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The Official Magazine of the Central States Water Environment Association, Inc.



94TH ANNUAL MEETING ADAPT & THRIVE

MAY 17-20, 2021 | VIRTUAL

PLANT PROFILE:

Rochester Water Reclamation Plant



PLUS:

Innovative Wastewater Monitoring
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GWS Update: Spring 2021

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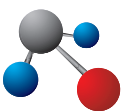


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Adapt and Thrive...

By Mark Eddington



next article



Mohammed Haque
To Mark Eddington

due March 19. Make it good...it's your last.

Mo

Yep, there she is. The dreaded email from Mohammed. No pressure there. I knew it was coming. I knew he wouldn't forget. I knew he knew when my family and I were leaving to camp over spring break. As I write this on March 23rd you will note it is already past due. Not "consultant past due" but past due, nonetheless. Ignoring Mohammed is like trying to ignore an out-of-date smoke detector and it never works out the way I hoped. Usually, Mohammed sends these things out with tons of fluff built into his schedule knowing you will just ignore it for a while. I pushed it two weeks past a deadline once, God I felt so alive... It's not that these aren't important, but let's face it, nobody reads these things unless they are trapped in an elevator without their phone. Plus, I'm an engineer not an English major; and no one will ever confuse me with Samuel Clemens (google it, millennials). In any event, looky what rolled in today. He even had Amy send the 'friendly reminder'. I wonder how many times she had to endure his nagging before shooting this off? Seriously, bringing Amy in to close on the President's Message? Damn. He knows I can't ignore Amy, but to play that card on a second notice? Let's just all agree this is excessive. Fine, here you go, straight from the bottom of my mind's barrel...

The worm is beginning to turn. Vaccines are effective and rolling out in my neck of the woods. My kids' schools are lengthening in-person instruction, my NCAA bracket is in shambles, and pitchers and catchers have reported. Hope truly does spring eternal. Something is certainly missing, no, not my family hating me as I head to the road for springtime conference season (affectionately referred to as "Mark's vacations" by the person to whom I'm related through marriage). I'm having a weak moment, but I am really beginning to miss the Central States crew. There has always been something about our annual

conference each spring that signals a new beginning. Even if this is the last virtual conference I ever attend it cannot come soon enough. I owe a debt of gratitude to Amy Underwood and the entire Illinois LAC – Amy, Mohammed, et al. They aspired to build on last year's virtual program and are bringing back many of the unique experiences (Seven S, Golden Manhole, Social Event, etc.) that have always made Central States unique. I also want to give a shout to Mandy Sheposh and this year's technical committee as this year's programming looks outstanding (as usual). We take these things for granted, but the work these committees put in does not just happen. I speak from experience when I describe the joy involved in handing off committee duties to the next chair after the last day of a conference.

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It was definitely a weird year (and by year, I mean nine months) to be Central States President. So much to contend with but always with a hope that we can soon return to a more normal world as more resilient and effective organization. For what it is worth, we can definitively say Central States has adapted. I'm not sure how to define "thrive," but if it means to stay solvent and relevant to fight another day, we have indeed thrived.

The next Executive Committee (no pressure Jane), Haque and Associates, and our membership at-large will have its collective work cut out for it (this is not at all refereeing to the President's Party Jane is going to throw in Madison at next year's conference). I can say with confidence that the next group of prospective officers (Jane Carlson, Tracy Hodel, and Amy Underwood) are some of the brightest, hardest working members of Central States. I had not noticed, until I re-read my last sentence, that next year's prospective officers are all women. I could be wrong, but this is the first time in the history of CSWEA that this is the case. I have mixed feelings about this. I am proud this is occurring but am also ashamed we are still at a point in time when barriers are still being broken. Maybe "adapt" has more meaning to it than just changing the way we perform our work on a day-to-day basis. Maybe the truest meaning of "adapt" is to acknowledge we each have biases holding us back from truly thriving. Hopefully, we can look back at the changes Central States has experienced this year and identify an inflection point where things changed for the better. Central States has an opportunity to be a more proactive and inclusive leader within an industry that has historically been

"Central States has an opportunity to be a more proactive and inclusive leader."

monolithic in its approach toward the changing tides. I know this is meaningful to WEF and I re-read WEF's statement of policy on Diversity and Inclusion:

The Water Environment Federation is committed to enhancing the diversity and awareness of race, ethnicity, nationality, gender, age, disability and sexual orientation among its staff, consultants, contractors, and members. As a matter of principle and practice, the WEF values and seeks a diverse and inclusive membership. It is the Federation's goal to encourage full participation in the activities of the Federation, its Member Associations, and affiliated entities by all individuals.

It is a few short sentences, but within lies a blueprint that could (if we pay it more than lip-service) transform Central States to become a member association that redefines "thrive".

Serving as the president of Central States Water Environment Association has been an honor. Special thanks to all that have contributed to my journey. I am lucky to have had many role-models and mentors along the way; you have made all the difference. **CS**

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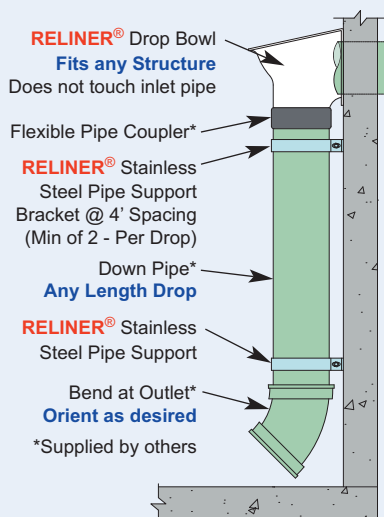
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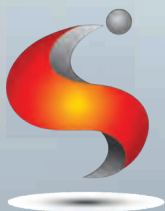
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Virtually Navigating Onward

By WEF Delegates, David Arnott and Tracy Ekola



David Arnott



Tracy Ekola

Spring is here with a new line-up of conferences, events, and initiatives.

WEFMAX events for 2021 will be virtual and are scheduled to be held in April/May. If you haven't attended WEFMAX in the past, now is a good time as the registration is free and the event is virtual. WEFMAX offers great opportunities to network and learn from other member associations. This year's topics include: *Making the Most of Your Virtual Conference*, *Operator Training Initiatives*, *Recruiting and Maintaining Members*, and *Member Association Engagement and Academic Institutions*. Each event has slightly different presentations so you can browse all four WEFMAX events and select one that fits your interest and schedule. www.wef.org/membership/wef-member-associations/wefmax/

VIRTUAL 2021 WEFMAX SCHEDULE:

- WEFMAX #1 Hosted by WEA of Utah, April 8, 2021
- WEFMAX #2 Hosted by Pennsylvania WEA, April 22, 2021
- WEFMAX #3 Hosted by Pacific NW CWA, May 6, 2021
- WEFMAX #4 Hosted by the Atlantic Canada WWA, May 27, 2021
- Virtual WEFMAX 2021YP Summit, April 21, 2021

The Collection Systems, Odors & Air Pollutants and the Stormwater Summit will be completely virtual. The remaining specialty conferences are expected to be hybrid including both socially distanced, in-person, and virtual components.

WEFTEC 2021 will be in Chicago in-person and virtual.

Work is ongoing within the House of Delegates (HOD) workgroups including Federal Advocacy, Diversity, Equity, and Inclusion; Conference Resources; and Financial Diversification. These new workgroups were discussed in the past two delegate reports and their work continues throughout the year. Updates and outcomes from the workgroups will be provided in future delegate reports and during WEFTEC.

In addition to workgroups, WEF has initiated the following efforts to address emerging and changing needs within our organization and industry: Member Engagement Transformation, PFAS Task Force, and Integrated Planning Task Force. Members from each of WEF's committees are included in the PFAS and Integrated Planning Task Force.

The **Member Engagement Transformation (MET) effort** was initiated to evaluate the WEF organizational structure of committees and workgroups and to develop ideas to increase engagement in our ever-changing industry environment. The MET effort aims to get more membership engaged outside the traditional WEF channels of the HOD, standing committees or WEFTEC. The purpose of this effort is to improve and broaden the access or pathway for members to be actively engaged with WEF.

The purpose of the **Integrated Planning Task Force (IPTF)** is to provide effective and focused leadership on the subject of Integrated Planning through collaboration with WEF committees, WEF members, regulators, municipalities, and other stakeholders. Integrated Planning is a concept that supports prioritization of capital investments in all forms of water infrastructure designed to protect human health and the environment, and to incorporate societal objectives in the most cost-effective, affordable way. Legislation in support of IP has been adopted and EPA established an office to specifically address this topic; however, the concept has not been implemented widely by city, municipality or utility leadership. Through leadership efforts, WEF aspires to become a recognized leader in the field of Integrated Planning.

The **PFAS Task Force** was organized to have a coordinated approach across all WEF committees. PFAS is a topic which several committees were already focusing on, however it is recognized that PFAS affects the entire water cycle. Due to the complex technical nature (measurement, fate and transport in water/solids/air matrices) and the various policy/regulatory frameworks (state/federal/countries), WEF initiated the PFAS Task Force.

These three initiatives were started in February and March 2021 and will be ongoing through 2021. Updates will be provided as available and look for information on these topics as part of WEFTEC.

In closing, we want to stress that the WEF Delegate role is to represent the interests of the Member Associations to the House of Delegates and WEF. If something is on your mind, please feel free to call or email. We are here to serve you/CSWEA and be a liaison to WEF leadership. [CS](#)

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So Much to Learn About

By Veronica Loete

For this issue's message, I wanted to take a different approach than the one I used for my previous messages. So even though I won't be going in depth about recent past and future CSWEA events, I still encourage you to keep an eye on the emails and the website. There's lots of good stuff going on!

I can't claim to keep up on ALL the water industry news since it's such a broad and global issue and there are only so many hours in the day, but I thought it would be fun to highlight some water-related news I've come across recently.



and then release the water. Approximately 95% of the water molecules that go into the aerogel are released as water. The aerogel is said to look kind of like a sponge and is unique in that it does not require an external power source to produce water. The water produced in laboratory tests met the World Health Organization's standards for drinking water. The researchers are now looking for industry partners to explore scaling up their operation for domestic or industrial use. (Source: "Engineers create 'smart' aerogel that turns air into drinking

water" from www.phys.org, January 2021.)

WATER USE

Water use in the US is forecast to decline 1.1% per year in volume through 2024. Withdrawals are expected to fall due to increases in water reclamation. The final 2020 numbers were pending but the COVID-19 pandemic was expected to cause about a 5.1% drop from 2019 levels due to decreases in manufacturing shipments and electricity generation. (Source: "Water: United States" from *Freedonia Focus Reports* as summarized by *Treatment Plant Operator* magazine, January 2021.)

NATURAL SANITATION

A study was conducted to assess the role ecosystems play in providing sanitation. It found that nature provides 18% of sanitation services in 48 cities worldwide. The study estimates that more than 2 million cubic meters of human waste from the cities studied is processed annually without engineering infrastructure. An example of this is pit latrine waste that gradually filters through the soil before it reaches groundwater. Sanitation infrastructure is a critical component of modern life, but this study looked at the role nature is playing in places with less of that infrastructure. Extrapolating from the data for the included cities, the researchers estimate that nature sanitizes 41.7 million tons of human waste per year. (Source: "Nature Provides Valuable Sanitation Services" from *One Earth* journal as summarized by www.phys.org, February 2021.)

DEVELOPING A NEW WAY TO GET WATER

Researchers in Singapore are developing an aerogel made up of special long-chain polymers that can switch between attracting water and repelling water. This aerogel can gather water molecules from the air, condense them into a liquid form,

THERMAL ENERGY FROM WASTEWATER

King County, WA is starting a pilot program to investigate the idea of using wastewater as a "renewable, carbon-free source of thermal energy." They will be working with developers or property owners also are interested in recovering unused waste heat in the sewer system. This is something that is already done in Europe and is beginning to be considered in North America. A utility in Vancouver, British Columbia (False Creek Neighbourhood Energy Utility) already uses thermal energy from sewage to provide hot water and space heating to some nearby buildings. As of January 2021, King County was reviewing applications for their pilot program. (Source: "King County, Washington, promotes sewer heat recovery as renewable energy source," *ASCE Civil Engineering* magazine, January 2021.)

These few items barely scratch the surface. There are so many other things I could have written about: regulatory bodies considering PFAS regulations, a study about how Midwest farmers should adapt soil management practices to accommodate climate change, California's new statewide rules for winery wastewater, and development of a low-cost, low-maintenance chlorine dispensing device that could be used to disinfect drinking water at the tap in regions of the world that lack financial resources and infrastructure. There's so much to learn about!

As this is my last message for this term as Chair of the Wisconsin Section, I wanted to take this opportunity to say that I've enjoyed working with the dedicated water professionals who make up CSWEA. I wish you all the best in the future and I encourage you stay creative when it comes to finding solutions to challenging issues and stay curious when it comes to learning about new innovations. [CS](https://www.cswea.org)

2020 Government Affairs Seminar Summary



Prepared by Jeff Smudde, Jenny Pagel, and Ben Brooks (WWOA)

The 2021 Government Affairs Seminar was held virtually and brought two days of information and education to 249 professionals associated with the wastewater industry. The seminar provided an opportunity for attendees to obtain the most recent information regarding regulatory initiatives in Wisconsin and USEPA Region 5, and to learn how Wisconsin dischargers are managing their operations within this evolving regulatory environment. On February 17 and 18, 2021 the Government Affairs Seminar welcomed attendees representing a wide spectrum of interests, including those involved with municipal government, state and federal regulation, education, advocacy, consulting, legal, and industry.

