

JOURNAL

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WATER
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VOLUME 60 NUMBER 3 / ISSN 1077-3002

FALL 2026



ASSET MANAGEMENT

From camera to code:
Artificial intelligence in sewer system
condition assessment

Criticality analysis for capital planning

The useful life of people:
Extending the asset management
mindset to workforce sustainability



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President's Message

In May, I attended the NEWEA Spring Conference.

The event packs a lot into a few days, including an in-person Executive Committee meeting, networking and the golf event, technical sessions, and, of course, the Operations Challenge competition. During my welcoming remarks, I reminded folks in attendance to reach out and tell their stories. The public and our customers need our help to fully appreciate the effort that goes into providing clean water services that support our communities and protect the environment, and our personal experiences and expert insights can help tell that story.

One highlight of the Spring Conference is the Operations Challenge competition. The contest includes five challenging events that require operators to demonstrate well-rounded expertise in laboratory practices, safety, process control, maintenance, and collections systems. Each state Member Association is allocated at least one slot in the competition.

Interest in the Operations Challenge has been on the rise, and this year's competition included teams from Massachusetts, Maine, Connecticut, two from Rhode Island, and a guest team from the Rocky Mountain Water Environment Association (WEA). After two days of competition, the top three teams were RI's Sludge, Aquidneck Aqua-holics, and Mass Chaos. The Rocky Mountain WEA team (Double Duty from Colorado), a national Division 1 team, also won honorary recognition for its impressive performance, and I'm sure the NEWEA teams benefited from having seen that team in action. Thank you to all the teams that showed up and competed in our regional challenge, and congratulations to those advancing to the national WEFTEC event, this year in New Orleans.

NEWEA and the Operations Challenge Committee have been formalizing the process that begins with formation of teams in each of New England's state operator associations. Because of our association's size, NEWEA normally can send three teams to the national competition, though this year four teams will be allowed to represent NEWEA, with the Sludge Hammers from Connecticut taking the additional slot. Once the eligible New England teams are identified based on the Spring Conference events, NEWEA and state association support for the teams is a separate challenge, and this support is now being clarified. As the popularity and number of participants continue to increase, this clarity will be essential to ensure the competition is well and fairly managed, and the process is understood by all participants.

Ops Challenge is a great example of the varying opportunities for telling your story. The event brings

together operators and highlights the skill and passion they daily but silently put into the little-seen operations and maintenance of clean water facilities. These contestants tell their stories through action, by displaying their ability, attention to detail, hard work, and the excitement of their professional craft and demonstrating the importance of teamwork in their critically necessary careers.

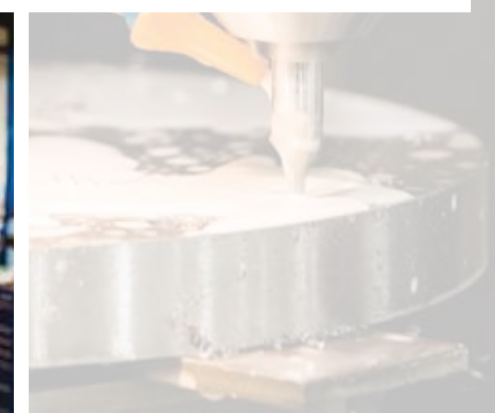
If you attend WEFTEC, please make sure to stop by and see their stories in action as our NEWEA teams face off with others from across the country and beyond in the ultimate Operations Challenge.



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From the Editor

Welcome NEWEA friends to the fall issue of the *Journal*. This issue focuses on asset management, a topic that touches both our personal and professional lives. For example, during my years as a soccer coach, I managed the team's assets, evaluating my players' abilities, determining which position best suited each player, developing practice plans to improve team skills and prepare for our next opponent, and then finding ways to encourage and motivate each player during the match. I also had to ensure the team was supplied with soccer balls, cones for drills, extra gloves for goalkeepers, and a well-stocked first aid kit. Our team's success was directly related to team asset management through preparation, organization, and decision-making to best support the players.



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In our water industry we, as asset managers, serve a similar role to that of a team coach. We must provide staff with the tools, equipment, and materials to ensure the reliable operation and maintenance of our clean water facilities, pump stations, and collection systems. We must focus on maximizing the abilities of staff by evaluating their skills, providing training, and placing them in a position to succeed. Most



importantly, asset managers must cultivate a positive and collaborative work environment that will motivate staff to recognize the critical role each of them plays in protecting our water resources.

This *Journal* issue offers three topical and intriguing features that illustrate the importance of effective

asset management. Our first feature describes how artificial intelligence computer programs have become a useful tool to improve the efficiency of performing closed-circuit television review and analysis of the condition of collection systems. These new software systems use algorithms to detect and classify defects, analyze video inspections, and provide codes and grades compliant with the industry standards to help the operator determine the condition of pipe and maintenance structure assets. Our second feature discusses how Functional Systems Criticality Analysis (FSCA), mainly used for the capital planning process, can offer an innovative approach for utilities to identify and mitigate asset risk more effectively. The FSCA approach focuses on preserving the system's function, rather than just performing equipment repairs on individual assets. The article presents a real-world case study of

how the Sewerage & Water Board of New Orleans used this methodology to develop a risk-informed Capital Improvement Plan. Our third feature is presented by longtime NEWEA member and past president Jim Courchaine. Jim's article focuses on our most important assets—our people. He explores the parallels between effectively managing physical assets and the asset manager's leadership responsibilities in managing staff. He notes that successful asset managers have a strategic responsibility to maximize the useful life of each individual to sustain safe, reliable, and effective utility operations.

In addition, this issue includes the latest industry news, NEBRA highlights, and reports from our six New England state directors highlighting their meetings, activities, and observations. Our Young Professional spotlight features Paige Sudore, a project engineer in Stantec's Boston office and a very active member of our Young Professional Committee. We are also honored to present this year's state winners of the Stockholm Junior Water Prize. The work of these young people is inspiring and confirms that the future of our water industry is bright.

As always, we offer our thanks and appreciation to our *Journal* advertisers and event sponsors whom we recognize for their vital role in supporting our NEWEA programs. On behalf of the Journal Committee, I wish you all a happy and colorful fall season.





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Industry News

Cybersecurity alert to water and wastewater systems

The Cybersecurity and Infrastructure Security Agency (CISA) is warning water and wastewater utilities about an increase in cyber threat activity targeting programmable logic controllers (PLCs). According to CISA, threat actors have altered passwords and changed internet protocol (IP) addresses on exposed devices, resulting in operational disruptions, including boil-water notices and extended manual operations.

CISA said utilities of all sizes may be vulnerable and urged owners and operators to identify and remove internet-facing PLCs and other operational technology from public networks. The agency also recommends enabling password protection, changing default passwords, restricting remote access to authorized devices, and maintaining clean backup copies of PLC configurations. Utilities seeking additional assistance can contact CISA or EPA's Cybersecurity Technical Assistance Program for the Water Sector.



Water infrastructure loan program fees waived for small communities

On June 29, EPA announced it will waive fees for small communities who apply for Water Infrastructure Finance and Innovation Act (WIFIA) loans in fiscal years 2026 and 2027. By waiving the WIFIA application and credit processing fees, small communities can save almost \$200,000 when applying for a WIFIA loan, clearing a barrier to accessing funding to improve water infrastructure through this program.

The WIFIA program charges fees to loan applicants to reimburse the federal government for costs incurred with processing and underwriting WIFIA loans. These costs can be financed by the WIFIA loan as eligible project costs. The \$25,000 WIFIA application fee for small communities and separate credit processing fee—averaging approximately \$156,000 per loan—can be significant barriers for small communities seeking to access this financing. EPA will waive the application fee for small communities with populations of 25,000 or fewer. The agency will also waive the credit processing fee for these same small communities in fiscal years 2026 and 2027, subject to WIFIA's program requirements and available administrative funds.

The WIFIA program has approximately \$11 billion in flexible financing available to support water infrastructure projects across the country, including in small and rural communities where WIFIA can finance up to

Note: All EPA industry news provided by EPA Press Office

80 percent of project costs. EPA is currently accepting letters of interest.

\$30 million in grants for small water systems and technical assistance

In July, EPA announced \$30 million in grant funding under its Real Water Technical Assistance (RealWaterTA) program. The funding will provide training and technical assistance to help improve water quality in small and rural communities. "Nationally recognized technical assistance providers will use this money to strengthen small and rural systems to protect water quality and support high-impact public health protection," said EPA Assistant Administrator for Water Jessica Kramer.

Funding for the training and technical assistance grants will be used to strengthen technical, managerial, and financial capabilities at small public drinking water systems, publicly owned wastewater systems, and decentralized wastewater systems. The funding will also help private well owners improve water quality through PFAS testing and lead service line identification. Pending completion of legal and administrative requirements, EPA anticipates awarding grants to three organizations that will assist communities across the country.

Award recipients include the National Rural Water Association (NRWA), which received \$9.1 million to provide technical, managerial, and financial assistance to small water and wastewater systems, including support for rate-setting, fiscal planning, operational troubleshooting, and asset management. The Rural Community Assistance Partnership (RCAP) received \$14.58 million to provide training and technical assistance to operators, board members, and managers; address drinking water compliance issues; support wastewater system improvements; and assist private well owners. The Southwest Environmental Finance Center at the University of New Mexico received \$7.02 million to support asset management planning, financial health assessments, lead service line inventories, and training related to PFAS regulations and treatment.

Since 2012, this grant has provided over \$200 million to training and technical assistance providers.

According to EPA, RealWaterTA supports drinking water and wastewater systems through technical assistance focused on local needs, public health protection, and compliance with the Safe Drinking Water Act and Clean Water Act. The program also emphasizes accountability and measurable results.

Strengthening the water sector workforce

In early August, EPA convened a roundtable on the water workforce to discuss how to help recruit and retain individuals into meaningful careers in water, and to identify opportunities where EPA can help reduce barriers and improve interstate coordination. EPA's Office of Water was joined by water systems, water associations, states, and other partners to engage in proactive discussions about how to address a potential widespread shortage of qualified workers due to anticipated retirements. This engagement will inform EPA's efforts to revitalize the 2020 Water Workforce Initiative while creating an online toolbox with resources that water systems, states, and technical assistance providers can use to improve recruiting, development, and retention.

"Every time we turn on the tap, flush the toilet, or water the garden, we are depending on the dedicated professionals managing public water systems. It is imperative that the water sector be set up for success, which is why the EPA is focused on working with our partners to bolster career recruitment and retention," said EPA's Ms. Kramer. "This roundtable discussion was a meaningful step in this shared effort because there are proactive actions we can take to reduce barriers and encourage talented professionals to enter the water sector and help protect public health by ensuring that all Americans can rely on clean, safe water."

The water sector, including drinking water and wastewater systems, faces a widespread shortage of qualified workers due to expected retirements. Approximately one-third of the water workforce is nearing retirement age. Additionally, new technical and scientific skillsets are needed to operate and maintain modern systems, implement cybersecurity best practices, and address new challenges. This wave of retirements also comes when new investments are needed to address the nation's aging water infrastructure. While investments in water infrastructure (through the State Revolving Fund programs, the Water Infrastructure Finance and Innovation Act [WIFIA] program, and other programs) are critical, investing in human capital is essential to strengthening the water sector to benefit current and future generations.

By connecting individuals to jobs in the water sector, providing critical training, and expanding public awareness about the benefits of careers providing vital water services, EPA will help the water sector meet current and future needs. Developing internships and apprenticeship programs, education programs, and other resources will ensure a strong pipeline of workers and high-quality jobs to provide clean, safe drinking water.

One way EPA supports the water workforce is through the Innovative Water Workforce Development Grant Program. Since the program's inception in 2018, this program has invested more than \$15 million in the expansion of public awareness about job opportunities in the water sector.

EPA also supports the workforce through national oversight of state Operator Certification Programs that are required under the Safe Drinking Water Act. The agency works with states to deliver best practices and resources, such as operator training and technical assistance. These help operators gain the technical expertise and certifications needed to treat and deliver safe drinking water.

EPA seeks comment on draft PFAS biosolids guidance

EPA has released draft guidance intended to help wastewater utilities, landowners, farmers, and others reduce potential risks associated with perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) in biosolids. The guidance is part of the agency's broader strategy to address per- and poly-fluoroalkyl substances (PFAS). EPA will accept public comments on the draft guidance until Oct 5, 2026 at 11:59 PM EDT. Comments may be submitted at www.regulations.gov—using Docket ID No. EPA-HQ-OW-2026-2509.

According to EPA, the draft guidance was developed after the agency reviewed comments on its earlier draft risk assessment for PFOA and PFOS in biosolids. Commenters raised concerns about assumptions used in the assessment, including how potential risks were calculated and the extent to which the analysis reflected real-world land application practices.

The draft guidance provides voluntary recommendations intended to reduce potential exposure to PFOA and PFOS, including avoiding land application of biosolids near waterways, on lands where children play, and on crops that may present a higher potential for human exposure. EPA said the recommendations are intended to help protect public health while recognizing the continuing role of biosolids recycling and the need for wastewater utilities to manage sewage sludge and biosolids from the communities they serve.

Under existing federal regulations, biosolids may be applied to agricultural lands, forests, tree farms, golf courses, turf farms, and other sites, and may also be sold to the public for use on lawns and home gardens. Some states, Tribes, and local jurisdictions have additional requirements governing the use of sewage sludge and biosolids.





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From camera to code: Artificial intelligence in sewer system condition assessment

RYAN ANGELICO, PE, Weston & Sampson Engineers, Inc., Reading, Massachusetts

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ABSTRACT | Over the years, technological innovations have enhanced the way sewer collection systems are managed, operated, and inspected. Early inspection methods dating back to the late 1800s involved lamps and vertical shafts to identify obstructions, with newer methods using modern video and robotic equipment.

Today, artificial intelligence (AI) software has become a useful tool to improve efficiency for many otherwise cumbersome and laborious tasks, and the wastewater industry is no exception. Many firms now have software for closed-circuit television (CCTV) review and video analysis. This software uses computer algorithms that have been trained to detect and classify defects, analyze video inspections, and provide codes and grades compliant with the industry standard—NASSCO, Inc.'s Pipeline Assessment Certification Program (PACP). With many firms pushing this technology forward, the industry has rapidly evolved over the last few years.

KEYWORDS | AI, sewer, evaluation, PACP, inspection, CCTV, software

Sewer system evaluation surveys (SSES) are comprehensive programs performed on gravity sewers to target infiltration and inflow (I/I) entering the system. SSES programs typically involve field investigations during a period of high groundwater, which is defined by the Massachusetts Department of Environmental Protection (MassDEP) as March 1 to June 30.¹ CCTV inspection is therefore performed in the spring to identify specific sources of infiltration entering sewers.

SSES and other condition assessments are important for municipalities, as they allow the communities to prioritize areas to target rehabilitations to reduce I/I flows (Figure 1). Reduction of I/I does four things:

1. Helps prevent both sanitary sewer overflows (SSOs) and combined sewer overflows (CSOs)
2. Increases system capacity
3. Complies with MassDEP guidelines¹ and similar regulatory requirements
4. Reduces flows at wastewater treatment facilities

These programs also help improve asset management for sewer system infrastructure.

CCTV inspections involve operating a robotic crawler mounted with a camera through the gravity sewer. Per industry standards, a trained and certified operator, following the standards set forth by the Pipeline Assessment Certification Program (PACP), guides the camera through the pipe to identify defects and other conditions observed through television inspection (Figure 2). Defects and observations are entered into the inspection software using standardized PACP codes for consistency across the industry. CCTV inspection, while targeting I/I sources, also offers the benefit of identifying structural issues (e.g., cracked, fractured, broken, or collapsed pipe, etc.) as well as operation and maintenance issues (e.g., grease, mineral deposits, root intrusions, etc.).

Prior to the standardization of PACP in 2002, the documentation of defects and observations through CCTV inspection was often inconsistent and depended on the individual operator and technician. PACP defect codes and operator training helped reduce inconsistencies in inspections and provided a standard for performing subsequent evaluations. Still, CCTV inspections rely on skilled operators to identify and record observations.



Figure 1. Sewer system evaluation surveys are comprehensive programs performed on gravity sewers to target structural defects and infiltration and inflow entering the system

TRADITIONAL VIDEO ANALYSIS METHOD

Wastewater engineers trained and certified in PACP often review CCTV inspection videos and data in the office following field investigations. This review enhances consistency and conformance to PACP standards as well as provides a professional assessment of preliminary design recommendations based on the observations from each inspection. These observations are recorded and cataloged into project databases. Defects are identified and preliminary design recommendations are included pipeline by pipeline.

In addition to reviewing the video, engineers can estimate I/I rates to prioritize rehabilitation. A cost-effective analysis comparing the cost of rehabilitation to an estimate of transportation and treatment can be performed. Additionally, pipes with severe structural defects or operation and maintenance (O&M) issues can be identified and prioritized.

While the engineer's review is an important step, the effort is nonetheless time-consuming and labor-intensive. Analyzing the data from CCTV inspections can be one of the most labor-intensive tasks in the investigation. Depending on the size of the project, it can take weeks to complete.

