Ohio Water Environment Association
Volume 96:1 | Issue 1 2023

Buckeye Bulletin

CITY OF DEFIANCE WPC

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OHIO WATER ENVIRONMENT ASSOCIATION

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Table of Contents

OWEA ONE WATER WEF TECHNICAL HUMAN INTEREST

The Buckeye Bulletin is published four times per year by the Ohio Water Environment Association.
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Disclaimer

The Buckeye Bulletin (BB) is the official publication of the Ohio Water Environment Association, Inc., a not-for-profit corporation founded in 1926, dedicated to the improvement of water quality in Ohio and the continuing education of water professionals. It is one of the top five member associations of the Water Environment Federation.

The ideas, opinions, concepts, and procedures expressed in this publication are those of the individual authors and not necessarily those of the Ohio Water Environment Association, its officers, general membership, or staff.

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Other photos OWEA Section and Committee photographers, article contributors, and advertisers, (list not all inclusive).

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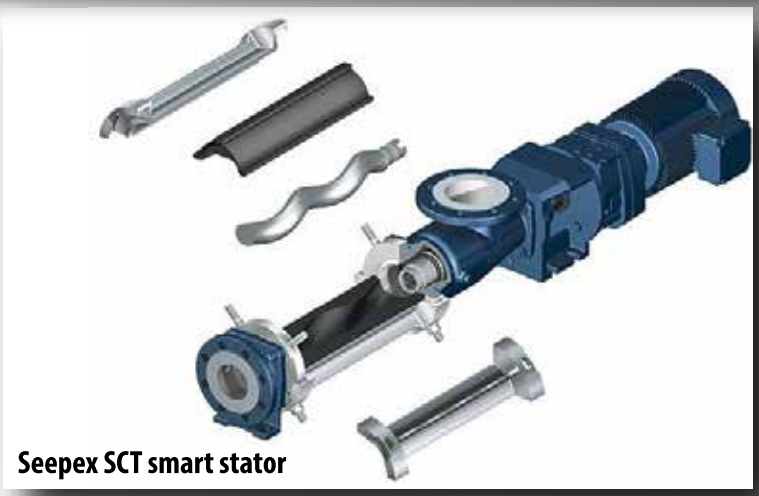
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President's Message

As President of OWEA, it is my goal to evaluate how the Organization has done, is doing and will do in the future. As part of that evaluation, I would like to share some of the OWEA accomplishments of 2022 and goals for 2023.

Brandon Fox
OWEA President

2022

- Provided 137 Professional Development Hours
- Created State Only Membership to expand membership opportunities and added 43 State only members
- Had another successful One Water Conference in Cleveland with almost 1,400 attendees
- Had over 2,600 attendees at other various workshops and webinars
- Established balanced budget and created Finance Task Force to evaluate short- and long-term financial strength of OWEA and make recommendations for future policies
- Continued a successful sponsorship program with a total of 38 sponsors and 58 advertisers
- Created Diversity, Equity and Inclusion Committee chaired by Kari Mackenbach and Miyah Bayless
- Established Water Training Academy as part of OWEA's continued efforts to provide best in class training
- Met with Ohio EPA Administration to continue dialogue on challenges and opportunities of the Water community and OWEA's membership
- Supported Section initiatives
- WEF held annual Residuals and Biosolids Conference in Columbus and had more than 200 attend the Friends of Biosolids event.

Upcoming Executive Committee Meetings

March 14, 2023

May 9, 2023

Brandon Fox recently changed roles to become the Project Manager for the City of Newark Division of Water and Wastewater. Prior to Newark, he was the Plant Manager for the City of Columbus Jackson Pike WWTP for seven years and the Residuals Manager for three and a half years. He started his career as an Operator in Training at Fairfield County Utilities in 2004 after earning a Bachelors Degree in Agriculture from The Ohio State University. He holds an OEPA Class 4 Wastewater License and a Class 3 Water License. Brandon is currently the President for OWEA. Away from work, he enjoys anything outdoors, woodworking, watching his children play sports, gardening, and spending time with his family and wife of 20 years, Mandy.

President's Message

2023 Goals

- Continue to be the go-to organization for Ohio Water Professionals for education and networking opportunities
- Expand Diversity, Equity and Inclusion efforts throughout all OWEA functions
- Achieve 2,000 attendees at One Water Conference in Columbus
- Kickoff Introductory Wastewater Training course in September
- Continue to support Section initiatives
- Evaluate opportunity for Pre-treatment/ Industrial Waste Workshop
- Review and update all OWEA Policies and Procedures

As you can see, OWEA has many accomplishments to be proud of and many more exciting opportunities ahead of us. Obviously, none of this is possible without volunteers. I would like to sincerely thank anyone who volunteered at any level during the last year and hope that you pull others into the volunteer community in the future. Once someone becomes involved, their personal and professional growth is vastly expanded. Additionally, please continue to support the Sponsors and businesses that are throughout the Buckeye Bulletin. They provide financial support to OWEA to allow the organization to stay strong and create new opportunities for its members.

Even though there is a lot going on within OWEA, we are always looking for new and innovative ideas so please share any thoughts for improvements. OWEA must continue to stay nimble as we progress into 2023 and beyond. I look forward to seeing you at a future event.

Welcome New Members

October 2022 - December 2022

Tanner Adair
Jehan Alkhayri
Matt Ambrogi
Jim Balogh
Patrick Blake
Courtney Boyle
Bichwan Boyles
James Brescol
Kerri Cheng
Dusty Cunningham
Edward Cvelbar
Frank Duran
Shane Durnawald
Don Eagle
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Brent Ogburn
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Clint Pemberton
Anisa Pike
Travis Rodriguez
Chris Ronksi
Henry Stephenson
Dustin Stoops
Mark Suchan
Lindsey Sullivan
Michael Tabin
Brandon Taynor
Erik Vasko
Patrick Vescovi
Gary Wagner
Steven Watson

Thank you for joining the Ohio Water Environment Association.
We welcome your contribution to preserving and enhancing Ohio's water quality environment.

2023 Webinar Dates	
3/8/23	10 AM
4/12/23	3 PM
5/10/23	10 AM
6/14/23	3 PM
7/12/23	10 AM
8/9/23	3 PM
9/13/23	10 AM
10/11/23	3 PM
11/8/23	10 AM
12/13/23	3 PM

OWEA

- All topics will be OM (Operations & Maintenance Approved
- One hour long
- $15 per webinar for members
- Topics will include PFAS, Collections, Financial Stability, Biosolids, Emerging Technologies, & more
- Conveniently the second Wednesday of every month with alternating times to accomodate various schedules

Register at www.ohiowea.org

Save the Date

Plant Operations Workshop
April 25-26, 2023

Watershed Workshop
October 25, 2023

Collection Systems Workshop
May 16, 2023

Biosolids Workshop
December 5, 2023

One Water

August 21-24, 2023

Greater Columbus Convention Center **Columbus, OH**

SAVE THE DATE

- Exhibitor Registration now open
- Attendee Registration opens in April
- Technical Program will be published late April

who should attend

- Utility professionals
- Engineers
- Young professionals
- Manufacturers
- Retired professionals

topics

- Asset Management
- Collections
- Distribution
- Ethics
- Management
- Treatment

...and much more! The full technical program will be available spring 2023 at www.onewaterohio.org

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OWEA

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90+ Ohio staff

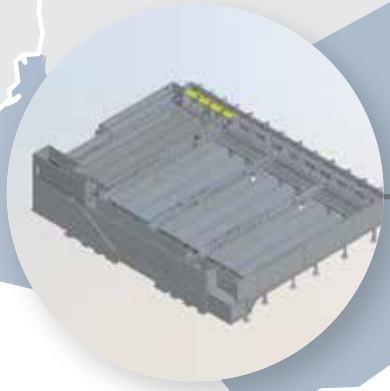
OWEA Volunteer Support:

- 2 Section EC / Presidents
- OWEA EC / President
- Multiple state section committees

1,500+ national staff

100% of revenue from water engineering

Examples of Hazen's Planning and Design Projects Throughout Ohio:



Cleveland Office

Rocky River WWTP CEPT and Final Clarifier Improvements – Phase I

Akron Office

Hazen provided regulatory assistance and prepared a No Feasible Alternative (NFA) that resulted in phased implementation of wet weather improvements at the plant and in the four member communities. Hazen is delivering the first phase of plant improvements, which includes conversion of existing tanks to Chemically Enhanced Primary Treatment (CEPT) and High Rate Disinfection (HRD) to provide up to 80 mgd of additional wet weather treatment capacity.

Columbus Office

Marion Long Term Control Plan Phase I – WPCC Enhancement

Hazen provided regulatory assistance in support in the development of an Integrated Plan to address the City's unique collection system and treatment configuration. Phase 1 included increasing the wet weather treatment capacity from 22 mgd to 51 mgd to reduce CSO frequency and volume.

Cincinnati Office

Program Management for Post Construction Monitoring and Modeling for the LMCPR – MSDGC, Cincinnati, OH

Following recalibration of the Mill Creek system-wide model with 180 flow meters, the Hazen team confirmed the Lower Mill Creek Partial Remedy improvements, including MSD's Lick Run Greenway project, achieved the CSO volumetric reduction of 1.67 Billion Gallons for the typical year continuous simulation.

Wastewater | Drinking Water | Stormwater | Reuse

Hazen

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Stantec

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Ohio

Cleveland… Volunteer Food Basket Preparation—Stantec in the Community Event

Columbus… OSU Engineering Learning House Community Autumn Festival

Cincinnati… Lick Run Clean Up—Stantec in the Community Event

…where we live, work, and play!

We care about the communities we serve—because they are our communities, too. This allows us to assess what's needed and connect our expertise (265+ professionals in Ohio); to appreciate the nuances and envision what's never been considered; and to bring together diverse perspectives to collaborate toward a shared success.

Stantec has a long successful history of service with a wide-range of local communities in the water and wastewater industries. While our large network and depth of expertise allows us to execute large projects, we also work on smaller projects and embrace the ability to improve the quality of life in any community.

stantec.com/ohio-offices

We are a community of designers, advisors, and creatives. Redefine your personal best. **Join us**.

MASI Laboratories

by Richard Harner

FACILITY NAME AND LOCATION:

MASI Environmental Laboratories

- 7940 Memorial Drive, Plain City Ohio 43064 (Main Lab- Wet Chem, Micro, HABS, Metals,)
- 11405 Century Circle West, Cincinnati Ohio 45246 (Organic Lab)
- 8235 Estates Parkway, Plain City Ohio 43064 (Corp Office and future site of Main Lab)

DESCRIPTION:

MASI (Mobile Analytical Services, Inc.) is a full-service laboratory specializing in the analysis of drinking water, wastewater, stormwater, and solid and hazardous waste. MASI offers OEPA and industrial electronic data deliverables, and a statewide courier service, providing a safe and timely delivery of samples to the laboratory. With 47 years of experience, MASI has proven the ability to adapt and service our environmental clients.

Current Facility

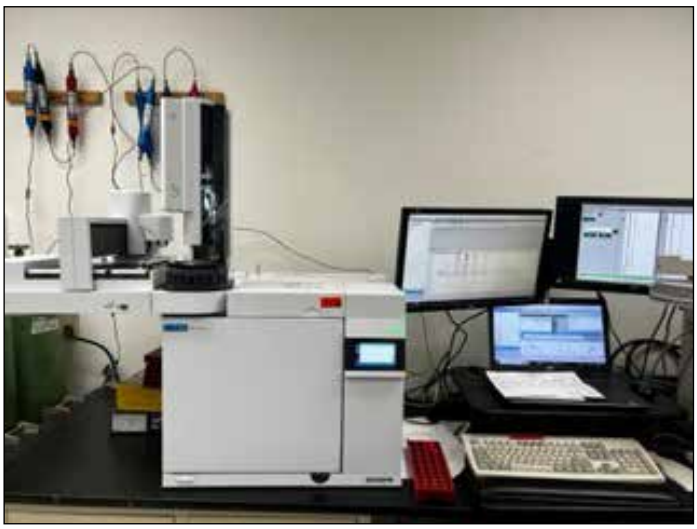
HOW MANY ANALYSTS/TECHNICIANS WORK IN THE LABORATORY?

19 Full-time / five Part-time EE (Equal Employment)

DO YOU ACCEPT SAMPLES FROM OUTSIDE SOURCES?

"YES" MASI accepts samples from public water systems, NPDES systems, industries, environmental consulting firms, other laboratories, and public health facilities.

VOA Instrument



HAA Instrument

WHAT ANALYSIS DO YOU PERFORM?

MASI is an OEPA certified drinking water laboratory. We analyze all Ohio certified analyses in-house, except for radiologicals. MASI can analyze 98% of all NPDES parameters, stormwater requirements, and discharge permit analyses in-house.

OTHER DUTIES YOUR LABORATORY IS RESPONSIBLE FOR?

MASI offers two additional services that coincide with laboratory testing.

- Statewide sample pick up and container replacement service
- Field Project Group - Offers the ability to perform on-site monitoring, sampling, and compliance tracking for small PWS, NPDES permits, and industrial requirements.

Where it all started in 1976 (Mobile) Analytical Services Inc, to where we are today with over 20 vehicles in service.

Lab Profile

DO YOU USE A CONTRACT LABORATORY?

"YES" Although MASI can analyze 95% of Ohio's drinking and waste requirements, MASI uses multiple contract laboratories as part of our emergency contingency plan to keep our clients in compliance with their permits and project requirements.

DO YOU HAVE ANY PERMITTED INDUSTRIES?

"YES" MASI works closely with multiple permitted industries throughout Ohio.

New Facility

HAVE YOU ASSISTED WITH ANY PILOT STUDIES OR UNCOMMON TESTING?

"YES" MASI has worked with various consulting firms, over the years, completing pilot studies, for new and exciting water and wastewater plant upgrades.

IS THERE ANYTHING ELSE WE SHOULD KNOW ABOUT YOUR LABORATORY?

MASI is excited to announce that we are in the designing phase, to build a state-of-the-art laboratory, combining our corporate offices and main laboratory, to continue supporting Ohio environmental challenges.

Lab Profile

Interested in showing off your lab? We want to hear from all wastewater labs around Ohio, big and small!

