THE CONDUIT

SPRING 2019

THE OFFICIAL PUBLICATION OF THE VIRGINIA WATER ENVIRONMENT ASSOCIATION, INC.

OCCURRENCE, REMOVAL, FATE, AND TRANSPORT OF

MICROPLASTICS IN WATER TREATMENT

HOW VIRGINIA IS ADDRESSING THE CHALLENGE OF MICROPLASTIC POLLUTION IN THE ENVIRONMENT AND ITS EFFECT ON HUMAN HEALTH AND ECOSYSTEMS.

INSIDE

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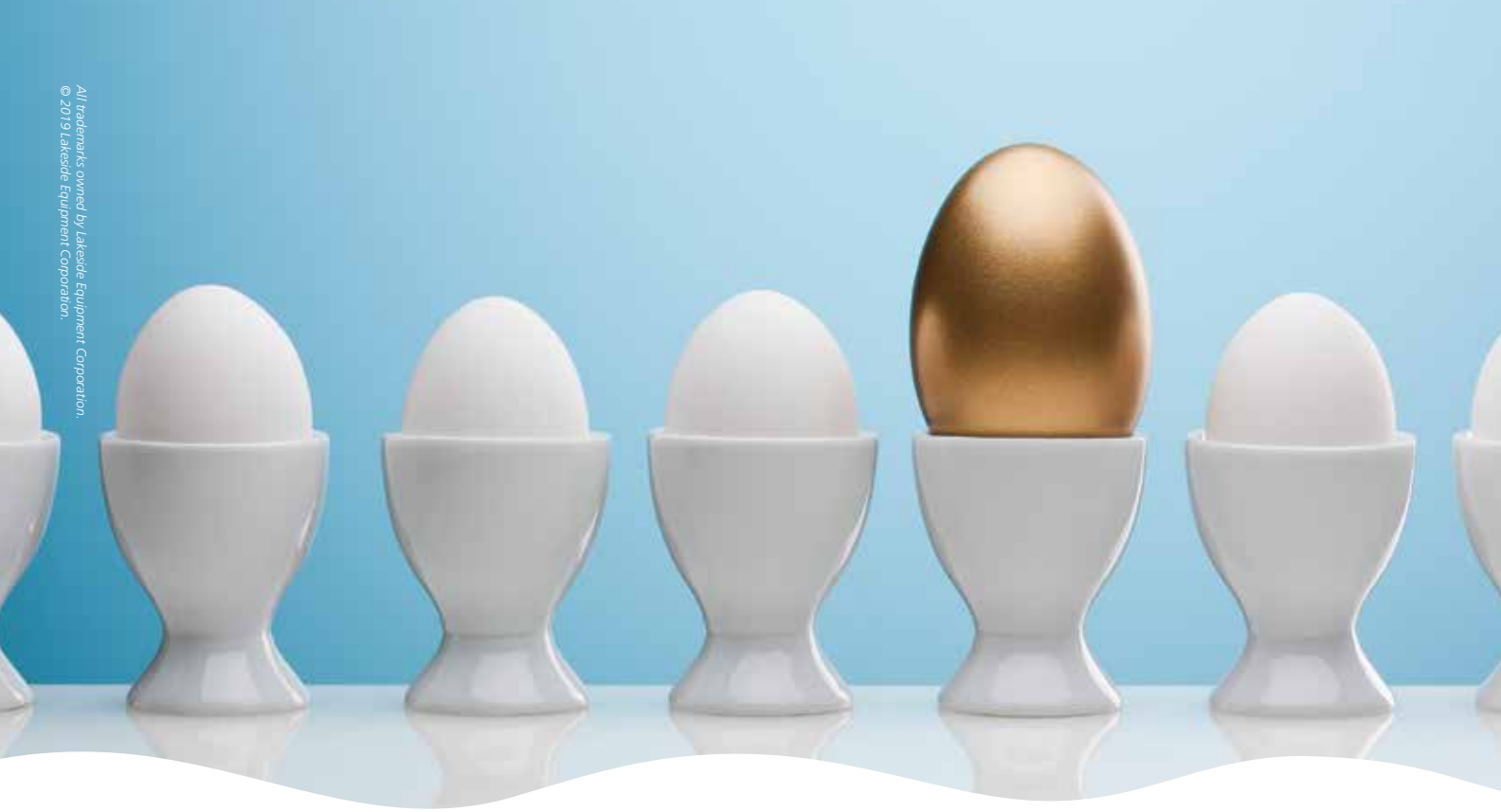

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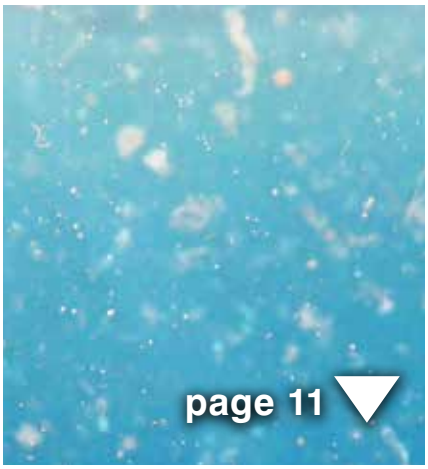

COVER FEATURE

FEATURES

WEF FEATURES

DEPARTMENTS & ASSOCIATION NEWS

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Spring into LeaderSHIP

Shawn Heselton, President

Ahhhhh… spring… a time when plants and flowers awake from dormancy and certain animals stir out of hibernation. Old Man Winter was last seen packing up his bags to make way for the warmer temperatures. While nature has been slowly opening its eyes up, committees have already been hard at work getting ready for a busy year!

The Industrial Waste and Pretreatment Committee hosted its annual conference on March 5-6, 2019 at the Omni Hotel in Charlottesville. The event attracted 157 attendees and 22 exhibitors. Speakers from the U.S. Environmental Protection Agency, the Virginia Department of Environmental Quality, academia, industry, the public sector, and the private sector presented and discussed major issues like pretreatment, pollution prevention, and regulatory updates. The Industrial Waste and Pretreatment Conference was also the first to utilize VWEA's new credit tracking system. The system was able to send transcripts the day of the event as opposed to several weeks later. In all, eight credits were offered for wastewater operators and professional engineers.

With a plethora of activities and events on the horizon, there are plenty of opportunities to either fine-tune those leadership skills or serve as a leader on a committee. Cory Booker, the first African-American junior United States Senator from New Jersey, said, "Leadership is not a position or a title, it is action and example."

The Leadership Academy

As mentioned in the Fall 2019 issue of *The Conduit*, VWEA and VA AWWA are in the process of creating a year-long leadership program that facilitates professional growth by enhancing communication and leadership skills and by providing networking opportunities. The Leadership Academy will dive into a variety of topics like ethics, active listening, emotional intelligence, and conflict resolution. The curriculum is expected to comprise a series of in-person, highly interactive training sessions with intermittent conference calls in-between.

The Leadership Academy is similar to WEF's Water Leadership Institute (WLI), which began eight years ago with the intent of educating and training participants and providing opportunities that enable developing and emerging leaders to build strong lasting relationships within the water industry. This intensive program allows participants to engage in management training and leadership development through a blended learning approach that includes the examination of complex challenges facing the water and wastewater industries and networking with public and private sector practitioners. As an aside, the WLI accepted five VWEA members; they include people from HRSD, Gannett Fleming, Greeley and Hansen, and CHA Consulting. Congratulations!

Committee Leadership

With over 30 committees, 14 of which are jointly coordinated with VA AWWA, there are a number of leadership opportunities of which our membership can take advantage. Each committee typically has a chairperson and a vice-chairperson that 1) shares the leadership workload, 2) sets up a succession plan for subsequent years, and 3) supports one another throughout the tenure. For the VWEA and VA AWWA Joint Annual Meeting (WaterJAM), subcommittee leadership is critical to pulling together the associations' largest event. I challenge the membership to take advantage of the leadership possibilities… you won't regret it!

To all of the members, committee volunteers, and committee leadership: **thank you for your devotion, energy, and unwavering commitment to VWEA and the environment.**