Day one began with keynote speaker and DNR Deputy Secretary, Todd Ambs, who provided an overview of upcoming initiatives and current challenges facing the DNR. The first session was titled Back to Basics. Wade Strickland (DNR) presented the basics of permitting in WI, and Jay Kemp (Black and Veatch) presented about how facilities are classified. This was followed by Vanessa Wishart (MEG Wastewater) discussing how laws and regulations are put into action and Nicole Kruschel (MSA Professional Services) presenting about funding options for WWTP's.

Upcoming issues were the focus of session two on the first day. Paul Kent (MEG Wastewater) shared the most current information about Per and Polyfluoroalkyl Substances (PFAS). Chlorides were the next topic, with a panel of presenters. Steve Corsi (USGS) presented about chloride impacts to groundwater, Lila Johnson (Baxter and Woodman) presented a case study about Paddock Lake's experiences with chloride reduction, and Allison Madison (WI Salt Wise), shared information about the resources Salt Wise can provide for chloride reduction needs. The last two sessions on day one included a presentation by Emily Jones (Madison MSD) about dental amalgam program reporting and by Paul Swaim (Jacobs Engineering) about the impacts of complying with E-coli after decades of fecal coliform.

Day two of the event began with Jerry Deschane (WI League of Municipalities) providing an update on new legislative activities, an outlook for the new administration, and upcoming issues. The first session addressed social issues and the first issue of focus was COVID-19. A panel of presenters included Jake Becken, NEW Water, who provided an update on the impacts of COVID-19 on facilities and the power of virtual roundtables; Amy Garbe (DNR) who discussed the impacts of COVID-19 on DNR and EPA; then Martin Shafer (WI State Laboratory of Hygiene) discussed wastewater surveillance for SARS-CoV-2 and the lessons learned from a statewide monitoring effort in Wisconsin.

The other social issue addressed was diversity, equity, and inclusion. Bri Nakamura (WEF-INFLOW) gave an inspiring presentation about bringing diversity, equity, and inclusion to the water sector.

The second session on day two addressed regulatory compliance strategies. A diverse panel included Matt Claucherty (DNR) presenting about the state of phosphorus compliance options in Wisconsin, John Bond (Roberts WWTF) and Autumn Fischer (Clearas) sharing experiences from Roberts WWTF involving compliance with low phosphorus compliance, then rounded out with Cassie Strauss (United Liquid Waste) presenting about the challenges, opportunities, and best practices of biosolids land application.

The final session on day two included regulatory updates from several WDNR staff members. Meghan Williams and Kristi Minahan shared information about the triennial standards review while Jason Knutson and Adrian Stocks provided additional DNR updates and also presented the annual awards. Mr. Knutson announced the winners of the 2021 WDNR Wastewater Operator Awards. Glen Franzen (Village of Crivitz) and Tyler Fadness (City of Eau Claire) received recognition as Outstanding Operator, and the Spencer Wastewater Treatment Facility and Boscobel Wastewater Treatment Facility were recognized for Outstanding Plant Performance. Congratulations to all that were nominated!

Planning efforts for the 2022 Government Affairs Seminar are already underway! The seminar is planning to return to Fond du Lac in 2022 for its second year at the new location. Mark your calendars for Thursday February 17, 2022 at the Radisson in Fond du Lac. [CS](#)





Navigating Cognitive Overload

By Anna Munson

It has been one year since our lives shifted into a confusing new dimension. As the severity of the pandemic has ebbed and flowed, we have navigated a minefield of decisions that, if poorly made, could have serious consequences.

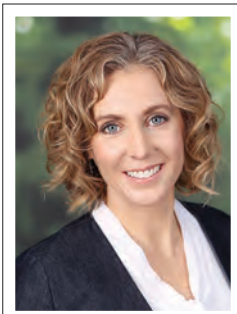
Decisions such as: can I let my son play with his friend? Do they need to stay outside or can they come inside? Should we join my parents for a family dinner? Am I really six feet from that man in front of me at the Caribou Coffee pickup counter? Does that even really matter? Do I tell my colleague that the mask should really cover his nose, not just his chin? Individually, these small decisions seem minor, but over months and months of evaluating our options for each situation, many of us have reached a point of fatigue.

There is a term for this fatigue. It is called cognitive overload. It occurs when an individual's mental effort exceeds their natural cognitive capacity for an extended time. The mental effort required to solve a complex math problem is higher than for a simple problem. It requires even more effort if one is still learning the method to solve the complex problem. The mental effort is further increased if the surrounding environment is stressful or distracting. Even more mental effort is needed if one is already stressed, tired from lack of sleep or from making a series of previous decisions or feeling overwhelmed.

The consequences of cognitive overload extend beyond feeling mentally exhausted or even physically spent. When our brain has reached its processing capacity, we begin to struggle to make good decisions. The cognitive load theory, developed by psychologist John Sweller in the 1980s, explains that competing signals make it difficult for our brains to filter the relevant information from the noise and cloud our decision-making abilities.

While I have been fortunate to work from home, I have struggled at times to avoid overload. Distractions abound; my children trying to do hybrid school, our exuberant puppy and talkative, attention-glutton cat, the neighbor kid who doesn't ever seem to have any schoolwork, dirty dishes that only take a minute to wash, seemingly 1,000 emails from the kids' schools, appointments to be rescheduled, activities modified, plans cancelled. My job presents new challenges almost daily. It is no wonder that focusing on completing work assignments has been a struggle for me at times, a struggle that is not unique in our time.

And yet, this is nothing compared to the cognitive loads some people manage with little trouble. There are many strategies for mitigating cognitive overload. Here are a few simple ones.



One strategy is to focus on one topic or problem at a time. Use your calendar to block off focus times for a particularly challenging issue. Schedule a time to follow up on unfinished items. Find a method to list your tasks that allows you to let go of the mental energy that you are expending to remember the tasks. Checklists are helpful when the tasks repeat on a regular basis or need to be completed in a particular order.

If external distractions are causing cognitive overload, try to minimize them. For those of us who are typically desk-bound, try turning off your email notifications, even for a short period of time. Close your home office door to keep your pets off your lap for a few hours. Block off 30 minutes at lunchtime to step away from your phone and computer.

“My favorite strategy for combating cognitive overload is to take a break and do something fun. If you're ready for socializing, grab a beer on a patio with a friend.”

Neil deGrasse Tyson, renowned astrophysicist, recommends asking questions when trying to solve a particularly sticky problem that is causing cognitive overload. Perhaps your colleague unintentionally left out some of the necessary information to develop a solution. Maybe your supervisor can give you an idea that will send you down the right path. Simply discussing the problem with another person can help one filter through the information to find the most relevant details. A colleague could review your solution to check that you made logical choices and haven't fallen victim to poor decision-making due to cognitive overload.

My favorite strategy for combating cognitive overload is to take a break and do something fun. If you're ready for socializing, grab a beer on a patio with a friend. Take that needy but adorable puppy out to play. Enjoy some tea and a book. Play a game with your kids. Doing something you enjoy will decrease stress, lift your spirits, and bring your cognitive load back into balance. Hopefully, once your cognitive overload has subsided, you'll be able to tackle the difficult task or multitude of decisions with ease. [CS](#)

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A Quick Year in Review

By Amanda Streicher

I know everyone always says, “that year went fast,” but this year really did! My year as Chair was a bit abbreviated due to a later than normal annual conference in 2020, which means we had nearly all the same work to do in less time. I’m proud to say our section has really stayed on track given the circumstances, held several IL Section meetings, virtual seminars, held our first IL-X, and other virtual gatherings to keep everyone engaged and active throughout the year. Thank you to all section members for making this year, albeit quick, a productive year!



I wanted to say thank you to everyone who supported me in my role this year and encouraged me to try new things as Section Chair with the IL-X event. I am looking forward to continuing my involvement and keeping the momentum going as Bob Swirsky takes over as the next section Chair. Congrats and good luck, Bob! Your year will not be quite as fast as mine was, but I assure you time flies having fun with this group!

Since the Annual Meeting took place on August 17-20, 2020, the IL section has held a total of 14 events. With more events planned between writing this article and the 2021 Annual Meeting, our section will have hosted over two events per month. During a pandemic, where everyone is on virtual calls and meetings all day, it is really positive to see that the content our organization is putting out is a quality and topic that members and non-members are interested in joining yet another zoom call for. A great reminder that what we are doing matters and the effort we put in to these events is appreciated.

Recently, the IL Section held the Government Affairs seminar. Typically, this seminar takes place in conjunction with the IAWA Government Affairs seminar as a joint event. The IL Section hosted their own event this year and turnout for the virtual event was just as positive as turnout for the joint seminar when held in person. A big thanks and congratulations to Matthew Streicher and Carl Fischer for coordinating such a successful event!

“The IL Section hosted their own event this year and turnout for the virtual event was just as positive as turnout for the joint seminar when held in person.”

The IL Section also helped coordinate the first Tri-State Collections System Seminar. The event was hosted over multiple mornings and had great turnouts each call. After missing last year’s seminar, the group came back and knocked it out of the park! Nice work Tom Romza and a big thanks to the WI and MN Committee Chairs, Mark Kolczaski and Adam Salo! Our Stormwater Committee was also largely involved with helping plan this event, so thank you to Paul Siegfried and Tim Juskiewicz! These gents also stay on top of

keeping CSWEA involved and informed with all of the latest information from other stormwater associations.

This was a great year for membership initiatives, so big thanks to Aaron Berry! Over the past several years, the IL Section has been working on a Membership Survey. Over this fall, the survey was published to all IL section members to gauge their involvement in CSWEA. We received great feedback and a few new initiatives, such as the CSWEA Social Hour, were created out of those comments. I am looking forward to taking that information and diving in to the results even further to see how we can best support our members, and how we can improve and grow to reach those who are not our members, yet!

The Operations Committee led by Jason Neighbors did a great job staying on top of training programs for Operators. At the time of writing the article, Jason has helped coordinate six different trainings! This training program has become an outstanding resource for CSWEA operators to continue learning and stay involved and up to date with their trainings. Thanks Jason for continuing to provide such a valuable resource to our members.

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Stephanie Cioni has been leading the Public Education committee for a few years now and continues to bring in new ideas and outstanding energy to the committee. She has planned a second Water's Worth It Essay Contest, has challenged the students with the prompts, and has promoted the essay to more schools. With the ideas from IL-X hosted in late 2020, Stephanie has brought energy to other ideas and ways to increase Public Education. I am excited to see all of the great ideas that Stephanie will continue to bring to the IL Section Public Ed Committee. Nice work, Stephanie!

The Biosolids, Energy, and Environmental Recovery Committee, coordinated by Chris Buckley and Mike Harvey, has been holding regular meetings to determine hot topics and how/when to host the next BEER seminar. The group is working towards putting together a conference in 2021, and digging into hot topics to focus on. A new initiative the group is working towards is making sure the Biosolids and Energy Recovery information from the WEF level is reaching our members. Chris and Mike are recognizing WEF topics that relate to our MA and bridging the gap to provide that information to all our section members. We're excited for what 2021 will bring in the BEER Committee.

Bringing people together in a social setting during the middle of a pandemic is quite difficult, but Liz Heise and

Nick Domalewski managed to engage the Students & Young Professionals throughout 2020! They started the pandemic with a virtual happy hour, and it was a great time to see all of the friendly faces we are missing during webinars and the lack of in-person conferences. Later in the year, a trivia night and social hour was a great hit! After trivia, everyone stayed around to chat and just catch-up. We have a great group of YPs in the IL Section and Liz and Nick did a great job keeping us all connected throughout the year. Thank you!

Our Lab and Pretreatment group has continued to remain active all throughout the year. Eduardo and Mary with their committee members have put together multiple webinars on topics revolving around PFAS and pretreatment regulatory updates. These webinars were well attended and contained content that was very relevant and well received in today's wastewater conversations. The feedback from their trainings was amazing, keep up the awesome work Eduardo and Mary!

Again, thank you to everyone who supported me as Section Chair this quick year, and THANK YOU to all of our Committee Chairs and Vice Chairs who have really made the section continue forward throughout a pandemic. We did not slow down when life threw us into a new direction, I'm proud to say we've adapted and thrived! Bring it on 2021! CS

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2021 OFFICER NOMINATIONS



AMY UNDERWOOD, 2ND VICE-PRESIDENT

Amy Underwood has been a member of WEF since 1999 and an active member of CSWEA since 2008. She was an inaugural member of the Illinois Section Biosolids Committee, served on the 2018 CSWEA Annual Meeting Local Arrangements Committee (LAC), and is currently serving as the 2021 LAC Chair. Amy studied Civil and Environmental Engineering and graduated with a Bachelor of Science degree from Michigan State University and a Master of Science degree from the University of Illinois at Urbana-Champaign. She is also a licensed professional engineer in the State of Illinois. After 20 years as a consulting engineer, Amy transitioned to the public side in 2019, where she is currently the General Manager for the Downers Grove Sanitary District. Amy serves the DuPage River Salt Creek Workgroup as a member of the Executive Board and as the Projects Committee Chair.