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Melodi Clark
MLClark@columbus.gov

Co-State Chair
Anthony Hintze
tjhintze@gmail.com

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City of Defiance Water Pollution Control

by: Kevin Connor, Assistant Superintendent

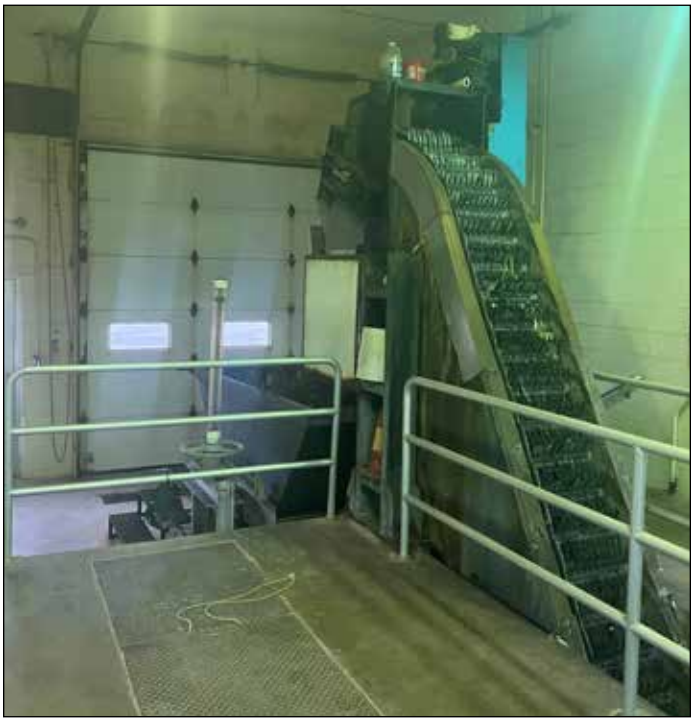
History

Defiance was first settled on the banks of the Maumee and Auglaize Rivers. As the population grew, it formally became a city in 1881. The first sewers were installed toward the end of the nineteenth century to remove sewage from the populated downtown district positioned at the confluence of the rivers. These sewers were designed to remove sanitary waste and stormwater to be discharge directly into the rivers. As the population continued to increase in the early 20th century, the city was compelled to do more than discharge to the river to avoid potential health hazards. The Water Pollution Control Facility was constructed in the late 1950's with exclusively primary treatment and chlorine disinfection. Over the last sixty years our facility has seen three major upgrades though out its history. The current plant has a design flow of 6.5 MGD, average flow of 3.2 MGD, and can see peak flows up to 15 MGD during wet weather events. The Water Pollution Control Facility currently services Defiance's 17,000 residents, portions of Defiance County and Ayersville for a total service population of approximately 20,000 people.

Influent

The city maintains 25 separate pump stations throughout the city. Flow enters the headworks from six separate pump stations. The stream enters two grit tanks which are aerated with two positive displacement 5 HP blowers. Flow then travels through an Aqua-Guard Parkson mechanical bar screen with 5/8 inch opening. A separate manual bar screen is used during high flows. An Ecolo AirPro Odor Control Unit has been installed to reduce odors at the headworks and to reduce the amount of hydrogen sulfide inside the building.

Grit Building



Parkson Unit

Primary Tanks

Primary Treatment/Solids Handling

After grit screening, flow travels through four rectangular clarifiers and one circular clarifier. Solids removed from the primary clarifiers are pumped by two Netzch Rotary Lobe pumps to both anerobic digesters. Macerator cutting blades are attached to the Netzch pumps to cut up rags and debris that advanced past the bar screen. Both digesters were upgraded to Evoqua Dystor Dual Membranes in 2018. Each membrane system holds 35,000 cubic feet of methane gas that is stored and used to fuel the digester boiler. Any excess gas is wasted to the burner.

Digestor levels are monitored and adjusted daily and sludge is removed to four holding lagoons that hold approximately one million gallons of solids each. Biosolids are removed annually in the late summer and early fall which are land applied to local farm fields at approximately 5% solids.

Secondary Treatment

With the addition of sodium aluminate for phosphorus removal after primary treatment, flow then travels to three single pass aeration tanks. Each tank individually uses 278 EDI fine bubble diffusers. Air is supplied from either an HSI High Speed 150 HP Turbo Blower or a 200 HP Lamson blower depending on the season and dissolved oxygen levels in each tank.

Three final clarifiers are used for solids separation. Seven Deming RAS pumps remove solids from the clarifiers and return back to the aeration influent stream. Two Gorman-Rupp pumps move the WAS stream from the final tanks back to the primary splitter box before being sent to the anerobic digesters.

Digesters

Aeration Tanks

Final Tanks

Disinfection

From May to October, disinfection is required by Ohio EPA. At the conclusion of the 2019 disinfection season, construction was underway to replace the chlorine gas system with ultraviolet disinfection. With a few minor delays in the late spring due to COVID-19, Enaqua's non-contact disinfection system was fully operational in June of 2020. There are two separate channels with a total of 936 bulbs that can treat up to 15 million gallons of wastewater per day. Effluent from the UV system is then discharged directly into the Maumee River just upstream from Independence Dam State Park.

Laboratory/Pretreatment

We have one full time lab chemist who is responsible for running process control tests as well as the EPA required tests. Alkalinity, ammonia, cBOD, COD, E. coli, pH, TSS/TVSS, UVT, and volatile acids are all completed in house while all other tests are sent to Alloway in Lima, OH.

Permit Limits

cBOD summer	20 mg/L weekly	13 mg/L monthly
cBOD winter	30 mg/L weekly	20.0 mg/L monthly
Dissolved oxygen	5.3 mg/L minimum	
ecoli	284 (weekly geometric mean)	126 (monthly geometric mean)
Nitrogen, Ammonia summer	8.0 mg/L weekly	5.3 mg/L monthly
Nitrogen, Ammonia winter	20.0 mg/L weekly	13.0 mg/L monthly
pH	9.0 maximum	6.5 minimum
Phosphorus	1.5 mg/L weekly	1.0 mg/L monthly
Total Suspended Solids	36.0 mg/L weekly	24.0 mg/L monthly

Plant Profile

The city's approved pretreatment program currently monitors 10 industries. 13% of WPC's influent flow comes from industrial users. All 10 industries are sampled quarterly by the city's industrial sampling team. Five of those industries are sampled monthly for high strength waste under the surcharge program. Industries exceeding 250 mg/L for total suspended solids and 500 mg/L for chemical oxygen demand are charged an additional $0.0830 and $0.0288 per pound.

UV Building

Laboratory

The Importance of Reducing Concrete Permeability in Water and Wastewater Structures

by Kayla Hanson, Concrete Sealants, Inc.

Tailor-Made Durability

It's well-known that concrete is the most widely used construction material in the world. This is thanks in large part to concrete's incredible strength, durability, economy, and long service life, as well as vast accessibility to its raw materials. However, not all concrete is created equal. Concrete's fresh and hardened properties are dictated by its raw materials and the proportions in which they're used; concrete production practices like mixing, placing, and finishing; and its curing environment including temperature, moisture conditions, and curing duration. This is immensely valuable because it means that concrete can be tailored to exhibit specific properties and perform in ways that are advantageous both in its fresh state during construction and in its hardened state in various service conditions. This includes making concrete set faster in cold weather, making it more flowable to properly fill forms with heavy rebar congestion, and making it more durable in harsh wastewater environments, just to name a few.

U.S. infrastructure – including water and wastewater storage, treatment, and conveyance systems – has been at the forefront of political and social discussions in recent years, with infrastructure durability at the crux of it all. ACI 201.2R, "Guide to Durable Concrete" advises that concrete permeability is directly related to its durability, and that reducing concrete permeability is a critical factor that can improve durability. The correlation between permeability and durability, combined with our understanding of how to manipulate concrete to achieve specific fresh and hardened concrete performance, enables us to optimize concrete for myriad conditions and construct durable infrastructure that can stand the test of time.

Concrete Permeability

Permeability is the rate at which water, air, gas, or other substances penetrate and migrate through a material under a pressure gradient. Permeability is measured as a speed, i.e. ft/s or m/s. As reported in ACI 201.2R, this rate ranges from about $1 \times 10{-}15$ m/s for concrete with a water-to-cement ratio of 0.3 to about $1.2 \times 10{-}12$ m/s for concrete with water-to-cement ratio of 0.7. (Powers et al, 1954.)

Pores and Porosity

Despite being an inherently strong and dense material, the nature of concrete's chemistry and production process results in an array of varying-sized pores throughout the otherwise dense concrete matrix. Employing production best practices can minimize or essentially eliminate larger unwanted pores like entrapped air – which result from concrete mixing and placing – that are visible to the naked eye. Conversely, the microscopic pores including gel pores and capillary pores – which result from chemical reactions during cement hydration – are generally unaffected by production practices and remain an intrinsic part of the concrete matrix.

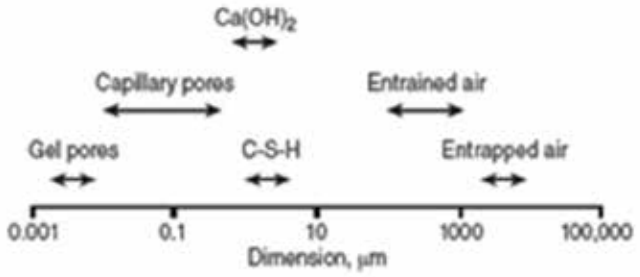


Figure 1: Relative sizes of different types of pores and other microstructural features (ACI 201.2R-16)

Porosity is the ratio of the volume of pores and other void spaces in a mass of concrete to the total volume of the mass of concrete, represented as a unitless decimal value. When there are fewer pores and void spaces, and pores and void spaces are smaller and spaced further apart (corresponding to a low porosity), the rate at which a substance can travel through a mass of concrete is reduced significantly (corresponding to a low permeability). A high porosity generally corresponds to a high permeability, while a low porosity generally corresponds to a low permeability.

Watertightness

Watertightness – the quality of being designed, constructed, installed, and maintained to be impervious to water – is important for many different types of treatment, holding, and conveyance structures, but is especially critical to wastewater structures. Wastewater exfiltration through cracks, leaking joints, faulty connections, or other areas can contaminate surrounding soil, groundwater, and ecosystems. This can also detrimentally impact the treatment environment inside certain structures due to maintaining a lower volume of wastewater than what the system was designed to maintain and a change in the biological environment. Infiltration and inflow are seemingly less concerning than exfiltration but can still negatively impact the system and its performance. Infiltration and inflow add to the volume of treated wastewater, reduce the capacity available for treating actual wastewater, and can alter the treatment environment within the system.

Impact of Porosity and Permeability on Durability and Watertightness

Concrete's durability could be compromised when substances penetrate concrete's pores. According to ACI 201.2R, "The ingress of gases, liquids, or ions in solution through concrete may initiate chemical processes, physical processes, or both, that affect the durability of the concrete under a given set of service conditions."

Water is one of concrete's most notorious potential enemies. Water that is allowed to penetrate concrete and travel through it via a pore system could be capable of corroding steel, going through freeze/thaw cycles, or carrying detrimental substances into the concrete matrix – all of which could result in cracking, spalling, or other forms of concrete degradation.

Furthermore, porosity and permeability have direct impacts on a structure or system's watertightness. Porous and permeable concrete will not achieve watertightness without additional measures like sealer or coating application. In short, low concrete porosity can lead to low permeability, and low permeability can help improve watertightness and enhance concrete's durability.

Low Permeability for Enhanced Durability, Watertightness, and Efficiency

There are myriad approaches and strategies to produce low-permeability concrete. Numerous can be employed proactively, prior to mixing a batch of concrete.

Low Water-to-Cementitious Materials Ratio

Use of a concrete mix design with a low water-to-cementitious materials ratio (w/cm) is the first key to producing low-permeability concrete. A w/cm is the ratio of the weight of all the cementitious materials in a batch of concrete – including cement and any supplementary cementitious materials – divided by the weight of the water used in the batch. This value should always be 0.48 or lower for durable concrete structures, with lower w/cm limits for specific environments or applications. A specific amount of cement needs a certain amount of water to hydrate and undergo chemical reactions that produce strong cement paste. Some additional water is incorporated for practical purposes, but beyond that, any more water in the concrete mix potentially could be detrimental. Eventually, excess water in the concrete – beyond what is needed for cement hydration – will evaporate during curing and leave small pores or void spaces. Void spaces not only increase concrete porosity and permeability, but also reduce concrete's compressive strength.

Well-Graded Aggregates

Aggregates are an inherently strong and economical component of concrete. Use of well-graded aggregates and the largest maximum size aggregate possible also helps produce low-permeability concrete. Well-graded aggregates consist of a range of particle sizes while poorly-graded or gap-graded aggregates may only consist of one or two primary aggregate sizes. Using a variety of aggregate sizes, including the largest maximum size aggregate possible for the application, provides better particle packing and reduces the volume of cement paste needed to fill the gaps between aggregates. Cement paste consists primarily of cement and water. Therefore, reducing the volume of cement paste in a batch of concrete not only reduces the amount of water needed in the batch and can enhance density of the concrete matrix, but also reduces the amount of cement needed in the batch and could provide cost-savings.

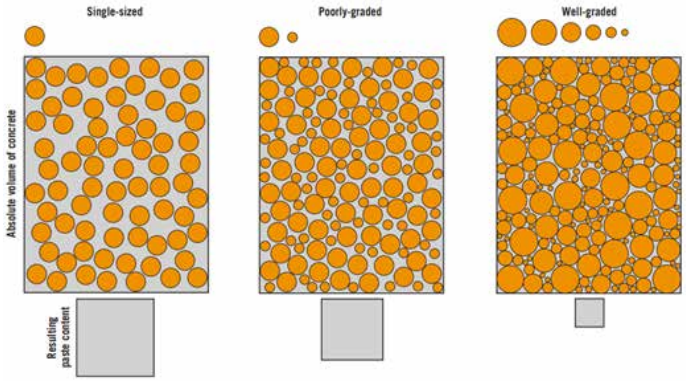


Figure 2: For equal absolute volumes when different aggregate sizes are combined, the void content decreases, thus the necessary paste content decreases. (PCA Design and Control of Concrete Mixtures, 15th Ed.)

Supplementary Cementitious Materials

Use of supplementary cementitious materials (SCMs) including fly ash, slag, silica fume, and metakaolin are proven to reduce concrete permeability and absorption. SCMs are batched into the concrete mixer much like ordinary portland cement, but some react differently than cement. Portland cement is hydraulic, meaning it reacts readily with water. Two main products of cement hydration reactions are calcium silicate hydrate (CSH) and calcium hydroxide (CH). CSH provides significant strength and density, and while CH is not detrimental to concrete in most service environments, it also does not contribute much strength. Certain SCMs, on the other hand, need more than just water to undergo chemical reactions. Pozzolanic SCMs react with water and CH and produce CSH. This process essentially replaces an arguably neutral component in the concrete matrix with a stronger and denser material. Therefore, use of SCMs not only offers greater long-term strength development potential compared to the same mix design using only

portland cement, but also enhances density and reduces permeability and absorption.