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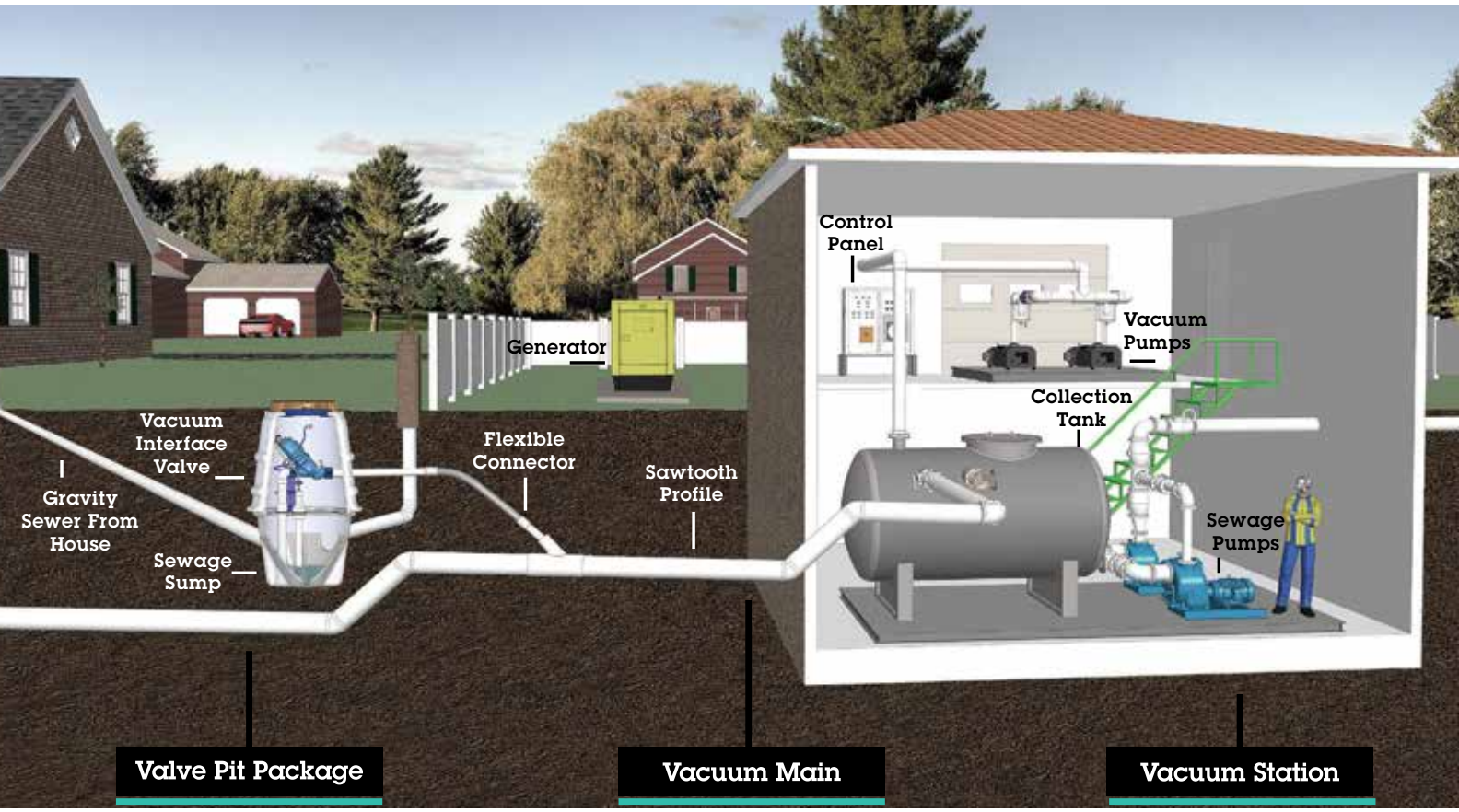

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OCCURRENCE, REMOVAL, FATE, AND TRANSPORT OF MICROPLASTICS IN WATER TREATMENT

BY LOLA OLABODE AND ASHWIN DHANASEKAR, THE WATER RESEARCH FOUNDATION

BACKGROUND

There is increasing public concern over the amount of plastic pollution in the environment and its effect on human health and ecosystems. According to recent estimates, there may be more than five trillion pieces of plastic floating at or near the ocean surface (Eriksen et al., 2014). Plastics are often ingested by sea animals and have been found in fish, birds, and sea turtles. Microplastics (MPs) are pieces of synthetic polymers that are typically smaller than five millimeters (i.e., 5,000 microns) (Browne et al., 2003). The appearance and shape of MPs vary widely, making it difficult to quantify and separate MPs from natural particles. Beauty products with microbeads, synthetic clothing, plastic bags, polystyrene foam packaging, and the deterioration of disposable plastic items or macroplastics (such as plastic straws or debris) can all contribute to microplastic pollution. MPs, including microfibers, were primarily manufactured as microbeads, capsules, pellets, or fibers but are being gradually phased out. The biggest examples are the microbeads used in cosmetics and personal care products. Napper et al. (2015) reported that around 4,500 to 95,000 microbeads could be released in a single use of a cosmetic product. Industrial scrubbers used for abrasive blast cleaning also contribute to MP pollution.

Microplastics are increasingly prevalent in the environment, including in the water table, soil, animal tissue, and even potable water. They have reached high densities (e.g., 100,000 items per m^3) and interact with organisms and the environment in a variety of ways (Eerkes-Medrano et al., 2015). This has resulted in an increased number of product bans for small plastics, such as microbeads used in cosmetics, and relatively larger plastic items, such as bags and straws, that can eventually degrade into MPs. California, New York, Illinois, and other states were the first to ban microbeads, but the ban is now nationwide (Chang, 2015). Moreover, there have been several new and planned requirements to monitor MPs in the environment and drinking water. In addition to legislative action, public education campaigns are underway to increase the public's understanding of the impact of plastic pollution on the environment.

Virginia has also been addressing the challenge of MPs in water. The Chesapeake Bay Watershed has contained a relatively significant level of MPs based on recent studies. Although studies measuring MP abundance are still in their infancy, there is information regarding MPs that is relevant to the Chesapeake Bay. The Virginia Institute of Marine Science (VIMS) has led research studies over the last few years to identify and characterize MPs in water and their interactions with the marine environment. VIMS scientists also received a grant that helped them develop and test a biodegradable replacement for microbeads used in household products such as shampoo, toothpaste, and sunscreen. VIMS professor Rob Hale, known for his expertise with marine toxic chemicals, reported that some MPs may release previously bound-up chemicals into the water as they break into particles, despite a lack of research that suggests that the changing composition of the smaller plastic bits may make it easier for them to absorb other chemicals present in water (Malmquist, 2013). The VIMS team builds batches of microbeads in its lab and tests formulations and processes for producing a different variety of beads. The team plans to collaborate with Charles Bott of the Hampton Roads Sanitation District and his "sequencing batch reactor," a lab-sized wastewater treatment plant (WWTP), to test the beads and see how well they biodegrade.

TREATMENT

Efforts to restrict upstream plastic uses and change consumer behavior are important because MPs are not easily removed by standard wastewater treatment processes and can pass through treatment facilities largely without change (Chang, 2015). Passing through wastewater treatment processes is one pathway by which MPs enter the aquatic environment. Their lack of treatability and the current lack of detective capabilities at WWTPs and water resource recovery facilities (WRRFs) allow microbeads from cosmetic products and polymer fibers from clothes to pass through WWTPs and WRRFs easily (Ziajahromi et al.,

"It is important for individual laboratories to be aware of their capabilities and limitations in microplastic analysis in order to produce reliable and comparable results."

2017). However, implementing a monitoring program requires highly reliable standardization methods and best practices guidelines. Such standardization and guidelines would enable the comparison of studies among regions and the comparison of quantification among sources. Although people have been quantifying and characterizing MPs in miniature samples, there is still a research gap when it comes to having a standard field and laboratory method or developing the reference materials necessary for quality assurance (McCormick et al., 2014). Mason et al. (2016) reported widespread MP pollution in WRRF effluents from 17 facilities in the U.S. The average discharge was 0.05 + 0.024 MPs per liter effluent, with a daily discharge of over four million MPs per facility per day. Fibers (some non-plastic) and fragments dominated the samples. The study's authors attributed the fragments to microbeads from cosmetics and personal care products.

Most conventional WWTPs and WRRFs have primary clarifiers as their initial processes for settling particles and removing the scum off the top surface. Polyethylene and polypropylene microbeads would be expected to either settle down at the bottom due to gravity or float to the top surface during this process. This would ideally be an effective strategy for removing microbeads from the liquid stream. If the microbeads are smaller in nature, they would be expected to attach to other sewage solids based on their hydrophobic nature. Therefore, in general, primary clarifiers would be expected to remove a large portion – but certainly not all – of the microbeads. Primary solids that are settled are usually managed in downstream solids handling processes. Microbeads would be transferred to these processes in an unmodified form. The primary clarifier scum is also occasionally directed to solids handling processes. In most WWTPs, however, this stream is usually heavily concentrated and directly landfilled due to its putrescible nature. Smaller WWTPs and WRRFs often do not include primary clarifiers, leading concentrated scum to be directly landfilled and therefore excluded from their release to the environment. Some of the more innovative WWTPs and WRRFs are installing micro-screening processes in place of their usual primary clarifiers. This has improved the particle removal process by 50%. At WWTPs and WRRFs employing anaerobic digestion for solids handling, the development of microbeads that would biodegrade within the residence time of 15 to 50 days would be ideal (Tarallo et al., 2015). The removal of particles like MPs in wastewater depends on the particle size, biodegradability, and hydrophobicity.

Thermal hydrolysis is one of the emerging digestion pretreatment processes that could improve both the rate and extent of microbead biodegradation in conventional anaerobic digesters (Tarallo et al., 2015). Some WRRFs are investing in a spending program of approximately two billion to minimize sanitary sewer overflows (SSOs), which will also address the extent of microbead and microplastic discharge from combined sewer overflows and SSOs.

Research on MPs in drinking water is limited. However, the traditional size class of 300 to 500 microns (0.3 mm to 0.5 mm) would be expected to make it through a modern-day drinking water treatment plant that has filtration (Eerkes-Medrano et al., 2018). Due to the high magnitude of contamination of these MPs, a truly complete removal by cleanup is not possible. The most effective solutions for the removal or complete elimination of MPs are those that are done at the source (McDevitt et al., 2017).

RELEVANT MP TECHNOLOGIES AND METHODS

There are a few technologies, including membrane microfiltration and ultrafiltration, that could enhance the removal of MPs. However, these are available at very few WWTPs and WRRFs and are not the most economic methods of treatment, unless the water is treated to potable reuse standards.