AI SOFTWARE PLATFORM AND WORKFLOW IMPLEMENTATION

With recent advancements in AI-powered inspection software, our team evaluated multiple AI software offerings with the goal of improving efficiency and providing better service to clients. We tested the software on legacy projects to monitor AI-generated observations compared to previously recorded observations logged by PACP-certified operators and reviewed by a similarly certified engineer. We found AI coding quality to be similar across the offerings

we evaluated but found large differences between pricing and the quality of user interfaces. Following our evaluation, we partnered with a sewer inspection software company to further test and implement AI-assisted review into our projects.

The software we selected uses a web-based interface that stores and organizes inspection data uploaded and/or generated within the platform. Data is structured hierarchically, with the highest level consisting of individual projects or jobs, allowing multiple projects to be maintained independently. Within each project, pipe assets are organized into a section table that allows sorting, filtering, and data management. Selecting a specific pipe section loads all of its associated inspection data, including observation records and linked video files, within a unified view to facilitate efficient review.

The interface synchronizes the observations with the embedded video file, enabling users to navigate directly to the corresponding timestamp for each recorded defect. Once data is uploaded or created, users can manage and review inspection data, run AI scans to automatically generate condition codes, and produce reports. Project data can be exported to a PACP-compatible database for further use in external applications and planning-level evaluations.



Figure 2. CCTV inspections involve operating a robotic crawler mounted with a camera through the gravity sewer following the standards set forth by the PACP

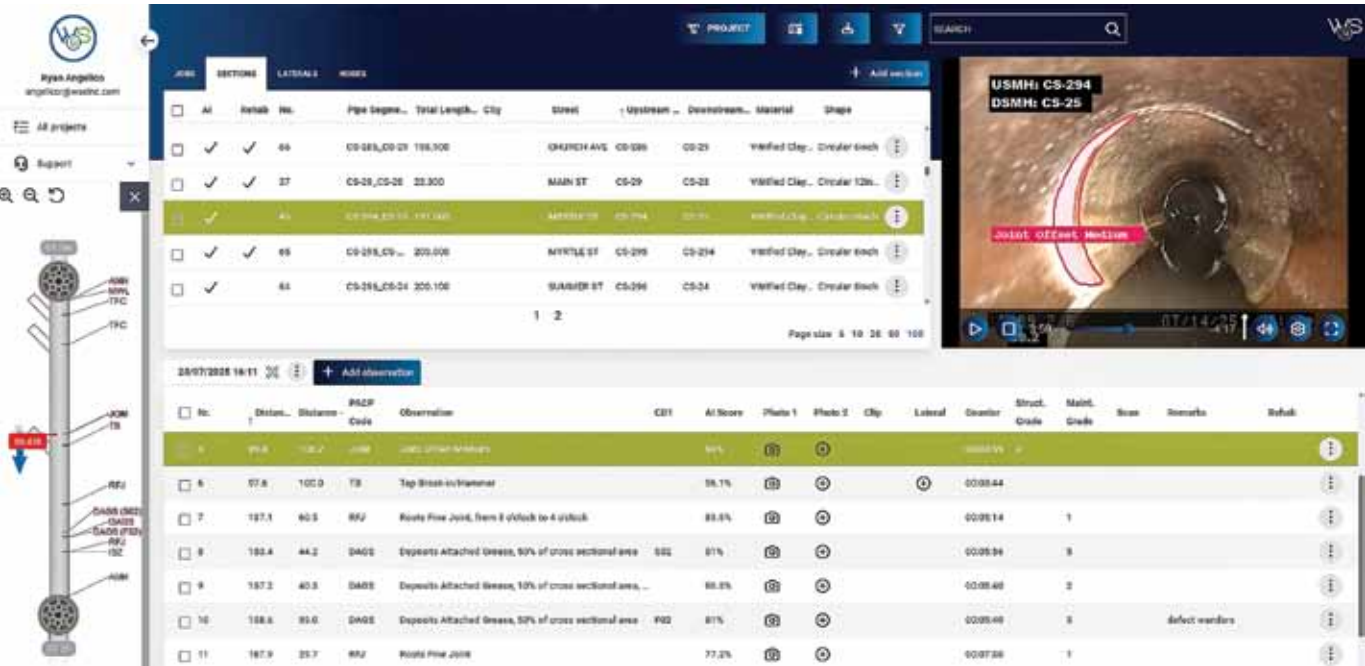


Figure 3. Customized web-based AI interfaces display project information, including pipe sections, observations, and linked video files within a unified view for efficient data management and review

We worked with the software vendor to customize the interface, including the use of custom fields within each asset's section record. These fields allow engineers to incorporate supplemental asset information, which includes pipeline recommendations, comments, or asset notes. These are used for reporting or data filtering. In addition, we configured our platform so engineers could incorporate preliminary rehabilitation recommendations and quantify infiltration rates/unidentified service flow for subsequent reporting and cost-effective analysis (Figure 3).

The integration of these custom fields allows the AI-assisted review process to align with our own planning-level assessments. These customized fields enable the engineer to input supplemental data based on their review while maintaining one data set.

AI EVALUATION AND TESTING

We implemented AI-assisted coding on a recent sewer inspection project using CCTV data collected by PACP-certified operators. The contractor provided both video files and a corresponding PACP database, which were uploaded to the AI platform for analysis. The PACP database is the foundation for the workflow by defining pipeline assets (PACP inspection table) and inspection observations (PACP condition table) while also establishing the structure to link inspection records to their corresponding video files within the platform.

The data import process is critical for successful integration of the AI software. The platform uses the PACP media inspection table, specifically the file name and file path for the video file, to associate each video automatically to the corresponding

inspection record. Retaining the file structure and uploading the videos and database in the PACP format is essential for proper linkage and subsequent AI coding. Prior to upload, QA/QC of the dataset is recommended to identify and correct issues such as incorrect asset IDs or broken file paths, which can otherwise disrupt the automated upload process.

We found that manually linking video files to inspection records is possible through the software's web interface, although this process is much less efficient. The most efficient way for large datasets is the use of the PACP database tables to automatically link asset information with the video files.

Particular attention should be given to sewers requiring multiple inspections (e.g., reversal inspections). Reversal inspection records and videos should be reviewed for consistent data collection after importing the larger dataset to prepare separate inspections for an AI scan. We observed that the second (or reversal) inspection video would not always upload or link automatically to the pipe section. In these cases, the reversal inspection would need to be manually uploaded and linked to the appropriate pipe section within the interface.

Once the data and video files have been uploaded to the web-based interface, the engineer can initiate the AI-scan of the data. For a project of approximately 30,000 linear ft (9,144 m) of inspected sewers, the scan was completed overnight and ready for the engineer to review the following day. Scanned sections were incorporated as new observation records, separate from the PACP-certified operator record.

The video recognition AI records observations based on the observed footage/distance and assigns a PACP code and corresponding observation description based on the detected scan. PACP structural and O&M grades, along with remarks, were assigned automatically. These were then used to populate the pipeline ratings, consistent with PACP guidelines. The AI scan also populates an AI score column, presented as a percentage from 0 to 100. This score represents the confidence interval determined by the video recognition AI for the certainty of the defect.

The video inspection file uploaded to the web platform is also updated following an AI scan. AI's observations are highlighted in the video with a translucent color overlay, which also identifies the PACP defect code and the AI confidence score, presented in brackets (Figures 4–6). This is a useful tool when the engineer reviews the data as it allows the engineer to identify the defect that the AI scan has detected and confirm if the observation is consistent with PACP guidelines and the engineer's professional judgement.

We reviewed each inspection after the AI scan to ensure accuracy and consistency with industry standards. We do not rely solely on AI-assisted observations to make design recommendations for pipelines or identify I/I sources. Rather, we leverage AI to establish the basis for which the engineer can review and provide preliminary design recommendations. Further engineer evaluation is still required to QA/QC the data and make design recommendations. The web-based platform, combined with a unified interface and the embedded video timestamp integration, allows the engineer to efficiently review observations and remarks from both certified operators and the AI scan, and make design recommendations. The expectation is that as AI accuracy improves, the process will increase efficiency even further by reducing the time spent reviewing and evaluating CCTV videos.

RESULTS

After comparison and review, we determined that the video recognition AI identified most standard defects. Even defects with relatively low confidence scores appeared to accurately represent the observed defect in most cases. Inconsistencies between the AI-driven and human-led review included the following:

- Missed or miscategorized service connections
- Misclassified infiltration, commonly at service connections or in sewers with turbulent flow conditions
- Duplicate observations
- Inconsistent detection with material changes within the pipeline
- Misidentified roots or obstructions
- Misclassified maintenance hole structures
- Assessment capabilities for sewers with multiple inspection records (i.e., reversal attempts)

Observations or defects within service connections fall under NASSCO's LACP inspection program; however, modifiers are used for tap codes in PACP inspections to identify general defects in laterals. Observations or defects in



Figure 4. Screenshot from an updated video inspection file following an AI scan. The green overlay depicts Roots Fine Joint (RFJ) with an AI confidence interval of 92.2 percent. The text entries within the black box are video overlays from the certified operator where an RFJ at 103.1 ft (31.4 m) was indicated.



Figure 5. Screenshot from an updated video inspection file following an AI scan. The purple overlay depicts Tap Break-in/ Hammer (TB) with an AI confidence interval of 79.7 percent.



Figure 6. Screenshot from an updated video inspection file following an AI scan. The orange overlay depicts Fracture Longitudinal (FL) with an AI confidence interval of 97.1 percent.

service connections were frequently coded incorrectly. This was likely because the video recognition software often codes and calls these out ahead of the physical feature in the pipe.

For example, a service connection at STA 0+90 may be identified and recorded by the video recognition AI at STA 0+87, which occurred before the TV operator panned the camera inside the lateral to determine capped or active connections. Additionally, service connections are occasionally missed by the AI review and not cataloged in the pipeline record. These services appeared to regularly correspond with services located between the 11:00 and 1:00 position within the pipeline.

Infiltration sources were sometimes misrepresented and required QA/QC. Normal usage or unidentified service flow from lateral connections was often coded as an infiltration defect. In some instances, turbulent flow conditions within sewers, where flow splashed against the camera lens or pipe walls, were identified as infiltration.

At times, defects were duplicated and the same defect, which was commonly roots, was identified and recorded more than once. This seemed to correspond to defects near lateral connections where the defect was coded prior to panning into the lateral and again after the CCTV operator would pan away from the lateral connection.

Other inconsistencies included the identification and subsequent miscategorization of continuous defects. Often, individual O&M-related deposits or roots were misidentified and assigned a continuous defect rating. This would subsequently report a higher PACP grade for O&M defects than may have been accurate. Other defects followed similar patterns, making the PACP ratings generated after AI-assisted review questionable for a pipeline in which the AI coded continuous defects.

TAKEAWAYS AND LESSONS LEARNED

The accuracy of pipeline observations is critical to driving informed rehabilitation and design recommendations to target areas of need. The results from our work still required QA/QC by certified engineers to ensure accuracy and appropriate design rehabilitations.

A clearer understanding of how AI codes sewer inspection videos will support more consistent inspection records aligned with PACP standards. Consistent CCTV operation during field collection, following PACP guidance, provides uniform data that supports improved AI training and performance. CCTV data collection optimized for AI-assisted review would improve the accuracy of the AI scan, broaden its use cases, and improve efficiency in the field during data collection.

AI-driven data review is not going away. Video recognition and AI software will certainly improve as these programs continue to be tested and applied to real-world applications. We do not expect, however, that AI-driven assessments will replace the operator, engineer, or reviewer but instead they will furnish another tool to improve efficiency, consistency, and accuracy. The rise of AI is ever-present in today's landscape, but human-led review and experience still have immense value and cannot be replaced.

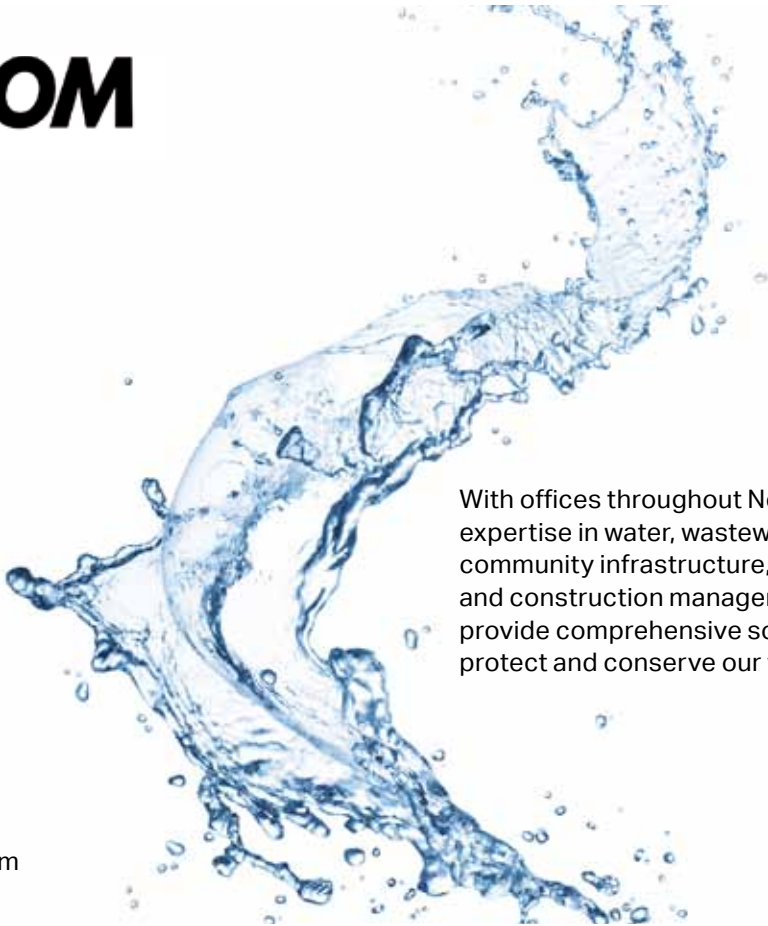
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Criticality analysis for capital planning

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ABSTRACT | The use of Functional Systems Criticality Analysis (FSCA) during water reclamation capital planning offers an innovative approach that can help utilities identify and mitigate asset risk more effectively. The FSCA approach, inspired by Reliability-Centered Maintenance (RCM), adopts a multiple failure scenario approach to risk analysis with a focus on the functional systems of assets. RCM is a risk-management framework used to determine the optimal maintenance strategy for assets. It focuses on preserving the system’s function, rather than just performing equipment repairs on individual assets. It uses reactive, preventive, and predictive actions to maximize the system’s uptime, safety, and cost-effectiveness. The FSCA approach permits the asset portfolio to be evaluated based on real-world behavior, and in significantly less time than is required by an asset-by-asset approach necessary in RCM.

A case study highlighting the use of a risk-informed capital planning approach by the Sewerage & Water Board of New Orleans (SWBNO) during its capital improvement plan (CIP) to mitigate asset risk is discussed in this article. Key terms and principles of asset and risk management are also provided, as well as common misperceptions about defining asset condition. In addition, the FSCA methodology and approach are explained, and the expected outcomes and applications to lifecycle asset management, including the risk-informed capital planning employed by SWBNO in its 2026 CIP, are discussed.

KEYWORDS | Capital planning, criticality analysis, asset management, functional system, critical risk mitigation

A utility’s mission and values are at risk when its critical systems and assets are about to fail. To determine this risk, a likelihood of failure (LOF) is typically estimated, with an associated level of criticality. This estimation should either drive the utility to immediate action for critical assets which pose high risk or, at the other end of the spectrum, allow for a “run-to-failure” approach for low criticality assets. Sometimes, the utility employs a solution in between. To better understand criticality analysis for capital planning, the key terms and definitions used in this approach include the following:

Asset is an item, thing, or entity that has a potential or actual value to an organization.

Critical asset is an asset that significantly affects whether an organization meets its objectives. These assets are necessary to deliver critical processes or services to customers, in which safety, environment, or performance is critical. They can also relate to legal, regulatory, or statutory requirements.

Risk is the effect of uncertainty on objectives, often expressed in terms of a combination of the

consequences of an event, including changes in circumstances, and the associated likelihood of occurrence.

Level of Service (LOS) is a metric of what an organization is expected to deliver daily. The LOS is the reason the assets were built.

Objectives can relate to the values across different disciplines such as financial, public health and safety, worker safety, and environmental goals.

Values influence risk; a change to values changes what poses risk. This implies that risk is not intrinsic to an asset, but rather to expectations.

Functional System is a collection of assets that delivers an LOS or performance objective and is fundamental to establishing asset hierarchies, particularly in plants or facilities. Examples of functional systems in water and wastewater treatment include chlorine storage and feed systems or gravity thickeners. A single loss of a tank, pump, or mechanical asset in either of these systems would result in the failure of that system in delivering its LOS. Therefore, only critical systems can have critical assets.

Probability	
Color	Impact Definition
	Frequent: Two times a year or more, or it faces imminent risk of failure.
	Common: Occurs three or more times in the past five years. Expected to fail within two years.
	Uncommon: Has occurred two times in the last 10 years of service, or once in the past five years.
	Infrequent: Has occurred once in 10 years.
	Rare: Has occurred less than once in 10 years, or it is not expected to fail. New equipment.