	Fly ash		Slag cement	Silica fume	Natural pozzolans		
	Class F	Class C			Calcined shale	Calcined clay	Metakaolin
Early age strength gain	↓	↔	↕	↑	↓	↓	↑
Long term strength gain	↑	↑	↑	↑	↑	↑	↑
Abrasion resistance	↔	↔	↔	↔	↔	↔	↔
Drying shrinkage and creep	↔	↔	↔	↔	↔	↔	↔
Permeability and absorption	↓	↓	↓	↓	↓	↓	↓
Corrosion resistance	↑	↑	↑	↑	↑	↑	↑
Alkali-silica reactivity	↓	↓	↓	↓	↓	↓	↓
Sulfate resistance	↑	↕	↑	↑	↑	↑	↑
Freezing and thawing	↔	↔	↔	↔	↔	↔	↔
Deicer scaling resistance	↕	↕	↕	↕	↕	↕	↕

Key: ↓ Lowers ↑ Increases ↕ May increase or lower ↔ No impact ↕ May lower or have no impact

Figure 3: Impact of SCM characteristics on the hardened properties of concrete (PCA Design and Control of Concrete Mixtures, 15th Ed.)

Permeability-Reducing Admixtures

Additionally, permeability-reducing admixtures (PRAs) can also be used to lower concrete permeability and reduce absorption. PRAs are available in liquid or powder form and are batched into the concrete mixer so they become evenly distributed throughout the batch. PRAs generally work similarly to pozzolanic SCMs, by reacting with the less-desirable CH to produce highly-desirable CSH. PRAs are categorized as permeability-reducing admixtures – hydrostatic (PRAHs) or permeability-reducing admixtures – non-hydrostatic (PRANs). PRAHs incorporated into concrete enable the concrete to reduce absorption by upwards of 98% and can waterproof concrete up to 200 psi, while PRANs are designed to reduce absorption of non-pressurized water. Because PRAs typically function like pozzolanic SCMs, they also tend to boost concrete compressive strength among other secondary benefits.

Figure 4: Concrete produced with a permeability-reducing admixture – hydrostatic (also referred to as a concrete densifying admixture, hence "CDA"), left, and concrete produced without a permeability-reducing admixture (also referred to as the reference or "control" concrete), right. (Concrete Sealants, Inc. file photos)

Other Permeability-Reducing Strategies

Other strategies for permeability- and absorption-reduction can be employed in conjunction with the aforementioned proactive measures and can be incorporated into the structure or system after the concrete has cured or has been installed.

Waterproofing Coatings

Various durable waterproofing coatings are available specifically for wastewater infrastructure applications. Waterproofing coatings create a membrane on the concrete surface that can entirely prevent concrete contact with moisture and prevent absorption under pressure. Some coatings are elastomeric, meaning they remain flexible after curing and can bridge some cracks and allow for slight structural movement without compromising the coating integrity.

Penetrating Sealers

Penetrating sealers are topically-applied sealers that can provide various benefits. Some sealers are reactive, meaning they penetrate the concrete surface to a certain depth, react with CH, and produce CSH. This process blocks concrete pores and strengthens and densifies the

concrete surface. Other sealers are capable of creating a hydrophobic surface, which forces water droplets to bead and roll off the concrete. Both are advantageous for preventing moisture absorption and reducing surface permeability.

Exterior Joint Wraps

Another common approach to reducing the likelihood of water penetration is to use an exterior joint wrap. Infiltration and exfiltration in any structure or system – whether a house, car, or wastewater system – is most likely to occur at points of material discontinuity, like joints or connection points. Structure joints are sealed with preformed flexible joint sealants, gaskets, waterstops, or some combination thereof. With certain structures, flexible wrap is also applied on the exterior of the structure around the entire joint. This not only provides another layer of protection over the crucial joint, but it also prevents soil and particulate penetration, which, during backfill or as a result of shifting or movement over time, can force joints apart and compromise its ability to prevent infiltration.

Low Permeability for Enhanced Durability

Concrete's fresh and hardened properties – including its permeability – are significantly influenced by the raw materials, mix design, and production and curing practices used to manufacture it. Many effective, long-lasting, low-cost, and low- or no-maintenance permeability-reduction options exist and can be incorporated into a concrete structure during construction and upon installation. Specifying permeability-reduction strategies can enhance concrete durability; protect the integrity and performance of water and wastewater storage, treatment, and conveyance systems; and enhance the service life of critical infrastructure.

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Discount on One Water events	✓	✓
Complimentary Job Postings	✓	✓
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Subscription to the OWEA electronic newsletter	✓	✓
Ability to serve as both members and chairs on OWEA/ Section committees	✓	✓
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Ability to serve on the OWEA Executive Committee	✓	
Ability to serve on WEF committees or in leadership	✓	
WEF Publications	✓	
Complimentary WEF webcasts	✓	
Discounts on WEF technical publications, products and services	✓	
Utility Partnership Program	✓	

Understanding and Implementing an NPDES Monitoring Program

by Julie Morelli, P.G., REM, CPESC, CESSWI

A conversation about the National Pollutant Discharge Eliminations System (NPDES) starts with the Cuyahoga River on fire in 1959. This was not the first time the river ignited, nor was it the only river in the United States that caught fire during this time period. It did, however, get the media's attention, marking an historic event that led to the addition of Clean Water Act amendments to the Federal Water Pollution Control Act of 1948.

The Clean Water Act laid the foundation for improving our nation's waterways by permitting the discharge of pollutants in water and enforcing overall water quality standards. Today, the Cuyahoga River supports aquatic life and human recreation, thanks in large part to the facilities that understood and implemented their NPDES permits.

Overview of Water Quality Standards

The NPDES program and parallel state programs target the elimination of pollutants in water discharge—both stormwater and wastewater—through establishing permit limits and monitoring practices.

What is the basis for permit limits? Why are some pollutants measured and some are not? How is the allowed discharge concentration established? Answers to these questions are found by better understanding the designated beneficial use of each receiving stream, an awareness of common pollutants associated with specific activities and utilization of the best available technology to remove pollutants from water.

Designated Beneficial Use

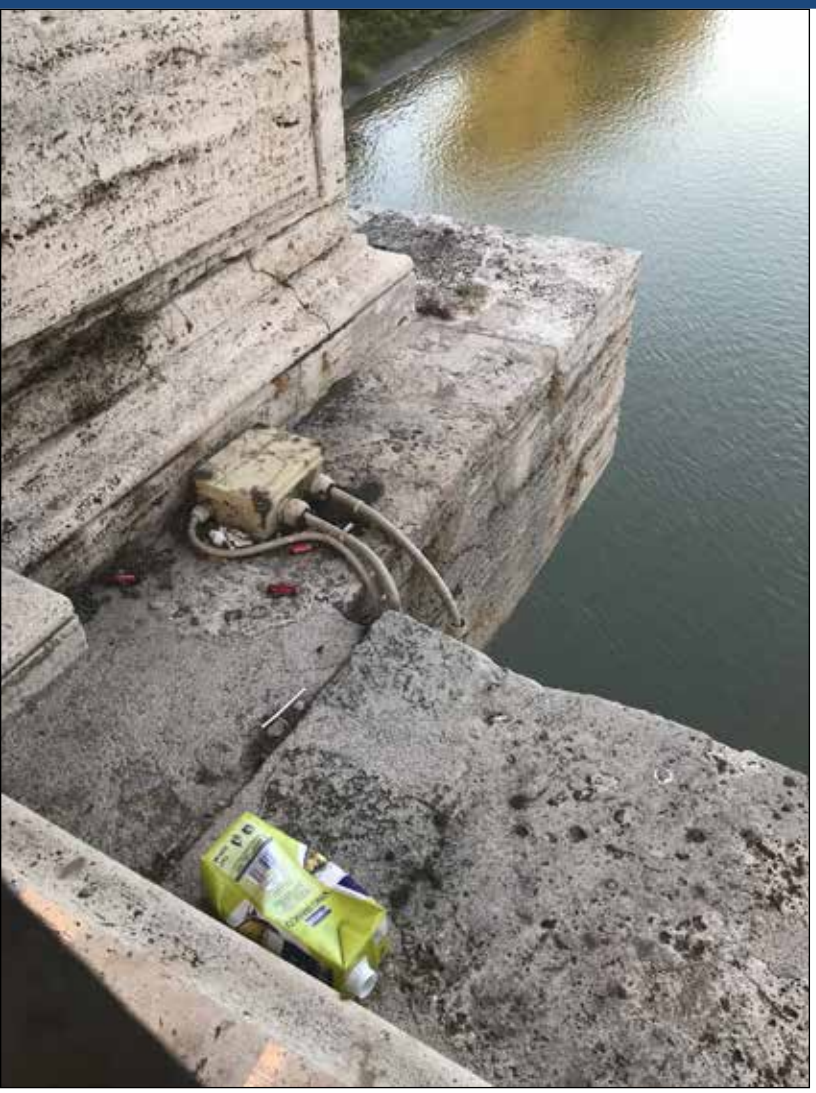
Section 401 of the Clean Water Act establishes standards to protect the physical, chemical and biological integrity of waters of the United States. Every receiving stream has an optimal condition. Some have clear water with rocky bottoms that support trout and cold-water fish populations. Others are muddy, warm and slow moving, supporting sediment transport to a river delta and providing an ecological niche for catfish. Water quality standards are therefore determined based on aquatic life and the designated beneficial uses by humans. These determinations are made at the state level, by organizations such as the Ohio EPA.

Surface waters are utilized for a variety of human activities that have a water quality criteria. Some of these defined beneficial uses include agriculture, drinking water, industrial supply, fishing and contact recreation. Each use has a set of "pollutants of concern" with associated concentration thresholds. Thresholds must be met for the stream to comply with its beneficial use designation, upon which effluent limits are established.

Impairment Status

Impaired waters are determined by performing an analytical test of a surface water body and comparing the pollutant concentrations to the thresholds established for its designated beneficial use. If the body of water exceeds one or more concentration threshold(s) of a pollutant of concern, it is classified as impaired waters.

States then calculate a Waste Load Allocations (WLA) from permitted sources and estimated non-



Batteries on a Bridge: Urban pollutants—like batteries—can introduce metals and other water quality problems

point sources like wildlife, urban runoff and agriculture. Based on WLAs, the state calculates the amount of pollutant loading a stream can hold and still maintain its designated beneficial use. This quantity is known as the Total Maximum Daily Load (TMDL). To reduce pollutant loading, local entities (e.g., river authorities and community groups) create Implementation Plans (I-Plans) by developing Best Management Practices (BMPs) specific to each stream.

NPDES permits can require additional monitoring when discharges enter an impaired stream for which a TMDL has been approved. To find out whether a stream is impaired, permittees should review the state 303(d) list and 305(b) report. Historically, reviewing the 303(d)—a biennial list identifying all streams requiring TMDL development—was adequate; however, with the increase in approved TMDLs, reviewing the 305(b)—a list of impaired streams with an approved TMDL—is also necessary, because the 303(d) does not include waters with initiated I-Plans.

Exceptional Water Quality

Another consideration when reviewing a monitoring program are Tier 2, Tier 2.5 and Tier 3 Waters. EPA's antidegradation regulation of 40 CFR 131.12 provides a framework for protecting water quality in these surface resources where water quality exceeds the levels necessary to support propagation of fish, shellfish, wildlife and recreation.

In general, Tier 2 Waters are high-quality waters typically identified on a water-body basis, like the Lac du Flambeau Band of the Lake Superior Chippewa Water Quality Standards. In some cases, Tier 2 water quality standards may refer to a specific parameter, instead. Outstanding Resource Waters (ORW), Public Water Supplies, Tributaries to Public Water Supplies, and wetlands bordering ORWs are designated as Tier 2.5 Waters. Tier 3 Waters are Special Resource Waters that may be designated by the state or Tribal government because they have special ecological significance or special environmental, recreational, religious or ecological attributes. They may also have a designation for waters that will protect other waters so designated.

In Ohio, these exceptional or high-quality waters are described by the State Scenic Rivers Program. Ohio currently has 15 designated Wild, Scenic and/or Recreational rivers comprising 27 stream segments. More than 830 river miles are protected in the Ohio scenic river system. Three state-designated streams—the Little Miami River, Big and Little Darby Creeks, and

Little Beaver Creek—are also designated as National Scenic Rivers.

NPDES permits for facilities that discharge into an exceptional quality waterway will be reviewed for their potential to degrade water quality. These facilities may have additional monitoring requirements or more stringent effluent limits.

Groundwater Protection Zones

While not all groundwater is maintained by an active surface water connection, this environmental context exists in many areas around the country, notably in areas with deep limestone sand layers.

A recharge zone has porous rock or sand that is connected to an aquifer, bearing rocks deeper underground. In this region, surface water can infiltrate through voids, fissures and caves, and be delivered to the underground water reservoirs or aquifers.

Aquifers fed by recharge typically have an upgradient watershed that captures surface water (i.e., rain, streams, etc.). This catchment area is commonly called a contributing zone. Pollutants loading in a contributing zone will pollute groundwater in a downgradient recharge zone.

A transition zone exists beyond a region where a recharge zone exposes an aquifer at the surface—typically further downgradient. Other, less-porous rock units overlay the porous recharge zone or aquifer rocks,

Stormwater Runoff: Flows of water into streams can carry pollution such as suspended solids, whether from stormwater or process water.

creating a cap above the water. This transition zone is not a straight line and must be mapped. Therefore, care must be taken to ensure that expressions of the recharge features are protected in this area to prevent impacts to groundwater. This can translate into NPDES permit limits--oriented geographically--for a sensitive groundwater protection area.

NPDES Monitoring by Permits

Monitoring defines the qualitative and quantitative observations of effluent from a facility's discharge points. *Qualitative* monitoring is assessing water quality through immediate and direct physical observation; conversely, *quantitative* monitoring requires clinical analysis of water samples, and should be performed by a laboratory accredited through the National Environmental Laboratory Accreditation Program (NELAP).

There are three main categories of NPDES permits issued in the U.S.: individual permits, stormwater general permits and wastewater general permits. As its name suggests, an individual permit is written for a single facility. The pollutants, effluent volumes, treatment methods and receiving stream are all taken into consideration when determining monitoring frequency and pollutant concentrations. General permits, whether for stormwater or wastewater, are designed for a type of activity (e.g., construction) or a type of industry (e.g., hydrostatic testing of vessels). This means that the pollutants relevant to the permittee and effluent limits are both achievable and protective of nearly any receiving stream. It should be noted that general permits often contain additional monitoring conditions if the proposed discharge will enter an impaired or exceptional waterway.

Effluent limits in permits may either be qualitative or quantitative. Qualitative limits may require the permittee to collect a sample representing water quality at a moment in time. Alternatively, quantitative limits may be composite samples, requiring the permittee to account for pollutant loading over a period of time. Sample collection depends on the type of data the permit requires to demonstrate compliance. In addition, permit limits may be technology-based or water quality-based limits.

Technology-Based Effluent Limitations (TBELs)

Technology-Based Effluent Limitations (TBELs) in NPDES permits require a minimum treatment level of pollutants in source discharges based on available treatment technologies, and the discharger may use any available control technique to meet the limits. TBELs are calculated independently of a receiving stream's water quality and are typical in general permits for pollutants like total suspended solids (TSS), oil and grease, and pH levels. TBELs may also be non-numeric and include specific BMPs (e.g., maintaining a vegetative buffer in riparian zones).

