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

90th ANNUAL MEETING

PLANT PROFILE:

Sheboygan Regional Wastewater Treatment Facility, Sheboygan, WI



PLUS:

- Radebaugh Paper SNRP 101: Fond du Lac
- Student Design & Stockholm Jr. Water Prize
- Washington DC WaterWeek Fly-In
- Education Seminar



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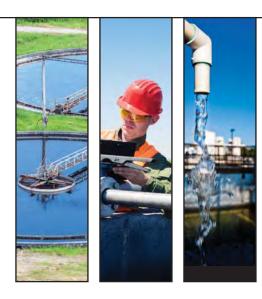
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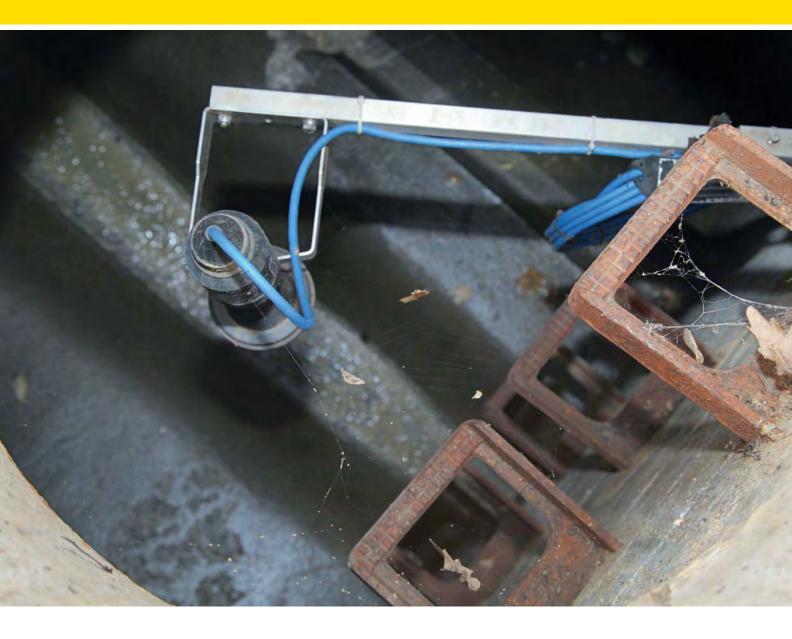
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Intensification of Resource Recovery



By Sue Baert

y definition, "president" is an official chosen to preside over an assembly. Just thinking about the vast responsibility that this position holds causes me to hyperventilate. But as I do my deep cleansing breaths IN and OUT, I realize that I have been ensconced in CSWEA since 1991, so some of the challenges are removed for me due to my constant involvement with how the organization works. Dedicated, intelligent, and forward thinking are a few of the words I can use to describe the wonderful group of individuals who comprise CSWEA.

In the 1970s wastewater treatment plants were tasked with cleaning the receiving streams by the Clean Water Act.

Then a shift away from wastewater to water reclamation occurred.

As I reflect on this, I realize when I was growing up on the farm, Mom would do laundry by starting with the whites and ending with the dirtiest clothes. The water would be saved in a "suds tub" and reused

"I believe we shouldn't just rely on others, but start at home and do all we can to protect and preserve our resources"

throughout the cycle and then reused again for the next load. We also had a shed that we used to collect all different colored glass bottles, cleaned and de-labelled cans, and newspaper. Which we would recycle in town. We reused some of the newspaper to clean windows (I really don't remember having paper towels or paper plates); I do remember cutting up old clothes and using them as rags to make rugs. We saved all our food waste in a bucket under the sink and would feed it to the pigs, which was usually my job. We had a windmill and water was used sparingly. The livestock received first dibs on the water. We washed our car (yes, singular) only if going to a wedding or big event. There were nine of us, and I can remember the four youngest

(me as the baby) would all use the same bath water. (Which promoted quick baths or the last few had freezing water.)

Now as the world faces a shortage of potable water we are tasked with being "Utilities of the Future." Cleaning the water, reuse, reclaiming nutrients, and producing energy via wind turbines, solar panels or combine heat and power engines. As WEF puts it, "Intensification of Resource Recovery."

So as we move to the, "Intensification of Resource Recovery," I believe we shouldn't just rely on others, but start at home and do all we can to protect and preserve our resources while using technology to help reclaim and reuse those that we can. CS



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WEFMAX 2017 and More





By Eric Lynne & Doug Henrichsen

ollowing a productive 90th Annual Conference, the WEF Delegates bring a WEF update and some new concepts to take the organization to the next level. As CSWEA's Delegates (and Executive Director), we took the opportunity to attend separate WEFMAX (which stands for: WEF Member Association Exchange) events and collect a few tidbits from our peers and share that with Central States. Eric attended the Cincinatti WEFMAX, Mohammed attended the Puerto Rico WEFMAX, and Doug attended the Austin WEFMAX representing CSWEA. Following these meetings, we are disseminating some of the news, both from the HOD and those tidbits from other MAs.

First, review WEF's mission statements in the box on the right; these provide the building blocks for most of the initiatives from WEF. At CSWEA, we are doing a super job towards supporting these efforts!

GENERAL WEF AND HOUSE OF DELEGATES INFORMATION UPDATE

- WEF has come a long way on its strategic planning journey as it develops a three-year business plan. This approach provides for predictable planning, budgeting, and tracking, giving the board and staff the necessary time to consider data and trends, seek input, and to plan ahead. This concept also provides an actionable reference for our staff to use throughout the year, as well as a broad overview of the business climate at WEF.
- There are four Delegate at Large positions opening for nominations. If anyone is interested in applying, contact Doug or Eric for more information.
- WEF is developing a new dues strategy to avoid confusion with how

- annual membership dues revisions are implemented. The proposed concept involves a long timeframe (greater than 12 months) from the time of considering the need until the time of implementation. The result is intended to increase communication. More information on the dues program will be shared in future reports when finalized.
- · WEF is still intending to offer free memberships to non-members from our three states who attend WEFTEC 2017. Details will be distributed on the free MA-Only membership opportunities offered to WEFTEC attendees. Current plans limit offerings to only true non-members; lapsed memberships would not qualify.

PUBLIC EDUCATION AND OUTREACH

This topic was a focus area requested by the membership. So much so that Mohammed, Eric, and Doug each were asked to share our CSWEA successes with the Global Water Stewardship program. Thus far, interest in our sister organization has been high. Other noteworthy activity in the organization includes:

• WEF and the HOD recently developed an elevator speech summary sheet of six quick responses to succinctly reply to the common "What is WEF?" question. The full document can be found on WEFCOM, but I've included my favorite below:

"We support the men and women who work everyday to ensure that water is cleaned and returned safely into the environment for reuse." By simply omitting or twisting some words, one can manipulate these statements to provide a more personal response for those times

WEF MISSION:

- Connect water professionals
- Enrich the expertise of water professionals
- Increase the awareness of the impact and value of water
- Provide a platform for water sector innovation

when you are asked "What do you do for a living?"

- WEF's Students and Young Professionals Committee, specifically the Community Service Project subcommittee, is developing a Standard Operating Procedure for their annual WEFTEC event. Aside from instilling a level of sustainability to the eternal transfer of knowledge, the group hopes that this document will be something that can be used to guide MAs in the development of local (likely smaller) community service projects.
- New York WEA shared their Messaging video (viewable here: https://www.youtube.com/ watch?v=HtCqNv00fGM) that they made for profiling plants and services provided and less about the everpresent need for funding. This concept could supplement facilities that have seen a decline in K-12 field trips.

MA EXCHANGE TIDBITS:

As mentioned above, the concept of WEFMAX is to disseminate those tidbits, things that other Associations are doing that could make our organization better. The below is a summarized list of relevant tidbits from the Cincinnati WEFMAX, so if something piques your interest - let's work together to put it in motion!

"To improve student chapter relations, consider devoting a section of the magazine for them and allow the university professor to provide relevant content.

- Ohio successfully boosted their membership from 1400 to 2000 to obtain a third WEF Delegate. Among the many concepts, one strategy helped them avoid membership swings was to utilize a multi-tier renewal system to ensure all members stay current and provide feedback.
- When discussing a target audience for membership either as professionals or students, do not lose sight of the nontraditional members: stormwater, soils, agriculture/biosolids, environmental science, rate/finance, women, legal, etc.
- Ohio supplemented their operations award to also recognize deserving operators via a points system, which helps them attend events if unable.
- A growing trend in association topics revolves around young professionals. Some MAs are starting to send their YP Chair to WEFMAX for that firstperson engagement with YPs.
- A growing number of MAs are developing an Annual Sponsorship Program, some of which some have included a points system for event related items like registrations. New England WEA has had a system like

- this already, but noted theirs does not extend to registrations, but may start to look into this. Ohio noted that they now provide a thank-you letter to all sponsors.
- To improve student chapter relations, consider devoting a section of the magazine for them and allow the university professor to provide relevant content.
- The Pacific Northwest CWA holds special new member events at conferences to expose them to the Executive Board and offer a place to find answers to some of the more basic questions in our organization.
- A growing number of associations are compiling an MA Calendar. Typically, these consist of a photo competition with a brief plant profile.
- MAs noted difficulty in getting responses to surveys, specifically on their own membership. Depending on the data requested, significant prizes were offered as a raffle to anyone who completed the survey. A similar concept, to boost readership of the MA magazine, involves a hidden member ID could be inserted to the

- text of a random article, which if that member properly claims it, could be offered a prize.
- To support the women in our industry, some associations held (solely or partnered with other groups) a Women's Leadership Luncheon, which acknowledges a Woman of the Year and offer a half-day set of presentations followed by a wine social.
- The Pacific Northwest CWA noted having a well running Student Mentorship Program and even developed an MA level guide. Similarly, New Jersey WEA indicated success at attracting YP attendance with special YP tract sessions where the YPs jointly develop and present their talk with a senior/retired professional.
- Looking to increase premium vendor offerings, Utah WEA now offers sponsor videos to be displayed during lunch.
- As part of Public Outreach and connecting with high school students, and retaining that connection through college, New York WEA has developed a strong scholarship program. The program is very successful and have a goal to distribute \$100,000 in 2017.

WEF FLY-IN

WEF has developed a packet for Fly-In attendees to increase the effectiveness of everyone's visits with legislators. The Cincinnati WEFMAX had significant discussion on how MAs have improved their Fly-In experience, with the below as only a few highlights:

• Have a unified voice. Practice. And do vour homework.



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- Be a resource. Use the JFK approach and change the dialogue from asking for support to providing support.
 Ask how we can help answer any questions they have with water related topics. This should lead to a better relationship that extends year-round, beyond the Fly-In week.
- Given the Flint, MI crisis, many lead service items (drinking fountains/sinks) in D.C. government buildings were labeled "DO NOT DRINK" with adjacent Culligan water coolers. This could be used as a topic to initiate discussion.
- Many politicians focus on job growth. Take the officials (local/ state/national) on a tour of the actual infrastructure including spots of overflows and show the need for support. If asked "How many jobs does the water industry support?":
 - Respond powerfully with "all of them" – as there is a way to support this claim from multiple angles.
- Plan the Fly-In as a committee. Start planning after election and try to send multiple MA representatives if possible.

"Plan the Fly-In as a committee. Start planning after election and try to send multiple MA representatives if possible."

Note, NEWEA sent 37 people from 6 states and host a Fly-In 101 for new people, many of which pay the way themselves. If possible, they bring a town manager to share a success story of funding.

- Sign up as "Water Advocate" on WEF.com/Advocacy to get weekly updates of This Week in Washington.
- Consider a State legislature level Drive-In (instead of Fly-In) for local officials.
- Remember we are not lobbyists, instead are advocating for an issue, not a candidate.