Figure 1. Sample rubric of LOF “probability”

Asset Management is widely regarded as the coordinated activity of an organization to realize value from its assets. In this view, a utility derives asset value from a balancing of its costs, risks, and opportunities over a lifecycle period to meet the utility’s performance objectives or LOS. The four pillars of asset management can be explained as follows:

1. Make risk-based decisions to ensure the target LOS
2. Establish a corporate line of sight to the field level
3. Derive maximum value from assets and achieve the lowest cost for the LOS
4. Ensure executive support and sponsorship and provide leadership

When a utility performs a criticality analysis during capital planning, an FSCA will typically achieve the objectives from Pillars 1 and 3 shown above. Additionally, an FSCA will facilitate a utility’s efforts to achieve the objectives from Pillars 2 and 4.

COMMON MISCONCEPTIONS

Cost and condition are not reliable indicators of either criticality or potential risk. An asset in poor condition, for instance, could have little impact on the operation when it fails, yet the failure of an inexpensive asset could have catastrophic consequences. What determines a critical asset in a specific asset portfolio must be uncovered through a structured criticality analysis.

Condition is merely a single snapshot in time of the degree of physical degradation. LOF, on the other hand, includes the rate of degradation and stress, thereby providing an asset’s performance history within its design and operating context. This is

Regulatory Compliance and Environmental Impact	
Color	Impact Definition
	Red: Impacts are severe, immediate, and cannot be mitigated. Examples: Regulatory notice of violation, chemical contaminant, backflow, complete loss of credibility (cannot self-assure anymore), loss of permit flexibility, significant fine, environmental cleanup, ecosystem damage.
	Orange: Major Impacts are immediate, mitigation is limited. Examples: Regulatory notice of violation, loss of many key samplers, disinfection limits not met, extra self-assurance checks to re-establish credibility, environmental contamination.
	Yellow: Significant Impacts can occur quickly or accumulate, mitigation is possible. Examples: Maximum contaminant levels< lesser violations, loss of data for reporting.
	Green: Moderate Impacts and likely can be mitigated. Examples: Missed sample, holding time exceeded.
	Blue: Impacts are minor. Examples: Loss of operational data, loss of non-essential chemicals.

Figure 2. Sample COF category for regulatory and environmental used in criticality analysis

more insightful into lifecycle decision-making in comparison to the current condition. Figure 1 shows an example LOF rubric.

Consequence of Failure (COF) is the impact of an asset’s failure against a utility’s objectives, often across worker safety, public health, customer service, production, and financial considerations. Criticality is therefore an asset’s relative consequence of failure within the asset portfolio. Figure 2 provides an example COF used for determining regulatory and environmental impacts.

FUNCTIONAL SYSTEMS CRITICALITY ANALYSIS

In the FSCA approach, which uses a condition-based LOF, risk is a driver for determining the response to a failing asset. Risk has a short- or immediate-term window. Endemic risk is the historic frequency of failure, namely the number of times an asset or system has failed over time. The difference between endemic risk and short-term risk is subtle, but important. Endemic risk is far more than identifying an impending failure from a failing bearing, for instance. Endemic risk indicates the risk posed by a system of assets employed over time based on their design, operating context, maintenance history, relationship to the rest of the portfolio, level of service requirements, staff culture, skill set, etc.

Endemic risk evaluates if the system and its assets are suitably designed for its intended purpose (i.e., fit for purpose). It considers the full reliability and cost history, and whether it is maintainable in its current state, similar to owning a car that is a lemon. This type of risk perspective is better suited to drive capital investment decision-making. Just because

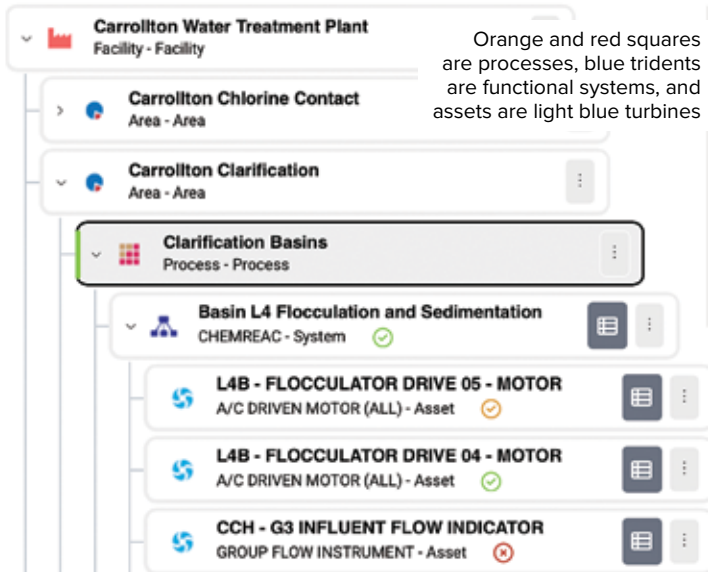


Figure 3. Sample asset hierarchy

a pump is rusty, it does not mean it needs to be replaced; it most likely just needs maintenance to clean off the rust. But if the level of service requirement exceeds its inherent capacity, then a capital decision is required. It is therefore an asset management decision. As such, short-term risk drives the maintenance approach, while endemic risk drives capital investment decisions. During a typical criticality analysis, one objective is to understand how critical or essential the systems and assets are to maintaining and supporting the organization's mission and its values.

Asset Grouping

A functional systems approach to evaluating risk is more accurate than an asset-by-asset approach, since the former approach does not require a complete asset register to evaluate the asset portfolio. Moreover, this approach avoids incorrect risk scoring because only critical systems have critical assets. Additionally, functional systems promote sound asset management by establishing robust parent-child relationships, thereby providing consistency in asset types. Figure 3 shows a sample hierarchy depicting a flocculation and sedimentation basin system and its assets.

Multiple Failure Scenarios

The FSCA accommodates multiple failure scenarios, thereby gauging the risk of multiple assets contributing to a system failure in different ways. This often uncovers hidden risks by leveraging the interrelatedness of assets within a system. As shown in Figure 4, every failure scenario must have a statement that describes the system failure, the loss of function associated with the asset in that system causing the system failure, and the impacts of that failure. Failure scenarios are scored collaboratively

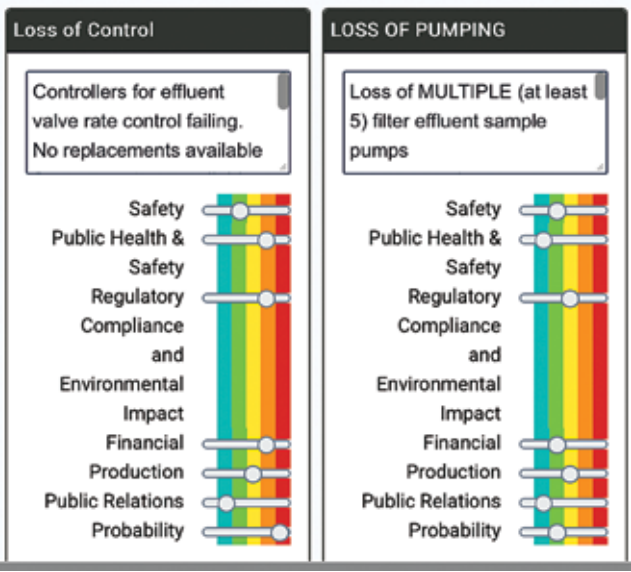


Figure 4. Example failure scenarios

with maintenance, operations, and engineering staff, among other disciplines, as needed. This description is then used to assess and justify the impacts on COF and LOF, which is denoted by "Probability" at the bottom of each column in Figure 4.

More Effective Estimation of Likelihood of Failure

Traditional approaches to estimating LOF can be speculative, as they often lump functional performance with physical condition. As explained earlier, these estimations are only a snapshot of information in time with no insight into either rate of degradation or loss of performance. Moreover, traditional LOF approaches overlook the historical frequency of failure. Additionally, corrective work history in a Computerized Maintenance Management System/Enterprise Asset Management System (CMMS/EAMS) can be limiting if failure codes are not consistently defined or used.

Operations and maintenance staff are inherently familiar with asset operating and performance history. Insights from these individuals can be more accurate about the asset's historical and future reliability than simply guessing when it will fail, providing keen insights into the asset's failure modes, its operating environment (e.g., humidity, corrosivity, dust), stress (e.g., start-stop cycles), repairability, and repair history. Therefore, eliciting this information from staff in a structured manner is far more effective in understanding an asset's endemic risk than a snapshot of condition or operational performance.

Composite Risk Evaluation

A conventional COF framework assigns impacts to failure across various categories of the utility's business including safety, operations, compliance, and finance; it also permits weighting of categories.

However, this approach is intended to capture only one failure scenario, one asset at a time. An FSCA, on the other hand, captures multiple failure scenarios across these categories, reflecting the many ways in which the system of assets actually fails and thereby providing a realistic, composite view of risk. Commercial asset management analysis software such as that used by the Sewerage & Water Board of New Orleans (SWBNO) can provide robust visual solutions for criticality analysis

Competitive asset management software is built from the ground up for criticality analysis that can manage multiple failure scenarios. The example above was for analysis of a nitrification settling tank system. By focusing on the assets driving system failure, this not only permits more targeted mitigations, but saves time from evaluating assets that do not contribute to a failure of the system's LOS.

More Insightful View into Portfolio Risk

After all functional systems in the asset portfolio have been evaluated, they can be ranked by criticality or risk, as shown in Figure 6. User interface screens show bubble groupings (also shown in the figure), which are collections of systems within a similar risk. The larger the bubble, the more systems reside in that risk category. Naturally, it is ideal to minimize the number of systems, but many cannot be reduced as they are simply assumed risk. This implies different lifecycle strategies are needed and, more specifically, that some systems of assets merit more attention and a higher priority when performing capital and maintenance decision-making.

This approach with an effective commercial software solution uses LOF criteria that can be edited. Also, the probability contribution to the overall risk can be adjusted. As with conventional frameworks, COF categories are editable and can be weighted, as well as scaled to accommodate any nonlinear impacts.

There are limitations when performing criticality analysis approaches using existing solutions, particularly with common spreadsheet software.

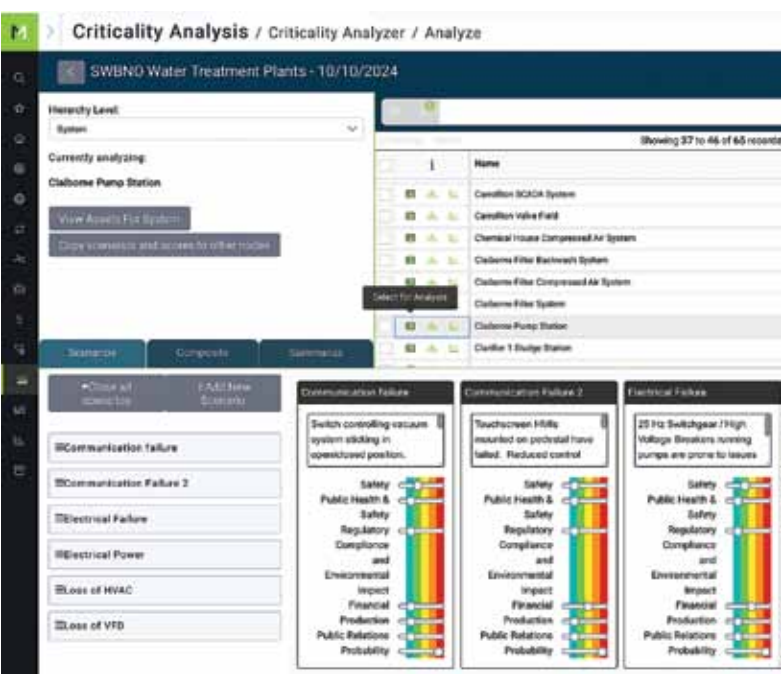


Figure 5. Commercially available criticality analyzer

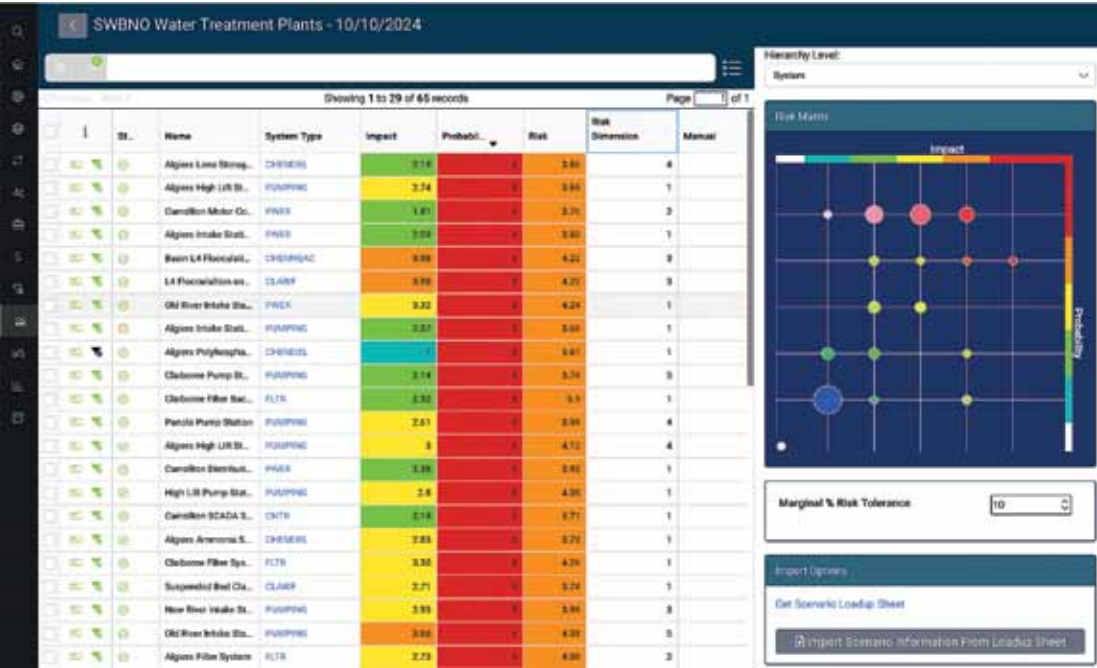


Figure 6. Ranking functional systems by criticality or risk

These limitations can include the following:

- Multiple failure scenarios are challenging for spreadsheet applications to handle.
- Tabular presentation alone lacks visualization of problem systems in the bubble chart, whose bubbles are collections of systems within similar bands of risk (COF x LOF).
- Without a functional systems approach, there is no interrelatedness of assets contributing to system failures. For example, a normal risk assessment of a rusted overhead crane would likely overlook that crane's impact on the

Attention Required

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Associated Scenario	Attention Type	Description
☐ Loss of VFD	Operations	Modify Operations for ideal VFD use. Cycling power on and of...
☐ Communication fail...	Operations	Perform 3 month PM when other pumping stations rehab co...
☐ Electrical Failure	Engineering	Design and replace switchgear
☐ Communication Fail...	Engineering	Engineering to install HVAC system and keep doors closed to ...
☐ Loss of VFD	Engineering	Engineering to evaluate adequacy of HVAC for VFD rooms. M...
☐ Electrical Power	Operations	Replace electrical tracks as part of a rehab CM.

Figure 7. Sample required interventions to inform capital improvement plans

pump whose motor cannot be pulled out for maintenance.

- Lack of a functional systems approach could allow for assets in low-critical systems to be assigned higher COF than assets in high-critical systems, thereby skewing priorities.

OUTCOMES AND APPLICATIONS

The benefits of a criticality analysis are immediately impactful across both mitigations to asset risk and comprehensive lifecycle strategies that inform maintenance, operations, and engineering. Curated mitigations are interventions necessary to address the consequences of the system failure. They can be operational, maintenance, or capital upgrades and address one or several assets driving system failure.

Curated Mitigations

“Attention Required” fields scope interventions to the specific failure scenarios identified, ensuring they are appropriate to the system and the asset’s failure modes. For instance, an intervention on a pump may

include provisioning a spare motor, whereas a screw feeder may entail a new unit or a different design. Additionally, a process change may be necessary to reduce stress on an asset. This sets the basis for comprehensive lifecycle strategies across capital, maintenance, and operations. Figure 7 shows sample required interventions.

Lifecycle Strategies

Risk-informed asset lifecycle strategies provide an immediate benefit to a utility. The asset risk score can facilitate rehabilitation versus replacement decisions, and the criticality score can facilitate the maintenance and inspection strategy. Mitigation strategies may range from routine inspections to run-time maintenance and continuous condition monitoring, with the chosen strategy directly affecting maintenance task selection and frequency.

CASE STUDY APPLICATION

This type of criticality analysis approach sets the stage for risk-informed capital planning. As an example of this approach, SWBNO developed the five-year portion of its water supply capital improvement plan (CIP) on the results of a criticality analysis in 2026. SWBNO identified targeted upgrades to clarification, filtration, and raw water pumping, thereby justifying funding. Project examples from SWBNO’s CIP are shown in Table 2.