The Clean Water Act establishes a sub-category of TBELs known as Categorical Effluent Limitations (CELs). As the name implies, CELs apply broadly to specific industries and wastewater streams associated with certain industrial activities. They are based on the available treatment technology's efficiency for removing pollutants of concerns.

TBELs permit limits may be established as concentration-based limitations (e.g., milligrams per liter [mg/L]) or they may be mass-based, allowing production-normalized discharge limits (i.e., pounds per day [lbs/day]). Mass-based permit requirements call for measuring flow at the discharge point and converting concentration data into mass.

Water Quality-Based Effluent Limits

Water Quality-Based Effluent Limits (WQBELs) are developed by NPDES permit writers when a TBEL is not sufficient to meet the water quality standards of a specific receiving stream. WQBELs are typical when a receiving stream is listed as impaired—regardless of whether a TMDL has been established—or when a receiving stream is exceptional and an anti-degradation standard applies.

WQBELs can be established for an individual parameter such as copper, biochemical Oxygen Demand (BOD), or total phosphorous. This allows stream restoration once a water quality impact has occurred and controlling the pollutant will restore the water quality to a level that supports the designated uses.

WQBELs can also include Whole Effluent Toxicity (WET) testing to address and regulate all toxic pollutants in effluent when the combined effect of multiple pollutants is suspected to be problematic. WET testing typically consists of the survival rate of a fish species in either 100 percent effluent or 50 percent effluent over a 24-hour period.

A bio-criteria approach may be used as a WQBEL. Bio-criteria is used to assess the overall biological integrity of an aquatic community, and typically consists of a periodic survey of resident biota in surface waters.

Implementing Your NPDES Permit

Knowing why your NPDES permit contains specific pollutants, monitoring frequency and sample collection procedures are all useful when strategically

Keeping it Clean: Keeping our waters clean has many benefits, such as healthy fish populations and aquatic life and recreation and scenic benefit.

implementing a permit on specific sites. For example, individual permittees with WQBELs are likely unable to reduce monitoring frequency, eliminate a pollutant from the permit or request a higher discharge concentration, because these limits were established to protect a specific receiving stream. However, TBELs are more flexible and may be amended under certain circumstances.

To understand next steps when analyzing effluent and finding a concentration above the permit limits, one must understand the type of monitoring performed.

Benchmark Monitoring

A quantitative analysis of stormwater quality is common to general permits. Benchmark values are TBELs, and parameters are driven by the industrial sector applicable to the facility and representative of typical pollutants associated with related industrial activities. Benchmark parameters may vary within a sector by the listed standard industrial classification (SIC) code or industrial activity (IA) code describing facility operations. Monitoring frequency, which is permit-driven, is typically semi-annual or quarterly. Exceeding a benchmark value is not a violation of the permit; however, the facility must investigate and take corrective action to reduce the concentration of the pollutant during the next discharge event.

Numeric Effluent Limit Monitoring

Numeric Effluent Limit (NEL) monitoring is a quantitative analysis required by an individual permit. NELs may be TBELs or WQBELs and are typical of an individual NPDES permit. NELs are enforceable. Exceeding an NEL is considered a permit violation and must be self-reported.

CELs are a subset of NEL monitoring and require quantitative analysis from a discharge associated with specific SIC, or IA codes within certain industry sectors. CELs reflect national water quality standards for specific industry types, as codified in federal regulations and listed in the NPDES permit. A CEL threshold exceedance is considered a permit violation and must be self-reported.

Reporting

Not all records have to be reported. Reporting is the documentation that must be submitted to the regulatory agency for compliance with a permit condition. Each permit defines the reporting requirements and there are many reporting variations among NPDES permits. Generally, the minimum reporting associated with water quality monitoring will include:

- Benchmark monitoring report form (annual summary)
- Discharge Monitoring Report (DMR) forms for NELs and/or CELs
- Exceedance reports

Keeping the Water Clean

The pollutants of concern, monitoring frequency and permit limits associated with the quality of water discharging from a facility are driven by site-specific conditions, permit compliance and industrial activities. The primary goal is to ensure protection of the physical, chemical and biological integrity of waterways. NPDES permits make this possible.

NPDES permitting continues to provide the framework for thoughtful pollutant management and, ultimately, has resulted in cleaner water throughout the U.S.

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Why I Have to be Different

by Ted Bennet, P.E., Jones & Henry Engineers

"Why do you always have to be different?," a rather thoughtless and selfish coworker angrily asked when I required a special arrangement for a client with a construction management software solution. Yeah, I was asking for a special accommodation, but it was for a special client and it was like two mouse clicks. Come on bro, make this happen, don't red tape me here. This coworker had a bad attitude with a history of unhelpful behavior, blocking people when clients or coworkers asked for special accommodations, using his perceived friendship with higher-ups to exercise pretend clout. People were afraid to challenge this individual because his brutish and gruff responses, like "why do you always have to be different?" offered as a smoke and mirrors answer to a request for help.

Insinuating that different is bad and that different is not acceptable, this thoughtless question cut right into old feelings, triggering a deep-set defense of special and different people. Spoiler alert – I consider myself to be different. In response I offered a quick and sharp; "Different? I'm different from you because I do all the work associated with my job. I help people and do what I'm asked to do and don't block people for no apparent good reason."

That comment and my strong reply came up in a passing conversation the other day. Why did I defend "different" so strongly. Reflecting, I reacted to the different is bad correlation because of my own personal experiences with being made to feel like different is somehow lesser; that if you are unique and not going with the flow, you're upsetting the status quo. Humans are not sheep and I've learned that different is special and should be celebrated not degraded. We are all different and by correlation are special, each bringing unique energy, talents, and characteristics. Isn't different really amazing?

Throughout my life, I have often felt different from others. I perceive things differently, think differently, see differently, feel differently, and therefore react differently. To date I don't think I have ever met anyone who is like me. I have wondered why that is so. To find out, please read on.

Early in life, I felt like different from the crowd was bad and likely to get you picked on. When I was in grade school and middle school I often got picked on because I was different. I was different in a lot of ways. Sometimes I felt like I just didn't fit in at all because I was into different things. There were a lot of things that I liked that other kids didn't like or perhaps even understand, and they often picked on me for that.

When I was in early elementary school, my dad and I liked to go watch old steam engine trains in operation. Together we visited museums and old bone yards and drove all over to see them running. I'm not sure when or where, but my dad bought me a train engineer's hat. I thought it was pretty cool, had the short bill, high crown and the vertical gray and white alternating stripes and some railroad patches my mom sewed on. Yeah, my sense of fashion was probably not stellar, but because my dad bought it for me, I thought it was cool. Trains were something that we both liked, and we bonded over checking them out. Well, that hat would get torn off of my head on the school bus and tossed around

in a messed-up keep-away game, one time terrifyingly being held out the bus window. Those kids were very cruel to someone who really was minding their own business and just wanted to wear something that they liked. It really sucked to not be able to wear the hat my dad bought me to school, stuffing it into my backpack before getting on the bus, so it wouldn't get thrown around. I hated not being able to be express how cool it was to have a dad that loved you. I felt that different was clearly bad because of how I felt.

This early experience on the bus in perhaps kindergarten or first grade really was my first exposure that I was different, and I'd be singled out for that, what they would now call bullying. Sadly, back then bullying was looked upon as "kids will be kids" and the schools and teachers did nothing about it. I saw a really nice girl in 5th grade reduced to tears by idiot boys who would not stop picking on her for being poor. She ended up breaking down and crying in front of the whole class asking why they picked on her. The teacher did nothing but turn the grade book page, look out the window to pretend nothing happened, and start writing numbers on the blackboard with her chalk holder.

As I advanced into grade school, my parents were not well enough off to spend a lot of money on fancy clothes, certainly not the name-brand clothes that all the cool kids wore. So yes, I got made fun of for wearing Asics and the darkest, heavy denim jeans ever made, while everyone else seemed to be rocking Air Force Ones and acid washed Levi's. I tried washing those jeans non-stop. They must have been made with non-fade material because there was zero change in color but no change in the jerks asking why I was wearing my dress blues. Here again, I was made to feel lesser and different by being ridiculed by my classmates. Let me tell you that hurt a lot. All kids just want to fit in, and you shouldn't have to buy your way into acceptance.

When I got into middle school, I had made it a point that I was going to wear fashionable clothes so I maybe wouldn't get made fun of anymore. I went and got myself a job doing odd jobs like paper shredding, gardening, snow removal and whatever else for an accounting office and bank down the street. I didn't make a ton of money, but that $7 an hour was enough for me to eventually be able to buy myself a pair of Air Jordan's and some more stylish clothes. Thinking that I was going to be walking on easy street now, I walked into school only to find that now I was getting picked on because people thought I was spoiled and rich. I was unfortunately different again. Man, I can't win, can I?

In high school, I thought sports might help cover up my differences, I played football and baseball all four years. Unfortunately, I was not, however, your prototypical athlete, actually I was pretty different from the sports jocks. Realizing, I probably needed a backup plan for all of our unlikely pro sports careers, I worked very hard to get good grades. My enthusiasm for academics didn't sit well with some of my teammates, especially the upper classmen who for some reason thought that I didn't fit their definition of what an athlete should be. I guess jocks at my school were supposed to be jerks because looking back they sure were. They singled me out and tried to beat on me extra hard in practice, but never once did I back down to being targeted by this group of older and stronger players. I might have gotten knocked down and even knocked out once, but I never stayed down and eventually they left me alone. To this day, this experience taught me that other people don't get to decide if your being different changes. You might get your tail kicked, but just keep getting back up and you'll never fail at being yourself.

Yeah, I was solid A- to B+, but I had to work very hard to get good grades and play on these teams at the same time. If I got C's my dad would have made me quit sports. Sports took 15 hours (at least) per week leaving little time for homework. Compounding my problems were some challenges with reading and comprehension. Back then I would have to study, practice and reread directions and lessons many times to master them. Math class was my real challenge. With all of my sports activities, I came to realize that I needed to do my math homework on the weekend preceding the actual lessons. My teachers always assigned either the odds or the even problems. The challenge was that I never knew which one would be picked. The only way around this was to do both the even and odd numbers and hold both papers to turn in. This required me to do twice as much math homework but also to learn the material on my own before it got taught by the teacher. I have no doubt that this effort helped me become good at math, but I never told anyone I went to school with that I did that. Working hard academically and admitting you were working that way was certainly different for a high school athlete at my school. I didn't want to start getting beat up so people could copy my homework.

My outlook on being different shifted dramatically near the start of my senior year. My math capabilities, being a football player and probably my personality got me into a group of students who were picked to work with our "special needs" classroom. This was a class of students who had all nature of physical and mental disabilities, but still attended our high school in a special classroom. Our role was to help teach these kids basic math and reading lessons, but I think we were there making friends with these kids just as much as teaching.

Before I was exposed to these special students on a personal basis, I heard so many nasty and horrible things said to and about these special people by the rest of the students. I knew this was wrong. Those words hurt me even more once I got to know these amazing kids personally. Yeah, they were different than the rest of us, but in a way that made them far far superior humans. These kids were stricken with some of the most debilitating diseases and physical maladies, but they were the most genuinely loving and authentic people that I have even been around – to this day.

Their attitudes and personalities are an inspiration to me as I write this decades removed from those days. The kids didn't ever seem to be down or having a bad day. They didn't pick on someone for being different. They actually celebrated and leveraged differences with one touching example sticking out on my mind. One kid had limited use of his arms. His arms were very thin and weak and he could not really grasp or even move checkers on a board. Another kid could move the pieces okay, but he didn't understand where to move them to. Together this team would play team checkers against me, with one kid telling the moves and the other moving. Sure, I was a mighty football player, but my heart nearly exploded with pride when I saw this team roll out for a match. They were inspiriting on how they used the strengths of each other to compensate for the other. Yeah, they were different, but how was that difference not an amazing thing that we should all aspire to?

It was such an inspiring and encouraging environment. I'll add that it was awesome looking up in the stands and seeing them all going nuts when #83 Bennett would turn and wave at them on Friday night. I had my own cheering section – one that never looked down on me for being different. I'm not going to lie to you, there were tears in my eyes at the last home game I played in front of them. All through school, up

to this point, I had worked so hard to try to hide my differences and appear to be like everyone else that I think I sometimes forgot what made me special - my uniqueness. This group of people, who had all the reason to be down on themselves for being different, taught me that being different was just being okay being yourself. Weird how I was supposed to teach them math and they taught me that being different is okay. I still miss the first people who taught me that different is amazing!

Being different is never wrong, because being different is being the authentic version of you. You authentically can't be anyone but you. You're not perfect and you don't know it all and guess what? That's okay. Don't change yourself to be someone else for someone else. You'll never be happy trying to be someone else and you won't be any good at pretending to be someone else anyways. I have tried to be Superman and can't change who I am. I tell people in their employee reviews to just be you and let's celebrate your assets and forget fretting about your weaknesses. You could try to change your weaknesses for 100 years of reviews and fail, but what if you just accepted them and were happy? Happy to be different?

Look around at a group of people and you'll see that no one is the same. We don't look the same, we don't talk the same and once you meet people, you'll realize that we don't even really think the same. Everyone is different in some way, shape, or form – special in their own way. I think this is the grand plan. God made us all different so we would have to work harder to get along. Working hard for something makes it all the more worthwhile. Once you have invested yourself into something you appreciate it that much more. Work hard to conquer and accept differences and you'll value that difference. That's God's plan with our differences, so we can learn from each other and value the result.

So, yeah, why do have to be different? Because different is beautiful. Different is creative. Different is amazing. Different is who I am. I am different because a long time ago, some different but special people taught be to become okay with who I am, flaws and all. Me being me might rub some people the wrong way or tick them off because I am different, not the way they'd be me. They get to be themselves, but that's it. I can't be anything that I am not. I am honored that God made me the way I am. Let's celebrate that difference in you, me and everyone.

Diversity, Equity, & Inclusion (DE&I)

OWEA has a new Diversity, Equity, and Inclusion (DE&I) Committee! This committee's mission is to define and educate our members on DE&I, to demonstrate and implement DE&I throughout our organization and to increase inclusivity. OWEA is committed to valuing diversity, equity and inclusion. Each issue of the Buckeye Bulletin will have an article that focuses on this topic. If you would like to contribute an article, please email Megan Borror at Megan@ohiowea.org. Celebrating and acknowledging the differences within our membership will allow OWEA to better serve our members and the diverse water workforce.

