that inhibit operator creativity. Of paramount need is a revision of those policies and procedures that give higher operational standing to people who design WRRFs than to those who operate them.

Operators like making clean water. I have yet to meet anyone in our profession who would prefer to make dirty water than clean. In working with the staffs of more than 60 municipal WRRFs, my experience is that informed changes in day-to-day operations significantly reduce nitrogen and/ or phosphorus at most treatment plants, whether they are designed for biological nutrient removal or not. Usually, water





recent increase in the cost of pH-adjusting chemicals, of late Palmer finds it more economical to cut back on the caustic soda needed to maintain an optimal aeration tank pH of 7.0 for biological phosphorus removal in favor of using more poly-aluminum chloride (PAC) to precipitate phosphorus.

#### Westfield, Massachusetts (population: 41,100)

Starting on December 1, 2009, Westfield had to meet a year-round phosphorus limit (0.46 mg/L in summer and 1.0 mg/L in winter). Historically, plant staff of this 6.1 mgd (23 ML/d) facility added sodium aluminate to meet the 0.46 mg/L limit for April through October. Concerns about freezing prompted staff to switch to polyaluminum chloride, a chemical that has worked well in several facilities (including Keene, New Hampshire). After months of struggling to achieve effective phosphorus removal, staff switched back to sodium aluminate and began exploring options for maximizing biological phosphorus removal.

Thus, over the last five years Jeff Gamelli, Ken Gagnon, and staff have undertaken various process

changes with the support of Public Works Director David Billips. These changes have not only brought the facility into compliance with tighter phosphorus limits, they have also reduced operating costs and provided other water quality improvements.

The plant's O&M budget for fiscal year 2018 was \$5.2 million, a seven percent (\$400,000) reduction from \$5.6 million in fiscal year 2016. Savings in chemical costs (\$200,000 per year), electricity (\$70,000 per year), and sludge processing and disposal (\$150,000) have been achieved.

The facility is operating with a higher mixed liquor suspended solids [MLSS, (4,500 mg/L)]. Airflow is minimized in the first pass of each of the plant's three trains to create fermentive zones for VFA production and PAO uptake of VFAs. These fermentation zones also enhance denitrification for improved TN removal.

The two floor-mounted fine-bubble aeration zones in the first of the plant's three-pass aeration tanks are uniquely operated to provide mixing with minimal oxygen transfer. In the first zone, 90 percent of the membrane disk diffusers have been removed and

quality can be improved with operational cost savings from reduced electricity consumption, fewer chemicals, and less sludge processed and hauled offsite.

Those who work at WRRFs are, if anything, reclusive, and certainly not glory seekers. Since most publicity surrounding facilities is bad (e.g., odors and rate hikes), operators generally like staying well under the radar and out of the limelight. Most operators see or hear from their regulators only during plant inspections. And most like it that way. Most regulators focus on paperwork and laboratory procedure rather than providing practical guidance for improved plant operations, likely because many inspectors do not hold an entry level license, let alone the higher levels of licensing required to oversee most facilities. Given that most inspectors have visited far more WRRFs than most operators, this is an opportunity lost.

The more successful regulatory agencies are correcting this. Their inspectors do not hide from their limited operational



stainless steel screws have been inserted into the ai inlets to seal off the airways. The remaining 10 perce of the diffusers were converted to big bubble mixers cutting large Xs into the membranes. Air to the seco zone is restricted by partially closing the knife valve on the aeration header. Once per day, the valve is fu opened for 15 minutes to thoroughly mix the tank's contents.

An in-line orthophosphate analyzer monitors efflu soluble phosphorus, and an equation programmed into the plant's supervisory control and data acquisition (SCADA) computer factors in the effluent total suspended solids (TSS) concentration obtained by a in-line TSS probe to compute the theoretical TP con tration. To get TP, TSS is multiplied by 0.03 and adde the ortho-P reading.

Periodic testing with a portable ORP meter is performed to confirm conditions in the pre-anaerobi zones. In-line ORP probes monitor conditions in the aeration tanks. After successfully testing an in-line ammonia analyzer in one aeration zone during the summer of 2017, three in-line ammonia analyzers wi

experience; instead they actively participate in classroom training alongside the operators of the facilities they oversee. As they learn new operating strategies together, partnerships develop and, before long, inspectors become valued for transferring knowledge from WRRF to WRRF. A particularly valuable form of training is morning classroom sessions on process control strategies (for example, nitrogen or phosphorus removal) followed by afternoon sessions in which operators talk about their plants and brainstorm ideas with their fellow operators (and regulators!) on how to make their facilities operate more effectively and efficiently.

When new standards are written into discharge permits, regulators typically include an implementation timeline that begins with the employment of a design engineer and ends with the construction and operation of new equipment. Such a timeline all but forces new construction, regardless of cost or environmental impact. Because construction funds are in short supply, priority points are awarded to determine which



ir	installed in 2018. A 20 percent reduction in electrical us
ent	is anticipated.
s by	Westfield's effluent phosphorus limits are routinely
ond	maintained. The year-around average for 2017 was
	0.43 mg/L. In 2013, effluent TP averaged 1.1 mg/L.
ılly	Effluent nitrogen is now averaging 8.1 mg/L for 2017.
	Prior to optimization (2010), TN averaged 13.9 mg/L.
	Conventional treatment has likewise improved. TSS and
ent	BOD averaged 4.7 mg/L and 6.6 mg/L, respectively, in
	2017. In 2010, TSS averaged 7.1 mg/L and BOD averaged
-	9.5 mg/L.
in	Keene, New Hampshire (population: 23,500)
cen-	To meet the water resources recovery facility's (WRRF's)
ed to	interim copper limit of 20 ug/L, Keene had already been
	adding PAC to the aeration tank effluent/secondary
	clarifier inlet since 2005. In 2008, to meet an interim TP
ic	limit of 0.5 mg/L during summer, PAC was added in two
	places—the inlets to both the primary and secondary
	clarifiers. Approximately 300 gpd (1,100 Lpd) of chemica
	was required.
ll be	

municipalities are to receive funding. Well-maintained, welloperated WRRFs frequently receive fewer points than struggling facilities, creating an incentive for municipal dependence on regulatory support and a disincentive for excellence.

Fortunately, there is a growing industry awareness of the value that operators bring to wastewater treatment. And regulators are responding by seeking new, productive ways to interact with those at the front line of water quality protection: wastewater operators.

EPA has prepared a voluntary survey due to be distributed to all publicly owned WRRFs in 2018. A draft was circulated in 2017. The survey will develop a database of facilities that are removing pollutants more effectively than what the facilities were designed to accomplish. In advance of the nationwide survey, a draft report, Case Studies on Implementing Low-Cost Modifications to Improve Nutrient Reduction at Wastewater Treatment Plants, has been prepared. It is currently under revision. A similar report by the New England Interstate Water Pollution Control Commission (NEIWPCC), Low Cost Retrofits for Nitrogen Removal at Wastewater Treatment Plants in the Upper Long Island Sound Watershed, was finalized in 2015.

The EPA and NEIWPCC reports provide case studies and site-specific recommendations on how WRRFs have been (or can be) modified to provide cleaner water at minimal cost. Additional case studies are available on the Internet, but, with so few companies providing the service, these reports can be difficult to locate.

Municipal wastewater discharge permits written by EPA Region 1 for western Massachusetts communities frequently contain language that requires the municipality to annually notify EPA and the Massachusetts Department of Environmental Protection (MassDEP) of changes to optimize nitrogen removal and to quantify the amount of nitrogen discharged compared to an annualized pounds per day target. Many municipalities have taken the challenge to heart and

have experimented with process control changes to improve nitrogen removal. Among them are the following: Amherst's Duane Klimczyk; Easthampton's Carl Williams; Greenfield's Mark Holley; Montague's Bob McDonald; Northfield's Eric Meals; Palmer's Gerry Skowronek and Ken Lord; South Hadley's Mike Cijka and Melissa Labonte; and Westfield's Jeff Gamelli and Ken Gagnon.

Montana and Tennessee have taken the idea one step further. There, permits are requiring the preparation and submittal of nutrient optimization studies. The approach being used by EPA Region 1 in Massachusetts and by permit writers in Montana and Tennessee offers municipalities a choice: permittees are given the opportunity to seek operational changes in advance of numerical limits. If they choose to do so and are successful, they can delay or eliminate the need for facility upgrades. Meanwhile, those that choose to stick with the status quo always have the option of building new.

To empower operators to excel, regulators are transitioning from a pass/fail approach toward the wastewater treatment plants they oversee to a collaborative search for excellence. Historically, regulatory efforts were focused on non-compliant treatment facilities while WRRFs that maintained permit compliance received little attention. Now, as a "we expect excellence from our operators" regulatory policy is developing, regulators are taking on roles of mentors rather than rule enforcers. New England's waterways are benefitting from more operator training and technical support.

To bolster this success, we need better mechanisms for recognizing operator excellence. When so much good work falls under the radar, it can be hard to identify, acknowledge, and reward. Another low-profile issue is the shortage of operational consultants. An abundance of talented people populates the engineering community, but few want to transition from design work to operational support. There remains more work to be done. 🔇

After attending a 2009 EPA nutrient removal seminar in Marlborough, Massachusetts, plant staff attempted biological phosphorus removal at a plant not designed for it. The first step was to shut off aeration in the first quarter of the 6 mgd (23 ML/d) facility's aeration train to create a pre-aeration fermentation zone for biological phosphorus removal. Mixing was achieved by operating a mechanical mixer. The experiment was successful and chemical consumption was cut in half, with one dose point eliminated.

With the combination of biological phosphorus removal and post-aeration chemicals, the effluent TP concentration dropped to below the 0.2 mg/L final limit, something chemicals alone did not achieve. An in-line orthophosphate analyzer was installed on the final effluent to allow staff to monitor the orthophosphate concentration on the plant's SCADA system.

As optimization progressed, a design study determined the best long-term strategy for phosphorus

removal. An \$18 million facility upgrade involving new clarifiers, additional bioreactor tankage, new chemical handling equipment, and final effluent filters was recommended as the best long-term strategy for phosphorus removal. Keene proceeded with a \$12.8 million upgrade, investing \$8.7 million in the WRRF, \$1.6 million for a new pump station, and \$2.7 million in dewatering.

Two new chemical handling buildings were constructed and equipped with bulk storage tanks, but no new clarifiers, tanks, or filtration equipment were built. Most of the money was used to repair and update equipment. For example, renovation of the WRRF's influent pumping station including new pumps, controls, and a complete electrical upgrade. At the WRRF, construction included a new electrical building, an electrical upgrade including all new VFDs and motor control centers (MCCs), and a new generator transfer switch. To replace the WRRF original generator, a new generator room was built.

Process upgrades included new return activated sludge (RAS) and WAS pumps and controls, new turbo blowers to replace two positive displacement blowers, and a new UV disinfection building and system. Upgrades to the clarifiers included larger scum boxes and algae sweeps. The plant's dewatering system was completely upgraded by replacing the belt filter presses with more efficient screw presses. The phosphorus removal upgrade was about 28 percent of the overall project cost.

Keene staff's innovative efforts have resulted in eight years of compliance with a summertime 0.2 mg/L TP limit at a fraction of the capital cost of the initial design. By not having to invest in new clarifiers and modifications to the biological reactor or construct and purchase a filtration system, the city used the money to upgrade and replace aging infrastructure at the end of its useful life, something that would have been needed regardless.

#### Plainfield, Connecticut (population: 15,400)

After a decade of study, a 2010 report recommended replacing Plainfield's 0.707 mgd (2.68 ML/d) Village plant with a new pumping station and force main. The study called for the replacement of the town's 1.08 mgd (4.09 ML/d) North plant with a new sequencing batch reactor (SBR). Both WRRFs were constructed in the 1970s and in need of renovation. Neither was designed for nutrient removal. The total cost of the recommended repairs was \$50 million.

As the design report was being prepared, town staff led by Superintendent Jeff Young and Chief Operator Jay Young, began making process changes at both facilities. They were motivated by Connecticut's nitrogen trading program to reduce nitrogen credits purchased by the town, resulting in significant cost savings. Within months, effluent TN had dropped considerably at both facilities. The larger North plant's TN concentration declined from 18 to 10 mg/L while TN at the Village plant dropped from 14 to 8 mg/L. Process changes

also resulted in a measurable drop in phosphorus at the Village plant, from 2.6 to 0.8 mg/L. BOD and TSS removals were unaffected.

By 2012, the process changes had proven effective and plant staff became confident that their WRRFs could meet future permit requirements. In lieu of the recommended \$50 million upgrade, the town self-financed a \$5.5 million renovation of the two treatment facilities. New aeration equipment, disinfection equipment, and simplified computer systems were installed at both plants. To meet a 1.09 mg/L TP limit, chemical phosphorus removal equipment was installed at the Village plant. The process changes are described below. The four mechanical aerators at the North plant (with two aerators in each of the two parallel trains) were cycled on and off to provide periods of aeration for ammonia conversion to nitrate. Aerators were off for periods to provide sufficiently anoxic conditions to support nitrate conversion to nitrogen gas. The tank contents were not mixed during air-off conditions. Portable meters logged ORP readings every 15 minutes on thumb drives. The thumb drives were removed weekly and the data downloaded tabularized, graphed, reviewed, and compared to daily test strip ammonia, nitrite, nitrate, and alkalinity results to establish the following week's air-on/air-off timer settings.

Instead of cycling the air on and off in the aeration tanks to create SBR-like cycling of aerobic and anoxic conditions at the Village plant, the aeration tanks were maintained sufficiently aerobic to provide consistent, effective ammonia conversion to nitrate. Nitrate was converted to nitrogen gas in the plant's gravity thickener. A surplus of sludge was wasted to the gravity thickener daily, the gravity thickener overflowed solids, and the denitrified solids were returned to the influent wet well. The gravity thickener was sufficiently oxygen-deficient to provide fermentive conditions that removed nearly all nitrate and two-thirds of the phosphorus.



### Rochester, New Hampshire successfully reduces total nitrogen discharges by changing operations

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**ABSTRACT** | The city of Rochester, New Hampshire, received notice that its future National Pollutant Discharge Elimination System (NPDES) permit will contain seasonal summer total nitrogen (TN) discharge requirements. Proactively, the city conducted a full-scale demonstration test to evaluate the ability of the existing plant to reduce TN discharges by operating in a low dissolved oxygen (DO)/simultaneous nitrification denitrification (SND) mode. Full-scale demonstration testing showed the plant could reduce monthly TN discharges between 8 to 10 mg-N/L under carbon-limited conditions. Process modeling showed that additional TN reduction below 4 mg-N/L could be achieved via supplemental carbon addition to the last aerated zone, provided its DO concentration was maintained at 0.1 mg/L.

KEYWORDS | Nitrogen removal, simultaneous nitrification denitrification, carbon addition



Figure 1. The Rochester Wastewater Treatment Facility

#### INTRODUCTION

The city of Rochester, New Hampshire received notice that its future National Pollutant Discharge Elimination System (NPDES) permit will contain seasonal summer (May through October) total nitrogen (TN) discharge requirements. Preliminary discussion with EPA suggested the plant may receive a monthly or seasonal interim TN discharge requirement ranging from 8 to 10 mg-N/L with final discharge limits of 3 to 4 mg-N/L. The city conducted a fullscale demonstration test to evaluate the ability of the existing plant to reduce TN discharges by operating in a low dissolved oxygen (DO)/simultaneous nitrification denitrification (SND) mode.

The Rochester Wastewater Treatment Facility (or plant) is rated to treat an average flow of 5 mgd (19 ML/d) and currently treats an average flow of roughly 3 mgd (11 ML/day). The facility's liquid treatment train consists of a headworks facility, high-flow equalization ponds, earthen basin air activated sludge, cloth media filtration, UV disinfection, and effluent aeration. Waste activated sludge is stabilized in sludge storage lagoons with residual solids dewatered as needed. An aerial view of the facility is shown in Figure 1. Each earthen aeration basin has three small anoxic selector zones for sludge quality control and a large non-baffled aerated basin with three fine pore diffuser grids (Zones A, B, and C). The plant typically operates only one aeration basin due to low organic wastewater strength.

#### **INITIAL TESTING**

To reduce TN discharges, the city first attempted to operate in a SND mode by installing one floating mechanical mixer in each of its aerated activated sludge zones to promote maintaining mixed liquor suspended solids (MLSS) in suspension at low airflow rates. Testing showed the mechanical mixers could not fully maintain the MLSS in suspension even with the aeration grid airflow set at the minimum diffuser airflow. A modified SND operating strategy was developed in which the Zone B mixer was moved to Zone A to provide additional mixing, Zone B was fully aerated to maintain DO concentrations of 2 mg/L, and Zone C was unchanged. A typical DO profile when operating in the modified SND strategy is shown in Figure 2.



Figure 2. Typical DO profile when operating in the modified SND

Achieving TN reduction is particularly challenging at the city's facility due to several factors. First, the biochemical oxygen demand to influent total Kjehldahl nitrogen (BOD:TKN) ratio of 3.8 is extremely low. Second, the city receives high nitrate loads from a landfill leachate treatment system, resulting in nitrate concentrations of up to 7 mg-N/L in the plant influent, further decreasing the carbon to nitrogen ratio. Third, the shallow earthen aeration basin results in mixed liquor operating temperatures below 10 °C (50°F) during the winter/spring period leading up to the nitrogen permit season. Average influent wastewater and operating parameters are provided in Table 1.

Table 1. Rochester influent

To counter the low influent carbon content and low operating temperatures, the city proactively found a source of readily biodegradable carbon (acetic acid) from a local food processing industry that did not require an acclimation period to promote denitrification. The hauled waste increased the facility's influent BOD loading by an average of 20 percent, improving the influent BOD:TKN ratio to 4.6. Despite the increased carbon loading, the plant is limited when it comes to accepting and continuously metering hauled waste flows.

operating parameters			
Flow	2.9 mgd (11 ML/day)		
cBOD₅	115 mg/L		
COD	280 mg/L		
TSS	200 mg/L		
TKN	30 mg-N/L		
TP	5.5 mg-P/L		
Nitrate	1 to 7 mg-N/L		
SRT	28 days		
Temperature	6 to 20 °C (43 to 68 °F)		

#### **FULL-SCALE TESTING**

Full-scale testing was conducted between May 1 and November 31 with the modified SND operating strategy. Figure 3 (see next page) shows the influent and effluent TN discharges along with DO operating levels and mixed liquor return (MLR) pumping rates. Baseline operations in April with all three aerobic zones operating at DO concentrations of at least 2 mg/L showed that roughly 45 percent of the influent TN was removed using the undersized selectors. October and November SND operations with reduced DO concentrations in Zones A and C and no MLR decreased monthly TN discharges to 10 mg-N/L (70 to 75 percent TN reduction). Additional TN reduction to 8 mg-N/L or less (75 to 80 percent TN reduction) was observed during July through August when the MLR pumps were operating at 100 percent of the influent flow rate.

Full-scale testing showed sludge quality was not impacted from the modified SND operations; however, MLSS variability to the secondary clarifiers increased dramatically during the test period as shown on Figure 4 (see next page). The variability in MLSS resulted from insufficient mixing in Zone C even after cyclic aeration was implemented to help maintain solids in suspension without over-aerating the mixed liquor to prevent high recycle DO concentrations. The variability in MLSS concentrations did not impact other effluent discharge parameters during testing.

Two additional benefits of the modified SND control strategy included a 40 percent reduction in aeration airflow requirements and soda ash addition used to maintain an effluent alkalinity of roughly 100 mg/L as calcium carbonate. The reduction in process airflow and soda ash addition saves the city roughly \$160,000 annually compared to historical baseline operations.



07-01

08-01



During testing, the plant received hauled food processing waste rich in carbon (acetic acid) about three to five days per week, as shown in Figure 5. The plant has a temporary system capable of receiving 9,000 gal (34,000 L) of hauled waste that can be metered to the aeration basin influent by gravity over 6 to 8 hours. Any additional hauled waste loads were fed directly to the aeration basins over a 30-minute period. Additionally, the plant operated using MLSS control, something that proved difficult

given the varying MLSS concentrations resulting in reported solids retention times (SRT) ranging from 15 to 45 days.

10-01

09-01

11-01

To evaluate the impact of these two operating conditions on plant performance, a BioWin model was calibrated to the full-scale demonstration operations and effluent TN discharges (Figure 3). The calibrated BioWin model was then used to evaluate whether changes to plant operations or other plant improvements could result in additional TN reductions.

Field testing and process modeling showed changing from baseline operations with a fully aerated basin to the modified SND operations reduces monthly effluent TN discharges by 8 to 9 mg-N/L (Figure 6). Surprisingly, Flow, modeling showed implementing SRT control to reduce the wide swings in SRT and/or reducing the SRT would not reduce monthly TN discharges. Similarly, equalizing hauled food processing waste to provide a continuous supply of readily biodegradable substrate did not reduce the predicted monthly TN discharge. However, the predicted effluent TN variability does decrease with industrial waste equalization combined with SRT control.