Through SWBNO’s analysis, frequent “Attention Required” improvements were identified as minor but necessary intervention. An example is the replacement of effluent flow controllers for the membrane filter system at its Carrollton Water Treatment Plant. The challenge posed for SWBNO was converting the myriad of targeted improvements across the plant into scoped projects. This

required not only pricing equipment replacements and upgrades, but also grouping them by common location and risk, requiring several field visits. The effort resulted in system-specific work packages ranked by asset risk, as shown in Table 2, although it required several months of validation. This provided SWBNO with significant improvements by justifying the needed expenditures within the five-year CIP budget.

By applying criticality analysis to its capital planning, SWBNO has greatly changed its procurement approach by connecting asset risk to project scoping in its near-term CIP. Improved transparency with stakeholders, reduced decision silos, and better use of institutional knowledge related to historical asset performance and organizational risk have enabled SWBNO to develop a CIP that more effectively supports its objectives. This allows SWBNO to maintain service levels, manage risk, and minimize lifecycle costs while providing the transparency needed for senior management and stakeholder support.

SUMMARY

The use of FSFA during the CIP process offers utilities an innovative approach to identify, mitigate, and justify asset risk more effectively. The methodology applies a multiple-failure-scenario approach to risk analysis focused on functional systems rather than individual assets. By evaluating risk based on how systems perform under real-world operating conditions, FSFA enables utilities to assess an entire asset portfolio in significantly less time than a traditional asset-by-asset approach.

SWBNO’s use of an FSFA approach during CIP development helped mitigate asset risk by identifying and prioritizing the capital projects needed to maintain reliable and consistent system performance.

This type of risk-informed capital planning can benefit other utilities that seek to implement and justify capital projects, and maintain their critical infrastructure systems effectively.

Table 2. Project examples from SWBNO 2025 CIP			
Assigned Risk	System	Project	Cost Estimate*
4.38	Old River Intake Station	Replace 72-inch and 48-inch intake pipe	\$3,660,000
4.26	Claiborne Filter System	Replace valve controllers	\$3,000,000
4.25	Old River Intake Station	Annual dredging	\$175,000
4.12	Old River Intake Station	Convert MTS to automatic	\$760,000
4.11	Sycamore Filter System	Replace effluent flow controllers	\$3,000,000
4.05	High Lift Pump Station	Engineering study: valve and leak repair	\$750,000
4.03	Old River Intake Station	O&M investigation	\$30,000
4.02	Algiers High Lift Station 2	Replace six pumps	\$846,000
4.00	Old River Intake Station	Replace drift deflector	\$1,120,000
3.99	Panola Pumping Station	Add sump pump system	\$166,000
3.92	Carrollton Distribution Switchgear	Replace Hamilton Incomer	\$1,102,000
3.90	Claiborne Filter Backwash System	Backwash valve replacement	\$1,568,000
3.90	New River Intake Station	Replace spray water system	\$1,430,000

*Costs shown in this table include contingency, mobilization, overhead and profit, etc., from the individual AACE Class 5 project 2025 cost estimates

ACKNOWLEDGMENTS

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ABOUT THE AUTHOR

John Helwig is corporate discipline leader in asset management for Trinnex and CDM Smith. He has nearly 25 years of experience in engineering design, maintenance, and asset management. John is an officer on the board of directors of the Society of Maintenance and Reliability Professionals, and is a graduate of Tufts University (B.S., Environmental Engineering) and Johns Hopkins University (M.S.E., Environmental Engineering, M.A. International Economics).

Table 1. Sample maintenance strategies				
System Name	Criticality Score	System Asset Driving Results	Asset Issue	Operations Inspection/Monitoring Strategy
Sycamore Filter System	4.79	1. Influent water piping 2. Valve failures 3. Sump pumps	1. Past end of service life 2. Frequent valve failures 3. Power surges cause sample pumps to trip	Continuous condition monitoring
Carrollton Finished Water Storage Tanks	3.02	1. Tank access and guarding 2. Mixing system 3. Tank interior	1. Tank access and guarding 2. No mixing leads to nitrification, wasted water 3. Corrosion of tank interior	Regular condition monitoring
Old River Intake Station Power	3.32	1. Throw switch	1. Old and worn out; tends to trip	Regular condition monitoring
Algiers Finished Water Storage Tanks	2.46	1. No mixing system	1. No mixing leads to nitrification, wasted water	Calendar inspection
Carrollton Distribution Switchgear	2.38	1. Main utility power breaker	1. Hard to replace, near asset life end	Calendar inspection



The useful life of people: Extending the asset management mindset to workforce sustainability

James Courchaine, Utility Leadership and Management Solutions, Cheshire, Connecticut

ABSTRACT | Asset management has long focused on extending the useful life of physical infrastructure through preventive maintenance, condition assessment, redundancy, lifecycle planning, and risk-based decision-making. Yet the same organizations that invest heavily in sustaining assets often fail to apply those principles to the people responsible for operating, maintaining, and leading them. This article introduces the concept of workforce sustainability by extending the asset management mindset to people. Its objective is to help utility leaders recognize that organizational reliability, resilience, knowledge retention, and long-term performance are directly tied to the conditions leaders create for the workforce. The article explores parallels between infrastructure stewardship and leadership responsibility, including early warning indicators, workload concentration, burnout, succession planning, operational resilience, and the consequences of deferred investment in people. It challenges leaders to view the useful life of people as a strategic responsibility essential to sustaining safe, reliable, and effective utility operations.

KEYWORDS | Sustainability, stewardship, leadership, resilience, accountability, recognition, investment, succession, reliability, workforce

Over the past two decades, water and wastewater utilities have made progress in how they manage physical assets. Preventive maintenance programs, condition assessments, risk-based planning, and capital improvement strategies have become standard. Utilities now approach infrastructure with a discipline that reflects its importance to public health, environmental protection, and system reliability. We understand how assets fail. We understand how to extend their useful life. And we understand the consequences of waiting too long to act. But there is another system, just as critical, just as vulnerable, that is not managed with the same discipline. The people responsible for operating, maintaining, and sustaining these systems. While we monitor the condition of pumps, pipes, and treatment processes with increasing precision, we rarely apply the same structured thinking to the condition of the workforce. Workload, fatigue, skill development, and knowledge transfer are often addressed only after they begin to affect operations. This is the gap.

We have learned how to manage the useful life of assets. We have not yet fully applied that same mindset to the useful life of people.

MANAGING PERSONNEL LIKE WE MANAGE ASSETS

We have built discipline around managing the useful life of assets. The same discipline has not been consistently applied to the useful life of people. When viewed in comparison, the gap becomes clear (Table 1).

This is not a theoretical comparison. It reflects two systems that are deeply connected. We do not wait for assets to fail before we act. But with people, we often do.

Early Signals We Often Miss

If we accept this comparison, the next question becomes clear: What are the early indicators that the useful life of people is being affected? Unlike asset failures, these indicators are not always measured. They must be observed. And they often appear long before performance declines or systems are impacted.

Asset Management vs. Personnel Management	
Preventive Maintenance We maintain assets before they fail to preserve performance and extend useful life	People Maintenance We support, develop, and rebalance workload before fatigue turns into burnout and disengagement
Condition Assessment We routinely assess asset condition to identify early signs of deterioration	Workforce Awareness We must recognize early signs of strain, loss of energy, reduced engagement, and quiet withdrawal before they affect performance
Lifecycle Planning We plan for asset renewal, replacement, and long-term sustainability	Workforce Sustainability We prepare for transitions through succession planning, career development, and intentional knowledge transfer
Redundancy (N+1) We build backup capacity so that the system does not depend on a single point of failure	Shared Capability We cross-train, distribute responsibility, and develop multiple people who can perform critical functions
Failure Consequence We understand the operational, financial, and regulatory consequences of asset failure	People Consequence We must recognize the impact of burnout, turnover, and knowledge loss on safety, compliance, and system reliability
Capital Investment We invest in infrastructure to ensure long-term performance and reliability	Leadership Investment We invest time, attention, and development in people to ensure sustained capability and performance

Table 1. Comparison of strategies for managing assets vs. managing personnel

The useful life of people rarely declines all at once. It changes gradually, through patterns that are visible, but often overlooked. They include:

- **Workload Concentration:** The same individuals are repeatedly relied upon to resolve complex issues, take on additional responsibility, and stabilize operations. What appears to be strength is often the early sign of imbalance.
- **Dependence on a Few:** Over time, critical knowledge and decision-making become concentrated in a small number of experienced individuals. The organization continues to function, but with decreasing margin for error.
- **Limited Development of Others:** As experienced individuals carry more of the load, fewer opportunities exist for others to develop. Capability does not expand. It narrows.
- **Quiet Withdrawal:** People do not always leave when strain increases. They often stay, but reduce effort, disengage from problem-solving, and limit their involvement to what is required.

These patterns are not random. They are signals. They appear early, long before failure occurs. Only leaders who are paying attention will recognize them for what they are. Workload. Dependence. Limited development. These are not isolated issues. They are

indicators of sustainability. Organizations that recognize them early can respond early. Organizations that do not will respond later, under pressure, with fewer options and greater consequence. Early signals give leaders choices. Late signals give them consequences.

The Reliable Few

In the case of one utility, a small group of experienced operators had become the default response for nearly every complex issue. They knew the system, understood its history, and could resolve problems quickly. At first, this was seen as a strength. Operations continued without interruption, and difficult situations were handled efficiently. Over time, however, a pattern began to emerge. The same individuals were consistently called upon, while others had fewer opportunities to develop. Workloads became uneven. Knowledge remained concentrated. When one of those experienced operators was unavailable, the impact was immediate. Decisions slowed. Confidence dropped. The organization realized that what had appeared to be reliability was actually dependence. The system had not become stronger. It had become more fragile.

Cost of Ignoring These Signals

When early signals (such as workload imbalance, limited participation, and diminished effort) are not recognized, the organization does not remain stable. It adapts, but not in a way that strengthens it. Work becomes more reactive. Fewer individuals carry more responsibility. And the system begins to rely less on structure and more on effort. At first, the impact is subtle. Deadlines are still met. Compliance is maintained. Operations continue. From the outside, little appears to have changed. But underneath, the margin for error is shrinking.

As workload concentrates and dependence increases, fatigue begins to affect decision-making. Problem-solving becomes more immediate and less thoughtful. Small issues are addressed, but root causes remain. Over time, this creates a cycle. The same problems reappear. The same individuals respond. And the organization becomes accustomed to operating in a constant state of recovery rather than prevention. The risks extend beyond efficiency:

- **Safety** begins to erode when fatigue and repetition reduce attention to detail.
- **Regulatory compliance** becomes more vulnerable when knowledge is concentrated and not shared.
- **Operational reliability** declines as systems depend on individuals rather than consistent processes.
- **Institutional knowledge** is lost when experienced individuals leave or withdraw, taking critical understanding with them.

These are not independent outcomes. They are connected consequences of the same underlying condition. When the useful life of people is not sustained, the systems they manage become more difficult to sustain as well. And by the time these impacts are fully visible, the organization is no longer addressing early signals. It is managing accumulated effects, under pressure, with fewer options and greater cost.

When It Becomes Visible

In the case of another organization, operations had been under increasing pressure for years. Staffing levels remained constant, but demands had grown. A few individuals quietly absorbed the additional workload. From the outside, performance appeared

stable. Compliance was maintained, and work continued to get done. Internally, however, fatigue was building. Small issues were being addressed, but underlying problems were not being resolved. Decisions became more reactive. The shift became visible when a routine operational issue escalated into a larger and more critical event. The response was slower than expected. Communication broke down. Nothing new had occurred. The conditions had been forming over time. The event did not create the problem, it revealed it.

Leadership as the Control Point

The conditions that affect the useful life of people are not accidental. They are created, intentionally or not, through leadership. Workload, expectations, communication, and accountability do not develop on their own. They are shaped daily by how leaders set direction, respond to issues, and follow through. This is why leadership is the control point. It is where conditions are established, reinforced, or allowed to erode. Leaders often focus on outcomes, performance, compliance, and reliability, but those outcomes are the result of conditions that have already been created.

When workload is uneven, when knowledge is concentrated, when development is limited, and when engagement declines, these are not isolated workforce issues. They are signals of conditions that have been allowed to form over time, and those conditions are influenced directly by leadership behavior. Clarity or lack of clarity. Consistency or inconsistency. Support or absence of support. Follow-through or missed follow-through. These are not small differences. They define how people experience the organization.

People do not respond to what leadership intends. They respond to what they experience. This is where the leadership self-awareness gap becomes critical. Leaders may believe they are communicating clearly, supporting their teams, and managing effectively. But if the experience of the workforce is different, the outcomes will reflect that, not the intention.

Addressing the sustainability of people requires more than programs or initiatives. It requires leaders to recognize their role in creating the conditions people work within every day. It requires a shift, from reacting to outcomes to shaping the environment that produces them. Because leadership does

not just respond to performance, it creates the conditions that determine it. If the conditions are not changing, it is because leadership is not changing them.

WHAT IT LOOKS LIKE WHEN IT'S DONE RIGHT

One utility recognized early signs of workload imbalance and dependence on a few experienced staff. Rather than waiting for the issue to grow, leadership made a deliberate shift. Responsibility was redistributed. Less experienced staff were brought into decision-making discussions. Time was created for mentoring and knowledge sharing. Progress was not immediate, and initially work even slowed as more people became involved. But over time, capability expanded. Confidence increased. Decisions were shared rather than concentrated. When challenges arose, the response was not dependent on a few individuals, a broader, more capable team supported it. The system did not rely on effort alone. It was sustained by design.

Integrating People Maintenance into Asset Management

The concept of people maintenance is not separate from asset management. It is an extension of it. Water and wastewater utilities have made progress in developing structured approaches to managing infrastructure. Programs such as CMOM (capacity, management, operations, and maintenance), condition assessment, risk-based planning, and capital improvement strategies have created a disciplined framework for sustaining physical assets over time. But these systems do not operate independently. They depend on the knowledge, judgment, and consistency of the people responsible for them.

Without sustained capability, even the most well-designed asset management programs become difficult to maintain. Integrating people maintenance into asset management requires expanding the definition of what is being managed. It means recognizing that workforce condition is as critical as asset condition.

Condition assessment must include the workforce: Just as utilities assess the condition of physical assets, they must also pay attention to the condition of the workforce. Workload distribution,

fatigue, engagement, and capability are leading indicators of long-term performance. These factors may not appear in traditional metrics, but they directly affect how systems are operated and maintained.

Risk assessment must address single points of failure: Asset management frameworks routinely evaluate risk based on likelihood and consequence. The same reasoning must be applied to workforce dependency. When critical knowledge or decision-making is concentrated in a few individuals, the organization is exposed. Identifying and addressing these dependencies is essential to reducing operational risk.

Lifecycle planning must include people: Utilities plan for the renewal and replacement of assets over time. A similar approach is needed for the workforce. Succession planning, career development, and knowledge transfer are not separate initiatives; they are part of sustaining long-term capability.

Redundancy must extend beyond equipment: The concept of N+1 redundancy is well understood in infrastructure design. Systems are built to ensure that failure of a component does not disrupt operations. That same principle applies to people. Cross-training and shared responsibility ensure that capability exists beyond any one individual.

Performance measures must reflect capability: Utilities track asset performance to evaluate system reliability and efficiency. To fully understand performance, they must also consider workforce capability. Indicators such as workload balance, training progression, and knowledge distribution provide insight into whether the organization is building or losing capacity over time.

Integrating these elements does not require creating entirely new systems. It requires using existing frameworks with a broader perspective, one that recognizes the interdependence between assets and the people who manage them. When workforce sustainability is incorporated into asset management, the organization becomes more resilient. Systems are not only maintained, but they are also supported by a workforce capable of sustaining them over time. This is the next step in the evolution of asset management. Not just managing what we build, but sustaining the people who make it work.

Most problems do not begin when they become visible. They begin when they are first overlooked.

Leadership Reflection: *If these patterns exist in an organization, they are not hidden. They are visible through workload, through behavior, and through how people respond to the work. The question is not whether they are present. The question is whether leadership is choosing to see them. Because what leadership chooses not to see does not stay hidden, it grows.*

Leadership Reflection: *The systems we rely on every day do not determine their own condition. They reflect how they are maintained. The same is true for people. The way people think, respond, and engage with their work is not accidental. It is shaped over time, through expectations, experiences, and leadership. The question is not whether people are capable. The question is whether the conditions around them allow that capability to be sustained.*

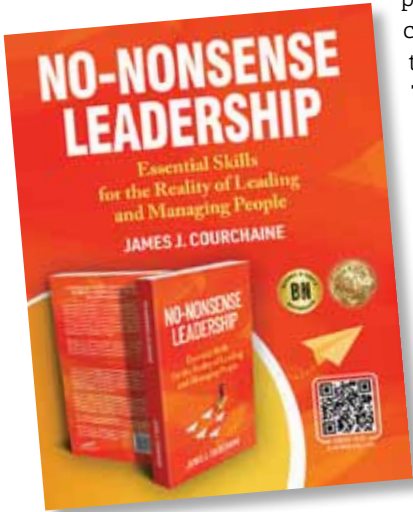
LEADERSHIP RESPONSIBILITY GOING FORWARD

The water and wastewater industry has made progress in managing infrastructure. Asset management practices have improved reliability, strengthened planning, and created a more disciplined approach to sustaining physical systems. The next step is clear. The same level of discipline must be applied to the sustainability of the workforce. The useful life of

people does not decline without cause. It is shaped by the conditions they work in every day. Those conditions are influenced by leadership, through clarity, consistency, support, and follow-through.