Eagle Creek Flood Basin:
A Watershed-Based appoach to Reduce the Risk of Flooding

by David Hayson, PE

Background

The community of Findlay, Ohio experiences frequent and significant overbank flooding events from the Blanchard River and its major tributaries, Eagle Creek and Lye Creek. The National Weather Service says "major flood stage" on the Blanchard River near Findlay occurs when the United States Geological Survey (USGS) gage 04189000 is at 14.5 feet or greater. The gage data indicates the Blanchard River has reached or exceeded the former major flood stage (13.5 feet) 22 times from 1913 to 2021, and of these events, nine occurred since 2007. Six events between 2007 and 2017 are among the top eleven stages on record. The August 2007 event was similar in magnitude to the 1913 flood of record, reaching a peak stage of about 18.5 feet.

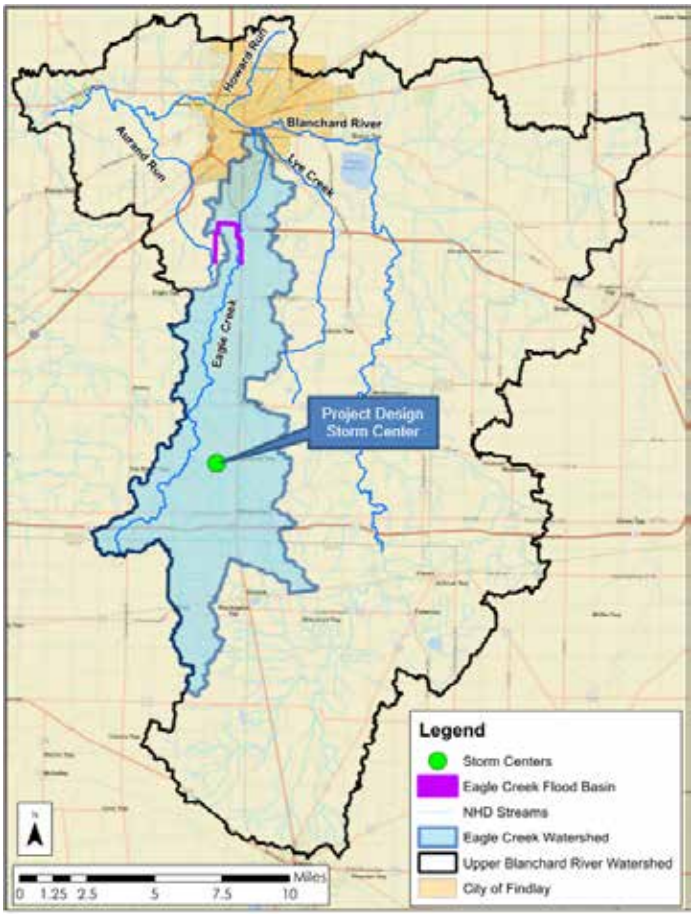

Figure 1: Upper Blanchard River Watershed, 350 square miles

Flooding has caused substantial economic challenges with extensive damage to downtown businesses and nearby agricultural and residential properties. During large flood events, river levels can remain above flood stage for several days, inundating bridges and approach roads, requiring closure. Rescue operations are often necessary during the floods, and significant cleanup and restoration expenses are incurred by property owners. Major regional employers have been impacted by the flooding including Marathon Petroleum, Whirlpool, and the Cooper Tire and Rubber Company. After decades of proposed projects that were unable to gain traction, local stakeholders, including the Maumee Watershed Conservancy District (MWCD), Hancock County Commissioners, and City of Findlay, have partnered with the common goal of reducing flood risk in the community.

MWCD is a legal subdivision of the State of Ohio created under Section 6101 of the Ohio Revised Code. The MWCD territory includes fifteen counties in northwest Ohio, including Hancock County. In 2016, Hancock County and MWCD engaged Stantec to complete a study to analyze the feasibility of flood risk-reduction opportunities in the watershed. The feasibility study reviewed previous recommendations by others and explored new

opportunities to reduce the risk of flooding. Figure 1 shows a layout of the Upper Blanchard River watershed, the confluence of multiple tributaries in downtown Findlay, and highlights both the Eagle Creek watershed and Eagle Creek Flood Basin project location.

Hancock County Flood Risk Reduction Program

Stantec, with the help and support of MWCD and the City of Findlay, considered multiple project alternatives for technical viability and cost-effectiveness. In 2017, Stantec recommended a program of options to reduce the risk of flooding. The recommended Hancock County Flood Risk Reduction Program included several independent projects including hydraulic channel improvements along the Blanchard River in Findlay and three-dry storage basins upstream in the watershed on Eagle Creek, the Blanchard River, and Potato Run. The storage basins would typically remain dry, with the exception of during flood events. The dams would be designed to passively store floodwater and slowly release flow downstream without the action of gates. The purpose of the basins would be to reduce the peak flow rate in the channels during large storm events, thereby reducing flood elevations downstream.

Stantec Presentation to project and community stakeholders

Stantec participated in a number of public coordination and outreach initiatives, including a series of local public meetings. Based on feedback from the community, MWCD requested that Stantec perform additional analyses and provide additional data to support ongoing planning efforts related to the Program. The results of the analysis and public input were documented in the Proof-of-Concept Update Report (Stantec, July 2018).

Active projects in the Program include the Eagle Creek Flood Basin and hydraulic improvements along the Blanchard River. Hydraulic channel improvements on the Blanchard River were determined to be a cost-effective, shovel-ready solution to mitigate flooding due to most of the property being City or County owned. Since 2017, the MWCD has substantially completed the first phase of hydraulic improvements within the downtown area which consisted of two projects intended to increase the hydraulic efficiency of the Blanchard River through Findlay. These activities included the removal of four low-head dams in the Blanchard River and excavation of a 3,500-foot-long floodplain bench. Another 3,000 feet of additional channel improvements and structure modifications are currently being designed.

The Hydraulic Improvements lower flood levels during a range of events. The water levels are reduced by approximately 0.8 feet during a 1% Annual Chance Exceedance (100-year) event due to Phase 1 of the Hydraulic Improvements alone. Given the relatively flat topography, this reduction provides meaningful benefits for the area impacted by flooding. The City has already realized the benefits of the Phase 1 project as recent minor flood events have produced lower peak flood elevations than compared to similar flood discharges in years past. The project also includes natural channel design elements which are anticipated to have other long-lasting co-benefits including improved wetland function, water quality, fish

passage, aquatic habitat, and enhanced recreational opportunities.

Phase 2 of the Hydraulic Improvements, currently being designed, would include additional benching and reconstruction of the Norfolk Southern railroad bridge over the Blanchard River. The new bridge is proposed to be widened to three spans in order to reduce a flow bottleneck. Information regarding these projects and more can be found at the Program website: *www.HancockCountyFlooding.com.*

Eagle Creek Flood Basin

The Eagle Creek Flood Basin site, with a 55 square mile watershed, is located in Eagle Township in Hancock County, approximately four miles south of the City of Findlay's downtown. The project is considered a high priority for the community due to the significant, cost-effective benefit it provides along both Eagle Creek and the Blanchard River.

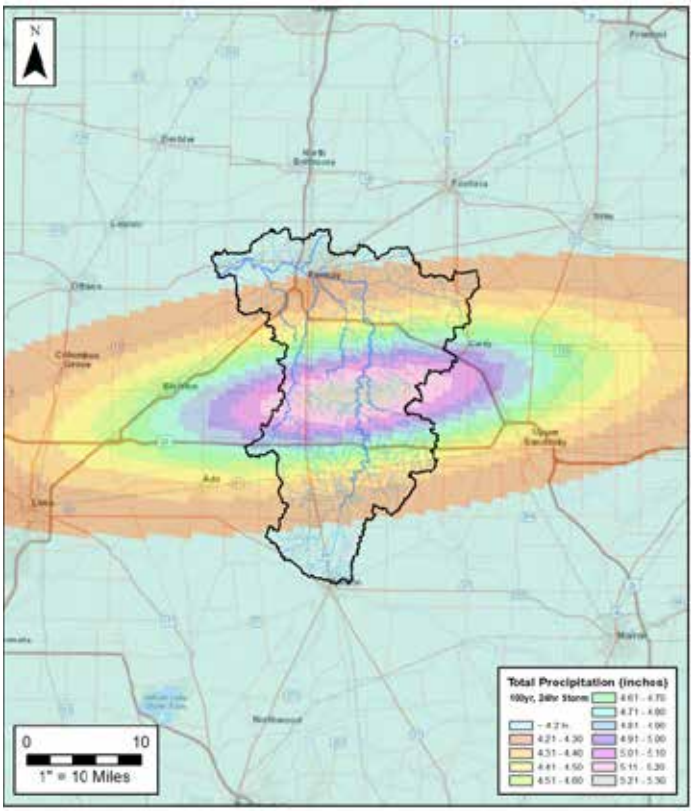

Figure 3: Typical Storm over centered Blanchard River Watershed with spatially varied precipitation depths

Stantec performed hydrologic modeling using HEC-HMS to analyze storm events that could be expected to occur in Hancock County. The flood depths observed through Findlay vary depending on the intensity, location, and durations of the storm events. Stantec worked with Applied Weather Associates (AWA) to study meteorological conditions in the region and develop updated model input data. AWA determined a custom temporal and spatial pattern for the hypothetical "Typical Storm" for the watershed using historical data. Figure 3 shows the spatial orientation and distribution of the Typical Storm. Several storm centers were evaluated, but a hypothetical storm located at the centroid of the watershed generally produces the most conservative results downstream where much of the population resides.

Model simulations were completed to include a more accurate representation of the spatial and temporal patterns for hypothetical storm events observed in this region. The HEC-HMS model was calibrated with processed radar data. The adjusted calibration favorably compares to and is supported by gage-based frequency analyses on the Blanchard River at the USGS Gage 04189000 downstream of Findlay. The result of the hydrology refinement and model calibration was a more accurate prediction of discharges in the watershed for a given storm event.

Dam Alignment Alternatives

Stantec considered four base layouts for the Eagle Creek dry-storage basin conceptual footprint. Three optional variations were considered for each of the four base layout footprints, resulting in sixteen (16) unique footprints. In addition, two design discharge criteria were evaluated for each footprint resulting in 32 unique alternatives.

The alternatives analysis considered the following variables for the conceptual footprints:

- Fill and excavation quantities to generate efficient storage for the 100-year event,
- Seepage mitigation measures, cutoffs, grout-curtains, and underlying bedrock foundation properties,
- Parcel acquisition needs, and
- Construction cost

Stantec utilized HEC-RAS to assess the hydraulic impacts and benefits of the proposed alternative footprints. The study results indicated that each of the 32 options would provide a level of flood risk reduction for the downstream community. The degree of flood risk reduction is dependent on the rate of discharge released from the Eagle Creek basin. Construction costs varied significantly based on the embankment alignment and downstream discharge criteria. The following trends were noted.

- Construction costs were generally lower for alternatives that utilize a larger reservoir area.
- Alternatives that incorporated excavation were more expensive than similar options without excavation.
- The added flood benefits (decreased downstream discharge) derived from excavated storage did not likely warrant the additional costs.

Based on the studies and analyses performed for conceptual design, the following recommendations were made.

- Construct the eastern dam embankment on the east side of Eagle Creek. This is the most cost-efficient option and is anticipated to present fewer dam safety design and operations concerns.
- Implement the largest reservoir footprint feasible, with consideration for property owner impacts.
- Design the principal spillway configuration and embankment alignment to maximize the downstream flood protection benefit, while minimizing the need for additional storage via excavation.

The flat terrain at the site lends itself to the impoundment being created by a long, perimeter dam. The potential construction of a new dam has introduced multiple project complexities for consideration including geotechnical exploration, H&H analyses, permitting agency coordination, stakeholder input, private property coordination, agricultural community engagement, ODNR dam safety compliance, and long-term O&M and funding considerations.

Preferred Alternative

Following four years of community and stakeholder engagement, the project reached a critical milestone when the MWCD Conservancy Court, a panel of fifteen judges representing the counties which the district operates, approved the addition of the Eagle Creek Flood Basin into the Official Plan of the District in July of 2021. This step paved the way for preliminary and detailed design.

Components of the dam include an earthen embankment, an integrated principal and auxiliary spillway, interior drainage improvements and land use design, and exterior drainage features. Figure 4 shows the selected dam alignment and project site layout.

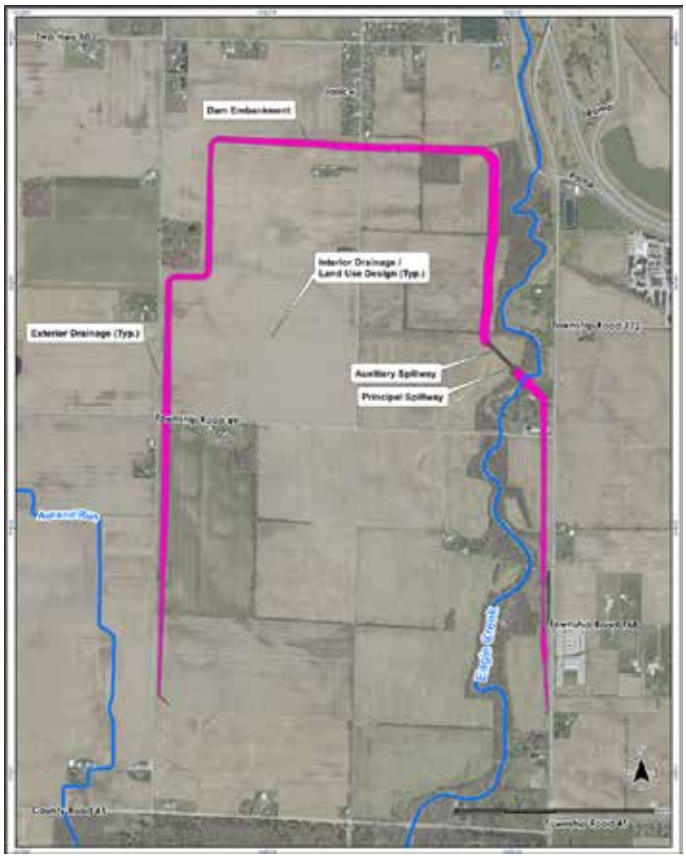

Figure 4: Eagle Creek Flood Basin - Site Layout

The Principal Spillway replaces a section of the earthen dam embankment and is the primary structure designed to convey Eagle Creek flows downstream. The spillway is situated within a realigned reach of Eagle Creek and will pass normal Eagle Creek flow (up to 630 cfs) through a static control wall with two rectangular orifices. When a large storm event occurs, the Principal Spillway will restrict the flow passing through the control wall and start to fill the basin. The project is designed to store up to the 1% ACE (100-year) flood event, while discharging approximately 1,250 cfs downstream into Eagle Creek. Downstream of the control wall is a baffled chute designed for energy dissipation and depth/velocity control associated with fish passage criteria.