WEF/WE&RF LIFT AFFILIATE

CSWEA is still pursuing MA Affiliate membership status. As a MA LIFT Affiliate, select CSWEA log-ins will facilitate a link between the utilities, universities, and LIFT projects to ensure our members are aware of opportunities that work towards our common goals. The free membership concept has been discontinued, therefore this will require CSWEA to pay a subscription fee based on the number of log-ins. We are currently still working through WE&RF's application process. CS

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By Liz Bohne, Marketing Chair

Summer GLOBAL WATER STEWARDSHIP 2017 Update



Summer is always a busy time for GWS! We started this summer with some great news! We have been approved and now have official 501 (c)3 status. This designation opens up a ton of doors for GWS as far as grant funding and sponsorship goes. We also recently had the CSWEA annual meeting! This is always a great time for GWS for

many reasons. For one, our team is located all over the Midwest and typically works through e-mail and conference calls. At the annual meeting this year we finally got to put faces to names of our new members, as well as spend some time building our team. We also had the opportunity to present on our projects, and sold some awesome

GWS gear to raise money for our projects and teach more people about our cause. We had two amazing visitors from AyA (the Costa Rican water authority) who were excited to learn more about our work and how we can create a partnership. We also announced our new chairs for the 2017–2018 year. This year's board will consist of:

- Executive Director Mohammed Haque, CSWEA
- Chair Amanda Heller, Baxter and Woodman
- Vice Chair Maureen Durkin, MWRD
- 2nd Vice Chair Tim Bronn, McMahon Group
- Past Chair Eric Lynne, Donohue & Associates
- Treasurer Matt Streicher, Glenbard Wastewater Authority
- Fundraising Richard Hussey, LAI
- International Programs Manual de los Santos, Aqua-Aerobic Systems Vice Chair – Micah Pitner, Crawford, Murphy and Tilly
- Marketing Liz Bohne, Trotter and Associates
- Social Media Alex Knicker, Baxter and Woodman. Vice Chair – Matt Castillo, MSA Professional Services
- Student Design Zach Wallin, SEH
- Research and Development –
 Paige Peters, Marquette University
 Vice Chair Elizabeth Brown,
 Metropolitan Council
- QA/QC David Arnott, Ruekert & Mielke
 Vice Chair – Jennifer Svennes, Nero Engineering

And our CSWEA Trustees, Beth Vogt of the Fox River Water Reclamation District and Randy Wirtz of Strand and Associates. We have added vice chairs to some positions this year to help with the transition into the chair position and create some continuity within the team. It's awesome to see some new people stepping up and taking on roles within the organization, as we have plenty of work to go around! We are still looking for a vice chair for student design and marketing, so if you're interested in getting involved, don't hesitate to reach out to chair@globalwaterstewardship.org.



We will be spending the rest of summer preparing for our trip in August. This trip will be a big one because we plan on installing our first biogarden. The biogarden will be installed at a preschool in Dominical and used to both treat grey water, and to teach children about the water cycle and water pollution. This is just one of the ways we are working with the local communities while they are waiting for their new wastewater treatment systems. We also will be holding meetings with the community's residents as well as working in the schools to educate children about what we are doing there and how they can help.

This trip will also be important as we collect data for our 2018 student design competition. The next community we will be working with is Palmar Sur, which was identified by AyA as one of their priorities. We are

planning to use this trip to continue to develop our relationships with the local government, move forward with acquiring permits for our 2017 project in Dominical, and touch base with local engineers on progress that has been made on permitting for Bahia Ballena. We also plan to visit the wastewater treatment plant in San Jose, the largest plant in Costa Rica and one of the only conventional treatment plants in the country. Needless to say, it is going to be a PACKED week as we try to accomplish the goals we have set and prepare ourselves to move our projects forward this year.

Aside from the trip, our fundraising committee is working hard to plan our first big event. Details are still TBD but I can guarantee it will be a great time. Stay on the lookout for updates as more details are finalized.

Finally, a quick update on our project statuses:

Piedras Blancas: The GWS design has been enhanced by the local engineering firm, RQL Engineering, who have expertise regarding local permitting and approval processes. The land zoning was recently updated to allow for a lagoon. Presently, GWS is waiting for the government to approve the land zoning for Piedras Blancas. After this last step, final approvals will be granted and construction will start.



Bahia Ballena: The Bahia Ballena design has gone through student design following the same process as Piedras Blancas, including meeting with local authorities, MINAE and the Municipality, presentations to the community, and public education. There has been difficulty with land acquisition for this project due to large amounts of protected land from the marine park. The original design turned out to be located in a protected area. The team is currently evaluating various site options for cost and constructability. The system design is being reevaluated to ensure it can accommodate the demand of future population growth. This includes consideration of expandable lagoons or a trickling filter.

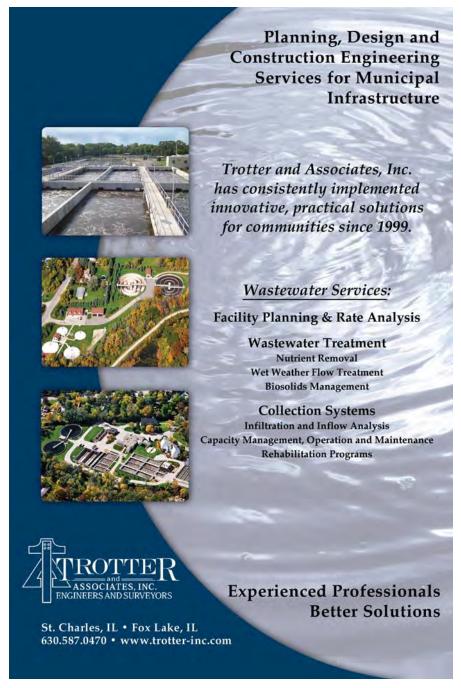
Dominical: Global Water Stewardship has presented the student design competition winners' project to the major developer for Dominical and received their feedback. The design includes a collection system with lagoon treatment. Now, GWS is working on alternatives that fit the developer's needs, while still adequately treating the water. The design will be preliminary, with the developer's engineers putting together the final specifications and final design. This project is a prime example of how GWS must coordinate with multiple parties to get the job done, and how every situation demands a unique approach.





San Isidro: GWS has reviewed drawings, made a site visit, and reviewed flow and loading data. A solution to the outstanding issues was proposed, but it was too expensive and consumed too much electricity. Alternative solutions are now being evaluated for affordability and technological suitability. GWS will continue to work with AyA and the community until this problem can be resolved and the treatment plant can perform to design standards.

As you can see, our workload is growing as we gain recognition in Costa Rica. We are very excited about where we are right now and the potential that our 501(c)3 status has opened for us, but we still need your help! Being a part of GWS is not only an opportunity to give back, a fun and rewarding experience that helps members to grow their networks and advance their professional skills. If you are interested in getting involved in any of the committees mentioned above, contact Amanda Heller at chair@globalwaterstewardship.org! CS



CSWEA 2017 Education Seminar

By Rachel Lee and Patrick McNamara



Thank you to all of those who attended the CSWEA 2017 Education Seminar. We had a great group of speakers and attendees, and all those who attended certainly left inspired about recovering resources through innovation. Dr. Charles Bott from the Hampton Roads Sanitation District discussed Pragmatic Utility Sustainability through Rapid Implementation of Emerging Technology, incorporating themes from their work with the SWIFT aquifer recharge program, their development of the VIP process, incorporating ammonia-based oxygen control, generating phosphorus recovery with Pearl and WASSTRIP, achieving ammonia removal with sidestream deammonification, and improving biosolids with thermal hydrolysis. HRSD is utilizing innovative technologies throughout their treatment facilities.

Christine deBarbadillo from DC Water presented Strategies for Upgrading WWTPs for Nitrogen Removal. Her presentation covered many nitrogen removal processes ranging from conventional biological nutrient removal processes such as MLE, A2/O, and Johannesburg, two stage nitrogen removal, IFAS and MBBR, to sidestream and mainstream deammonification. The technical discussion was followed up with several case studies demonstrating various nitrogen removal technologies.

DC Water is planning to incorporate short cut nitrogen removal and mainstream deammonification. It will be exciting to see this innovative technology incorporated full-scale.

Blair Wisdom from Denver Metro Water Reclamation District (MWRD) presented on Nutrient Management at the Robert W. Hite Treatment Facility. Denver MWRD has embarked on a phosphorus management pathway that started in 2003 and will be a 17-year process moving from biological phosphorus removal to sidestream recovery to tertiary treatment. At this time, the facility has been pilot testing various phosphorus management technologies with the goals of controlling phosphorus recycle, improving biosolids dewatering, reducing struvite formation in the digester, reducing the phosphorus content of biosolids, and recovering a product. They have piloted AirPrex and a phosphorus stripping process and are looking to make a decision on their path forward over the next several months.

The morning concluded with a regulatory roundtable panel. Wendy Turri from Minnesota Pollution Control Agency (MPCA), Brian Weigel from Wisconsin Department of Natural Resources, and Tom Granato from Metropolitan Water Reclamation District of Greater Chicago (MWRDGC)

were part of the panel. Each state representative discussed their approach to nutrient standards and regulations pertaining to meeting those standards.

Our afternoon started with an in-depth discussion titled, Addressing the Energy and Intensification Opportunities Provided by Carbon Redirection and Shortcut Nitrogen Removal presented by Dr. Charles Bott. HRSD is moving toward mainstream shortcut nitrogen removal. The main drivers for this project are to eliminate external carbon, reduce energy demands, and to promote intensification. HRSD has learned quite a bit about strategies to out select NOBs and anammox retention. Also, a heads up that comammox is entering the discussion as well – described as complete ammonia oxidation by Nitrospira.

Kathy Lake with the Madison
Metropolitan Sewerage District (MMSD)
presented on their Watershed Adaptive
Management program which is a regional
solution. MMSD is facing strict effluent
limits of 0.075 mg/L. They could meet
this limit with filtration which holds an
estimated \$140 million price tag or
they could use one of the innovative
compliance mechanisms available in
their permit. After a successful adaptive
management pilot, MMSD along
with over 30 partners have decided
to move forward with a full adaptive



Christine deBarbadillo



Blair Wisdom



Charles Bott



Patricia Oates



Jeremy Guest



Jeremy Cramer and Autumn Fisher



Kelly Lake



management program. This program leverages watershed improvements to reduce phosphorus discharges throughout the watershed. The total price tag for the watershed adaptive management program is \$140 million with MMSD contributing \$12 million. This program has many benefits, but the partners have learned that working together brings challenges, and it will take a broad mixture of solutions to achieve the program goals. They have learned to remain flexible, keep an open mind, listen, cultivate partnerships, and push against the status quo. She left us with the concluding thought that, by considering all sources, true water quality improvement is possible.

Autumn Fisher, Fond du Lac's Superintendent, and Jeremy Cramer, Fond du Lac's former Superintendent, presented on Fond du Lac's Pursuit of Nutrient Removal and Recovery. The facility is looking at addressing their phosphorus and nitrogen loads from

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the influent, to the sidestreams, to the biosolids, and effluent loads. They have evaluated three chemical phosphorus removal technologies, biological phosphorus removal, and piloted five tertiary treatment technologies. They have seen the various technologies impacts on the treatment plant performance and the plant's ability to remove soluble non-reactive phosphorus (SNRP). Fond du Lac is also evaluating sidestream deammonification to help free up capacity for local businesses, to reduce costs, to set up the facility for biological phosphorus removal, and to lower the cost of ammonia removal. After going through a procurement process, they decided to move forward with the Paques Anammox process. Fond du Lac will be incorporating these innovative technologies over the next few years.

To conclude the day Dr. Jeremy Guest with the University of Illinois presented on the Evolution and Intensification of Algal Technologies. Algae has been used for decades in lagoon treatment processes; however, the low intensity, large footprint technologies are not practical for larger utilities. Technologies like Clearas leverage microalgae's ability to access nutrients for growth. These photobioreactors enable intensification by solid-liquid separation using membranes. Intensive algal treatment processes are evolving quickly and will be able to tailor a N:P uptake to match your wastewater, achieve 24-hour nutrient uptake via stored carbon, leverage local algae, and model these processes using accepted modeling software.

In summary, this was a magnificent collection of speakers that inspired us to be leaders in our field and in the world. We have the opportunity, and the obligation, to recover energy and products from our one water for our one world. The seminar is available as a webinar and can be purchased through the CSWEA website if anyone is interested in hearing any of the presentations. CS

Click HERE to return to Table of Contents Summer 2017 | CSWEA 17



The 90th CSWEA Annual Meeting was held May 22-24 at the beautifully renovated IHG Hotel in downtown St. Paul Minnesota. With the backdrop of downtown St. Paul and the view of the Mississippi River, this was an outstanding venue for this event.

The Annual Meeting started on Monday with the Leadership Academy presented by Cristine Leavitt of MCES. This session introduced the practice of Continuous Improvement with an exercise that divided the group into teams that were competing to produce the best product. Participants commented that the Continuous Improvement approach gave them a better understanding of how to increase efficiency, and new tools eliminate wasteful practices in a process. In the afternoon, attendees had the choice of our traditional golf outing at Oak Marsh golf course, a plant tour, or a new addition to the conference, a Stormwater Best Management Practices tour – Swales, Rails and Ales.

The tour of the MCES Eagles Point Plant hosted by Jay Sockness and

George Sprouse, focused on sustainable infrastructure, which includes the reclamation of heat from the plant effluent and enhanced stormwater best management practices. Our guests from Costa Rica joined this tour, which added an international flair to the event.

The Stormwater BMP tour included a tour of CHS field, home of the St. Paul Saints, and presented information on stormwater management and reuse at that facility. From there, the participants took the light rail system to view the BMPs at light rail facilities, and then ended at the Bang Brewery where they learned about the stormwater and industrial waste management at that site while enjoying a local brew. The tour was well received by the 44 attendees, with very positive feedback. After returning from Monday's events, we concluded Monday evening with our time-honored meet and greet social in the hotel ballroom, which gave our members time to greet old friends and an opportunity to meet new ones.

