

# THE Onsite Journal

**NOWRA**  
National Onsite Wastewater Recycling Association

Fall 2025

**2025 Conference Preview Edition**

2025 | Sandusky, OH  
**Onsite Wastewater  
Mega-Conference**  
Clean Water Strategies  
at the Heart of it All

**October 19-22, 2025**

**Kalahari Resort and Conventions  
Sandusky, Ohio**

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Ohio  
Onsite  
Wastewater  
Association

Cedar Point Amusement Park, Sandusky, OH

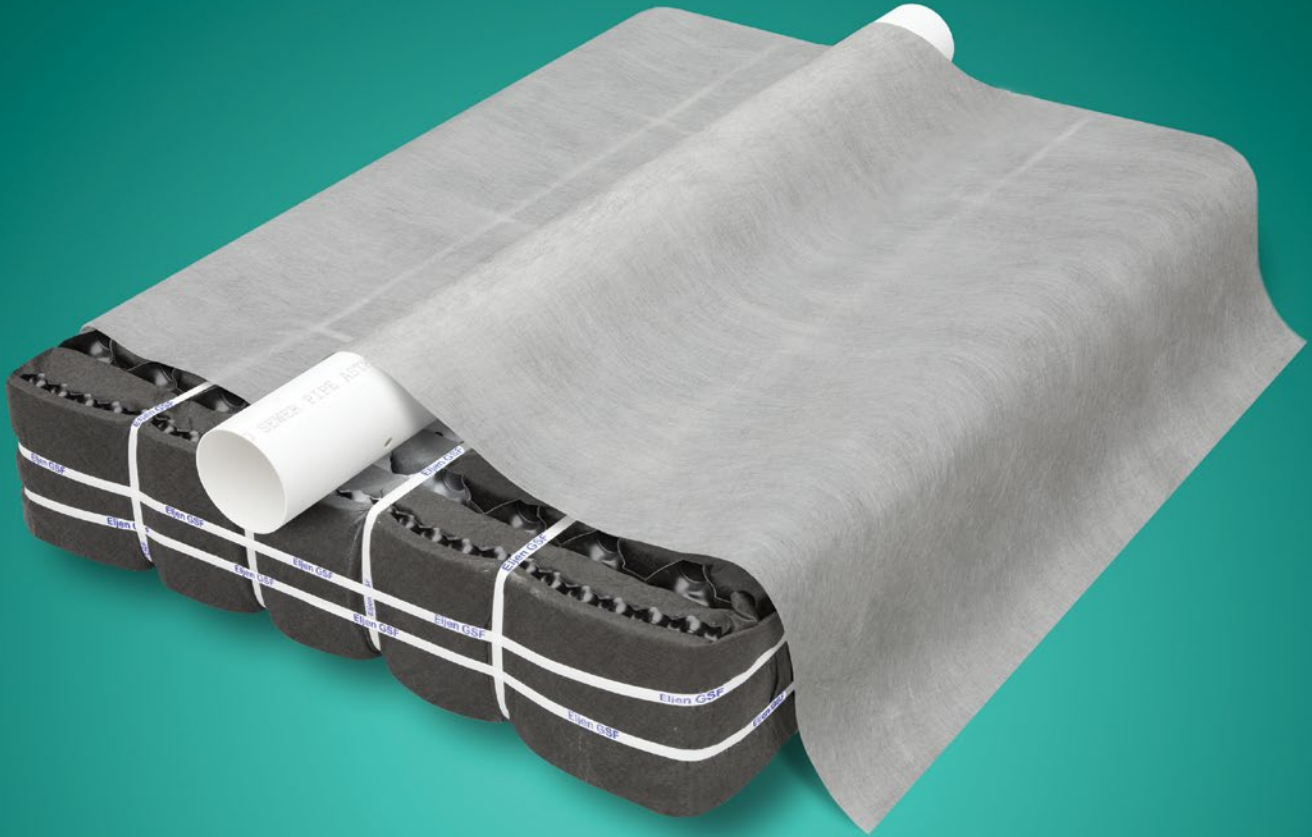


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**SepticSmart Week:  
September 16-19**

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Life After “One Big  
Beautiful Bill”**  
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# A NOTE FROM THE PRESIDENT



**G**reetings from Minnesota! As the weather cools and leaves change, NOWRA's annual Mega-Conference quickly approaches. Join us in Sandusky, Ohio, from Sunday, October 19, 2025, to Wednesday, October 22, 2025.

In addition to excellent speakers, exhibitors, field trips, social events, and an educational tract dedicated to service providers, I am pleased to announce the inaugural Cornhole Tournament organized by the Emerging Professionals Committee. In Minnesota, this game is commonly referred to as "bags" because you betcha we talk funny don'tcha know. The event will take place on Sunday, October 19, 2025, at noon. Proceeds from this fundraising event will support the EPC's scholarship fund.

The tournament is scheduled to commence at noon on Sunday, October 19, 2025, featuring 20 teams of two participants each. The teams will be divided into two divisions and will participate in a 15-minute rapid

round robin format. A team can secure a victory by either reaching 21 points, leading when the 15-minute period concludes, or scoring 13 points before their opponent does. The top four teams from each division will advance to a double elimination bracket, which will begin immediately following the round robin matches. The final four teams will compete in the medal rounds on Monday, October 20, 2025, at 4:30 pm. This will include the semi-finals, a third-place game, and the championship game.

Each player on the winning team will receive a set of boards and a set of bags, which will be shipped to their residences. Additionally, the championship team will be awarded a set of bags featuring the EPC Cornhole Tournament logo printed on them and a beer glass with the tournament logo.

Entry into the tournament is \$50 per person. If you are interested in participating, please contact me at [cleclair@ottertailcounty.gov](mailto:cleclair@ottertailcounty.gov), Jonathan Kaiser

at [JKaiser@infiltratorwater.com](mailto:JKaiser@infiltratorwater.com), or Jenny Borgeson at [jborgeson@norweco.com](mailto:jborgeson@norweco.com).

I would like to extend my sincere gratitude to Jonathan Kaiser, Chair of the Emerging Professionals Committee, and Jenny Borgeson from Norweco for their diligent efforts and invaluable assistance in organizing this event. The successful execution of this event required considerable effort, and it would not have been possible without your support. Thank you very much for your contributions. We would like to extend our gratitude to the members of the Ohio Onsite Wastewater Association for their assistance in planning the conference, sponsoring the welcome reception on Sunday evening, and their continued support and partnership with NOWRA. See you in Sandusky!

— **Chris LeClair**



More info and enrollment



## New Health Benefits Available for NOWRA Members

At NOWRA, we're committed to supporting the health and well-being of our members. That's why we're excited to announce a new partnership with Apollo Health Insurance.