According to a recent study on the occurrence of MPs in wastewater, microplastic fibers pose a more severe problem in comparison to microplastic particles (Lares et al., 2018). This suggests a need to focus on the occurrence and fate of microplastic fibers in wastewater and receiving water bodies. The same study also found that an advanced membrane bioreactor (MBR) technology would be efficient at removing MPs. It was noted that this MBR process had a slightly better removal efficiency of MPs (99.4%) compared to an overall conventional activated sludge-based process (98.3%). Also, of all the polymers that were analyzed in this study, polyester (mostly poly-ethylene-terephthalate) was identified as the most abundant, constituting up to 79% of the entire MP load, essentially being present in all studied stages of the WWTP and WRRF (Lares et al., 2018).

There are currently no standardized MP sampling and analytical methods. Microscopy, scanning electron microscopes, and particle counters are some of the methods used for screening MP samples, but they are not reliable for the identification of microplastic composition in water. Consequently, spectroscopic methods (particle concentration) like Raman and Fourier transform infrared spectroscopy or pyrolysis-gas chromatography-mass spectrometry (mass concentration) may be required. It is important for individual laboratories to be aware of their capabilities and limitations in microplastic analysis in order to produce reliable and comparable results in MP research (Müller et al., 2018).

RESEARCH NEEDS

While there is research on human exposure to MPs, there is a need for research to define the impacts of MPs on human health. Microplastics are frequently ingested by aquatic species that are consumed by humans as food, including oysters and mussels. They have also been detected in food staples such as sea salt. A recent study found that the risk of plastic ingestion via seafood consumption is minimal when compared to fiber exposure during a meal via dust fallout in a household (Catarino et al., 2018). Recent research also indicates that MPs can be inhaled (Gasperi et al., 2017). In human medicine, MPs are generally used as carriers of medications into body tissues. There is little evidence of potential human health impacts of microplastic pollution.

There is also a need for more reliable ways of identifying plastic particles and fibers from non-plastics, especially with ever-increasing numbers of identified particles and fibers (Lares et al., 2018). Additionally, studies have been performed with grab samples at separate time frames and different sampling locations with possible contamination, which might affect the overall quality of results.

Dr. Allen G. Burton, Jr., an aquatic toxicologist at the University of Michigan, states that the focus on plastic pollution in aquatic

systems will continue – but the ecological risk comes from macroplastics, not microplastics (Burton, 2017).

There are more than a dozen research needs on MPs in water, human health, and the environment. The top research needs in water include:

- Standard methods for collecting, identifying, analyzing, and determining toxicity and bioaccumulation of MPs, including those smaller than 300 microns (0.3 mm). There is currently a wide range of accuracy and uncertainty. Measurement methods for MPs vary significantly and there is no universal protocol for sample preparation, which can make results hard to compare.
- Improved exposure and fate models for WTTP and WRRF effluents and receiving waters.
- Treatment and removal efficiency between various wastewater and water treatment processes, including cost-effective water treatment.
- Translational public and governmental education programs to inform water quality stakeholders, decision makers, and the public.

More research is also needed on the removal of MPs and microfibers by various water treatment processes, particularly for sizes smaller than 300 microns (0.3 mm). A strategic research plan and collaboration with federal agencies (e.g., U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration), standards-setting organizations (e.g., American Society for Testing and Materials, National Institute of Standards and Technology), key stakeholders, and the academic community is needed to address these critical knowledge gaps (Burton, 2017).

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35th Annual Industrial Waste and Pretreatment Conference

"Thanks to all who contributed to making this year's conference an overwhelming success!"

Fantastic presentations were "on tap" at VWEA's 35th Industrial Waste & Pretreatment Conference at the Omni Hotel in Charlottesville on March 4-5, 2019. The theme for this year's conference was "Something is Always Brewing in the Pretreatment World. National and international speakers, consultants, Virginia treatment facility staff, and manufacturing representatives all descended upon Charlottesville for two days of informative and enlightening presentations.

Topics included treating brewery wastewater; amalgam separators; the U.S. Environmental Protection Agency's dental amalgam rule; industrial inspections; electronic reporting; flow metering; pretreating plating wastewater; and hauled waste treatment. Total registered conference attendees numbered at 157, with a super-showing of exhibitors numbering 22!

Ten VWEA Environmental Excellence Awards were also presented to the following companies:

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Gold Award (2-4 years of 100% compliance)

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- Precision Steel
- Excel Truck Group

Thanks to all who contributed to making this year's conference an overwhelming success! If you have a desire to become more involved by serving on the Industrial Waste & Pretreatment Committee, there is room for you! Contact Beau Dodge at 703-228-6881 or by email at *wrdodge@arlingtonva.us*.

Environmenal Excellence Awards.

The Exhibit Hall at the Industrial Waste & Pretreatment Conference.

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THE RISING TIDE

WATERJAM 2019

By Adrianna Dimperio and Matt Harrison, WaterJAM 2019 Co-Chairs

HURRICANES no more! Florence has moved on and now it's time to prepare for *The Rising Tide*. Pack your bags again and meet your colleagues in Virginia Beach for WaterJAM 2019!

Come join us in September for WaterJAM – the Joint Annual Meeting of the Virginia Section American Water Works Association (VA AWWA) and the Virginia Water Environment Association (VWEA). Since 2002, WaterJAM has been a record-setting conference registering growing numbers of participants each year. More than 1,700 professionals continue to join their friends and colleagues to make WaterJAM one of the most successful state conferences in the United States.

This year's theme, *The Rising Tide*, is appropriate, as our industry works toward solving the sea level rise and future storm impacts in watersheds all around us. Flood-control management programs and improvements to stormwater systems are on the rise to prevent neighborhood flooding, alleviate backups, and protect community assets. This year's WaterJAM promises to provide the latest in our industry to help you advance your knowledge in this highly technical world – while you have a little fun along the way.

Your WaterJAM Planning Committee has been working tirelessly over the past few months and will continue doing so to fulfill its mission:

Plan and implement a sustainable, comprehensive conference that brings together technical excellence and innovation while supporting networking opportunities at an exceptional value to all attendees.

An extremely motivated team is working on your behalf to plan this year's WaterJAM and our goal is to exceed your already high expectations for this annual event. The Committee members have brought new ideas into this process, which will be reflected when you join us in Virginia Beach later this year!

We have partnered with the Virginia Beach Convention Center and the Hilton Oceanfront Hotel to host our activities from September 9-12, 2019. The impeccable oceanfront views continue to draw attendees back to the beach. We anticipate close to 1,800 professionals coming together to present new ideas, update you on current regulatory initiatives, and discuss industry hot topics that we face in our ever-evolving world.

As a testament to WaterJAM's successful history, we had another huge response to our 2019 Call for Abstracts. With nearly 350 abstracts submitted, Technical Program Co-Chairs **Ryan Radspinner and Noelle Slater** and Vice Co-Chairs **Sam McAdoo and Dana Hargrove** worked exceptionally hard to put together another comprehensive technical program with something for every attendee.

Due to this overwhelming response and the quality of the abstracts, this year's Technical Program will once again offer ten concurrent sessions to be given over three days for a total of 210 presentations. Some of the sessions offered this year are as fol-

> The **Committee** is focused on providing **activities** that give participants opportunities to **network, socialize, and have fun.**

lows: System Operation and Maintenance, Technology Forum, Emerging Technology, Water and Wastewater Treatment, Biosolids Management and Solids Handling, and two sessions each on Asset Management and Utility Management. Returning this year will be sessions for Small Utilities and Public Outreach and Education. New this year will be two sessions dedicated to Sustainability and Resiliency as well as Stormwater. We're certain there will be something for everyone in this diverse program! All of the sessions provide the opportunity for professional engineer educational credits; the large number of presentations will also allow numerous opportunities for both water and wastewater operator educational credits.

Local Arrangements Co-Chairs **Stacey Higgins** and **Chris Wilson** and countless volunteers from both VA AWWA and VWEA have been busy putting together a conference experience that provides much more than just technical growth. The Committee is focused on providing activities that give participants opportunities to network, socialize, and have fun – what we strive for each WaterJAM. We always look forward to seeing what this group puts together for the attendees!

We will be back at The Signature at West Neck Golf Course to host our annual Monday outing. In addition, the highly-attended clay shoot will continue to be held at Old Forge Sporting Clays in Providence Forge. These events are sure to provide loads of competition, sponsorship opportunities, and chances to win excellent prizes provided by generous local businesses.

The Young Professionals Committee is as active as ever for this year's conference and is striving to make WaterJAM 2019 one of the best ever for new and current young professionals and students. If you have questions or ideas, please contact **Allison Lee**, Young Professionals Liaison: *alee@hazenandsawyer.com*. The Young Professionals Committee-sponsored service event will again be held on Monday this year and the Committee is excited to bring WaterJAM attendees a fantastic volunteering opportunity! All attendees, families, and friends are invited to join. Volunteers will assist with cleaning the grounds and areas adopted by the Virginia Aquarium through the City of Virginia Beach Adapt a Waterway Program. For more information, please contact Pearl Ashitey (*pashitey@vbgov.com*), Rachel Schwaab (*22rschwaab@gmail.com*), or Kayla Yingst (*kayla.yingst@alexrenew.com*).