Following the theme of Water is Our Future, Tuesday morning started off with

our keynote speaker, Dr. Julian Sandino, who presented on "Making the Case for Disruption in Used Water Management," that discussed becoming prepared for rapid pace of change that is starting in the water industry. The technical program included 51 papers selected from 118 that were submitted. There were also 10 poster sessions. The highlight of Tuesday afternoon was our first Resource Recovery track, which included invited speakers. An invited speaker track was new for the annual meeting, and was piloted in an effort to broaden our technical program with papers that had been presented on a national level, or that were new topics to Central States members.

The exhibit hall opened on Tuesday with 74 exhibitors displaying and demonstrating their products, with box lunches being served in the exhibit hall. A silent auction benefitting the Global Water Stewardship was held in the exhibit hall.

Tuesday evening wrapped up with a social aboard the Anson, a Mississippi River paddleboat that travels between St. Paul and Minneapolis, providing



another great opportunity to network with friends, while enjoying the Mississippi River, city skylines and the sunset. Traveling on the mighty Mississippi was a pleasant reminder of what we are accomplishing as dedicated water professionals.

Wednesday started with the state section breakfasts, then continued with technical sessions that included technical presentations as well as leadership and ethics training. At the annual luncheon our WEF visitor Dr. Paul Bowen spoke on "The Business Case for Water – Coca Cola" which provided insight on Coke's sustainability programs and the business model that support them. Wednesday concluded with our annual awards banquet featuring WEF and Central States awards, followed by a social event.

I offer a sincere thank-you to our sponsors and exhibitors who have made the annual meeting a huge success. I also thank our Local Arrangements and Technical Program Committees who developed interesting technical programs and fun social events for the 499 attendees (one short of our goal of 500!). We look forward to another great event in Illinois in 2018.

The Local Arrangements and Technical Program Committees are the heart of bringing us a conference that meets our mission "...to provide for the exchange of water quality knowledge and experiences among its members and the public and to foster a greater awareness of water quality achievements and challenges." I'd like to recognize these dedicated individuals by listing their names below, and if you get a chance, thank them in person!

- Patricia Oates
- Tim Korby
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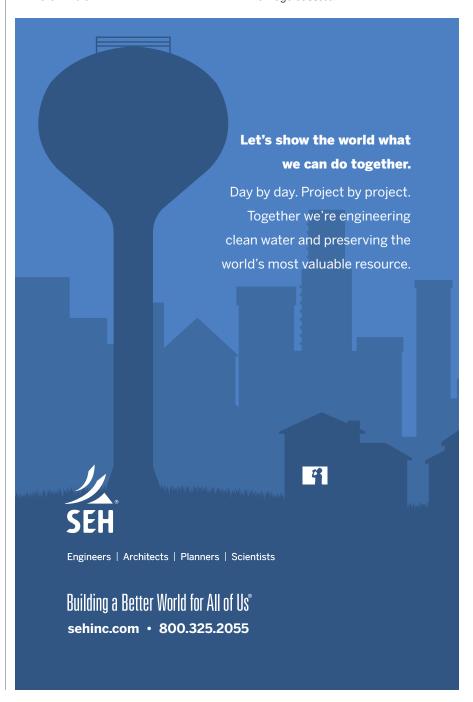
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The Central States Exchange of Ideas will be held in July and one agenda item is improvements to the Annual Meeting. If you have suggestions, please bring them to the meeting or send them to an executive committee member.

Thanks again to all of you for attending the conference and making it a huge success. (S







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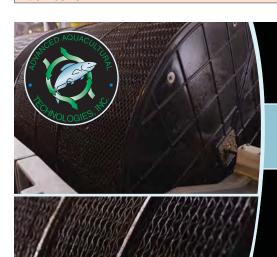






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Larry Rogacki, Metropolitan Council – Environmental Services



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Douglas J. Nelson, Milwaukee School of Engineering



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Megan Cox, St. Cloud State University



Allison Herzog, Minnesota State University

– Mankato



Maria Garcia-Serrana, Zeinab Takbiri, Abigail Tomasek, Anne Wilkinson

Congratulations also to our award winners who could not join us:

- Operations Award Sharon Thieszen, City of Sheboygan, WI
- Academic Excellence Award Henry Croll, University of Minnesota Twin Cities
- Student Design Competition Winners Andrew Szymaszek, Linjie Tang, Catherine Terando, Megan Wolfe, UW Platteville





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Christopher Harrington with Mike Holland



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Opening General Session

Making the Case for Disruption in Used Water Management

The theme of the 90th Annual Meeting was Water is Our Future, and we are experiencing many changes that will lead us a future as water professionals that looks very different from how we are managing water today. We have seen the transformation of wastewater treatment plants into water reclamation plants, and are now seeing the transition to resource management facilities.

Our keynote speaker, Dr. Julian Sandino, presented on "Making the Case for Disruption in Used Water Management" and this paper focused on how we need to recognize the increasing pace of change in our industry, how to keep up with this change, and how the use of disruptive technologies can benefit us. He described disruptive technologies as: Doing things very differently.

An example of disruptive technology that we are all familiar with is activated sludge, which was introduced in Britain in 1935.

Dr. Sandino also described the attributes of the plant of the future, and how we will need to rapidly



Dr. Julian Sandino

incorporate new technologies to manage water resources in an efficient manner that will support a population that is ever increasing.

He also presented rationale for moving from the lowest bid to the best



Activated sludge "disrupted" urban used water management

value model when making decisions, managing the risks when adopting unproven technologies that might bring substantial value and to conclude Dr. Sandino summarized key elements of adopting disruptive technologies. CS

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Leadership Academy

By Anna Munson

Bright and early on Monday morning at the 2017 CSWEA Annual Meeting, 18 wastewater professionals gathered in a conference room in the lower level of the St. Paul InterContinental Hotel to participate in a continuous improvement workshop. The workshop was the singular component of this year's Leadership Academy. Christine Leavitt from the Metropolitan Council Environmental Services Continuous Improvement group led the workshop and shared her expertise during the workshop.

The workshop participants were divided into project teams and assigned project roles. Each team worked to produce "permits" following the simulation instructions. The permits needed to conform exactly to the specifications. The first round of the simulation was a bit chaotic, as expected. Christine then introduced the key principles of continuous improvement to help the project teams improve their processes and products. The key principles are:

- Customer focus
- Results
- Respect
- Equity
- Excellence
- Data-driven decisions

Project teams learned about the Plan-Do-Study-Act (PDSA) cycle of improvement and built a continuous improvement toolbox to guide their work. The project teams evaluated their processes using the PDSA concept in subsequent simulation rounds to arrive at an improved outcome. The Leadership Academy workshop allowed participants to practice the continuous improvement techniques and to observe how the techniques produce improved results. (\$\mathbf{S}\$



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Global Water Stewardship at the Annual Meeting

By Amanda Heller



Global Water Stewardship was fortunate to travel this year to the CSWEA Annual Meeting in St. Paul, Minnesota. This was the first time since GWS was formed that we have traveled to the Minnesota region for the Annual Meeting to spread the news of our work, and WOW, what an exciting time it was! Many new faces approached our booth to learn more about who we are, what we do, and how they can get involved. While our "Your Number 2 is Our Number 1" t-shirt sales were a hit, the most exciting part of the week was the standing-room-only during our presentation. The room was filled with interested potential volunteers and supporters. We had extremely positive feedback, questions, and comments from our viewers. As a group we are looking to incorporate this feedback as we move forward in our mission.

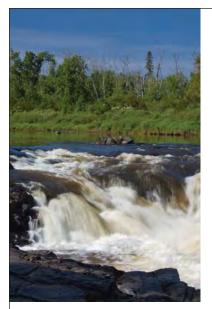
During the CSWEA Annual Meeting, we had two very exciting visitors from Costa Rica. Alvaro Araya-Garcia and Manuel Lopez Fonseca traveled from Costa Rica to visit the Central States and learn from our wastewater treatment



Amanda Heller (GWS Chair), Elizabeth Bohne (GWS Marketing Chair)

processes and techniques. Both Alvaro and Manual work for AyA. Alvaro is in charge of the regional wastewater treatment systems for all of Costa Rica, and Manuel is in charge of the metropolitan area wastewater treatment facilities. During their trip they were also able to tour a few treatment plants operated by CSWEA members.

We enjoyed meeting with Alvaro and Manuel, as well as all of the new faces we met at our booth. With our continuing increase in support, and our new 501(c)3 status, GWS is excited to move forward with our on-going projects and projects yet to come. Thank you all for your support! CS



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Manuel de los Santos (GWS International Programs Chair), Manuel Lopez Fonseca (AyA), Alvaro Araya-Garcia (AyA), David Arnott (GWS QA/QC Chair)



5K Event

By Scott Mulinix



On Tuesday morning of the CSWEA 90th Annual Meeting, 21 runners met at the top of the Wabasha St. Bridge in downtown Saint Paul to test themselves against the clock in a 5K (3.1 mile) run. The nearly out-and-back course featured an impressive view of the Saintly City from across the Mississippi River with a finish on Harriet Island.

The participants each provided a prediction of their finishing time with the winner being the person whose time was closest to their prediction. The winner this year was Amanda Heller (Baxter & Woodman) who was 24 seconds off of her predicted time. Second place was Jerod Gabel (City of Duluth), and third went to Lila Johnson (MSOE). The

first overall finisher was Finn Finucane (MSOE) who finished in 20:01.

Thank you to Centrisys for being the sponsor for the event, and to Hobas Pipe, Xylem – Sanitaire, and SEH for donating finishing prizes. The event would not have been possible without volunteers, so thanks also to both Colin Fitzgerald (CH2M Hill) and Brendan Wolohan (SEH).

Golf Scramble

By John Glatzmaier

The 2017 CSWEA annual golf scramble was held at Oak Marsh Golf Course on Monday afternoon, May 22, 2017. The weather was great, and a good time was had by all. The winners of the event's three flights were:

- Flight 1: Clark Corbett, Brian DeWolf, Chad Beltrand, and Dick Corbett with a score of 57.
- Flight 2: Tim Korby, Dan Popehn, Kyle Fritze, and Matt Fritze with a score of 6.
- Fight 3: Steven Forsythe, Todd Olmschenk, and Mark Hessel with a score of 65.

Skill prizes for longest drive, longest putt, and closest to the pin were won by Dick Corbett, Brian DeWolf, Matt Fritze, John Glatzmaier, Brandon Koltz, and Beth Vogt. A special thanks to our golfers for their donations to Global Water Stewardship, and to all our hole sponsors!





nt 1 Flight 2

Flight 3

Thank you to our Golf Scramble sponors!



























Plant Tour

By Jay Sockness

The Metropolitan Council Environmental Services of the Twin Cities was proud to host a tour that visited their Eagles Point WWTP in Cottage Grove, MN.

The tour was attended by approximately 20 folks, two of whom were from Costa Rica. The tour attendees were attending the 90th Annual CSWEA's meeting in St. Paul.

A brief discussion was held in the plant's O&M building to discuss that building's sustainable features.

Those features include heating the building with heat exchangers that extract heat from the plant's effluent water. Other interesting features that were discussed were the carpeting that was made from recycled milk cartons, daylighting that provides the majority of the office lighting during the daytime hours, office desks



made from wheat board, and cabinets made of sunflower seed shells.

The group discussed each system as they roamed throughout the facility, and a lengthy discussion was had at the aeration system. The conversation covered not only





best practices for running a Bio-P plant, but new technology and methods for enhancing the Bio-P process.

Finally, the group was also treated to several sightings of our namesake, the local bald eagles. \$\mathbb{G}\$

Stormwater Tour – Swales, Rails and Ales

By Mark Doneux

The Minnesota Section Stormwater Committee hosted the inaugural Stormwater Tour – Swales, Rails and Ales. The tour was very popular with over 40 attendees. The first stop of the tour began at CHS Field, the "Greenest Ballpark in America." At CHS field attendees could see all the latest innovative stormwater management, information kiosks, and stormwater reuse practice for watering turf and flushing toilets. Following the CHS Field tour, participants make the short walk to the Union Depot where they boarded the Green Line Light Rail Transit system. The group stopped at the Hamline Station along the Green Line where able to see firsthand the world's largest, award winning green infrastructure practices for the Green Line along University Avenue. After the University Avenue stop, the group boarded shuttles for a visit to Bang Brewing, a very unique and green brewery that incorporates many best practices for stormwater and water conservation. After learning about the great project at Bang Brewing, everyone could enjoy one their



brews and light snacks before heading back to the InterContinental Hotel.