Operating the facility's MLR pumps at 100 percent of the influent flow (100 percent capacity) can provide additional TN reduction of roughly 1.5 mg-N/L as seen in the test period. Modeling showed expanding the MLR recycle capacity to 200 or 300 percent of the influent flow could further decrease TN discharges to approximately 6.5 mg-N/L, however at significant capital costs and higher operating costs. A more cost-effective method to achieve an effluent TN discharge to 6 mg-N/L is to reduce the Zone 3 DO to 0.1 mg/L while maintaining the MLR capacity at 100 percent of influent flow. To reduce effluent TN discharges below potential future monthly discharge of 4 mg-N/L required adding 300 gpd of 70 percent acetic acid to Zone 3 being operated at a DO of 0.1 mg/L.



20.000

18.000

16.000

14.000

10.000

gpd 12,000

Addition of 300 gpd (1136 L/d) of acetic acid (or equal of readily biodegradable substrate) to the system increases the influent BOD load by 50 percent. Methanol was also considered as an alternative carbon source; however, its longer acclimation period coupled with cold operating temperatures would result in year-round chemical addition.

#### CONCLUSIONS

Full-scale testing showed the city could achieve a monthly TN discharge of 8 to 10 mg-N/L by changing its current aeration strategy to the modified SND mode. Process modeling showed the effluent TN variability could be decreased by equalizing hauled waste flows fed to the system and maintaining a constant SRT. To achieve monthly TN discharges below 4 mg-N/L, viable options include supplemental carbon addition to the last

liquor solids

and sludge

quality





#### Figure 6. Nitrogen reduction optimization analysis

aerated zone with additional mixing, converting the basin to

a conventional four-stage BNR system, or the addition of an anoxic moving bed biological reactor to the process train.

#### **ABOUT THE AUTHORS:**

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- David Green is superintendent of the city of Rochester Wastewater Treatment Facility
- Mark Allenwood is the Brown and Caldwell project manager
- Robert Winn is the Wastewater Division lead in the Brown and Caldwell Boston office



### **NEWEA's Operator Exchange program**

Each year six operators representing each of New England's states participate in NEWEA's Operator Exchange program. This program enables operators to witness, first-hand, how other operators employ various technologies within their treatment processes to achieve compliance with location-specific

regulations. Most important, this program allows operators to exchange ideas to improve treatment plant performance and network with other dedicated water professionals. The 2017 participants were asked to provide the NEWEA community with a synopsis of their experiences.

in the Operator Exchange program to my boss, Ray Weaver, of the Manchester Waste Water Treatment Plant, I never thought that I would be offered the opportunity. The first person picked

to participate in the Operator Exchange program could not commit, so Mr. Weaver asked me if I would still be interested. I was excited about this opportunity to serve as the exchange operator from Connecticut to Massachusetts.

I have been in the wastewater industry for 17 years. Throughout those 17 years, I have learned a lot, read many books, have taken classes, and completed tests. Despite my years in the industry, this experience of touring plants gave me an invaluable hands-on education that cannot be gained through extensive book reading, courses, and tests. I think all operators should raise their hand for the chance to participate in this useful program.

I was given the opportunity to observe how other treatment plant operators worked with equipment that I had read about but was not familiar with. I gained new perspectives and insights into the various ways other plants treat their wastewater.

I checked into the hotel in Auburn, Massachusetts, on Wednesday and had dinner with members of the Massachusetts Water Pollution Control Association (MWPCA) John Downey, from F.W. Webb, and Charlie Tyler, a retired operator from the Deer Island Sewage Treatment Plant in Boston and wastewater expert. We had engaging conversations about wastewater.

On Thursday morning I was picked up at the hotel by Justin deMello from Woodard & Curran. He was my host/driver for the day. Our first plant tour was at the **Billerica Wastewater Treatment Plant**, a

hen I first expressed interest in participating 5 mgd (19 ML/d) facility, similar in size to the plant where I work. We met with Plant Supervisor David Garabedian. Of particular interest was the CoMag system. Unlike the ACTIFLO system at my plant that uses a silica sand ballast, the CoMag system uses

> **CONNECTICUT TO** MASSACHUSETTS **David Geng** Manchester, CT WWTP

magnetite (fully inert iron ore particles) to enhance clarification. Magnetite is denser (heavier) than silica sand. Both systems remove phosphorus. Mr. Garabedian was informative and explained the system in detail.

The next stop was the Acton Wastewater Treatment Facility, a contract operations plant, where we met with Mike Thompson, area manager, and Bill Dickson, plant manager from Woodard & Curran. This is a sequencing batch reactor (SBR) and groundwater discharge facility that treats an average of about 250,000 gpd (950,000 L/d). Mr. Dickson gave us a tour of the plant, which performs many of the operations of a larger plant but within a smaller footprint; each process comprises one or two tanks done in batches. It was great to see this type of facility, since although I have read about SBRs, I have never visited one. Also of interest was the discharge treatment of effluent to rapid infiltration beds (RIBs). These RIBs are three or four times larger than the rest of the plant. The plant's permit prohibits it from discharging directly into the nearby waterway.

We went to the **Uxbridge Wastewater Treatment Facility** for our next plant tour. There we met with James Legg, wastewater operations supervisor. The 2.5 mgd (9.5 ML/d) plant, built in 1979, is going through a \$44.8 million nutrient upgrade. I have been through two plant upgrades, so I know what Mr. Legg is dealing with daily. Keeping a plant efficiently operating during an upgrade is a great feat. Mr. Legg and his staff should

be commended on keeping the plant in compliance operations manager. This plant serves about 250,000 people in the greater Worcester area and manages through the upgrade. He said he and his staff are also keeping an eye on the collection system, which the biosolids of an additional 14 communities. This comprises approximately 50 miles (80 km) of pipe. They plant was originally designed to treat a flow of 56 mgd are conducting inflow and infiltration studies and an (212 ML/d), but more typical daily flows are about overall conditions assessment of the system. I would 30 mgd (114 ML/d), with peak hourly flows of 160 mgd 605 ML/d). One unique aspect of this plant was its like to return to see the plant after the upgrade. After a long day of touring plants, Mr. deMello and two incinerators. These multiple hearth furnaces I met with Eric Smith from WhiteWater for dinner. can incinerate the sludge from the belt filter presses WhiteWater provides contract operations with small to form inert ash, which is then trucked to an onsite landfill. The plant also has a biofilter that treats municipal wastewater treatment facilities. Mr. Smith was my tour guide for my second day of plant tours. odorous air from belt filter presses, mix tanks, grit On Friday morning, Mr. Smith and I went to the facilities, and primary influent and effluent. Also of Hopkinton Wastewater Treatment Plant, operated by interest were the fresh water sponges living near WhiteWater. John Murphy from the Massachusetts the effluent channel. These sponges grow only in Department of Environmental Protection met us at exceptionally clean water, something not every plant the plant. Mr. Smith led Mr. Murphy and me on a tour can claim. This shows how well Upper Blackstone's of the MBR. I had heard of MBR plants, but I was not process runs.

too familiar with how these types of plants are operated. It is a unique wastewater treatment process that combines an activated sludge biological treatment process with innovative membrane filtration within a small footprint that discharges the treated effluent to leaching fields.

Then the three of us went to the Southborough Wastewater Treatment Plant, also run by WhiteWater. This plant uses an RBC treatment process. Southborough's RBCs are an older technology, but they still work well. The RBCs must be completely enclosed in one building to avoid potential freezing during New England winters.

Next Mr. Murphy and I drove to the Upper Blackstone Water Pollution Abatement District's facility in Millbury. We met Michael Foisy, the plant

ach year NEWEA sponsors the Operator Exchange program where each New England state sends an operator to another state to visit wastewater plants, observe different treatment processes first-hand, and establish networking relation-

ships with operators in another state. Luckily, I was selected as the Massachusetts operator for 2017. This year, Massachusetts exchanged with Connecticut. First, I want to emphasize that

as an operator you should do this!



As a manager, please find a way to make this happen under training and investment time so staff can participate in this incredible program. The learning opportunity and value provided by seeing other facilities and speaking with staff cannot be overstated.

Nearing the end of the year and in the middle of the After a short drive, my next stop was one of the four holiday season, my Connecticut liaison, Virgil Lloyd, Hartford Metropolitan District Commission (MDC) scheduled me to visit six plants, all in the Hartford area, plants. I met with MDC Plant Superintendent Jeff over a two-day period. The dedication of the staff at Bowers as well as Superintendent Ray Weaver from

Thank you to the MWPCA members who hosted the exchange as well as Messrs. Downey, deMello, Tyler, Smith, and Murphy. The hotel and meals were outstanding.

I also thank the plant supervisors and managers. Messrs. Garabedian, Legg, Foisy, Thompson, and Dickson for their time and efforts for the exchange. Thanks also to the Connecticut Water Pollution Abatement Association members for allowing me to participate in the Operator Exchange program, especially Mr. Lloyd. A special thanks to Mr. Weaver for thinking of me for the exchange. Lastly, thank you to Mike Emond, my boss at the Manchester Wastewater Treatment Plant. for allowing me to participate in this program.

I thoroughly enjoyed myself and meeting everyone. It was a great experience that I will never forget.

each plant was obvious. Many of the plants we visited are aging like many in New England, but the pride of the staff showed at each facility from the front gate.

With my schedule, it was best for me to travel to the hotel the night before so I could start early the

#### MASSACHUSETTS **TO CONNECTICUT** MCI Bridgewater, MA

next morning. The hotel was conveniently located and allowed me to start day one early at the Wallingford Water Pollution Control Facility. I met with Superintendent Terry Smith for about two hours. Beaming with

pride, he introduced me to the staff and gave me a tour of the facility. Historically, the unique rotating biological contactor (RBC) facility has had a few operation and maintenance challenges that the staff have overcome. To date, the facility is running very well.

the Hockanum River Water Pollution Control Facility in Manchester. The MDC Brainard Road Wastewater **Treatment Facility** is in the middle of a large upgrade project inside the facility as well as a CSO tunnel project. For Mr. Weaver, this was a return visit to see the progress on the upgrade. Mr. Bowers gave a short presentation describing the MDC, the existing plant, upgrade details, and the award-winning plant performance achieved by each of the MDC plants over several years. As it is a larger facility, the tour was longer than expected, but fortunately that did not affect meeting Mr. Weaver at his plant after the MDC stop. With the CSO tunnel project just under way, we guickly toured the active construction site, the building of the tunnel boring machine, and the digging of the two access shafts. At the time one of the shafts was at about 75 feet (23 m) deep, and the other was approaching 175 feet (53 m) deep. After the tour the three of us had lunch nearby before Mr. Weaver and I left for his plant to end the day.

It was a short drive to the Hockanum River Water Pollution Control Facility in Manchester. Mr. Weaver is a wealth of knowledge. His experience shows in the many innovative features around the plant. He is always thinking and planning for tasks that will need to be done around the plant. His planning has led to improvements, which are intended to both save time and help to prevent injuries. I noted the several different operation modes for his pumps around the plant, giving him flexibility to operate them under any condition and from any location. If anyone has the opportunity for a tour of his facility, make sure you ask for the long tour, and make sure he takes you to his walkway. We continued the operator exchange at the ice-cream shop, a great way to end day one.

Day two conveniently had facility visits scheduled that led me back on my route to Massachusetts. Unfortunately, I received a voicemail from Mr. Lloyd that one of the plants had to cancel my visit. This gave me more time at the other facilities. My tours of the day began with the Meriden Water Pollution Control Facility. The manager, Frank Russo, described the plant and several of the unique equipment upgrades, including Connecticut's first installation of turbo blowers. Mr. Russo described a slip lining project that required the pond to be drained for one day, and how staff protected the facility during this time, working with the state and local emergency agencies to make the repair as quickly and safely as possible.

My last tour was at the Groton Water Pollution Control Facility. Assistant Director Christian Lund and the operations supervisor led me on the tour. highlighting the unique high-rate moving-bed-reactortype aeration process. This process created some unanticipated operation and maintenance issues. The staff overcame these operational issues and have fine-tuned the operation to provide the best treatment with the fewest issues.

Each plant's staffing levels differ from what I have experienced in my 24-year year wastewater career. This opportunity allowed me to see and ask questions about pieces of equipment being considered for an anticipated upgrade to my facility. I again thank NEWEA and MWPCA for enabling me to participate in the 2017 Operator Exchange and visit several facilities in neighboring Connecticut. I hope to remain in contact with the operators I met and return to each of the plants in a couple of years to see the progress of the scheduled upgrades.

y husband and I had the wonderful opportunity to be a part of the NEWEA Operator Exchange program this year as a husband and wife team! I am the laboratory analyst and an

operator for the city of South Burlington, while my husband, Arthur Garrison is the lead operator for Milton, handling water distribution as well as wastewater treatment.

First, our hosts made us feel very welcome in Rhode Island.

Everyone we met was genuine and enthusiastic about our visit. Our first day started with a tour of the Warwick Regional Wastewater Treatment Plant. This plant suffered severe flooding in 2010. It took five days for the plant to regain primary treatment and about two months to regain secondary treatment. I cannot imagine the stress of managing through that disaster.



is recycled) along with aluminum sulfate for phosphorus removal. Solids are thickened at the site but trucked out to another facility for incineration.

Our second tour that day was at the Cranston Wastewater Treatment Plant, the third largest

plant in Rhode Island. About 50 people work at this facility, making up three shifts. Most impressive about this plant is the incineration process. We could see inside an operating incinerator, which burns the sludge to ash at about 1300 to 1400°F (700 to 760 °C). This facility also had large tunnels under the plant where many pumps are located, something we

had never seen before. The plant is also run under contract operations, a practice I was not familiar with, even though there are some plants run this way in Vermont.

The West Warwick Treatment Plant was our last tour of the first day. This plant also has three shifts for operations. Methanol is used as a carbon source for denitrification. Aluminum sulfate is used for phosphorus reduction. Odor control is also implemented at this plant. Sludge is dewatered to "cake" and trucked out for incineration. This plant also uses microsand for phosphorus removal and uses UV for disinfection.

On our first day of tours I noticed that the plants we visited do not seem to be digesting sludge or creating biosolids. Perhaps it is not very useful or cost-effective in this state. They do, however, use treated effluent for plant processes, a practice likely more common at most treatment plants now. Since the beginning of my career in wastewater, I have really been impressed by the reuse of effluent at treatment facilities.

On our second day in Rhode Island, we visited three more plants. The first was the Westerly Wastewater **Treatment Plant**, built in 1959. Only six people work there, much like my department and my husband's as well. This 3.5 mgd (13 ML/d) facility is under contract operations and uses chlorine and sodium bisulfite for disinfection. Sludge is trucked out for incineration. The unusual process at this plant is the sponge media that is aerated in suspension. It is recirculated and reused, and should last for about 10 years. We had never seen anything like this before. Operation of this plant had recently changed from one company to another, and its condition was described as subpar. Operators are working hard to bring this facility back from some apparent neglect while still meeting their permit requirements.

The second tour for the day was at the **East** Greenwich Wastewater Treatment Facility. This plant was last upgraded in 1988. Only five people they each had their own way of screening septage work at this plant, which has a design flow of 1.8 mgd before accepting and adding it into their treatment (6.8 ML/d). The most impressive thing about this plant processes. So many differences exist between our was the rotating biological contactor (RBC) building, plants and the plants we toured, but one thing is housing huge RBC units. Walking past these massive the same: operators at the plants we toured owned a sense of pride in their work, even at the facilities in machines as they were turning was amazing. This plant also uses sand filtration for nitrogen removal need of restoration and updates. and methanol for denitrification. To the best of my I would like to thank the Narragansett Water knowledge, this was the first treatment plant in Pollution Control Association for its hospitality. We Rhode Island to use UV for disinfection, but it still stayed at a nice hotel and ate fantastic food with has the chlorine contact chamber as a backup. Much new friends, all while enjoying the beautiful scenery thought went into the architecture to make it more of Rhode Island, Mr. Garrison and I also had a great aesthetically pleasing, but it appears that this affluent time at the Trade Show on our last day there, before community does not appreciate the value of keeping heading home. I encourage any operator who would treatment plant equipment up to date. Despite the like to learn more about the wastewater industry to state of this facility, the operators here are working become a part of the Operator Exchange program. hard to keep things running smoothly. In my short



time in this industry, I have learned much about the struggle to educate the public on the importance of wastewater treatment facilities and collection systems.

Our final tour was at **Field's Point Wastewater Treatment Facility**, the largest treatment facility in Rhode Island and built around 1900. There are three shifts and approximately 250 people who work here. This facility has a 77 mgd (290ML/d) design flow, but has had to handle more than twice that flow during times of heavy rain because of the combined sewer collection system. Everything about this plant is massive—the aeration basins, the clarifiers, the pumps. I cannot imagine working at a facility so large that you need golf carts to get from one place to another. The aeration process includes 10 trains of basins filled with tiny disk media and 10 blowers to aerate them. Sludge is thickened at this plant but then contracted out for dewatering and incineration or sent to a landfill. I was mostly interested in the laboratory, which by itself was larger than the entire building where I work. The lab analysts run daily total suspended solids (TSS) and biochemical oxygen demand (BOD), and daily most probable number (MPN) for fecal coliform and Enterococcus on the facility's final effluent.

The last thing we had hoped to see was the historymaking stormwater tunnel completed in 2017 by the Narragansett Bay Commission, but the elevator was not working that day, and climbing 50 flights of stairs did not sound like too much fun. The \$1 billion project diverts the flow of stormwater from the aging system in Providence and prevents overwhelming and overflow of that system and the treatment facility, thus reducing pollution into the sensitive bay.

Before this trip, there were processes and methods we were previously unfamiliar with, including the use of methanol, sand filtration, incineration of sludge, and suspended media. The plants we toured in Rhode Island routinely receive a lot of septage, and

ast fall, from November 7–9, 2017, I participated in the Rhode Island to Vermont Operator Exchange. It was a great experience, and I learned a lot from my counterparts in the Green Mountain state. I describe my three-day trip to Vermont below.

First, though, some background and perspective: I am a first shift operator at the West Warwick Wastewater Treatment Facility. I was new to the field about one year ago. Previously I worked in the building

restoration business (at times cleaning up after wastewater flooded a home). I made a career change to the wastewater treatment field because I wanted to protect the environment in my own backyard (I am a West Warwick resident) as well as job stability and better benefits.

West Warwick normally averages approximately 5 mgd (19 ML/d) of wastewater flow. During high groundwater and periods of rain, the plant can see up to 12 mgd (45 ML/d) of flow. Activated sludge is the main treatment process, though we recently upgraded to treat phosphorus to the 0.1 mg/l permit limit using ballasted flocculation. We discharge treated effluent to the Pawtuxet River. As noted below, many of the facilities that I toured in Vermont differed from West Warwick's, and it was interesting to observe and learn from those differences.

On November 7, I met Rick Kenney, Green Mountain Water Environment Association (GMWEA) president, and toured three facilities. First, we toured the White River Junction and Quechee facilities, which each treat approximately 500,000 gpd (1.9 ML/d) of flow. What struck me about these visits was the cloth filters used at the Quechee facility to polish effluent prior to discharge. It was fascinating to learn about this technology compared to what we use at the West Warwick plant.

On the same day, I met GMWEA Board Member Chris Cox at the Montpelier facility. During the tour, Mr. Cox explained that this facility treats up to approximately 1 mgd (3.8 ML/d) of flow. The interesting thing is that this facility has sludge digesters and recovers methane for energy use. This is different from West Warwick's approach, which involves sludge dewatering and disposal. I also learned about the Archimedes screw pump used to lift flow into the plant.

After a long day of touring wastewater treatment facilities, we had dinner at the Capital Plaza and then rested for the night before another full day of activities.

On November 8, I met NEWEA Director Nate Lavallee and Will Sanderson from the Milton Wastewater Treatment Facility, and we toured the Essex Junction treatment plant. There we met Superintendent Jim Jutras, who impressed me with his vast knowledge and hands-on approach. Essex Junction is a 3.3 mgd (12.5 ML/d) advanced treatment facility, which, similar to Montpelier, uses sludge

digesters. Essex Junction captures

**RHODE ISLAND TO VERMONT** Gene Medeiros West Warwick, RI WWTP

the methane and uses it for heating. Mr. Jutras's main mission is to be as green as possible, and I was struck by how environmentally and energy conscious the staff is. At the West Warwick

facility, we may turn to Essex Junction for a few pointers in this area.

Later in the day, I met GMWEA Past President Chris Robinson, and we toured the Shelburne Wastewater Treatment plant. The Shelburne plant has a capacity of approximately 500,000 gpd (1.9 ML/d) and discharges treated effluent to Lake Champlain. Appreciating my interest in history, Mr. Robinson gave me a tour of the local area, and one of our stops was a farm owned by the Vanderbilts. The 5,000 ac (2,000 ha) farm was used to raise horses. Though the main buildings were converted to a bed and breakfast, there were stables not yet renovated, and I was able to see them as they were long ago.