The Auxiliary Spillway is a secondary structure, used to discharge flows exceeding the 1% ACE (100-year) flood event, once the basin's storage volume is at capacity. The spillway has additional discharge capacity to safely pass flows up to the design flood (Probable Maximum Flood). The crest of the labyrinth weir will be at elevation 807.0 feet, approximately the 1% ACE (100-year) water surface elevation. The Auxiliary Spillway is a 13-foot tall, steel-reinforced concrete labyrinth weir with an ogee shaped crest. Downstream of the labyrinth weir will be an USBR Type I natural jump stilling basin which will dissipate energy and provide the transition for flow downstream to Eagle Creek.

The hydraulic model indicates that the Eagle Creek Flood Basin project results in a peak flow reduction of about 2,700 cfs (17% decrease) on the Blanchard River during the 1% ACE event. Below is a list of other key project facts.

Key Project Facts:

- Length of dam embankment = ~3.75 miles
- Height of embankment = average 12.5 feet, maximum 29 feet.
- Maximum storage at 100-year = ~7,000 acre-feet
- Additional 100-year Water Surface Elevation reduction in Findlay = ~1.5 feet
- Number of parcels removed from 100-year floodplain = ~2,000
- Eagle Creek Project benefit to cost-ratio = $2.20 : $1

Project Co-Benefits

The primary project goals for the flood basin include reducing water surface elevations (WSEs) during flooding events along Eagle Creek and the Blanchard River; and reducing flood risk to mitigate potential structural, social, and environmental damages. A secondary project goal is to improve water quality by creating wetlands, native habitats, and riparian corridors within the inundation area. The basin interior is prime ground for wetland restoration due to its suitable soils, good growing conditions, and

abundance of potential sources of wetland hydrology. Borrow for dam embankment fill material will be sourced from the interior of the basin and the borrow pits are expected to be graded, vegetated, and converted into wetlands as their final condition. Another anticipated component of the basin interior (post-construction) is passive recreation. A public trail system is proposed to access the wetlands and adjacent naturalized areas. The wetlands are expected to attract wildlife to the area and will provide an aesthetically pleasing landscape to visitors to view. A trail will wind through the site and may contain wildlife / birding platforms and informational kiosks describing the functions and values of the wetlands and creatures that inhabit them.

The MWCD will be responsible for the basin following construction and will complete at least annual inspections of the basin. The MWCD has discussed partnering with the City of Findlay to complete the regular maintenance such as mowing, removal of debris and weekly inspections.

The current projected cost is approximately $70 Million without contingency included. To date, $60 Million has been received for the project from the Ohio General Assembly state capital budget. The Ohio Department of Natural Resources has been tasked with administration of the funds.

The project team has submitted applications for a Clean Water Act (CWA) Individual Section 404 permit from the USACE and a CWA Individual Section 401 Water Quality Certification from the Ohio Environmental Protection Agency (OEPA). A Conditional Letter of Map Revision application has also been submitted to FEMA and will need approval before construction can begin. Design will advance through early 2023 when Stantec will submit the Final Design Package to ODNR Dam Safety to obtain a construction permit. Construction is projected to be bid in the fall of 2023 and completed in approximately two years.

Figure 05. Eagle Creek Flood Basin – Project Rendering

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SVI_5 comparison of aerobic granular sludge (left) and conventional activated sludge (right)

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Getting Ahead of UCMR 5:
How to Proactively Communicate about PFAS to the Press & the Public

by Mike McGill, President, WaterPIO

Note: This article was written before the EPA's announcement of its proposed MCLs for PFOA and PFOS, which was expected in December 2022. This piece makes assumptions about what the proposed MCLs will be based on our knowledge, and the knowledge of other top water leaders, as of January 6, 2023.

At the crack of dawn on the morning of June 15, 2022, I was in two places at once. Physically, I was in San Antonio, preparing to give a speech on Lead and Copper Rule public communications at ACE22. Mentally, and via phone, text, and email, I was in my home city of Wilmington, North Carolina, because the Water World was rapidly changing. And not for the better.

Before I dive in, I should provide a little background about myself. Before I started working in water, I was a news producer in Washington, DC for a decade. At times, I covered all sorts of utility-related issues, so when I gained the chance to become the spokesperson for the Washington Suburban Sanitary Commission (WSSC) in 2007, I jumped at it. After all, clean drinking water is something we can't live without.

My life led me to Wilmington, North Carolina, where I became the head of communications for the Cape Fear Public Utility Authority (CFPUA). Thanks to its state-of-the-art water treatment plant, it had the best water for hundreds of miles around. Or so we thought.

Acting as a proper steward of our resources, when researchers from North Carolina State University asked CFPUA to assist with their testing for PFAS chemicals they suspected were being dumped into the Cape Fear River, we did everything we could to help.

When the study came out in 2016, it detailed how several PFAS (per- and polyfluoroalkyl substances) were found in the river water and CFPUA's drinking water. The results caused concerned conversations between the utility, the researchers, and a top local environmental group. In the end, a consensus was formed around the idea that, while more investigation was certainly in order, the results should be sent to state regulators so they could determine if any further action was needed.

Soon after I left CFPUA to start WaterPIO, I received a call from several of my former colleagues. The date was May 15, 2017.

That day, a reporter from the local newspaper called them to ask about the study and what the utility was going to do about the PFAS found in the water. While I suggested - and my former colleagues agreed - they should get out front with full transparency about the study, that approach was rejected by the C-Suite. No one was allowed to speak with the reporter for three crucial weeks. At the last minute, an incomprehensible word salad statement was supplied that only made things worse.

When the article hit on June 7, 2017 – with a screaming front-page headline in the next day's paper – the utility's reputation imploded. Because the utility

wasn't transparent, it was viewed as a villain, perhaps even more so than the company dumping the chemicals into the river, Chemours.

Why? It was simple. A water utility is expected to always protect public health; a chemical company isn't. Because of the C-Suite's decision to bunker and hide, angry cries of "COVER UP!" drove the press coverage for weeks, and even though they helped find the PFAS in the first place, the press and local politicians attacked the utility's water pros as being untrustworthy liars.

After the bomb dropped, no one at the utility was willing to speak in front of any live audience. I was asked by local leaders to try and calm the panic; they were worried they were on their way to being tagged – like Flint, Michigan – as an unsafe place to live.

During the 48 hours after the story broke, I did a half-dozen live television, radio, and social media interviews to answer the public's angry questions. Their understandable questions were not easy. During my appearance on the area's top newscast, the first question I received was posed by an upset young woman.

She asked if CFPUA's drinking water had killed her unborn child.

It was clear just before the morning of June 15, 2022, the EPA was going to rock the Water World with its new PFAS-related health advisory levels (HAs). Because of the 2017 controversy and the fact CFPUA was wrapping up construction of $43 million in advanced treatment to get rid of its PFAS, Wilmington was picked as the perfect location to make the announcement.

I'm going to state it bluntly. The EPA's HAs are absurdly irresponsible. Based largely on the results of one vaccine efficacy study, the HAs were set at four parts per quadrillion for PFOA and 20 parts per quadrillion (ppq) for PFOS, levels no current test can reliably find. Error rates for PPQ testing are upwards of 50%.

Thanks to a reporter friend in the room on June 15th, the EPA's Assistant Administrator for Water Radhika Fox admitted – I have the video – utilities should use approved parts per trillion testing methods to find PFOA and PFOS. PPQ testing was not mentioned. The EPA acknowledged it set health advisories at levels no utility can reliably test for.

That didn't stop the EPA from putting this paragraph on its website, where it remains today:

> *"Based on current methods, the health advisory levels for PFOA and PFOS are below the level of both detection (determining whether or not a substance is present) and quantitation (the ability to reliably determine how much of a substance is present). This means that it is possible for PFOA or PFOS to be present in drinking water at levels that exceed health advisories even if testing indicates no level of these chemicals."*

As you can imagine after seeing these statements, many in the press had a field day. Dozens of stories have run across the country since June 15, 2022, stating that "[Insert Utility Here!] has unsafe drinking water!" unnerving the public and even state regulators. Since June, I've been brought in to help several utilities work with state agencies who have demanded action, either because the regulators panicked or they saw a window of opportunity to show they were in command of the issue. One state even required a Tier One-like public notification when a utility found PFOA levels at only three parts per trillion. THREE.

Biosolids are also under attack because, without EPA

guidance, the press is misapplying the drinking water HAs onto biosolids. In Illinois, one utility providing free biosolids during a "Garden Day" was hit with damaging coverage because its staff didn't tell the people the biosolids contained PFAS at the HAs' "unsafe levels." It didn't matter the HAs are only for water and have nothing to do with biosolids, the reporter had his big story.

Unfortunately, the reaction to the HAs is just the beginning of the PFAS chaos we'll face. As of January 6, 2022, the proposed MCLs for PFOA and PFOS are anticipated to be set at single-digit parts per trillion levels. At levels that low, hundreds of utilities are going to be placed at risk for future violations. And the press isn't going to wait to report on "UNSAFE WATER!" until 2026 when the standards will go into effect. They'll pronounce any water found above the proposed levels unsafe to drink NOW.

It is in this environment that water providers will begin our testing under the EPA's Fifth Unregulated Contaminant Monitoring Rule (UCMR 5). Over the next two years, we'll be conducting tests for 29 PFAS chemicals to discover where we stand when it comes to possible contamination.

Typically, the UCMR process is designed to help the EPA reach conclusions about possible drinking water regulations in future years. Unfortunately, the UCMR 5 results will now be viewed as the canary in a coal mine, a warning for immediate action. The test results – which are public records – will immediately be tied to the HAs and proposed MCLs by the press.

That is why we must learn from our past mistakes. We must begin or upgrade our public information efforts about PFAS, even if we haven't detected the chemical in the past.

The EPA has decided to put public confidence in drinking water at risk to achieve the larger goal of punishing PFAS polluters. Its actions will lead to calls to spend billions of dollars water providers don't have for advanced treatment we might not need, setting the table for consolidation on what could be a grand scale. It doesn't matter that we didn't put the PFAS in our water; we're the means to the EPA's end, and while much is made about suing polluters to pay for our treatment upgrades, those dollars are, with rare exceptions, decades away.

So how do we keep public confidence in our drinking water ahead of, and during, future PFAS chaos? The answers lie in how proven-successful crisis communication plans are developed and implemented.

The number one rule to follow is how you must become or stay the go-to source for public information about PFAS and its impacts on your drinking water. If you are not taking the lead on this water quality matter, even if you don't know everything to say, then someone else – usually on social media – will be providing the information to the public. Not only will it almost certainly be wrong, but it will almost certainly attack you.

Rolling the dice and communicating about PFAS only when you're forced to do so sets you up for failure. That was the lesson learned in North Carolina; silence on PFAS will be viewed as arrogant disrespect by your customers.

We also must view our public communications through the prism of Flint, and how the failure of water officials there still hangs over the industry. Lead and PFAS are contaminants that have nothing to do with one another, yet when a picture was chosen to run

nationwide about North Carolina's PFAS mess, it was of a woman holding a sign saying, "Wilmington = Flint."

You must create a proactive public communications plan now to cover PFAS discoveries and future findings. Your UCMR 5 test results will bring the proposed MCLs and the HAs to life with the press and the public. They'll make misinformed leaps UNLESS you are out front, stating the facts and answering questions from the word Go.

The heart of the COMMS plan is the creation of a "one-stop shop" for PFAS public information on your website. A page that the public and your employees can turn to for all the latest information is a necessity, and it is a modest investment of time and resources because it will link to pages of vetted details from your state agency, the EPA, and other top entities like AWWA or NRWA. Letting your customers know you have this wealth of information available will go a long way to showing you're on top of the issue.

I know water pros don't like talking about data they don't have nailed down, but the current landscape doesn't give us the luxury of waiting. And that day may also never come with PFAS. That is why you should provide your UCMR 5 data before you must put them in your Customer Confidence Reports. Review your data, develop your response detailing your current and future actions, and communicate them before you're required to do so.

One benefit of this "planned transparency" is that it pre-emptively addresses the negative questions first. You ask and answer them yourself before the press does for you. We had an adage in my DC newsroom, "If I hear from you first, I trust you first. If I hear from you last, I trust you last." If you come to the table first with difficult information about PFAS, you will get much better treatment from the press and the public than if your data is "discovered" first by an enterprising reporter or community leader. Then you're on defense, reacting to their harsher questions.

Your PFAS information must be provided in ways that connect with all your customers. Newspapers and evening newscasts for aged populations, a combination of traditional and online media for middle-aged consumers, and a combination of online and social media for everyone under the age of 40; it's unlikely they will ever hold a newspaper or watch the evening news.

Okay, so I've said the magic words. Social media. Most water pros hate social media because it gives angry people ample opportunities to attack you. I've taken those shots, so I get it. However, it's where your customers are getting their information. You must be educating them there early and often. Otherwise, the "Always Angry" will control what your customers read about PFAS. You can't let that happen.

You must do something we often don't do in water. You must plant the flag and tell people you are the experts, that 15 minutes spent on Google doesn't trump, say, your 15 years of working in water. You can do so without looking arrogant too, but only if you show respect for the customer first through proactive communication. If you listen to them, they'll listen to you.

In the end, that's where you need to be when it comes to communicating about PFAS, a position where the public listens to you about it first. If you are consistently seen as the go-to source for information about PFAS and your drinking water, then you have a greater chance of succeeding when the chaos comes. And make no mistake, it is coming.