As a NOWRA member, you now have access to a range of tailored health insurance plans designed to meet your unique needs. Whether you're an installer, designer, pumper, service provider, or other small business owner in the onsite wastewater industry, Apollo offers flexible and affordable options with your lifestyle in mind.

### Key Benefits:

- **Personalized Plans:** Apollo's experts will work with you to create a plan that fits your specific needs and budget.
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To explore your options and enroll, please visit [Apollo and NOWRA Enrollment](#) to schedule your call. For immediate assistance or to learn more, please contact Apollo at 816-282-1977.



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# MESSAGE FROM THE EXECUTIVE DIRECTOR



Welcome to the Fall issue of NOWRA's *Onsite Journal*. This is our third and last issue of 2025. It is also referred to as our conference preview issue and should arrive in mailboxes during SepticSmart week (see page 20). In addition to our regular features of advocacy report from Washington D.C., state affiliate news, committee spotlight, etc., this issue features a technical article on Phosphorus removal which is a growing national concern for our industry.

We are excited for our upcoming main event – the 2025 Onsite Wastewater Mega-Conference in October. There are great technical sessions planned as always with a sold-out exhibit hall featuring the latest in onsite wastewater technology. In addition, this year we are hosting the NOWRA Backhoe

Roe-D-Hoe during the exhibit hours along with several other interesting optional events, such as a NAWT Vacuum Truck Training, 12-hr. Service Provider Training, educational field trips, and a Cornhole Tournament fundraiser. To find out more about the Mega-Conference, check out the conference information on page 22.

NOWRA is pleased to report that our recently completed fiscal year (July–June) was our best year for online training and revenue sharing with our affiliates. We look to continue to add new courses and expand our network of states and professionals to take our training offerings. And don't forget that we also provide FREE training courses for members on business development skills as well as FREE general education courses for the general public.

Much of the great work that you will read about inside of the publication is due to the dedicated board members, committee chairs, and volunteers. This organization is only as strong as its volunteers. We are currently holding an election for four open seats on the NOWRA Board. Check out our list of Board members on page 14. We are now accepting nominations for 2025-26 Board of Directors (see page 14 for open industry categories).

As you read about NOWRA's activities, please consider joining a committee or task force, see page 18 for a list of current NOWRA committees. It's a great opportunity to expand your horizons, network with like professionals, feel good about yourself and the industry that we have chosen, and make life-long friends. This month we spotlight the NOWRA Education Committee (page 18) and their activities. Be sure to check it out and see if it something that you'd like to get involved with.

I'm looking forward to seeing many of you at our Mega-Conference in Ohio in October. Thank you for allowing me to serve as the Executive Director of this great organization!

— **Thomas Groves**



*Interested in getting more involved with NOWRA?*

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# STATE AFFILIATE NEWS

**CPOW (COLORADO)** — CPOW held a public board meeting in July, opening attendance to members and non-members and allowing them a chance to see how board meetings operate. In August, CPOW hosted the third round of our new Design Course, which also involved participants completing online modules through the NOWRA Online Learning platform. We are gearing up for our Free Member Day in September, which will include presentations on pumps & control panels, and an onsite wastewater treatment system inspection.

**MSO (MISSOURI)** — Missouri Smallflows Organization is planning special events for Septic Smart Week in September. On September 17, there will be an Open House at the Onsite Wastewater Training Center for homeowners to come and learn about septic systems. This training center has systems above ground for homeowners and professionals to learn about components of treatment systems. Additionally, MSO is hosting a state-wide free webinar on September 18 for the public to learn about systems too. This will be led by MSO's President and Executive Director. More information can be found on MSO's website: [www.mosmallflows.org](http://www.mosmallflows.org).

**OOWA (OHIO)** — Greetings from the Buckeye State! We are excited to be hosting the NOWRA Mega Conference in Sandusky on October 19-22, 2025, at Kalahari Resorts and Conventions! We will have some great keynote speakers on hand, a variety of technical sessions that will allow you to gain continuing education credits, a backhoe Roe-D-Hoe contest, and a full day of field trips to name a few highlights! We can't wait to see you there!

**OOWA (OKLAHOMA)** — The Oklahoma Onsite Wastewater Association (OOWA) is hosting their state conference at the Renaissance Tulsa Hotel & Convention Center September 23rd-25th. With over 300 attendees, 50 vendors and speakers from across the nation it's expected to be a great show. Attendee and vendor info can be found at [www.oowaok.org/OOWA-Conference](http://www.oowaok.org/OOWA-Conference). Early bird pricing expires soon!

**O2WA (OREGON)** — The Oregon Onsite Wastewater Association (O2WA) just announced the date and location for their Fall Mini Conference. It will be held November 14,

2025, at Umpqua Community College in Roseburg, Oregon. Check out the O2WA website for more information at [www.o2wa.org](http://www.o2wa.org).

**VOWRA (VIRGINIA)** — The Virginia Onsite Wastewater Recycling Association (VOWRA) held the 3rd Annual Ronnie Thomas Memorial Golf Tournament on July 26 with 76 participants and proceeds going to the Professional Development Fund. VOWRA is also progressing through a review and overhaul of association bylaws to better provide for members. Recent legislation in Virginia has encouraged VOWRA's development of new online resources and training opportunities.

**YOWA (NEW ENGLAND)** — Since the beginning of the year, the Yankee Onsite Wastewater Association (YOWA) has hosted two in-person events. On May 20, YOWA hosted Foundations in Soils, a training sharing foundational knowledge in soil properties, hydrology, and classification essentials. Innovative Alternative Treatment Systems (I/A), a training course designed to expand attendees' I/A knowledge with presentations given on various onsite wastewater treatment and dispersal practices used in New England, was then held on June 24. YOWA is planning to host another Foundations in Soils training in Vermont this September, as well as a Septic System training and Understanding Septic System Pressure Distribution webinar later this year

[See full listing of NOWRA state affiliates.](#)