After Shelburne and local area tours, we stopped at the South Burlington Airport Facility. This facility was recently upgraded and can treat approximately 3 mgd (11 ML/d) of flow. It also has an anaerobic sludge digestion facility that captures digester gas for heat and power production. The city's water quality superintendent, GMWEA Board Member Bob Fischer was also was also in attendance and shared his knowledge, experience, and sense of humor with all of us.

Later in the day we toured the Champlain Water District drinking water treatment facility, a nice contrast to the wastewater treatment plants toured during the first two days of my trip.

The day culminated with dinner at a restaurant in the Burlington area. It was attended by several GMWEA board members and their spouses.

On the last day, November 9, I attended the GMWEA trade show. While there I interfaced with several equipment vendors and learned about the wastewater industry's latest equipment.

My three days in Vermont were a great experience. I toured plants that were different from my own, and I took home a few operational pointers. I met many knowledgeable and passionate industry professionals. I highly recommend the Operator Exchange and encourage others to participate in it.

hank you to everyone who worked so hard and put so much of their valuable time and effort into making this wonderful program possible. As a new operator, this was a tremendously valuable learning experience. I entered the wastewater treatment world just nine months

ago. When Dan Driscoll told me that I was selected to be part of the Operator Exchange program, I was honored and grateful. Clayton "Mac" Richardson (Lewiston–Auburn Wastewater



Treatment Facility superintendent) was my tour guide and bodyguard for the three amazing days spent touring the Maine facilities.

Day one started out at the **Sanford Wastewater Treatment Facility**. This plant was the first oxidation ditch, lagoon, and composting facility of this size that I had seen. André Brousseau, plant superintendent, led me around and explained how the large oxidation ditch and lagoons worked. This was also the first time that I had seen such a large composting facility. To my surprise, the composting odor was not strong. Mr. Brousseau explained how the sludge was mixed and heated to 145°F (63°C) and sold as a Class A compost.

Our next stop was the beautiful coastal town of Wells. Wells Wastewater Treatment Facility was the first indoor plant that I had seen. Owing to the large influx of tourists to the region in the summer, the facility experiences the highest flows in that season. Much like Sanford, there are no primary clarifiers at this plant. After preliminary treatment, the flow goes directly to the aeration basin. Wells's collection system comprises approximately 40 miles (64 km) of sewer systems with 10 pump stations. The plant is rated for a daily flow of 2.0 mgd (7.6 ML/d) but averages between 0.4 and 1.5 mgd (1.5 and 5.7 ML/d).

Our next stop was the RBC/activated sludge plant in Kennebunk. This was again a first for me, as I experienced how an RBC plant worked. This plant has 12 employees and 28 pump stations. I saw a map of the sewer system and was stunned by the size. Kennebunk's flow averages between 0.7 to 2.0 mgd (2.6 to 7.6 ML/d). The plant consists of one primary clarifier, a secondary clarifier, nine RBCs, and the aeration basin. A great screw press dewaters the sludge before it is shipped.

After a great lunch at Duffy's, Mr. Richardson and I headed to the downtown Biddeford Wastewater **Treatment Plant**. This plant is an activated sludge plant that averages 2.0 mgd (7.6 ML/d) and is rated at 6.5 mgd (25 ML/d). Like Wells and Sanford, this plant does not have a primary clarifier. It has two aeration basins, which cycle air flow for denitrification. When the air is cycled on, the wastewater is nitrifying; when the air is off, it is denitrifying. It also has a biofilter tower. Presses are used for dewatering sludge.

Our last stop of the day was the **Scarborough** Wastewater Treatment Facility. This activated sludge plant treats approximately 1.2 to 1.4 mgd (4.5 to 5.3 ML/d) and is rated to 2.5 mgd (9.5 ML/d). The plant has two primary clarifiers, three secondary clarifiers, a large

#### **NEW HAMPSHIRE** Stephen Simeone Concord, NH WWTP

aeration basin with six aerobic aeration tanks, and three anoxic selector tanks. The outfall is approximately 3 miles (5 km) out to sea. The sludge thickening system comprises three hose feed pumps and a gravity belt thickener. Two

rotary presses are used for dewatering before the sludge is composted at the facility.

Mr. Richardson brought me to his tiny (yet very interesting) oxidation ditch plant early on Wednesday morning. He runs this plant by himself part-time. This plant serves Windham High School, Middle School, and Elementary School. This plant treats an average of 11,000 gpd (41,600 L/d) with a maximum of 25,000 gpd (94,600 L/d). This plant is particularly difficult to run since it is fed only by the school system. During winter and summer breaks, the flows are very low and the microbiology becomes difficult to control.

The next stop on Thursday morning was Mr. Richardson's other plant, the Lewiston-Auburn Wastewater Treatment Facility. This is an activated sludge plant that has an off-site composting facility in addition to anaerobic digesters. The plant treats an average of 6.0 to 7.0 mgd (23 to 26.5 ML/d) and is rated at 14.2 mgd (54 ML/d). It has 21 employees and is run seven days a week. It was the first time I have seen a digester. I was fascinated to learn how efficient the digesters are. The methane gas produced from the digesters is used to power two co-generators, which power a good portion of the plant.

Our final plant of the tour was the **Oxford** Wastewater Treatment Facility. This smaller plant treats about 17 homes as well as the casino. A membrane bioreactor (MBR) treatment process treats approximately 20,000 gpd (75,700 L/d). The plant uses microfiltration to separate the solids. To the best of my knowledge, it is the first MBR to be used at a municipal treatment plant in the state. It is now run by one operator.

To conclude the day, the Maine Water Environment Association (MEWEA) treated me to 18 holes of golf at the beautiful Sunday River golf club. I did my best to pitch in with my four-man team during the best-ball tournament. My teammates were good sports, and I was lucky enough to learn a few tips from them.

The following day I attended the 2017 MEWEA Fall convention. It was a great opportunity with many vendors and courses being taught. I was fortunate to be a part of this whole experience. I appreciate everything that the New Hampshire and Maine associations have done for me, and I look forward to working with both again in the future.

ast year I took part in the NEWEA Operator Exchange program, where operators across New England visit wastewater plants in different states. This year Maine and New Hampshire were conveniently paired: a New Hampshire operator came

up to Maine, and I traveled south across the bridge. Over the next three days, I toured seven wastewater plants, stayed in a nice hotel, was wined and dined, and met a lot of great people. My first stop was the

Dover Wastewater Treatment Facility, in the

town also known as the "Stainless Steel Capital of

New Hampshire," It was a sunny day and, luckily, I brought my sunglasses. Dover recently underwent

a major upgrade and was converted to a modified

aeration upgrade (involving diffused air, modulating

valves, a selector zone, and a nutrient recycle pump).

The facility installed new return activated sludge and

waste activated sludge pumps, a biofilter for odor

control, and a screw press for dewatering. Soon, our

Westbrook plant will be installing a similar piece of

dewatering equipment, allowing us to produce drier biosolids. Dover is a 4.7 mgd (18 ML/d) facility and,

much like our (smaller) Peaks Island plant, treats its

The next stop was the **Hampton Wastewater** 

**Treatment Plant**. Built in 1965, the facility is facing

them. Hampton discharges into marshland full of

including a very low copper limit. To make matters

worse, last year the town had a force main leak that

discharged raw sewage into the Hampton–Seabrook

estuary. This leak was swiftly followed by a tremen-

dous amount of cleaning and testing. Despite these

the team running the Hampton plant is doing an

Day one ended with a stop in Hooksett at the

Hookset Wastewater Treatment Facility, a plant

with a very friendly, small-town-like atmosphere,

but not without its own unique challenges. Several

years ago, to take on increased loads without room

for expansion, Hooksett invested in new technology

filled with silver-dollar-sized plastic discs that, like

a trickling filter, provide surface area for biological

that I had never seen before. It had its aeration basins

growth, thus enabling the facility to treat more waste

without additional tanks and space. However, owing

allows flow to pass through) coupled with high flows,

to a disc design flaw (insufficient hole spacing that

the discs clogged the aeration effluent screens and

flooded the plant, washing the discs down the river.

After winning a lawsuit with the design company,

challenges, aging infrastructure, and a limited budget,

interesting challenges and is proactively rising to meet

aquatic life, and thus faces strict permit limits, notably

effluent with UV light.

amazing job.

Ludzack–Ettinger (MLE) process, like Portland's



Hooksett has fine-tuned its operational strategy and is running again. I left the plant with a Hooksett Wastewater Treatment Plant T-shirt and a nice scraper for removing oil from cooking pans.

The first stop on day two was to the **Nashua** 

Wastewater Treatment Facility. The facility treats approximately 11 mgd (42 ML/d) and discharges its clean effluent into the Merrimack River. The plant, which began operations in 1959, has gone through several upgrades

over the years, transforming it from a small operation to one that can handle a maximum influent flow of 110 mgd (416 ML/d). The plant operates an anaerobic digester in which two different types of bacteria feed on sludge, reducing its volume and as a byproduct producing methane gas. This gas can be used to heat the digester, power engines, and the building. Nashua, like Dover and soon our Westbrook plant, dewaters sludge using a screw press. The average dry cake solids is 30 percent. When I visited, the cake was averaging 33 percent solids, almost double the solids we produce at Westbrook. Drying biosolids to such a degree is an enormous cost saver. "Solid" work, Nashua.

Following the river north, my next stop was the Merrimack Wastewater Treatment Facility, where a valuable product is produced while treating waste. Here, biosolids are composted, marketed, and sold for profit. The Merrimack staff have composting down to an exact science and are producing a product that meets the EPA Class A compost standard. It is distributed throughout New England and New York, and even used on golf courses played on by the PGA. The plant has gone through several facility upgrades over the years and now runs an agitated bed composting system. In layman terms, the facility is virtually a large covered garage divided into horizontal bays, where the compost mix is loaded into the front and moved through with an automated agitator. There are temperature sensors, aeration blowers, and a biofilter for odor control. After about 21 days the mix reaches the end of the process and is moved to an uncovered area to cure. To take something that is literally flushed away and turn it into an environmental friendly, profit-making product is a great achievement.

My final stop of day two brought me to the **Concord Wastewater Treatment Facility**. Like most wastewater treatment facilities, Concord has spent much time evaluating new and existing technologies for a future process and biosolids end-use upgrade. The plant currently uses belt-filter presses and a heat and lime stabilization process to produce a Class A compost that is primarily spread onto agricultural land. The city conducted several evaluations on a range of options for the compost use, including composting, thermal drying, lime stabilization, aerobic digestion,

incineration, landfilling, and anaerobic digestion. By defining its short- and long-term goals, Concord could evaluate each method while narrowing down its options. In the end, the current biosolids stabilization process, which has undergone major upgrades of its own, was selected for the short-term solution since it is both cost-effective and environmentally sound. For the long-term solution, anaerobic digestion was chosen. The city decided it will revisit this decision soon before the upgrade. Concord's time and effort into these important decisions are impressive, as it is considering its employees, the community, and the environment.

After a nice dinner with the board of directors and some of the plant hosts, my third and final day brought me to the largest plant in New Hampshire, one that has gone through a decade of major upgrades totaling over \$50 million. Since 2007, the **Manchester Wastewater Treatment Plant** has upgraded its dewatering process, secondary clarifiers, incinerator, grit removal, and aeration process. The plant is now replacing all the internal

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components of its primary clarifiers and gravity thickeners. This plant is big: It takes an average of flow of 34 mgd (128 ML/d) and a design peak flow of 56 mgd (212 ML/d), and can effectively treat 80 mgd (300 ML/d) before bypassing. The crew is on top of its game, keeping up with constant upgrades and new process technologies, and the city of Manchester clearly understands the importance of investing in its wastewater facilities. This was a really cool and interesting plant to see.

Finally, my last stop was at the Puritan Restaurant for the New Hampshire Water Pollution Control Authority (NHWPCA) fall lunch—great food and good people once again. The exchange program was not only enjoyable but also interesting. I highly recommend the program to those seeking to further their wastewater knowledge. I thank Scott Firmin and Mac Richardson for selecting me to participate, all the tour guides for showing me their plants, Amy Pollock from Hach, and Ken Conaty for setting this up and making it a great experience.

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### **NEBRA** Highlights



**Resource Management Recognized for Excellence** The leaders of Resource Management—Charley Hanson, Shelagh Connelly, and Marty Riehs, with (left in photo) project manager Mike Potash—earned well-deserved recognition with the Biosolids Management Achievement Award that Ms. Connelly received at the NEWEA Annual Conference in January. This local New Hampshire company has helped pioneer residuals management options throughout the Northeast, and Ms. Connelly has been a leader in ensuring effective policies and regulations.

#### **NEBRA Facilitating Research**

Although its budget is small, NEBRA is helping advance critical research related to residuals and biosolids management. "While we don't have the funds to sponsor major research projects," said Research Committee Chair Charles Alix (Stantec), "we are good at identifying, facilitating, and leveraging research." The committee surveyed members in 2016 and determined four focus areas:

- 1. Contaminants of emerging concern/ microconstituents
- 2. Public outreach
- 3. Co-digestion
- 4. Science-based regulatory limits on phosphorus

Currently, NEBRA is helping initiate projects addressing the first and last of these focus areas.

As concerns about perfluorinated compounds (PFAS) continue, NEBRA is leading the dissemination of key information. Its staff and PFAS Advisory Committee have proposed and are helping facilitate targeted research that the New Hampshire Department of Environmental Services has agreed to fund. The project, led by Dr. Thomas Ballestero of the University of New Hampshire (UNH), will help clarify concerns about PFAS leaching to groundwater from sites where biosolids and other residuals are applied for agronomic purposes. NEBRA is discussing with other state environmental agencies the possibility of conducting similar site and leaching evaluations in their states to build a consistent, robust database that will measure the potential risk of biosolids and residuals on land.

Additional research NEBRA is helping to initiate was triggered by the promulgation of the Massachusetts Plant Nutrient Regulations (330 CMR 31.00) in 2015. In January 2018, the regulations were updated. NEBRA's Research Committee has discussed with UMass Cooperative Extension and UMass researchers over the past year an approach to guide biosolids and residuals managers regarding compliance with these new, challenging regulations. The key concern is that the regulations and UMass Extension guidance, which is cited by the regulations, do not address how phosphorus is to be tested and managed when composts, biosolids, and other organic residuals are applied to soils. The latest version of the regulations emphasizes that, in the absence of UMass guidance, best industry practices should be followed. Therefore, NEBRA is facilitating further development of industry best management practices that will incorporate the latest scientific understanding of the environmentally relevant availability of phosphorus in biosolids and other products.

NEBRA brings expertise, facilitation, seed funding, in-kind services, and collaboration to these projects, helping make them happen. Anyone interested in helping, please contact the NEBRA office.

#### **Co-Digestion and Combined Heat and Power Life Cycle Analysis**

Late last year, EPA approved release of a significant new technical study of co-digestion and

combined heat and power (CHP) at a small water resource recovery facility (WRRF) in Bath, New York. EPA staff, working with a contractor, conducted a life cycle assessment and cost analysis (LCCA) of water and wastewater treatment options for sustainability. The analyses compared



current operations with proposed upgrades at this small [~1 mgd (3.7 ML/d) design] New York facility. Dr. Xin (Cissy) Ma (EPA) facilitated the project and presented it at the Northeast Residuals & Biosolids Conference last October

#### SEPA

Life Cycle Assessment and Cost Analysis of Water and Wastewater Treatment Options for Sustainability: Upgrade of Bath, NY Wastewater Treatment Plant



(slides available on the NEBRA website). The report is available at nepis.epa.gov.

As Ned Beecher of NEBRA noted in a review provided to EPA, "The Bath, New York life cycle

#### The ultimate benefit of the Bath study is that it goes further than any other in bringing together the full complexity of the many systems and variables at a modern WRRF

assessment (LCA) study is, as best as I know, the most comprehensive, detailed analysis comparing a wastewater treatment process with an upgraded process designed to address the most pressing, current, water quality and energy efficiency needs. The Bath facility is a good example of a typical small WRRF. Also, its water quality and energy goals are typical of many current facilities: reducing nutrients in wastewater effluent to meet more stringent discharge permit requirements, maximizing energy efficiency, recovering resources (energy, nutrients, and organic matter in the solids), and providing a community service by treating other high-strength wastes. These are the leading topics of interest and technology development in the wastewater field today, according to numerous sources. This makes the LCA study highly relevant. It also made the study particularly challenging; past studies have generally focused on only effluent nutrient reduction or anaerobic digestion and CHP, and not on all of them together. In addition, what is unique about the LCA study is that it involves a small plant. This makes the study useful for a larger number of facilities in the Northeast and around the country. Managers of many relatively similar facilities can learn from this report and apply its findings to their own situations."

The LCA study seems to suggest that installing nutrient reduction systems to meet stricter

#### NEBRA Trainings, Workshops, and Events

We continue to offer more opportunities for learning about the basics and the latest developments regarding solids management in this region. Check out our Events page at nebiosolids.org.

effluent requirements does not have to negatively affect the impacts of installing anaerobic digestion, CHP, and high-strength organic waste processing systems. Even if a WWRF does not have to install additional nutrient reduction technology, it could benefit from other systems. However, taking the step toward anaerobic digestion, CHP, co-digestion, and composting or other processing of solids requires commitment to doing it right, with continued vigilance during all operations, if the net life cycle costs and benefits are going to be positive. Otherwise, purported benefits of these systems may not be realized. Fortunately, an increasing focus in professional circles is maximizing the efficiency of anaerobic

digestion systems, with research and reports focused on anaerobic digestion mixing technologies, avoidance of grit accumulation, digester feeding regimens, high-strength feedstocks, and the variety of configurations (multi-phased, mesophilic and thermophilic, acid-gas phases, etc.). This focus is appropriate, given the report's finding that "marked reductions in [negative net] environmental impact are demonstrated in



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scenarios exploring increased acceptance of high-strength organic waste and the pursuit of exceptional digester operational performance."

The LCA study also confirms the benefits for WRRFs with anaerobic digestion systems, including cost benefits, of maximizing the capture of solids in the primary treatment process through chemical and/or other enhancements. This has also been a recent focus in the wastewater engineering profession.

Last, the LCA and LCCA confirms what prior studies and experience seem to indicate: that "achieving an anaerobic digestion payback period that is shorter than the system lifetime is challenging at this scale" [meaning at such a small WRRF, i.e., 1 mgd (3.8 ML/d)]. That it is possible, however, if done with care and operational vigilance, is a significant finding of the study, given that the assumption in the engineering profession has historically used 5 mgd (19 ML/d) as the minimum size for installing anaerobic digestion costeffectively. The addition of managing high-strength wastes and the associated benefits of providing that community service clearly make it possible to install and operate anaerobic digestion and CHP at WRRFs between 1 and 5 mgd (3.8 and 19 ML/d). A successful example is the 3.3 mgd (12.5 ML/d) Essex Junction, Vermont facility.

The ultimate benefit of the Bath study is that it goes further than any other in bringing together the full complexity of the many systems and variables at a modern WRRF and calculates the total net environmental and cost impacts of upgrades being planned and implemented at many facilities nationwide. The scope of the study is large. It is a useful piece of work, and it confirms the findings of piecemeal studies and experiences that have looked at the impacts of separate systems.

This study provides a template and data for making similar calculations at other WRRFs. However, the complicated details may make repetitions of the effort daunting. EPA is considering refining the calculators used for this study and making them user-friendly, for public release.

#### **Biosolids Use Farm a Recognized Environmental Steward**



The Whitcomb Farm is a part of the community fabric and landscape in the center of Essex Junction, Vermont. The current farmer, Lorenzo Whitcomb, is the fifth generation of the family to

care for the land that was first tilled in 1867, according to a local news story. The family was recognized as dairy farmers of the year in 2001. And, for many years, the family has incorporated biosolids from the nearby Essex Junction wastewater treatment facility (WWTF) into its soil management. In the last few years, the Whitcomb farm has gone even further in its stewardship of the land, conserving

271 acres (88 ha) in



2014 in association with the Vermont Land Trust and, in 2017, an additional 139 acres (56 ha). The Essex Junction WWTF, which has worked with the Whitcombs for decades, is led by Jim Jutras, who was recognized with the NEWEA Energy Management Achievement Award for 2017.

Ned Beecher, Executive Director Tamworth, N.H. 603-323-7654 | info@nebiosolids.org

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### Spotlight: : Ray Vermette, an Operator's Operator

Ray Vermette is one of the most widely respected wastewater treatment plant operators in New England. In addition to running the Dover, New Hampshire Wastewater Treatment Facility, Mr. Vermette is NEWEA's 2018 president-elect (and 2019 president). He has served as president of New Hampshire Water Pollution Control Association (NHWPCA) and in various leadership roles with NEWEA. And, over the years, Mr. Vermette, along with the Dover facility, has been recognized for many accomplishments (see sidebar). We recently caught up with him to ask about his work.