For those who would rather stimulate their intellects, we've planned some Monday workshops that will provide attendees the opportunity for additional education and collaboration. These workshops will cover timely topics.

After your day of golfing, clay shooting, the Young Professionals service event, or enjoying the workshops, join your friends at the Hilton Oceanfront Hotel for the Meet and Greet. This is an excellent gathering to kick off the conference with great food and music while preparing for a week full of fun and shared knowledge.

Tuesday's activities start with the annual 5K fun run/walk to benefit Water For People. This is always a well-attended event and a great way to kick off your conference day. The 5K is followed by the General Opening Session.

Technical sessions will follow on Tuesday afternoon, all day Wednesday, and Thursday morning. There will be a Networking Reception on Tuesday afternoon featuring the Water Reach Silent Auction in the Exhibit Hall from 5 p.m. to 6:30 p.m. Be sure to get your bids in for the auction between 2 p.m. and 6 p.m. After 6:30 p.m., Tuesday night will remain a free night to attend consultant and vendor outings or simply to enjoy one of the local restaurants or nightlife establishments.

As always, the much-anticipated Awards Banquet and Fun Night will be held on Wednesday night. The pre-dinner reception is a great time to mingle with friends and colleagues and a perfect opportunity to meet our WEF and AWWA national representatives. Some of the top performers in our profession will be recognized with prestigious awards during the banquet.

Once the banquet is over, the Local Arrangements Committee will be ready for us! This year the Mardi Gras-themed fun night will feature themed games, food, and prizes along with dancing and refreshments.

Exhibits Committee Co-Chairs **Jon Casarotti** and **Ronnie Baker** will be sure to have a completely full Exhibit Hall. Be sure to visit the Exhibit Hall during each break in the Technical Program on Tuesday and Wednesday to see the latest technology while enjoying some light refreshments. The ever-so-popular Mobile

Sessions will be held in the Exhibit Hall. Vendors will present their latest innovations and products. We will continue to feature exhibitor trailers, so you can't miss the latest equipment that has been hauled in from across the country. As always, the exhibit area will host the Operations Challenge and Utility Rodeo Demonstrations. And don't forget the Scavenger Hunt, the Networking Reception featuring the Water Reach Silent Auction, the Water for People Raffle sponsored by the WaterJAM exhibitors, and free Wi-Fi access as you visit with vendors and network over a beverage. The SWAG (Sewer & Water Art Gallery) will be returning again this year in the Exhibit Hall, so be sure to take a stroll through and vote for your favorite item retrieved out of the system.

In case you have extra time, we've planned additional events before and after the conference. The Water Taste Test is returning, so come out and support the teams as they educate the public about the value of water and the benefits our industry provides to our communities.

Before you leave for home after your week in Virginia Beach, we suggest you consider

one of our facility tours. This year, **Chris Wilson** is arranging tours that are sure to be educational all the while providing innovative treatment ideas.

To keep up with technology and improve sustainability, we encourage the use of the WaterJAM app at this year's conference. By using the app, you can bypass the printed program and reduce the amount of paper used at the conference. This year, WaterJAM is working with the VA AWWA/VWEA Sustainability Committee to put on a conference with as small an environmental footprint as possible. Finally, to stay current on the latest WaterJAM news, be sure to follow us on Twitter #WaterJAM19 and find us on Facebook at *www.facebook.com/VirginiaWaterJAM.*

Because WaterJAM is the premier event for Virginia water professionals, hotel rooms will disappear quickly, so make sure to register and book early (and save money in the process!). Registration opens online in early May 2019, so be sure to check the VA AWWA and VWEA websites for registration information. We are tremendously excited about this year's WaterJAM and on behalf of your hard-working WaterJAM Planning Committee, we look forward to seeing you in Virginia Beach in September!

INCENTIVES FOR GREEN INFRASTRUCTURE

BY JANET CLEMENTS, CORONA ENVIRONMENTAL CONSULTING, AND ALYSE GREENBERG, THE WATER RESEARCH FOUNDATION

Incentive programs can leverage investment in green infrastructure, reduce local stormwater management costs, increase awareness around stormwater issues, and better distribute the benefits of green infrastructure across communities.

Green infrastructure (GI) has become an increasingly important component of municipal stormwater programs. GI practices include green roofs, rain gardens, bioswales, permeable pavement, and other approaches that retain, reduce, infiltrate, and/or treat stormwater prior to its entry into local waterways and/or drainage systems. In addition to stormwater management, these practices have many important co-benefits, including beautifying neighborhoods, increasing climate change resiliency, and reducing costs associated with traditional "gray" stormwater management infrastructure.

To date, most municipalities have focused their GI investments on public rights-of-way and other publicly owned properties. However, as stormwater programs evolve, many utilities are looking to increase adoption of GI on private lands through market-oriented incentives. Implementing GI on private land can be easier and more cost-effective than on public property. In addition, incentive programs have the potential to leverage additional public and private investment in GI, increase education and awareness about stormwater issues, and better distribute the benefits of GI across communities.

The Water Research Foundation (WRF) project *Incentives for Green Infrastructure Implementation on Private Property: Lessons Learned* (Clements et al., 2018) brings together a range of public- and private-sector perspectives to help municipalities and utilities create incentive programs that promote broader, better targeted, and more effective implementation of GI within their service areas, with a focus on private property. This research provides practical guidance and detailed case studies that highlight program design and implementation challenges, success factors, and lessons learned.

INCENTIVE PROGRAM TYPES

Several entities have implemented programs that offer market-oriented incentives to developers, private property owners, and/or nonprofit organizations that implement GI projects. These incentive programs encompass a range of approaches that provide financial and non-financial benefits to participants. Clements et al. (2018) reviewed the various incentive programs and organized them into six categories (Figure 1).

STRATEGIES FOR SUCCESS

For those considering GI incentive programs, Clements et al. (2018) identified nine key strategies for success that apply across all six GI incentive program types.

Articulate and Align the Incentive With Your GI Program's Objectives

Some GI incentive program types are more supportive of and better aligned with specific GI program objectives than others. The goals of a GI incentive program significantly drive the budget, scale, type of GI interventions, target areas, and property types for the program. By first clearly articulating your program objectives, you can select the incentive programs that are best aligned with your overall goals and targets. Potential program objectives include meeting water quality goals associated with regulations/permits, mitigating localized flooding, educating the public about stormwater issues, etc.

Green infrastructure private property incentive program models.

Start Where You Are and Build Up

Successful programs can be implemented at different levels and scales. Therefore, take on what you can at the moment and allow for program growth over time. There are many reasons to start small, including the availability of resources needed to implement the program. Implementing an incentive program one step at a time allows you to build programs on a foundation of initial successes and lessons learned.

Take a Targeted Approach

A key step in developing an effective incentive program is to assess the opportunities, motivations, and challenges associated with different property owners and development types. Be sure to consider different programs or program elements to effectively address property-specific needs and challenges and to adopt approaches that incentivize GI where it is needed most.

Show Value

Understanding and demonstrating the cost-effectiveness of and benefits associated with implementing GI projects on private property can help you better focus your resources, set appropriate incentive levels, maximize program benefits, and justify incentive programs to both internal and external stakeholders (e.g., staff, property owners, and community members).

Lower Barriers to Entry

Ensuring that GI incentive programs are easy and accessible for participants is key to program uptake. For example, providing clear guidance and streamlining the application process can reduce the burden on the applicant, making it easier for interested parties to participate. In addition, facilitating project design by providing design funding or connecting participants to design contractors is another way to provide support to participants.

Build Partnerships

Effective stormwater management is beneficial not only for municipalities and utilities, but for entire communities. Building partnerships with nonprofit organizations, community groups, and the private sector can increase program participation, reduce your administrative burden, and leverage additional funding for GI projects. Partners can play a variety of roles, such as conducting program outreach, providing training, or even administering incentive programs on your behalf.

Coordinate Across Your Municipality

Effective program implementation often requires coordination with multiple municipal partners, including planning, procurement, legal, transportation, and other departments. Involving other departments can help identify any municipal policies, processes, and programs that can affect the success of GI incentive programs. In addition, such coordination can help educate other departments, build support for the incentive program, and leverage resources.

Ensure Performance

Long-term performance of GI solutions on private property requires proper installation and ongoing maintenance. With most incentive programs, the property owner is responsible for conducting and paying for maintenance of the GI installation(s) on their property. Maintenance agreements vary in complexity and restrictiveness, depending on program goals, structure, and target participants. Such agreements must ensure long-term performance without discouraging participation. You may want to consider providing resources to help with maintenance, such as training programs, partnerships, financing, or staff to perform the work.

Keep Learning and Improving

To ensure program success, work with developers, private property owners, and other partners to continuously obtain feedback on all aspects of the program. Even entities with the most established incentive programs continue to explore new strategies and design elements to maximize program participation or take their programs to the next level. Key actions for measuring program success and determining next steps include tracking established performance metrics, surveying program participants, and seeking input from those who have chosen not to participate in the program.