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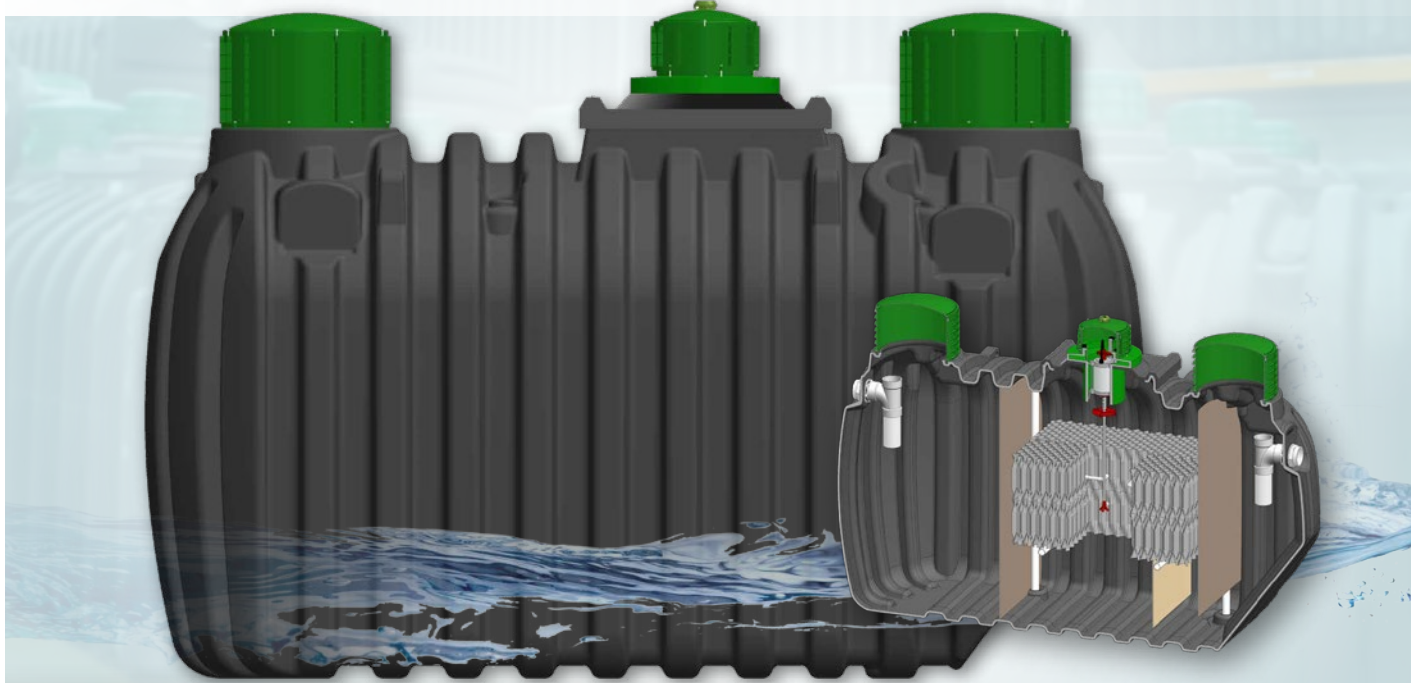
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# STATE AFFILIATE SPOTLIGHT



**N**OWRA is featuring one of our State Affiliates in our new *Onsite Journal* feature, the State Affiliate Spotlight. In this issue, we spoke with **Josh Gunia**, current Past-President of Washington On-Site Sewage Association (WOSSA) and the Founder and Executive Leader of A-Advanced Septic & Construction Services, Inc.

*When was your organization established and how many members do you have?*

**JG:** When WOSSA was started back in 1980, we started with just a handful of folks that would show up once a month to talk about all the crazy things that were happening in our industry. They would talk about the lack of consistency in regulation and upcoming issues that all were facing. Then they would pass a hat around the table to collect any cash that they could to help fund the next mission. When we started with the handful of men and woman no one believed at that time it would lead to over 1000 members!

*Who makes up the bulk of your membership (installers, pumpers, etc.)?*

**JG:** WOSSA is incredibly fortunate to be well balanced between installer, pumpers, O/M and regulators. We found that our membership grew over the last 25 years based on the people's needs. When pumpers or their code were under attack, well then, we stepped up to fight for them and made campaigns that engaged with them to help encourage more people to step up. When that happened then we acquired more members, when installers or O/M were under attack we had the same approach. WOSSA has made a commitment to participate in all conversations with regulators and that has led to a fair

and balanced array or representation in our association.

*Do you hold a statewide conference? If so, what kinds of activities get the most positive feedback?*

**JG:** WOSSA has been holding a yearly wastewater conference for 23 years. WOSSA wastewater conference is now officially called Septic-Con. It was trademarked at 21. Septic-Con has changed our association and our membership's involvement in regulations and involvement with the local regulators. Septic-Con allows a place where all parties get together and listen to each other. It's a safe place to build relationships and solve problems.

There is no way to answer this question without this turning into a paper. But here are a few of the activities that come to mind.

Education tracks. We usually have 40 to 55 different classes. We make sure to stay current with all new regulations that are coming out. We bring in educators and speakers from all over north America, as well as having guest speakers from outside the US. We make it a point to have a robust educational program with high energy speakers and look to always keep the audience engaged and awake. That is tricky in this business.

The conference for us has turned into two different tracks that people come for. The second track being

the exhibit hall. The exhibit hall is so crucial to the program. We started with 5 exhibitors and now consistently have over 70 booth spaces covered by promoting wastewater. This time with exhibitors is so crucial. What we see is that relationships are formed, questions are answered, health department officials get to actually see the products that we are installing and have a real opportunity to understand what they are regulating.

Overall, to answer this question is tough. It's not possible to narrow down one or even a few items that make Septic Con great. At the end of the day, it is about the people of our industry and with that we focus on making sure that they are educated and entertained and will keep coming back. When the people come back then we can continue to build on change.

We also have two auctions on the first night of the conference, one silent and one with an auctioneer. These auctions support the two scholarships that we offer – the Young Achievers Scholarship and the Big Jim Trades Scholarship. These are a good reflection of who we are as an association and how we strive to support our members, their families, and their employees,

*continued on page 12*

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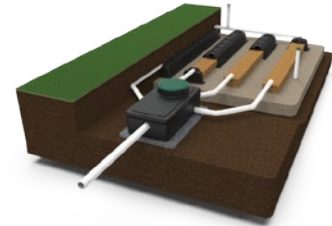
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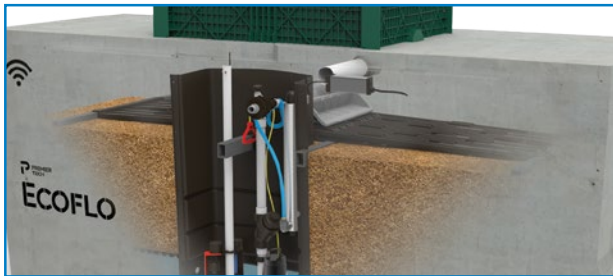
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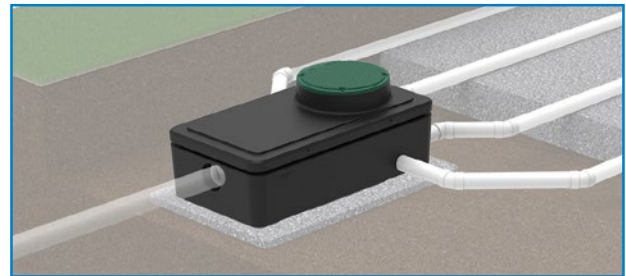
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## STATE AFFILIATE SPOTLIGHT *(continued)*

*Do you publish a newsletter? If so, what information do you share? If not, what other ways do you communicate to your membership?*

**JG:** WOSSA makes it a point to communicate on multiple levels, some ways are with a newsletter, online and in print, social media posts, emails and personal outreach. Depending on what the needs of the industry are what we are reporting, our executive directors in the past do a great job keeping up with DOH, local health districts and regulations being passed down. One of the many goals of the association is communication and we take it seriously and have committed to being the mouthpiece of the industry.