MATT STREICHER, PWO REPRESENTATIVE 2021-2023

Matt has been an active member of the Illinois Section CSWEA since 2009, serving on many committees; including Public Education, Membership, Local Arrangements, past chair of the Collections Systems, current Chair of the Government Affairs, and past IL Section Chair. Matt has also participated in the WEF Operations Challenge 2015-2019, and again in 2021, and was the recipient of the 2015 IL Section Collection System Award, 2017 IL Section Young Professional Award, and 2020 Water Stewardship Award. Matt graduated from the University of Iowa with BS in Civil and Environmental Engineering, is a licensed engineer in IL, a Board Certified Environmental Engineer, a Professional Operator, an Envision Sustainability Professional, and holds a Class 1 Wastewater Certificate in IL. He is currently the Executive Director at the Glenbard Wastewater Authority, where he has been employed for five years, after previously being the District Engineer at the Wheaton Sanitary District.



ALAN GROOMS, TREASURER

Alan Grooms has been a member of CSWEA and WEF since 2009. He has presented at the CSWEA Annual Conference, WEFTEC, the WEF Biosolids and Residuals Conference, and the WEF Nutrient Conference. Alan has served on several committees and organizing bodies, including service as the 2013 CSWEA Annual Conference Local Arrangements Chair, Wisconsin Section CSWEA Chair, as well as working on local arrangements committees and the Wisconsin Section Operations committee. Alan is a licensed professional engineer in the state of Wisconsin and a certified operator in Wisconsin. Alan graduated from Iowa State University with BS and MS degrees in Civil and Environmental Engineering, and currently works as the Operations Manager at Madison Metropolitan Sewerage District, where he has been employed for over 10 years. Prior to coming to the District Alan worked as a consulting engineer serving municipal clients. [CS](#)



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PROGRAM AND REGISTRATION INFORMATION





WELCOME TO THE 94TH ANNUAL MEETING



Mark Eddington
CSWEA President
2020-2021

The Local Arrangements Committee (LAC) is excited to bring you the 94th Annual Meeting! The LAC is made up of CSWEA members from the IL Section, though while attending this year's meeting, you may not be cognizant of which state is hosting as the meeting will be held virtually. The virtual platform will be Pheedloop, which was used for our 93rd Annual Meeting last year. The current LAC thanks CSWEA Past President Doug Henrichsen and last year's LAC from the MN Section for laying the groundwork last year that we have been able to build upon for this year's virtual annual meeting. Our goal this year has been to deliver greater value to each attendee's experience during the annual meeting by providing great networking opportunities as well as opportunities to reconnect with business associates and friends from the comfort of your own home or office. To this end, the Social Event, Awards Event, 7S meeting, Golden Manhole meeting, GWS & YP meeting, and the annual race have been added back to the schedule for this year's meeting, and a 50/50 raffle will be held in lieu of the annual silent auction. Participation in the virtual race and the 50/50 raffle will be open throughout the entire week.

Our conference theme this year will be the Adapt and Thrive. We live in a time when new challenges are frequently presenting themselves, from issues on climate change to potential new regulations to new viruses. The Technical Program this year provides opportunities to learn about these challenges and how we can adapt and thrive in response to them. The Keynote Address on Monday afternoon will be delivered by US Congressman Sean Casten who has devoted his career to fighting climate change. The Technical Program will include two parallel technical tracks each day on Monday, May 17th through Thursday, May 20th. Technical sessions will focus on the adaptation of our industry to COVID-19, overcoming collection system and wet weather challenges, advances in secondary treatment and clarifier operations, the sustainable future of biosolids, PFAS, master planning, and managing data, as well as a dedicated track for management and professional skills. Wednesday morning's live workshop will focus on Resource Recovery & Energy (R2E). The virtual stormwater tour will feature the City of Naperville's South Central Interceptor Sewer Stabilization Project that protected 6,500 feet of 48-inch pipe threatened by severe erosion along the West Branch of the DuPage River. The Plant Tour will feature the Northern Moraine Water Reclamation District's Water Resource Recovery Facility.

Exhibit Hall hours will be held concurrently with the Technical Sessions in the afternoon each day. Many of the exhibitors also sponsor the meeting, for which we are extremely grateful. Please visit them in the Exhibit Hall and thank them for their support while learning about what services or products they offer.

The annual meeting will start on Monday morning with the Annual Business Meeting, the 7S meeting, and the Golden MH Society meeting. Monday will end with the Social Event late in the afternoon, after the Technical Sessions. The Social Event will be Virtual Trivia! hosted by TriviaHub. This will provide opportunities to network and socialize while also having competitive fun testing your knowledge against your colleagues.

Tuesday starts with the Annual Association meeting where Ms. Jackie Jarrell, WEF Past President, will be our honored WEF visitor. The afternoon will close out with the State Section meetings followed by a combined Global Water Stewardship and Young Professionals meeting.

The Annual Awards event is being planned for the end of the day on Wednesday. The conference is planned to conclude around 3:00 pm on Thursday with closing remarks following the Technical Sessions.

Thank you to all who have worked tirelessly for this Annual Meeting. We look forward to seeing everyone in May for a successful event!

Register today:
<https://pheedloop.com/register/cswea94am/attendee/>

CONFERENCE AT A GLANCE

TIME ACTIVITY

MONDAY, MAY 17

8:00 am – 9:00 am	Executive Committee Meeting
10:00 am – 10:30 am	7S Meeting
10:30 am – 11:00 am	Golden Manhole Society
11:00 am – 12:00 pm	Annual Business Meeting
1:00 pm – 4:00 pm	Exhibit Hall
1:00 pm – 2:00 pm	Welcome and Keynote Address
2:00 pm – 4:00 pm	Technical Sessions with Utility Management Track
4:00 pm – 5:30 pm	Social Event

TUESDAY, MAY 18

11:00 am – 12:00 pm	Annual CSWEA Association Meeting
12:00 pm – 3:00 pm	Exhibit Hall
12:00 pm – 3:00 pm	Technical Sessions
3:00 pm – 4:00 pm	State Section Business Meeting - IL
3:00 pm – 4:00 pm	State Section Business Meeting - WI
3:00 pm – 4:00 pm	State Section Business Meeting - MN
4:00 pm – 5:00 pm	Young Professional & Global Water Stewardship Meeting

WEDNESDAY, MAY 19

9:00 am – 11:15 am	Resource Recovery & Energy (R2E) Workshop
11:30 am – 12:00 pm	Stormwater Tour
12:00 pm – 3:00 pm	Technical Sessions
12:00 pm – 3:00 pm	Exhibit Hall
3:00 pm – 4:00 pm	Annual CSWEA Awards Event

THURSDAY, MAY 20

11:30 am – 12:00 pm	Plant Tour
12:00 pm – 3:00 pm	Technical Sessions
12:00 pm – 3:00 pm	Exhibit Hall
1:00 pm	50/50 Raffle Sales End
3:00 pm – 3:15 pm	Closing Remarks

ON-GOING ACTIVITIES

All Week	Poster Session
All Week	Virtual Race
All Week	50/50 Raffle



LOCAL ARRANGEMENTS COMMITTEE

NAME	ORGANIZATION	LAC ROLE	EMAIL
Amy Underwood	Downers Grove Sanitary District	LAC Chair	aunderwood@dgsd.org
Amanda Streicher	Baxter & Woodman	Virtual Race Chair	astreicher@baxterwoodman.com
Elizabeth Heise	Trotter and Associates	Awards Chair	e.heise@trotter-inc.com
Dean Wiebenga	Peterson and Matz	Exhibit Chair	dean.wiebenga@petersonandmatz.com
Tim Tack	LAI, Ltd.	Golf Outing Chair	ttack@lai-ltd.com
Matt Streicher	Glenbard Wastewater Authority	Social Chair	mstreicher@gbww.org
Luke Markko	Northern Moraine Water Reclamation District	Plant Tour	markko@nmwrld.org
Natalie Cook	Donohue & Associates	Poster Sessions Chair	ncook@donohue-associates.com
Leigha Green	Greeley & Hansen	Service Project Chair	leighacgreen@gmail.com
Rich Hussey	LAI, Ltd.	Raffle Chair	rhussey@lai-ltd.com
Tim Juskiewicz	Strand Associates	Stormwater Facilities Tour Chair	timothy.juskiewicz@strand.com
Mandy Sheposh	Johnson Controls	Technical Program Chair	amanda.sheposh@jci.com
Derek Wold	Baxter & Woodman	Utility Management Track	dwold@baxterwoodman.com
Mike Holland	Kishwaukee Water Reclamation District	Utility Management Track	mholland@kishwrld.com
Jillian Kiss	Trotter and Associates	2018 LAC Chair, Advisor	j.kiss@trotter-inc.com
Sue Baert	Wheaton Sanitary District	Advisor	baert@wsd.dst.il.us
Joe Lapastora	Northern Moraine Water Reclamation District	Flyers/Social Media Chair	lapastora@nmwrld.org
Mark Eddington	Kishwaukee Water Reclamation District	CSWEA President (2020 - 2021)	meddington@kishwrld.com
Mohammed & Amy Haque	Central States Water Environment Association	Executive Management	mhaque@cswea.org ; ahaque@cswea.org
Jonah Arter	Central States Water Environment Association	Virtual Platform & CEUs	jarter@cswea.org

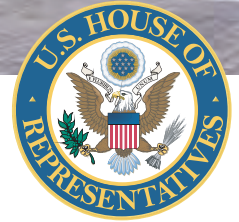
TECHNICAL PROGRAM COMMITTEE

NAME	ORGANIZATION	STATE	EMAIL
Mandy Sheposh (Chair)	Johnson Controls	IL	amanda.sheposh@jci.com
Chris Buckley	EEL	IL	cbuckley@eeiweb.com
Matt Seib	Madison Metropolitan SD	WI	matts@madsewer.org
Ryan Geifer	City of Wisconsin Rapids	WI	rgieffer@wirapids.org
Emma Larson	City of St. Cloud	MN	emma.larson@ci.stcloud.mn.us
Colin Fitzgerald	Jacobs	MN	colin.fitzgerald@jacobs.com

EXECUTIVE COMMITTEE

- President, Mark Eddington
- 1st Vice President, Jane Carlson
- 2nd Vice President, Tracy Hodel
- Treasurer, Alan Grooms
- Immediate Past President, Doug Henrichsen
- WEF Delegate '22, Tracy Ekola
- WEF Delegate '23, David Arnott

- PWO Representative '21, Kathy Crowson
- YP Representative '22, Samantha Austin
- Minnesota Section Trustee '22, Chris Harrington
- Wisconsin Section Trustee '21, Jay Kemp
- Illinois Section Trustee '21, Mike Holland
- Executive Management, Amy Haque and Mohammed Haque



WELCOME AND KEYNOTE ADDRESS

US Representative Sean Casten

Monday, May 17 | 1:00 pm to 2:00 pm



CSWEA is pleased to welcome US Congressman Sean Casten as the Keynote Speaker for our 94th Annual Meeting. Sean Casten represents Illinois' 6th Congressional District, located in suburbs west of Chicago, and is serving as a sophomore in the 117th Congress. As a scientist, clean energy entrepreneur, author, and now as a Member of Congress, Casten has dedicated his life to fighting climate change. In Congress,

Sean currently serves on the House Financial Services Committee, the Science, Space, and Technology Committee, the Select Climate Crisis Committee, and is a Co-Chair on the New Dems Climate Change Task Force.

Rep. Casten has a Bachelor of Arts in Molecular Biology and Biochemistry from Middlebury College, a Master of Engineering Management and a Master of Science in Biochemical Engineering from Dartmouth College. He has worked as a clean energy consultant and manager at Arthur D. Little (1997 to 2000); as the President and CEO of Turbosteam (2000 to 2006); and he co-founded Recycled Energy Development (RED), which focused on recycling wasted energy and converting energy facilities to cleaner, more economic uses.

Casten was a founding chairman of the Northeast CHP Initiative, a nonprofit advocacy organization with a mission to advance policies that favor energy efficiency in the Northeast US, and a lead negotiator on the Massachusetts interconnection standard and participated in multiple utility rate cases. For his advocacy of clean energy policies and technology, Casten was named to the Chicago Council on Global Affairs' Emerging Leaders Class of 2011.

Rep. Casten is also committed to keeping in close contact with his constituents, believing in the benefit of hearing the views and ideas of all of the people he represents.

The Congressman will be available for a live question and answer session following his address.



CONFERENCE HIGHLIGHTS



MONDAY, MAY 17

CSWEA ANNUAL BUSINESS MEETING

11:00 am to 12:00 pm

The Association Business Meeting will include reports from the Association Committees and Sections and the annual election of officers. We encourage everyone to attend and learn about our association's activities.

WELCOME AND KEYNOTE ADDRESS

1:00 pm to 2:00 pm



CSWEA is pleased to welcome US Congressman Sean Casten as the Keynote Speaker for our 94th Annual Meeting. Sean Casten represents Illinois' 6th Congressional District, located in suburbs west of Chicago, and is serving as a sophomore in the 117th Congress. As a scientist, clean energy entrepreneur, author, and now as a Member of Congress, Casten has dedicated his life to fighting climate change. In Congress, Sean currently serves on the House Financial Services Committee, the Science, Space, and Technology Committee, the Select Climate Crisis Committee, and is a Co-Chair on the New Dems Climate Change Task Force.

Join us live for the keynote address. The Congressman will be available for a live question and answer session following his address.

SOCIAL EVENT

Virtual Trivia! Presented by TriviaHub

4:00 pm to 5:30 pm

Come join us as we bring the pub to your house for a night of virtual trivia fun! Complete with a live and engaging trivia host, you'll get the full pub trivia experience... without having to leave your chair!

The event will run about 90 minutes and you'll be added to a team with other colleagues to test your knowledge with fun and unique trivia questions.