Success Stories and Lessons Learned

The report includes ten detailed incentive program case studies (Table 1), along with brief highlights of additional incentive programs that demonstrate the successes, challenges, and lessons learned from municipalities and utilities throughout the United States and Canada. For example, one case study features the Montgomery County (MD) Department of Environmental Protection's (MCDEP) RainScapes and RainScapes Rewards Rebates programs. MCDEP is responsible for managing stormwater and meeting water quality standards pursuant

to the county's municipal separate storm sewer system (MS4) permit. To address MS4 permit requirements, RainScapes promotes the implementation of GI-based landscape design techniques, primarily on private properties. A key component of RainScapes is the RainScapes Rewards Rebates program, which offers financial assistance to private property owners who install eligible RainScapes practices on their properties. The program offers up to $2,500 per single-family lot or up to $10,000 per multi-family, institutional, or commercial lot for installation of approved projects that infiltrate stormwater onsite. Governmental and nonprofit entities are also eligible to receive these rebates. To receive the rebate, which is issued as a reimbursement following county inspection, property owners must submit receipts, pass a final inspection, and sign a five-year property owner agreement that allows MCDEP access to the property for inspection purposes.

Between 2008, when the program began, and 2017, 885 projects were installed and paid for, managing runoff from approximately 45 impervious acres. Key factors in program success include:

- An easy-to-use online application system.
- Resources, such as fact sheets and plant lists, for program participants.
- A database for program staff to systematically collect and track data on individual projects/participants.

TABLE 1: Case studies by green infrastructure incentive program type.

Program Type	Case Studies
Rebates and Cost-shares	Montgomery County (MD) RainScapes Rewards Rebates Toronto (ON) Eco-Roof Incentive Program
Grants	Northeast Ohio Regional Sewer District (OH) Green Infrastructure Grant Program Philadelphia Water Department (PA)
Development and Redevelopment Incentives	Chicago (IL) Green Permits Seattle (WA) Green Factor
Awards and Recognition Programs	Sustainable Business Network of Greater Philadelphia (PA) Green Stormwater Infrastructure Excellence Awards Pima County (AZ) Regional Recognition
Stormwater Credit Trading	Washington, D.C. Department of Energy and Environment Stormwater Retention Credit Trading Program Chattanooga (TN) Stormwater Credit Trading Program

- A GI training program for landscape contractors.
- A multi-pronged marketing approach that uses techniques such as radio, flyers, and social media.
- Demonstration of the cost savings obtained through the rebate projects compared to other MCDEP GI projects, which helps to sell the program internally.

Along with these successes, MCDEP has faced challenges such as difficulty reaching commercial property owners and having adequate administrative staff to support the program. MCDEP has addressed many of its challenges over the years and continuously seeks to learn from these experiences and resolve any other challenges that might arise.

The Northeast Ohio Regional Sewer District (NEORSD) Green Infrastructure Grant Program serves as a model for using GI to reduce the volume of stormwater entering combined sewer systems. NEORSD has a 25-year goal of reducing combined sewer overflow-related pollution in Lake Erie by four billion gallons per year. While NEORSD is addressing this primarily through construction of large-scale storage tunnels and treatment plant enhancements, it is also investing in GI projects to store, infiltrate, and evapotranspirate stormwater before it reaches the combined sewer system. To build on that work and leverage partnerships with the private sector and public agencies, NEORSD established its Green Infrastructure Grant Program in 2014.

The Grant Program funds GI projects within NEORSD's combined sewer area that remove and/or detain stormwater from the combined system. The program is open to 501(c)(3) nonprofit organizations, NEORSD member communities, governmental entities, and businesses working in partnership with communities. Grant funding is available for retrofit projects at existing sites, as well as for new and redevelopment projects.

The Grant Program supports a variety of GI practices based on site-specific needs and opportunities and funding is provided through reimbursement. NEORSD staff evaluate requests for funding based on 1) anticipated project benefits, 2) project feasibility, 3) capacity of the applicant to maintain the project, 4) project visibility and access to the public, and 5) existence of a project design at time of application. Key factors in program success include:

- Partnering with local nonprofits and community development corporations, which have worked with GI designers to submit applications, served as project screeners, and more.
- Identifying and addressing barriers to program entry.
- Addressing maintenance from the beginning by requiring that maintenance plans be submitted with applications.

NEORSD is continuously working to evaluate and improve its program and identify how to better leverage its investments. For example, recognizing that having the resources to design GI projects can pose a barrier for potential applicants, NEORSD is working with local foundations to fund a program that will provide selected applicants with GI designers and cover design-related expenses. NEORSD is also assessing the potential to bundle projects under one grant application, identifying priority areas for grant project implementation, prioritizing projects with benefits that match broader community goals, and developing a GI contractor training program to help create a pool of knowledgeable individuals to help maintain GI projects.

APPLICATIONS/RECOMMENDATIONS

Clements et al. (2018) bring together perspectives from public agencies, private sector representatives, and other stakeholders to enhance understanding of GI incentive programs for private properties. The project results will help utility and municipal stormwater practitioners recognize the range of alternative GI program and incentive models, understand the advantages and disadvantages of various approaches, and evaluate and develop strategies that best suit their circumstances.

To address the need for innovative and timely research on green infrastructure and other stormwater management techniques, the WRF sponsors stormwater research, such as this project, and partners in larger stormwater efforts.

REFERENCES

Clements, J., Henderson, J., Raucher, R., Sands, R., Sommer, S., & Basoli, D. (2018). *Incentives for green infrastructure on private property: Lessons learned.* Denver, CO: The Water Research Foundation.

By Morgan Brown and Brianne Nakamura

WEF InFLOW Program Introduces Underrepresented Minority Students to Working in Water

As the "silver tsunami" of retirements that will result in a mass exodus of U.S. workers approaches, the water sector is taking steps to prepare as well as encourage greater diversity in its workforce. At WEFTEC® 2018, WEF piloted a new program to help address this need for a younger and more diverse workforce. WEF InFLOW, which stands for Introducing Future Leaders to Opportunities in Water, brought underrepresented minority students to WEFTEC and introduced them to working in the water sector. The program also sought to help these students foster a network within WEF's membership to increase opportunities for mentorship and employment.

The Exodus

New research this summer helped prompt action on the coming wave of retirements. In June 2018 the Brookings Institution (Washington, D.C.) published the report *Renewing the Water Workforce: Improving Water Infrastructure and Creating a Pipeline to Opportunity*. The report found that the silver tsunami will cut drastically into the pool of skilled, qualified water sector workers. For some utilities, this could result in staffing vacancies of up to 50%.

The report also points out a lack of diversity in the water workforce. The percentage of black and Asian water workers lags behind the national average for all occupations combined. Additionally, for higher-paying water occupations such as engineering and management, black and Hispanic workers are particularly underrepresented.

WEF InFLOW

This pilot year of the WEF InFLOW program primarily focused on African American students. African Americans are one of the most underrepresented groups with respect to the percentage of the population versus percentage engaged in STEM.

InFLOW brought a total of 16 undergraduate and graduate students to WEFTEC from Howard University (Washington, D.C.), Tuskegee University (Tuskegee, AL), and the University of South Florida (Tampa, FL). The group of eight men and eight women had a range of technical backgrounds and awareness of water sector opportunities. One student is pursuing a doctorate in the water sector. The students from Tuskegee University had summer internships related to water. Many other students, however, had no background knowledge of water sector possibilities.

The 2018 InFLOW program relied on generous support from program sponsors: Arcadis, GlobalWET, Centrysis/CNP, Environmental Technical Sales Inc. (ETEC), and the Milwaukee Water Council. Because of these sponsors, the students received travel assistance, hotel accommodations, registration, and special networking opportunities at WEFTEC.

Water Sector Introductions

The students' schedules included both technical and networking events. They participated in many events coordinated by

WEF InFLOW participants with WEF President Tom Kunetz and panelists from a networking event scheduled just for them. Photo credit: Oscar & Associates.

Students from the University of South Florida teach the next generation of water students the "Water Cycle Dance" during Water Palooza at St. Mary's Academy in New Orleans, LA. Photo credit: Rahkia Nance/Water Environment Federation.

The WEFTEC Opening General Session was among the activities slated for students participating in the WEF InFLOW program. The students received front row seats. Photo credit: Oscar & Associates.

the WEF Students and Young Professionals Committee. These included Water Palooza – where the University of South Florida students are now famous for introducing us to the "Water Cycle Dance" – the Community Service Project, committee meetings, the WEF Career Fair, and the Student Design Competition. The students attended the Opening General Session and were encouraged to explore the exhibition and attend technical sessions.

Aside from these traditional WEFTEC activities, the students attended two special events. The first was a networking panel that introduced the students to some African American water sector leaders who represented utilities, academia, consulting, and manufacturing. Panelists such as David Gadis, CEO and President of DC Water (Washington, D.C.) and Kishia Powell, Commissioner of the Department of Watershed Management for the City of Atlanta, talked about their journeys and career paths and answered the students' questions. Gadis and Powell shared their insights about how to use diversity not as a barrier, but as a quality to be remembered by. A networking lunch wrapped up the InFLOW students' WEFTEC experience.

The program already has yielded one result: Howard University is working to start a WEF student chapter, which will help expand the program's reach to more students at the university. The chapter is hoping to participate in future Student Design Competitions.

The InFLOW program will continue to grow in the coming years. WEF intends to expand the number of participating schools and students, as well as include a second track with activities focused on operations and maintenance.