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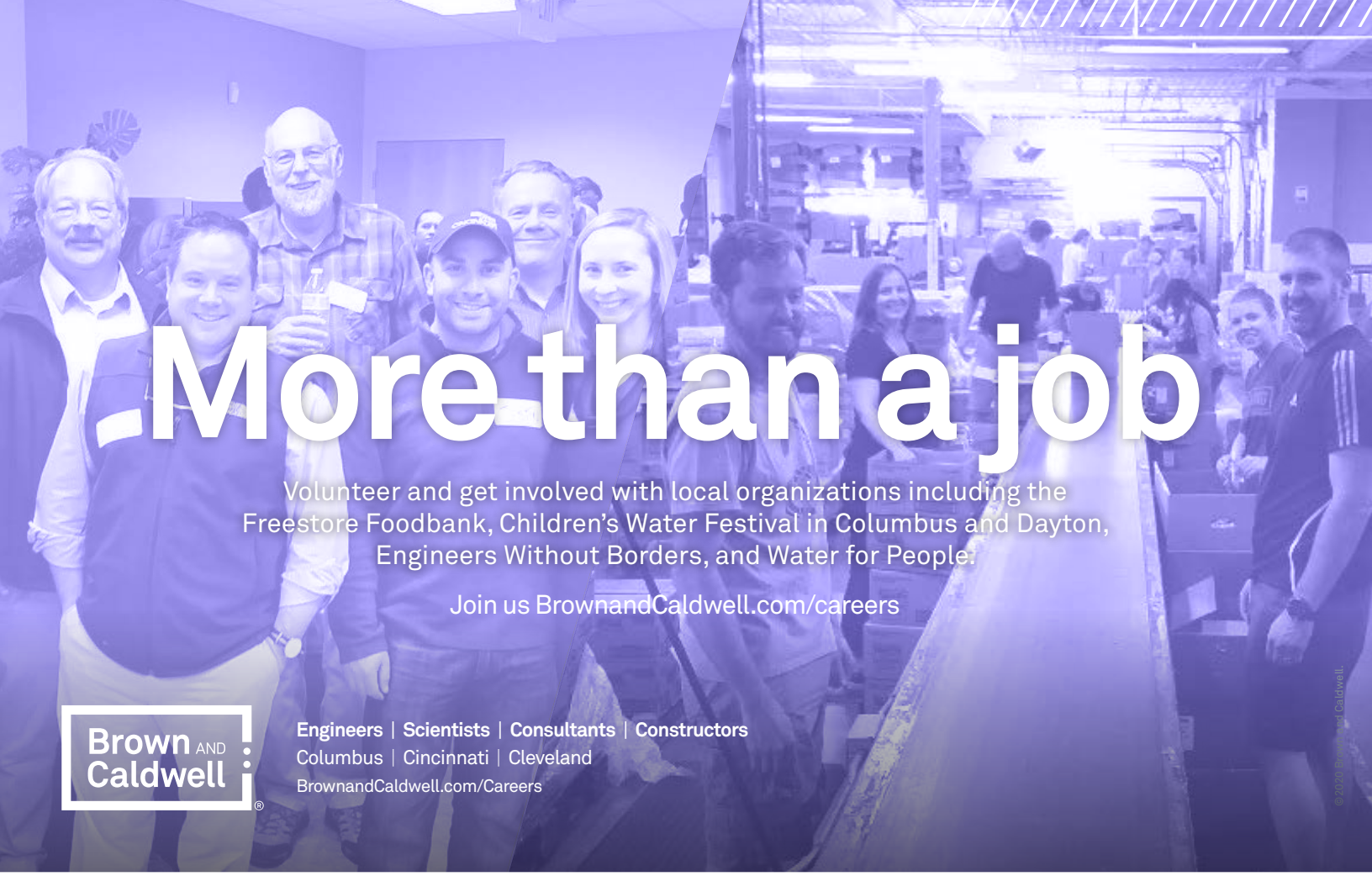
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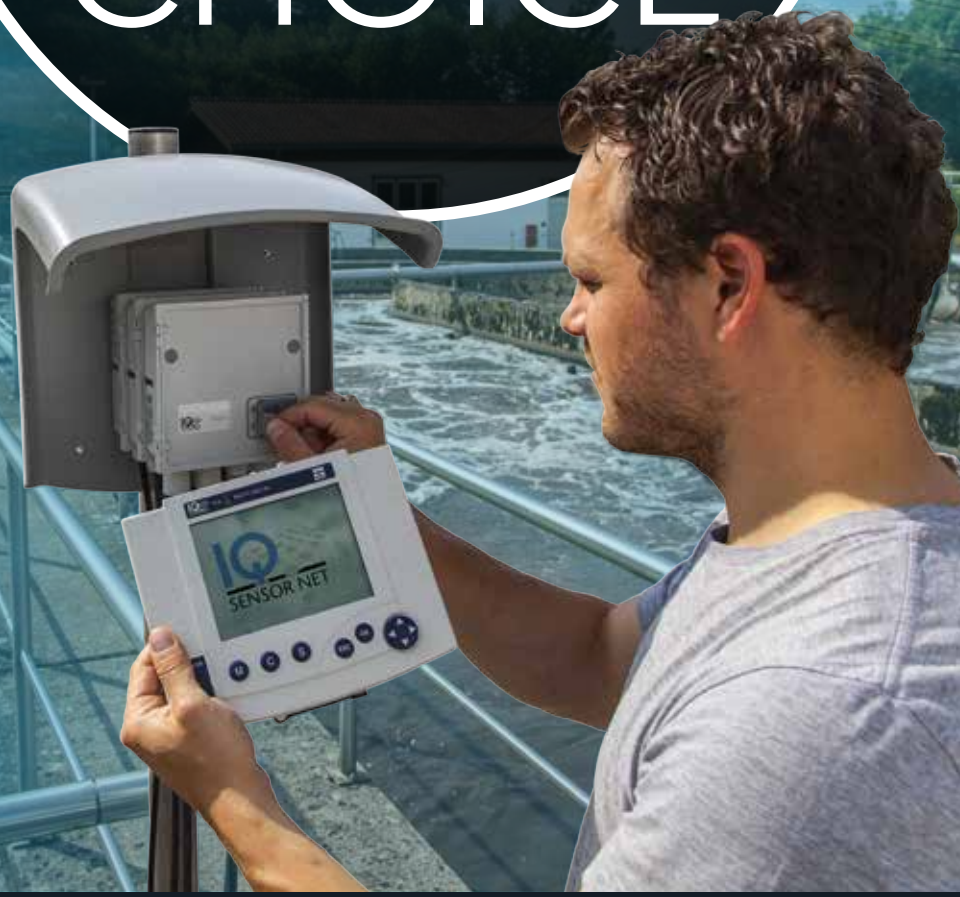

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WEF Utility Partnership Program

The WEF Utility Partnership Program (UPP) is designed to allow Ohio utilities to join WEF and OWEA while creating a comprehensive membership package for designated employees. Utilities can consolidate all members within their organization on to one account and have the flexibility to tailor the appropriate value packages based on the designated employees' needs. Key benefits include:

- UPP is fully customizable, based on the needs of each utility, and a WEF team member will be on-hand to walk each utility through the enrollment process.
- ALL members at the utility will be enrolled with synchronized begin and end dates, on ONE invoice, for an easy one-time per year payment.
- All members, who were already WEF members, retain original membership number, credit for all years of membership, and remain a full-voting WEF member.
- ALL employees at the UPP utility will be eligible for membership registration rates at WEFTEC, as well as the early-bird rate for Premium and Standard WEFTEC registration at anytime throughout the registration period.
- ALL employees at the UPP utility will also be eligible for member rates for the OWEA Technical Conference and Exposition, OWEA Workshops, and events.
- All employees at the utility will be eligible to register for a WEFTEC Exhibition-only pass at NO CHARGE.
- WEFTEC registrations can be included in the UPP Membership transaction at the time of enrollment or can be grouped and submitted closer to WEFTEC.
- UPP also includes a special, NO CHARGE membership for Public Officials designated by the Utility, at their discretion.
- Up to five new WEF/OWEA members can be added by the utility each year, at no charge for the first year of membership.
- UPP utility will be eligible for distributor pricing on all WEF products and services – that's 40% off list pricing. In addition to traditional items this discount also extends to online learning in the new WEF Knowledge Center.
- UPP members will be eligible for special discounted registration for other WEF Conferences and events.

OWEA currently has 35 municipalities signed up for the Utility Partnership Program.

To learn about the benefits for your utility visit http://www.wef.org/UtilityPartnership/

Ohio UPP Members

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City of Canton
City of Celina
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City of Dayton
City of Fairborn
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City of Lorain
City of Marietta
City of Mason
City of Newark
City of North Royalton
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City of Painesville
City of Solon
City of Steubenville
City of Troy
City of Twinsburg
City of Urbana
City of Warren
County of Summit
Delaware County Regional Sewer District
Fremont Water Reclamation Center
Greene County
Lake County
Lucas County
MSD of Greater Cincinnati
Montgomery County Environmental Services
Northeast Ohio Regional Sewer District

Office Offerings

DEI. It seems to be what everyone is talking about. Our industry is no different and most of you have heard of these three little letters. But what does DEI really mean?

DEI stands for diversity, equity, and inclusion. In my opinion the most important two letters are the E and I. That's not to say we don't have diversity challenges in the wastewater industry and OWEA. I think anyone that attends an event can see that most of our attendees are middle aged white men. When I say that I feel the two most important letters are the E and I, it's because in order for any diversity outreach effort to be effective it has to be coupled with a strong equity and inclusion effort. Also, most of us fully understand what diversity means, but might struggle a bit with equity and inclusion.

Equity is often confused with equality, but at the risk of there being way too many e words, they are not equal. Equality means providing the same to all, while equity means recognizing that we do not all start from the same place and that adjustments must be made to these imbalances. Equity means everyone has the same chance, even if those chances look different. For instance, if you are five-foot tall and you need to reach something that is in an eight-foot high cabinet (think the ones above your refrigerator), you will need a step stool, but a person who is six foot five inches tall won't. The step stool provides equity, even though not everyone will need one. Equality would be making sure the cupboard isn't locked. Even though the cupboard is unlocked for both people, obviously only the taller person can get inside.

Inclusion means feeling like you are part of the group. Often you might hear that inclusion is the equivalent of getting asked to dance. Even though everyone knew about the school dance, you don't really feel you are a part of it until you are asked to dance.

So why am I going into such detailed explanation about DEI, when you have already read about it several times lately in this magazine? There are several reasons. First of all, it's important. Our industry is desperate to recruit new water and wastewater professionals and if we don't reach beyond our current standard demographic, we simply can't meet the demands of the future. Second, you might have missed the other articles. We cover many topics and it's really hard sometimes to be aware of everything going on. Finally, we have some exciting DEI news and it's something I am so very proud of these organization for doing.

In addition to now having an OWEA DEI committee, we now have an OWEA DEI video! This video has already been played at various section

events, included in our newsletter and on social media. It isn't just a feel-good piece, it acknowledges that our industry has work to do. It features real OWEA members, leaders and both of our DEI committee chairs. It will hopefully start what can be some uncomfortable conversations. It opens the door to our next steps and challenges us to all do better. If you haven't had a chance to see it yet, please visit our website.

I would like to give a special shout out to our Executive Committee President Brandon Fox and our Immediate Past President Jason Tincu for making the DEI committee and video a reality. Thank you to our entire executive committee for embracing the tough conversations and being open to getting uncomfortable. Most importantly, my appreciation goes out to DEI co-chairs, Kari Mackenbach and Miyah Bayless, and the employees at the City of Columbus Surveillance Lab, City of Dayton WWTP and ms consultants. This video was only possible because these people stepped up and showed up and for that we are so grateful.

I am so excited about how this video turned out and where it can take OWEA. Insuring our industry is inclusive and diverse and looks at our challenges with an equity lens and not just an equality one is a marathon not a sprint. Change doesn't take place overnight, but in small increments over time. OWEA is posed for the next steps, are you?

Dawn Larsen, CAE,
Executive Director

88% of Success in Life is Showing Up

by Dale E. Kocarek, PE, BCEE, Past President 2010-2011

Introduction

Some years ago, I took classes on computer literacy, keyboarding, and the Microsoft Office Suite at Columbus State Community College. Personal computers were revolutionizing workplace culture. Prior to that time, it was customary to write documents by hand and work with administrative staff who would type and revise them.

I was first drawn to the title of my article at Columbus State Community College. Bulletin boards and classroom walls had a placard saying 88% of Success in Life is Showing Up.

We all know that there is more to success in life than showing up. Implied messages suggest punctuality, commitment, engagement, and follow through. The original author is Comedian Woody Allen (1935-).

Columbus State understood their role in the life of a student. The student body was diverse in ages, race, and ethnicity. Most students were in their late teens and twenties but many like me were older. Instructors saw me as an engaged learner.

Where I Drew My Material

In 1977 while attending Ohio State, I took a class called Physiology121 – The Physiology of Learning. The course was an elective that covered different styles of learning based on the purpose desired: casual or recreational knowledge, passing a test, teaching, or expert. What became clear is that a different style of learning is needed for a hobby, passing a certification test or becoming a course instructor. One style did not fit every need. These differences were a bit analogous to using golf clubs in a game of golf. One does not typically use a wedge off the tee box or a driver on a green. Each has its own distinct purpose.

I have also taught operator training sessions when I was with the SEOWEA and currently I help train staff at Aurora. I have also developed material for operators during projects I helped design as a consultant. More recently I worked to provide sample test questions for a Wastewater Collections Course through the WEF Collections Committee.

Public Speaking

Jobs I have held including serving as OWEA Board Member, President and WEF Delegate required me to do lot of public speaking in small groups and large audiences. I have given countless presentations to many groups including those at One Water, WEF, clients, and city councils. In each setting, I viewed myself as a teacher. I believed that my purpose was to first instruct the audience (my students) to build a common base of knowledge. Even if those in my audience did not agree, I wanted their opinions to be based on a foundation of knowledge.

During the last two years as a city employee, I have been involved with training some of our Service Department personnel in the field of Wastewater Collections and Treatment. The experience has supplied insights into the learning process.

What I Learned about Learning

Each person has their own unique learning process. I have learned it is my role to guide each person to discover their own learning path. I am careful to dictate how they should learn, but instead guide them along to discover what works best for them.

During this period, I have made several observations:

1. **Reading is not the same as learning.** I have seen people use reading as the principle means

for study, often with yellow highlighter in hand. Unfortunately, most people are passive readers and gloss over critical information.

2. **Active listening and notetaking are effective.** I have been a robust note taker since I was in college and have kept this habit to this day. I feel this helps me be an engaged learner as I reinforce what I hear by a feeling of writing. Notetaking is a lost art.

3. **Admit if you don't understand.** I advocate that you need to know what you know; know what you don't know; and know the difference. Don't be fooled by thinking you understand when you don't.

4. **Study time does not equate quality:** Study sessions longer than two hours produce diminishing results.

5. **Memory and understand compliment.** Memory without understanding is a recipe for failure.

6. **Group study is an option.** Studying in groups with the right partners can add enough variety to make it beneficial. The City of Painesville had operators in a small study group do this successfully. They now have three new Class III Operators!

7. **Some nervousness is OK.** Some anxiety is expected and can help mental acuity.

8. **Not intended to be tricky.** The test is written to test knowledge and not be impose tricks with wording. Accurate reading of each question is critical to understand exactly what is being asked.

9. **Units are essential.** Effective test taking with math problems involves multiple unit conversions including such as gallons per day, milligrams per liter, pounds per day. Almost everyone I teach misses this point.

10. **Don't let you past dictate who you are.** If you were not good in school, put this in your past. I know this is easier said than done.

11. **Cramming can work.** However, do not cram within 24 hours of a test. Retention is improved by a good night's sleep.

> "Don't let your past dictate who you are, but let it be part of who you become."
>
> **Louis Mandylor**

Water Training Academy

OWEA is establishing the Ohio WEA Water Training Academy (WTA) with the purpose of providing training to serve the needs of professional wastewater operators in the 21st Century. The Academy is in its formative stages of planning and design and will be a topic of discussion in the future and discussed by others at OWEA.

During the WTA development, OWEA is cognizant of different learning styles and understands it is important to tailor the coursework to ensure we meet the needs of future students, to pass the test, but also to become an engaged life long learner of the wastewater industry, as I have become.