*What has been your most successful outreach or recruitment idea/event?*

**JG:** Consistency!!!!!!For us there is no one successful outreach program over the other. People, people, people is the answer. People buy from people, people want relationships, people want to hear their name and feel that they have a voice that is being heard and that there is place for them to effect change. So, consistency in engaging with your people keeps the association alive and vibrant and makes leaning in for volunteers easy, makes for exhibitors that want to step up and help people in need, it leads to community.

Everything we do as association is about the people and the environment. We like to keep the plain things the main things. If everything we do is about serving the people and the environment we never have a shortage of engagement when needed.

*Does your affiliate offer any state specific benefits (discounts on training/conferences, discount programs etc.?)*

**JG:** We offer all sorts of stuff. Members get discounts on classes and

the conference, scholarships, business consulting, and safety courses. We are an advocate for members and the industry at the local, state, and national level. We travel throughout the state for classes and testing and are opening an eastside training and demonstration facility in Moses Lake. We partner with many firms and companies to provide discounted rates and services for our members. Membership is also a great way to network and share expertise, as well as serving on the board and being the voice of the industry.

Through membership in NOWRA our members can get potential discounts on medical insurance as well as other benefits such as lobbying on a national level.

*Are your state or any of your local codes getting updated currently? Do they need to be updated and in what way? If you have a great code, what is great about it?*

**JG:** Oh boy are they. WOSSA has been invited for years now to participate in rule revisions and is often consulted to determine the cause and effect of certain regulations. WA state has a very active code book and is often looked at. We are just finalizing a code revision that we as well as the state and many others have been involved in for the last 6 years.

We have a good state code, some of the highlights are:

- Established treatment levels
- NRCS soil types
- Requirements for O&M and property transfer inspections
- Rules for minimum lot sizes for land development

*What kind of challenges do the decentralized wastewater industry face in your state?*

**JG:** Pick one, we seem to have all the challenges. Mountains to the sea, every type of soil you can think of. WA state has an incredibly diverse environment and because of that the rules and regulations are wide ranging and complex. Sometimes it's how complicated the regulations can be that often promote engineering firms and developers to want to source big pipe as the solution. We have extremely tight lot sizes in many of the regions that add to the complexity of our state. Overall WA State has a very robust decentralized program that is very healthy and contently promoting the positive uses of decentralized waste systems we are increasing the odds of the right technology being used in the right space not because it's cheaper or easier but because it's the right solution.

*What do you appreciate about your NOWRA membership, or do you have suggestions for NOWRA benefits to provide your members?*

**JG:** To have a big brother fighting for you and knowing he is in your corner is a great feeling. Knowing that we have a partner in WA DC that is fighting for the needs at a national level has allowed the state associations to double down on their responsibility to fight the battles in their local back yard.

The online education platform has been a game changer.

The change in the board and the goals of the board being marketed in a way the members can see and hold accountable.

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# LEGISLATIVE UPDATE

## *Life After “One Big Beautiful Bill”*

By Tim Perrin, Polsinelli

President Donald Trump signed into law the “One Big Beautiful Bill” (OBBB) on Independence Day, capping off six months of focused effort to extend the 2017 tax cuts and implement the Trump 2.0 policy agenda through the budget reconciliation process, which allows Congress to enact legislation connected to the federal budget by majority vote. Now that the sweeping changes included in OBBB are the law of the land, the question for policymakers in Washington becomes, “what’s next?”

Congress has many other priorities this year. Must-pass legislation includes the 12 Fiscal Year (FY) 2026 appropriations bills, the National Defense Authorization Act (NDAA), and reauthorizations of the Farm Bill and the Highway Bill, among others. Federal programs that impact decentralized wastewater stakeholders are included in some of these legislative packages. Here’s what NOWRA members should watch for in the coming months:

### **Farm Bill Reauthorization**

The OBBB included \$67 billion in funding for Department of Agriculture (USDA) programs, including a significant boost in reference prices and expanded crop insurance protections – two measures that strengthen the agricultural safety net for producers. At the same time, the legislation

included changes to the Supplemental Nutrition Assistance Program (SNAP), as well as other social safety net programs, opposed by Congressional Democrats. Because of budget reconciliation rules, Congress was not able to reauthorize all the Farm Bill programs in OBBB. As such, lawmakers are now drafting a “skinny” Farm Bill to reauthorize and extend the initiatives left out of the reconciliation package. This leaner legislative package is expected to garner bipartisan support for widely valued programs like the Specialty Crop Block Grant, the Organic Cost Share Program, and rural infrastructure grants that impact private water wells and decentralized wastewater systems.

### **FY 2026 Appropriations**

With the passage of the OBBB, Congressional appropriators pivoted promptly to advancing FY 2026 spending bills through the committee process. Congress must pass all 12 federal funding bills, or a continuing resolution to extend FY 2025 funding levels, before the end of the fiscal year on Sept. 30. Before the August recess, the Senate and House Appropriations Committees approved bills that will provide funding for federal programs within the USDA and the Environmental Protection Agency (EPA). The USDA appropriations bill includes funding for grants and loans

for the “construction, refurbishing, and servicing” of household water wells and decentralized wastewater systems in rural areas for low- and moderate-income residents. In FY 2025, Congress appropriated \$5 million for this grant fund. For FY 2026, the House Appropriations Committee designated \$4 million for the program and the Senate committee assigned \$5 million. This program is a top NOWRA priority, and we are working with Congressional leaders to secure again \$5 million for this program in the coming fiscal year.

Passing all the federal appropriations bills before Sept. 30 seems like a tall order, as there are partisan divisions over funding levels and policy riders. For example, House Republicans have proposed a 23% cut to the EPA budget, which includes reductions to the Clean Water and Drinking Water State Revolving Funds. These programs are critical for small and rural communities relying on decentralized systems for wastewater treatment. NOWRA is educating lawmakers about the impact of these proposed cuts and calling instead for sustained support.