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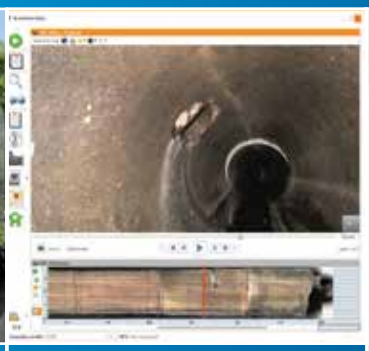

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By Patrick Dube

U.S. EPA Office of Inspector General Releases Biosolids Report

A routine investigation by the U.S. Environmental Protection Agency (EPA) Office of Inspector General (OIG) has concluded that EPA's controls over the land application of biosolids were incomplete or had weaknesses and may not fully protect human health and the environment. However, the EPA Office of Water, which operates the biosolids program, disagrees with the findings and states that the presence of pollutants does not automatically pose a risk to public health and the environment.

Throughout 2017 and 2018, OIG investigated whether EPA "has and implements controls over the land application of sewage sludge that are protective of human health and the environment." On November 15, 2018, OIG released a report based on its investigation titled *EPA Unable to Assess the Impact of Hundreds of Unregulated Pollutants in Land-Applied Biosolids on Human Health and the Environment*.

OIG Process and Findings

OIG is an independent office that helps the agency protect the environment in a more efficient and cost-effective manner. OIG's main activities include performing audits and investigations of EPA to prevent and detect fraud, waste, and abuse. Following an audit or investigation, OIG typically releases a report of findings.

In the report on the biosolids investigation, OIG found 352 unregulated pollutants in biosolids and stated that EPA lacked the data or risk assessment tools to decide safety. These 352 pollutants are in addition to the nine regulated pollutants that EPA consistently monitors.

The report pointed to a steady reduction in staff and resources in the EPA biosolids program as a cause of many of these weaknesses. The OIG recommended that the EPA Office of Water "address control weaknesses in biosolids research, information sharing with the public, pathogen control and training" and implement corrective actions with milestones to fix these issues.

The report and related materials can be viewed on OIG's website at *http://bit.ly/EPA-OIG-biosolids2018.*

Office of Water Response

OIG provided the Office of Water the chance to comment on the report; this response is included in Appendix D of the report. The Office of Water took issue with how the science was presented in the report and stated that "there is no attempt to make it clear to the reader that the occurrence of pollutants in biosolids does not necessarily mean that those pollutants pose a risk to public health and the environment."

The response also states that a top priority for the biosolids program will be to address the uncertainty of potential risk posed by pollutants found in biosolids but uncertainties in science does not mean that they are threats to human health and the environment.

The OIG report resulted in 13 recommendations for the Office of Water to consider. The Office of Water response provides corrective actions and milestone dates for eight of them, with resolution efforts underway for the remaining five.

The Office of Water conducts biennial reviews of biosolids that include a full lit-

erature review of potential toxic pollutants and determines if the pollutants detected pose "potential risk to human health or the environment." The 2015 report analyzed peer-reviewed journal articles from January 2013 through December 2014 to determine the articles' relevance to biosolids and potential pollutants. Overall, 46 articles met the eligibility criteria. Once analyzed, the biosolids program identified 29 new chemical pollutants. Following a risk assessment of these new chemicals, the Office of Water determined that no additional pollutants needed to be regulated. A 2017 report following the same intensive analysis is expected to be released in the coming months.

WEF Actions

During the OIG investigation, WEF staff members were interviewed and have since been tracking the report and working with other biosolids partners to coordinate responses after the release. It is WEF's position that decades of science have shown that biosolids are a safe, renewable resource that improves our environment, lowers costs to consumers, and strengthens our farming communities.

> "Biosolids are a safe, renewable resource that improve our environment and lower costs to consumers."

Biosolids undergo a rigorous set of treatment processes that include physical, chemical, and biological processes to aid pathogen reduction. Utilities across the country have been safely recycling biosolids for decades while delivering innovative solutions that lead to stronger, more sustainable, and resilient communities.

WEF supports continued research on biosolids to ensure regulatory requirements continue to be based on the latest science. The WEF Residuals and Biosolids Committee (RBC) is committed to developing and promoting cost-effective practices and policies in biosolids and energy technologies associated with municipal, agricultural, and industrial wastewater residuals for the protection of the environment. Through education of WEF members, the public, and policymakers, the RBC aims to serve the public interest regarding scientifically sound residuals and biosolids environmental practices and regulation. To learn more, visit the RBC page – *www.wef.org/biosolids* – and download fact sheets, white papers, and technical reports.

Patrick Dube *is a technical program manager in the Water Science & Engineering Center at the Water Environment Federation (Alexandria, VA). He manages the Residuals and Biosolids Committee and the Air Quality & Odor Control Committee. He can be contacted at* PDube@wef.org.

By Patrick Dube

The Future of Phosphorus

A gathering of the leaders for biological phosphorus removal and recovery

In January 2019, the Water Environment Federation convened the James Barnard Research Forum on Emerging Themes in Biological Phosphorus Removal and Recovery. This three-day forum paid tribute to Dr. James Barnard by celebrating his significant contributions to wastewater processing, specifically focusing on biological phosphorus (bioP) removal.

Three themes emerged from the forum. First, participants set out to discuss the science behind phosphorus removal and recovery to find out how much we know and don't know about the process. Second, the forum turned an eye toward future markets and drivers. This discussion also focused on the value proposition of phosphorus recovery, including products (phosphorus, biosolids, valuable metals), services (eutrophication prevention, meeting discharge limits), and global drivers (food products, energy to mine mineral phosphorus). Third, the forum provided an opportunity to look at a broad overview of the environmental effects of phosphorus recovery.

About James Barnard and the Forum

As the developer of the Bardenpho, Modified Ludzack-Ettinger, and Phoredox processes for biological nitrogen and phosphorus removal, Barnard was instrumental in bringing these innovative technologies to water resource recovery facilities (WRRFs) around the globe. The forum, held in Austin, TX, featured leaders in bioP removal who were invited to give presentations and facilitate discussions. With short presentations and panel discussions, the forum encouraged free-flowing dialogue to examine the past, present, and future of bioP removal topics and set the agenda for years to come.

Phosphorus 101

Phosphorus is an essential mineral for growth. However, phosphorus runoff and deposition in water bodies can cause aquatic dead zones that choke off oxygen to plants and wildlife. This leads to a unique conundrum where there can be no life without phosphorus, yet too much has disastrous effects.

Furthermore, global supplies are dwindling, and we are facing a potential crisis if renewable sources are not developed. A balance must be struck between efficiently using phosphorus while simultaneously developing recovery techniques. Recovering bioP via WRRFs can help fill this gap, but continued research is necessary to make it more efficient, reliable, and accessible to utilities of all sizes.

Bacterial Populations and Modeling

Current knowledge and existing gaps emerged as the first theme at the forum. Presentations dove into the microbial ecology of enhanced biological phosphorus removal, starting with understanding two of the most important polyphosphate accumulating organisms in wastewater treatment, *Tetrasphaera* and *Accumulibacter*. These two organisms are studied widely, but there remains a knowledge gap about them as researchers continue to try to better utilize them by fully unlocking their mechanisms.

The Microbial Database for Activated Sludge, a program started at Aalborg University in Denmark, aims to learn more about these and other organisms by mapping the microbial diversity present in wastewater treatment systems worldwide. Getting people talking the same language by learning more about what options are present at WRRFs can help select for the most efficient and effective microorganisms.

Likewise, models are frequently used to help optimize WRRFs, plan for upgrades, and design new facilities. However, the limitations of these models came to the forefront of the modeling discussions, as presentations addressed different approaches to unlocking the process dynamics of a WRRF. Each WRRF is a unique system with specific parameters and influent; as such, there exists no one-size-

"A balance must be struck between efficiently using phosphorus while simultaneously developing recovery techniques."

fits-all approach to modeling or treatment.

Two approaches highlighted during the forum tackled overcoming modeling challenges. One suggested modeling individual units within a system, while the other seeks to develop a predictive system relying on process metabolics. Both models are viable options and the presentations set up a further discussion on how to use information gleaned from a model and put it into practice.

The discussions highlighted one universal truth: the key to all good models is more data to better understand process dynamics. As we get to know more about the intricacies of these systems, models will be more accurate.

Value Propositions

Forum participants also examined the value proposition of phosphorus recovery. One of the current pain points in widespread phosphorus recovery is that turning these value propositions into reality requires overcoming current technology bottlenecks and improving industry business models.

The key to success is broadening the current value potential of bioP from only recovered products to the entire ecosphere. When discussing the barriers for real-world application, several ideas were put forth. These included implementing real-time population sensing, developing cheaper and simpler instruments that can be used by utilities of any size, and incorporating phosphorus recovery in all industries such as food reduction and waste recycling. Additionally, work must be done to develop regulations and incentives that help promote resource recovery while continuing to educate the public and increase awareness about the potential value.

Overall, the tone of the session was optimistic and attendees agreed that the research and ideas currently being developed were building a much-needed knowledge base that will soon be translated to implementation at WRRFs.

Addressing Environmental Effects

The forum also provided an opportunity to look broadly at the environmental effects of phosphorus recovery. Representatives from utilities and government entities who have successfully addressed phosphorus concerns in their regions provided insight on replicating

"The key to all good models is more data to better understand process dynamics."

their successes. All panelists agreed that clearly defining regional problems is the first step in beginning to address them; science alone can't fix all problems. The buy-in of local communities and positive public perception often drive success as much as sounds science. Without seeing a direct effect – perhaps the project isn't entirely local or the effects aren't readily visual – achieving buy-in can be difficult.