This is not a separate initiative. It is not a program to be implemented. It is a responsibility to be carried. Leaders determine whether workload is sustainable, whether capability is developed, whether knowledge is shared, and whether people remain connected to the work they perform.

The systems we rely on every day do not sustain themselves. They are sustained by people, people whose effectiveness, engagement, and longevity are influenced by how they are led.



The principles discussed here are not theoretical. They are grounded in decades of operational and leadership experience across water and wastewater utilities, and are further developed in *No-Nonsense Leadership: Essential Skills for the Reality of Leading and Managing People*. At its core, the message is consistent: Organizational performance is not sustained by systems alone. It is sustained by leadership practices that shape how people experience their work every day. The industry has learned how to manage the useful life of assets. The opportunity now is to apply that same reasoning, intentionally and consistently, to the useful life of people. After all, the sustainability of our systems will always depend on the sustainability of the people responsible for them.

ABOUT THE AUTHOR

James Courchaine has five decades of experience in water and wastewater spanning roles from operator to executive leadership, providing a practical, real-world perspective on the challenges utilities face today. Throughout his career, Jim has delivered more than 900 presentations on leadership, accountability, operation and maintenance, and organizational performance, and he is the author of *No-Nonsense Leadership: Essential Skills for the Reality of Leading and Managing People*. His work focuses on strengthening the systems that sustain organizations, both infrastructure and the people responsible for it.



The Asset Management Committee promotes asset management principles and practices to help utilities make informed, risk-based decisions pertaining to their infrastructure. The committee is composed of utility professionals, consultants, technology providers, regulators, and industry partners who are passionate about improving utility performance through strategic planning, data-driven decision-making, and sustainable infrastructure management.

The committee serves as a forum for sharing knowledge, discussing emerging challenges, and advancing best asset management practices. Through collaboration and industry engagement, committee members develop and deliver educational opportunities including workshops, conference technical sessions, panel discussions, guidance materials, and training resources. These efforts support utilities at all stages of their asset management journey, from establishing foundational programs to implementing advanced risk, capital planning, and performance management strategies.

The committee also works to increase awareness of the value of asset management as a business practice that supports regulatory compliance, financial sustainability, operational efficiency, and long-term service delivery. By fostering connections among utility leaders and practitioners throughout New England, the committee helps utilities learn from one another and build stronger, more resilient organizations.

Annually the committee has highlighted a deserving New England Clean Water utility that demonstrates initiative and leadership in asset management. Recent winners have included South Essex Sewerage District (Salem, Massachusetts), John Jackman, Megan Moir, and the City of Dover, New Hampshire.

Committee Focus in 2026

The Asset Management Committee continues to expand educational opportunities, strengthen industry collaboration, and provide resources that help utilities advance their asset management programs. One initiative has been updating and enhancing the NEWEA Asset Management Committee webpage and Resource Center to provide members with easier access to asset management tools, guidance, presentations, and industry resources.

We also maintain a strong partnership with the New England Water Works Association in planning and hosting the

annual Asset Management & Information Technology Fair. This collaborative event brings together utility professionals, consultants, technology providers, and industry leaders to share practical experiences, emerging technologies, and innovative approaches to asset management and information systems. The event (this year November 2 at NEWWA in Holliston, Massachusetts) continues to be valuable for networking, knowledge sharing, and professional development across New England.

To support ongoing learning throughout the year, the committee invites guest speakers to monthly meetings to present on emerging trends, new technologies, case studies, and industry best practices. These presentations keep members informed about advances in asset management while learning directly from practitioners and subject matter experts across the water and wastewater sector.

Looking ahead, the committee is exploring opportunities to collaborate with the New York Water Environment Association to develop joint programming and educational initiatives. Potential efforts include combining resources and expertise to support future Joint Spring Meeting activities and create additional opportunities for knowledge exchange among asset management professionals throughout the Northeast.

Get Involved with the Committee

The Asset Management Committee is a great networking and information sharing opportunity for both established professionals and emerging leaders interested in infrastructure management, capital planning, operations, maintenance, engineering, technology, and utility leadership.

Members meet online monthly on the third Thursday and participate in various activities throughout the year, including developing conference programming, supporting webinars and workshops, contributing technical resources, and sharing lessons learned from asset management initiatives across New England.

The committee welcomes professionals from utilities, consulting firms, regulatory agencies, technology providers, and other water and wastewater industry organizations. Whether you're new to asset management or an experienced practitioner, joining the committee offers opportunities to collaborate with peers, stay current on industry trends, and help advance asset management practices throughout New England. For more information contact: Eliza Styczynski, committee chair at ESTyczynski@BrwnCald.com.

NEBRA Highlights

This fall, NEBRA's work will be centered on practical responses to fast-moving perfluoroalkyl substances (PFAS) science, federal guidance, and member needs. The updates below highlight regulatory developments, national research, training opportunities, and organizational investments shaping biosolids management across the Northeast.

EPA issues draft guidance for PFOA and PFOS in biosolids

The July 6 Federal Register notice began a public comment period, now ending October 5, on EPA's draft guidance for reducing risks from perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) in biosolids. EPA previewed the guidance for NEBRA and other stakeholders on July 1, acknowledging concerns raised about the January 2025 Draft Risk Assessment and scheduling informal listening sessions for August 12 and 18.

In publishing the guidance, EPA emphasized the value of biosolids recycling, noting that while nearly 60 percent of sewage sludge is land applied, biosolids are applied to less than 1 percent of U.S. farmland annually. EPA also clarified that draft risk-assessment scenarios had been misread as suggesting all biosolids use and disposal practices pose public risk, and dismissed the widely cited 1 ppb concentration as a misinterpretation.

The draft guidance is voluntary and recommends risk-reduction practices rather than limits. For land appliers, EPA suggests avoiding application near fishable waters, drinking-water reservoirs, and areas with higher groundwater risk, and prioritizing lower-exposure crops such as grain, fiber crops, or corn for ethanol. For wastewater facilities and sludge generators, EPA emphasizes source identification, pollution prevention, and monitoring. EPA also encourages sewage sludge incinerator owners to consider performance testing for potential PFAS releases.

EPA is seeking data and comment on improving the guidance and reducing risk, perhaps leading to amendments to the federal Part 503 regulations to address PFAS in biosolids. NEBRA and other regional biosolids associations plan to submit written comments. More information is available through EPA's draft guidance page at [epa.gov](https://www.epa.gov).

NEBRA's President-elect goes to D.C.

NEBRA President-elect Phil Tucker of York, Maine, represented the organization in Washington, D.C., at a workshop marking the close of the Water Research Foundation study *Unregulated Organic Chemicals in Biosolids: Prioritization, Fate and Risk Evaluation for Land Applications*, funded by EPA in 2021. Phil joined NEBRA Research Committee member Kamruzzaman Khan of Hazen and Sawyer and other project

participants to review the study's findings and next steps.

Researchers reported on analytical method development, priority-list development, field studies, and a new risk calculator. The project began with about 910 compounds, including PFAS, and narrowed the list to 124 priority unregulated organic compounds (UOCs), excluding PFAS, based on occurrence, mobility, persistence, bioaccumulation, and toxicity.

The field studies in Virginia and California reinforced several expected patterns in PFAS behavior. PFAS and UOCs tended to accumulate in topsoil, correlate with organic carbon, and vary in mobility by chain length: long-chain PFAS bind more strongly to organic matter, while short-chain PFAS are more mobile. They found that high soil concentrations do not always translate into significant crop uptake. Runoff of PFAS remains an important concern.

Frequently detected compounds included pharmaceuticals, flame retardants, and phthalates. Researchers observed that soybeans did not take up PFOS or N-ethyl perfluorooctane sulfonamide (EtFOSA) precursor compounds, though some short-chain PFAS were taken up. PFAS in secondary-effluent irrigation water appeared more bioavailable than PFAS associated with biosolids.

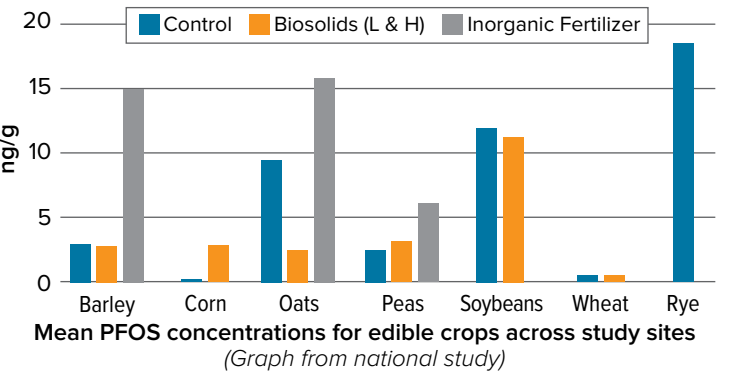
Bench-scale work raised new questions after 20 percent to 80 percent of PFAS appeared to disappear, including about 40 percent during windrow composting. Researchers are working to determine whether PFAS are degrading, transforming, or becoming unavailable or bound in soil.

Dr. Drew McAvoy of the University of Cincinnati demonstrated the "UCL Risk Calculator v6," an Excel-based screening tool that was financially supported by the regional biosolids associations, including NEBRA. The tool uses EPA's CompTox Chemicals Dashboard, EPA's *Exposure Factors Handbook*, and EPA risk-assessment scenarios to model contaminant risks in biosolids. NEBRA looks forward to the final report and public release of the calculator later this year.



National collaborative PFAS and biosolids research project update

Dr. Ian Pepper, Director of the University of Arizona's Water & Energy Sustainable Technology (WEST) Center, and his colleagues continue to advance national research on PFAS fate and transport at land application sites. Phase 1 of the project evaluated indirect exposure to PFAS from biosolids land application across 23 sites in 17 states, including soil, water, and biosolids sampling. A peer-reviewed article on PFAS incidence and mobility was published in January 2026 in *Science of the Total Environment* (National collaborative study on the incidence and mobility of PFAS following land application of biosolids—ScienceDirect). Researchers are calculating soil screening levels using surface and subsurface samples, an important distinction for evaluating groundwater risk. Additional manuscripts are in progress, including work comparing PFAS incidence and mobility by chain length.



Phase 2 of the project turns to crop uptake. So far, researchers have received and analyzed 261 of 285 expected crop samples, representing edible and non-edible parts of alfalfa, barley, corn, grass, oats, peas, rye, soybeans, and wheat. Early results show low plant-tissue concentrations of PFOS, PFOA, and 23 other analytes, with uptake also observed in control plots. Researchers are also seeking additional inorganic and synthetic fertilizer plots after one site showed significant PFAS uptake.

A potential Phase 3 would analyze archived soil and plant-tissue samples for microplastics, now seen as a major emerging issue for biosolids land application. Comprehensive analysis is estimated at about \$1,200 per sample and would require approximately \$500,000 to complete. Interested supporters can contact Dr. Pepper at ipepper@ag.arizona.edu.

Key strategic initiatives in progress

NEBRA continues implementing its 2024–2029 Strategic Plan, which focuses on organization management, finances, membership, advocacy, and branding. Completed initiatives include a membership survey, branding materials, expanded funding, a five-year dues plan, new bylaws, an operating manual, and member networking events. Two major efforts underway are a new website and a new association management system (AMS). The custom AMS integrates email, online payments, accounting, and member management into a cloud-based platform. Rolling out in phases, it will let members sign up for webinars, select email groups, and join committees through a more accessible, mobile-responsive interface. NEBRA expects to launch its redesigned website by year-end.

NEIWPCC and NEBRA webinar series

To help practitioners keep pace with changing technologies, NEIWPCC and NEBRA's Research Committee launched a webinar series on "Reimagining Residuals: Innovations, Impacts and Insights" into the future of biosolids management. The idea was sparked by a conversation with the Region I administrator of EPA, NEIWPCC staff, and NEBRA's Research Committee chair on a visit to a NEBRA member's treatment facility in Maine. Each webinar session combined technical foundations, utility experience, vendor information where appropriate, and discussion of future research needs.

There were six sessions total. The final session, Embryonic Stage Technologies, is on October 7 with TCH/PDH credits available. Prior session topics included dewatering, drying, digestion, incineration, pyrolysis, gasification, hydrothermal liquefaction, supercritical water oxidation, and deep well injection technologies. These recordings are available for a nominal fee. Visit NEIWPCC Training Registration for details.

Building on the "Reimagining Residuals" webinar series, NEIWPCC and NEBRA will be collaborating on a panel discussion at the annual Northeast Residuals & Biosolids Conference on October 30 in Portland, Maine. That panel will bring together utilities, consultants, researchers, technology developers, and regulators to discuss how established and emerging approaches can support practical, resilient, and sustainable solids management into the future. Another NEIWPCC-NEBRA collaboration, the BioHub is intended to develop solutions as a region while improving resource and energy recovery from wastewater solids.

Still time to register for the Northeast Residuals & Biosolids Conference

The 2026 Northeast Residuals and Biosolids Conference, a NEBRA–NEWEA collaboration, will be held on October 29–30 at the Westin Portland Harborview in Portland, Maine. Built around the theme "From Challenges to Sustainable Solutions: The Future of Biosolids in the Northeast." Registration remains open. Learn more and register through the conference page on the NEWEA website. Read more on these topics and stay abreast of the latest biosolids/residuals news and events at nebiosolids.org.

Janine Burke-Wells, Executive Director
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For additional news or to subscribe to NEBRAMail, NEBRA's email newsletter, visit nebiosolids.org



The Stockholm Junior Water Prize

This year's state winners from New England

The Stockholm Junior Water Prize (SJWP) is the world's most prestigious youth award for a water-related science project. National and international competitions are open to young people between the ages of 15 and 20 who have conducted water-related projects of proven environmental, scientific, social, or technological significance. The projects aim to increase students' interest in water-related issues and research, raise awareness about global water challenges, and improve water quality, water resources management, water protection, and drinking water and wastewater treatment.

This year, applications were received from all six New England states. These state winners then participated in virtual interviews with WEF judges to determine which

competitors would move on to the in-person nationals at the Industrial Water Solutions conference in Chicago. Twenty-three finalists representing 19 states, including Ellie Mao of

Connecticut, Victoria Wahlig of Maine, and Jinseo Kim of Rhode Island, advanced to these in-person national finals. Aarush Jain and Soham Kela of North Carolina won this competi-

tion and moved on to represent the United States at the international Stockholm Junior Water Prize competition in Stockholm, Sweden, August 22–27, 2026.

Thank you to the state associations for the continued support and our NEWEA judges—Carina Hart, Tracy Chouinard, and NEWEA SJWP Coordinator Annalisa Onnis-Hayden—for volunteering their time and expertise.



CONNECTICUT

Ellie Mao, Greenwich High School, Greenwich, CT

Field and Lawn Runoff Removal of Nitrates and Phosphates via Fabrication of an Iron and Calcium Fortified Biochar Filtration Material and Pouch

This research introduces a novel solution to combat eutrophication through a filtration device using fortified acorn biochar (FAB) in a water-permeable fabric bag. Dried and crushed acorns were fortified with 15 percent ferric chloride and 15 percent calcium oxide before pyrolyzing at 600°C. The FAB bag is placed in the path of runoff, preventing entry to watersheds. Experiments in free-standing contaminated water showed 92.7 percent nitrate removal and 76.8 percent phosphate removal, or 11.6 mg-NO₃⁻ and 2.9 mg-PO₄³⁻ per gram of FAB. When placed in a pouch, simulated runoff experiments illustrate that nutrient removal improved as flow rate slowed. At typical suburban lawn flow rates (~1.7 ml/min), ~75 percent nitrate removal and ~70 percent phosphate

removal was achieved. Slower flow (0.9 ml/min) increased removal rates to ~82 percent for nitrates and ~74 percent for phosphates. Lifetime studies, measured through repetitive adsorption, demonstrated consistent removal of 1.44 mg of nitrates and 1.35 mg of phosphates per gram of FAB. For lawn use, a 50 lb (22.7 kg) FAB bag can remove 32.4 g of nitrates and 29.3 g of phosphates. In the worst-case scenario, calculations found that one to two 50 lb (22.7 kg) bags are enough to treat nitrate and phosphate runoff.



Ellie Mao

> 1.5 log, and > 1.7 log for Legionella, E. coli, lead, and cadmium, respectively. Mechanism analysis experiments suggested that heavy metal removal is primarily due to chemisorption between natural animal bone chemical components and the heavy metal ions, while bacteria removal is likely primarily due to physical-blocking using bone-powder. Filter hydraulics studies indicated non-linear behaviors. To apply this method into real-world application, three user-centric prototype filters were then fabricated and proven successful through field implementation. This study presents a new approach for nearly-zero-cost, scalable filtration systems tailored towards underserved regions, with broader implications for sustainable infrastructure models worldwide.