While relevant legislation winds its way through the Congressional process, President Trump is working to streamline environmental review and regulatory processes across agencies. More specifically, he is

*continued on next page*

# LEGISLATIVE UPDATE

*continued*

implementing changes to federal environmental and water policy through regulatory reforms carried out at EPA and by the White House Council on Environmental Quality (CEQ). Further, President Trump's nominee to head the Federal Permitting Improvement Steering Council emphasized the importance of timely approvals for major infrastructure projects, including those involving water and wastewater systems. Discussions like these afford NOWRA stakeholders and advocates an opportunity to share with policymakers the important role decentralized wastewater plays in protecting the environment and public health.

As the skinny Farm Bill and federal funding bills progress through the legislative process, NOWRA will continue to advocate for robust federal funding and regulatory support for decentralized wastewater systems.

—Tim Perrin is a Senior Policy Advisor with Polsinelli PC.



## WIESER CONCRETE PRECAST TANKS:

**Standard Septic Tanks**  
320 gallons - 3000 gallons

**Combination Tanks**  
700/300 LP - 19000/19000

**Large Septic Tanks**  
4200 gallons - 38,000 gallons

**Heavy Duty Holding Tanks & Cisterns**  
2000 gallons - 40,000 gallons

**Extra Heavy-Duty Tanks/ Traffic**  
1000 gallons - 20,000 gallons



**NOWRA**

**WOWRA**  
Wisconsin Onsite Water  
Recycling Association

**MOWA**  
MINNESOTA ONSITE WASTEWATER ASSOCIATION

**NPCA**  
CERTIFIED PLANT

[www.wieserconcrete.com](http://www.wieserconcrete.com)



## ADVOCACY EFFORTS

The following companies and organizations are supporters of NOWRA's advocacy efforts for 2025 and comprise our Lobbying Board of Governors.

We thank them for their efforts & support.

- American Manufacturing, Inc.
- Anua
- BioMicrobics, Inc.
- Eljen Corp.
- Florida Onsite Wastewater Association
- Infiltrator Water Technologies
- Jet, Inc.
- Missouri Smallflows Organization
- National Association of Wastewater Technicians (NAWT)
- Norweco, Inc
- Orenco Systems, Inc.
- Residential Sewage Treatment Co.
- Roth North America
- Virginia Onsite Wastewater Recycling Association (VOWRA)

### BECOME INVOLVED!

We would welcome your participation on the Board of Governors if you are able to make that commitment. You are also welcome to contribute at a lower level. All of the funds raised go directly to supporting our advocacy efforts.

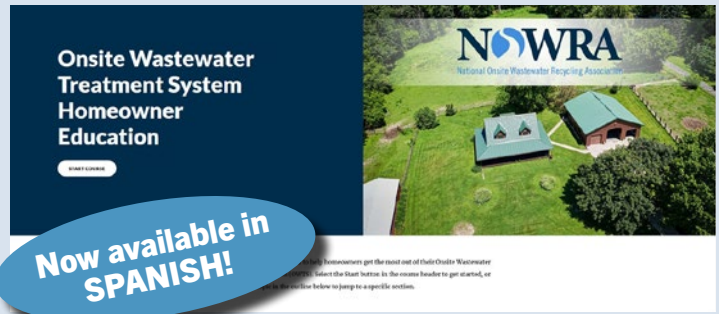
To find out more about NOWRA's Advocacy activities, visit our [Advocacy website](#) to get more involved or [contact the NOWRA office](#).

# HELP US EDUCATE HOMEOWNERS

NOWRA's Online Learning Academy now includes a free, online training module to educate homeowners about their onsite wastewater systems.

The **Homeowner's Education Course** was designed to be an engaging way for people to learn the basics of onsite treatment and maintenance. While the training's target audience is property owners with onsite systems, the concepts are also applicable to the general public, realtors, local health officials, and septic system professionals.

MORE  
INFO  
HERE



Concepts covered in this short and easy-to-use training module include: the importance of wastewater treatment, an overview of treatment in an onsite system, typical onsite system features, final treatment and dispersal, management, maintenance, safety, and system troubleshooting.

The Homeowner's Education Course was developed through a U.S. EPA grant and in partnership with the Rural Community Assistance Partnership (RCAP).

This course is free but users must create an account on [NOWRA's Online Learning Academy](#)

Questions about this course should be directed to NOWRA at [info@nowra.org](mailto:info@nowra.org).

## Homeowner Education Pilot Workshops

Throughout the Summer, NOWRA along with the Rural Community Assistance Partnership, hosted two pilot events for the material under development. The first training was held in Maryland with the Southeast Rural Community Assistance Project (SERCAP) and the Maryland Onsite Water Professionals Association (MOWPA) and piloted the O&M training materials. The second event highlighted the Solutions for Difficult Site training materials, which was hosted by Communities Unlimited (CU) with our state affiliate, the Tennessee Onsite Wastewater Association (TnOWA).

Our local affiliates were critical in marketing the events and providing local trainers to test our materials. Based on the feedback from these events we are updating and improving the materials for use at the remaining pilots and for release for use across the industry.

Many events are scheduled for Fall 2025 through Spring 2026:

- Bismark, North Dakota, November 3–5, 2025 — Solutions for Difficult Sites
- Milford, Massachusetts, Jan. 6–8, 2026 — Solutions for Difficult Sites
- Indianapolis, Indiana, Jan. 13–15, 2026 — Small Community
- Ripley, West Virginia, March 3–5, 2026 — Solutions for Difficult Sites
- Griffin, Georgia, March 17–19, 2026 — Solutions for Difficult Sites
- Springfield, Missouri, March 24–26, 2026 — Operation and Maintenance
- Tulsa, Oklahoma, April 8–10, 2026 — Small Community
- Madison, Wisconsin, April 21–24, 2026 — Operation and Maintenance



For more information about the project, future pilot events, or to request access to the final materials visit the [NOWRA website](#).

# COMMITTEE UPDATES

## NOWRA Committees

NOWRA's committees are the working groups of the organization. They exist to shape the direction of the organization over time. NOWRA welcomes and encourages its members to become involved with its committees and task forces. To belong to a NOWRA committee, you must be a NOWRA member. For information on joining a committee check out the [committee webpage](#) or contact the NOWRA office at [info@nowra.org](mailto:info@nowra.org).