One example shared is the experience of the U.S. Environmental Protection Agency's Chesapeake Bay Program. When it first started, this program, which aims to clean up the formerly polluted bay, required getting signatures on more than 400 best

management practice documents from around the entire region. These 400 individual agreements combined to increase the health of the Bay but, individually, they only had a small effect and local communities had to be convinced to buy in to help the overall region.

Forum speakers recommended making the effort to translate national or regional challenges into the effects it has on your specific locality. By making it a personal issue, citizens are more likely to connect. Also, involving key, trusted members of a community can further help promote public acceptance. Overall, a clear message tackling a well-defined problem with which community members can engage is the best way to quickly and efficiently get projects completed locally.

More to Come

All participants reconvened at the end of the forum to summarize and discuss the best ways to approach phosphorus removal and recovery now and in the future. Throughout the next few months, the forum's Steering Committee members plan to summarize the event thoroughly and release outcome reports. They aim to capture the entirety of the forum, the current state of phosphorus removal and recovery science, what recovery needs to look like in the next 50 years, and what research needs to be tackled to meet these needs. In the meantime, the forum's complete, 42-page technical program can be accessed online at *www.wef.org/forum*.

Patrick Dube *is a technical program manager at the Water Science & Engineering Center at the Water Environment Federation (Alexandria, VA). He manages the Residuals and Biosolids Committee and the Air Quality & Odor Control Committee. He can be contacted at* PDube@wef.org.

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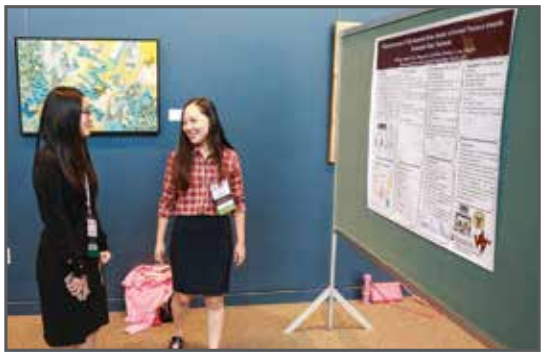

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Jack Lee - jjlee@dewberry.com
Daniel Edgell - daniel.edgell@hydromaxusa.com
Hanna Montoro - Hanna.Montoro@arcadis.com

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VirginiaSection

Why Should You Know the Utility Management Committee?

We bet most of you don't know what we do… We are a team focused on helping utilities optimize the management systems necessary to effectively and efficiently run a water sector utility. We try to stay abreast of the current utility-related management issues utilities are experiencing. We then use our resources to find solutions to these issues and develop training tools (webinars, lunch and learns, workshops, seminars, etc.) to educate utilities and their consultants on these solutions.

Other VWEA Committees Should Know…

We are your resource for speakers related to utility management topics. If you are considering including education on a utility management topic at your event, please reach out to us to discuss it before you finalize your topic or speaker. We would like to help you identify the right topic and speaker that fits your agenda all the while balancing utility management education across the Commonwealth.

Utilities and Utility Management Consultants Should Know…

We welcome you to join our committee to assist us with our mission and be a part of the conversation. Together we can more effectively identify issues and find solutions. We have separate subcommittees to allow for focused attention on specific topics. Some of these, such as the Financial Management subcommittee, are strictly working subcommittees. This means they are focused on how to solve problems and educate. Other subcommittees, such as the Asset Management subcommittee, include a monthly call for sharing what utilities are doing.

We have no intention of replacing the work with which utility management consultants provide utilities. We focus on education, not implementation. We educate on issues we are seeing ahead of time to provide notice to utilities and consultants who may not yet be experiencing the issues. We educate on solutions and optimizations that can help utilities. Finally, we educate utility staff on specific procedures to prepare for or enhance implementations.

Utility Management Committee Mission

To improve the management of water sector utilities by providing information to utility managers and other interested parties on a variety of utility management topics (asset management, alternative project delivery, change management, continuous improvement, energy and environment, ethics, financial management, leadership strategic planning, succession planning, and workforce issues).

Get Ready! We are Bringing a Utility Management Conference to Virginia!

We recognize there are many in Virginia who do not have the opportunity to attend the national AWWA/WEF Utility Management Conference, either due to cost, timing, or just too much work to take off the time required to travel and attend this three-day conference. When it comes to utility management systems, this conference has proven to be very valuable to those of us who have attended, so we want to bring the best of this conference to you. We are excited to announce the first annual Virginia Utility Management Conference in 2020. Not only is this conference an opportunity to learn what you may have missed at the national conference, but it is also a great opportunity to network with other utility managers in Virginia and discuss the management systems issues challenging us. We hope to see you there.

Earth Day 2019

How did you celebrate?

Every year on April 22, people around the world collect trash, clean waterways, plant trees, or watch environmental movies such as "The Lorax" and "The Human Element." They also participate in and attend events that raise awareness on the need to protect our planet. As water quality professionals, we have a direct impact on not only the public's well-being, but also on the quality of the water, air, and land around us. You may even say that many of us find that Earth Day truly is every day! This year, the Sustainable Utilities Committee wants to shine a light on Earth Day and what it is all about, and to also acknowledge the various Earth Day events that took place throughout Virginia.

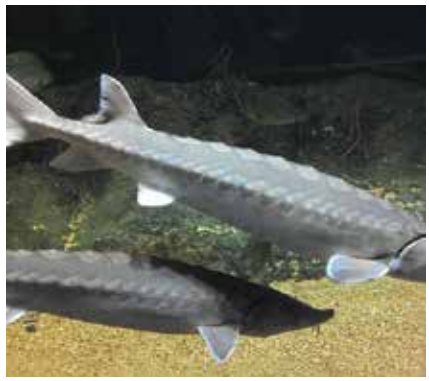
The theme for Earth Day this year, "Protect our Species," encouraged us to take pause and focus on understanding the threat that many species are under. In Virginia alone, there are more than twenty birds, turtles, fish, and mammals that are listed as either endangered or threatened. This includes the Atlantic Sturgeon, the Roseate Tern, and quite a few sea turtles, which include the Kemp's Ridley, the Hawksbill, and the Green sea turtle. And just to the south of us, in the Alligator River National Wildlife Refuge in North Carolina, red wolves are fighting for survival: less than 40 wolves remain in the wild. Our actions as a society have both direct and indirect impacts on the wildlife that either call Virginia home, or simply stop by during their migratory travels.

In a time where technology is king, it is time to reconnect all people with nature. Earth Day is always a good place to start in reminding us to stop and reflect on our daily impact on the planet. By taking pause on Earth Day and doing something impactful such as cleaning up a waterway, fundraising for an environmental cause, or educating the public on sustainability, we can all do our part to move our planet in the right direction.

Thank you to everyone who participated in an event this year. Efforts to improve our environment take place daily, so we would love to hear from you. Send us a photo or two of what you have done for the Earth, along with a short description, and we will include it in an upcoming article. And while you are at it, why not start planning now? April 22, 2020 is the **50-year anniversary** of the creation of Earth Day!

Here is a list of statewide events that took place in April in celebration of Earth Day:

1. April 5 – Town of Buchanan's Arbor Day Celebration; Buchanan, VA
2. April 13 – Earth Day Staunton; Staunton, VA
3. April 13 – Abingdon Earth Day Celebration; Abingdon, VA
4. April 20 – Earth Day Celebration at the Virginia Living Museum; Newport News, VA
5. April 20 – Virginia Zoo Party for the Planet; Norfolk, VA
6. April 20 – Earth Day Festival; Radford, VA



The Atlantic Sturgeon is protected as endangered in the Chesapeake Bay and is in decline both due to habitat loss and historic overfishing. It is now illegal to fish, catch, or keep sturgeon. An interesting fact: the Sturgeon dates back to 70 million years ago and can grow up to 16 feet in length. Photo courtesy of the National Oceanic and Atmospheric Administration.

7. April 27 – Mill Mountain Zoo's Party for the Planet; Roanoke, VA
8. April 27 – Earth Action Day; HRSD's Atlantic Plant, Virginia Beach, VA

Laboratory Practices Committee Activity News

The VWEA and VA AWWA Joint Laboratory Practices Committee is proud to announce that the 25th Annual Good Laboratory Practices Conference will be held at the Omni in Charlottesville on July 29-30, 2019. The event will consist of six half-day workshops on July 29 and technical programs on July 30. Technical program topics will cover the areas of drinking water, wastewater, and management. There will be an exhibitors' reception on the evening of July 29 with the latest in instrumentation and equipment on display.

The Good Laboratory Practices Conference is an excellent opportunity to meet and network with fellow professionals from all over Virginia, for wastewater and water operators to earn CPEs, and to earn CECs. Information regarding these worthwhile events and contact information will be posted on the VWEA and VA AWWA websites. So, mark your calendars and be on the lookout for more information to come!

The Laboratory Practices Committee also plans to present a workshop at WaterJAM 2019 in Virginia Beach on September 9.

The Laboratory Practices Committee membership consists of a variety of municipal wastewater and drinking water laboratories, commercial laboratories, as well as regulatory agencies and laboratory vendors. Meetings are held throughout the year to discuss such interesting topics as laboratory issues, changing methodologies, regulatory concerns, and quality assurance requirements.