Journal Like many operators, is there a story to how you came into this line of work?

RV In 1986, in the summer of my junior year of high school I signed up for employment with a state of New Hampshire vocational program. I was slated to clean cars at an auto dealership. When school ended I went to visit family in Connecticut for a week before I started work. When I returned, my placement was filled and was told that the only slot left was at the Somersworth Wastewater Facility. As they say, the rest is history.

■ How long have you been doing this work, and what are the significant changes you have seen over the course of your career?

□ I have been at the Dover Wastewater Treatment Facility for 27 years. The biggest change that I have seen is technology. Here in Dover we have always

#### The Ray Vermette Stat Sheet QUALIFICATIONS

- Associate Degree from New Hampshire Technical College
- Certificate from University of New Hampshire in Supervisory Skills
- Grade IV New Hampshire Wastewater License
- Grade I New Hampshire Water Treatment License
- Grade IV NEWEA Collections Systems Certification
- Grade I NEWEA Laboratory Analysis Certification

#### POSITIONS

- NHWPA, 2007
- NEWEA State Director
- NEWEA Plant Operations Chair

#### RECOGNITION

- 2017 WEF Hatfield Award
- 2015 EPA Operations and Maintenance Excellence Award
- 2015 NEWEA Utility Management Achievement Award
- 2013 WEF Operator Ingenuity Awards
- Featured in TPO Magazine September 2012
- 2011 New Hampshire Operator of the Year
- Featured on New Hampshire Chronicle for NHWPCA 2007
- 2003 NHWPCA Plant of the Year Award
- 2003 Alfred E. Peloguin Award

used the progression of technology to streamline and optimize our facility operation. One major example was the upgrade of our dewatering process. When the facility went online in 1991 we dewatered with gravity belt thickeners and belt filter presses. For over 20 years we had an operator designated to dewatering and one designated to our in-house composting operation. After a comprehensive evaluation, we installed two inclined screw presses. This equipment allowed us to go from four pieces of dewatering equipment down to two. As a result of increasing our solids cake from around 15 percent dry solids to around 30 percent dry solids, we found that it is more cost-effective for us to recycle our biosolids with RMI (2017 NEWEA Biosolids Management Award winner) than to continue with our composting operation. As a result, we were able to delete the compost operator position and

> reallocate 80 percent of the time previously spent by an operator on just dewatering. The ability to operate the new equipment virtually unattended allowed us to do more things and be more efficient with our personnel resources as well as produce better solids for ultimate reuse.

■ What makes you get up each morning and gets you excited about the work you do? □ I love what I do! I have been allowed to think and act like an owner. I try to operate the facility as if it were my own. I have had a tremendous amount of support from the city manager, director, and city council to make our facility what it is today.

■ What do you see as the challenges facing your facility and the clean water profession as a whole over the next few years? □ Funding is one of the biggest challenges. For Dover it is not so much operating and maintaining the facility, but the permit limits we need to meet keep getting lower and tighter. This is a huge challenge for us and many other facilities.





■ What advice would you give to someone wanting to explore plant operations as a career? □ Start by taking a tour of a facility. I think a majority of people have no idea how involved and broad a plant operator's duties are. Next, order the Sacramento Wastewater Volume I manual. This is a very inexpensive way to not only get a view of what an operator's position entails but also provides a sense of how interesting and rewarding this work really is.

■ What are you most proud of in your professional operations career?

□ What I am most proud of is taking part in making the environment a better place every day. We, as facility operators, are the first line protecting the waters of the world. Also, the opportunities that I have had to be involved and serve our professional associations like NEWEA and NHWPCA have allowed me to help other operators and facilities to do the best job possible. It is amazing how hard working and dedicated the people who do this work, largely out of sight of the public, really are.

■ Why does it make sense to be involved in the NHWPCA and NEWEA?

□ In my opinion, networking is one of the biggest benefits in becoming a member of one of our professional organizations. This gives individuals a valuable opportunity to talk to other professionals about the day-to-day issues that we all face. The sense of

shared purpose among all the professionals that make up our professional organizations is inspiring, not to mention the training and trade shows that keep us up to date on the latest technology.

■ What advice would you give to a student about ready to graduate from high school today? Would you recommend a career in the environmental field? Plant operations in particular?

□ Absolutely! I would highly recommend this field to anyone looking for work that is important, rewarding, and stable. We have a wide range of specialty trades that make up wastewater treatment. From facility maintenance, operations, and laboratory functions to electrical and SCADA positions to name a few, and that doesn't begin to highlight opportunities in consulting, product development and sales, government, construction, and academia.

#### ■ Congratulations on your selection as NEWEA president-elect. What plans do you have for NEWEA when you are president in 2019?

□ To carry the NEWEA torch forward and promote the growth and progression of the association. I have some very big shoes to fill! I will be following a long line of past presidents whom I respect and look up to and who have paved the way to where the association is today. We have a great story to tell, the challenges keep coming, and working together we can meet those challenges.







Responsibilities of the NEWEA state director include ensuring continuity between NEWEA and the state member association and serving on the NEWEA Executive Committee. A heartfelt thank you goes to outgoing Vermont director Nathan Lavallee for his past three years of service. His term ended during the January Business Meeting. Where Mr. Lavallee's journey ends, my journey begins. I look forward to serving as director in NEWEA's Executive Committee over these next three years.

As incoming director, let me tell you about myself. I entered the wastewater field in 1997 after graduating from Paul Smith's College in 1995 with an A.A.S. degree in Ecology and Environmental Technology. I was a member of the Vermont Operations Challenge team from 2001–2003. In 2007, I became a Green Mountain Water Environment Association (GMWEA) board member and have since served on various committees and in officer roles. From the spring of 2014 to the spring of 2016, I served a two-year term as GMWEA's president.

#### 2017 Events

2017 was a busy year for GMWEA. The following is a summary of the past year's events.

- For the Vermont State Science and Math Fair/ Stockholm Junior Water Prize, GMWEA board members selected the Vermont fair winners and the Stockholm Junior Prize winner on April 1 at Norwich University.
- The George Dow Memorial Golf Tournament, held on August 18 at Cedar Knoll Country Club, was a success. This tournament has been held for 25 years, and 2017 was the 10th in honor of George Dow.
- The New England Biosolids and Residuals Association held its annual conference in Burlington in October. The event was a success. GMWEA was proud to sponsor this event, and we look forward to doing so again in Vermont.
- The GMWEA Fall Conference & Trade Show was held at the Sheraton hotel in South Burlington. The event had more than 100 trade

booths, six training events, and 400 attendees. This one-day event brought vendors, engineers, consultants, and operators together from the water, wastewater, and stormwater sectors for a fun-filled day of training and networking.

#### **Operator Exchange**

Rhode Island Participant Gene Medeiros from West Warwick's WWTF, was welcomed to the Green Mountain State. Mr. Medeiros was in Vermont for three days for fun and learning. On the first day he visited White River Junction, Quechee, Northfield, and Montpelier wastewater treatment facilities, and had a great dinner at Capital Plaza. The next day he traveled to the Burlington area and toured the South Burlington, Shelburne, and Essex Junction facilities. In the evening he attended GMWEA's second annual Poo & Brew followed by dining along the Winooski River at Waterworks in downtown Winooski. On the third day, Mr. Medeiros attended our Trade Show and Conference, before driving home. It was an honor to host him for these three days. The Operator Exchange program is a great opportunity for operators to network, tour facilities, and make new friends.

Thank you to the Narragansett Water Pollution Control Association for hosting GMWEA's first married couple exchange operators. Arthur and Jennifer Garrison, Milton Wastewater Facility and South Burlington WRRF, respectively, travelled to Rhode Island for three days. Be sure to read about the Garrisons' experience on GMWEA's website.



Alfred E. Peloguin Award recipient John Lazelle poses with his son at the NEWEA Annual Conference

#### **Public Interest and Government Affairs**

GMWEA Lake Champlain Citizens Advisory Committee members continue to shape Vermont's clean water future. Board members Bob Fischer and Wayne Elliot serve in governor-appointed positions on the Lake Champlain Citizens Advisory Committee. This 10-member committee advises the Vermont Legislature and governor with their annual Lake Champlain Action Plan.

The Government Affairs Committee is one of GMWEA's largest and most active committees. Consisting of 34 members, the committee is involved with the following:

- Following and testifying on (when necessary) multiple water quality bills. These include H.564, H.576, S.219, and S.260.
- Statehouse meet and greet, held on January 12. This was successful and committee members spoke with many legislators regarding water quality initiatives.
- Regulator's meeting. Quarterly meetings with state regulators started in 2016 and the event has been held five times. These meetings were established for GMWEA operators and consultants to discuss current initiatives and for the transfer of information among participants. The meetings have been a success for all parties, and future meetings are scheduled.
- Local government day. Hosted by the Vermont League of Cities and Towns, this event was held on February 16. GMWEA participated, and it was a great opportunity for GMWEA members to meet with legislators on a variety of topics.



US EPA Wastewater Treatment Plant Operator **Excellence Award recipient, Nathan Lavallee** 

#### Award Winners

Congratulations to the following Vermont individuals who were recognized at the January NEWEA awards luncheon: John Alexander (Town of Hinesburg), Operator Award; John Lazelle (Town of Wilmington), Alfred E. Peloquin Award; Village of Essex Junction, Energy Management Achievement award; Aida Arms (South Burlington High School), Stockholm Junior Water Prize; Town of Milton, EPA O&M Excellence Award; Paul Gormsen (Barre), WEF Life Membership.

#### Upcoming Events

- GMWEA Spring Meeting and Conference is scheduled for May 24. The event will again be held at the Killington Grand Hotel and Conference Center. Officer elections will take place this year. A special thank you to Rick Kenney for his service over the past two years as GMWEA's president. First Vice President Tom DiPietro is next in line to fill the role of president for the upcoming two-year term.
- Water Quality Day, a governor's proclamation event held in May since 2014, will be moved to July/August to coincide with the state's Clean Water Week, which is scheduled for July 30-August 3.
- George Dow Golf Tournament is scheduled for August, and once again will be held at the Cedar Knoll Country Club. Details will be posted soon.

For further information regarding GMWEA/NEWEA activities and events, contact Vermont Director Chris Robinson at chris.robinson@gmwea.org or visit our website at gmwea.org.



### **Rhode Island** State Director Report by Scott Goodinson ott.c.goodinson@warwickri.com



As the new Rhode Island state director, I would like to introduce myself. I have worked in the wastewater industry for 26 years, and I am the superintendent at the Warwick Sewer Authority in Warwick. My wastewater experience has been predominantly in operations and maintenance (O&M).

My wastewater journey started as a Honey-Truck driver (and, yes, tending Port-a-Johns, too). After many years of "dumping my honey" at the Cranston water pollution control facility (WPCF), I was hired as an operator-in-training there. During 20 years of work at the Cranston facility, I learned the ins and outs of the operations process, solids dewatering, multiple hearth incinerator operation, plants are minutes away from each other and from my home. Apparently, I am the poster child for a typical Rhode Islander, who will not drive far, and if the commute is more than 10 minutes, no thanks!



Quonset Development Program recognized with an EPA O&M Excellence Award: From left to right, Bill Young, NWPCA President Scott Goodinson, Tim Andrews, Dennis Colberg, Bill Patenaude of **RI-DEM** 

equipment maintenance, collection systems, and much more. I owe much of what I know to the Cranston plant; a large, busy, often challenging, activated sludge/BNR, merchant sludge/ incineration facility. During one of my mid-life moments, and with my wife's blessing, I accepted the position of assistant superintendent at the West Warwick Regional WPCF. West Warwick is an ideal activated sludge, BAF, UV, biosolids composting facility, and after a few years there, I was offered a position in Warwick, my home town, and the rest is history. Many colleagues tease me about the three publicly owned treatment works where I have worked, as all three

As the incoming NEWEA affiliated state association (ASA) director from Rhode Island, I would like to energize the Operations Challenge both regionally and at the WEF level, push for more training and resources for our industry, help create new ideas to increase both ASA and NEWEA memberships, increase awareness of infrastructure age and condition, and promote opportunities for military veterans in our industry. I have been an active member of the Rhode Island Narragansett Water Pollution Control Association (NWPCA) for many years, and serving as its president for the last three years was amazing. I have been a competitor on a few Rhode Island Operations Challenge teams over the years including Rhode Island's High Voltage and Fecal Matters teams, and I also coached the Ocean State O&M team. I currently am vice chair of the NEWEA Operations Challenge Committee, and I have always found Operations Challenge to be fun and rewarding.

Rhode Island is also known as the Ocean State, and more recently it has been cited by the Chamber of Commerce as being the "fun-sized" state, with so much to offer, as does our association, which was established 66 years ago in 1952.

#### What is happening?

NWPCA's 2017 Annual Holiday Christmas Party/ Food Drive and Election of Officers was held at the Potowomut Golf Club again this year. More than 200 NWPCA members and guests enjoyed a great, full-course buffet, and ballots were cast



for the new 2018 officers. Door prizes and raffles were awarded, and NWPCA collected 669 pounds of food products for donation to the Rhode Island Food Bank.

NWPCA's 2018 board of directors comprises the following individuals: Peter Eldridge, Town of Narragansett, president; Peter Connell, Inland Waters, vice president; James Lauzon, CH2M, Woonsocket WPCF, treasurer; Nora Lough, Narragansett Bay Commission, secretary; Bernard Bishop, West Warwick WPCF, executive board; Anthony Calenda, Suez, Newport WPC, executive board; Mike Bedard, West Warwick WPCF, executive board: Jason Trenholm, Veolia, Cranston WPCF, executive board; Chris Campo, Seacoast Supply, director of vendor/consultant & coordination; Steve Buckley, Blake Equipment, director of vendor/consultant & coordination; Paul A. Desrosiers, Narragansett Bay Commission, operator certification board rep.; and Scott Goodinson, NEWEA state director (and NWPCA past president).

During our January meeting we selected our committee chairs: Membership, Nora Lough; Entertainment, Peter Eldridge; Public Relations, Scott Goodinson; Operator Training, Nora Lough; Scholarships, Bernard Bishop; Finance, Jim Lauzon; Golf Tournament, Peter J. Connell; Tradeshow, Jim Lauzon/Chris Campo; Awards Banquet,

#### Upcoming 2018 NWPCA Events

Board of Directors	April 10	Warwick Sewer Authority
Board of Directors	May 8	Warwick Sewer Authority
Clean Water Legislative Lunch	May 15	State House, Providence
Annual Awards Banquet	May 24	Potowomut Golf Club Warwick
Pawtucket Red Sox	June 23	McCoy Stadium, Pawtuck
Golf Classic	June 25	Potowomut Golf Club
Hot Dog Roast / General Meeting	July 17	Veolia-Smithfield WPCF
Wine & Jazz Event	July TBD	Carolyn's Sakonnet Vine
Chowder Cook-off/ General Meeting	Aug 14	Narragansett WWTF
Annual Clambake and Exhibition	Sept 7	Twelve Acres, 445 Doug Pike, Smithfield, RI



Peter Connell/Paul Desrosiers: Awards Committee. Bernard Bishop; Operations Challenge, Scott Goodinson/ Ed Davies; and Website, Edward Davies.

After years of continued success, our golf and bowling leagues are still open and everyone is welcome to participate. This is a great, inexpensive way to network and to get to know one another within NWPCA and in the Rhode Island wastewater community. Reach out to any of us for more information on these or any of our events. Our NWPCA Facebook page has more than 200 "likes" and 200 people following us (facebook.com/NWPCA).

#### Kudos

Congratulations to Rhode Island's Janine Burke-Wells as newly elected NEWEA president. Her dedicated service not only to Rhode Island and NEWEA but to our industry is truly appreciated. Under her leadership and direction, NEWEA and all the ASAs can look forward to "fun-sized" enchantments and opportunities. Ms. Burke-Wells's easy-going approach to sensible solutions to problems and her can-do attitude are contagious. She personifies energy with an attitude; best of luck in your new role!

Several people from Rhode Island were recognized at the NEWEA annual awards ceremony: Christopher Petrone of Narragansett, NEWEA Operator Award: Edward Davies of Providence, NEWEA Alfred E. Peloguin Award; John Howell of Warwick, NEWEA Paul Keough Award; Julia Forgue of Newport, NEWEA E. A. Cutone Award; and Nicolas Berg of North Kingstown, Stockholm Junior Water Prize state winner. In addition, the Jamestown, Narragansett, Narragansett Bay Commission Fields Point, and West Warwick plants were all deservedly recognized with EPA Region 1 O&M Excellence awards.

In closing, thank you to Mike Spring, outgoing Rhode Island NEWEA state director (2015–2017), for dedicated service in this position. He did an amazing job bringing our ASA and NEWEA together. With his assistance and under his tutelage, I expect continued progress and much success in my new role as state director. I look forward to working with and learning from all the other state directors, committee members, and NEWEA officers and staff in the upcoming years. Building an even stronger bridge to exchange ideas, to get our message out, and to serve our members while promoting our valuable events is paramount for the continued success of both Rhode Island and NEWEA.



### **New Hampshire** State Director Report

by Sean Greig sgreig@newmarketnh.gov

It is hard to believe that the New Hampshire Water Pollution Control Association (NHWPCA) has completed its 50th anniversary year. Thank you to Mike Theriault and his Activities Committee for all the hard work in making the NHWPCA 50th anniversary such a fun-filled year. Thank you also to Shelagh Connelly for her work on the Washington, D.C. Fly-In, Fred McNeil for his work on the golf tournament, and Geri Ciardelli for her work on the poster contest.





Annual winter meeting at the Thompson Inn and Cyderhouse

The last event of 2017 was the NHWPCA's annual winter meeting. The meeting took place on December 8 at the town of Newmarket's wastewater treatment facility (WWTF). The town welcomed and gave tours to approximately 180 wastewater professionals.

info at

hwpca.org

The Newmarket facility has approximately 2,000 sewer accounts and treats on average 0.5 mgd (1.9 ML/d). The original primary treatment plant with anaerobic digesters and chlorination was constructed in 1970. The plant was upgraded to secondary treatment (trickling filtration) in 1985 with a .85 mgd (3.2 ML/d) design flow. The trickling filtration process worked well for many years. In 2012, the town received a new National Pollutant Discharge Elimination System (NPDES) discharge permit with an Administrative Order by Consent total nitrogen (TN) limit of 8.0 mg/L. To comply with new, stringent TN limits, the town evaluated various technologies with the main goal of providing a WWTF capable of meeting current requirements and the flexibility to meet future requirements. The selected upgrade was a full conversion of the WWTF including abandonment of the trickling filter process and construction of the new four-stage Bardenpho treatment process. In addition to meeting the TN standards, the upgrade also addressed general equipment replacement and long-term reliability of the town's major wastewater treatment assets.

The four-stage Bardenpho process has been in operation since July 2017. The new process has reduced Newmarket's WWTF TN discharge going into the Lamprey River by 90 percent. The tricking filter process would normally discharge

60,000 to 70,000 pounds (27,000 to 32,000 kg) a year of TN into the Lamprey. Based on six months of operation, the four-stage Barndenpho process will discharge approximately 6,000 to 7,000 pounds (2700 to 3200 kg) per year of TN into the Lamprey River. The tours were followed by a luncheon and meeting at the Thompson Inn and Cyderhouse. A presentation was given by Wright-Pierce and Newmarket town staff. A business meeting followed with the election of the NHWPCA 2018 board of directors. Santa dropped in to raffle off his big bag of presents. A good time was had by all. It was a great ending for the NHWPCA 50th anniversary.

Tim Vadney from Wright-Pierce is now the NHWPCA president. He and I attended the NEWEA Annual Conference in January, and together we attended the Affiliated State Association meeting. The meeting brought together representatives from the New England state associations and NEWEA to discuss common issues and things on which the associations may be able to work jointly. Topics discussed included promotion of careers in the water quality profession, Operator Exchange program, student outreach, and the NEWEA Regulator Membership pilot program.

The NEWEA Government Affairs Committee meeting followed, and I attended the meeting with Shelagh Connelly, Mike Trainque, and Peter Goodwin of the NHWPCA Legislative Affairs Committee. Ms. Connelly and I gave an update of the NHWPCA Legislative Breakfast and the new bills in front of the New Hampshire Legislature. She discussed perfluoroalkyl substances (PFAS), particularly concerning residuals reuse in New Hampshire, and shared important PFAS information with the NEWEA committee and WEF representatives. Congratulations to the following New Hampshire professionals who received awards at the NEWEA Annual Conference: Mike Carle. NEWEA Operator of the Year; Ray Vermette, WEF Hatfield Award; Ken Kessler, NEWEA Peloguin Award; Shelagh Connelly, NEWEA Biosolids Management Award; Peter Labonte, EPA Wastewater Treatment Plant Operator Excellence Award; Town of Peterborough, EPA Industrial Pretreatment Program Excellence Award; Northumberland WWTF, EPA

Wastewater Treatment Plant O&M Excellence Award.