The Minnesota Stormwater Committee would like to thank HR Green, Met Council/Metro Transit, CHS Field/St. Paul Saints Baseball Team and Bang Brewing for making this event a success! (S

































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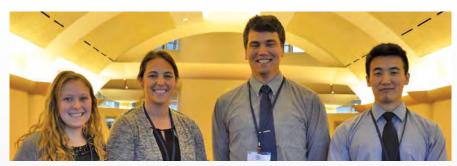
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Student Design By Mike Holland Competition

he CSWEA Student Design Competition is intended to promote "real world and hands-on" design experience for students interested in pursuing an education and/or career in water/wastewater. There are three levels of competition, conventional wastewater design, which includes traditional wastewater design project, environmental design, which would include contemporary engineering design topics like sustainability, water reuse, wetland construction and Engineers Without Borders projects, and the Global Water Stewardship project. The CSWEA design completion was held on April 10 at the Monona Terrace in Madison. Four teams entered the competition, all in the Global Water Stewardship category: two teams from UW-Platteville, and one each from the Milwaukee School of Engineering (MSOE) and the University of Illinois-Urbana/Champaign. The competition was extremely close but in the end the winning team was determined to be from the University of Wisconsin-Platteville, as follows:

Global Water Design: University of Wisconsin, Platteville Megan Wolfe, Linjie Tang, Andrew Szymaszek, Catherine Terando "Global Water Stewardship – Dominical, Costa Rica"

As part of winning CSWEA's student competition, the competing students' expenses for attending WEFTEC in Chicago will be covered by CSWEA and they will be given the chance to enter their design projects in WEF's competition, representing CSWEA. Additionally, members from the MSOE and UW-P teams will be involved in the implementation of the Global Water Stewardship project with the opportunity to go to Costa Rica. Congratulations to the winning students, and good luck at WEFTEC in Chicago! CS



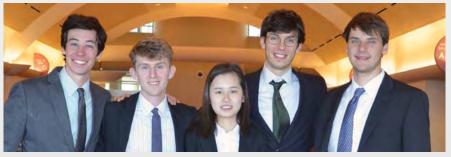
UW Platteville - Team 1 Winners



Milwaukee School of Engineering



UW Platteville - Team 2



University of Illinois – Urbana/Champaign

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Stockholm Junior Water Prize Winners

Wisconsin



Laurel Chen and Riley Olinger from Brookfield Central High School, claimed SWJP honors in the Badger State, second year in a row. For their awardwinning project, titled "Novel Approach to Wastewater Treatment with Solarpower: Removal of Cyanobacterial Contaminants via Electrocoagulation-Sand Filtration." The pair explore the electrocoagulation cell to enhance the removal of harmful cyanobacteria from surface water. The work was carried out in collaboration with Marquette University with an intent to develop a technologies transferable to developing areas. The abstract follows below.

An Approach to Water and Wastewater Treatment with Solar-power: Removal of Cyanobacterial Contaminants via Electrocoagulation-Sand Filtration

Laurel Chen and Reilly Olinger Brookfield Central High School

Abstract:

The availability of drinkable water diminishes with the increase of cyanobacterial blooms. This study set to determine the: (1) feasibility of solar-powered electrocoagulation (EC) on Anabaena, (2) effects of pH on the EC,







and (3) effectiveness of sand-filtration as a polishing step. EC works by charging particulate matter in solution causing it to clump, as hydrogen ions float this "floc" to the top. Research has been done on EC, but few studies have been done using slow-sand filtration, solar energy, and cyanobacteria. It was

hypothesized that treatment would be most effective at a pH of 2 and slow-sand filtration would be less effective than EC, but an ideal post-treatment step. It was determined that solar EC was not feasible in Wisconsin winter, but it could be effective at sunnier times. Of the pHs tested (2, 4 [control],

6, and 8), the control produced the greatest decrease in turbidity and green absorbance levels according to the scanning spectrophotometer. Although the sand filter did not affect turbidity much, it did produce a qualitative drop in absorbance, making it perfect for post-treatment clarifications.

Minnesota

First Place – Maxwell Vogel (9th grade, Oak-Land Jr High School, Lake Elmo, MN)

Can a Golf Course Riparian
Buffer Zone Reduce Fertilizer,
Pesticide and Sediment Runoff into
the Brown's Creek Watershed?:
Year One - Phase I



The purpose of Phase I of this science experiment was to collect baseline data and to begin to investigate the effect a riparian buffer zone of indigenous vegetation can have on reducing the flow of runoff pollution from Oak Glen Golf Course into Brown's Creek in Stillwater, (Washington County) Minnesota. The hypothesis of the investigation was that the effect of the riparian buffer zone on

the Oak Glen Golf Course would have a positive filtering effect on the health of Brown's Creek. This experiment, in collaboration with the Washington County Conservation District and Oak Glen Golf Couse, collected water quality data from a riparian buffer zone that was created in 2012 to protect Brown's Greek from Plant Growth Regulators (PGRs) and sediment runoff from the Oak Glen Golf Course and nearby parking lot and streets. Brown's Creek runs directly through the Oak Glen Golf Course. The data was collected using Hydro Lab HL4 Monitors to measure conductivity, dissolved oxygen, temperature, and turbidity, and analyzed using Excel, Flowlink, and, Wolfram Mathematica, IBM Watson Virtual Intelligence, and Tableau Data Visualization software. The findings of macro invertebrate assessments and indicator species studies support the classification of Brown's Creek as impaired. T-test comparisons for the variables conductivity, turbidity, dissolved oxygen, and temperature were all inconclusive. The hypothesis of the investigation that the riparian buffer zone on the Oak Glen Golf Course, would

have a positive filtering effect on the health of Brown's Creek could not be conclusively proven in Phase I of this study

Runner-Up – Jacob Schmidt (12th grade, Cloquet, MN) & Levi Peterson (12th grade, Cloquet, MN)

Phase III: The Implementation of a Testing Protocol to Test Deicing Qualities of Fracking Salt Pellets When Compared to Road Salt (NaCl) and to Test the Plausibility of the Implementation of Fracking Salt Pellets as a Possible Northern Road Deicer

Second Runner-Up – Morgan Smith (11th grade, Cloquet, MN) & Jordin Weisz (11th grade, Cloquet, MN)

The effect of Ibuprofen contaminated sediment on benthic community diversity, survival, reproduction, and avoidance of contaminated sediments in Boundary Waters sediment and Lake Superior water ©



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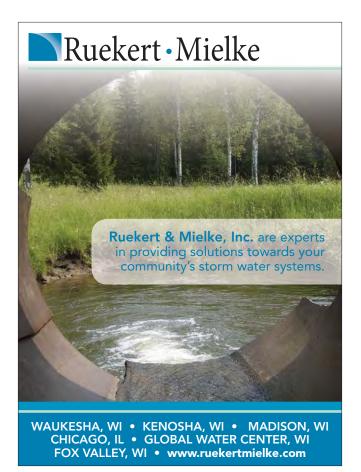
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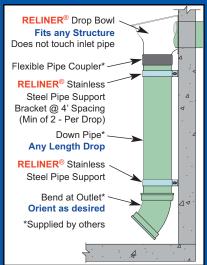
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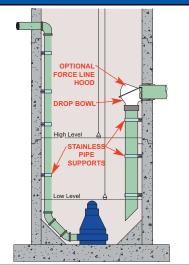
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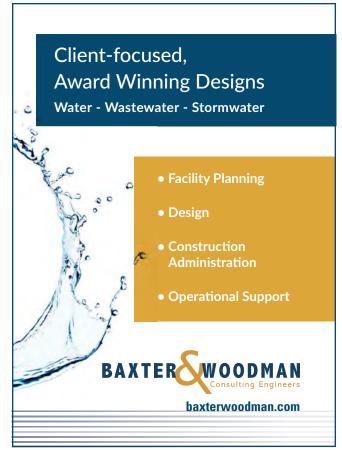
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Central States Represented at the Washington Water Week Fly-In and Recent EPA Initiatives

By Brandon Koltz, Brandon Koltz Water & Environmental Consulting LLC, Wisconsin Section and Patti Craddock, SEH, Minnesota Section

here are many issues in Washington that our Representatives and Senators are addressing as the new administration has come into office. In large part, water issues do not receive significant attention; hence the need to remind Congress of the importance of water reclamation and safe water supply for our health and the economy. The Water Environment Federation in association with American Water Works Association, Association of Metropolitan Water Agencies, National Association of Clean Water Agencies, US Water Alliance, Water Environment & Reuse Foundation, Water Research Foundation, WaterReuse, and Water and Wastewater Equipment Manufacturers have developed Water Week to bring awareness of the needs of the water and wastewater industry and service providers.

The Wisconsin Section was represented by 10 members and the Minnesota Section by four members. The purpose of the Fly-In is to hear current initiatives with respect to water regulation and funding from U.S. EPA staff, Congressional members and committee staff and to educate members of Congress with respect to the importance of funding and other issues of importance to our industry. The Wisconsin Section met with staff for Representatives Ryan, Moore, Pocan, and Duffy, with Representative Gallagher, staff for Senators Baldwin and Johnson. The Minnesota Section with staff for Representatives Ellison, Paulson Emmer, Walz, Nolan, McCollum, Lewis and Peterson, and Senators Klobucher and Franken.

The Fly-In is also an opportunity to get an update on USEPA initiatives, discuss specific topics with EPA in a roundtable setting, inform Congress of the funding needs for water and wastewater infrastructure funding and other issues facing our industry. There is a heightened awareness in Congress of the needs for investment in water and wastewater infrastructure at the federal level – helped in part by our annual visits. Often water and wastewater infrastructure

are forgotten when "infrastructure investment" is discussed. Studies provided by WEF and NACWA have been used to illustrate the impact of water and wastewater investment on the economy. In the handout provided to Congressional offices, it was emphasized that:

- 85% of the US population gets its water from community water systems.
- One job in water or wastewater creates
 3.68 jobs in the national economy.
- Every dollar invested in water/ wastewater infrastructure increases the long-term GDP by \$6.38.
- Tax free municipal bonds financed \$38 billion in water/wastewater infrastructure in 2016.
- Investment in the Drinking and Clean Water State Revolving Funds returns \$0.93 for every \$1 invested.
- WIFIA (Water Infrastructure Finance and Innovation Act) leverages \$60 for every \$1 invested.
- \$650 billion to \$1 trillion in water and wastewater infrastructure investment will be needed over the next 20 years.

The "ask" included:

- \$2.8 billion for the State Clean Water Funds.
- \$1.8 billion for the Drinking Water State Revolving Fund.
- \$45 million for WIFIA.
- \$50 million for the Bureau of Reclamation's water reuse and recycling program.
- \$5 million for National Priorities Research Funding.
- Continued full tax-exempt status for municipal bonds.
- Removal of the cap on tax-exempt private activity bonds.

A week before the Fly-In, the President submitted his FY 2018 budget to Congress. It included substantial cuts to the U.S. EPA budget: staff cuts of about one-third, defunding of research and watershed programs such as the Great Lakes Restoration Initiative (GLRI) and Chesapeake Bay programs. An update of the President's proposed budget continues to call for similar reductions in the U.S. EPA budget. Congressional speakers and staff we visited stressed that Congress will prepare their own budget. It was not clear where staff cuts would be made, but it was hypothesized that most would be at Regional offices, with the potential to consolidate the Regions. There is significant support for continued funding for the GLRI and other watershed programs. There is also recognition of the continued need for research and sound science, and the need for regulatory staff to serve the regulated community. Nevertheless, our delegation added support for the GLRI, research and decision-making based on sound science, and the need for the regulated community to have access to experienced U.S. EPA staff at reasonably convenient locations to our congressional office visits. As Congress develops its Fiscal Year 2018 budget, WEF may ask us to contact our Senators and Representatives with respect to budget cuts or funding needs. Representatives are particularly responsive to real world examples of impacts in their own districts. WEF's This Week in Washington is a good source to follow the developments with the EPA budget, program funding, and staff changes. Access it at http://wefcom.wef. org/search?executeSearch=true&SearchT erm = This + Week + in + Washington & l = 1. You can receive the report by requesting email copies as published.



U.S. EPA UPDATES

Benita Best Wong is serving as Acting Deputy Assistant Administrator Office of Water. She reported that per the Executive Order two regulations are to be removed for each new regulation. U.S. EPA Administrator Pruitt supports water and wastewater infrastructure funding. She stressed that it will be important to have eligible projects ready to go for WIFIA funding. Waters of the United States Rule has been withdrawn; it will be reconsidered with respect to the "Scalia" opinion. EPA will solicit comments on a revised Waters of the United States proposal.

Jeff Lape, Office of Science & Technology discussed water criteria and rules being worked on. OST is looking at algal toxins (mycocystis) as a public health criteria (dermal, inhalation, swimming). Guidance will be issued initially. U.S. EPA still wishes to obtain results of the nutrient removal survey. Regulations on hold include dental amalgam and analytical methods update. OST is working on remote real time sensors for numerous constituents.

John Goodin, Acting Director Oceans, Wetlands and Watersheds (OWOW) also mentioned the Clean Water Rule, to be reissued considering Scalia's opinion and discussed Section 319 success stories. EPA is working on more GIS accessible data.