MAINE

Victoria Wahlig, Falmouth High School, Falmouth, ME

Quantifying Ship Noise Pollution in Casco Bay and Its Potential Impact on Maine's Blue Economy

A commercial ship is louder than a jet engine. Increasing vessel traffic contributes to underwater noise pollution, particularly in the Gulf of Maine. Maine's "Blue Economy" (fishing, tourism, and shipping) provides \$6.8 billion in yearly revenue and 90,000+ jobs. Underwater noise overpowers communication, with instances of 78 percent declines in fish populations and 30 percent higher mortality for critically endangered whale populations. Underwater noise is under-researched and current regulations are ineffective. In this project, a deployable hydrophone recording system prototype was designed to monitor underwater noise. Recordings were collected along a shipping route through Portland Harbor. Using MATLAB code, signals were analyzed with a Fast Fourier Transform analysis and Welch's method. Results were compared to frequency bands for vulnerable marine species and to controls. Two-sample t-tests were performed to determine significance. Recordings containing ships (n=8) had significantly

greater acoustic energy than control recordings (n=8), with relative mean spectral power increasing from 2.42×10⁻³ (control) to 4.64×10⁻² (ship), a 19-fold increase (p=0.013). Large cargo ship noise produced a 25-fold increase. Energy was significantly elevated in the humpback whale range (80-4000 Hz); 3.80×10⁻² vs 2.07×10⁻³, p=0.012, while increases in the Atlantic salmon, right whale, and Atlantic cod bands were larger but not statistically significant (α = 0.05). The prototype effectively acquired specific data for vessels traversing the Gulf of Maine. This data encourages and evaluates technical solutions for underwater noise, informs regulatory policy, and protects marine life while maintaining Maine's vibrant coastal economy.



Victoria Wahlig

VERMONT

Gavin Blackburn and Cindy Do, South Burlington High School, South Burlington, VT

Phylax

The objective of this study was to identify systemic failures in nuclear groundwater monitoring due to negligence, by detecting radioactive anomalies that bypass current regulatory frameworks, a phenomenon defined as the "0/3 Paradox." Using an Isolation Forest machine learning algorithm, we developed Phylax, a computational sentinel designed to audit federal effluent databases and identify three standard deviation breaches that escape traditional oversight. Results indicate significant detection latencies intensified by a regulatory

shift from quarterly to annual sampling frequencies, which creates massive blind spots in environmental protection. Analysis of the Indian Point and Monticello leaks confirms that manual sampling fails to capture episodic spikes, leading to millions of gallons of contaminated groundwater and localized aquatic mortality. Phylax has reliably detected tritium leaks before the federal government's official detection date in seven out of seven trials. We conclude that current manual reporting is statistically insufficient for real time safety and recommend the immediate integration of Phylax as a proactive, automated layer of defense. By eliminating the detection gap, this scalable framework protects local communities and their drinking water from unpermitted radioactive releases.

MASSACHUSETTS

Ronita Shukla, Acton Boxborough Regional High School, Acton, MA

Enzymes to the Rescue! Novel Enzymatic Processes for Treating microplastics and nanoplastics in aqUatic ENvironments (NEPTUNE)

Microplastics and nanoplastics have been detected across diverse environmental and human matrices, raising concern about inflammation, oxidative stress, cancer and endocrine disruption. There is widespread concern about the increasing

levels of these pollutants in aquatic environments from which they spread and magnify through the food chain. This project visualizes a paradigm for removal of these pollutants from aquatic environments via wastewater treatment using enzymes. The work done demonstrates the NEPTUNE framework in which enzymes that could possibly degrade specific types of plastic polymers are identified from the microbiology literature, experimentally screened and characterized in the lab and finally engineered using AI-assisted molecular modeling packages.

RHODE ISLAND

Jinseo Kim, Portsmouth Abbey School, Portsmouth, RI

A Comparative Study of Microplastic Abundance in Coastal Sediments and Surface Water In Third Beach and Narragansett Bay

In this study, efforts were geared towards quantifying and comparing the concentrations of microplastics present in the surface water and sediment samples in two locations in Rhode Island, each having varying degrees of human activity. Surface water and sediment samples from Narragansett Bay and Third

Beach were studied using a cost-effective and easy detection technique of filtration and Nile red dye stain to determine microplastics. Microplastics were found to be present in higher concentrations in sediments compared to surface water, with Narragansett Bay having higher concentrations and Third Beach having the least. This suggests that microplastics are greatly affected by human activities and are generally concentrated in sediments rather than in surface water. It can thus be concluded that approachable and easy methods of analysis can be used to track trends in microplastics pollution.

Note—photos were not available for the winners from New Hampshire, Vermont, Massachusetts, and Rhode Island

New Members

June – August 2026

YP Spotlight

Paige Sudore is originally from Seattle, Washington. She moved to Tempe, Arizona, to attend Arizona State University, where she earned a bachelor’s degree in environmental engineering and a minor in public service and public policy. After graduating, Paige relocated to Boston, where she has continued to grow professionally at Stantec.

Journal *How did your childhood/community shape your understanding of the environment/water/wastewater/etc.?*

Growing up in the Pacific Northwest (PNW), I was exposed to a lot of nature and rain; as a result water and the environment were always at the forefront of my mind. As a young child I really enjoyed being outside. My family and I would go hiking, camping, backpacking, and fishing throughout the PNW. One of my earliest experiences understanding the importance of clean water was on a long backpacking trip where my family and I relied on a portable water filter to ensure we had clean water on the trail. Through this experience I learned how essential access to potable water truly is and that it is not accessible everywhere. Another memory that I have growing up was waiting for the “creek” to fill up so my sisters and I could play in the water. I learned later in college that the “creek” was actually a stormwater swale. Looking back, it is interesting to realize I was interacting with stormwater infrastructure well before I understood its purpose.

As I got older, community service became very important to me. I was heavily involved in the National Charity League organization. During my senior year of high school, I served as the vice president of philanthropy. In this position I organized our big volunteer event for the year. The event that I organized was helping a local state park. We helped to plant trees, organized a park clean up event, and helped create bird houses. Even though I did not recognize it at the time these experiences cultivated a deep connection to the environment and water, which ultimately guided me to pursue a career that I find both rewarding and vocational.

■ How did you find your way to this industry?

I found my way into this industry during my time in college. When I started school, I did not know where my degree would take me, but I was fortunate enough to get an internship at Stantec the summer before my junior year. I did not know what to expect but quickly became passionate for the work that we do. I find the work very fulfilling and meaningful.

■ What have been the most exciting parts of your job and your involvement with NEWEA?

Since graduating and now working full time at Stantec I have been able to work on amazing projects all over North America. For me the most exciting part of my job has been being exposed to a wide variety of projects. I have had the opportunity to work on water treatment plants, wastewater treatment plants, pump stations, sewer separation, combined sewer overflow, and construction projects. The most exciting part about NEWEA has been the opportunities and people I have been able to meet since joining.

■ When did you first get involved with NEWEA?

I moved to the Northeast last year, and prior to that I was living in the Southwest. I was previously involved with AZ Water so when I moved, I knew I wanted to get connected with a professional organization and chose to join NEWEA and be a part of the YP Committee.

■ What’s your favorite thing about the YP Committee?

My favorite part of the YP Committee is the encouragement and support that it brings to becoming more involved in the organization. When I joined the committee the vice chair position was open, so I jumped on the leadership opportunity. Since being the vice chair of the YPs I have been able to meet so many amazing people, not only on the YP Committee but many other committees as well. Additionally, I was excited to be selected to go to D.C. for the Water Fly-In; this would not have been possible without being part of the YP Committee. Being in D.C. and having a day on the Hill taught me so much about what goes into funding and how policy works within our industry. This opportunity affirmed my passion for water policy.

■ Tell us a fun fact about yourself!

A fun fact about me is that I have been freediving with sharks!



Paige Sudore

Daniel Amelin
City of Somerville
Woburn, MA (PRO)

John Brooks
City of Essex Junction
Essex Junction, VT (UPP)

Cassandra Calabro
Milton, MA (YP)

Joseph Carey
Woodridge Lake Sewer
Plymouth, CT (PWO)

Andrew Carr
NHDES
Franklin, NH (UPP)

Zachary Cronin
City of Portsmouth
Portsmouth, NH (YP)

Megan Cunningham
Flow Tech
Boston, MA (PRO)

Aidan Davie
Weston & Sampson
Readers, MA (YP)

Dan Demers
NHDES
Franklin, NH (UPP)

Daria DiBiasio
Narrabay
Providence, RI (YP)

Ted Diers
NHDES
Franklin, NH (UPP)

Jason Dixon
Anson Madison District
Norridgewock, ME (PWO)

Anthony Drouin
Brown and Caldwell
Andover, MA (PRO)

Mike Dunn
Redmond, OR (PRO)

Andy Duverge
Wright-Pierce
Burlington, MA (YP)

Joseph Forleo
CDM Smith
Boston, MA (YP)

Michael Grega
Littleton Water Department
Littleton, MA (UPP)

Isobel Healy
Boston Water & Sewer
Commission
Boston, MA (PRO)

Lydia Heely
GHD Inc
Barnstable, MA (PRO)

Joe Irving
NHDES
Franklin, NH (UPP)

Paul Kaboub
Inyarek Partners
Dedham, MA (PRO)

Carolynn Kennedy
Littleton Water Department
Littleton, MA (UPP)

Gregory Leger
Littleton Water Department
Westminster, MA (UPP)

Julia Long
NEIWPCC
Lowell, MA (YP)

Tyler Marshall
City of Essex Junction
Essex Junction, VT (UPP)

Erik Milde
Brown and Caldwell
Andover, MA (PRO)

Nargis Mirzaie
Amherst, MA (STU)

Christopher Mulligan
City of Westfield
Westfield, MA (PWO)

Sarah Pedicini
Beta Group
Peabody, MA (PRO)

Rene Pelletier
NHDES
Franklin, NH (COMP)

John Person
Biobot Analytics
Avondale Estates, GA (PRO)

Lilia Pettit
Boston, MA (YP)

William Powers
UNH
Durham, NH (YP)

Scott Ripatrazzone
FR Mahony
Rockland, MA (PRO)

KC Symonds
R.H. White
Auburn, MA (PRO)

Melanie Wannamaker
WM Organic Recycling
Houston, TX (PRO)

Michael Wood
Dover-Foxcroft, ME (PWO)

Samuel Wood
NHDES
Franklin, NH (PWO)

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



Maine State Director Report

by André Brousseau
abrousseau@sanfordsewerage.org



Water! That is our most precious resource that draws many tourists and residents to remote destinations in Maine. The need for water is ever-present, and we as clean water and drinking water professionals ensure delivery around the clock to support the well-known motto, “Maine, the way life should be.”

In this great state, we share, borrow, lend, network, divide, and conquer our challenges together. For the past year, Maine Water Environment Association (MEWEA) has developed a utilities management committee that meets in person a few times year, usually at a local brewery to relax and bounce ideas off each other. Subjects can range from rates to specific policies one may share or need. The initial group decided to keep it small, so only one manager/supervisor or delegated staff member from each facility attends. When we are not meeting in person, email chats are flying. The gatherings yield some wicked good conversations.

Maine has great energy coming out of the Operations Challenge team, Force Maine. The team thrives despite the challenge of staying together when the members work for different, geographically spread employers (York, Wells, Bethel, Brunswick, and Scarborough). That is not easy, but it seems like it's the Maine way, since that is how it was when I competed (with Pump Fiction) back in the late 1990s, and the tradition goes back to the Maine teams (including the Mainely New Englanders and the Maineiacs) who competed in the 1980s. The Force Maine team continues to generate extra support, including a fundraising event at the local Portland Mainers hockey game where over 100 tickets were sold to clean water professionals with proceeds offsetting future team travel expenses. The event brought together many MEWEA members with some volunteering at the concession booth to help offset the tickets prices, and our very own president, Rob Pontau, dropped the first puck. Force Maine recently demonstrated a few Ops Challenge events during the clean water week at the local high school in York. After the event, the team opened the collection event, inviting students to try cutting pipes. What a great way to introduce the students to the clean water industry.



The Operations Challenge team Force Maine at the 2026 Rhody Rumble

The clean water week also brought a handful of us to Washington, D.C., for the celebration of clean water. We had successful meetings with Senator Collins, Senator King, and staff members from the offices of representatives Pingree and Golden. One point coming from Senator Collins was to make sure your community is prepared to contribute mandatory matching funds when applying for Congressionally Directed Spending grant awards. Senator Collins is the chair of the Appropriations Committee, and it frustrates her efforts when communities are not providing the matching funds, and thereby negating the grant.

During the visit, Senator Collins also had a personal question about a lack of drinking water at her home in Bangor, when at one point her well pump malfunctioned during a large gathering. While she found a plumber to save that event, the senator asked Amanda Smith, who runs the Bangor clean water facility, if municipal sewer and water could be extended to her home. I pointed to a “Water's Worth It” sticker on my business folder and asked her whether water was



The Force Maine team continues to find ways to generate extra support, including a fundraising event at the local Portland Mainers hockey game where over 100 tickets were sold to clean water professionals with proceeds offsetting future team travel expenses.

worth it that night. The entire group erupted into laughter as she said water was *well* worth it that night.

Our group then attended a wonderful Tuesday night gathering of hundreds of water professionals at DC Water for an evening of networking, light hors d'oeuvres, and cocktails. I was amused at the starstruck attitudes from our colleagues from the Midwest upon meeting Amanda Smith, who had a small cameo in the widely distributed documentary “Unless something goes terribly wrong.” They peppered the surprised Amanda with questions while our own Scott Firmin (who starred in the film) was left to the wayside for a change. We are honored to have had the documentary made here in Maine, featuring the wonderful clean water professionals at the Portland Water District, and it's a pleasure to see our local managers traveling the country to speak on behalf of our industry after the viewings.

One water! We practice that here in Maine. Over 275 water professionals from the Maine Water Utilities Association (MWUA) and MEWEA members gathered at Delta Dental Park (at a Portland Sea Dogs game) in June, and the groups were recognized before and during the ball game. Keith Levasseur, vice president of MWUA joined MEWEA president Rob Pontau to throw out the first pitch. Rob and Roger Crouse did radio interviews during the third inning highlighting our profession. There was also a joint summer outing in August coordinated by MWUA at the Lost Valley Ski area in Auburn. MWUA annually invites partnering organizations to join this event that starts off with a technical session from 8–10 AM followed by a day of summertime food and

fun with live music, wonderful surf and turf, hot dogs, and hamburgers. The cornhole tournament is a big draw while a scavenger hunt provides an entertaining opportunity to seek unknown prizes. It was a great time.

MEWEA kicked off its annual fall conference on September 16 with the golf tournament at the Sunday River Golf Club. The conference held dozens of technical sessions on the following two days. Among other subjects, there was discussion of how biosolids disposal is getting minor relief in Maine, although the battle continues over the proposed expansion of the Juniper Ridge landfill, which the Penobscot Nation understandably opposes due to leachate handling. We are, however, excited that Waste Management's Crossroads landfill in Norridgewock now accepts residuals from a handful of Maine communities. MEWEA also continues to support other future developments under discussion in southern Maine.

The fall conference included an awards event recognizing the outstanding efforts by professionals throughout the state. The highly competitive cornhole tournament followed; for 10 years it has drawn dozens of attendees to throw a few bags. It's quite the scene observing multiple games simultaneously taking place for a few hours in pursuit of the annual championship. These recreational networking events are valuable for idea sharing, recognition, and camaraderie among the hard-working members of our often thankless profession.



Vermont State Director Report

by Jennie E. Auster
jennifer.auster@wright-pierce.com



As my term as NEWEA's Vermont director finishes, I thank the Vermont clean water community for the opportunity to serve in this role. Vermont is a small state within NEWEA, but our operators, engineers, regulators, and utility staff have never been small in their contributions, and representing them at the regional level has been a privilege.

I'm grateful to NEWEA for the chance to work alongside the other state directors and committee volunteers across New England. These connections have been valuable both professionally and personally, and they've given me a clearer picture of how much this six-state association depends on collaboration among member states, large and small.

Thank you to Vermont's members for their support during my term, and to NEWEA's leadership and staff for their work behind the scenes. It's been an honor to serve.