The remaining Laboratory Practices Committee meetings for 2019 are scheduled as follows: June 19 and October 16. Meetings are held at the Henrico Water Operations Building; subcommittee meetings start at 10 a.m., followed by the full committee meeting at 11 a.m. There is a short technical presentation and lunch is provided. We encourage everyone interested to join, participate, and take advantage of the wealth of knowledge and experience that is there.

For more information, please contact Mignonne Wint, Chair: *mignonne.wint@norfolk.gov.*

2019 VWEA
Laboratory Analyst Excellence Award

The VWEA and the VA AWWA joint Laboratory Practices Committee congratulate **Sam Farag** of Fairfax County's Department of Public Works and Environmental Services for receiving the 2019 VWEA Laboratory Analyst Excellence Award. His work at Fairfax County has been exemplary, as noted by his supervisor, Brian Polick, who nominated Sam for this award.

The Laboratory Practices Committee will be submitting Sam's name to the VWEA Awards Committee as the laboratory professional selected to receive the 2019 award. The award will be announced at the awards banquet at WaterJAM 2019, which will be held on September 9-13 at the Virginia Beach Convention Center.

In recognition of his exceptional career as a laboratory analyst, the association will pay for Sam's WEF/VWEA membership for one year. In addition, Sam will receive complimentary one-day registration to WaterJAM and the awards banquet and will be provided a complimentary registration to the Lab Practices Committee's 25th Annual Good Laboratory Practices Conference, which will be held at the Omni in Charlottesville on July 29-30.

The Laboratory Analyst Excellence Award is the highest recognition given by the association to a laboratory professional. It acknowledges significant contributions to the water and wastewater industry, dedication to improving the environment, and professionalism in the laboratory. The Laboratory Practices Committee encourages everyone to consider becoming a member of VWEA or VA AWWA to make a difference not only in their own community, but worldwide.

WATERJAM
DIGITAL KNOWLEDGE COMPETITION

Calling Student and YP members to enter the
Digital Knowledge Competition!

DKC presentations are 30 seconds to 2 minutes and should present a concentrated message to showcase recent or ongoing research, or innovative or novel ideas related to the fields of water and wastewater. Video submissions may utilize any combination of footage, photographic images, animation, voice-over, music, humor, etc. to illustrate the message. Presentations will utilize video to engage, educate, and interact with audiences local and remote to WaterJAM.

All Digital Knowledge Presentations will be presented on a dedicated monitor at WaterJAM for the region's Industry Professionals to enjoy! Student and YP winners will be selected. First place and second place winners will be awarded $500 and $250, respectively.

Concise abstracts (max 200 words) must be submitted no later than **Friday, August 16, 2019.**
No video will be reviewed without abstract submission and approval.
Final video submissions must be received no later than **Friday, August 30, 2019.**

Visit www.vwea.org/?page=DigitalKnowledge for more information.

Contact Rebecca Holgate with questions: rholgate@hazenandsawyer.com

VWEA
Virginia Water Environment Association

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26th Annual NVRAC Golf Classic

When: Tuesday, June 11, 2019
Where: 1757 Golf Club
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Register online until Tuesday, June 4, 2019
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Join **VWEA** and your **water industry associates** at the **26th Annual NVRAC Golf Classic**. Team play is **four-player scramble** and will be followed by a **lunch awards** and **prizes ceremony**.

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Fees are $120 per player (includes greens fee, cart fee, driving range, contests, awards, and prizes!). Registration and payment are due by **Tuesday, June 4.**

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Tlipinski@loudounwater.org

Member Spotlight

Each year the VWEA recruits, attracts, and adds new members to its ranks. Our diverse membership includes students, academics, and professionals (working and retired) from the public and private water industry and beyond. A list of recent member additions and their current affiliations (if known) are presented below. You can get to know a little more about our current membership by checking out the member bios included herein.

Khantil Buch
Monika Bueltel, Greeley and Hansen
Doug Canody
Gayle England
Doug Flanagin
Stefan P. Haas, Loudoun Water
Ian Macdougall, Balfour Beatty Infrastructure, Inc.
Romaric X. Moncrieffe, Arlington County Water Pollution Control Bureau
Natasha Nicholson, O'Brien & Gere Engineers, Inc.
Samantha M. Sifre, Arlington County Water Pollution Control Bureau
Erik W. Smedley, Loudoun Water
Betsy Smith, Fairfax County Department of Public Works and Environmental Services
Kristen Walls
Kathleen Whitten, Loudoun Water
Rick Zaepfel, Loudoun Water
Christian I. Zepeda, Arlington County Water Pollution Control Bureau

Name: SARAH WILLIAMS

Month or years with VWEA: 2 years
Company/Profession: Principal Civil Engineer with Kennedy Jenks Consultants.
Years of Experience: 16
Home Town: Denver, CO. I have lived in Virginia Beach for two years.

What kind of projects do you work on? Project management and design of civil water and wastewater projects. I love pipelines and site civil!

What drew you to joining VWEA? Networking and continuing education opportunities.

What is your favorite thing to do outside of the office? Ride my horse and go sailing on the Chesapeake Bay.

Name: MIKE WOODEN

Month or years with VWEA: 10 years
Company/Profession: Arcadis
Years of Experience: 24
Home Town: Glen Allen, VA

What kind of projects do you work on? I've managed a variety of water supply, wastewater collection and treatment, and stormwater management projects

What drew you to joining VWEA? The opportunity to meet and learn from other wastewater professionals and stay current on trends within our industry.

What is your favorite thing to do outside of the office? When I'm not working, chances are you'll find me playing or coaching soccer.

2019 BUYERS GUIDE

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RELINER/Duran Inc.
SEKISUI SPR Americas, LLC
Timmons Group
Tri-State Utilities
Whitman, Requardt and Associates, LLP

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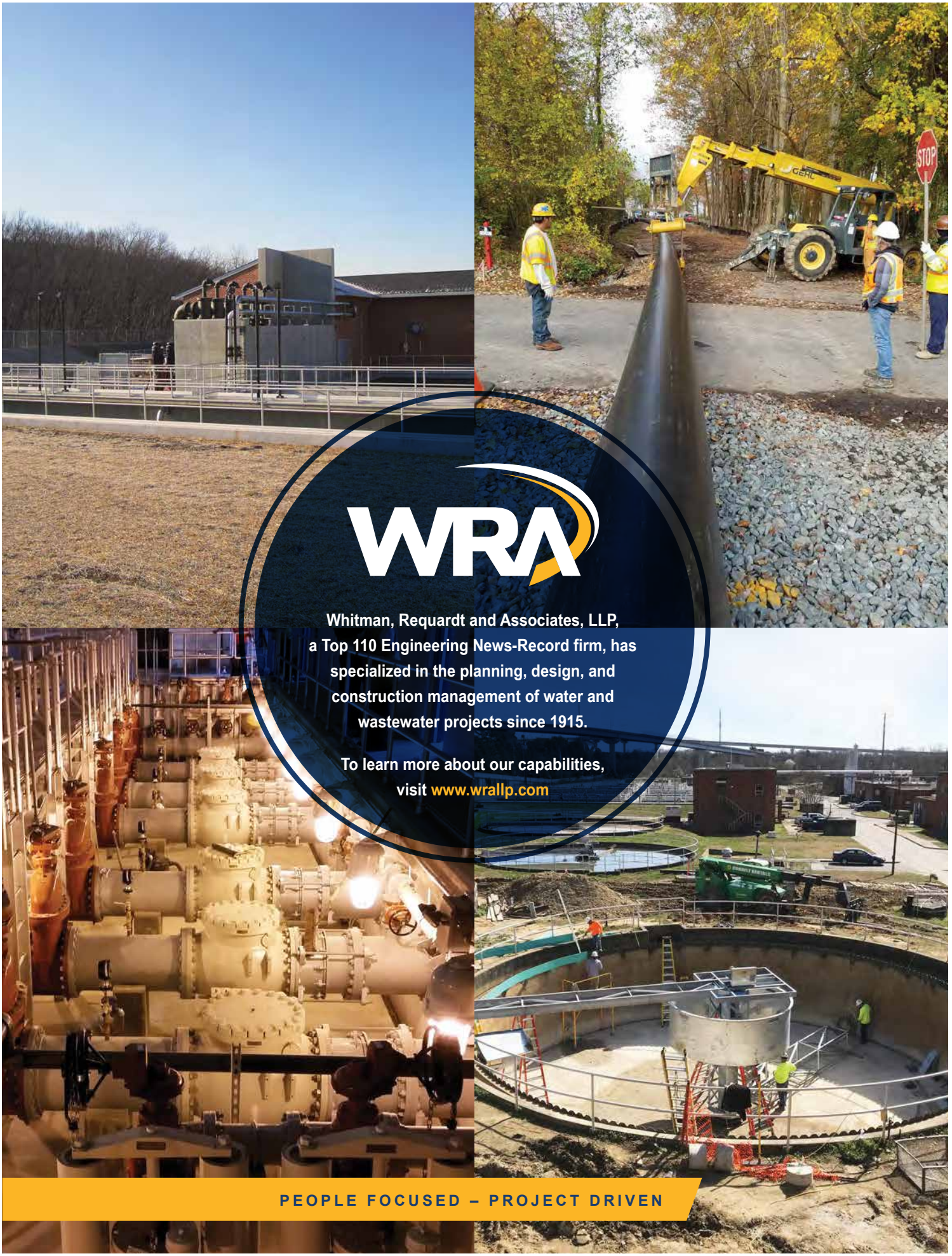
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