Andrew Sawyer, Director Office of Wastewater Management Office of Water noted that \$600 billion is needed for water and wastewater infrastructure; how this

investment is made is a challenge. Much of the infrastructure is at the end of its useful life. EPA considers a community's ability to pay an issue: 12% of households pay over 4.5% of median household income for water, wastewater and stormwater services. Going forward public-private partnerships will be important. He also noted that WIFIA is ready to be implemented as a funding source for larger projects. Applications are being solicited. With respect to long term strategic planning, integrated planning, the challenge is financial. Stormwater financing is particularly challenging because of a lack of dedicated revenue. He noted that there are 8,000 MS4 permittees but only 1800 stormwater utilities (Chris Kloss/Chief, Municipal Branch Water Permits Division, Office of Wastewater Management also mentioned this as the greatest challenge during the Roundtable discussion of stormwater and green infrastructure issues).

Peter Grevatt, Director Office of Ground Water and Drinking Water/Office of Water noted that there are 51,000 water systems in the United States. He noted that many systems are struggling, strong systems should help those that struggle. He also noted a need to bring Clean Water Act and Safe Drinking Water Act issues together.

As a panel, it was noted that a workgroup will be formed representing Air, Solid Waste and Water to interact with Office of Management and Budget.

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Central States Represented at the Washington Water Week Fly-In and Recent EPA Initiatives

Breakout Roundtable Discussions with U.S. EPA Representatives

In addition to aforementioned Stormwater/Green Infrastructure discussion, EPA representatives facilitated discussion on the following topics:

- Water Finance, WIFIA and Affordability
- Reuse
- Integrated Planning, CSO, SSO
- Technology and Innovation
- National Survey on Nutrient
 Performance of Secondary Treatment,
 Effluent Guidelines, and Dental
 Amalgam Rule
- Energy Water Nexus

Majority and minority representatives from Senate & House committees provided a congressional snapshot of areas of agreement (need for investment), areas of difference (regulatory agenda, Waters of the United States). The panel all agreed that Congress will prepare its own budget with respect to EPA, watershed restoration funding should be retained, and that EPA staff needs to be sufficient to maintain core functions.

Following the Congressional panel, attendees were bussed to an area outside the Capitol for a Rally for Water, then proceeded to meetings with Congressional members or staff.

Again, as the FY 2018 budget is developed over the next 3 to 4 months, our members may be called on to contact their Representatives or Senators to advocate on behalf of water issues and funding. It is effective. Real situations from home districts carry the most weight.

Recent Developments

Subsequent to the Fly-In, EPA requested comments on regulations that could be eliminated to meet the "2 for 1" executive order. EPA is required by court order to finalize the lead and copper rule. WEF Government Affairs Committee discussions that is rarely the regulations that are problematic, but implementation of guidance that have been at issue. Nevertheless, WEF solicited input from Member Associations and submitted the following suggestions:

National Pollutant Discharge
 Elimination System (NPDES):
 Applications and Program Updates
 General Permit Remand; Therefore,
 WEF requests that the EPA 1) change
 the term of the NPDES permit from

- 5 years to 10 years AND without the EPA overriding and deciding an administratively continued State permit; and 2) not change the method of NPDES effluent limitations calculations.
- <u>Draft Field-Based Methods for</u>
 <u>Developing Aquatic Life Criteria for</u>
 <u>Specific Conductivity.</u> WEF members wish the EPA to consider using an adaptive approach that allows State, regional, and local authorities the flexibility to apply the best method to their ecoregion and not implement this draft field-based method nationwide.
- National Emission Standards for Hazardous Air Pollutants: Publicly Owned Treatment Works. WEF asks the EPA to reconsider its approach to controlling stationary air emission sources and rather than using the CWA Pretreatment Program Control Authority the EPA can use its existing CAA Control Authority at these stationary sources to achieve its attainment objectives.
- Clean Water Act Methods Update
 Rule for the Analysis of Effluent.
 Therefore, WEF requests that if the
 EPA clarify the rule status. If it still
 considers the rule active, that it
 promptly re-opens the rule for public
 comment via the Federal Register to
 complete the public review process.
- Recommend a change from deterministic NPDES permitting to a stochastic/statistical approach. This reinforces previous WEF position correspondence to EPA.
- On December 5, 2013, EPA announced a new collaborative framework for implementing the Clean Water Act (CWA) Section 303(d) program with states – A Long-Term Vision for Assessment, Restoration and Protection under the Clean Water Act Section 303(d) Program. The new program vision details enhancements made to the CWA 303(d) program informed by the experience gained over the past two decades in assessing and reporting on water quality and in developing tens of thousands of TMDLs. It enhances overall efficiency of the CWA 303(d) program and encourages focusing attention on priority waters and acknowledges that states have flexibility in using available tools beyond TMDLs to attain water

quality restoration and protection. With the recognition that there is not a one-size-fits-all approach to restoring and protecting water resources, states have been able to develop tailored strategies to implement their CWA 303(d) program responsibilities in the context of their water quality goals. While the Vision provides a new framework for implementing the CWA 303(d) program, it does not alter state and EPA responsibilities or authorities under the CWA 303(d) regulations. WEF participated in this process by facilitating states and EPA dialogue with utilities and is supportive of the adaptive management principles included in the new program vision.

These comments were assembled over a short time frame per the EPA request. As the 2 for 1 policy is implemented, our members should be prepared to think through additional comments that may be made. Section Government Affairs Committees are the best forum for this.



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Sheboygan Regional Wastewater Treatment Facility, Sheboygan, WI



n a concerted effort to clean up our rivers and lakes by the mid-1980s, communities in Wisconsin and throughout the nation started working to meet stringent state and federal water quality standards. The Sheboygan Regional Wastewater Treatment Facility plays an important part in this continuing battle for cleaner water. The high quality of the effluent discharged into Lake Michigan is evidence of the positive action that has been taken to restore and maintain the lake's chemical, physical, and biological integrity. Residents of Sheboygan and the surrounding area can be proud of their wastewater treatment facilities.

HISTORY OF THE SHEBOYGAN REGIONAL WASTEWATER TREATMENT FACILITIES

www.cswea.org

The City of Sheboygan first constructed a wastewater treatment plant on the present site in 1937. This original plant provided primary treatment, which essentially consisted of removal of large suspended solids. In 1957, the plant was upgraded to provide secondary treatment through the removal of additional suspended solids and soluble organic material.

By 1970, Sheboygan had outgrown the upgraded treatment facilities, and the city authorized an engineering study to assess the community's wastewater treatment needs. Before design and construction of a plant addition could begin; however, Congress enacted the Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500. In response to these new requirements, a feasibility study was conducted which indicated that a single wastewater treatment plant would be the most cost-effective and environmentally sound method of treating wastewater produced in the region. The regional facilities would serve the Cities of Sheboygan and Sheboygan Falls, the Village of Kohler, the Town of Sheboygan, and portions of the Towns of Sheboygan Falls, Lima, and Wilson.

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The sanitary sewer system analysis and the wastewater treatment facilities plan were completed in 1975 and 1976, respectively. The facilities plan called for expansion of the existing Sheboygan wastewater treatment facilities and the abandonment of the treatment facilities in Kohler and Sheboygan Falls. Many components of the previous Sheboygan treatment plant were incorporated into the new facilities, which resulted in lower construction costs. This plan also included construction within the City of Sheboygan of the west interceptor to convey wastewater from Sheboygan Falls and Kohler. Other projects included a sanitary sewer rehabilitation and combined sewer (storm and sanitary) elimination program, and the upgrading of Sheboygan's two major wastewater-pumping stations located at North Avenue and N. 3rd Street and at Kentucky Avenue and S. 7th Street.

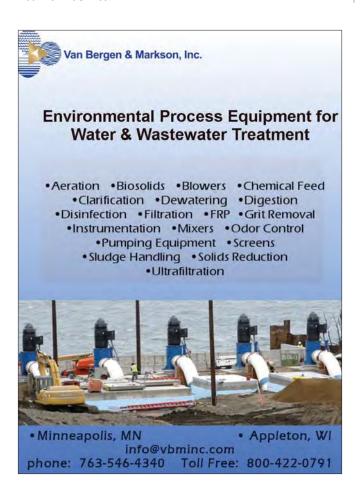
In 1977, the Wisconsin Department of Natural Resources (WDNR) gave final approval of the plans and specifications for the regional wastewater treatment facilities. The City of Sheboygan received federal funding for 75 percent of the project cost, with the WDNR providing approximately five percent of the project cost. The remaining cost of the project was funded locally.

In January 1978, construction of the \$23.9 million regional treatment facilities commenced. The liquids handling portion became operational in December 1979 and the solids handling portion in the fall of 1981. Construction of the \$1.04 million west interceptor, \$810,000 sanitary sewer rehabilitation, and \$1.55 million upgrading of the North Avenue and Kentucky Avenue pump stations was concurrent with construction of the treatment facilities.

In 1998, work was completed on the North/South Interceptor sanitary sewer project. The North/South Interceptor was a major project identified in the 1970s during the sanitary sewer system analysis. The North/South Interceptor was built to provide adequate sanitary sewer capacity to the northwest quadrant of the regional planning area (the Town of Sheboygan and the Town of Sheboygan Falls) when development reached adequate size to necessitate construction of the larger sanitary sewer pipe and wastewater pump station. The process of acquiring easements for the project began in 1994 and continued into 1996. The \$3.1 million project was funded through a State Revolving Fund (Clean Water Fund) loan with a subsidized interest rate under 3.2 percent.

CURRENT TREATMENT FACILITY AND PROCESS SUMMARY

Today the Sheboygan Regional Wastewater Treatment Facility (WWTF) is a state of the art activated sludge treatment facility which cleans the wastewater for over 68,000 residents in seven local communities. The WWTF operates five major lift stations and an advanced treatment facility which treats wastewater and reclaims an average of 11 million gallons per day of clean water. The facility is operated and maintained by 15 dedicated professionals who come from diverse backgrounds and incorporate multiple disciplines and skills including, administration, natural science, process operations, mechanical engineering, maintenance, metal fabrication, electrical, process controls, computer programing, network engineering, and environmental and federal pretreatment program regulations.





In 2016, the Sheboygan Regional WWTF reclaimed over 4 billion gallons of water and returned it to Lake Michigan. The reclaimed water is cleaner than the lake water. The treatment processes removed 99% of the organic pollutants, 95% of the ammonia, and 86% of the phosphorus. The nitrogen and phosphorus in the wastewater were recovered in the solids and used as a natural fertilizer. Approximately 9 million gallons of liquid solids were applied on agricultural fields and 1,300 tons of dried solids were produced and used on residential lawns and gardens and agricultural fields. The WWTF recovered enough energy from the treatment processes to produce almost 70% of the facility's electrical needs and 90% of the heating demand. The Sheboygan Regional WWTF is a true environmental leader in sustainability and protecting our most valuable resource, WATER.

RAW PUMPS

Raw wastewater, which enters the plant via large underground pipes, is pumped to the screening process by two raw wastewater pumps driven by 200 HP electric motors with VFDs and three 250 HP electric motors with eddy-current drives. Each pump has a capacity of 11,800 gallons per minute (gpm).

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Upgrades in 2008 included replacing the Wiessman® center-flow band screens with Brackett Green® self-cleaning center-flow fine screens with 5 mm openings. The screenings process is designed to remove large and small non-biodegradable debris from the wastewater flow. The screenings collected by the fine screens are processed through a JWC "Muffin Monster"® washer/compactor before being placed in a waste roll-off container. The collected screenings are transported to a landfill for final disposal.

GRIT REMOVAL

In 1997, one 20-foot diameter, cyclone grit separator was installed to remove sand and silt from the influent wastewater. Sand and silt enters the waste stream with the inflow/infiltration of rainwater and clear-water into the sanitary sewer collection system. In 2007 a Huber® vortex grit washer was installed that washes the grit, removing any remaining organic matter from the grit before it is deposited in the waste roll-off with the screenings collected by the fine screens.

PRIMARY CLARIFIERS

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Four primary clarifiers (90 ft. x 90 ft. x 12 ft) provide 6.2 hours detention at 11.0 million gallons per day (MGD) average daily flow. Heavy suspended solids settle out by gravity. The settled primary sludge solids are pumped to the anaerobic digestion process for further treatment before thickening and land application as fertilizer.

BIOLOGICAL NUTRIENT REMOVAL

In 1999, two unused aeration basins (50 ft. X 100 ft. X 26 ft.) were modified to allow for Biological Nutrient Removal (BNR). Baffle walls were installed to direct the flow into an N shaped path that increased the detention time in the basin, thereby creating anaerobic (without oxygen) conditions for the specialized bacteria required in the BNR process. Eight submersible mixers were added to each basin to keep the solids from settling in the basin. Detention time is 4.1 hours at average daily flow.