### Corporate Member Committee

*Open to existing NOWRA Corporate Members only*

*Chair: Ed Schloss, Jet, Inc.*

### Conference Planning Committee

*(2025 Mega-Conference)*

*Chair: Valerie Graham, Ohio Onsite Wastewater Association*

### Education Committee

*Chair: Gary Hawkins, Ph.D., University of Georgia*

### Emerging Professionals Committee

*Chair: Jonathan Kaiser, Infiltrator Water Technologies*

### Government Relations Committee

*Open to existing NOWRA Lobbying BOG only*

*Chair: Carl Thompson, Infiltrator Water Technologies*

### Marketing & Communications Committee

*Chair: Donna Fiorentino, Infiltrator Water Technologies*

### Online Education Committee

*Chair: Sara Heger, Ph.D., University of Minnesota*

### Onsite Journal Committee

*Chair: Anish Jantrania, Ph.D., Texas A&M University*

### State Affiliates Committee

*Open to existing NOWRA state affiliates*

*Chair: Jessica Wood, Residential Sewage Treatment Co.*

### Technical Practices Committee

*Co-chairs: Allison Blodig, GYST Consulting and Chris Strycharz, Infiltrator Water Technologies*

## FEATURED COMMITTEE

### NOWRA Education Committee

The NOWRA Education Committee has the role to advance member education through the NOWRA annual conference, state programs, Installer Academy classroom, and other venues or specialty programs. The Committee provides opportunities for essential dialogue on innovative technologies and management through effective forums and maintain approval of Continuing Education Units (CEUs) for all NOWRA courses.

The main responsibility of the NOWRA Education Committee is to manage the call for abstracts for the Annual Conference [Mega-Conference with the partners of the National Onsite Wastewater Recycling Association (NOWRA), the National Association of Wastewater Technicians (NAWT), and the State Onsite Regulators Association (SORA)]. Once abstracts are received, they are sent out for review and comments with the selected ones being placed in the agenda for the Mega-Conference. Once the agenda is set, the Education Committee (along with others) reviews all the presentations to ensure they meet the guidelines of the conference. Presenters may also submit papers to be included in the conference proceedings, and the Education Committee reviews these papers prior to publishing in the online proceedings. The committee also disseminates training programs to industry practitioners; coordinate with other organizations and states' groups in the development and delivery of training programs.

Besides working to develop the agenda for the Mega-Conference, the NOWRA Education Committee also is currently working to develop a Realtor Education program that can be distributed and used by Realtors to better understand onsite wastewater treatment systems (OWTS). The committee also is looking for other similar programs that can be distributed to assist other sectors of our communities to better understand the operation and maintenance of OWTS. If you have any ideas, please let the NOWRA Education Committee know or contact the NOWRA office.

# NEW NOWRA POSITION PAPERS

## *Great Resources Developed for Onsite Regulators and Industry*

The NOWRA Technical Practices Committee (TPC) is tasked with developing and reviewing best management practices, standards, training, and technical guidelines for our industry. They utilize known and proven science and engineering principles to perform this task, with the goal of providing these materials to our members to use at the state and local level to support advancing and managing onsite and decentralized systems.

The materials being developed by the TPC are meant to be used to support changing or updating regulations or policies to improve how systems are designed, installed, and serviced across the country.

The current strategic plan NOWRA developed has a specific category that is meant to support the advocacy efforts at the local level and to that end the TPC is developing “position papers” to articulate a national perspective on issues that often arise when writing regulations or policies. They will be revisited on a routine basis in order to keep up with new technologies and techniques as needed to keep them relevant. The format for these papers include an introduction, a discussion, and a final conclusion.

To date the board has finalized the following two position papers.

### 1. **Importance of Secondary Safety Devices**

This paper brings to the forefront the often deadly consequences of unprotected access risers involving children, people, or pets that fall into septic tanks often die. The cost to add these devices is minimal and we have an obligation as an industry to address these unnecessary deaths. There are several devices manufactured by NOWRA’s corporate members that will meet your needs. Look for ads in this publication that highlight these devices.

### 2. **The Role of the Environmental Health Professional in Onsite & Decentralized Wastewater Management**

This paper focuses on the importance of well trained professionals that have a broad experience level across many disciplines including soil characteristics, chemistry, biology, and engineering concepts to name a few. It also highlights that getting that type of experience should not be an entry level position and efforts should be made to provide training and

require continuing education to maintain a current understanding of new techniques and equipment available. Our industry needs these positions to understand and enforce the codes they work with and also have excellent people skills, as they often find themselves in the middle of competing interests and politically charged situations.

These papers are now available on [NOWRA’s website](#).

The group also has several papers in the works or on deck addressing the following issues:

1. Roles and responsibilities of all sectors of the industry from a broader perspective. So the roles of soil evaluators, designers, installers, and environmental health professionals will be described in the first draft about to be reviewed by the committee for submission to the board for approval.
2. The absolute need for continuing education for all sectors of the industry. The industry changes so quickly the only way to keep up is requiring ongoing CEUs.
3. A deeper dive into the role of designers in our industry.

**If you would like to be part of this effort, contact the current chairs of the TPC (see page 18) for information.**

**The committee currently meets the third Wednesday of the month for most months and will meet face-to-face at the upcoming NOWRA conference in Sandusky.**

**If you have ideas for position papers, reach out to the chairs as well . . . we love a good idea!**

**[Visit NOWRA’s website for access to all NOWRA’s Position Papers](#)**

# How Will YOU Honor SepticSmart Week?

The EPA's SepticSmart public education campaign is now in its 13th year. This year, commit to spreading the word about SepticSmart Week in your community from Sept 15-19.

Reach out to your local health regulators, realtors, newspapers, teachers, or government officials. Tell them that proper septic system care and maintenance can save money, safeguard health, and protect the environment. Then ask them to share the EPA's SepticSmart tips!

- **Protect It and Inspect It!**
- **Think at the Sink!**
- **Don't Overload the Commode!**
- **Pump Your Tank!**
- **Don't Strain Your Drain!**
- **Shield Your Field!**
- **Keep It Clean!**



[www.epa.gov/septic/septicSMART](http://www.epa.gov/septic/septicSMART)

## Proclamation

WHEREAS, proper septic system use and routine care are vital to protecting public health, preserving our highly valued groundwater, lakes, streams and waterways, and avoiding costly repairs that can result from neglect; and

WHEREAS, more than one in five households depend on septic systems to treat wastewater from homes and businesses; and

WHEREAS, wastewater professionals of NOWRA use their expertise in the design, installation, maintenance, research, outreach and/or regulation of septic systems in the U.S.; and

WHEREAS, the U.S. Environmental Protection Agency's SepticSmart program used by NOWRA does educate homeowners about the need for proper septic system use and routine maintenance; and

WHEREAS, homeowners and the environment benefit from properly designed, installed, operated, and maintained septic systems;

NOW THEREFORE, we the Board of Directors of the National Onsite Wastewater Recycling Association do hereby proclaim the week of September 15-19, 2025, as SepticSmart Week and we urge all people to join us in this special observance.