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- Gift card prizes.
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Just sign up for the Social Event when you register for the Annual Meeting, and you'll receive a Zoom link where the event will take place. Our host will be ready to take care of everything for you – and that's it! We look forward to seeing you there!





TUESDAY, MAY 18

ANNUAL CSWEA ASSOCIATION MEETING

11:00 am to 12:00 pm

Hear from our President and WEF Visitor as they present a summary of activities and initiatives of the organizations. We will recognize our Operations Challenge team for their performance at WEFTEC 2020 and our newest inductees into the Golden Manhole Society and the 7S will be announced and honored.

STATE SECTION BUSINESS MEETINGS

3:00 pm to 4:00 pm

Please attend your respective State Section's business meeting to be updated on the activities of the Section and its committees. Don't miss this opportunity to get involved and find out where you can help your Section.

WEDNESDAY, MAY 19

STORMWATER TOUR**South Central Interceptor Sewer Stabilization Project, Naperville, IL**

11:30 am to 12:00 pm

Please join us for a virtual Stormwater Tour of the City of Naperville's South-Central Interceptor Sewer Stabilization Project that protected 6,500 feet of 48-inch pipe threatened by severe erosion along the West Branch of the DuPage River.



Upland runoff scour

Riverbank erosion

Vulnerable pipe bridge

Where Did That Sewer Come From?

The City of Naperville's South-Central Interceptor Sewer was constructed in 1969, paralleling the West Branch of the DuPage

River. For decades this 48-inch interceptor sewer serving 7.8 square miles in the northeast corner of the city was doing its job, inconspicuous to the residents and community. But in the last 10 years, the sewer has been making random appearances and raising questions from unsuspecting observers, "Hey, what's that sewer doing there?"

Increased urbanization and river flash responses to weather conditions have changed flow conditions in the West Branch of the DuPage River which has been increasingly threatening the City's existing sewer through extreme riverbank erosion and exposure. The City studied a 1.25-mile segment of interceptor sewer pipe and identified numerous concerns including upland runoff scour and riverbank erosion, as well as designed but vulnerable pipe bridges.

Through investigations and modeling, the City visualized a multi-stage sewer hardening and riverbank stabilization project to stabilize and protect the interceptor sewer pipe, restore and reinforce the riverbank, and re-establish a sustainable riparian environment improving the health of the river.

Join us on a virtual tour describing the common sources threatening the City's infrastructure, the explorations made to identify sustainable solutions, and the critical partnerships between local parks, forest preserves, and City residents leading to successful implementation of the City's vision.

ANNUAL CSWEA AWARDS EVENT

3:00 to 4:00 pm

Hear updates about CSWEA activities from the outgoing president, the vision for the year ahead from our incoming president, and honor this year's award winners for the many WEF and CSWEA Awards presented to the very best of our industry.



THURSDAY, MAY 20



PLANT TOUR

Northern Moraine Water Reclamation District

Thursday, May 20, 2021

11:30 am to 12:00 pm

Established in 1978, the Northern Moraine WRD is located in Northeastern IL, and serves the communities of Island Lake, Lakemoor, and Port Barrington with its 2.0 MGD Activated Sludge WWTP along with over 77 miles of sanitary sewer main, and 23 lift stations. Originally constructed as a package plant in 1980, the WWTP has gone through one major expansion in 1999 to expand capacity and provide improvements via an oxidation ditch, larger secondary clarifiers, and dewatering via belt filter press. Later improvements were made on a more focused approach over the subsequent years. These included improvements with screening at the headworks, a digester rehabilitation, addition of a centrifuge, and sludge storage improvements to name a few. Join us on a virtual tour to see how this facility is facing the challenges of today, and focusing on a vision for the future.





ONGOING ACTIVITIES

JIM SHAW MEMORIAL VIRTUAL RACE



For those who wish to participate, each individual at the registration of the conference will make an activity pledge. This pledge will identify how many minutes of activity you plan to do each day of the conference. Activities are not limited to running or walking, but can include anything that gets your heart pumping - swimming, yoga, rollerblading, lifting

weights, whatever your activity is, it counts! Activity minutes will be reported each day of the conference. The individuals who meet or exceed their pledges will be in the 'running' for the prize. This is a great way to get our bodies in motion after sitting at a computer all day!

The virtual race will be in honor of Jim Shaw, who passed away in November 2019. Jim was an active CSWEA member and avid runner. While Jim enjoyed the running, he certainly relished the camaraderie that running provided. He encouraged many of his friends and colleagues to participate with him in whatever running event he could find, whether it was the Central States 5k or a self-organized WEFTEC run with the promise of breakfast after. Jim's love of water and running were evident to all that met him. Regardless of whether you are running or doing another activity, it is fitting that we honor him with this race.

50/50 RAFFLE

In lieu of the silent auction which CSWEA holds every year to benefit Global Water Stewardship (GWS), a 50/50 raffle will be held through the virtual platform to raise money for GWS. Raffle ticket sales will be split evenly between the winner and GWS. Raffle ticket sales will close at 1:00 pm on Thursday. The winner will be posted in the announcements in the virtual Lobby by 3:00 pm on Thursday.

SERVICE PROJECT

Every year CSWEA holds a service project for members to come together and give back to the host community. Due to the COVID-19 pandemic, the service project will look different this year. In order to ensure members' safety, the service project will focus on outreach and educating the public - specifically upper elementary to high school and college students. As part of the CSWEA Annual Meeting, the virtual plant tour of Northern Moraine Wastewater Reclamation District's wastewater

plant will be partnered with the service project's outreach and education efforts.

Teachers, community leaders, and others will be able to use the virtual plant tour as a resource to help teach youth about wastewater processes and what goes into treating water that goes down their drains. Inspiring youth can lead to passionate future leaders in the wastewater and drinking water industries.

EXHIBIT HALL

Monday | 1:00 - 4:00 pm

Tuesday | 12:00 - 3:00 pm

Wednesday | 12:00 - 3:00 pm

Thursday | 12:00 - 3:00 pm

Exhibits showcasing the latest technology in wastewater, collection systems, treatment and many related items will be on display. Be sure to thank our fine exhibitors for their support of our Association.

Pheedloop's Gamification combines leaderboards, sponsorship, prize redemption, and lots of ways to engage with your colleagues in a virtual environment. Attendees will receive codes when visiting exhibitor booths that can be entered to redeem points and track progress on an event leaderboard. This feature provides useful insight into attendee event engagement and those at the top at the leaderboard at the completion of the Annual Meeting will be eligible for exciting prizes!

TECHNICAL SESSIONS

Monday | 2:00 - 4:00 pm

Tuesday | 12:00 - 3:00 pm

Wednesday | 12:00 - 3:00 pm

Thursday | 12:00 - 3:00 pm

Technical sessions will focus on the adaptation of our industry to COVID-19, overcoming collection system and wet weather challenges, advances in secondary treatment and clarifier operations, the sustainable future of biosolids, PFAS, master planning, and managing data, as well as a dedicated track for management and professional skills. All technical presentations will be pre-recorded and available for viewing one year after the annual meeting. Presenters will be available during the presentation airing to answer questions live via chatroom. Attendees will be able to download a certificate summarizing continuing education units (CEUs) or professional development hours (PDHs) earned while watching the technical sessions. For more information, please see the Technical Program.

Register at <https://pheedloop.com/register/cswea94am/attendee/>



TECHNICAL PROGRAM

MONDAY, MAY 17, 2021

KEYNOTE ADDRESS			
1:00-2:00	A Federal Update – US Congressman Sean Casten		
SESSION A		SESSION B	
COVID STINKS! COVID AND ODOR CONTROL		UTILITY MANAGEMENT: PLANNING FOR AN AGING WORKFORCE	
Moderator	Colin Fitzgerald	Chris Buckley	
2:00-2:30	Assessing the Ecotoxicological Effects of Coronavirus Countermeasures on WRRF Performance Bryan Coday , Carollo Engineers	2:00-2:20	Flying Solo – Thoughts for Mentors and Mentees Alan Grooms , Madison Metropolitan Sewerage District
2:30-3:00	COVID-19 Modern Trash Loading Proves Sewage Pump Clog Resistance Can Not Be Predicted by Impeller Througlet Size Bob Domkowski , Xylem, Inc.	2:20-2:40	Asset Management/CMMS Paul Burris , City of Elmhurst; Megan Fox , Baxter & Woodman
3:00-3:30	Odor Control and Whole Plant Considerations Eric Redmond , Black & Veatch	2:40-3:00	Aging Operators Versus Technology Jim Huchel , City of Flagstaff, AZ
3:30-4:00	Wastewater Odor Control using Hydrogen Peroxide and ORP Brady Overton , USP Technologies with Glenbard Wastewater Authority	3:00-3:20	Leading through Challenges Tim Juskiewicz , Strand & Associates
		3:20-3:40	Smart Water Utilities Pablo Calabuig , GoAigua Inc.
		3:40-4:00	Discussion

TUESDAY, MAY 18, 2021

SESSION C		SESSION D	
ADVANCED SECONDARY TREATMENT		WET WEATHER	
Moderator	Ryan Giefer	Emma Larson	
12:00-12:30	Continuous Monitoring of Nitrification Kinetics in a Low DO, Continuous Flow Granular Activated Sludge Leon Downing , Black & Veatch	Using Acoustic Inspection Technology to Prioritize Cleaning at Wastewater Utilities Charlie Rotman , InfoSense, Inc.	
12:30-1:00	Intensify! Membrane Bioreactors Expand Capacity Glenn Tranowski , Strand Associates, Inc.	When COVID Clouds the O&M Picture, IoT Technology Brings New Clarity Jay Boyd , ADS Environmental Services	
1:00-1:30	Low DO Biological Nutrient Removal: Full-scale Examples, Lessons Learned for Operation and Design, and the Fate of Nitrogen Natalie Beach , Carollo Engineers	CCTV Data Management Life in the Time of COVID Rebecca Specht , Milwaukee Metropolitan Sewerage District	
1:30-2:00	Kishwaukee Biological Improvements – The Importance of Process Flexibility and Operational Optimization Brent Perz , Baxter & Woodman, Inc.	Meeting BNR Limits While Handling Extreme Peak Flows with a Continuous Influent/Intermittent Decant Sequencing Batch Reactor Benjamin Barker , YSI Inc, a Xylem brand	
2:00-2:30	Aerobic Granulation – Secondary Clarification Impacts and Considerations Eric Redmond , Black & Veatch	Evaluation of Alternatives for Town's Peak Wet Weather Flow Treatment and Permitting Process John Dyson , Aqua-Aerobic Systems, Inc.	
2:30-3:00	Failure IS an Option: Assessing Final Clarifier Performance by Quantifying Uncertainty Associated with State Point Analyses (SPA) through Monte Carlo Brian Shoener , Black & Veatch	Pilot Study: Advanced, High-rate Treatment System for Sewer Overflow Elimination During Wet Weather Events Paige Peters , Marquette University	

WEDNESDAY, MAY 19, 2021

	TECHNICAL WORKSHOP: RESOURCE RECOVERY & ENERGY (R2E)	
9:00-11:15	Corey Bjornberg , Rochester, MN; Mike Holland , Kishwaukee WRD; Matt Streicher , Glenbard Wastewater Authority; Cody Schoepke , Fond du Lac, WI; and Tanja Rauch-Williams , Carollo Engineers	
	SESSION E	SESSION F
	SUSTAINABILITY	BIOSEDOLDS & PFAS
Moderator	Emma Larson	Colin Fitzgerald
12:00-12:30	Repurposing Infrastructure for Phosphorus Removal: Developing Design Guidelines for S2EBPR Leon Downing , Black & Veatch	Using Dried Biosolids as a Sustainable Fuel Source – A Long-term Review of Energy Recovery System with the Potential to Address Emerging Contaminants Sudhakar Viswanathan , Veolia Water Technologies
12:30-1:00	Perspectives for Utility of the Future Wendell Khunjar , Hazen and Sawyer	Biosolids Drying to Eliminate Liquid Land Application Eric Lynne , Donohue & Associates
1:00-1:30	Impact of Sludge Minimization Technologies on Mass, Energy and Nutrient Balance of the Wastewater Treatment Plant Brett Bevers , Centrisys/CNP	Economic Impacts of PFAS on Biosolids Programs Maddie Ledoux , CDM Smith
1:30-2:00	Class A Via B3: Otsego Implements Sustainable Biosolids Upgrades with Minnesota's New "Buildings Benchmarks and Beyond" Requirements Scott Schaefer , AE2S	PFOA and Microplastics in Biosolids – Summary of Occurrence, Regulatory Status, and Current Understanding of Toxicology Tanja Rauch-Williams , Carollo Engineers
2:00-2:30	Milwaukee MSD South Shore WRF Digester Gas Treatment System Demonstrates Improvements in Engine Generator Reliability Jay Kemp , Black & Veatch	Small Batch Treatment of PFAS-Impacted Industrial Wastewater Katie Wolohan , Barr Engineering Co.
2:30-3:00	Efficiency, Reliability, and a Whole Lot More: Combining Aeration Systems for Big Savings Garrett Sheehan , Carollo Engineers	PFAS Incineration at Wastewater Reclamation Facilities Lloyd Winchell , Brown and Caldwell