AERATION BASINS

The four remaining aeration basins (50 ft. x 100 ft. x 26 ft. deep) each contain 1500 submerged fine bubble diffusers. In 2006, two 350 horsepower high-efficiency Turblex® centrifugal air blowers operating at 3,500 rpms were installed. The Turblex® Blowers use dissolved oxygen (D.O.) meters and modulating valves to control the amount of D.O. available for the microorganisms. The blowers provide the mixing and oxygen necessary to maintain the Activated Sludge process. This process consists of providing the right environment for the bacteria and other microorganisms that consume the organic matter in the wastewater. Detention time in the aeration basins is 8.2 hours at average daily flow.

FINAL CLARIFIERS

Four final clarifiers (105 ft. x 105 ft. x 14 ft), providing 7.8 hours detention at average daily flow, settle out the Activated Sludge by gravity. A major portion of the activated sludge is returned to the plant flow upstream of the BNR basins. The activated sludge is returned to the plant flow in order to maintain a high concentration of bacteria and microorganisms within the process. A portion of activated sludge, known as waste activated sludge, is pumped to a point upstream of the primary clarifiers where it is co-mingled with the raw wastewater and settles with the primary clarifier sludge.

EFFLUENT DISINFECTION

The treated wastewater is disinfected with sodium hypochlorite in the chlorine contact basins followed by dechlorination with sodium



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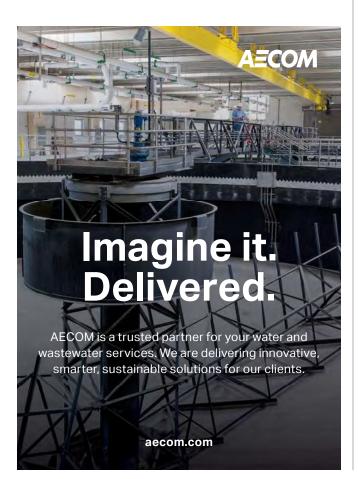
bisulfite prior to discharge to Lake Michigan. The reclaimed clean water flows through a 60-inch diameter concrete outfall pipe that extends 1,570 feet into Lake Michigan. Detention time in the contact basins is two hours at average daily flow.

SLUDGE DIGESTION (STABILIZATION)

Waste activated sludge (WAS) is pumped to the primary influent splitter box for co-settling with raw wastewater in the primary clarifiers. The resulting primary sludge/WAS mixture is pumped directly into one of three primary anaerobic digesters that are heated and mixed by Linear Motion mixers. After the sludge is stabilized it is transferred to one secondary anaerobic digester for final stabilization. The primary and secondary digesters have a total volume of 4,855,000 gallons. While the sludge is in the primary digesters, the sludge is heated and mixed to create the appropriate environment for the anaerobic bacteria to stabilize the sludge. The methane gas produced is beneficially used as a fuel to heat the digesters, plant buildings, generate electricity, and further process the biosolids. The WWTF augments its digester gas production through a high strength waste receiving program that feeds hauled in waste directly to the primary anaerobic digesters.

BIOSOLIDS PROCESSING

The WWTF thickens the digested anaerobic sludge from 2.5 percent to 6.0 percent solids via a two-meter and/or three-meter gravity belt thickener. The thickened liquid sludge is transferred to two 2 MG storage tanks that were added to the



plant in 1996. The biosolids are stored until it can be applied on farmland located throughout Sheboygan County.

Starting in 2014, a portion of the liquid biosolids stored in the storage tanks are further dewatered by two Huber® 800.2 Screw Presses and dried to a moisture content of less than 10% via Huber® Medium Temperature Belt Dryer. The dryer uses biogas produced in the anaerobic digestion process and the waste heat from the plant's microturbines to heat the dryer to approximately 204 degrees Fahrenheit. The design of the dryer is simple; slow moving belts, drive systems using standard market components, and all stainless steel components where moisture or wear may occur. The dryer utilizes indirect heat so there is no ignition source of any kind within the dryer; therefore, it provides a safe operating environment. There is very little dust produced by the drying operation due to the slow moving belt technology and no dry recycle of any kind. The dryer has a low electrical demand and uses a cascading air technology and state-of-the-art controls which provide optimal energy efficiency. The dryer's enclosed system maintains a negative pressure to ensure minimal odor emissions.

The final product is a pellet sized dry product that has a very high agronomic value and is safe to use on lawns, shrubs, trees, flowers, vegetables, and as a general soil amendment. The final product has virtually no salts, so it will not burn plants. The nitrogen and phosphorus are released slowly into the soil and plants, which allows for even growth and better root development.

Sheboygan's dryer is designed to dry approximately half of the biosolids produced by the facility's treatment processes. By drying half of the liquid biosolids produced, the Sheboygan Regional WWTF was able to diversify the biosolids disposal and reuse options, while minimizing capital and construction cost. The liquid biosolids are land applied via injection into agricultural fields as a natural and beneficial fertilizer. Land application of the liquid biosolids is limited by season, weather conditions, and field availability. The dried biosolids are an Exceptional Quality, Class A product that can be used in residential and agricultural applications, as well as, landfilled if necessary.

COMBINED HEAT AND POWER

The WWTF also operates a Combined Heat & Power (CHP) System which uses the biogas produced in the anaerobic codigestion process to produce electricity and heat. The CHP



System has 700kWh of electrical generating capacity and over 2.4 million BTU per hour of heat recovery. In 2006, the WWTF partnered with Alliant Energy to install ten 30 kW CapstoneTM Microturbines and Heat Exchangers capable of recovering 1,000,000 BTU of heat energy. The high strength waste and codigestion program resulted in more biogas than the WWTF could use so in 2010 the WWTF installed two 200 kW CapstoneTM Microturbines and Heat Exchangers capable of recovering an additional 1,400,000 BTU per hour.

The WWTF has essentially one heating loop which provides the necessary energy to heat the digesters, the biosolids dyer, and the buildings. The heat energy to the loop is provided by two biogas boilers, one dual fuel natural gas and biogas boiler, and the Combined Heat and Power systems. The WWTF currently produces 70 percent of its electrical needs and 90 percent of its heating needs.

CHEMICAL SYSTEMS

Two 10,000-gallon chemical storage tanks and one chemical feed pump are used to add ferric chloride to the influent wastewater to control odor and to reduce the influent phosphorus load to the BNR process. Two chemical feed pumps also add ferric chloride to the aeration basins, as needed, when the BNR process does not reduce the phosphorus levels in the wastewater stream below the discharge permit requirement. A separate chemical mix and feed system adds polymer to the digested sludge to condition it before dewatering on the gravity belt thickeners.

INSTRUMENTATION

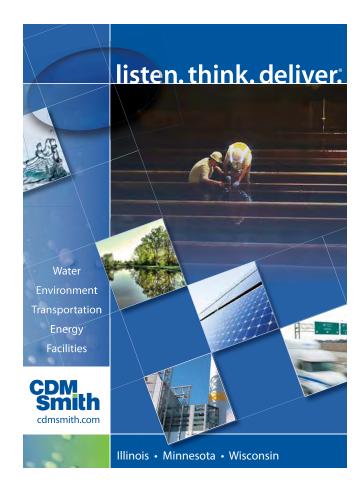
The instrumentation system is capable of monitoring equipment and processes over the entire plant and at the five-wastewater pump stations located throughout the City of Sheboygan. Programmable Logic Controllers (PLCs) control, monitor, and record the operating status of all critical equipment at the wastewater treatment plant. The data collected by the PLCs are sent to a centralized industrial server that logs the data and displays it graphically on a video monitor. The plant operators can examine the operating status of all process equipment throughout the treatment facility, as well as, the wastewater pump stations from one central location at the wastewater treatment plant.

LABORATORY

The advanced wastewater laboratory uses modern analytical equipment to monitor the quality and character of the wastewater as required by the WDNR and U.S. EPA. One wastewater laboratory technician analyzes samples daily to monitor the influent and effluent quality. The wastewater laboratory also analyzes plant process samples for the plant operators, who then make process adjustments, as required, to improve process operations and enhance effluent quality. In addition, the wastewater laboratory analyzes raw wastewater samples collected by the member communities served by the Sheboygan Regional Wastewater Treatment Facility. The result of each community's raw wastewater sample analysis is used when billing them for wastewater treatment provided by the City of Sheboygan.



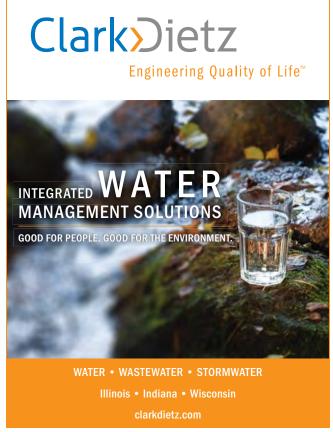








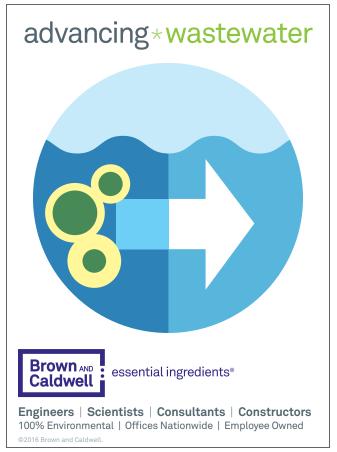
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Radebaugh Paper Winner

SNRP 101: Fond du Lac WWTP Lab Experiences

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ABSTRACT

The City of Fond du Lac, Wisconsin Regional Wastewater Treatment Plant (FDL WWTP) has a proposed phosphorus water quality based effluent limit (WQBEL) of 0.04 milligrams per liter (mg/L) effective January 1, 2022. Because of this stringent limit, the plant laboratory staff has explored a multitude of phosphorus species with a primary focus on soluble non-reactive phosphorus (sNRP). FDL currently experiences a sNRP average of 0.08 mg/L and has become increasingly interested in how this sNRP level may affect the ability to meet a future phosphorus limit of 0.04 mg/L.

KEY WORDS

Phosphorus speciation, soluble non-reactive phosphorus (sNRP), phosphorus removal, low phosphorus concentration

INTRODUCTION

The City of Fond du Lac, Wisconsin Regional Wastewater Treatment Facility (FDL WWTP) serves the population of not only the City of Fond du Lac (which is approximately 43,000 people) but also the population of an Outlying Sewer Group which includes an additional 30,000 people and has a design flow of 9.84 MGD. The facility utilizes the activated sludge process and anaerobic digestion and typically uses aluminum sulfate for phosphorus removal.

Like many other wastewater treatment facilities in the state of Wisconsin, the FDL WWTP is preparing to meet a much lower final effluent phosphorus limit. A predicated effluent limit of 0.04 mg/L has forced the facility to look in to multiple options and treatment methods to determine the best course of action to meet the future limit. The options and treatment methods piloted here include the following: CoMag[™], full-scale biological phosphorus removal, full-scale chemical phosphorus removal using cerium chloride (SorbX₁₀₀), Ovivo® TriSep membrane filtration, ACTIFLO®, Aqua-Aerobics AquaDisk® followed by Aqua Ultrafiltration™, and even a nutrient harvesting process. Over the course of the past several years, each pilot study that has been conducted at the facility to determine if a 0.04 mg/L concentration

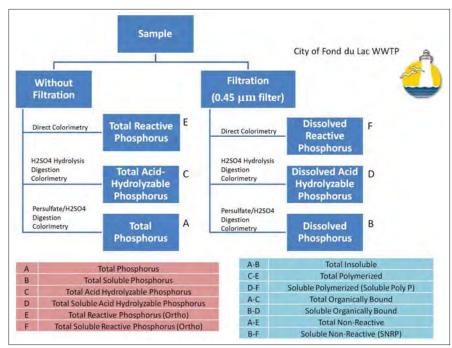


Figure 1: Phosphorus speciation flow chart and calculations

is achievable has shown that it will be difficult and costly to meet the future limit. It has become apparent there is something affecting the ability of most of these processes to achieve results below the 0.04 mg/L concentration.

For each pilot study, the on-site laboratory staff has played a significant

role in analyzing and collecting data. In evaluation of phosphorus removal efficiencies of the pilots, sNRP presence has been suspected to affect achievable levels of phosphorus removal. Due to this finding, the laboratory staff has devoted a significant amount of time investigating this phenomenon, including developing a

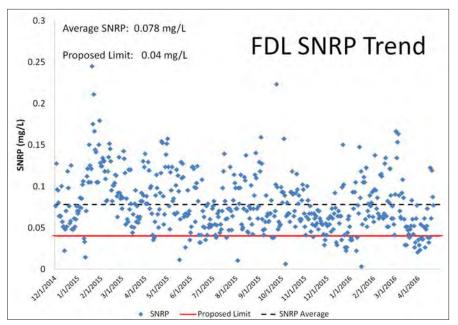


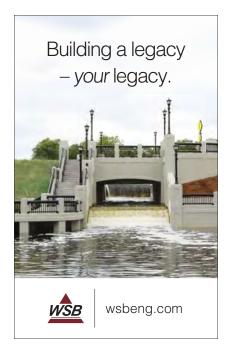
Figure 2: FDL WWTP sNRP average versus proposed WQBEL



standard operating procedure to analyze and properly measure sNRP and validate the accuracy of all data obtained.