The 2018 NHWPCA board of directors will be led by Mr. Vadney. He is aiming high to increase membership and involvement in the NHWPCA. Mr. Vadney has identified much new and pending legislation that could have a major impact on the wastewater treatment plants. He has created a three-person committee to respond quickly to legislation as needed. The board has hit the ground running in January, and it is securing a lobbyist that will help keep tabs on legislation that could affect our industry.

The 2018 NHWPCA board of directors comprises the following individuals: President Tim Vadney, Past President Kevin Maclean, Vice President Kurt Robichaud, Secretary Dave Mercier, Treasurer Noelle Osbourne, 1st Director Ken Conaty, 2nd Director Mike Carle, 3rd Director Robert Robinson, Director at-Large Amy Pollock, and Director at-Large Ryan Peebles.

Upcoming 2018 NHWPCA Events				
Summer Meeting	June 22	Ellacoya State Park		
Ocean Networking Trip	July 13	check NHWPCA for m		
Golf Tournament	Aug 2	Beaver Meadows golf		
Fall Meeting	Sept 14	Concord WWTF		



f club, Concord



Alfred E. Peloquin Award, Kenneth Kessler



US EPA Regional Wastewater Treatment Plant O&M Excellence Award—Northumberland, New Hampshire Wastewater Treatment Facility represented by Water and Sewer Supervisor **Reginald Charron** 



For Massachusetts questions or suggestions, please contact me at jdemello@woodard , curran.com.

The Massachusetts Water Pollution Control Association (MWPCA) is in the midst of another eventful year. With more than 750 members across the state, MWPCA is still the leading provider of training opportunities and providing a place for operators and water quality professionals to network and exchange information. I would like to acknowledge and thank our executive director, Lynn Foisy, who will be leaving us this spring for a warmer climate. Her commitment and dedication to our association has been nothing short of amazing, and we wish her and her husband, Mike, the best in this next chapter of their lives.

In addition to searching for a new executive director and planning upcoming events (discussed below), MWPCA also continues to pursue one of our largest initiatives—Water Warriors. This NEWEA initiative, spearheaded in Massachusetts by Jeremiah Murphy, promotes jobs in the water industry for returning military personnel. So far, MWPCA has eight committee members who have been very busy. In October, committee members presented at the Veteran Service Officer Conference to discuss opportunities in the water field. Additionally, the Massachusetts Department of Environmental Protection (MassDEP) plans to allow up to two additional years of education credit toward licenses for candidates with military backgrounds. We encourage those with a military background or others with an interest advocating for the program to get involved.

In alignment with our initiatives of expanding training and education opportunities, advocating for the industry, promoting membership involvement, and expanding networking opportunities, below is a recap of the last few months and our plan moving forward.

#### **Operator Exchange**

This year, the NEWEA Operator Exchange involved Massachusetts and Connecticut. MWPCA hosted Dave Geng, Manchester Water Pollution Control Facility operator, and over two days toured him around six facilities—Acton, Billerica, Upper Blackstone Water Pollution

Abatement District, and three smaller facilities in central Massachusetts operated by WhiteWater. Thank you to all the operators and facilities who opened their gates to these tours and helped to make this such a great program. For those who have not participated before, please get your name in early for our 2018 Operator Exchange with the state of Maine that will take place in September. This is a great opportunity to see new facilities, learn about new technologies, and make lasting friendships.

#### **December Quarterly Meeting**

MWPCA hosted more than 70 members in Mansfield. The meeting focused on our aging workforce and was headlined by presentations from Bristol Community College, the town of Billerica, Massachusetts Maritime Academy, Lynn Regional PCF, the Upper Cape Technical High School, and MassDEP on their existing programs for outreach and education.

#### **NEWEA Conference and Awards**

MWPCA was well represented in January at the NEWEA Annual Conference with 14 members taking advantage of the FREE (MWPCAsponsored) pass on Operator's Day and several others taking home NEWEA, EPA, and WEF awards. MWPCA member Scott Skelley from the Greater Lawrence Sanitary District was awarded the NEWEA Operator award and James Legg from the town of Uxbridge was honored with the Alfred E. Peloguin award. Other notable MWPCA members who won awards included:

- Richard Gould, Woodard & Curran–Operator Safety award
- Zeb Arruda, City of New Bedford—Public Educator award
- Jeff Kalmes, Town of Billerica—E. Sherman Chase award
- Don St. Marie, MassDEP—Committee Service award
- Ray Willis, Onsite Systems—Past President's plaque and pin
- Paul Dombrowski, Woodard & Curran—WEF Fellow
- Kevin Wholley, Town of Salisbury—WEF Life Membership
- MWPCA Past President Frank Arnold, East Freetown (retired)— WEF Life Membership

#### Spring Meeting

MWPCA hosted our spring meeting on March 21, 2018, at the Devens Common Center, in Devens. The meeting included technical presentations on multiple open channel flow technologies, ozone odor control technology, and combined heat and power and onsite distributed generation. This session also featured the 2017 Massachusetts Wastewater Management Training Program graduation ceremony.

#### Legislative Event

MWPCA, together with Massachusetts Water Works Association (MWWA) and the American Council of Engineering Companies of Massachusetts (ACEC/MA), will be hosting another joint legislative day on May 15, 2018, at the State House in Boston, Building on our success of last year, we are again combining forces to create a stronger message around the importance of water and infrastructure investment. This year the event will include morning meetings with state representatives and legislators followed by a networking lunch that will include informational display areas and presentations from local elected officials.

#### Training

New England Interstate Water Pollution Control Commission. MassDEP, and the Massachusetts Water Pollution Control Association plan to start another Massachusetts Wastewater Management Training Program this spring. Last year's training program had nearly 30 registrants from facilities all over Massachusetts, and we are hoping for another good turnout. This one-year program aims to develop essential skills to propel candidates into management positions. The program will be based on the successful management training programs that have been developed in Rhode Island, Maine, and Connecticut. Participants will meet once a month for 12 months, addressing a new topic each month. Topics include introduction to management, advanced process control, working with the media, NPDES permitting and state regulations, engineering design and blueprint reading, preventive maintenance, microbiology, finance and budgeting, and job shadowing.

As an increasing number of operators approach retirement, this program prepares the next generation of operators to fill the resulting open managerial positions across the state. Any wastewater operator interested in career advancement and one day assuming a management or superintendent position is encouraged to consider joining a future management training program. Watch the MWPCA website for information on the 2018 program.



Alfred E. Peloguin Award, James Legg



Operator Safety Award. **Richard Gould** 



Operator Award, Scott Skelley



Quarter Century Operators' Club, Brendan O'Regan



Water Warriors, a NEWEA initiative that promotes jobs in the water industry for returning military personnel, is spearheaded in Massachusetts by Jeremiah Murphy

Upcoming 2018 MWPCA events			
Legislative Event	May 15	State House, Boston	
Quarterly and Election Meeting	June 13	Log Cabin, Holyoke	
Golf Tournament	June 19	Shaker Hills Country Club, Harvard	
Annual Trade Show	Sept 12	Wachusett Mountain Resort	



### Maine State Director Report

by Clayton "Mac" Richardson mrichardson@lawpca.org

fter an enjoyable and somewhat less active summer season in "vacation land," the Maine Water Environment Association (MEWEA) kicked into September with a few members, mainly from our Young Professionals Committee, staffing a booth at the Portland Greenfest held in Portland's Monument Square on Saturday, September 9. This was an opportunity for us to get in front of the public to explain what we do and why clean water cannot be taken for granted.



**MEWEA** members Jen McDonnell (and family), Julianne Page, Paul Rodriguez, and Doug Roncarati tend the association booth at the Portland Greenfest

The month continued with our association hosting exchange operator Stephen Simeone from the Concord, New Hampshire wastewater treatment facility. Mr. Simeone toured the Sanford, Wells, Kennebunk, Biddeford, Scarborough, Windham School, Lewiston-Auburn, and Oxford facilities before joining us for our annual golf tournament at Sunday River on September 20. He was also able to enjoy much of our annual fall convention the following day before having to return to the Granite State. It was our pleasure to host him and to participate in this terrific NEWEA program. The fall convention was well attended and featured 27 technical sessions ranging from pump station drawdown testing and unidirectional flushing to funding for plant upgrades, lab

reagent water, and public engagement through virtual tours. Mark your calendar for September 19-21, when we will again host our golf tournament and annual conference at Sunday River in the beautiful Mahoosuc Mountains of Maine.

info at

mewea.ord

October was another busy time for our association as many members attended the Maine Stormwater Conference in Portland on October 23 and 24, and still other members traveled to Burlington, Vermont, for the annual residuals conference jointly sponsored by the NEWEA Residuals Committee and NEBRA.

On Wednesday, November 1, a team of volunteers traveled to the University of Maine's flagship campus in Orono to speak with members of the student American Society of Civil Engineers (ASCE) chapter about career opportunities in the water environment field. 2017 MEWEA President Matt Timberlake of the Ted Berry Company, Amanda Smith from the Bangor Wastewater Treatment Facility, Ryan Wadsworth from Wright-Pierce, and Mac Richardson from the Lewiston-Auburn Water Pollution Control Authority (LAWPCA) presented to about 30 students. This is an outreach effort spurred by 2017 NEWEA President Jim Barsanti and is one we intend to continue. Clearly both the students and the faculty appreciate our efforts to forge strong ties with the university.

The new year started off with a rapid succession of events. First, on January 19, our Young Professionals Committee again held a family skate night at Thompson's Point in Portland. The very next day, four MEWEA members jumped into the Atlantic Ocean to support Special Olympics Maine. The event was held on January 20 (the day before the NEWEA annual conference) after being postponed twice due to severe weather. On the original date, the air temperature was hovering around 0°F with a wind chill in the negative teens. Several of us were happy to jump in when the ocean temperature was 39°F and the air temperature was a balmy 34°F.

February 6 and 7 again saw MEWEA working with the Maine Water Utilities Association (MWUA) on its annual conference at the Holiday Inn by the Bay in Portland. This is just one area where our two associations have been cooperating for the last few years. Another area is government affairs. Our Government Affairs Committee chair, Tim Haskell, has been so busy following the ups and downs of the Maine Legislature, we wonder when he sleeps! MEWEA and MWUA, NEWEA and New England Interstate Water Pollution Control Commission (NEIWPCC) shared in hosting our annual Legislative Breakfast at the Senator Inn in Augusta on Thursday, March 1. We have been working with organizations such as the Associated General Contractors of Maine, the Natural Resources Council of Maine, the American Council of Engineering Companies – Maine, and others to support a \$50 million bond issue for wastewater infrastructure grants this year. It has been nearly 10 years since a bond funding wastewater infrastructure grant bill has been passed in Maine. In many of our rural communities—especially those having experienced a mill closure or the loss of another significant employer-the need is acute. Partially to that end, we are looking forward to participating in the Washington, D.C. Fly-In this year. We expect to have the town manager from Jay, Maine, join us in Washington on April 17 and 18.

Friday, March 2, we again partnered with our New Hampshire association siblings to host our 12th annual ski day at Black Mountain in Rumford, Maine. Black Mountain is a smaller area boasting a beautiful lodge and 1,000 vertical feet (305 M) of trails and glades. Thanks to those who joined us this year for an unforgettable time.

On March 29, we presented a session on stormwater issues and the changing nature of the water protection profession at the Maine Sustainability and Water Conference. This conference was sponsored by the Mitchell Center at the University of Maine and attracted students and environmental professionals from all over New England. Our association feels this is another important opportunity for us to make connections and get our message out to a wider audience.

Two more events will keep us busy in April—as if the Washington Fly-In was not enough. On April 12, we will hold a strategic planning meeting ahead of our spring conference at the Four Points Sheraton Inn, in Bangor, on April 13. Although it may be a bit far north for many NEWEA members, we would love to see you make the trip. On April 21 we will assemble runners, walkers, and anyone willing to hobble 5 km to help MEWEA again win the prize for the largest non-profit group at the Urban Runoff 5K and Neighborhood Festival at Deering High School in Portland. We will again set up a booth for the festival that follows the 5K. We have been happy with the reception received from school-aged kids at this event, so we expect to continue with that effort.

In our last outreach effort prior to the NEWEA spring conference, we will talk with children and their families at the Southern Maine Children's Water Festival at the University of Southern Maine on Friday, May 18.

We thank you for all you do to keep our New England Waters among the best and healthiest in the world. If we can help you, reach out to me or one of our officers, especially our 2018 president, Paula Drouin, and 2018 vice president, Stacy Thompson.



(I-r) Scott Firmin, Mac Richardson, Nick Konstantoulakis, and Paula Drouin pose following their "polar dip" to support Special Olympics Maine



Stephen Simeone (left) of Concord, New Hampshire, receives a tour of the Sanford, Maine plant from André Brousseau



(I-r) Mac Richardson, Amanda Smith, Matt Timberlake, and Ryan Wadsworth attend a student outreach effort at UMaine in Orono



### **Connecticut** State Director Report

by Virgil Lloyd vlloyd@fando.com

#### Manager's Leadership Program Is Back

After a one-year hiatus, the Manager's Leadership Program is back! Starting this fall, a class of up to 20 aspiring wastewater treatment operators will begin the 2018 program. This will be the fifth running of this successful program, which has graduated more than 80 individuals, many of whom are now in leadership positions in facilities throughout Connecticut.

The Wastewater Management Leadership Program is a series of 10 full-day sessions that explore the skills and knowledge needed for effective management. The first session is



scheduled for September 2018 and will continue with one class session in each of the following nine months. Student participation is significant to enhance the learning experience. The class graduates receive their certificates and are recognized at the Manager's Forum.

Participation in the program is by application only, as seating is limited. Each applicant must provide documentation of support from her or his superintendent or manager. The application deadline is scheduled for July 2018. For program details and application forms, please visit ctwpaa.org.

This program, which has been a great success over the past six years, is the result of the hard work of many individuals, most of them volunteers. In particular, the Connecticut Water Pollution Abatement Association (CWPAA) recognizes the vision and determination of Jim Clifton in getting the first class off the ground (and I am sure he continues to enjoy his retirement in Florida). In addition to Mr. Clifton, the program is truly indebted to the passion, energy, and continued commitment of Art Enderle and Kevin Shlatz.

info at

ctwpaa.com

#### **Annual CWPAA Product Show**

Mark your calendars for the Annual CWPAA Product Show on April 26 at New Life Church in Wallingford. This is a great opportunity to informally network with colleagues, vendors, consultants, the Certification Advisory Committee (CAC), other CWPAA members, and Department of Energy and Environmental Protection (DEEP) staff. This year's program will again feature the Annual Business Meeting, election of officers, and important updates. Admission is free to all operators, with lunch provided at no charge to all CWPAA members—a great reason to join CWPAA.

#### Operators Appreciation Day Event— May 18

Operators, please circle May 18 on your calendars for CWPAA's second Operator Appreciation Day event. The inaugural event was held last year at the Connecticut River Museum in Essex, and featured tours of the museum, beautiful weather, and socializing on the wide decks overlooking the Connecticut River. And to recognize the great contributions of our wastewater treatment facility operators, admission was free courtesy of CWPAA.

This year's event is still being finalized, but the date is firm. Look for further information at the CWPAA Product Show, the Connecticut Association of Water Pollution Control Authorities (CAWPCA) Spring Workshop, and, of course, at ctwpaa.org.

#### **CWPAA Ski Classic**

On Friday, February 2, CWPAA held its eighth annual Ski Classic at Stratton Mountain in Vermont. The weather was sunny but cold. The ski conditions were great. Twenty-seven people attended the event, making it the largest Ski Classic. Many thanks go to our sponsors, including Aqua Solutions, Blake Equipment, Momar Chemical, Homa Pump Technologies, Pond Technical Services, GA Fleet, and Myers Pump.

#### Manager's Forum

This event continues to be one of the most popular events on the calendar for Connecticut operators. Last year it was conducted Nov. 16, 2017, and was again jointly sponsored by the New England Interstate Water Pollution Control Commission and CWPAA.

Program highlights included the traditional and informative regulatory update by DEEP staff, addressing topics such as outlook for the Clean Water Fund with the budget finally passed by the legislature, and an interactive discussion with the CAC. Many CAC members attended the wideranging discussion, which covered certification tests, selection of questions, input to a soon-expected continuing education program requirement, and other topics.

#### **Government Affairs Update**

CWPAA and CAWPCA again represented Connecticut well in legislative matters this spring. Volunteers from both groups attended two meetand-greet days in Hartford, where they met with critical legislators and committee chairs to support legislation important to the wastewater industry, including funding of the Clean Water Fund and support of legislation to create a Continuing Education Program requirement for operators. The two groups will also send six representatives to Washington, D.C., as part of NEWEA's Congressional Fly-In during Water Week on April 17–18, and will conducted meetings with Connecticut's congressional delegation.

#### **CWPAA & CAWPCA Collaboration**

Last year I reported here with pleasure on the growing collaboration between Connecticut's two wastewater organizations. Generally, CWPAA provides programs primarily targeted to operators, and CAWPCA focuses mostly on professionals and volunteers in management—keeping in mind these are generalizations, and much overlap exists in program content and common interest.

The leaders of the two organizations have conducted joint meetings, resulting in collaboration on several initiatives. This discourse will continue through 2018. Watch for future updates on collaboration and planning of joint events.









NEWEA Award Recepients: 1. Alfred E. Peloquin, Jay Sheehan 2. Operator of the Year, David Geng 3. Wastewater Utility, Waterbury WPC—accepted by Denis Cuevas, Waterbury's General Manager and the 2018 CAWPCA president

Upcoming 2018 Connecticut Events			
CWPAA Trade Show	April 26	New Life Church, Wallingford	
CAWPCA Spring Workshop	May 4	Aqua Turf Club, Plantsville	
CWPAA Wastewater Operators Appreciation Day Meet & Greet	May 18	Location TBD – check ctwpaa. org for updated information	
CWPAA Sewer Open	June 15	Skungamaug River Golf Club, Coventry	

### **2017 NEWEA Student Poster Board Display Competition**

nother successful student poster competition organized by the Student Activities Committee took place on Tuesday during the Annual Conference. This year, students participated from eight colleges: Northeastern University, University of California at Berkeley/Peking University Shenzhen Graduate School, University of Hartford, University of Massachusetts at Amherst (UMass Amherst), University of Massachusetts at Lowell (UMass Lowell), Tufts University, and Worcester Polytechnic Institute (WPI). Five undergraduate and seven graduate poster entries were displayed and judged, followed by a student reception and awards ceremony. The winning posters, presented by undergraduate Evelyn Grainger of WPI and graduate Nicholas Tooker of Northeastern, are reproduced here.





Advisors: Dr. Aaron Sakulich (CEE), Dr. Peter Hansen (INTL), Ana Lucía Lim (ACP), Carolina Lara (ACP)



**Evelyn Grainger** 

Application of Hydraulic Simulations and Flexibility in **WPI** Engineering Design Methods to the Panama Canal Evelvn Grainger (CEE, INTL)



**Project Goals** Hydraulic Simulation Results **Uncertainty & Infrastructure Planning** 1. Perform a Hydraulic Simulation of a river to evaluate Model The ACP uses dams and spillways to ults Indicate ALLER possible downstream impacts from the construction of a Water depth along control the water level of Gatun Lake new spillway the cross sections for the transit of ships. River velocity Gatun Dam & Spillway 2. Assess Uncertainty & Infrastructure Planning methods Extent of floodpla The ACP needs to design water infrastructure to ensure a used by the Panama Canal Authority (ACP) to determine certain water level in Gatun Lake for the transit of ships. the feasibility of applying the Flexibility in Engineering Water level is influenced by factors like changes in Design (FIED) method for improved water management Floodplains for pre-construction 100 year technology, policies, and the global economy m (orange) and post-construction probable mum flood (blue) Deterministic vs. Flexibility in Engineering Design: **Hydraulic Simulation** Floodplains for 100 year storn Hydraulic Engineering Center-River Analysis System (HEC-· Conditions of today will be future RAS) software was used to model rivers by relating struction (blue)  $\rightarrow$ conditions; sustained growth geometric, flow and energy river data using the energy rates Plans do not allow for changes in the future FIED Method Incorporates large range of notential future events & their impact through benchmarks The probable maximum flood impact will be similar to a pre-Plans allow for changes in the future Steps to Create Floodplain Maps: ruction 100 year storm eve ed ArcMap to reduce the xyz coordinates by **Recommendations for Incorporating FIED Methods** rting them to a raste Reassess the existing project for potential ways to incorporate FIED methods sed coordinates to create alignments of Long Term plains, riverbanks, and centerline. Created cro The intensity of probable > Further investigate the potential of applying the FIED ns along alignments s will be significantly les method to large scale dam projects mported cross sections into HEC-RAS; defined ow & energy data. Ran the model and reviewed th

> Acknowledgments I'd like to thank Ana Lucía Lim, Carolina Lara, and Julio Monroy of the ACP and the NSF's Office of International Science and During a probable maximum flood it is estimated that, 240 Engineering for supporting this work through grant #1357667, buildings would flood putting 960 lives at risk, requiring the titled IRES: Environmental Impact of the Panama Canal Expansio ation of a flood evacuation plan.