The effort is by the OWEA Operator Training Task Force and led by Dave Wilson and volunteers including President Brandon Fox. In the spirit of looking ahead with hope and promise of a new year, OWEA is planning to launch a pilot class of the Academy in September 2023.

1974-1975 President Larry Rigby Passed Away

Republished from the Marion Star

Lawrence "Larry" E. Rigby, beloved husband, father and civic leader passed away at the age of 95, November 7, 2022, at the Kingston Residence of Marion. Larry was born December 31, 1926 in Mansfield. Larry graduated from Minerva High School with the class of 1944. Larry answered the call to serve his county and enlisted into the United States Navy and was honorably discharged in 1947. After his time in the service, he enrolled at Purdue University in Civil Engineering where he graduated with a Master's degree, but not before children. On June 10, 1950, Larry was united in marriage to Leah Hyatt in Minerva. The couple gave birth to three boys: Donald (born in Lafayette, IN), Gene and Dana (born in Marion, OH). Family always came first throughout his entire career in engineering. Larry first worked for Floyd Brown Associates in Marion where he designed the wastewater treatment plant for Mansfield, OH and in a rare move, chose to be the first Superintendent of that plant. Years later, he accepted the management role of a larger treatment facility in Columbus, OH. In 1968, the principals of Floyd Brown Engineering encouraged his return to Marion with a role as an Associate and later, member of the firm where he was instrumental in growing and diversifying the business until retiring at the age of 62. Larry was honored with several civic and service awards including the Lifetime Engineering Achievement Award from the Ohio Water Environment Association. Larry knew the importance of being involved with the community and was a longtime member of the morning Kiwanis Club. He also served as coach to his son's ball teams, and served as the president of the Ohio WPCF. Larry loved the game of golf and was an active member of the Marion Country Club and because of his devotion and advocacy for the club, he was awarded a lifetime membership. Above all, his greatest service was to his family.

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SEOWEA

Josh Holton, President

2023 has started out strong for the Southeast Section. We want to thank all those who could attend our October Pretreatment Workshop as well as the February Collection Workshop at the Columbus SMOC facility. Special thanks to the City of Columbus for hosting our Section to learn more on how the City and other entities are addressing collection system issues.

I also want to to take this time to thank our sponsors for 2023. The sponsorship of the Section allows the excutive committee to plan low cost events for our members. Additionally these sponsorships support YPs in the Section as well as highschool science fair participants. Without this sponsorship the Section could not operate at the level it does. Through Section sponsorship the section was able to raise nearly $9,000 to support our Section. Thanks again for your generosity.

Looking forward to future events. The Section is planning a hands on operator workshop for biosolids in March. This event will walk operators through the necessary paperwork for land application of biosolids. This includes site setup, agronomic rates, buffer zones, and post application follow up, as well as lessons learned in land application of biosolids.

The Section is also fully underway of planning of the April plant operations workshop. This event is going back to the four plant tour layout. This event will be in the Licking county area with lunch being in Newark.

The May awards workshop will be hosted by the City of Columbus Southerly Wastewater Treatment Plant. This meeting will highlight the new high rate treatment train at the Southerly plant. Keep an eye out on details for this event as they finalize.

We are extremely excited about the events coming soon. We hope members have a chance to make it to our events this year. We also want to challenge our members to bring in new members to the family. OWEA is truly a family and we want to continue to grow our family. This can be done in a cost effective manner with the new State Only membership. Please consider adding members within your organization so they can learn and grow within the wastewater industry.

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Section Reports

NESOWEA

Jennie Celik, President

Greetings from the Northeast Section!

The NESOWEA held SEVERAL seminars and meetings through the late fall and early winter months! We held our annual **Supervisors & Ethics Seminar** on November 3 in Richfield, OH. We also held our Friends & Family **Clam Bake** at a new location on Saturday, November 5! The turnout and weather were both fantastic. We could not have asked for a nicer Fall day! At this family-friendly event, members enjoyed a taste of fall (clams), good company, and outdoor fun & games. On December 2, we held our annual **Executive Committee & Leaders Meeting** with all of our section leaders. Later that same day, our Past Presidents' gathered for our annual **Past Presidents' Luncheon**! All of these events made for a fun and engaging end to 2022!

We also held our **Operations Seminar** on January 19 in Richfield and **Industrial Wastes Seminar** on February 16 in Richfield. We are appreciative for the vendors that exhibit at this event.

Upcoming Events

Looking forward, plans are underway for upcoming events. We have a lot of exciting events planned for contact hours, networking, and social activities:

- **Innovation Seminar** will be held on April 20 in Richfield
- **May Business Meeting** will be held on May 18 in Akron

Save the date for these meetings and events!

With Gratitude,

Jennie Celik, NESOWEA President

Section Reports

NWOWEA

Andrew Gall, President

Hello from the Northwest Section:

Northwest Section ended 2022 with several events for our members.

In September, Lori Komorowski, Northwest Section YP chair coordinated a YP event in partnership with the Northwest AWWA section. The event included a tour of the Maumee Bay Brewing Company's brewing facility and provided an overview of the processes used to prepare the water for brewing, the brewing process and then how the waste generated from the brewing process is managed. A social hour was held following the tour. The event was enjoyed by all that attended.

On December 7, the City of Fostoria hosted our Fall Section Meeting. We had a good turnout for the meeting which included morning tours of the Fostoria Wastewater Treatment plant, which had recently completed construction of upgrades. The plant tours were followed by contact hour presentations by Adam Athmer on the Fostoria Plant Improvements, Zach Bolain on Wastewater Surveillance Monitoring during COVID and Elizabeth Wick on Pretreatment Programs.

As part of the meeting, we presented the 2022 Section Awards recognizing the following members of our section:

- 2022 Max Philips Operator Award – Presented to Stace Dibling, Northwestern Water and Sewer District
- 2022 Moe Swaisgood Collections System Award – Presented to Mark Davis, Northwestern Water and Sewer District
- 2022 Kathy Cook Lab Analyst Award – Presented to Kent Bacon, City of Napoleon Wastewater Treatment Plant

Planning is underway for our 2023 Section Meetings and Events. In March 2023 we look forward to having our early spring section meeting in Minster, Ohio which will include tours of Danone Yogurt's facility and the Village of Minster Wastewater Treatment Plant. Look for final details and registration information for the 2023 section meetings in your email and on the OWEA website soon.

Once again, I am thankful for all our members. We look forward to seeing you at a section meeting or event in 2023 and encourage you to invite a co-worker or friend to attend a section event in 2023. Please reach out to me if you are interested in hosting a section meeting at your facility or have an interest in sharing about project you worked on or an innovative solution your developed to solve a problem at your facility by giving a presentation at an upcoming section meeting.

Andy Gall, Northwest Section President
andrew.gall@epa.ohio.gov

SWOWEA

Justin Bahar, President

Happy New Year from the Southwest Section. 2022 brought us both opportunities and challenges as we worked our way through a new normal. We hosted several events all over the southwest section and saw attendance in numbers that continue to grow as we find our footing and look for new and creative ways to bring our community back together. A big thank you to all the hosting facilities and venues, we couldn't do what we do without your help and support.

Upcoming Events

The SWOWEA committees are planning their events for 2023 and updates will be provided on the website as they are confirmed at *https://southwestowea.org/*.

Award Nominations

We are looking for nominations for our 2023 Section Awards! There are so many wastewater professionals in our section who are worthy of an award and we encourage all of you to please nominate those who deserve to be recognized for their efforts. Keep an eye out for an email with instructions on how to provide a nomination or feel free to contact myself at *justin.bahar@cincinnati-oh.gov,* or Roger Rardain at *roger.rardain@fairbornoh.gov.*

Opportunities

We are looking to fill two spots on the executive committee, as well as other positions in our committees. If you know of someone that would be interested, or you are interested in the position, please contact me, *justin.bahar@cincinnati-oh.gov.* Finally, get involved. We are always looking for new members to join our different committees in our organization, Collections, Plant Operations, Lab Analysts, Education, etc. You will make new friends, learn, grow, and help the Southwest remain the best! Looking forward to seeing all of you again soon!

Justin Bahar, SWOWEA President

Collections Committee

by Dan Martin and Afaf Musa, Collections Co-Chairs

The Collections Committee is excited to build on our strong 2022 as we leap into 2023. We are underway with our planning for the Collection Systems Seminar at Embassy Suites in Dublin on May 16th. Please join us for six contact hours with a lunch and an extra helping of networking. Our presentations will cover the topics listed below:

- Alternate Collection System Projects and Operational Experiences
- Green Infrastructure Projects and Maintenance
- GIS and Information Transfer in Collection Systems
- Asset Management of Collection Systems
- Pump Station Rehabilitation
- High Efficiency Pumps
- Inspection Technologies Including Artificial Intelligence
- Odor Control Strategies for Collection Systems and Pump Stations
- Fats, Oils, and Grease Handling in Pump Stations and Collection Systems
- Pump Station Maintenance
- Force Main Air & Vacuum Release Maintenance and Design
- Workforce Innovations and Management
- CSO and SSO Long Term Control Plans

2022 saw the triumphant return of our Hands-On Seminars around the state. Let us know if you have an engaging presentation that you would like to share with frontline operators this fall.

We are always looking for new committee members, especially folks with a municipal/public background. Please reach out to our co-chairs if you'd like to get involved with our dynamic, informative (and fun!) committee:

Afaf Musa / CDM Smith

MusaAB@cdmsmith.com / 614.847.6858

Dan Martin / RA Consultants

dmartin@raconsultantsllc.com / 513.469.6600

Certification Committee

by Kathy Beckett, Certification Chair

Happy New Year! With the New Year comes resolutions and a sense of renewal – eating better, exercising more, losing weight, and ... renewing your Wastewater Laboratory Analyst certification. OWEA certificate renewals are in the middle of the 2022-2023 cycle. You can still renew until 12/31/23, but you will incur late fees.

I've received several questions about certificate renewals. Most of these questions can be answered by going to the OWEA certification page *https://www.ohiowea.org/certification.php*. Here you can update your contact information, renew your certificate, apply for certification exams, and find general information on certification.

Please be sure to update your contact email if that has changed so you can receive renewal notices from OWEA and not incur late renewal fees.

For those who took and passed a Wastewater Lab Analyst exam in the past year, you will not need to renew your certification until the next renewal cycle.

For 2022, 19 new Wastewater Laboratory Analyst certificates were issued (9 Class I; 6 Class II; 3 Class III, and 1 Class IV) and three new Ohio Industrial Waste Inspector certificates were issued.

These individuals passed the following examinations and received certification from October - December 2022:

Wastewater Laboratory Analyst Class I

- Lisa Jeter
- Amy Theriault

Wastewater Laboratory Analyst Class IV

- Paul Skerl

Ohio Industrial Waste Inspector

- Jeremy Pijor
- George Rohde

Join me in congratulating these professionals on their accomplishments!

Please reach out to me if you have any questions about OWEA Wastewater Laboratory Analyst certification at *kmrish@columbus.gov* or visit the OWEA certification webpage for more information on applying for certification at *https://www.ohiowea.org/certification.php* .

WEF Delegate Report



Elizabeth Wick **Joe Tillison** **Mike Welke**

WEF Delegates

At WEFTEC in New Orleans last October, Fred Smith's term as a Delegate ended. Thank you for your service! As Fred steps off, Mike Welke, from Warren, joins the Delegate team. We are excited to have Mike on the team!

WEF leaders developed a new Strategic Plan. It states that their mission is to inspire the water community in pursuit of human and environmental well-being. The vision is, "A Life free of water challenges". They have three strategic goals:

1. Attract and develop a diverse and passionate water workforce.

2. Cultivate a purpose-driven community to sustainably solve water challenges for all.

3. Lead the transformation to the Circular Water Economy.

The plan lays out strategies under each of those goals. It contains WEF's core values which are: 1. Lead boldly with purpose and agility, 2. Focus on our customers through empathy and service, 3. Collaborate for collective impact, and 4. Integrate Diversity, Equity, and Inclusion in all we do.

As WEF Delegates, each of us is part of a workgroup or committee. Joe and Elizabeth are on the House of Delegates (HOD) of the Future workgroup. The group's focus is to determine how to best align the structure and function of the HOD with the new Strategic Plan, how to get 100% participation of Delegates, and determine any needed changes to make the HOD more effective in supporting the Member Associations (MAs).

Mike is part of the Strategic Plan Rollout workgroup. The purpose of this workgroup is to distill the relevant contents of the plan to the MAs. This workgroup will strategize how best to connect WEF's strategic plan to MAs. The group will focus on effective communication of relevant actions out of the plan to MAs. WEF is not trying to force it's MAs to follow or do their Strategic Plan but would like to encourage MAs to consider doing some of this plan in some way. OWEA is already doing a lot of this plan or at least started to.

If you have any questions about WEF, reach out to one of us!

DEI Committee

Getting the New Year 2023 Kicked Off Right!

by Miyah Bayless and Kari Mackenbach, DEI Co-Chairs

If you didn't hear the news, the OWEA has created a Diversity Equity and Inclusion (DEI) Committee that will focus on the needs of our members and industry to diversify and promote DEI throughout the organization. Although we are just getting started, the Diversity Equity and Inclusion (DEI) Committee is excited to announce the creation of a video that will be released shortly. This video focuses on OWEA's commitment to diversity and highlights several existing members including yours truly Miyah Bayless from the City of Dayton and Kari Mackenbach from ms consultants inc. in Columbus, Ohio. Our DEI Committee has representation in all sections of OWEA, so look for us to be at your next section meeting.

We are also setting up quarterly meetings with the DEI Committee to look at how to engage in upcoming OWEA Workshops and even more so at One Water! We have already adopted our Mission and Vision Statement and plan to collaborate with other committees within OWEA.

For 2023, we are focused on the DEI messaging throughout our organization but also recognize the connection to Science, Technology, Engineering and Mathematics (STEM) efforts and encouraging children of all backgrounds that this could be a career path for them.

OHIO WATER ENVIRONMENT ASSOCIATION

STUDENT MEMBERSHIP

HURRY, DON'T MISS OUT!

50 ANNUAL MEMBERSHIPS AVAILABLE

INTERFACE WITH WATER QUALITY PROFESSIONALS ACROSS THE STATE!

- OWEA members can offer mentoring, career guidance, tales of experience, internships, access to job opportunities, and more.
- Membership is designed for the specific needs of students - offering a solid foundation on which to build careers and gain credibility with water quality leaders.
- The Ohio Water Environment Association is offering a year-long OWEA/WEF membership to students with an interest in the water quality/wastewater field. This is a dual membership with OWEA (as the state member association) and WEF.
- Students must be enrolled in a minimum of 6 credit hours in an accredited college or university.
- Encourage students to apply for a free year-long OWEA/WEF membership at: https://www.ohiowea.org/membership.php

CONTACT

OHIO WATER ENVIRONMENT ASSOCIATION

614.488.5800 | info@ohiowea.org | www.ohiowea.org

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