GMWEA Spring Meeting

Thank you to everyone who joined us in Killington for our Spring Meeting on May 21, 2026. It was a great day of valuable technical sessions on drinking water, wastewater, and stormwater; networking opportunities with peers and vendors; and celebration of our award winners. Special thanks to the Continuing Education Committee for organizing a diverse program. Green Mountain Water Environment Association (GMWEA) elections were held in May for the following roles:

- President – Harry Shepherd, Town of Stowe
- Vice President – Jeremy Rathbun, Vermont Mechanical, Inc.
- Second VP – Jennie Auster, Wright-Pierce
- Past President – Christina Adams
- Secretary – Amy DeCola, Wright-Pierce
- Director – Christine Dougherty, Town of Williston
- Director – Matt Guerino, Champlain Water District

At the Spring Meeting, Vermont's lieutenant governor issued this proclamation, read during the meeting:

"WHEREAS, Vermont is blessed with abundant lakes and streams, including Lake Champlain, a world-renowned, international freshwater ecosystem of great beauty and significance; and

WHEREAS, Vermont citizens rely on clean surface waters as sources of water for drinking, recreation including swimming, fishing, boating, and more; and WHEREAS, clean water is critical for the health of wildlife and the ecological systems of the Green Mountain State, and WHEREAS, the stormwater, wastewater, and drinking water systems in communities around Vermont are the first and most critical protections and barriers against water pollution to protect the public health and the environment; and WHEREAS, the stormwater, wastewater, and drinking water systems and the staff that operate them—24/7, 365 days a year, collaboratively with the assistance of State and Federal partners, the GMWEA, and VTRWA—are public servants dedicated to protecting public health and the environment and deserve the understanding and support of the Vermont citizenry; the Lieutenant Governor of the State of Vermont honors them with this proclamation."

GMWEA Annual Awards

Please join us in congratulating the following award winners, recognized at the 2026 Spring Meeting:

- *President's Award*: Karen Horn
- *Wastewater Operator Excellence Award*: April Busfield, Town of Canaan
- *Stormwater Award*: Christine Dougherty, Town of Williston
- *NEWWA State Leadership Award for Vermont*: Matt Guerino, Champlain Water District
- *Wastewater Facility Excellence Award*: Cavendish Water and Sewer
- *Michael J. Garofano Operator of the Year*: Leslie Gardner, Grand Isle Fire District
- *Corporate Sponsor of the Year*: PW Tech
- *Andrew D. Fish Laboratory Excellence Award*: Mark Breznick, City of Rutland



2026 George Dow Golf Tournament It was a fun day for the for the teams "competing" at the annual George Dow Golf Tournament at Cedar Knoll Country Club in Hinesburg on August 7. The tournament was a great opportunity to see our colleagues and enjoy the beautiful Vermont summer! (Amy DeCola, Griffin Parodi, Mike Orr, and Matt Dow pause for a team photo)

- *Elizabeth A. Walker Meritorious Service Award*: Joe Duncan, Champlain Water District
- *Bob Wood Young Professionals Award*: Tyler Sullivan, Village of Essex Junction
- *Bob Wood Young Professionals Award*: Victoria Beloin, Village of Ludlow

Operator Exchange: Vermont Operators head to MAWEA Spring Trade Show

In May, Vermont operators Tori Beloin and Alex Beloin headed to Massachusetts to attend the Massachusetts Water Environment Association (MAWEA) conference. We give a special thank you to John Downey, Kelly Olanyk, Denise Descheneau, Joseph Parker, Peter Lyons, Quinn Lonczak, Rudy Schoonover, Reed Martineau, Jake Peterson, Rey Roman, Carina Hart, and Shane Moody for being such excellent hosts.

The program was fantastic, from the wonderful hospitality, great food, and great folks they met. Tori and Alex had a packed itinerary and toured Northampton, Chicopee, Springfield, Sturbridge, and Upper Blackstone clean water treatment facilities. They reported back on all the innovative elements they saw at these facilities. They also

enjoyed participating in a pipe-cutting contest put on by Mass Chaos (the Massachusetts Operations Challenge team).

GMWEA is looking forward to hosting the Massachusetts visiting operator at our Fall Tradeshow in November.

Upcoming GMWEA Events Fall Tradeshow, DoubleTree Hotel in South Burlington, November 5

- Each fall, over 400 water, wastewater, and stormwater professionals, water quality technology and service providers, Department of Public Works (DPW) administrators, staff from nonprofit organizations, and state agency administrators convene at the DoubleTree Hotel. After a night-before welcome session in the exhibit hall, they attend six hours of training sessions, tour over 90 vendor exhibits, eat a delicious lunch, and hear distinguished speakers from Vermont and throughout New England. Trainings and speakers vary from year to year, depending upon member preferences.
- GMWEA's Continuing Education Committee seeks papers for presentation at the Fall Tradeshow.



Connecticut State Director Report

by Jeff LeMay
jeff.lemay@glastonbury-ct.gov



Greetings from the Connecticut Water Environment Association (CTWEA) and the state of Connecticut. I hope that the summer treated everyone well and provided a much-needed break from the rigors of life as a clean water professional. With hurricane season upon us, I wish you all the best of luck in dealing with these challenging times. I have no doubt that you will all persevere in providing your critical services to your communities. Without further ado, let's look at what Connecticut has been up to.

Wastewater Forum and Exhibit

The 2026 CTWEA Wastewater Forum and Exhibit was held on May 8 at the Aqua Turf in Plantsville. As usual this event was very well attended. The event included our annual business meeting, where Kat Young of H2M and Zach Lamoureux of Carlsen Systems were elected as new board members. In addition to being newly elected directors, Kat also chairs the Small Communities & Collection System Committee, and Zach is heavily involved with Ops Challenge. Rounding out this year's slate of nominees are our very own CTWEA President, Ben Levin, and Tom Sgroi, Director of Engineering for Greater New Haven Water Pollution Control Authority. Ben and Tom have been key contributors to CTWEA since its inception, and we could not be happier to have them both locked in for three more years. I would be remiss not to take an opportunity to thank Norb Church, who stepped down from his director role this year. Norb will continue to chair the Bylaws Committee and to be involved with the Legislative Committee as well. The time and effort Norb has put into CTWEA have been truly inspiring, and we look forward to continued work with him in his committee roles.

Melissa Biggs, lobbyist for our organization, was in attendance to give a summary of what turned out to be quite an eventful legislative session. Ivonne Grajko Hall of Connecticut Department of Energy and Environmental Protection spoke about the status of the Nitrogen Trading Program and provided very useful guidance for Clean Water Fund applications. Technical sessions on Cyber Security, Artificial Intelligence in Collection Systems, and Septic systems rounded out the program. The Ops Challenge team thrilled us with a lab testing/pipe fitting event that had all on hand on the edge of their seats! We also



Kenneth Crowther offers a lively presentation on cybersecurity

give a special thanks to all those who participated, including our sponsors and all the vendors in attendance.

Awards and Scholarships

This year five \$1,000 scholarships were awarded at the CTWEA Wastewater Forum and Exhibit. The following students were recipients:

- Milo Burch, Manchester – college undecided
- Eden DeRosa, Bethel – college undecided
- Faith Kalisz, East Haddam – University of Maine
- Ethan Rich, Wallingford – University of RI
- Aaron Rich, Wallingford – University of RI

The 2025 CTWEA Award winners were also announced at this event:

- Eric Hooper, Town of Manchester
Operations Leadership Award
- Joseph Carey Jr., Town of Litchfield
Laboratory Excellence Award
- Christopher Findley, Greater New Haven WPCF
Safety Award
- Rob Butler, Town of Manchester
Operations Service Award
- Conrad Gale, Town of Stafford
Collection system Operator Award



The Sludge Hammers team at the 2026 Rhody Rumble

Sewer Open

The 2026 CTWEA Sewer Open on June 5 featured a great turnout and perfect weather. Thirty-three teams competed for the title and bragging rights. Congratulations to the winning team of Larry Murphy, Larry Sullivan, Russ MacGregor, and Ian Gervais. A special thanks to Mike Spring for his amazing photography. This tournament is a key fundraising event for CTWEA. This year \$4,250 was raised toward the CTWEA Scholarship Fund, and over \$5,000 for the Ops Challenge team. Another thank you goes to all the sponsors and participants who always make this such a wonderful event. Last, but certainly not least, a big shout out to the Sewer Open Committee—Craig Burmeister, Vanessa McPherson, Bridget Buckley, Zach Lamoureux, Ray Bahr, Ray Weaver, Kat Young, and Pat Rimkoski.

Ops Challenge

The CTWEA Ops Challenge team, the Sludge Hammers, had an excellent showing at the NEWEA Spring Meeting competition. This year the team consists of Kevin Mauricin (Norwalk), Graydon Stewart (Simsbury), John McLaughlin (Inframark – Bridgeport), Brendan Gandeck (Manchester Clean Water), and Michael Cera (Norwich). I am excited to announce that the Sludge Hammers will compete as a NEWEA team at WEFTEC this fall. Congratulations and good luck to the Sludge Hammers. Thank you to Zach Lamoureux, Jason Nenninger, Uday Karra, and Rick Hartenstein for their hard work and dedicated support of our Ops Challenge Team.

2026 Operator Exchange

Connecticut is paired with Maine for the 2026 Operator Exchange. The Maine visit took place from September 16–18, where the lucky Connecticut participant visited five Maine treatment plants and had the optional of participating in the golf tournament and Maine Water Environment Association



Cheryl Rourke awarded for straightest drive on hole 18

fall trade show. The Maine visitor to Connecticut will also enjoy five plant tours, with the visit culminating in the 2026 CTWEA Fall Workshop.

Legislative Update

Connecticut had a busy legislative year. House Bill 5503 – An Act Requiring Municipalities to Report Excess Wastewater Capacity, was of particular interest to our organization. After meaningful conversation with legislative staff, this bill was dropped, as both sides agreed that the language put forth would not be helpful in gathering the collection system data that the legislation intended. House Bill 5502 aimed to make changes to the Sewage Right to Know reporting requirements. Included in this bill was language requiring municipalities to post incident-specific signage for each event. CTWEA was against this bill, as the time and labor in creating and posting these signs would take valuable resources away from fixing the issues at hand. After some discussion this also failed to pass. CT DEEP continues to work on a PFAS General Permit for monitoring at Connecticut treatment facilities. It has released the draft of a PFAS roadmap, and we will meet with DEEP staff to discuss it and provide input during the public hearing.

Upcoming Events

- **Fall Workshop**
October 9 at the Aqua Turf in Plantsville
- **Operations Forum**
February 24 at the Aqua Turf in Plantsville



Massachusetts State Director Report

by Peter Lyons
plyons@woodardcurran.com



Hi NEWEA! Massachusetts has been through a busy spring and summer. With most of our major events occurring during this span, I'm pleased to report on all the fantastic items we have been working on.

Government Affairs: D.C. Fly-In and State Level

A group of water and drinking water professionals participated in the National Water Policy Fly-In. We're thankful to our partners at Mass Water Works Association and New England Water Works Association for helping to coordinate the event and outreach to the Massachusetts Senators and Representatives. We met 10 of the 11 members of the Massachusetts federal delegation. Talking points included the State Revolving Fund (SRF) program, PFAS and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) protections for utilities, low-income household water assistance programs, and, of course, the Wippes Act (Wastewater Infrastructure Pollution Prevention and Environmental Safety Act). Our federal delegation generally supported these requests, the most politically concerning seemed to be the CERCLA protections. The congressional staff were particularly attentive to perspectives shared by utility directors and public employees. As a result, we hope to increase participation from these professionals next year. We all know that budgets are tight around the state, and one way that Massachusetts Water Environment Association (MAWEA) assisted in this challenge was funding two applicants to attend the event. Please look for an email toward the end of 2026 if you'd like to attend in 2027. Some of us were lucky enough to ride the mystical underground subway system via chaperon from one of Congressmen Keating's aids.

Another government affairs concern is one that came up while planning our annual event with our local representatives at the Massachusetts State House. This event has not been well attended over the last



NEWEA members: Paul Ferland, Peter Garvey, John Digiaco, Colin O'Brien, Daphne Short, and Chris Brainard meeting with Congressman James McGovern (center) at D.C. Water Policy Fly-In

number of years, and MAWEA has tried to revamp this campaign. We are tracking a number of bills at the state level, including S3034, which includes land application restrictions and PFAS provisions. It appears that this bill will be reintroduced in 2027. Some are concerned that as a result of this bill biosolids disposal capacity may be reduced with the closure, reduction, or moratorium of various disposal facilities. However, the big elephant in the room is the state of the SRF program and its funding levels for both clean water and drinking water.

Annual Operator Exchange

Massachusetts hosted Vermont this year, welcoming two operators, Alex and Tori Beloin. Many thanks to the facilities that opened their doors so we could ask questions, learn, and connect. During three days in late May, we toured facilities in Northampton, Chicopee, Springfield, Sturbridge, and Upper Blackstone before concluding at the MAWEA Annual Trade Show at Wachusett Mountain. As part of the exchange, a Massachusetts operator has been selected to travel to Vermont for two days of plant tours, followed by the

Green Mountain Water Environment Association Annual Trade Show in Burlington. Next year's exchange will be with Connecticut, so watch for emails inviting applicants for the opportunity to visit the Nutmeg State.

Spring Meeting and Annual Trade Show

On March 25, MAWEA hosted its well-attended spring meeting at Devens Common Center, where attendees earned three TCHs. The technical program, provided by Fuss & O'Neill, discussed asset management, drinking water corrosion inhibitors affecting wastewater treatment plants, monthly operating report and discharge monitoring report data management, and seasonal temperature impacts on wastewater treatment plants.

On May 29, MAWEA held its annual trade show at Wachusett Mountain. Attendees earned 2.5 TCHs visiting the 40 vendors who attended. Presentations from Tighe & Bond, Brown & Caldwell, and the Massachusetts Department of Environmental Protection highlighted the conference. A shoutout is due to the Operations Challenge team MASS CHAOS, out of Springfield (Veolia), which attended the conference and (just days after leading our tour of the plant) put on a rigorous but not-too-dangerous PVC pipe cutting event. Over a dozen brave souls wielded the saw, but former Operations Challenge champion Eddie Davies took home the prize of fastest cut at just under 30 seconds. At the luncheon, John Downey (Veolia) was presented with the Charles W. Tyler Service Award, Aimee Wendolowski (Crane Currency) won the Laboratory Analyst Excellence Award, and Samuel Stevens (Montague Clean Water Facility) won the Operator of the Year Award.

Congratulations to MASS CHAOS on making their way back to the National Operations Challenge by qualifying at the NEWEA Spring Meeting competition; they will undoubtedly showcase their skills and make Massachusetts proud.

Annual Golf Tournament

On June 10, MAWEA hosted its annual golf tournament at Heritage Country Club in Charlton. This continues to be an amazing event with a lot of PGA tour-level play. Many prizes were awarded, and the steak dinner and raffle continue to steal the show.

Upcoming Events

Through the hard work of the MAWEA president, Denise Descheneau, and our board of directors, several events remain on the calendar:

- Week of October 12 (Imagine a Day without Water Week), various locations across the state - Screening of the treatment plant documentary film, *Unless Something Goes Terribly Wrong*
- October 20, Fall Meeting—Hands-on pump training in Foxborough, co-hosted by Pare Corporation. Penn Valley Pump with its local representative, New England Environmental Equipment (NE3), will describe pump concepts and will perform a live O&M demonstration on a double-disc pump.
- Schedule TBD—State Point Analysis Training by Paul Dombrowski of Woodard & Curran
- December, Virtual Winter Meeting—Presentation on SRF funding



Aimee Wendolowski, MAWEA Laboratory Analyst Excellence Award recipient



Samuel Stevens (Montague Clean Water Facility) MAWEA Operator of the Year Award recipient



MASS CHAOS at the 2026 Rhody Rumble



Rhode Island State Director Report

by Laura Marcolini
Laura.Marcolini@fando.com



Since the spring *Journal* director report, Rhode Island Clean Water Association (RICWA) contingents visited our federal delegates at the Water Policy Fly-In in Washington, D.C., and a large part of the summer RICWA effort was concentrated on planning for our August 27–28 combined 26th Annual Tradeshow and 2nd Annual Regional Operations Challenge event (the Rhody Rumble) which was held to provide our New England teams a venue for late-stage practice and preparation for the WEFTEC technical conference and national Operations Challenge competition, held on September 28–30.

Government Affairs: D.C. Fly-In

On April 14 and 15, a Rhode Island delegation of water and wastewater professionals participated in the D.C. Fly-In. Water advocates Stephen Soito and Stephen Coutu from RI Water Works joined us in our “One Water” objectives. We met with Senator Jack Reed and Senator Sheldon Whitehouse’s environmental staff and both congressmen Gabe Amo and Seth Magaziner. We conveyed the importance of and appreciation for federal funding, including congressionally directed spending (CDS) grants and State Revolving Funds (SRF). Technical discussions included the Wippes Act, the evolving issues associated with biosolids and residuals use and/or disposal, cybersecurity, and of course PFAS. We offered each delegate and office staff tours of Rhode Island water recovery facilities during our open-house events this spring and had lively participation from our federal delegates.

RICWA’s new Government Affairs Committee has been busy:

- We met with Senator Whitehouse in late July 2026 to discuss the issue of liability under CERCLA for passive receivers of PFAS. In addition to RICWA board members, Joe Habereck of Rhode Island Department of Environmental Management attended.
- We are through the legislative season and the most impactful law that passed established a joint Sludge Study Commission, H7532Baa. The final version increased the study commission to 21 members and extended the reporting deadline to April 2027, sunseting the commission in June 2027. The commission is waiting on

appointments by the Speaker of the House and the senate president. The original intent was to start meetings in August 2026.