### Rethinking and Reforming Enhanced Biological Phosphorus Removal (EBPR) Strategy -Concepts and Mechanisms of Side-Stream EBPR

Nicholas Tooker<sup>1</sup>, Guangyu Li<sup>1</sup>, Charles Bott<sup>9</sup>, Paul Dombrowski<sup>7</sup>, Peter Schauer<sup>3</sup>, Adrienne Menniti<sup>3</sup>, Andrew Shaw<sup>2</sup>, James L. Barnard<sup>2</sup>, Bev Stinson<sup>4</sup>, Gerry Stevens<sup>4</sup>, Patrick Dunlap<sup>2</sup>, Imre Takács<sup>5</sup>, Heather Phillips<sup>6</sup>, James McQuarrie<sup>8</sup>, Kurt Carson<sup>8</sup>, Annalisa Onnis-Hayden<sup>1</sup>, and April Z. Gu<sup>1\*</sup> 1 - Northeastern University, 2 - Black & Veatch, 3 - Clean Water Services, 4 - AECOM, 5 - Dynamita, 6 - City of Olathe, Kansas, 7 - Woodard & Curran, Inc., 8 - Metro Water Reclamation District, 9 - Hampton Roads Sanitation District; \* april@coe.neu.edu

- phosphorus removal, but these benefits are often offset by the need to have chemicals on standby to achieve reliable and consistent performance.
- even eliminating anaerobic zone, via several different process configurations. However, understanding of fundamental mechanisms is lacking, there are no benefits of S2EPBR
- footprint, primary clarifiers may be required, and greater potential for odors.
- criteria for process implementation.



- separately, while PAOs were similar, and GAOs were reduced in S2EBPR facilities.
- to maintenance-oriented metabolism from 18-36 hours.



(left) Winning entry in the undergraduate student poster Polytechnic Institute

ilts for er

4. Used RAS Mapper to export results to Civil 3D to

### 2018 Annual **Conference & Exhibit** PROCEEDINGS

Boston Marriott Copley Place Boston, MA • January 21–24

The 2018 NEWEA Annual Conference convened with a meeting of the Executive Committee with all chairs on Sunday, January 21, 2018. A total of 2,082 people registered for the conference. The three-day event featured 196 exhibit booths and 31 technical sessions.

The Annual Business Meeting was held on Monday, January 22, 2018. Nominating Committee Chair Bradley Moore presented the slate for officers for 2018 as follows:

- Vice President Jennifer Kelly Lachmayr
- Treasurer Priscilla Bloomfield (3rd year)
- Council Director Communications Meg Tabacsko
- Council Director Outreach Justin Skelly
- WEF Delegate Susan Guswa
- Rhode Island Director Scott Goodinson
- Vermont Director Chris Robinson

In accordance with the provisions of Article 9.3.2 of the NEWEA Constitution & Bylaws, these Officers will advance to the following positions:

- President Janine Burke-Wells
- President-Elect Raymond Vermette
- Past President James Barsanti

The remaining incumbents are fulfilling unexpired terms:

NEWEA

Conference

Annual

& Exhibit JANUARY 21-24, 2018

- WEF Delegate Susan Sullivan (through WEFTEC 2018)
- WEF Delegate Fred McNeill (through WEFTEC 2019)
- WEF Delegate Matt Formica (through WEFTEC 2020)
- Council Director Meeting Management Elena Proakis Ellis (3rd year)
- Council Director Treatment, Systems Operations, and Management – Marylee Santoro (3rd year)
- Council Director Collection Systems, and Water Resources – John Digiacomo (2nd year)
- Maine Director Clayton "Mac" Richardson (3rd year)
- New Hampshire Director Sean Greig (3rd year) Connecticut Director – Virgil Lloyd (2nd year)
- Massachusetts Director Justin DeMello (2nd year)

All nominees have indicated their willingness to serve. Respectfully submitted by the NEWEA Nominating Committee: Brad Moore (Chair), Ray Willis, Matt Formica, Marylee Santoro, and Virgil Lloyd.

1. Keynote speaker Juliette Kayyem speaks on current security strategies 2. Exhibit Hall ribbon cutting (I-r) Mary Barry. WEF President-elect Tom Kunetz, Elena Proakis Ellis, Jim Barsanti, Paul P. Casey, Janine Burke-Wells, and Howard Carter 3. Scholarships Chair Uday Karra and Francis "Jerry" Hopcroft at the awards luncheon 4. A busy exhibit hall is great for networking

### **31 Technical Sessions**

#### SESSION 1

CSO/Wet Weather 1: Innovation in CSO Management

#### Moderators:

• Ivonne Hall, Connecticut DEEP • Rita Fordiani, Kleinfelder

Hartford Metropolitan District Commission (MDC) Wet Weather Expansion Project (WWEP) Phase 1-New 200 MGD Preliminary Treatment Facilities

• Greg Bazydola, Arcadis

• Thomas Tyler, The Metropolitan District Design and Implementation of the South Hartford CSO Tunnel

- Brian Canterbury, AECOM James Sullivan, AECOM
- Andrew Perham, The Metropolitan District

SESSION 2

Moderators:

• Michael Brady, Stantec



Modernizing Combined Sewers Inspections using Drones in Boston, MA Jonnas Jacques, Kleinfelder • Amy Schofield, Boston Water and Sewer Commission

David Peterson, Kleinfelder

Globe Street Sewer Improvements: "The Dancing Manhole Cover" • Andrew Smith, Wright-Pierce • Terrence Sullivan, City of Fall River, MA • Paul Ferland, City of Fall River, MA

#### Collection Systems 1: To Dig or Not to Dig, That is the Question

• Peter Garvey, Dewberry • Kara Johnston, CDM Smith Downtown Sewer System Rehabilitation Light on Study—Heavy on Rehab Stephen Calabro, Stantec Jonas Kazlauskas, Town of Bridgewater, MA A "CIPP First" Approach Changes Community from Reactive Scramblers to **Proactive Believers** 

• Justin deMello, Woodard & Curran

**Designing for Construction**—Trenchless Solutions for the Springfield Water and Sewer Commission

- Laura Nolan, Kleinfelder
- Josh Schimmel, Springfield Water and Sewer Commission
- Tom Ritchie, Kleinfelder

Framingham Interchange 12 Interceptor— Trenchless Technologies Can Apply to New Pipelines Too!

• Victor Olson, Stantec



At the Young Professionals Summit, YPs improvise in the "This is not a stick" exercise: 1. Erin Mosley and Tom Kunetz (photo by Lisa Roby for Erin Mosley, Inc.) 2. Amanda Shanahan improvises 3. Jenna Diamond laughs with Kenneth Yu 4. Andrew Osei and James Plummer look on as Ben Smith "unsticks"

#### **SESSION 3**

#### Water Reuse— Old Meets New: Water **Reuse Treatment and Regulation** Moderators:

- Helen Gordon, Environmental Partners Group
- Chuck Pike, Black & Veatch

Use of Reclaimed Water Expanded at Bayberry Hills Golf Course in Yarmouth, MA

- David Young, CDM Smith
- Jeff Colby, Town of Yarmouth, MA
- Fluorescence Characterization of Organic Fouling in Membrane Treatment • Lauren Bergman, Tighe & Bond

#### Sidestream Anaerobic Zones Open Up Options and Improve Phosphorus Removal Process Stability

- Patrick Dunlap, Black & Veatch • James Barnard, Black & Veatch
- Mark Steichen, Black & Veatch

S2 EBPR Practices and Fundamentals— Rethinking and Reforming Enhanced **Biological Phosphorous Removal** Nick Tooker, Northeastern University

#### SESSION 4

#### Government Affairs: "Ask not what your country can do for you—ask what you can do for your country"

Moderators:

 Matt Formica, AECOM • Lauren Hertel, Stantec

WIFIA—Learn About EPA's Newest Water Infrastucture Financing Opportunities • Karen Fligger, US EPA

- Regulatory Advocacy for Water and Wastewater Utilities
- Philip Guerin, Massachusetts Coalition for Water Resources Stewardship

#### Using WQS Variances to Implement an Adaptive Management Approach to Nutrient Source Control

• Gregory Currey, Tetra Tech, Inc. • Clair Meehan, Tetra Tech, Inc.

Long-Term Instrument-Based Monitoring for Assessing Compliance with Water Quality Standards

- Alex Santos, Arcadis
- Dominic DiSalvo, Bergen County Utilities Authority

#### SESSION 5

#### Water for People: Global Perspectives on Water and the Environment Moderators:

• Renie Jesanis, MWRA

• Tommy Chase, PEER Consultants, Inc.

Ready, Set, Listen! Perspectives from the Listening Project on International Work • Hugh Tozer, Woodard & Curran

- Cambodia 2017—Water and Wastewater Experiences
- James Donison, Town of Hooksett, NH
- Improving Water Quality in the Villages of Himachal Pradesh
- Evelyn Grainger, Worcester Polytechnic Institute
- Randy Melanson, Worcester Polytechnic Institute
- Amod Choudhary, Worcester Polytechnic Institute

Wading Water Woes by bringing 4M approach into Program Planning and Implementation—Lessons from India • Dr. Sakshki Saini, Society for

Participatory Research in Asia

#### **SESSION 6** Young Professionals Moderators:

#### • Amanda Lade, AECOM • Kate Roosa, Woodard & Curran

Multifaceted Approach to Copper

Reduction at the Scituate Wastewater Treatment Facility Austin Weidner, Tighe & Bond

• William Branton, Town of Scituate, MA

Performing Successful Large Diameter Pipe Inspections Under Variable Flow

- Conditions • Eliza Morrison, Wright-Pierce
- Michael Stein, Wright-Pierce

Process Improvements at Southbridge WWTP

• Vanessa Borkowski, Stantec • Justin Motta, Stantec

Turners Falls Main Drain and Siphon Rehabilitation

- Ryan Graham, CDM Smith
- Jonathan Kunay, CDM Smith • Tom Bergeron, Town of Montague, MA

 Danielle Spicer, Green International Affiliates, Inc.

1. Mario Francucci, Mike Spring, and Brandon Blanchard in the exhibit hall 2. Jim Barsanti speaks to the Lab Practices Committee 3. Kate Biedron enjoys her first 5S luncheon 4. Melissa Mooradian, Zach Donahue, and Paul Donahue at the awards luncheon

#### Stormwater 1: Stormwater Resiliency **Planning for an Uncertain Future**

• David Bedoya, Stantec • Vinta Varghese, CH2M

**SESSION 7** 

Moderators:

Environment

Initiative

Climate

New York City Stormwater Climate **Resilience Study** 

 Steven Roy, Ramboll Environ • Trine Stausgaard Munk, Ramboll

Advanced 2D Hydraulic Modeling and LIDAR Integration for Resiliency Planning Caitlin Fedio, Hazen and Sawyer Charles Wilson, Hazen and Sawyer

Integrating Flood Protection and Linear Park Space in a Vulnerable Urban

 Victoria Weiss Yildirim, Dewberry • Milton Puryear, Brooklyn Greenway

#### Promoting Sustainable Land Use Development

#### SESSION 8

#### **Utility Management: Preparing and Planning for the Future Management of** Utilities

#### Moderators:

- Laura Nolan, Kleinfelder
- Kevin Garvey, CDM Smith

#### Creating Change Starts with an Organizational Assessment: A Field-Tested Approach

- Seth Garrison, Raftelis Financial Consultants
- Tom Arn, Raftelis Financial Consultants

#### Effective Utility Management—A Case Study of Manchester, NH

• Frederick McNeill, City of Manchester, NH

#### An Aging Industry—Preparing the Next Generation of Wastewater Management

- Benjamin Smith, NEIWPCC
- John Murphy, MassDEP

An Integrated Water Resources Management Plan for a Small City Pamela Westgate, Kleinfelder

• Dan Murphy, City of Easthampton, MA



1. Ned Beecher and Heidi Lemay catch up at the conference 2, On camera, Ken Carlson promotes the benefits of NEWEA participation 3. Michaela Bogosh and Allison Zeoli at the YP/football playoff reception 4. Stacey DePasquale Engineering reps in their 2018 edition shirts

#### **SESSION 9**

#### **Residuals 1: Lessons Learned from Municipal Solids Planning** Moderators:

- Natalie Sierra, Brown and Caldwell • Tracy Chouinard, Brown and Caldwell
- Seven Miles of Sludge Pipe -- A Fifteen-Year Journey
- Ethan Wenger, MWRA
- A Streamlined Approach to Multi Facility Master Planning with Triple Bottom Line Optimization
- Vera Gouchev, Hazen and Sawver
- Paul Knowles, Hazen and Sawyer
- Robert Sharp, Hazen and Sawyer

#### Co-Digestion with Food Waste Organics—The Next Chapter in GLSD **Biosolids Management**

- Richard Weare, Greater Lawrence Sanitary District
- Michael Walsh, CDM Smith
- Cheri Cousens, Greater Lawrence
- Sanitary District Benjamin Mosher, CDM Smith

#### New Products and Markets for a

- Federally Registered Biosolid Fertilizer Sludge Performance
- Samantha Halloran, Lystek International • Mike Dougherty, Lystek International
- **SESSION 10**

#### Energy 1: Tales of Energy Efficiency and Lessons Learned Moderators:

- David Michelson, South Essex
- Sewerage District
- Dede Vittori, MWRA

#### Design and Operation of Advanced Aeration Control Systems

- Maureen Neville, CDM Smith
- Alexandra Doody, CDM Smith

#### An ESCO Story—Aeration Upgrades in Westfield, MA Lead to Energy Savings and Improved Process Control Cvnthia Castellon, Tighe & Bond

- Jeffrey Gamelli, City of Westfield, MA
- Kenneth Gagnon, City of Westfield, MA

#### New Hampshire's Unique Approach to Wastewater Efficiency

- Sharon Rivard, NHDES
- Mark Toussaint, Eversource Energy
- Steve Bolles, Process Energy Services

#### How Oversized Mixers Hurt Activated

- Coenraad Pretorius, CDM Smith
- Ed Wicklein, Carollo Engineers
- Randal Samstag, Randal W. Samstag Civil and Sanitary Engineer

#### **SESSION 11**

#### **Small Community: Practical Solutions** for Small Community Problems Moderators:

• Ian Catlow, Tighe & Bond • Kurt Mailman, Fuss & O'Neill

Decentralized Wastewater Collection and Advanced Treatment Technology • Julie Barown, Orenco Systems, Inc.

#### Selection of an On-Site Wastewater Treatment System for the Buskin Beach House in Kodiak, Alaska

- Luis Garcia, U.S. Coast Guard Academy Gretchen Krause, U.S. Coast Guard
- Academy Sharon Želmanowitz, U.S. Coast Guard
- Academy

• Michael Carle, Town of Hampton, NH

- Phosphorus Removal
- **Operating Costs**

#### **SESSION 13 Plant Operations 1: Nutrients** Moderators:

- - Tom Hazlett, Woodard & Curran • John Adie, NHDES Evolving Nutrient Standards for a Small Coastal NH Community: Newmarket, NH WWTF Upgrades
- Clara Dahill, U.S. Coast Guard Academy

#### **SESSION 12 Operator Ingenuity**

for a presentation

Corporation

Corporation

- Moderators: • Tim Vadney, Wright-Pierce
- Lindsey Shields, Wright-Pierce
- David Thompson, Town of Edgartown, MA
- How to Sell your Upgrade

• Michael Crowley, Environment One Corporation

#### Solving Stormwater Issues at US Coast Guard Air Station Boringuen—A Senior Capstone Design Experience

Hydraulics of Pressure Sewer Systems

• Keith McHale, Environment One

Clark Henry, Environment One

- Corinna Fleischmann, U.S. Coast Guard Academv
- Elizabeth Nakagawa, U.S. Coast Guard
- Academy

- Pump Station Odor Control
- Joseph Rock, Town of Edgartown, MA

1. Mike Plummer and Angelo Salamone at a Safety Committee meeting 2. Kevin Garvey, Kate Biedron, Elena Proakis Ellis, and John Bobreck at a Sunday reception 3. Bob Dunn, Jim Pappas, and Pat Hughes during a break 4. Mike Walsh and Richard Weare ready

Less is Better-Benefits of Biological • Kenneth Harwood, Town of Ayer, MA Reducing Pump Installation and

- Kevin Cini, City of Groton, CT

- Michael Curry, Wright-Pierce • Sean Greig, Town of Newmarket, NH
- Testing Add-On Phosphorus Removal Processes at Upper Blackstone to Balance Low-Level Phosphorus and Metals Permit Limits
- Maureen Neville, CDM Smith • Alexandra Bowen, CDM Smith
- Karla Sangrey, Upper Blackstone Water
- Pollution Abatement District

Tertiary Filtration Process Performance Testing to Meet 0.05 mg/l Total Phosphorus

- Matthew Formica, AECOM
- Jon Pearson, AECOM
- Erik Grotton, Blueleaf, Inc.

Implementation of Nutrient Removal Upgrades in Cranston, RI-A Phased-Approach to Achieving Effluent Limits Entering the Pawtuxet River Helps Control Capital Improvement Costs

- David Bowen, Wright-Pierce
- Andrew Grota, Wright-Pierce
- Kenneth Mason, City of Cranston, RI

#### **SESSION 14**

#### Sustainability: Sustainable Energy-**Creating Food from Waste** Moderators:

 Courtney Eaton, Woodard & Curran • Sandy Tripp, GHD

#### Alternative Project Delivery Improves Biosolids Program Sustainability

- James Dunbar, Lystek International
- Greg Baatrup, Fairfield-Suisun Sewer District. CA
- Tim Shea, Waite Consulting



1. Jonnas Jaques discusses using drones for sewer inspections 2. Lauren Bergman speaks on fluorescence characterization technique 3. Chris Goodwin at the Opening Session 4. A typical crowd at the well-attended technical sessions 5. Landon Kendricks presents a session on data management

Digest or Co-digest—Can the Clinton WWTP Import Organics or Not?

- Christopher Muller, Brown and Caldwell
- Kevin DePerri, MWRA
- David Duest, MWRA
- Robert Gorham, MWRA
- Co-digestion of Organic Solid Waste at
- WWTPs-Pre- treatment Options
- Joerg Blischke, Black & Veatch
- Food Waste and FOG Processing for
- Digestion • Wayne McFarland, GHD

#### **SESSION 15 Collection Systems 2: Pumped for** Resilience

#### Moderators:

• Mark Thompson, Kleinfelder • Dennis Sullivan, National Water Main Cleaning Co.