THURSDAY, MAY 20, 2021

	SESSION G	SESSION H
	NUTRIENTS	PLANNING & DATA
Moderator	Matt Seib	Mandy Sheposh
12:00-12:30	PONDUS Thermal Hydrolysis for VFA Production to Enhancing EBPR and Pre Digestion P Gerhard Forstner , Centrisys/CNP	Complex Facilities Planning for Racine, Wisconsin Rusty Schroedel , AECOM
12:30-1:00	Evaluating a Revolving Algal Biofilm (RAB) to Treat Anaerobic Digester Centrate at the Sioux City WWTP to Reduce Overall Plant Loading Jens Dancer , Gross-Wen Technologies	Case Study: Pingree Grove, IL – Advanced Primary Treatment for Increased Biological Capacity in Existing Town's Wastewater Treatment Facility John Dyson , Aqua-Aerobic Systems, Inc.
1:00-1:30	Rapid Start-Up of an ANITA Mox Deammonification System Downstream of Phosphorus Recovery and Anaerobic Digesters Larry Li , Veolia Water Technologies	It's Easier to Go with the Flow When You Know Where the Flow is Going: How Machine Learning-Based Predictions Lead to More Confident Decisions Katya Bilyk , Hazen and Sawyer
1:30-2:00	Construction, Commissioning and Start Up of the World's First Advanced Biological Nutrient Recovery (ABNRTM) Facility at the Village of Roberts, WI Jordan Lind , CLEARAS Water Recovery	Mercury Removal in Municipal Wastewater: The Role of TSS and DOC in Great Lakes Discharge Limits Georjee Spilkia , University of Minnesota – Duluth
2:00-2:30	Beyond Ultra-low Effluent Phosphorus Concentration: The Benefits of Using Lanthanide Elements in Wastewater Treatment Logan Wherry , Neo Water Treatment	Taking your Disinfection in a New Direction: UV Disinfection from Concept to Construction Matt Sokolowski , Carollo Engineers
2:30-3:00	Two-Stage HPO Process Optimization for Improved Tertiary Filtration Performance Anthony Giovannone , Black & Veatch	Global Water Stewardship: La Fortuna, Costa Rica – Sanitation Solutions Elizabeth Heise , Trotter and Associates



UTILITY MANAGEMENT TRACK

PRESENTERS Monday, May 17 | 2:00 pm to 4:00 pm



Alan Grooms



Paul Burris



Megan Fox



Pablo Calabuig



Jim Huchel

Planning for an Aging Workforce

Our workforce is aging at a rapid rate as we are in the midst of the silver tsunami. Participants in this track will be rewarded with strategies on how to combat the loss of institutional knowledge and plan for retirements. From methods to invest in staff to implementation of best practices and new technologies, listeners will come away with strategies for a successful transition to a new workforce.

Presenters:

Alan Grooms is approaching 25 years in the water and wastewater engineering field. In that time Alan worked almost 2 years as a project manager for a wastewater equipment manufacturer, then for over 11 years as a project manager for a municipal consulting engineering firm primarily engaged in wastewater work. Currently employed with the Madison Metropolitan Sewerage District as the Operations Manager, he first served the District as the Process & Research Engineer for six years. Alan earned both his BS and MS degrees in Civil Engineering from Iowa State University in Ames, IA. A licensed professional engineer and certified operator in the State of Wisconsin, Alan is an active member of the Wisconsin Wastewater Operators Association (WWOA), Central States Water Environment Association (CSWEA), and Water Environment Federation (WEF).

Paul Burris has been in Elmhurst for the last five years but has over 30 years of operations of water and wastewater facilities. Paul was recognized in 2018 as APWA's National – Water Resource Manager of the Year. Paul is an Illinois Class 1 Wastewater Operator and a Class "A" Potable Water operator. Paul also holds a Master in Public Administration from Governor State University in University Park IL. Paul is also licensed at the highest levels for wastewater and water in Arizona, Illinois, Indiana, Nevada, and New Jersey. He also holds the highest non-surface potable water certifications in Michigan (S-1/D1).

Megan Fox has been working as an environmental engineer for Baxter & Woodman for two years. She has worked on a variety of drinking water, wastewater, and water conveyance system projects. Megan received her Bachelor's degree from the University of Illinois at Urbana Champaign in Civil & Environmental Engineering and is currently pursuing her Master's degree in Environmental Engineering also from the University of Illinois at Urbana Champaign.

Jim Huchel has served as an operator or plant manager at multiple facilities throughout the country for over 38 years. He is currently the Water Reclamation Manager for the City of Flagstaff, AZ. Jim is also a Past President of CSWEA.

Pablo Calabuig is CEO of GoAigua Inc, the smart water company that is transforming utilities into smarter, more proactive and more resilient entities with its software and analytics. He graduated in Civil and Environmental Engineer at University of Valencia and UC Berkeley.

RESOURCE RECOVERY AND ENERGY (R2E) WORKSHOP

PRESENTERS Wednesday, May 19 | 9:00 am to 11:15 am



Corey Bjornberg



Mike Holland



Matt Streicher



Cody Schoepke



Dr. Tanja Rauch-Williams

Overcoming Barriers to New Technology Implementation

Join us for a live technical workshop on Resource Recovery and Energy (R2E). This workshop, presented by the R2E Committees of MN and WI, highlights key strategies utilities in the Central States region have used to overcome barriers to implementing new technologies. Several utilities will present their unique story, the barriers they faced, and the approach they used to overcome them. The workshop will include breakout sessions organized to facilitate further dialogue around various challenges and solutions to implementing new technologies.

R2E Workshop Schedule – May 19, 2021

9:00-9:10	Introduction by R2E Workshop Subcommittee
9:10-9:30	Corey Bjornberg, Rochester, MN
9:30-9:50	Mike Holland, Kishwaukee WRD and Matt Streicher, Glenbard WA
9:50-9:55	Break
9:55-10:15	Cody Schoepke, Fond du Lac, WI
10:15-10:35	Tanja Rauch-Williams, Carollo Engineers
10:35-10:55	Breakout Sessions
10:55-11:15	Wrap-up: Share ideas from Breakout Sessions and Conclusion

Presenters:

Corey Bjornberg is originally from Willmar, MN where he grew up on a family farm. He received his bachelors in Civil Engineering and Masters in Environmental Engineering from North Dakota State University (NDSU) in Fargo, ND. While at NDSU he worked part time for approximately three years at the Moorhead Wastewater Treatment Facility. After graduation he



worked for a consulting firm for almost four years where he performed studies and design work on various wastewater treatment plants in Ohio. For the last eight years, he has been with Rochester as a process control engineer where he oversees plant performance and is continually working on plant optimization and preparing for future upgrades. Corey has a Minnesota Class A Wastewater Operator License and a Professional Engineering License.

Mike Holland holds a bachelor's degree in Civil Engineering from the University of Illinois – Urbana/Champaign and a master's degree in Public Administration from Northern Illinois University. He worked for nine years as an engineering consultant with Trotter and Associates, Inc. before coming to work for the Kishwaukee Water Reclamation District in 2013 as the District Engineer / Asst. District Manager. Mike is a licensed Professional Engineer in Illinois and Wisconsin and a Class 1 Wastewater Operator.

Matt Streicher graduated from the University of Iowa with a degree in Civil & Environmental Engineering. After serving as the District Engineer for the Wheaton Sanitary District, he moved to the Glenbard Wastewater Authority in 2016 as their Assistant Director and was promoted to the Executive Director in 2018. He's a licensed Professional Engineer in IL, a Board Certified Environmental Engineer, Class 1 Wastewater Operator, and a Professional Operator.

Cody Schoepke graduated from the University of Wisconsin – Stevens Point with a Bachelor of Science Degree in Soil and Waste Resource Management. He began his career as an Operator in Milwaukee at the Jones Island Water Reclamation Facility where he worked for five years ending in Supervision. Cody has been at the Fond du Lac Regional Wastewater Treatment and Resource Recovery Facility (WTRRF) for six years. He began as the Operations Leader transitioning to the Assistant Superintendent and is now the Superintendent. He has been Chair for the WWOA Southern Region, part of the WWOA Technical Committee, and is currently Chair of the CSWEA – Wisconsin Operations Committee. A recent accomplishment for him and his staff was receiving the 2020 CSWEA Operations Award.

Dr. Tanja Rauch-Williams serves as Carollo's Wastewater Process and Innovation Lead and Principal Technologist with more than 20 years of experience in wastewater treatment, nutrient removal, and applied research. Her work has focuses on wastewater treatment, optimization, codigestion, resource recovery, energy optimization, and trace organic removal. Tanja is a member of LIFT's Steering Committee, the second vice-chair of WEF's Municipal Resource Recovery Design Committee, and Co-Founder of the Rocky Mountain Innovative Water Technologies Committee.

R2E Workshop Subcommittee Members: Matt Seib, Anna Munson, John Berghesi, Will Martin, and Anndee Huff Chester.

SPECIAL GUEST

Jacqueline A. Jarrell, PE
WEF Past President



Jackie Jarrell, PE, is the Immediate Past President of the Water Environment Federation (WEF), an international organization of water quality professionals headquartered in Alexandria, VA.

Jackie has been with Charlotte Water for more than 29 years. As wastewater operations chief she has been responsible for wastewater operations with

total permitted capacity of 123 million gallons per day (MGD), with the largest plant permitted at 64MGD, the related residuals program producing more than 90,000 wet tons/year, oversight of regulatory functions, process control, and continuous improvement programs within the operations areas.

Recently, Jackie was appointed as an interim deputy director for Charlotte Water. This has expanded her role to oversee customer service, communications, industrial pretreatment, laboratory services, and the Industrial Pretreatment Program, with more than 60 significant industrial users.

As a WEF member, Jackie has held multiple leadership and committee roles, including serving as the chair of the Utility Management Program Symposia and First Vice Chair of the Utility Management Committee.

Also an active member of the North Carolina Water Environment Association (NCWEA), Jackie served as the MA Chair in 2013. At that time, she led the MA in developing NCWEA's strategic plan in 2013. Over many years volunteering for NCWEA, she chaired several committees including the Nominating Committee, the Public Education

Committee, the Annual Conference Committee, and the Program Committee. She also worked on several committees such as Water for People (including a trip to Bolivia in 2011), the Wastewater Schools Committee, the Endowment Committee, and the Plant Operations Committee.

She is actively involved with the North Carolina Water Quality Association, a regulatory advocacy organization of utilities in North Carolina, and is a past chair and a current board member.

Jackie is a registered professional engineer in the state of North Carolina and holds a Biological Wastewater Grade II OIT. She received a BS in engineering from the University of North Carolina-Charlotte. She is also a member of the NC 5S and the 2014 recipient of the Arthur Sidney Bedell Award. In 2015, Jackie, along with her colleagues, was awarded the Gascoigne Wastewater Treatment Plant Operational Improvement Medal.

About WEF

The Water Environment Federation is a not-for-profit technical and educational organization of 35,000 individual members and 75 affiliated Member Associations representing water quality professionals around the world. Since 1928, WEF and its members have protected public health and the environment. As a global water sector leader, our mission is to connect water professionals; enrich the expertise of water professionals; increase the awareness of the impact and value of water; and provide a platform for water sector innovation. To learn more, visit www.wef.org.





EXHIBIT HALL

Exhibitors will be featured all four days of the conference: on Monday, May 17, from 1:00 to 4:00 pm; Tuesday, May 18, from 12:00 - 3:00 pm; Wednesday, May 19, from 12:00 - 3:00 pm; and Thursday, May 20, from 12:00 - 3:00 pm.

CURRENT EXHIBITORS

- | | | | |
|---|--|---|---|
| <ul style="list-style-type: none">• ADS Environmental Services• AE2S• Aqua-Aerobic Systems, Inc.• Baxter & Woodman, Inc.• Boerger, LLC• Bolton & Menk, Inc.• Brown and Caldwell• Carollo Engineers• Carus LLC• Centrisys/CNP | <ul style="list-style-type: none">• Clearas Water Recovery Inc.• Central States Water Environment Association• Deuchler Engineering Corporation• Donohue & Associates• Drydon Equipment, Inc.• Engineering Enterprises, Inc.• Hazen and Sawyer• HDR Engineering, Inc. | <ul style="list-style-type: none">• HR Green, Inc.• Industrial Flow Solutions• Innovyze• Jim Jolly Sales, Inc.• LAI Ltd.• Peterson and Matz, Inc.• Ruekert & Mielke, Inc.• SEH• Shand & Jurs Biogas | <ul style="list-style-type: none">• Starnet Technologies, An Electric Pump Company• Strand Associates, Inc.• Sustainable Generation• t4 Spatial• Trotter and Associates, Inc.• Unison Solutions, Inc.• Wonderware Midwest |
|---|--|---|---|

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- Listing in Central States Water

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Registration Deadline: April 9, 2021

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INNOVATIVE WASTEWATER MONITORING FOR COVID-19 MITIGATION: *Part 2*

*By Martin Shafer PhD, Senior Scientist & Research Lead, Wisconsin State Laboratory of Hygiene
Photos by Jan Klawitter, Public Affairs Manager, Wisconsin State Laboratory of Hygiene*

STATUS/ACCOMPLISHMENTS

An important, if not the primary, goal in developing the SARS-CoV-2 wastewater surveillance network and system was to be able to report virus/RNA levels to the Wisconsin Department of Health Services (DHS) on a rapid and consistent timeframe. A timeframe that would allow the DHS to raise concerns with local public health authorities before a significant outbreak might occur. Thus, fulfilling the promise of wastewater-based epidemiology (WBE) for outbreak detection and rapid implementation of mitigation strategies. Achieving this goal required building new and complex process-flows in the laboratory that enable the intake and pre-processing of 100s of raw wastewater samples per week, and virus RNA isolation/concentration and quantification from those samples within a period of two days. Add another day for data review/validation and the data is ready to be reported out to public health



Dr. Dagmara Antkiewicz adds samples to a qPCR analysis plate

authorities and wastewater utilities within 3+ days of sample receipt. Given the overnight sample shipping and wonderful cooperation/collaboration with the POTWs, that typically means around 4+ days from sample collection.