Signed this 18th day of August 2025

Chris LeClair  
NOWRA President

**NOWRA**  
National Onsite Wastewater Recycling Association

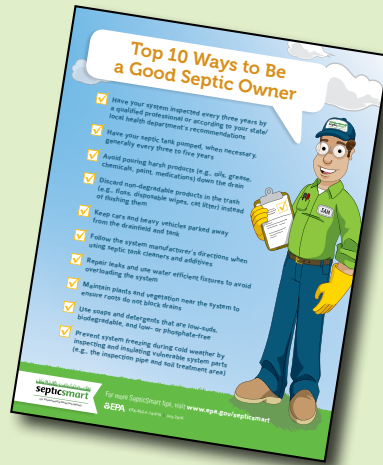
# Looking for new resources to share with the public?

## Check out NOWRA's Homeowner Education Course

This online training module is a more interactive way to learn about the basics of septic system operation and maintenance. It is a free resource, but users must create an account on [NOWRA's Online Learning Academy](https://www.nowra.org/online-learning-academy).

## Check out EPA's SepticSmart Resources

The EPA has many engaging SepticSmart materials for the public to use and disseminate, from videos and social media graphics to door-hangers for realtors and printouts for rental property guests. These resources can all be found at [www.epa.gov/septic/septicSMART](https://www.epa.gov/septic/septicSMART).



## About the EPA Decentralized MOU Partnership

For 21 years, NOWRA has been a proud member of the EPA's Decentralized Wastewater Partnership. The partners, which include other national organizations involved in the onsite industry, coordinate to improve decentralized wastewater treatment performance and protect the nation's public health and water resources.

The partners update and sign a Memorandum of Understanding every few years to renew our commitment to improving the decentralized industry. The MOU was recently signed and renewed in December 2023. Our current MOU priorities are:



- **Education & Outreach:** Increase public education and outreach through EPA's SepticSmart program to ensure septic/decentralized wastewater systems are properly used and maintained to protect water quality and human health.
- **Technical Assistance for Underserved/Disadvantaged Communities:** Promote technical assistance (TA) resources and foster connections between TA providers and underserved communities and tribes to support the design, construction, and financing of sustainable decentralized wastewater infrastructure.
- **Resiliency & Sustainability:** Showcase research, information and technologies that demonstrate how innovative approaches can help decentralized systems become more resilient to climate change and natural disasters, and sustainable for the long term.
- **Data Collection & Application:** Utilize federal and MOU partners' networks to collect, analyze and apply varying types of decentralized system data.
- **Workforce & Training:** Expand mechanisms to address the workforce and training needs in the decentralized wastewater industry.



Vermilion Lighthouse

2025 | Sandusky, OH  
**Onsite Wastewater  
Mega-Conference**  
Clean Water Strategies  
at the Heart of it All

## OCTOBER 19–22, 2025 | Sandusky, Ohio

**Why Attend?** The 2025 Onsite Mega-Conference is a collaborative effort between NOWRA and OOWA (the Ohio Onsite Wastewater Association) in partnership with NAWT (the National Association of Wastewater Technicians) and SORA (the State Onsite Regulators Association). This year's conference will be held October 19–22 at the Kalahari Resort in Sandusky Ohio.

Now in its eleventh year, the Onsite Wastewater Mega-Conference offers high quality education, training, and networking opportunities to grow your career and business.

**There's something for everyone.** Whether you've got an established career in the decentralized wastewater industry, or you're just beginning, the Mega-Conference has a wide variety of options to meet your education needs. Online professionals from across the nation will be presenting multiple education session tracks..

**You can fulfill your continuing education requirements.** In many states, our conference curriculum will qualify for credit hours in licensing or professional certification programs. We are working with our State Affiliates to secure approval for continuing education credit from

many states that license or certify installers, service providers, inspectors, and designers.

This year's Mega-Conference features a 12-hour Ohio Department of Health approved Service Provider track. This training is included in your Mega-Conference registration.

**Tackle today's challenges and invest in your business.** The Mega-conference is an ideal place to learn about today's wastewater challenges and identify new opportunities for your company to grow and expand.

Between meeting many of the industry's most progressive and innovative companies in our exhibit hall and attending education sessions, you can get new ideas for building your existing business. Even finding one new idea to help keep your business thriving will more than justify your cost of attending.

**Network and have fun!** Join with others in the onsite wastewater community to celebrate achievements and take pride in providing clean water. Enjoy a range of networking events and field trips while visiting a new part of the country and building your career.

**REGISTER NOW! [NOWRA.ORG](https://www.nowra.org)**

# MEGA-CONFERENCE HIGHLIGHTS



## Welcome Reception

Join us for a special “Welcome to the Buckeye State” reception with food and entertainment sponsored by the Ohio Onsite Wastewater Association (OOWA).

## Opening General Session

Hear keynote speaker Dr. Christopher Winslow speak about the “State of Lake Erie and Harmful Algal Blooms.” Mark S. Johnson will provide information and updates about the Ohio EPA Division of Surface Water and H2Ohio. Raffael Stein (EPA) will give updates on federal decentralized wastewater programs. Tim Perrin, of Polsenelli, LLC, will provide an analysis of the regulatory and legislative landscape, initiatives underway which may have an impact on the onsite/decentralized wastewater industry, and steps the industry can take to increase its influence in Washington on those initiatives.

## NAWT Pre-Conference Vacuum Truck Workshop

On Sunday, October 19, 2025, NAWT will be offering a Vacuum Truck Technician Course, which will run from 8:00 am until 4:00 PM. The course offers a great educational opportunity whether you are just starting a vacuum truck business or you’re an experienced operator who wants a refresher. A separate registration is required, and there is a discount for NAWT members.

## Support Emerging Professionals

Beginning Sunday afternoon, NOWRA’s Emerging Professionals Committee will host their **first ever cornhole (or bags) tournament.**

The competition will begin with twenty teams, and on Monday will hold their championship round. Additional information and instructions to sign up will be posted to NOWRA’s website. The tournament benefits the Emerging Professionals Scholarship Fund. The Emerging Professionals will also host a 50/50 raffle.



For additional information, please see the Optional Pre-Conference Vacuum Truck Workshop page on the [NOWRA conference website](#) or contact NAWT directly.