- We discussed developing a survey of water resource recovery facilities (WRRFs) on biosolids management to supplement our management of topical data.
- We are tracking expanded outreach/education efforts and opportunities to work with Blackfly Media.
- We have discussed hosting tours of clean water facilities for new legislators in the fall.
- A GAC webpage will be established on RICWA’s new website. We made a LinkedIn post during the legislative season.

WEFTEC Operations Challenge and Operator Exchange

Operators from Rhode Island and New Hampshire “exchanged” positions during each state’s annual trade show. Russell Sargent, treatment operations foreman at the Pease wastewater treatment facility (WWTF) in Portsmouth was the New Hampshire Water Pollution Control Association-sponsored operator visiting Rhode Island during our late August fall trade show. Natalie Deshaies, Operator 2 in Wolfeboro, New Hampshire, joined us, as her employer Woodard & Curran sponsored her participation. When it comes to operator interaction, the more the merrier.

Congratulations to Operations Challenge team RIsludge on qualifying to compete in Division 1 at WEFTEC in New Orleans representing the Rhode Island Clean Water Association and NEWEA



RICWA golf tournament committee members and event volunteers

nationally. The national competition fields over 50 teams performing five classic Operations Challenge events, each testing a different aspect of work in the wastewater profession: process control, laboratory, safety, collection systems, and pump maintenance.

Congratulations again to Rising Sludge for placing 2nd at the competition at NEWEA’s Spring Conference. The 2026 team includes: Peter Rojas, coach/captain (Veolia Cranston WWTF), Shaun Collum (Narragansett Bay Commission Bucklin Point), Courtney Iava-Savage (Inframark), Eric Lemoi (Wright-Pierce), and Alex Medeiros (Rhode Island Resource Recovery Corporation). We appreciate their commitment to competition, comradery, and promotion of the clean water industry.

Academic Scholarship Winners

RICWA is pleased to announce awarding three \$1,000 academic scholarships to college students, sponsored by our members and fundraising. Congratulations to our 2026 scholarship recipients: Jennessa Zillich, Karilton Lough, and Tommy Connell. Visit ricwa.org for more information on our scholarship program.

Professional Development and Licensing Preparation

RICWA is partnering with Community College of Rhode Island and state regulators to provide operator education via formal courses/classes. We envision participants will benefit from preparation for operator certification, and, potentially, internships will develop from this program.

RICWA Events and Happenings

With WEFTEC in the rear-view mirror, RICWA’s slate of calendar events will be winding down for the season with the final event for 2026, our December 4 Annual RICWA Holiday Party, Food Drive, and Election of Officers. We encourage anyone who is interested in becoming a member of RICWA or NEWEA to join us at this or any of our scheduled events.



Dave Bruno attempts to coax a putt home

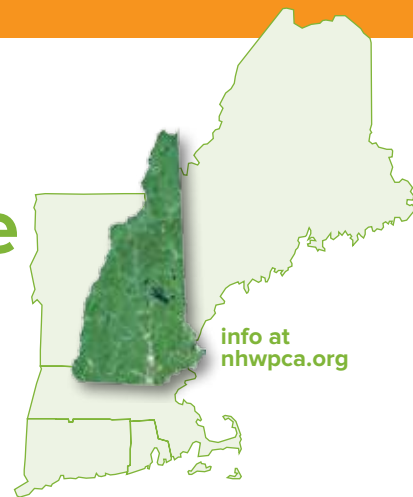


The Rising Sludge team: Peter Rojas (coach/captain), Shaun Collum, Courtney Iava-Savage, Eric Lemoi, and Alex Medeiros



New Hampshire State Director Report

by Tracy Wood
tracy.wood@des.nh.gov



IN CONSIDERING WHAT TO WRITE ABOUT for this issue's theme of asset management, I kept coming back to one topic: the workforce. Hardly a day goes by that I don't hear about a wastewater treatment facility struggling with proper and adequate staffing. In New Hampshire and across the region, we continue to feel the impact of the "silver tsunami" of retirements and hear the recurring question, "What is New Hampshire Department of Environmental Services doing about workforce development?" While it's a fair question, no single agency or organization can solve this challenge alone.

I find it encouraging that one of this issue's feature articles also explores the workforce development theme, as it reflects a growing recognition that investing in people is just as important as investing in infrastructure, and that a stronger, more resilient workforce is fundamental to the future of our industry. Workforce development is an industry-wide responsibility. Utilities, regulators, educators, and professional organizations all have a role to play, and lasting solutions will come only by addressing the root causes of today's workforce challenges.

Workforce: The most critical asset in wastewater infrastructure management

When discussing wastewater asset management, the conversation often centers on physical infrastructure—piping, pumps, motors, blowers, clarifiers, digesters, chemical feed systems, electrical equipment, instrumentation and controls, and buildings and structures. Although these assets represent a large public investment, they have little value without the skilled workforce to operate, maintain, and optimize them. The most important asset in any wastewater utility is not its equipment, it is its people. Certified wastewater operators, maintenance technicians, electricians, instrumentation specialists, laboratory personnel, engineers, and supervisors provide the knowledge, experience, and judgment to ensure infrastructure performs as designed, regulatory requirements are met, and public health and the environment remain protected. Without a competent, trained, and adequately staffed workforce, even the most advanced treatment facility cannot consistently achieve these objectives.

Asset management is more than equipment

Asset management is commonly defined as the systematic process of operating, maintaining, upgrading, and replacing assets cost-effectively over their life cycle. However, every asset management decision is made and carried out by people.

Every maintenance activity, process adjustment, compliance decision, and capital improvement is planned, implemented, and evaluated by people. A computerized maintenance management system (CMMS) can schedule preventive maintenance, but it cannot inspect a deteriorating pump or diagnose the cause of an equipment failure. A supervisory control and data acquisition (SCADA) system can generate alarms, but it still requires experienced operators to interpret changing process conditions and respond appropriately. Infrastructure reliability ultimately depends on workforce reliability.

Workforce challenges facing utilities

Across the country, wastewater utilities face significant workforce challenges that directly affect their ability to manage assets effectively. Many experienced operators are reaching retirement age, taking decades of institutional knowledge with them. At the same time, utilities are struggling to recruit and retain certified operators due to competitive labor markets, demanding work schedules, regulatory responsibilities, and increasing technical complexity.

Small and rural communities face additional challenges. Inadequate operating budgets often make it difficult to offer competitive salaries or maintain adequate staffing levels. As vacancies persist, remaining staff assume greater responsibilities, increasing the risk of fatigue, deferred maintenance, and operational errors. The result is a shift from proactive asset management to reactive maintenance, where repairs occur only after equipment has failed.

Institutional knowledge is an asset

One of the most valuable—and least documented—assets within any wastewater utility is institutional knowledge. Experienced operators develop an

(*New Hampshire Report—continued on page 52*)



Photos by Charles Tyler



New Hampshire Happenings

This year, New Hampshire exchanged operators with Rhode Island as part of the annual Operator Exchange event. In New Hampshire, the exchange took place from September 9–11, to coincide with the New Hampshire Water Pollution Control Association (NHWPCA) September 11 Fall Meeting in North Conway. The guest operator from Rhode Island visited the wastewater treatment facilities (WWTFs) in Nashua, Hookset, Newmarket, and the Peirce Island plant in Portsmouth. New Hampshire had two operators participate in the exchange this year, Natalie Deshaies and Russel Sargent. Amazing!

NHWPCA Events

NHWPCA's Annual Summer Outing took place on June 26 at Ellacoya State Park in Gilford. For over 60 years, the NHWPCA has held a summer celebration for the hard-working, dedicated professionals of New Hampshire's clean water profession. Sun, fun, lots of food and camaraderie were enjoyed by all who attended.

The NHWPCA also held its 35th annual Golf Tournament on August 6, at the beautiful Beaver



Meadows golf course in Concord, and its Annual Fall Meeting on September 11 at North Conway Water Precinct in North Conway with refreshments and plant tours followed by a presentation and luncheon.

NHWPCA's Annual Winter Meeting will be held on December 4, at the Nashua WWTF with refreshments and plant tours in the morning followed by lunch, a brief business meeting, and the always popular Santa's raffle at the Marriott Courtyard in Nashua. Who will be Santa this year? Come and see for yourself.

GSRWA Events

The Granite State Rural Water Association (GSRWA) held its annual Operator Field Day and Trade Show on August 27 at Waterville Valley. It was another great opportunity to join professionals in the water and wastewater industry, check out new products and services, attend continuing education classes, participate in various field day games and activities, and network with others in the water industry.

For more information on what's happening in the Granite State, check out the latest edition of *The Collector*, NHWPCA's newsletter, at nhwpca.org.

(*New Hampshire Report—continued from page 50*) understanding of how treatment processes respond to seasonal changes, rainfall events, industrial discharges, equipment aging, and subtle process variations not captured in operating manuals. They know which pumps are prone to clogging, which valves require extra attention, how equipment sounds when operating normally, and what early warning signs indicate developing problems. When these operators retire without transferring this knowledge, utilities lose information that may take years to rebuild.

Asset management programs should therefore include strategies to preserve institutional knowledge through documented standard operating procedures, preventive maintenance records, cross-training, mentoring, and succession planning.

Certification protects public health

Operator certification is fundamental to effective asset management. Certified operators possess the technical knowledge to safely operate treatment processes, interpret laboratory data, troubleshoot equipment failures, and maintain regulatory compliance. Continuing education requirements ensure that operators remain current with evolving technologies, regulatory changes, and industry best practices.

Allowing individuals who are not properly trained or certified to perform important operating functions introduces unnecessary operational, environmental, and safety risks. Improper equipment operation, delayed maintenance, and poor process control can shorten equipment life, increase operating costs, and jeopardize permit compliance.

Investing in certified personnel is therefore an investment in the long-term performance and reliability of a utility's physical assets.

Safety and workforce retention

Asset management also recognizes the relationship between workplace safety and workforce stability. Employees are more likely to remain with organizations that demonstrate a commitment to safety through proper equipment maintenance, confined space programs, personal protective equipment, hazard assessments, and ongoing training.

Conversely, unresolved safety concerns can make it difficult to retain and recruit qualified personnel, increase employee turnover, and discourage contract operations firms from accepting work. Frequent staff turnover disrupts continuity, erodes institutional knowledge, and ultimately weakens an organization's ability to manage its infrastructure effectively.

Maintaining a safe workplace is not simply a regulatory obligation—it is a critical workforce retention strategy and essential to sustainable asset management.

Preventive maintenance requires people

Preventive maintenance is often viewed as an equipment management strategy, but its success depends entirely on workforce capacity. Maintenance schedules must be planned,

inspections completed, repairs documented, and deficiencies corrected before failures occur. When staffing levels become inadequate, utilities naturally shift their focus toward immediate operational needs, allowing preventive maintenance activities to accumulate and go undone.

Over time, deferred maintenance accelerates equipment deterioration, increases emergency repairs, shortens asset life, and raises overall operating costs. What begins as a staffing challenge eventually becomes an infrastructure challenge.

Building resilience and succession planning

Resilient utilities recognize that workforce development is as important as infrastructure investment. Cross-training employees reduces dependence on a single individual and ensures operational continuity during vacations, illnesses, retirements, or emergency response. Apprenticeships, mentoring, leadership development, and structured succession planning prepare the next generation of operators before critical vacancies occur. Like replacing an aging clarifier or rehabilitating a pump station, preparing future leaders requires planning, investment, and long-term commitment.

Investing in people protects infrastructure

Municipalities routinely invest in rehabilitating treatment facilities, replacing aging equipment, and upgrading collection systems. Those investments achieve their full value only when supported by an adequately qualified, trained, and properly staffed workforce.

Competitive compensation, professional development, certification support, continuing education, modern equipment, and safe working conditions are not simply employee benefits—they are investments that improve reliability, reduce risk, extend infrastructure life, and strengthen regulatory compliance.

The return on investing in people is measured not only in employee retention, but also in improved system performance and reduced life-cycle costs.

Conclusion

Every wastewater utility depends on physical infrastructure, but infrastructure alone cannot protect public health or the environment. Pumps do not maintain themselves, treatment processes do not optimize themselves, and compliance is not achieved through automation alone.

The true strength of any asset management program lies in the people responsible for operating, maintaining, and improving the system. Recognizing workforce development as a core asset management strategy positions utilities to improve reliability, preserve institutional knowledge, enhance regulatory compliance, and maximize the value of infrastructure investments.

Ultimately, protecting wastewater infrastructure begins by investing in the people who operate it. In the long term, the workforce is not simply part of an asset management program—it is the asset that makes every other investment successful.

Upcoming Meetings & Events

NEWEA GOLF CLASSIC
Derryfield Country Club, Manchester, NH
September 25, 2026

WEFTEC LOUISIANA
Ernest N. Morial Convention Center
New Orleans, LA
September 26–30, 2026

**JOINT NEWEA/NEWWA UTILITY
MANAGEMENT SEMINAR**
Marlboro, MA, Courtyard Marriott
October 7, 2026

AFFILIATED STATE ASSOCIATIONS AND OTHER EVENTS

**YOWA MASSTC INNOVATIVE
ALTERNATIVES**
Massachusetts Alternative Septic System
Test Center, Sandwich, MA
October 6, 2026 (Rain date 10/8)

CTWEA FALL WORKSHOP
AquaTurf, Plantsville, CT
October 9, 2026

MAWEA FALL TRAINING
Pare Office, Foxborough, MA
October 20, 2026

**AWWA NE SECTION—CONFERENCE
EXHIBIT**
The Verve Hotel, Natick, MA
October 21–22, 2026

**NEWEA/NEBRA NORTHEAST RESIDUALS &
BIOSOLIDS CONFERENCE, EXHIBIT & TOUR**
Westin Harborview, Portland, ME
October 28–30, 2026

**JOINT NEWEA/NEWWA TECHNOLOGY &
ASSET MANAGEMENT FAIR**
NEWWA Office, Holliston, MA
November 2, 2026

ANNUAL CONFERENCE & EXHIBIT
Marriott Copley Place, Boston, MA
January 24–27, 2027

**NEWWA WATER RESOURCE &
SUSTAINABILITY SYMPOSIUM**
Devens Common Center, Devens, MA
October 28, 2026

GMWEA FALL TRADESHOW
DoubleTree by Hilton South Burlington, VT
November 5, 2026

NHWPCA WINTER MEETING
Mariott Courtyard, Nashua, NH
December 4, 2026

**RICWA HOLIDAY PARTY, ELECTIONS
MEETING, AND FOOD DRIVE**
December 4, 2026

MAWEA WINTER WEBINAR - VIRTUAL
December 9, 2026

Measurement unit conversions and (abbreviations) used in the <i>Journal</i>			
U.S.	International System of Units (SI)	U.S.	International System of Units (SI)
Liquid volume		Length	
gallon (gal)	liter (L)	inches (in.)	centimeters (cm)
cubic feet (ft³)	cubic meters (m³)	feet (ft)	meters (m)
cubic yards (yd³)	cubic meters (m³)	miles (mi)	kilometers (km)
acre-feet (ac ft)	cubic meters (m³)	Area	
Flow		square feet (ft²) or yards (yd²)	square meters (m²)
million gallons per day (mgd)	million liters per day (ML/d)	acre (ac)	hectare (ha)
for larger flows (over 264 mgd)	cubic meters per day (m³/d)	square miles (mi²)	square kilometers (km²)
gallons per minute (gpm)	liters per minute (L/min)	Weight	
Power		pounds (lb)	kilograms (kg)
horsepower (hp)	kilowatts (kW)	pounds per day (lb/d)	kilograms per day (kg/d)
British Thermal Units (BTUs)	kilojoules (kJ) / watt-hours (Wh)	ton – aka short ton (tn)	metric ton or tonne (MT)
Velocity		Pressure	
feet per second (fps)	meters per second (m/s)	pounds/square inch (psi)	kiloPascals (kPa)
miles per hour (mph)	kilometers per hour (km/h)	Inches water column (in wc)	kiloPascals (kPa)
Gas		Head	
cubic feet per minute (ft³/min)	cubic meters per minute (m³/min)	feet of head (ft of head)	meters of head (m of head)

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Upcoming Journal Theme

Winter 2026—Innovative Solutions and Operator Ingenuity

NEWEA/WEF* Membership Application 2026



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

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☐ Dual	If you are already a member of WEF and wish to join NEWEA	\$53
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MEMBERSHIP PROFILE

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

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- | | | | | |
|---|--|--|--|--|
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Utility: Wastewater
and Stormwater |
| 2
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Non-profits/NGOs | 8
State or Federal
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Utility: Wastewater,
Drinking Water, and
Stormwater | 15
Other
<hr/> (please define) |
| 3
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Plants | 6
Finance, Investment,
and Banking | 9
Utility: Wastewater | 13
Utility: Wastewater
and Drinking Water | |
| | | 10
Utility: Drinking Water | | |

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- | | | | | |
|--|-----------------------------------|-----------------------------------|--|---|
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| 2
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| | 7
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What are your KEY FOCUS AREAS? (circle all that apply) (FOC)

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

Gender: ☐ Female ☐ Male ☐ Non-binary

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

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