Keeping with the theme of rapid reporting of SARS-CoV-2 virus levels and supporting metadata to public health experts, we have been reporting these data to DHS on at least a weekly basis for analysis by their epidemiologists.

DHS in turn, immediately uploads these data to the new CDC-managed National Wastewater Surveillance System (NWSS) [www.cdc.gov/coronavirus/2019-ncov/cases-updates/wastewater-surveillance.html] for nationwide COVID-19 disease monitoring. The accomplishment here cannot be understated – within a period of less than four months (for WI monitoring) and eight months (for nationwide monitoring) from recognition of the severity of the COVID-19 threat,

a completely new and complex WBE program was developed and put-in-place. Nothing of this scale, complexity and near-real time reporting had previously been attempted, let alone successfully implemented, and represents a real success story for collaboration of academia, public health, and importantly, wastewater utilities.

To facilitate the distribution and visualization of the wastewater SARS-CoV-2 data to the wastewater utilities, local public health authorities and the general public, the data visualization experts at DHS built a Public-Facing Wastewater SARS-CoV-2 Dashboard. There these data are displayed and freely available to download (www.dhs.wisconsin.gov/covid-19/wastewater.htm) Data from nearly all of the facilities participating in the monitoring network are available for display/download at this public website. Since the beginning of the program, historical patterns in both wastewater SARS-CoV-2 RNA concentrations and clinical (human) caseloads are shown; and the most recent series of dates/ data are analyzed on a running basis to provide a simple trend metric (decreasing, no trend, increasing) for both wastewater and clinical data. Importantly, the case data are those specifically located within the boundaries of the service area of the wastewater treatment facility, and therefore correlations/relationships between wastewater and clinical data can be more accurately evaluated. On the dashboard map of Wisconsin, each of the participating wastewater facilities can be selected and zoomed-in-on to display the service area district boundaries, along with the aggregate population served.

The DHS in Wisconsin (and the CDC) closely monitor the data submitted by the WSLH and UW-Milwaukee, looking, in particular, for signs of increasing trends in the wastewater SARS-CoV-2 concentrations. If upward trending data is observed, DHS staffers alert local public health authorities to provide a warning, thus closing the cycle and achieving the promise of WBE.

In close collaboration with experts at UW-Madison, the WSLH is building sequencing capability for the SARS-CoV-2 genome for samples collected from wastewater (the WSLH currently sequences SARS-CoV-2 RNA, for variant monitoring, in a portion of the positive clinical cases).

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After the wastewater is concentrated by filtration, Dr. Kayley Janssen rolls up the filter and places it in a tube filled with beads to be homogenized.

This will be a very significant technological as well as public health advance. Similar to the situation we faced almost a year ago, when only a few reports of wastewater monitoring of SARS-CoV-2 concentrations were in the literature and methods were just being developed, there are just a couple papers detailing methods and implementation of SARS-CoV-2 genome sequencing from wastewater. However, the benefits of sequencing from wastewater are many (maybe even more so, than for the concentration measurement), foremost of which is the ability to detect SARS-CoV-2 variants from large “pools” of people – whole communities. This is a much more efficient and cost-effective approach to variant surveillance, especially in communities with low rates of clinical testing. The sequencing tools in development will also allow for the detection of new variants and lineage evaluation, not just assessment of variants previously identified.

Our wastewater network currently has 72 participating facilities, collecting samples for SARS-CoV-2 surveillance at a frequency of either once or twice per week. A handful of facilities are also providing samples every weekday. We are actively recruiting for an additional 20+ facilities to bring the total closer to 100, however, the recruitment success rate has slowed considerably (not sure why – maybe pandemic weariness?). This current (and hopefully expanded) scale of monitoring will continue to June 2021. We have submitted a proposal to continue the surveillance program for at least another year, with an increased emphasis on variant detection (RNA sequencing). Maintaining the program/infrastructure will provide great benefits to public health – with an



Dr. Dagmara Antkiewicz sets up instrumentation with the concentrated and homogenized wastewater sample for the extraction of genetic material to test for the presence of SARS-CoV-2.

efficient and cost-effective approach for early warning of SARS-CoV-2 infection and variant detection. Maintaining the network through the full rollout of the vaccines will provide a critically needed independent assessment of vaccine efficacy and community immunity.

If we are successful in securing funding to continue the wastewater surveillance, we will develop the tools needed to add other respiratory (e.g. seasonal influenza) viruses and enteric pathogens to the wastewater surveillance program.

The WSLH and UW-Milwaukee are working very closely with several federal agencies (American Public Health Laboratory (APHL) association), CDC, NSF, and EPA to develop and document best practices for wastewater surveillance of SARS-CoV-2. With APHL, we are developing guidance for public health laboratories that wish to initiate wastewater surveillance of SARS-CoV-2. In our continuing effort to refine methods and develop best practices for wastewater monitoring across a large range of facility size (2,000 to 650,000 population served), we just completed a large scale high-frequency monitoring study at over

a dozen of the participating POTWs. Samples were collected daily for two months over a period of dynamic change in virus levels. The data developed will help inform on (a) minimum frequency of sampling necessary to detect change, (b) robust approaches for fecal normalization, and (c) matrix effects impacting method performance.

WHAT WE HAVE LEARNED (TO DATE)

We observe rational relationships between levels of SARS-CoV-2 RNA in wastewater and COVID-19 cases in the community sewershed, in many, but not all facilities/communities. The case correlations are strongest with new cases and the percentage of positive cases, but correlations with seven-day averages are close behind. We are working to understand why, in certain communities, the wastewater-case correlations are less clear. Reasons may include, biased or incomplete case data, variable time lag between the wastewater signal and the case reporting, asymptomatic virus shedding (40-50% of virus loading are from asymptomatic

infections), and unresolved matrix effects on SARS-CoV-2 quantification (e.g. high BOD or industrial loadings).

While wastewater RNA-case correlations are generally more robust in the larger systems, reasonable relationships are also apparent for small systems, therefore we can provisionally conclude that the wastewater-based epidemiology (WBE) of COVID-19 is viable over a wide range of system scales (2K to 650K persons in the community). This bodes well, not only for

SARS-CoV-2, but for WBE of other viral and enteric pathogens. However, we must make it clear that we are not yet at the point of being able to accurately predict caseloads in the community strictly from wastewater SARS-CoV-2 RNA levels. Validating that predictive power is one of many goals of on-going research, but until those studies are complete, the wastewater data are best used as a powerful trend monitoring and early warning tool/approach.

Wastewater SARS-CoV-2 levels appear to be a leading indicator (i.e. the signal appears in the wastewater before COVID-19 cases are reported in the community) by from one to 10 days of COVID-19 prevalence in the community served. This time-lag (and early warning) is the results of many factors, but high among them are the lag between early infection and symptoms (viruses are shed into fecal matter at early infection and appear in the wastewater before clinical symptoms appear); and typical delays in infected people seeking treatment and then reporting to the disease databases.

There remains uncertainty in best practices for several important sampling and procedural protocols, however these issues are being addressed in dedicated sub-studies. We have addressed sampling frequency requirements for trend detection at many of our larger sewersheds and find that a minimum of two samples per week is required, with three samples providing marginally improved power, for trend detection. Increasing the sampling frequency beyond three per week does not improve trend detection in these larger, more stable systems. We are conducting high frequency sampling campaigns in smaller sewersheds to determine if these sampling guidelines must be more nuanced. On-going efforts are also addressing other important factors such as variation in SARS-CoV-2 concentration as driven not by community infection levels, but by hydraulic dilution or variable fecal load. Here we are examining several “fecal-markers” (other viruses, bacteria, or bacteriophages endogenous to human fecal matter) that could be used to “normalize” the SARS-CoV-2 concentration data. Under evaluation are PMMoV (one of the most common RNA viruses in human fecal matter); HF-183 (a human-specific *Bacteroides* bacteria); and crAssphage (a human gut-associated bacteriophage). The issue of “non-standard” matrices and impact on viral RNA quantification is an important one and will need to be properly vetted before WBE can be applied routinely across all communities. We are critically examining the role of matrix-driven variability. Industrial and commercial loadings may be significant factors driving variability, and meta-data (such as BOD5, TSS, metal levels, conductivity, etc.) collection is important in addressing these issues.



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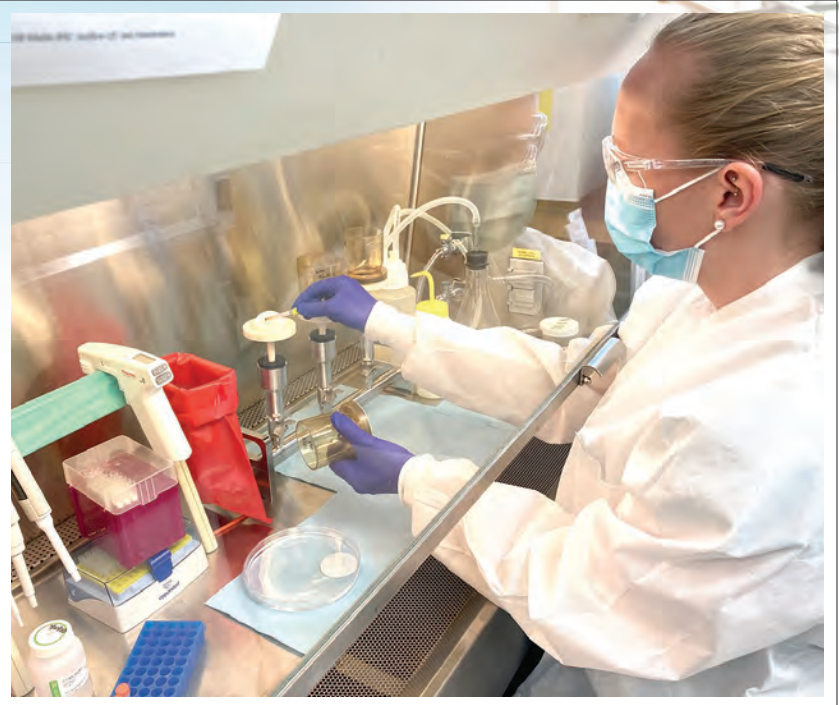
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WBE is not restricted to community scale (and associated municipal wastewater treatment facilities) applications. Numerous studies have shown the viability of wastewater monitoring at congregate living facilities, prisons, and university residence halls. Though representative sample collection is typically more difficult at the individual building scale, and wastewater matrices more challenging to work with, we are among other groups that have documented that reliable quantification of SARS-CoV-2 can be achieved in these settings. Thus enabling efficient and cost-effective viral early warning and trend monitoring to complement clinical testing.

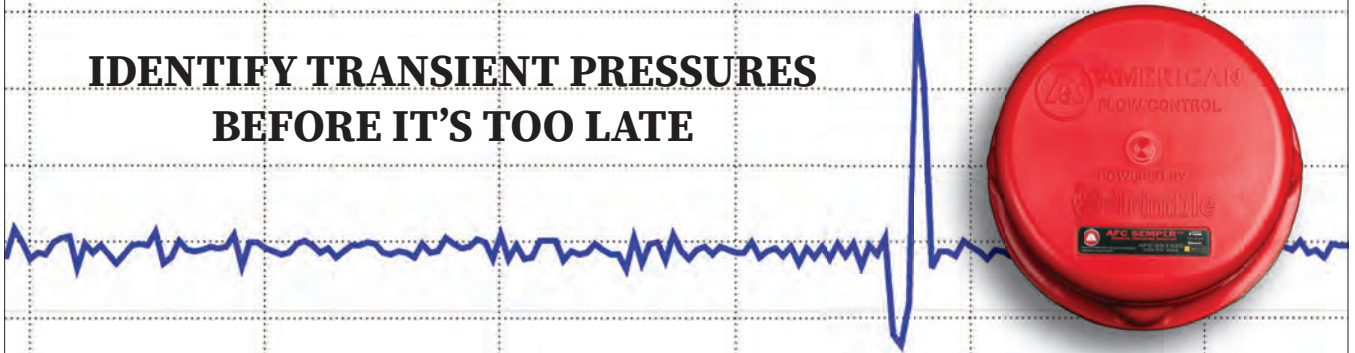
Essentially, WWTF operators have been extremely conscientious and proficient in sampling and providing meta-data! We believe there should be some mechanism to “reward” participation.

Our large network of monitoring sewersheds was able to capture the rapidly changing SARS-CoV-2 dynamics across the state of Wisconsin. Several “surges” (and their die-offs) are represented in the virus concentration data – some statewide, others more regional/local. [CS](#)



Dr. Kayley Janssen sets up a filter funnel unit by placing a filter onto the funnel. The collected wastewater will be filtered on the setup pictured to concentrate the wastewater for processing of SARS-CoV-2 genetic material.