Rerouting Worcester's Sewer—The New Whitla Drive Pump Station • Daniel Roop, Tighe & Bond

Increasing the Resilience of Vulnerable Infrastructure in the Face of Climate Change—A Tale of Two Communities

- Sara Greenberg, GHD
- Anastasia Rudenko, GHD
- Winning the War Against Wipes
- Troy Heimerl, JWC Environmental
- Kevin Bates, JWC Environmental
- Not Just Another Leak in the Pipe
- Marc Moccio, Wright-Pierce
- Kevin Olson, Wright-Pierce
- Robert Ward, City of Haverhill, MA

#### **SESSION 16 Asset Management 1: Planning** Moderators:

- Georgine Grissop, CDM Smith
- Peter von Zweck, CH2M
- Timing is Everything: CIP Prioritization Methods
- Kevin Campanella, Burgess & Niple, Inc. Burlington Vermont's First Asset
- Management Journey • Greg Johnson, City of Burlington, VT
- John Jackman, Hoyle, Tanner &
- Associates
- Rod Lovely, Assetic

Getting the Most Out of Your Asset Management System: Data Analysis and Visualization for Self-Assessment and Planning

• Cris Perez, Kleinfelder • Andrew Goldberg, Kleinfelder

#### Lowell Regional Wastewater's Approach to Asset Management of its Critical Facilities

- Brian Shea, Stantec
- Mark Young, Lowell Regional
- Wastewater Utility
- Michael Stuer, Lowell Regional Wastewater Utility

#### **SESSION 17**

#### Plant Operations 2: Cost Cutting Case Studies

- Moderators: Nick Tooker, Northeastern University
- Sue Guswa, Woodard & Curran Optimization Through Design-
- Implementing Full Scale Carbon Addition to 700 MGD of Wastewater Treatment in NYC
- Robert Frost, Hazen and Sawyer
- Sarah Galst, Hazen and Sawyer
- Mark Supplee, CH2M

# EW ENGLAND WATER ENVIRONMENT ASSOCIATION Annual Conferen

3. Jack Melcher takes in a Wednesday afternoon session

#### Improving Nutrient Removal of Existing Wastewater Facilities using Cyclical Aeration and Chemical Addition

• Rachel Schnabel, Fuss & O'Neill • Jeffrey McDonald, Fuss & O'Neill, Inc. • Stephanie Baldino, Town of Plainfield, CT

A New Low—Achieving 3 mg/L Total Nitrogen with Bardenpho

- Matthew Pitta, CDM Smith
- William McConnell, CDM Smith
- David Norton, City of Brockton, MA

Primary Setting Tank Concrete Repair Work at the Poguonock WPCF, CT—The Success Story of Overcoming Budgetary Challenges

• Allison Zeoli, Arcadis Carl Veilleux, The Metropolitan District

#### **SESSION 18**

Stormwater 2: MS4 Community Strategies for Effective Stormwater Management

#### Moderators:

• Vonnie Reis, City of Framingham, MA Natalie Pommersheim, Environmental Partners Group

- Commission Commission
- Not Reinvent the Wheel
- Community Partnerships
- Kathryn Edwards, Arcadis



1. Allison Zeoli speaks on budgeting concrete tank repairs 2. Susan Guswa delivers a session on NPDES Permit nitrogen limits

#### Evaluating Urban Water Quality in Boston's MS4

• Andrea Braga, Geosyntec Consultants Charlie Jewell, Boston Water and Sewer

• Amy Schofield, Boston Water and Sewer

### Planning for Phosphorus Control-Let's

• Zach Henderson, Woodard & Curran Steve Lauria, Woodard & Curran

MS4 Program Cost Savings through • Nicholas Erickson, City of Fitchburg, MA

The Formation and Functions of the National Municipal Stormwater Alliance and Regional Coalitions of MS4 Permittees: A New Strategy for MS4 Permitting Efficiency and Effectiveness • Randy Neprash, Stantec

#### **SESSION 19**

#### **HOT TOPIC: PFAS/Perfluorinated** Compounds— Regulatory Concerns Are Impacting Wastewater & Residuals Managements

Moderators:

- Shelagh Connelly, Resource Management, Inc.
- Elena Proakis Ellis, City of Melrose, MA

Perfluorinated Alkyl Substance (PFAS) Concerns Related to Wastewater & Residuals

Ned Beecher, NEBRA

Getting Ahead of the Curve – Risk Management Strategies for Perfluoroalkyl Substances

- Sara Barbuto, Integral Consulting Inc.
- Rachel Jacobson, WilmerHale
- Nicholas Shonka, Integral Consulting

PFAS in New England: Regulatory Status and Considerations for Assessment Lisa McIntosh, Woodard & Curran

Analyzing PFAS in Wastewater, Residuals and Soils

Sarita Croce, Town of Merrimack NH



1. Milan Horbaczewski, Kathy Cullen, and Patrick Smith pause during a break 2. Amanda Jett, Chelsea Roberge, and Beth Kaniuka chat at the exhibit hall meet & greet 3. Shelagh Connelly speaks at Government Affairs Committee 4. Sam Heffron, Todd Gianotti, and Sean Grieg relax at the exhibit hall

#### **SESSION 20** Safety: Safety is Only as Strong as the Weakest Link

#### Moderators:

- David Aucoin, Narragansett Bay Commission
- Patricia Chesebrough, Weston & Sampson

How to Read (and Understand) Safety Data Sheets!

- David Horowitz, Tighe & Bond
- The Top 10!
- David Wright, Weston & Sampson The Importance of Maintenance in Your
- Safety Program John Perrrotti III, Fuss & O'Neill
- Larry Bouvier, Fuss & O'Neill Can You Handle the Pressure?
- David Wright, Weston & Sampson

#### SESSION 21

#### Workforce Development: Attracting the **Next Generation to the Water Quality** Profession

#### Moderators:

• Lenny Young, MWRA Danielle Gallant, CDM Smith

Veteran Engagement—NEWEA Water Warriors

- Dustin Price, Portland Water District Peter Goodwin, Ted Berry Company
- The Davies School to Career Program—A Work- Based Learning Partnership with the Warwick Sewer Authority
- Betty Anne Rogers, Warwick Sewer Authority
- Janet Butler, Davies Career and
- Technical High School Christina Befumo, Davies Career and
- Technical High School

#### **SESSION 22** CSO/Wet Weather 2: Smart CSO **Planning and Optimization**

- Moderators:
- Jeff Cantwell, Flow Assessment Services
- Steve Perdios, Dewberry

#### CSO Plan Optimization using SWMM

 Nancy Kelley Beaton, CDM Smith • Eilish Corey, CDM Smith

• Paul Ferland, City of Fall River, MA Narragansett Bay Commission, Phase III

CSO Abatement Program—Revaluation and Optimization Todd Moline, MWH Constructors

- Chris Feeney, Stantec
- Kathryn Kelly, Narragansett Bay Commission
- Addressing the City of Albany's CSO and Flooding Challenges with Continuous Monitoring and Adaptive Control Technology
- Scott Simpson, OptiRTC
- William Simcoe, City of Albany, NY • Mike Miller, CHA Consulting, Inc.

Water Analytics—Empowering Decision Making Through Big Data Analysis and Living Models in Hartford, CT

- Scott Craig, CDM Smith
- Jason Waterbury, The Metropolitan District

• Matthew Gamache, CDM Smith

#### **SESSION 23**

#### **Private Inflow: Navigating Private Inflow in Public Communities** Moderators:

• Frank Occhipinti, Weston & Sampson • William Paulitz, City of Peabody, MA

Removal of Private Inflow—No Thanks, Not in my Basement or Backyard Chris Dwinal, Wright-Pierce Kattie Hartwell, Wright-Pierce

Separating Combined Properties in Chicopee, MA

 Allison McMordie, Tighe & Bond • Kayla Larson, Tighe & Bond

Sump Pump Disconnection Programming and Ordinance Development Lindsey Sylvester, Wright-Pierce

#### Finding Inflow—A Public, Private... Animated Production

 Justin deMello, Woodard & Curran • Brian Pena, City of Lawrence, MA

SESSION 24

Moderators:

District

· Zhongtian Li, Centrisys Corporation -**CNP** Division Melissa Arnot, Kenosha Water Utility

1. Peter Frick, Dave Archard, and John Mele network during a break 2. President Janine Burke-Wells wields the gavel as Past President Jim Barsanti steps aside 3. Julia Miller presents her student poster to Elena Proakis Ellis. Annalisa Onnis-Havden, Mary White, and Leonard Young 4. Ethan Wenger, Charlie Ryan, John Colbert, and Patty Mallett at the end of a day of technical sessions

#### Energy 2: Finding Energy Savings in **Resource Recovery**

- David VanHoven, Stantec • John Adie, NHDES
- Torrefaction, Pyrolysis, and Gasification-Thermal Processes for Resource **Recovery and Biosolids Management** Jeanette Brown, Manhattan College
- Flue Gas CO2 Recycling at Upper Blackstone Water Pollution Abatement
- Rick Johnson, Clearas Water Recovery Mark Johnson, Upper Blackstone Water Pollution Abatement District • David Bayless, Ohio University
- Apply PONDUS Thermochemical Hydrolysis (TCHP) for Improving Biogas Production, Digested Sludge Dewaterability and Energy Balance of Solids Handling Processes

· Hiroko Yoshida, Centrisys Corporation -**CNP** Division

#### Modelling Ammonia Based Aeration Control in Real Time with Online Instrumentation

- Dave Commons, Hach
- Bob Dabkowski, Hach
- Melody White, Hach

#### **SESSION 25 Industrial Wastewater: Industrial** Discharger's Opportunities for Studying Non-Traditional Pollutant Loading, **Stormwater Compliance Strategy and FOG Mitigation** Moderators:

• Michael Curtis, Quantum Biopower Sarah White, UniFirst Corporation

#### Effects of a Novel Degreaser on FOG Accumulation. Membrane Performance. and Effluent Compliance

- Patrick Antle, Protein Matrix
- David Elmer, Weston & Sampson
- Corey Repucci, Weston & Sampson

Challenges Assessing and Treating Wastewater from Biotechnology Manufacturing Operations • Wayne Bates, Tighe & Bond

• William Potochniak, Tighe & Bond • Derek Sykes, Amgen

Wastewater Load Modeling—What You Don't Know Can Hurt You • Alex Santos, Arcadis

Addressing the Impacts of Industrial Stormwater Compliance

Russell Parkman, Ramboll Environ

#### SESSION 26

#### Stormwater 3: Sustainable Stormwater Management, Green Infrastructure, and Other Innovative Ideas

#### Moderators:

- Maria Rose, City of Newton, MA
- Kathryn Edwards, Arcadis

#### Satellite Treatment as an Anchor for Green Space

- Mark Boner, WesTech Engineering
- Matthew Williams, WesTech Engineering
- Brian Mitchell, WesTech Engineering

#### The Path to Sustainable Funding for Stormwater Infrastructure in Longmeadow, MA

- Tracy Adamski, Tighe & Bond
- Sarah Bounty, Tighe & Bond
- Stephen Crane, Town of Longmeadow, MA

#### A Green Street for Watertown, MA

- Pallavi Mande, Charles River Watershed Association
- Elisabeth Cianciola, Charles River Watershed Association
- Matt Shuman, Town of Watertown, MA
- Green Houses in The Bronx for CSC control

• Virginia Roach, CDM Smith • Walid Harrouch, City of New York DEP

#### **SESSION 27**

#### **Plant Operations 3: Plant Upgrades** from Planning Through Construction Moderators:

• David Press, Tighe & Bond

• Lindsey Shields, Wright-Pierce

#### Newington, NH WWTF—Repackaging an Old Packaged Treatment Plant

• Jeff Mercer, Wright-Pierce

Conceptual Resiliency Planning for Stratford Water Pollution Control Facility

- Daniel Stapleton, GZA
- GeoEnvironmental, Inc.
- Samuel Bell, GZA GeoEnvironmental, Inc.
- Chad Cox, GZA GeoEnvironmental, Inc.

#### Treatment Options for Achieving Stringent Nutrient Removal at One of the Last Municipal Powdered Activated Carbon/ Wet Air Oxidation Plants in the U.S.

- Fred Mueller, Tighe & Bond
- Austin Weidner, Tighe & Bond
- Robert Grasis, Town of Vernon, CT

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Understanding IFAS—Lessons Learned from the Hooksett Experience David Mercier, Underwood Engineers

#### **SESSION 28**

#### **Collection Systems 3: An Odor!** An Inline Storage! My Kingdom for **Alternative Delivery!**

#### Moderators:

- Shawn Syde, CDM Smith • John Murphy, Stantec
- Oneida County, NY-A Case Study for Continuous Improvement
- Peter Frick, ADS Environmental Services • Brian Whittaker, O'Brien & Gere
- Michael Armes, ADS Environmental Services

#### Reducing H2S and Odors with Superoxygenated Wastewater

- Tim Haskell, York Sewer District
- Richard Russell, Walker Wellington LLC • Chris Milligan, Blue in Green
- Westminster's Approach to Increasing Sewer System Capacity and Cost-
- Effectively Lifting its Sewer Connection Moratorium – Inline Storage! • Kevin Olson, Wright-Pierce
- Barry Yaceshyn, Wright-Pierce
- Joshua Hall, Town of Westminster, MA

Alternative Project Delivery Allows New Wastewater System to Unlock Economic Opportunity for Rural Community Robert Polys, Woodard & Curran

#### **SESSION 29**

#### **Residuals 2: Enhanced Concepts in Biosolids and Residuals Management** Moderators:

- Eric Spargimino, CDM Smith
- Ben Mosher, CDM Smith

#### Enhanced Phosphorus Removal and Recovery Through Acid Phase Digestion and Brushite Precipitation

- Zhongtian Li, Centrisys Corporation -**CNP** Division
- Menachem Tabanpour, Nutrient
- Recovery & Upcycling LLC Hiroko Yoshida, Centrisys Corporation
- I Know You Like to Think your ish Don't Stink . . .
- Michael Hodge, Casella Organics Clark James, Casella Organics
- Patrick Ellis, Casella Organics

#### Reducing Plant-available Phosphorus in Agricultural Soils with Water Treatment Residuals

- Michael Potash, Resource Management, Inc
- Andrew Carpenter, Northern Tilth

When Legislators Don't Realize What they Voted On-Biosolids, Wood Ash, and Paper Fiber

 Shelagh Connelly, Resource Management, Inc.

#### SESSION 30 **Asset Management 2: Technology**

- Moderators: • Dan Capano, Gannett Fleming Engineers
- Lori Carriero, Tighe & Bond
- Practical Uses of Mobile Data Management and Computerized Maintenance Management Systems in Water and Wastewater Treatment Facilities.
- Landon Kendricks, Woodard & Curran • Alan Fabiano, Woodard & Curran

Navigating SCADA from Design to Startup – Case Study of the Metropolitan District Wet Weather Expansion Project SCADA Implementation • Ryan Kowalski, Arcadis Scott LaRose, The Metropolitan District

Agile Traffic Reporting During Construction: A Public Relations Solution Integrating GIS and Waze • Berkley Myers, Kleinfelder

- Tyson Ross, Kleinfelder
- Rome Wasn't Built in a Day...Neither Should a CMMS
- Evan Walsh, Hazen and Sawyer Michael Stuer, Lowell Regional
- Wastewater Utility
- Aditya Ramamurthy, Hazen and Sawyer

#### **SESSION 31**

#### Watershed Management: The Many Scales of Watershed Management— Case Studies from the River, Pond, and Site Perspectives

Moderators: Steven Wolosoff, CDM Smith • Sara Greenberg, GHD

Lowell Water's Clean Stream Initiative for the Merrimack River

• Gregory Coyle, Lowell Regional Wastewater Utility

 Steven Chapra, Tufts University • Tim Devine, Hazen and Sawyer

New NPDES Permit Limits for Nitrogen for Massachusetts in the Connecticut River Watershed— Truth or Fiction? Susan Guswa, Woodard & Curran • Paul Hogan, Woodard & Curran

Integrated Resource Management • Cambria Ung. VHB

• Theresa McGovern, VHB

Starting from the Bottom: Successfully

Restoring an Urban Water Body · Lauren Swett, Woodard & Curran • Nathaniel Smith, Portland Public Services

#### **POSTER BOARD DISPLAYS**

Public Safety vs. Environmental Risk: Toxic Fire Fighting Foam Discharges in Drinking Water Areas (PFOS/PFOA) Matthew Abraham, Tighe & Bond

CM-at-Risk—A Great Construction Delivery Method to Facilitate Relationships Among the Owner. Designer and Constructor Anthony Accardi, MWH Constructors

Technological Advances in Wireless Collection Systems Flow Monitoring • Jim Caruso, Hach • David Brown, Hach

Pump Industry Breakthrough

• John Fortin, Hazen and Sawyer

• Doug Stellato, Tighe & Bond

**Essential Contract Provisions in** 

and Construction of Modifications/

Teno West, West Group Law PLLC

David Whittle, WesTech Engineering

UNDERGRADUATE STUDENT

POSTER BOARD COMPETITION

Daniel Burger, University of Hartford

Hydraulic Modeling and Flexibility in

Rainwater Harvesting in El Cisne de

for Sustainable Land Development

Engineering Design for the Panama Canal

• Evelyn Grainger, Worcester Polytechnic

• Abigail Ismail & Emilia Perez, Worcester

Use of Integrated Resource Management

Sarah MacClellan, Northeastern University

Samantha Nyser, University of Hartford

Specific Oxygen Uptake Rate Research

Improvements of Resource Recovery

Settled Solids Collection—An Innovative

Populated Coastal Area

• Sandra Tripp, GHD

• Ali Trollier, ECO2

Infrastructure

Never Was.

Oxygen

Facilities

Approach

Project

Institute

Conchan

Polytechnic Institute

State Point Analysis

MS4

Intelligent Wastewater Pumps—The Next

Maximizing Nitrogen Removal with Existing

Simple Equation for Complex Math: I + I =

The Industrial Pretreatment System That

Falmouth Case Study: Finding a Balance for

a Centralized Sewer System in a Denselv

Alternatives for H2S Odor and Corrosion

Control, With Case Study for Using Pure

Agreements for Operations, Maintenance,

• Nathan Michael, Weston & Sampson

• Robert Domkowski, Xylem, Inc. - Flygt



Undergraduate student poster competition presenter (left) Abigail Ismael, WPI

#### **GRADUATE POSTER BOARD DISPLAYS**

Impact of Oscillatoria and Nitrogen Availability on Oxygenic Photogranule Formation Under Static Conditions • Megan Hann, University of Massachusetts, Amherst

Nitrogen Flows in an Anaerobic Ammonium **Oxidation (Anammox) Reactor** 

 Jennifer Lawrence, University of California, Berkelev

Removal of Illicit Drugs in Wastewater **Treatment Plants** 

• Jiayue Luo, University of Massachusetts, Lowell

Unreliable Water Sources in The West Bank-Revealing the Challenges in Al-Walaja Village • Julia Miller, Hiromi Hashimoto, Colleen O'Brien, Mariela Medina Castellanos, Andrea Becerra, Tufts University

Water Chemistry Influences on Dissolution of Cdse/ Zns Quantum Dots

• Pooya Paydary, Northeastern University

Manufacture of Symmetric Thin-Film Polymer Composites Using Soft Lithography Akarapan Rojjanapinun, University of Massachusetts, Lowell

Rethinking and Reforming EBPR Strategy-Concepts and Mechanisms of Side-Stream

Nicholas Tooker, Northeastern University

FRPR

Calculating Diffusive Flux of Polychlorinated **Biphenyls Between Sediments and Water** Column from New Bedford Harbor Using Polyethylene Passive Samplers Alice Peiying Wang, Northeastern University



### 2017 Awards & Recognitions

#### **U.S. EPA REGION I NEW ENGLAND AWARDS**

#### Wastewater Treatment Plant Operation and Maintenance Excellence Award

- Northumberland, New Hampshire Wastewater Treatment Facility, represented by Reginald Charron, Chief Operator
- Milton, Vermont Wastewater Treatment Facility, represented by David Allerton, Director
- West Warwick, Rhode Island Wastewater Treatment Plant, represented by Bernie Bishop, Superintendent
- Narragansett, Rhode Island Wastewater Treatment Plant, represented by Peter Eldridge, Superintendent
- Jamestown, Rhode Island Wastewater Treatment Plant, represented by Douglas Ouellette, Superintendent
- Narragansett Bay Commission Fields Point Wastewater Treatment Plant
- Providence, Rhode Island, represented by Paul Desrosiers, Plant Manager
- Canton, Connecticut Wastewater Treatment Plant, represented by Roger Ignazio, Superintendent

#### Wastewater Treatment Plant Operator of the Year Excellence Award

- Peter LaBonte, North Conway, New Hampshire Wastewater Treatment Facility
- Nathan Lavallee, Burlington, Vermont Wastewater Treatment Facility

#### Wastewater Trainer of the Year

- James LaLiberte, New England Interstate Water Pollution Control Commission
- Paul Dombrowski, Woodard & Curran

#### Industrial Pretreatment Program Excellence Award

- Town of North Attleboro, Massachusetts, represented by Tracy Bellavance, Industrial Pretreatment Coordinator
- Town of Peterborough, New Hampshire, represented by Anthony Carland, Industrial Pretreatment Coordinator
- Lewiston Auburn Water Pollution Control Authority, Lewiston, Maine, represented by Edwin Woods, Industrial Pretreatment Coordinator

#### WEF - MA AWARDS & RECOGNITIONS

#### WEF Fellows\*

• Paul Dombrowski, Enfield, CT • April Gu, Boston, MA

#### WEF Service/Delegate Award\*

- John Trofatter, Land O' Lakes, FL
- George Vercelli, Gorham, ME
- **Quarter Century Operators' Club**
- Raymond Drew, Middletown, CT
- Brendan O'Regan, Haverhill, MA
- Timothy Levasseur, Waterville, ME

#### WEF Life Membership

- Frank Arnold, East Freetown, MA
- Robert Dangel, Boston, MA
- Paul Gormsen, Barre, VT
- Robert Hill, Acton, MA
- Francis Hopcroft, Norwood, MA
- John Jackman, Somersworth, NH
- Bruce Pierstorff, Dover, NH
- Leo Potter, Foxboro, MA
- Anthony Tawa, Jr., Merrimack, NH
- Kevin Wholley, Methuen, MA
- Francis Yanuskiewicz, Peabody, MA

#### George W. Burke, Jr. Award

#### Veolia/Sturbridge, MA WPCF

#### Laboratory Analyst Excellence Award • Danielle Morrison, Fairfield, CT

#### William D. Hatfield Award

- Raymond Vermette, Dover, NH
- **Arthur Sidney Bedell Award**
- Susan Guswa, Enfield, CT

#### \* Presented at WEFTEC (October 2017)



3. Michael Guethle, Young Professional 4. Annaleis Hafford, Operator (ME)

#### **NEWEA RECOGNITIONS**

#### Scholarship Recipients 2017

- **Undergraduate Student** Kestral Johnston,
- Northeastern University **Graduate Student**
- Ryan Ordung,
- University of Connecticut **Non-environmental Student**
- Riley Cobb
- Southern New Hampshire University

#### **Student Design Competition**

• Erika Towne, Lindsey Carver, and Catherine Moskos—Northeastern University, Boston, MA