In addition to the pilot study findings and daily final effluent phosphorus speciation, it has been noticed that some treatment processes may influence the removal levels of sNRP. For this reason, the laboratory staff has also analyzed numerous samples that have been collected from high strength waste haulers, industries, Outside Sewer Group, and normal influent wastewater flows to determine levels of incoming sNRP. The reason much emphasis has been focused on sNRP levels at FDL is the average sNRP value is around 0.08 mg/L. This may pose a serious problem if the facility needs to meet a 0.04 mg/L limit.

Another reason sNRP may be an issue for the FDL WWTP is the fact that the facility will not only have a concentration limit of 0.04 mg/L but will also have a mass limit. The mass limit will be an important consideration because FDL is greatly impacted by inflow and infiltration and during a high flow rain event, the facility may have difficulties meeting the mass limit. Overall, it has been found that only certain processes seem to show good removal efficiencies and it may require a combination of treatment processes/ methods to remove the sNRP below 0.04 mg/L at a significant cost to the ratepayers of the city. Ultimately, the level of sNRP in the FDL wastewater may determine what treatment methods are utilized in the future





at the facility. This has given rise to the importance of knowing various sNRP data points and understanding contributors.

METHODOLOGY

Phosphorus can be broken down into two primary forms, organic and inorganic. With this distinction, further speciation can be conducted to determine the various phosphorus species such as insoluble, polymerized, and non-reactive. Particulate phosphorus refers to any form of phosphorus which is retained by a 0.45 μ m pore size filter. Soluble/dissolved/filterable, which can all be used interchangeably, refer to any form of phosphorus which passes through a filter with a pore size of $0.45 \, \mu \text{m}$. It should be noted that the filtrate that passes through a 0.45 μ m filter may also contain fine particles and colloids (Neethling, et al. 2007). sNRP can be calculated by determining the difference between soluble total phosphorus (sTP) and soluble reactive phosphorus (sRP). A majority of sNRP is soluble organic (sOP) and the remainder is soluble polymerized (sPoly). Figure 1 shows a breakdown of how the various fractions were analyzed and calculated.

The FDL laboratory used Standard Methods analytical methods to distinguish various phosphorus fractions in their wastewater and other facility contributors. The FDL laboratory has fine-tuned their technique and has determined that the dirtier a sample is, the longer the sample takes to filter. Therefore, in some circumstances for analysis of sludge, industrial, hauler, or plant influent samples it was necessary to pre-filter samples with a glass fiber $1.5\,\mu\mathrm{m}$ filter prior to filtration with the $0.45\,\mu\mathrm{m}$ filter. Another helpful technique utilizes a benchtop centrifuge followed by filtration of the sample.

Instrumentation used for the analysis of samples was a Thermo Scientific GENESYS 10 Spectrophometer with a MDL of 0.01 mg/L and a Seal AQ2 Discrete Analyzer with a MDL of 0.005 mg/L.

Careful consideration was given to contamination and the laboratory periodically analyzed filtered blanks to ensure no background could be attributed to filtration technique and equipment.

RESULTS/DISCUSSION

The FDL laboratory has been analyzing their sNRP in excess of a year and a half and has become well adept at sNRP analysis.

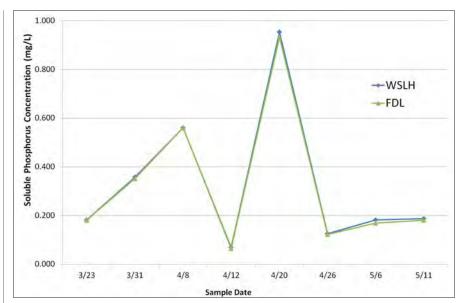


Figure 3: FDL laboratory versus WSLH sTP results

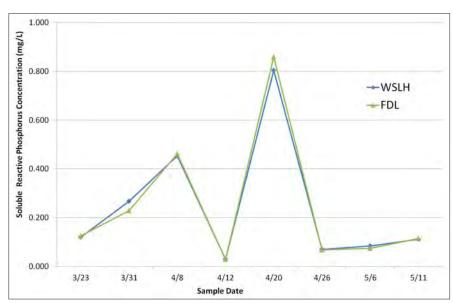


Figure 4: FDL laboratory versus WSLH sRP results

	Phosphorus Species	Influent	Effluent
А	Total Phosphorus (TP)	4.635	0.814
В	Total Soluble Phosphorus (sTP)	2.448	0.576
С	Total Acid Hydrolyzable Phosphorus (tAHP)	3.497	0.697
D	Total Soluble Acid Hydrolyzable Phosphorus (sAHP)	2.223	0.535
Е	Total Reactive Phosphorus (tRP)	2.787	0.601
F	Total Soluble Reactive Phosphorus (sRP)	2.126	0.500
A-B	Total Insoluble (pTP)	2.187	0.238
C-E	Total Polymerized (tPoly)	0.710	0.095
D-F	Soluble Polymerized (sPoly)	0.096	0.035
A-C	Total Organically Bound (tOP)	1.138	0.117
B-D	Soluble Organically Bound (sOP)	0.225	0.041
A-E	Total Non-Reactive (tNRP)	1.849	0.212
B-F	Soluble Non-Reactive (sNRP)	0.321	0.076
E-F	Particulate Reactive P (pRP)	0.660	0.101

Table 1: FDL average influent and effluent phosphorus species concentrations

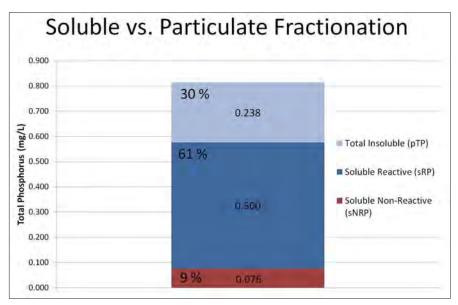


Figure 5: FDL insoluble versus soluble speciation

The FDL WWTP currently experiences sNRP levels of approximately 0.08 mg/L which is double the concentration of the 0.04 mg/L WQBEL. See Figure 2.

Fond du Lac relied on Neethling (2007) to provide general direction on sNRP analysis and technique. However, because of the vast amount of data generated, it was important to the FDL WWTP to not only generate data for research but also ensure the data being collected was accurate. Therefore, the FDL laboratory conducted a comparison study with the Wisconsin State Lab of Hygiene (WSLH) to confirm its laboratory results.

Overall, the FDL laboratory results when compared to the WSLH had a relative percent difference (RPD) of less than 25%. The Wisconsin Department of Natural Resources (WiDNR) typically recommends comparison results be within 10% but in the case of lower concentration samples they allow for up to 25%. The FDL laboratory trended very closely with the WSLH for sTP analysis (see Figure 3) but experienced RPDs of up to 15% for comparison sRP results (see Figure 4). It is speculated that the increased RPDs for sRP analyses was experienced due to the fact that the WSLH performed the filtration step for sRP samples analyzed at their facility and the FDL staff performed filtration for sRP samples analyzed in-house. The same phenomenon was not experienced with the analysis of sTP samples because FDL submitted a filtered sample to the WSLH for the sTP analysis. Differences in filtration equipment and analyst technique likely contributed to the discrepancies in sRP data.

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Further breakdown of phosphorus species can be conducted with the analysis of total phosphorus (TP), sTP, acid hydrolyzable (tAHP), soluble acid hydrolyzable (sAHP), reactive phosphorus (tRP), and sRP. With the analysis of these six phosphorus fractions, the FDL laboratory was able to determine the

average phosphorus fractions that can be attributed to things such as organically bound and polymerized phosphorus in the plant influent versus the final effluent. The results can be found in Table 1.

The FDL WWTP phosphorus was further evaluated for differences attributed to insoluble and soluble reactive fractions. A breakdown of these phosphorus species can be found in Figure 5 below. When evaluated under these conditions, the phosphorus most often experienced at the FDL WWTP is sRP with pTP and sNRP also present in varying degrees.

According to Neethling et al. (2007) phosphorus species vary from facility to facility depending on treatment characteristics such as type of phosphorus removal methods (chemical, biological, or filtration) as well as plant recycle flows and substrate acceptance policies. Therefore, FDL felt it was necessary that in addition to daily final effluent sNRP determinations, plant influent should also be analyzed for various fractions of phosphorus to determine facility removal efficiencies. Figure 6 shows the FDL WWTP sNRP removal efficiency.



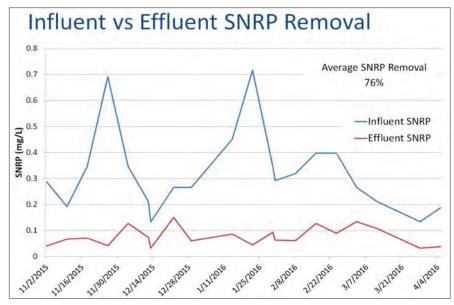


Figure 6: FDL WWTP influent versus final effluent sNRP

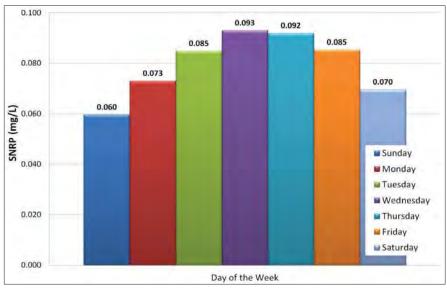


Figure 7: FDL sNRP by day of the week

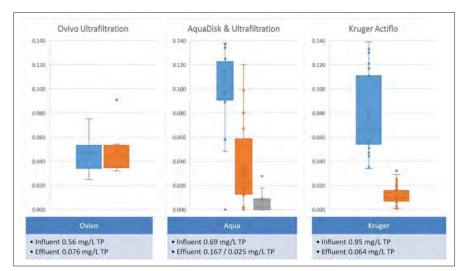


Figure 8: FDL pilot phosphorus removal results

In addition to monitoring the facility effectiveness on removal of sNRP from the influent to the final effluent, the data was scrutinized to determine any trends that may arise. When looking at sNRP by day of the week, it became apparent that sNRP increased throughout the week with the facility experiencing the highest average sNRP values on Wednesday and Thursday as can be seen in Figure 7. The increase in sNRP throughout the week coincides with the operation of our dewatering centrifuges and our centrate recycle stream and demonstrates the impact the side stream has on our facility sNRP.

As part of our facility study of feasible alternatives, the FDL WWTP has conducted a variety of tertiary treatment pilot studies including CoMag[™] and Actiflo® (ballast settled floc processes), Ovivo® (ultrafiltration membrane), AquaAerobics® (cloth disk followed by membrane filtration), AirPrex™ (nutrient harvesting), and SorbX® (cerium chloride phosphorus removal chemical). The FDL laboratory performed extensive sNRP analysis during the Ovivo, Agua Aerobics, and Actiflo pilot projects to determine removal capabilities. The graphs in Figure 7 show the removal efficiencies of sNRP in blue, orange, and gray experienced during these pilots with a table below indicating the pilot total phosphorus results.

CONCLUSIONS

Analysis of the various fractions of phosphorus has provided the City of Fond du Lac valuable information towards their future compliance options. Specifically, evaluations of sNRP have been targeted to determine the feasibility of meeting future effluent requirements. Current effluent sNRP concentrations exceed future WQBELs, therefore phosphorus reductions of all fractions are necessary. Elevated sNRP was observed to increase with increased side stream loadinas. sNRP is linked to the presence of colloidal particles. This link is further supported by the pilot testing data, which exhibits a trend of increased sNRP removal with increased colloidal removal (coagulation and flocculation) upstream of the technology.

Moving forward, Fond du Lac hopes to acquire recommendations and/or comments from the Wisconsin DNR in relation to sNRP and what it may mean for area TMDL studies and phosphorus WQBELs. Future direction for Fond du Lac will likely include assessing changes in

sNRP under various treatment conditions such as centrate recycle changes and bio-P. Additionally, we will continue to assess local industries, high-strength waste, and septage/holding/portable waste. Fond du Lac would also like to conduct a bioavailability study using algae and assessing phosphorus uptake. CS

ACKNOWLEDGEMENTS

The authors would like to thank the Fond du Lac laboratory staff for their extensive efforts in sample handling and abundant laboratory analysis. Additionally, we would like to thank the Wisconsin State Lab of Hygiene for their efforts during our eight week comparison study.

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From left to right: Jim Kaiser (Industrial Pretreatment/Lab Coordinator), Jason Garcia (Lead Lab Analyst), Emily Buch (Lab Analyst), Autumn Fisher (Superintendent, previously Operations Research Coordinator/Lead Analyst), Lizzi Guell (Lab Analyst).