IDENTIFY TRANSIENT PRESSURES BEFORE IT'S TOO LATE



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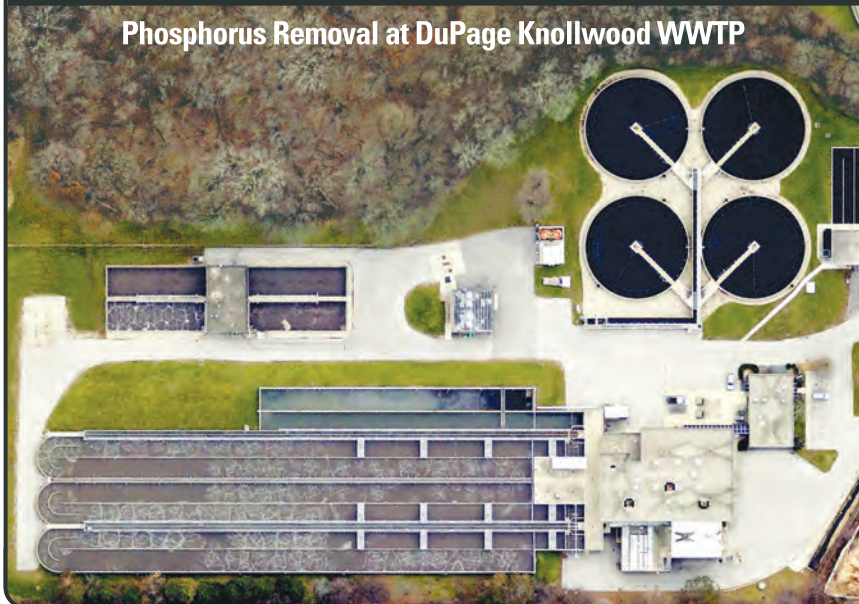
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Rochester Water Reclamation Plant



2004 Plant

The Rochester Water Reclamation Plant (WRP) serves the City of Rochester, located in the southeast corner of Minnesota and home to world renowned Mayo Clinic. The Rochester WRP serves a population of approximately 120,000 plus the numerous visitors that come on behalf of Mayo each year. The WRP treats about 14 MGD and has a design capacity of 24 MGD. The plant is operated 24 hours per day, seven days per week, 365 days a year by 29 staff members that include management, engineers, lab and environmental compliance staff, operators, maintenance staff, and support staff.

HISTORY

In the early 1900's, Rochester, like most cities, simply conveyed sewage to nearby fields or local waterways. As Rochester grew, the proportion of sewage entering the local waterway increased causing

downstream pollution and in 1916 downstream farmers began to complain about the condition of the river indicating that their cows, pigs, and chickens were dying from drinking polluted river water. An emergency election was held and bonds were passed to approve a wastewater treatment plant.

In 1926, Rochester's first wastewater treatment plant was built and sewer lines that were partially installed as far back as 1894 were connected to the plant to begin treatment. The mechanical activated sludge plant was designed for a flow of 2.2 million gallons per day at a cost of \$276,000 and was the largest of its kind in the US at that time. The process included screening, aeration tanks where sewage was drawn from the bottom of the tanks and sprayed over the surface for aeration, and clarifiers where settled sludge was pumped to digestion tanks. Sludge from the digestion tanks was sent into drying beds until dried at which point it was used as a fertilizer.

Rochester continued to grow as a community and soon the plant became overloaded. The City confines had also expanded and now surrounded the wastewater plant. In 1945, land was purchased two miles north of the City where the current facility is located. Although the plant was constructed several miles from Rochester, due to continued growth, the plant site is again surrounded by the Rochester Community. The original 1926 plant was decommissioned after construction of the new plant.

The 1952 wastewater treatment plant consisted of bar screens, grit collection, fine screens, trickling filters, settling tanks, and chlorination. Trickling filters were selected as the technology provided low operating costs and simple operation. The total cost for the new treatment facility was \$1,900,000. Shortly after construction, it was realized that the sludge treatment process was inadequate. In 1957 two anaerobic digesters were constructed to reduce sludge volumes and further treat the solids.



1926 Plant



1957 Plant



1967 Plant



1980 Plant



1992 Plant

In 1967, an activated sludge treatment process was added to the facility. The new process consisted of grit removal, preaeration tanks, primary settling tanks, aeration tanks, final settling tanks, a blower building, additional chlorinating tankage, a sludge thickening tank, sludge lagoons and sludge drying beds. The expanded plant was rated for 12 million gallons a day and cost \$2,700,000. The project was the first major expansion and required work to be performed with existing processes online. This expansion also added a tunnel system, which allowed the majority of operations to exist underground.

On July 5, 1978 the City of Rochester received 6" of rain that caused major flooding throughout the City. The Water Reclamation Plant did not escape its wrath when the South Fork of the Zumbro River banks overflowed. With water flooding the sub-basement of the plant, the staff had to cut power to the facility. Temporary treatment of sewage was done with six 2,000 gallons per minute submersible pumps, which pumped the sewage through a one inch bar screen and into final settling tanks before discharging to the South Fork of the Zumbro River. Transportation to and from the plant during the flood was achieved by using an employee's fishing boat as all roads were flooded. Repair costs for the 1978 flood damage totaled \$240,000.

A second treatment plant expansion was started in 1980 due to stricter MPCA effluent standards and increasing wastewater flows. The expansion added an administration building, equalization basin, high purity oxygen plant, primary clarifiers, intermediate clarifiers, final clarifiers, thickening building with centrifuges, pho-strip phosphorus removal system, gas compression building with storage sphere, chlorination treatment facility, extensive odor control facilities, and computer control for the entire plant. Part of the stricter MPCA regulations required Rochester to be the first wastewater treatment facility in the state to have an effluent phosphorous limit. This upgrade also included an energy recovery system, which included methane gas collection, boilers, two 400 HP engines, and final effluent water heat recovery system for process equipment and HVAC. The expanded plant was designed to treat 19.1 million gallons a day and cost \$56,000,000. 95% of the treatment plant upgrade cost was paid for by the Federal Government under the Clean Water Act.

In 1988, a chemical storage facility was added to house chemicals used for phosphorus removal shortly followed by a Solids Handling Improvements Project in 1992. The solids handling project included two new anaerobic digesters, two gravity belts replaced three centrifuges for sludge thickening, and a 4.7 million gallon biosolids storage tank was constructed to increase the overall storage capacity. This improvement cost \$14,600,000.

In 2004, the aeration basin complex (ABC) plant was constructed to run parallel to the existing high purity oxygen (HPO) plant and increased the plant's capacity to 23.9 million gallons per day. The new ABC plant consisted of a primary clarifier, two aeration basins, and a final clarifier. In addition to the new ABC plant, a new headworks was installed that included a new pump station, fine screens, and vortex grit removal. A third gravity belt was added to the solids handling facility and a second 2.5 million gallon biosolids tank was also added. Total cost for the expansion and upgrade was \$75,000,000.

RECENT HISTORY

In 2015 the MPCA indicated the Rochester WRP would be required to reduce their phosphorous discharge to Lake Zumbro below their current limit of 1 mg/L. At the same time it was becoming apparent that the cryogenic air plant used to generate high purity oxygen for the HPO plant was reaching the end of its useful life. Leadership decided it was time develop a Facilities Plan that addressed new limits, the cryogenic air plant, and other aging infrastructure. Several overarching goals were included into the facilities plan including reducing energy demand, clean design, decrease maintenance costs, consider innovative approaches, and have a long term holistic approach.


Rochester selected Brown and Caldwell for the Facility Plan work, which was completed in 2020. Brown and Caldwell evaluated most components of the facility including the liquid stream, the solids stream, and auxiliary gas handling and heat recovery systems. The finalized report included recommendations for a three-phased approach to implement the upgrades.


Phase 1 was primarily an administration upgrade. Due to restructuring within the City, it was decided to create an Environmental Services Department that would include the water reclamation plant, collection systems, storm water, and flood control. All these groups are to be located at the WRP site and thus new office space, shop areas and storage space was required. Several abandoned buildings and unutilized process spaces will be converted for the needed amenities, reducing the footprint of any new buildings. Phase 1 is currently under construction and had a cost of \$13,500,000.

Phase 2 is the upgrade to liquid stream and includes the modification of the HPO Plant to a conventional aeration treatment process. The existing HPO basins will be retrofitted for conventional treatment with the first stage being converted to anaerobic volume and second stage being converted to aerobic volume. Additional tankage will be required to convert to fully conventional


PHASE
1

Remodel and Effluent Upgrade

 CAPITAL COST
\$10,000,000




 ENERGY SAVINGS
\$47,000/year



 CHEMICAL SAVINGS
\$23,800/year

Remodel and effluent treatment upgrade to address aging equipment, improve collaboration, and meet regulatory requirements.



air and a new splitter structure will be added to allow a single mixed liquor to create a single plant concept. Estimated cost for Phase 2 is \$54,000,000 and engineering is expected to start in 2022.

Phase 3 is the upgrade to the solids treatment stream. This phase includes the addition of a primary thickener, modifications to the solids handling process, modification to abandoned tankage for storage, a second load out facility and upgrades to the odor control system. The estimated cost for Phase 3 is \$15,000,000 and would occur in the late 2020s. However, near the

end of the completion of the facilities plan, three significant industrial users in Rochester closed their doors resulting in noteworthy drop in loadings to the WRP. It is believed many of the projects for Phase 3 can be reduced or eliminated due to the decreased loadings.

The facilities plan also considered some innovating technologies including granular sludge. While this technology was not selected, sludge densification was singled out as a potential opportunity for Rochester when looking forward to design of Phase 2. With Rochester's facility plan goal of looking for innovative



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PHASE
2

Liquid Treatment Upgrade



CAPITAL COST
\$62,000,000



ENERGY SAVINGS
\$210,000/year



CHEMICAL SAVINGS
\$70,000/year

Liquid treatment upgrade replaces 40 year old unreliable equipment and provides treatment to meet new regulatory requirements.



PHASE
3

Solids Treatment Upgrade



CAPITAL COST
\$15,000,000



ENERGY SAVINGS
\$22,000/year



HEAT SAVINGS
3 Billion Btu/year

Solids treatment upgrade using existing tankage to meet biosolids regulatory requirements and reducing energy, heat, and liquid treatment costs.



opportunities that could potentially reduce capital and operation costs, decided to pilot this technology.

Granular sludge or densified sludge are similar in they are trying to increase the density of normal flocs found in

activated sludge with the goal of faster settling sludge. This in turn means clarifier capacity is increased and higher mixed liquor concentrations can be achieved within the existing basins, increasing overall capacity of the system.

The densification can happen solely by gradient pressures within the basin but often-external pressures are also applied. One of the external pressures that is common for sludge densification is the use of hydroclones on the return activated sludge (RAS) stream. This involves sending a portion of the MLSS or RAS to the hydrocyclone, which will retain the denser sludge while wasting the lighter poor settling material.

This concept of densified sludge pairs well with simultaneous nitrification denitrification as the densified sludge creates zones where aerobic, anoxic, and anaerobic environments can all exist within a single densified floc. Simultaneous nitrification denitrification also requires dissolved oxygen to be reduced from typical values of around 2 mg/L down to 0.3-0.7 mg/L, which reduces aeration requirements, and energy costs. If successful, this could mean short term gains in reduced energy for Phase 2 and assist in achieving future total nitrogen limits with less capital and operational costs compared to that of traditional denitrification methods.

Rochester Water Reclamation Plant has undergone many changes over the last century and will need to continue to change well into the future as our world evolves. The common link in all these changes is the dedicated professionals who have a passion to serve the Rochester community and environment so that area natural resources are available for future generations to enjoy. [CS](#)

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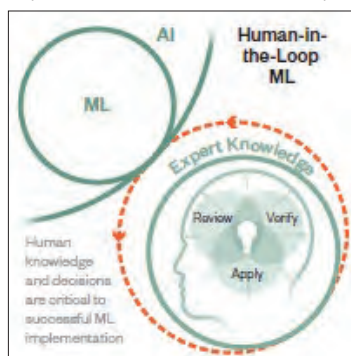
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At its simplest, machine learning (ML) is learning from data. Every day, various types of data are recorded on a massive scale throughout the water sector and ML can be used to analyze these complex datasets. Well-trained ML models can explore and process massive and diverse datasets in real time while also providing rapid predictions and/or recommendations for operators – a difficult and sometimes impossible task for a human, especially in a short time frame.



One common misconception is that ML tools will replace human operational decision making. Water experts are critical to integrating the science of water into model development. And once in production, it will always be important for a human to review the recommendations of the

model, periodically verify the model is continuously learning, and apply their own judgment and experience to the situation.

MACHINE LEARNING VS. TRADITIONAL MODELING

Models in the water industry have traditionally focused on known relationships and fixed equations derived from years of research. Those equations (rules) along with their inputs (data) can be coded directly into a computer model.



ML uses data and answers to learn rules, and uses error minimization algorithms to find the best way to represent a relationship between the data and the answers. ML can be used to gain insight into processes that are not well understood, processes that are too complex to use a conventional equation, or when mechanistic models don't represent the system well. They can also be used for more complicated tasks like process optimization.

CASE STUDY: HOLISTIC WET WEATHER MANAGEMENT COMBINING MACHINE LEARNING, TREATMENT PLANT OPTIMIZATION, AND PREDICTING COLLECTION SYSTEM INFLUENT FLOW HYDROGRAPHS

The 75 mgd Neuse River Resource Recovery Facility (NRRRF) operated by Raleigh Water in North Carolina, has an average daily flow of 48 mgd and peak hydraulic capacity of 225 mgd.

The facility has stringent total nitrogen (TN) limits of less than 3 mg/L at permitted flow, and a quarterly average effluent total phosphorus limit of 2 mg/L. High flows can impact the facility's ability to meet these strict nutrient limits; influent flows increase dramatically during heavy and/or sustained rainfall, which can shorten treatment time.