#### Stockholm Junior Water Prize

- Luca Barcelo, Greenwich, CT
- Mei Tian, Bangor, ME
- Sangwon Cha, Byfield, MA
- Meghana Avvaru, Nashua, NH
- Nicolas Berg, North Kingstown, RI
- Aida Arms, South Burlington, CT

#### **NEWEA** acknowledged retiring officers and committee chairs

#### OFFICE

James Barsanti	Past President
Daniel Bisson	WEF Delegate
Jennifer Lachmayr	Communications Director
Michael Spring	Director – Rhode Island
Nathan Lavallee	Director – Vermont
Jonathan Kunay	Council Director – Outreach

COMMITTEE

#### CHAIR

OFFICER

Douglas Miller Cha	ir – Bylaws
Justin Irving Cha	ir – Microconstituents
Bradley Moore Cha	ir — Nominating
David Aucoin Cha	ir – Safety
Daniel Ottenheimer Cha	ir – Small Community
David BedoyaCo-0	Chair – Stormwater
Vinta Varghese Co-0	Chair – Stormwater
Annalisa Onnis-Hayden Cha	ir – Student Activities
Brian Armet Cha	ir – Utility Management
Anastasia Rudenko Cha	ir – Water for People

NEWEA Award recipients: 1. Donald St. Marie, Committee Service Award 2. Julia Forgue, Elizabeth A. Cutone Executive Leadership

#### **NEWEA AWARDS**

Maine

Vermont

Maine

Vermont

**NEWEA** Operator Award Connecticut

• David Geng, Manchester, CT

• Annaleis Hafford, Winterport, ME

Massachusetts Scott Skelley, North Andover, MA

**New Hampshire** • Michael Carle, Hampton, NH

**Rhode Island** 

Christopher Petrone, Narragansett, RI

• John Alexander, Hinesburg, VT

Alfred E. Peloguin Award Connecticut

• Jay Sheehan, Enfield, CT

• Phyllis Arnold Rand, Augusta, ME **Massachusetts** • James Legg, Uxbridge, MA **New Hampshire** • Kenneth Kessler, Concord, NH

**Rhode Island** • Edward Davies, Providence, RI

• John Lazelle, Wilmington, VT

#### **NEWEA AWARDS**

**Operator Safety Award** • Richard Gould, Hingham, MA James J. Courchaine Collection Systems Award George Kathios, Kittery, ME Paul Keough Award • John Howell, Warwick, RI Young Professional Award Michael Guethle, Portland, ME Public Educator Award Zeb Arruda, New Bedford, MA **Biosolids Management Award** Shelagh Connelly, Holderness, NH

Asset Management Award • City of Portland, ME

**Energy Management Achievement** Award

 Village of Essex Junction, VT WWTF Wastewater Utility Award

• Waterbury, CT WPC

Committee Service Award Donald St. Marie, Boston, MA

E. Sherman Chase Award • Jeff Kalmes, North Billerica, MA

Clair N. Sawyer Award • Annalisa Onnis-Hayden, Boston, MA

Founders Award New Hampshire Water Pollution Control Association

**Elizabeth A. Cutone Executive** Leadership Award • Julia Forgue, Newport, RI

**Past President's Plaque and Pin** 

• Raymond Willis, Franklin, MA

#### **EXHIBITORS**

#### ЗM

ABBA Pump Parts & Service **ADS Environmental Services** Advanced Drainage Systems, Inc. AERO-Mod Airvac- A brand of Agseptence Group Allied Powers LLC. AllMax Software, Inc. Amphidrome ANUA Aqua Solutions, Inc. AquaTurbo Systems, Inc. Aquionics, Inc. Aries Industries, Inc. ASA Anayltics Asahi/America, Inc. Associated Electro-Mechanics, Inc. Atlantic Fluid Technologies, Inc. Atlas Copco. Autrol America BAU Hopkins, Inc. BDP Industries, Inc. Blake Equipment Co. BMC Corp Boyson and Associates, Inc. Brentwood Industries Cabot Norit Activated Carbon Calgon Carbon UV Carl Lueders & Company Carlsen Systems, LLC Carter Pump Co. **Casella** Organics ChemFree DeFoam LLC Claro CN Wood Continental Carbon Group Coyne Chemical Environmental Services **Cretex Specialty Products** CSI Controls CST Covers CUES Custom Conveyor Corp. DANFOSS David F Sullivan & Assoc., Inc & Groth Corporation Denali Water Solutions DeRagger DeZURIK. Inc. Diversified Infrastructure Services Inc. DN Tanks Doetsch Environmental Services Duke's Root Control Duperon Corp. EATanks, Inc. Eastern Pipe Service ElectroScan, Inc.

Enagua Enduro Composites,Inc. Enviro-Care Co. Environmental Dynamics, Inc. Environment One Corp. Environmental Operating Solutions, Inc. eRPortal Software, Inc. EST Associates Evoqua Water Technologies F. R. Mahony & Associates, Inc. F.W. WEBB Co. - Process Controls Div. FCB Insurance LLC Flottweg Separation Technology Flood Control International, Inc. Flomotion Systems, Inc. Flow Assessment Services LLC Flow Tech. Inc. FlowWorks Flygt Products - A Xylem Brand Ford Hall Company Fournier Industries Franklin Miller, Inc. FreeWave Gabriel Novac & Assoc. Glasco UV Grande Water Management Systems Green Mountain Pipeline Services Groth Corporation Grundfos Water Utility, Inc. Hach Company Hach Flow Hannah Equipment Haves Pump, Inc. Hazen and Sawyer Hobas Pipe USA Holland Company, Inc. Hydro Gate Hydromatic Pumps from Pentair ILC Dover Infiltrator Water Technologies Innovyze IPEX USA LLC Ishigaki USA ITpipes J&R Sales and Service, Inc. JDV Equipment Corp. JESCO Chemical Feed Systems JPS Industries, Inc. JWB Company Kemira Kruger KSB, Inc. Kusters Water, a division of Kusters Zima Corporation Lakeside Equipment Corp. LandTech Consultants, Inc Layne.

Lystek International Inc LobePro Rotary Lobe Pumps Maltz Sales Company Mastrrr Co. Mechanical Solutions Inc. Methuen Construction Co., Inc. MGD Process Technology, Inc. Michie Corporation Motor Protection Electronics National Filter Media National Water Main Cleaning Co. Netzsch New England Environmental Equipment NEXOM Nivelco, USA Oakson, Inc. Oldcastle Precast – Stormwater Opti Float/Cox Reserach Orenco Systems Inc. P&H Senesac, Inc. Parkson Corporation Patterson Sewage Pumps Penn Valley Pump Performance Chemicals, LLC Perma-Liner Industries, LLC Pieralisi Philadelphia Mixers PipeLogix POND Technical Sales Precision Trenchless, LLC Premier Tech Aqua Pribusin, Inc. **PRIMEX** Controls PULSCO Pump Systems, Inc. Purafil Pure Technologies U.S. Inc. PW TECH R. H. White Construction Co., Inc. RACO Manufacturing & Engineering Rain for Rent Raven Lining Systems Rebuild It Services Group Resource Management, Inc. RI Analytical Laboratories, Inc. **RMS Utility Services** Rockwell Automation Russell Resources, Inc. SAF-T-FLO Schreiber Seepex Pumps Sentrol, Inc Shelter Works Smith and Loveless SNF Polydyne Spencer Turbine Co. Sprayrog, Inc.

SPX Flow, Inc. – Lightnin Mixers SSI Aeration, Inc. (Stamford Scientific Int.) Stacey DePasquale Engineering, Inc. StormTrap SUEZ Sullivan Associates/RITEC Environmental Synagro Northeast, LLC Technology Sales Associates, Inc. Ted Berry Company, Inc. Tenstim The MAHER Corporation Trojan Technologies/Salsnes Filter The Vortex Companies Thermal Process Systems, Inc. Thompson Pipe Group Trident Actuators Truax Corporation Trumbull Industries, Inc. Ultraflote LLC United Concrete Products, Inc. USABLUEBOOK Utility Cloud (AESC) Vapex Environmental Technologies Verder Vertical Turbine Pumps Victaulic Viking Chains Enviro Division of Connexus Industries, Inc. Vogelsang Vulcan Industries, Inc. WACO Products, Inc. Walker Process Equipment – Division of McNish Corp. Walker Wellington, LLC WasteCorp Pumps Watson Marlow, Inc. Wemco Weir Specialty Pumps Wescor Associates, Inc. WesTech Engineering, Inc. Whipps, Inc. WhiteWater, Inc. Williamson Pump & Motor Worcester Polytechnic Institute Xylem Dewatering Solutions Inc. - Godwin Pumps Xylem – Sanitaire Products

The following companies received award of recognition of continuously exhibiting at the **NEWEA Annual Conference:** 

25-Year Award New England Environmental Equipment, Inc.

10-Year Award

• eRPORTAL Software, Inc. Green Mountain Pipeline Services, Inc.

University

AECOM ARCADIS CDM Smith Dewberry Fuss & O'Neill GHD Hayes Pump



2017 NEWEA Scholarship Recipients (I to r): Undergraduate Student, Kestral Johnston, Northeastern University; Graduate Student, Ryan Ordung, University of Connecticut; Non-Environmental Student, Riley Cobb, Southern New Hampshire

#### **CONFERENCE SPONSORS**

- **ADS Environmental Services**
- AllMax Software, Inc. Aqua Solutions Brown and Caldwell David F. Sullivan & Associates Duke's Root Control **Environmental Partners Group EST** Associates Flow Assessment Services
- Green Mountain Pipeline Services
- Hazen and Sawyer Hoyle, Tanner & Associates, Inc. Kleinfelder Lystek International, Inc. NEFCO Nitsch Engineering Rizzo Associates Stantec SUEZ Synagro Northeast Tata & Howard Ted Berry Company The MAHER Corporation Tighe & Bond Weston & Sampson Woodard & Curran Wright-Pierce

### **Upcoming Events**

### Save the Date

**NEWEA SPRING MEETING** June 3-6. 2018 Gurney's Resort and Marina Goat Island, Newport, RI

#### AFFILIATED STATE ASSOCIATIONS AND OTHER EVENTS

NHWPCA TRADE FAIR April 13, 2018 Radisson Hotel, Nashua, NH

MEWEA SPRING CONFERENCE April 13, 2018 Four Points Sheraton, Bangor, ME

**URBAN RUNOFF 5K** April 21, 2018 Portland, ME

**CAWPCA SPRING WORKSHOP** & AWARDS May 4, 2018 Aqua Turf, Plantsville, CT

**RI NWPCA LEGISLATIVE MEETING** May 15, 2018 RI State House, State Room Providence, RI

**GMWEA SPRING & ANNUAL MEETING** May 24, 2018 Killington Grand Hotel, Killington VT

NWPCA (RI) ANNUAL AWARDS BANQUET May 24, 2018

Potowomut Country Club, Warwick, RI **MWPCA ANNUAL GOLF** 

TOURNAMENT June 19, 2018 Shaker Hills Country Club Harvard, MA

NHWPCA SUMMER MEETING June 22, 2018 Ellacoya State Park, Gilford, NH

**RI NWPCA GOLF TOURNEMENT** June 25, 2018 Potowomut Country Club, Warwick, RI

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NHWPCA **OCEAN NETWORKING TRIP** July 13, 2018 leaving from Seabrook, NH

NWPCA (RI) PAWTUCKET RED SOX EVENT June 23.2018 McCoy Stadium, Pawtucket, RI

NWPCA (RI) ANNUAL GOLF CLASSIC June 25

Potowomut Country Club

NHWPCA ANNUAL GOLF TOURNAMENT August 2, 2017 Beaver Meadow Golf Course, Concord, NH

**RI NWPCA FALL TRADE SHOW &** CLAMBAKE

September 7, 2018 Twelve Acres Banquet Facilty. Smithfield, RI

**MWPCA TRADE FAIR** September 12, 2018 Wachusett Mountain, Princeton, MA

NHWPCA FALL MEETING September 14, 2018 Hall Street WWTF. Concord, NH

NEWWA ANNUAL CONFERENCE September 16-19, 2018 Stowe Mountain Lodge, Stowe, VT

**MEWEA FALL CONFERENCE & GOLF TOURNAMENT** September 19-21, 2018 Sunday River, Newry, ME

OPERATIONS CHALLENGE FACILITY TOUR & TRAINING DAY April 6, 2018 Dover WWTF. Dover. NH

**ASSET MANAGEMENT & ENERGY** CONFERENCE April 11–12, 2018 Anheuser Busch, Merrimack, NH

NATIONAL WATER WEEK-DC FLY-IN April 17–18, 2018 Washington DC

**NEW ENGLAND WATER FOR PEOPLE KENTUCKEY DERBY GALA** May 5, 2018 Dane Estate, Chestnut Hill, MA

**STORMWATER CONFERENCE & EXHIBIT WITH** UNH AND U MAINE ENV. FINANCE CENTER May 7-8, 2018 Sheraton, Portsmouth, NH

NEWEA SPRING MEETING June 3-6, 2018

Hyatt Regency Goat Island, Newport, RI

**TEACHER TRAINING** August 14, 2018 MWRA

INDUSTRIAL WASTEWATER SEMINAR June 25, 2018 Cataqua Public House, Portsmouth, NH

WEFTEC September 28 – October 3, 2018 New Orleans, LA

#### Save the date

NEWWA and NEWEA Water For People **Committees Present** 

ENTUCKY DERBY

Galla

**May 5, 2018** Dane Estate, Chestnut Hi

This is a partial list. Please visit the state association websites and NEWEA.org for complete and current listings.

# Thank you

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**Environmental Partners Group** Fuss & O'Neill Hazen and Sawyer Hoyle, Tanner & Associates, Inc. NEFCO Svnagro Northeast Tata & Howard Ted Berry Company Tetra Tech Tighe & Bond Woodard & Curran Wright-Pierce

#### Bronze

**ADS Environmental Services** AllMax Software, Inc. David F. Sullivan & Associates Duke's Root Control GHD Hayes Pump Kleinfelder Nitsch Engineering Stantec



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### Join NEWEA's 2019 **Annual Sponsor Program**

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- 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 Mary Barry Email: mbarry@newea.org Call: 781-939-0908



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### **Advertise** with **NEWEA**

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Upcoming *Journal* Themes Summer 2018—Engineers Fall 2018—Public Works/Municipal Winter 2018—Young Professionals

#### **NEWEA/WEF<sup>\*</sup>** Membership Application 2018

Personal Information (ple	ase print clearly)			
Last name		M.I. First	Name (jr. sr. e	etc)
Business Name (if applicable)				
Street or P.O. Box			(□Business Address □Hor	ne Address )
City, State, Zip, Country				
Home Phone Number	Ν	Iobile Phone Number	Business Phone number	
Email Address				
Check here if renewing, please	provide current member I.D	).		
*NEWEA is a member association	of WEF (Water Environme	ent Federation). By joining NEWEA, y	you also become a member of WEF.	
<b>Employment Information</b>	1 (see back page for coc	les)		
1. ORG Code Oth	er (please specify)	2. JC	DB Code: Other (please specify)	
3. Focus Area Codes		Other (pleas	se specify	
Signature (required for all new me	mberships)		Date	
Sponsorship Information	1			
WEF Sponsor name (optional)		Sponsor I.D. Number	ACQ. Code for WEF use	only   WEF 18
Membership Categories	(select one only)		Member Benefit Subscription	Dues
Professional Package	Individuals involved in or ir	nterested in water quality	<ul> <li>WE&amp;T (including Operations Forum)</li> <li>WEF Highlights Online</li> </ul>	\$185
Young Professional Package	New members or formerly of experience in the indust package is available for 3	student members with 5 or less years try and less than 35 years of age. This years. Date of birth (mm/yy)	<ul> <li>WE&amp;T (including Operations Forum)</li> <li>WEF Highlights Online</li> </ul>	\$69
<ul> <li>Professional Wastewater</li> <li>Operations (PWO)</li> <li>Package</li> </ul>	Individuals in the day-to-da treatment or laboratory fac <1 mgd or 40 L/sec. Licens	ay operation of wastewater collection, ility, or for facilities with a daily flow of se #	<ul> <li>WE&amp;T (including Operations Forum)</li> <li>WEF Highlights Online</li> </ul>	\$109
□ Academic Package	Instructors/Professors inter	rested in subjects related to water qua	lity. WE&T (including Operations Forum) WEF Highlights Online Water Environment Research (Online)	\$181
□ Student Package	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.		ted WE&T (including Operations Forum) ool WEF Highlights Online er. Water Environment Research (Online)	\$10
Executive Package	Upper level managers interested in an expanded suite of WEF products/services.		<ul> <li>WE&amp;T (including Operations Forum)</li> <li>WEF Highlights Online ■ World Water</li> <li>Water Environment Research (Online)</li> <li>Water Environment Regulation Watch</li> </ul>	\$353
🗆 Dual	If you are already a membe	er of WEF and wish to join NEWEA		\$40
Corporate Membership     (member benefits for one person)	Companies engaged in the design, construction, operation or management of water quality systems. Designate one membership contact.		<ul> <li>WE&amp;T (including Operations Forum)</li> <li>Water Environment Research (Print)</li> <li>Water Environment Regulation Watch</li> <li>WEF Highlights Online</li> </ul>	\$411
New England Regulatory Membership	This membership category Agencies, including: USEP Environmental Protection, VT Department of Environ	is a NEWEA only membership reserve A Region 1, CT Department of Energy a MA Department of Environmental Prote mental Conservation, and RI Departme	ed for New England Environmental Regulatory and Environmental Protection, ME Department of ection, NH Department of Environmental Services, ant of Environmental Management	\$50
WEF Utility Partnership Prog creating a comprehensive membe and have the flexibility to tailor the	ram (UPP): NEWEA partic rship package for designate appropriate value packages	ipates in the WEF Utility Partnership Pr ed employees. As a UPP Utilities can c s based on the designated employees'	ogram (UPP) that supports utilities to join WEF and NEWE consolidate all members within their organization onto on needs. Contact WEF for questions & enrollment (703-684	A while e account -2400 x7750)
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#### **NEWEA/WEF<sup>\*</sup>** Membership Application 2018

To help us serve you better, please complete the following: (choose the one that most closely describes your organization and job function)



What is the nature of your What is your Primary What are your **KEY FOCUS AREAS? ORGANIZATION? JOB FUNCTION?** (circle one only-required) (ORG) (circle one only) (JOB) (circle all that apply) (FOC) Public/Private Wastewater Plants and/or Management: Upper or Senior **Collection Systems** Drinking Water and/or Stormwater Drinking Water 2 Management: Engineering, Laboratory, Public/Private Wastewater Only Operations, inspection, Maintenance Public/Private Drinking Water Only 3 4 (e.g. municipality, utility, authority) Engineering and Design Staff 4 5 Δ Industrial Systems/Plants Scientific and Research Staff 5 6 Consulting or Contracting Firm 5 **Operations/Inspection Maintenance** 6 7 State, Federal, Regional Government Agency 6 Purchasing/Marketing/Sales 8 7 Research or Analytical Laboratories 7 9 Educator 8 Educational Institution 10 8 9 Student Manufacturer of Water/Wastewater/ Stormwater Equipment or Products 9 11 Elected or Appointed Public Official 10 Water/Wastewater/Stormwater Product 12 Distributor or Manufacturer's Rep. 10 Other \_ 11 13 Public/Private Stormwater (please specify) (MS4) Program Only 14 12

Public Financing, Investment and Banking

> 13 Non-profits

99 Other (please specify)

#### **Optional Items (OPT)**

Years of industry employment? 1 (1 to 5) 2 (6 to 10) 3 (11 to 20) 4 (21 to 30) 5 (>30 years)

> Gender? 1 Female 2 Male

Education level? (ED)

1 High School 2 Technical School **3** Some College **4** Associates Degree **5** Bachelors Degree 6 Masters Degree 7 JD 8 PhD

Education/Concentration Area(s) (CON) 1 Physical Sciences (Chemistry, Physics, etc.) 2 Biological Sciences 3 Engineering Sciences 4 Liberal Arts 5 Law 6 Business



Water quality professionals, with fewer than 5 years working experience and under the age of 35, are eligible to join WEF as an Active Member, while

participating in the NEWEA/WEF Young Professionals Program. This program allows up to 50% off of the Active Member dues, valid for the first three years of membership. This program is available for new member applicants and Student Members.

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

Industrial Water/Wastewater/ Process Water

Groundwater

Odor/Air Emissions

Land and Soil Systems

Legislation (Policy, Legislation, Regulation)

Public Education/Information

Residuals/Sludge/Biosolids/Solid Waste

Stormwater Management/ Floodplain Management/Wet Weather

Toxic and Hazardous Material

Utility Management and Environmental

Wastewater

Water Reuse and/or Recycle

15 Watershed/Surface Water Systems

16 Water/Wastewater Analysis and Health/ Safety Water Systems

> 17 Other

(please specify)





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