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Where Will You Go?!



By Zach Matyja

ou made it! Here we are in the thick of summer and you've made it through another spring, a season associated with new beginnings, spring cleaning, wet weather (I hope you had your flow meters in and calibrated!), graduations, and, of course, conferences and trade shows.

I want to start by thanking my predecessor, Matt Streicher. Under Matt's leadership, the Illinois Section was as strong as ever. Matt exemplifies what it means to be a leader in the industry. His

involvement is just one example of how those passionate about our industry get involved. There are dozens of others in our organization just like Matt – their service often goes unrecognized but never unnoticed.

As I reflect back on this spring, I see how quickly we can become overwhelmed by the dizzying array of opportunities that are available to someone in our industry. The same week as the CSWEA Annual Conference was the national WEF Collections specialty conference, and multiple other associations' events in the Chicago area. It is certainly both a blessing and a curse to live in Illinois where we have just as many PDH and CEU events as we do layers of government. One could easily travel the state, attend an educational event, trade show, golf outing, or other event within our industry, and never get any work done. For those of us covering multiple states and expansive territories – the lists grow exponentially! Where will you go?!

The number of events doesn't show signs of slowing down either, with rumors that the long-anticipated and overdue requirement for adding continuing education unit (CEU) requirements for wastewater operators is being discussed in the Illinois state legislature. So what should our role be, as an organization focused on all things wastewater? I would like to see our Section continue growing in three areas – two of which I believe we have excelled at, and one growth area where I see tremendous potential.



- 1. Excellent local specialty conferences. The Illinois Section provides excellent one-day specialty workshops throughout the year. These events are very successful and well attended and include Collections (June 22), Operations (July 12) Energy and Resource Recovery, Government Affairs, Industrial Pre-Treatment and Laboratory, Biosolids, and more! While these conferences will never replace the annual conference or WEFTEC, they provide an inexpensive opportunity for member agencies to send staff to expand their knowledge in their areas of interest and specialty.
- 2. Teaming and collaboration. Given the overload mentioned above, I believe it is in our best interests to continue collaborating with other organizations throughout the state to maximize the exposure of our events and minimize the number of total events. Instead of competing for attendees, we need to team up so the best and brightest of each group join together to increase attendance, value, and excellence of each workshop we are a part of. The result will always be stronger because of collaboration. We have great examples of this, including involving the Illinois Association of Wastewater Agencies and the Chicago Metro APWA in our Illinois Collection Systems Workshop for the past few years. The conference has grown and become one of the strongest specialty conferences in the state.
- 3. Downstate involvement. I do have one goal that I would like to see become a reality. If we continue to accomplish items one and two above, we can become a section that encompasses the entire state and not just the Chicago metro area. Our Collections and Operations Committees are in the early stages of developing teaming partnerships and content for a downstate specialty conference this fall. What it will look like, where it will be, and who will be involved is still to be determined, but we are hopeful that this will grow our downstate membership, exposure, and involvement for years to come. If you live or work that way and want to get involved more in CSWEA, please let me know you're interested! I'm honored to represent the Section as your chair, and I am excited to see what 2017-2018 brings! CS

"You have brains in your head. You have feet in your shoes. You can steer yourself any direction you choose... you know what you know. and you are the guy who'll decide where to go."

- Dr. Seuss, Oh, the Places You'll Go!

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Resource Recovery Facilities New Opportunities, Past Successes



By Jay Kemp

hen I started in our industry, we had wastewater treatment plants that were designed to do one thing very well: remove BOD.
Soon there were Water Pollution
Control Facilities, eliminating the word waste from the title. Then there were Water Reclamation
Facilities. These periodic re-brandings over the decades since the 1970s and 1980s reflect how we view our work and how we want to be viewed by the public. The plants that removed BOD have

been modified with re-trained bacteria to remove nitrogen and phosphorus and operate more efficiently resulting in improved water quality with lower energy inputs. This evolution represents continuous improvement in the core function of our treatment facilities: producing clean and safe water.

Now we are embarking on Resource Recovery Facilities, placing an emphasis on the value of the products that our facilities generate. In addition to clean water, there is nutrient recovery and energy production and more. It is an exciting time to be in this business. The 2017 Annual Conference featured an entire track on Enhanced Resource Recovery including production of bioplastics from digester gas. How cool is that! And of course, new acronyms: Minnesota Section now has an R2E Committee, and if you're in Green Bay, home of NEW Water, you have R2E2. Illinois has an Energy Committee, and our Wisconsin Section has created an Energy subcommittee within the Operations Committee. I am sure this new initiative will receive the attention it needs from incoming Operations Chair Jeremy Cramer.

As Milorganite enters its 91st year, I think it's fair to say that resource recovery is nothing new to our industry. Creating a fertilizer product that is marketed successfully to the public is the high watermark of resource recovery. More recently, struvite precipitation has been controlled to convert the evil, pipe clogging mineral to a commercial fertilizer; recovering phosphorus and nitrogen. Brushite, a calcium-based phosphate, shows promise as an alternative pathway to phosphorus recovery. These successes exemplify the potential of our facilities for resource recovery. However, it is also important to note that a well-run land application program is an awesome resource recovery



operation as well. Not only does the application of biosolids recover nutrients for beneficial use, the soil acts to sequester carbon resulting in a reduction of greenhouse gas emissions.

The new opportunities for resource recovery are exciting, but we must also realize that our industry has much different priorities and constraints that the fertilizer and energy industries with which we intersect. The desire to create new products and employ new technologies must not distract from our core mission to improve water quality, enhance

the water environment and protect human health. To the extent that we can recover new products from our facilities in an economical and environmentally beneficial manner, I say go for it! The coolness factor of resource recovery is a great motivator, and can be an opening to get involved in the new committee opportunities in the Wisconsin Section.

Speaking of opportunities, the summer is chock full of ways to get more involved in the Wisconsin Section. CSX, our Central States Section Exchange, will be held at the Kalahari in Wisconsin Dells on July 20 and 21; all members are invited to attend and share thoughts and ideas about things that CSWEA can and should be doing – oh, and there's pizza and a waterpark. The Northwoods Collection system seminar is July 27 in Marshfield, the Management Seminar August 9 in Milwaukee and the Pre-treatment Seminar August 15 at UW Oshkosh. The Wisconsin Section Summer Board meeting is scheduled for August 10 at the Global Water Center in Milwaukee. WEFTEC is in Chicago this year – always a great opportunity for Central States to be recognized.

Stay tuned for the YP Brewer's Game outing – possibly featuring the Crew against a certain team south of the border.

The Wisconsin Section has new leadership in several committees. Autumn Fisher takes over Membership, Paul Boersma is leading Government Affairs, Glen Tranowski is transitioning to the Spring Biosolids Symposium and Mark Mittag moves into the Watershed and Stormwater Committee. Amy Post chairs the Collection Systems committee.

As I start the year as your Chair, I am honored and excited to be part of the leadership in our Wisconsin Section and look forward to seeing many of you at our events throughout the year.

"I am honored and excited to be part of the leadership in our Wisconsin Section and look forward to seeing many of you at our events throughout the year."

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How Can I Help?



By Timothy Wedin

elcome to a new year for the CSWEA Minnesota Section!
I am excited to step in as Section Chair for this year, and am looking forward to working with you to keep our section strong. I would like to thank Christopher Harington for the leadership that he has provided over the past year. Thanks to him and his team, we are starting this year in a strong position, with engaged leaders in our committees. I plan to continue his work, and the work of so many others who have helped make the Minnesota Section what it is today.

The 90th Annual Meeting was a great success. To the team that helped arrange the venue, pulled together the technical presenters and keynote speakers, and planned so many fun activities; thank you for your hard work. Your dedication resulted in a well-attended conference that provided excellent information and great networking opportunities to all of us. To those of you who could join us; thank you, and I hope that you found it as enjoyable and informational as I did.

During and after the Annual Meeting, several people approached me and asked, "how can I help?" I had some great conversations with many people who saw the benefits that they received from belonging to this organization, and sought to find a way to keep it vibrant. So, what's the answer? How can you help?

First, get involved with one of our committees! While each of our nine committees is led by an outstanding team, they need your help to make this a successful year. Find your interest, whether it's Collection Systems, Operations, Public Outreach, Stormwater, or Resource Recovery and Energy, and get in touch with the chair to volunteer your time. Our committees are working to arrange tours, plan conferences, and make sure that our legislators are aware of key issues that water reclamation professionals need to address in our communities. We need your help to continue to provide the high-quality programming and outreach that you have come to expect.

Second, nominate someone for an award. Every day, Central States members find new ways to address unique and challenging issues in the field. Whether it's in the design, or operation of a



Water Reclamation Facility, or in the education of our students in the study of the water environment, we think it is important to recognize the people who advance the knowledge base of our industry. We need your help in finding worthy nominees throughout the state, from Ada to Zumbrota, who deserve to have their efforts recognized. Visit the Central States website to learn more about the awards, and to submit a nomination.

Third, participate in one of our conferences. Our next Collection Workshop, jointly held with MWOA,

will take place on September 20, at Western Lake Superior SD in Duluth. A second workshop will be held on January 24, 2018 at the Regional Maintenance Facility in Eagan. These workshops, along with the Conference on the Environment, the Innovative Conference, and the Annual Meeting, are great opportunities for you to not only learn from others in the field, but to pass on information that you have gained. I also would encourage you to consider presenting at one of our conferences. Your experience as designers, operators, and educators is valuable.

Finally, reach out to non-members and invite them to join CSWEA. You are our best ambassadors. As section members, you know what benefits membership has provided to you. Talk to your co-workers, clients, and students, and let them know about the benefits of membership. Tell them about the network of professionals that membership in the Water Environment Federation (WEF), CSWEA, and the Minnesota Section opens for them. Tell them about the professional development opportunities that are available through these organizations. Tell them about the next activity that you will be attending, and bring them along! By continuing to promote membership, you help to enhance and grow our organization, while developing them as a future industry leader.

So how can you help me through this next year? Get involved with one of our committees. Nominate a person or group of people for an award. Help with one of our many conferences. Introduce a non-member to the organization. In short, be active! Through your active participation, we can continue to grow and strengthen CSWEA.

"How can you help me through this next year?

Get involved with one of our committees. Nominate a person or group of people for an award. Help with one of our many conferences. Introduce a non-member to the organization. In short, be active!"

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JULY

WI Section Northwoods Collection System Seminar July 27, 2017

Marshfield, WI

S&YP Brewers Outing

July 28, 2017 Miller Park

1 Brewers Way, Milwaukee, WI

AUGUST

WI Section Pretreatment Seminar

August 15, 2017 UW Oshkosh Alumni Welcome & Conference Center (AWCC) 625 Pearl Avenue, Oshkosh, WI 54901

SEPTEMBER

MN Section Collection Workshop (w/ MWOA)

September 20, 2017 Western Lake Superior SD Duluth, MN

OCTOBER

CSWEA/IWEA WEFTEC Reception

October 1, 2017, 6:00 – 8:00 p.m. Hilton Chicago Chicago, IL

NOVEMBER

MN Section 32nd Conference on the Environment

November 8, 2017 Minneapolis Convention Center Minneapolis, MN

JANUARY 2018

MN Section Collection Workshop (w/ MWOA)

January 24, 2018 MCES Regional Maintenance Facility Eagen, MN



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Updated on July 1, 2017

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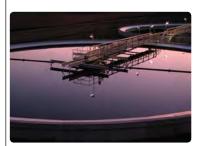
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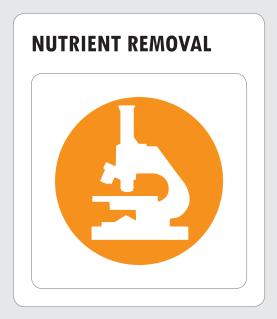
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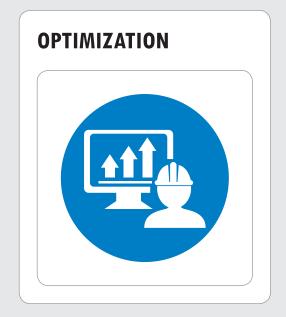
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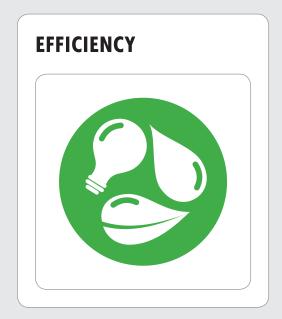


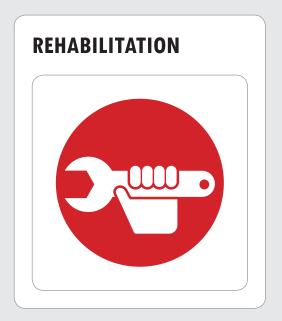














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