The NRRRF has a 32-million-gallon equalization basin (EQ) to withhold a significant portion of the flow and load entering the facility during high flow events. Historically, NRRRF staff utilized collection system pump station data, weather forecasts, and experience to determine when to move flow into the EQ basin. Pump station data provides about 30-60 minutes of advance warning but does not predict if flows would continue to increase. As a result, operators historically had to use their own judgement and experience to determine how to optimize the utility of the EQ basin. Raleigh Water realized requiring a human to process the available data and recall how past storm events unfolded was neither practical nor efficient, and that it could benefit greatly from a quantitative model with the ability to predict the flow hydrograph in advance of and during a rainfall event.

Raleigh Water has a traditional collection system model and collection system flow monitors. The collection system model is an excellent tool for planning but is not equipped to provide flow forecasts in real-time, and the flow monitors are not predictive. Hazen determined that this would be an excellent opportunity to develop and implement a machine learning tool to provide real-time flow hydrograph forecasting.

The model development process was conducted entirely on a desktop computer. Hazen used supervised and unsupervised machine learning to gain insight into the input parameters that best predict future flow. The resulting model has 77 inputs, including streamflow, rainfall (past and predicted), and past plant flow. The ML algorithm was calibrated to six years of historical data, covering 38 storms, and the model accuracy was +/- 2.8 mgd for any point during the storm. Once the desktop model was developed, the project entered the deployment step.

Azure and SQL were used for the automated data pipeline. The predictions are displayed in a web-based Microsoft Power BI dashboard tool that includes a tool to estimate the optimal point to fill the equalization basin to maximize its utility (see Figure X). There is also a tool to estimate the near real-time process capacity of the secondary clarifiers (see Figure Y), which are typically the most strained part of the process during a wet weather event. The entire pipeline including data visualization dashboard was securely deployed to work alongside a closed SCADA network. The model and dashboard are updated hourly with the latest prediction. Since the model uses real-time streamflow, plant flow, rainfall, and rainfall predictions, it naturally adapts to changing conditions throughout the course of the storm and remains relevant.

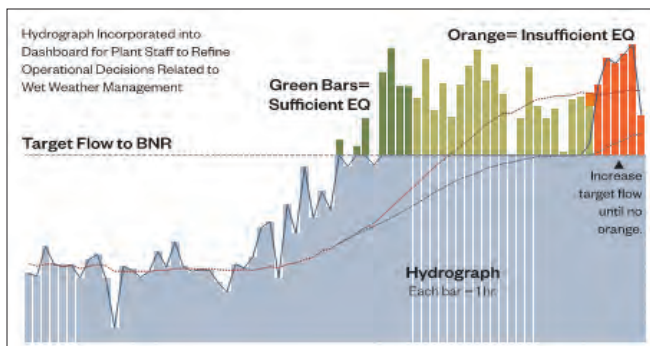


Figure X. Visualization of equalization basin guidance program. Operator adjusts the target flow to BNR until orange bars no longer appear, indicating the optimal flow above which to divert flow to EQ.



Figure Y.

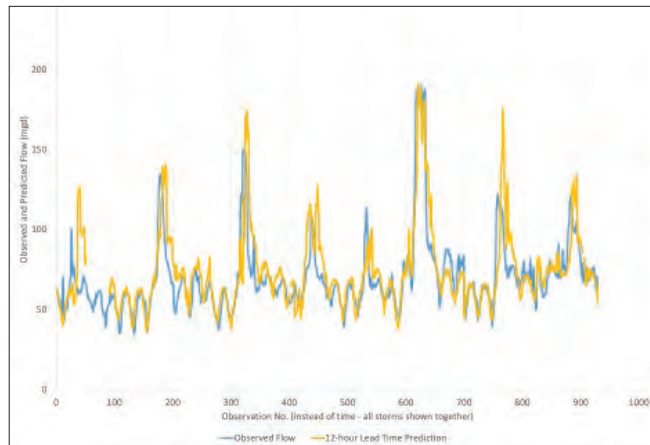


Figure Z. Comparison of observed flow and model predicted flow 12-hours in advance. There are a few days of missing model predictions following the first storm due to a planned SQL-server migration by Raleigh Water.

Secondary clarifier guidance program screen. Left – displays key performance indicators for past 72 hours. Top center – displays past flow (blue colors), projected flow (green), and maximum allowable flow (red) with all secondary clarifiers in service. Right – calculator tool that allows operators to solve for any one of the following by specifying the other four parameters (shown solved for SC surface area required): SVI, influent flow, RAS flow, MLSS, and clarifier surface area. Bottoms center – additional KPIs and combinations of small and large clarifiers that meet the criteria established in the calculator tool.

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The project was deployed in a test mode in December 2019, and completed in July 2020. Since then, at least eight major storm events – including Hurricane Isaias – have occurred and been predicted well beforehand (see Figure Z). With this tool the plant implemented its wet weather standard operating protocol: putting 2 additional primary clarifiers online, then one additional BNR basin, and finally diverting flow to the EQ basin. Wet weather equalization was employed five times since the finalized model was deployed. For these five storms the equalization volume utilized ranged from 12.6 to 26.8 MG. More importantly, the equalization basin volume was never exceeded, indicating this program and the interpretation of its results by Plant Staff were utilized optimally.

As these figures show, the model errs on the side of being conservative, occasionally predicting a flow that is higher than the actual wastewater flow. One of the reasons for this is because rainfall forecasts are uncertain, and the model does depend on their accuracy. More importantly though, local streamflow was shown to be the most significant variable in predicting the peak flow. For this reason, models that predict future streamflow based on predicted rainfall quantities were developed and incorporated into the ML model. Flow predictions more than 10-hours away are highly dependent upon those streamflow predictions, whereas model predictions within that 10-hour window are much more reliant upon the actual streamflow. Thus, the model becomes increasingly accurate as the time to event narrows, but also provides a very good prediction of what is likely to happen based on past storm events when the event is still several days away.

When the model overpredicts the peak flow it is generally because the actual streamflow did not rise as high as was expected based on past storms.

The eight storms and associated wet weather flows were significant. The largest rainfall event involved 6.7 inches of rain over a nine-hour period with a peak rainfall intensity of 4.5 inches per hour. Of the available 32 MG in the EQ basin, 17 of the were utilized and effluent quality the day after the storm was the same as the day prior, indicating the program helped the utility maintain process performance and efficiently utilize its equalization volume for managing wet weather flows.

The resultant model and Power BI dashboard are valuable tools that provide utility staff near real-time visualizations of key data, such as current operating parameters and stream flood stages as well as future flow predictions. The tool provides an interactive interface for quickly assessing current conditions and planning for projected future conditions, which assists with making informed decisions. The benefit is greater efficiency and reliability in utilizing existing infrastructure to effectively manage wet weather flows and continue to meet stringent effluent limits. The model is effective at proactive planning for large, anticipated storm events such as tropical storms with built-in tools for assessing a potential range of future flow conditions if additional rainfall occurs beyond current weather predictions. The model is also responsive to real-time measurements of streamflow, rainfall, and plant influent flow, and its accuracy generally improves the closer it gets to the wet weather event. [CS](#)

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GLOBAL WATER STEWARDSHIP

GWS

Update

By Liz Heise

SPRING 2021

With 2020 FINALLY coming to a close, GWS has been working on our plan for 2021.

We are optimistic that this year we will be able to travel and continue pushing our projects forward. This year we are launching our new GWS SLAP program (See, Learn, and Participate) where we will invite one student from the winning student design team to spend two weeks in the Midwest shadowing engineers, visiting WWTFs, and spending time learning about lab work. The goal of this program is to expose students and young professionals to the wastewater industry and give them an opportunity to learn how our industry works and bring that back to Costa Rica with them. This opportunity will be open to AyA and ASADA members as well as Costa Rican university students in the future. We had hoped to start last year, but travel restrictions forced us to postpone. We are so excited that we will be able to go forward with this program in 2021.

We are also hard at work planning our second annual TicoSan Wastewater Conference. This conference will take place in November. At the moment we are planning for another virtual conference, but we are still optimistic that we will be able to transition to an in-person event. For this reason, we are preparing for both options so that we will be ready to go if we get the green light!

An exciting initiative that came out of the virtual revolution that 2020 brought us is that we are working on developing training webinars in Spanish on wastewater treatment design, operation, and maintenance. These webinars will be a great addition to our in-person training seminars as they will allow for people



to register and watch them on their own time, as well as be able to reach a broader audience. The first webinars will utilize a similar model and format to the CSWEA Operator Training series that was recently updated and presented.

In addition to continuing to push our professional development initiatives forward, we are also excited about the student design competition. This year's problem statement features the community of Playa Samara, and is the first regional design that will include three different "ASADAs" working together. The competition will take place on April 28, 2021, virtually. We have several American university teams registered, as well as two universities in Costa Rica. This year students in the Environmental Engineering program at both TEC and UCR will participate in the competition. We are optimistic that the winners from the top US team will be able to travel to Costa Rica with us in August to help with data collection and biogarden construction for the 2022 project. We also have secured a spot for the winning Costa Rican team to compete in the international student design competition at WEFTEC this year (either virtually or in-person).

Though this year's competition isn't complete yet, we are already getting started on community selection for next year's project. After over a year without travel, Mohammed was finally able to make it down to Costa Rica in March to start scoping out the next project location. AyA has recommended three different locations – Montezuma, Santa Teresa and Puerto Jiménez. Mohammed visited the ASADAs at Montezuma and Santa Teresa to meet with community leaders and give them our community selection checklist. This checklist is used to help us determine the level of preparedness the community has for implementing a wastewater solution and allows us to select communities with the greatest ability to move a project from concept to construction. After we review these applications, we will select a community to visit in August.

Though we are still not sure what the future holds, we are beginning to see the light at the end of the tunnel and excited at the possibility of getting back onsite to construct a biogarden in Samara Beach and work with the children and community members on public health and education. If you are interested in learning more or getting involved, please reach out to Liz Heise at chair@globalwaterstewardship.org. [CS](https://www.cswea.org)

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Membership Application

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

1. What is the nature of your ORGANIZATION? (circle one only) - required

- | | | |
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| 01 Public/Private, Wastewater and/or Drinking Water and/or Stormwater | 06 State, Federal, Regional Government Agency | 11 Public/Private Stormwater (MS4) Program Only |
| 02 Public/Private Wastewater only | 07 Research or Analytical Laboratories | 12 Public Finance, Investment, and Banking |
| 03 Public/Private Drinking Water only | 08 Educational Institution | 13 Non-profits |
| 04 Industrial Systems/Plants | 09 Manufacturer of Water/Wastewater/Stormwater Equipment or Products | 99 Other (please specify) _____ |
| 05 Consulting or Contracting Firm | 10 Water/Wastewater/Stormwater Product Distributor or Manufacturer's Rep. | |

2. What is your Primary JOB FUNCTION? (circle one only) (JOB)

- | | | |
|---|--|---|
| 01 Management: Upper or Senior | 03 Engineering & Design Staff | 07 Educator |
| 02 Management: Engineering, Laboratory, Operations, Inspection, Maintenance | 04 Scientific & Research Staff | 08 Student |
| | 05 Operations/Inspection & Maintenance | 09 Elected or Appointed Public Official |
| | 06 Purchasing/Marketing/Sales | 10 Other (please specify) _____ |

3. What areas do you consider to be your KEY FOCUS AREAS? (circle all that apply) (FOC)

- | | | |
|--|--|--|
| 01 Collection Systems | 08 Public Education/Information | 14 Water Reuse and/or Recycle |
| 02 Drinking Water | 09 Residuals/Sludge/Biosolids/Solid Waste | 15 Watershed/Surface Water Systems |
| 03 Industrial Water/Wastewater/Process Water | 10 Stormwater Management/Floodplain Management/Wet Weather | 16 Water/Wastewater Analysis and Health/Safety Water Systems |
| 04 Groundwater | 11 Toxic and Hazardous Material | 17 Other _____ |
| 05 Odor/Air Emissions | 12 Utility Management and Environmental | |
| 06 Land and Soil Systems | 13 Wastewater | |
| 07 Legislation (Policy, Legislation, Regulation) | | |

4. Optional Items (OPT)

Education/Concentration Area(s) (CON)

- | | | |
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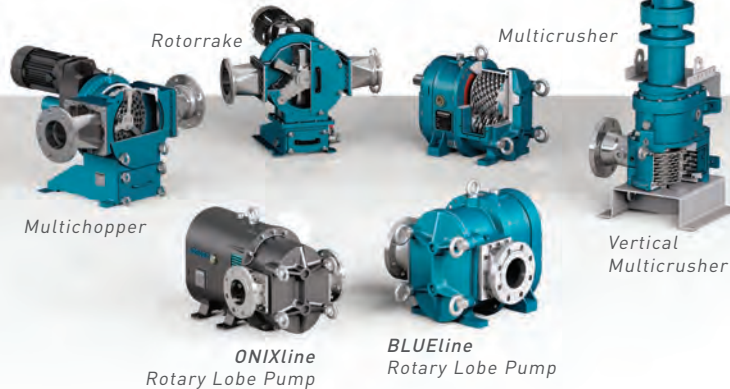
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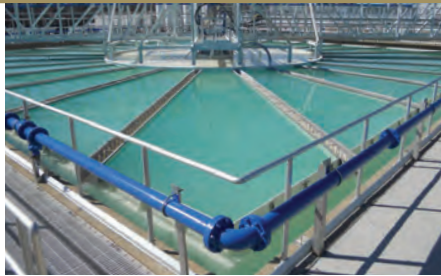
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