## Technical Education & Training

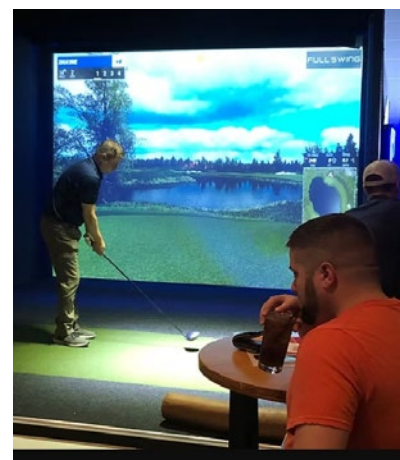
With more than 60 sessions to choose from on a variety of topics, the Mega-Conference agenda is packed with opportunities to learn. Speakers from all sectors of the onsite industry will offer information on nutrients, soils, policy and regulation, installation, design, business management, innovative solutions, emerging issues, and technology. Ohio Service Providers will be able to get 12 hours of continuing education credit in our special service provider track.

## Exhibit Hall

Our expo hall will be filled with national and local companies exhibiting their latest technologies. Visit them to network and discover innovative solutions.

## Social Event

Join your colleagues Monday night for food, drinks, and some friendly competition at Clubhouse No. 3 for our social event. Clubhouse No. 3 features golf and racing simulators, pinball machines, darts, and shuffleboard, which will be available for all attendees to play. Dueling Pianos will provide music during the evening. This offsite event is optional and requires a pre-purchased ticket, which you can purchase during registration. Bus service will be provided to the location.



## Backhoe Roe-D-Hoe Contest

Come test your skills in our popular Backhoe Roe-D-Hoe contest during conference breaks.

*More conference info on the next two pages*

# FIELD TRIP DETAILS

We will be offering a choice of two optional field trips. Pre-registration is required due to expected demand. Each trip will feature multiple stops and lunch will be provided.

## FIELD TRIP 1 — OHIO STATE UNIVERSITY STONE LABORATORY TOUR AND CRUISE

*Participants on this field trip are advised to please wear comfortable walking shoes. This program involves a moderate level of activity. Participants should have the ability to climb stairs, stand for a period, walk over uneven ground and maneuver on and off our vessels.*

### STOP 1: AQUATIC SCIENCE CRUISE

Take a Lake Erie Science Cruise aboard a research vessel, where we'll measure current environmental conditions, sample algae and plankton and collect and identify Lake Erie fish. These cruises can provide a unique opportunity to engage with real-world scientific research.

### STOP 2: GIBRALTER ISLAND WALKING TOUR

Explore Gibraltar Island with a science and history tour. Gibraltar is named for its resemblance to the famous British fortress at the western end of the Mediterranean Sea. The island was a summer retreat for Civil War financier Jay Cooke and his family in the mid-to-late 1800s. In 1925, Cooke's daughter, Laura Barney, sold the island to Julius Stone, who gave it to The Ohio State University. Franz Theodore Stone Laboratory is named after Julius Stone's father, a naturalist.



### STOP 3: HARMFUL ALGAL BLOOMS TALK

Ohio Sea Grant programs address the frequency and intensity of harmful algal blooms (HABs) in Lake Erie and their causes (nutrient loading associated with agriculture, wastewater treatment, residential fertilizers, etc.) and impacts (toxin production, pollution of drinking water, foul odor, and decreased lake aesthetic). This includes working with state and federal agencies to collect relevant data and with the state and regional governments to develop nutrient reduction recommendations and suggest plans of action.

## FIELD TRIP 2 — OHIO ADVANCED SYSTEMS AND BREWERY TOUR

### STOP 1: NORTH AMERICAN TESTING

North American Testing is a third-party research and development facility for the small-flow and wastewater industry. It was formed in 2006 to provide a midwestern testing facility for onsite and decentralized wastewater products, including testing new products, conducting engineering evaluations system modifications, and testing alternative materials for products and components. They provide product certification to NSF/ANSI Standard 40, NSF/ANSI 46, NSF/ANSI Standard 245, NSF/ANSI Standard 350 and NSF/ANSI Standard 385. North American Testing maintains its field testing facilities in Norwalk, Ohio, USA. The facility can simultaneously evaluate 21 separate treatment systems, each with a flow of up to 3,000 gallons per day.

### STOP 2: MUFFLEHEADS BREWERY

Muffleheads Brewery, a craft brewery located in Northeast Ohio, faced some unique challenges with their wastewater system. While the high strength wastewater goes to a holding tank which is pumped and transported to a local wastewater treatment facility, they needed a different solution for the wastewater from the restrooms. The lot is narrow, and after brewery construction was completed, there was not room to install a traditional system. In order to accommodate the flow rate, an Anua Puraflow Peat Single Filter was installed.



### STOP 3: RESIDENTIAL JET SYSTEM

This Jet system is a residential treatment system that discharges off lot to a water way. This type of system is often used on small lots where there is not room for a traditional system. This system features UV disinfection, and participants will see a demonstration about how to service every component and compartment of the system.

# MEGA-CONFERENCE SCHEDULE

## SUNDAY, OCTOBER 19

- 8:00 AM-4:00 PM NAWT Pre-Conference Vacuum Truck Training (Pre-registration required)
- 8:00 AM-12:00 PM NOWRA Board of Directors Meeting
- 11:00 AM-5:30 PM Registration Open
- 12:00 PM-5:00 PM Emerging Professionals Cornhole Tournament
- 12:00 PM-5:00 PM Exhibitor Move-In
- 6:00 PM-8:00 PM Welcome Reception

## MONDAY, OCTOBER 20

- 7:00 AM-5:00 PM Registration Open
- 8:00 AM-12:00 PM Opening General Session
- 8:00 AM-4:40 PM Service Provider Training
- 12:00 PM-1:30 PM Lunch Break in Exhibit Hall
- 1:30 PM-4:40 PM Concurrent Education Sessions
- 4:45 PM-6:00 PM Exhibit Hall Reception
- 6:30PM -9:30 PM Offsite Social Event (Pre-registration required)

## TUESDAY, OCTOBER 21

- 7:00 AM-4:30 PM Registration Open
- 7:00 AM-1:00 PM Exhibit Hall Open
- 8:00 AM- 11:40 AM Concurrent Education Sessions
- 8:00 AM-4:25 PM Service Provider Training
- 11:45 AM-1:00 PM Lunch Break in Exhibit Hall
- 1:00 PM-4:25 PM Concurrent Education Sessions
- 1:00 PM-6:00 PM Exhibitor Move-Out
- 5:00 PM-6:30 PM NOWRA Annual Business Meeting & Reception
- 6:30 PM-8:30 PM SORA Reception (Invitation Only)

## WEDNESDAY, OCTOBER 22

- 8:30 AM-5:00 PM Optional Field Trips (Pre-registration required)

**Backhoe Roe-D-Hoe and the Poster Session will be happening Monday and Tuesday.**

[A detailed agenda is available on our website.](#)



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National Precast Concrete Association (NPCA)  
Orenco Systems  
Polylok

**Bronze Level**

Anua  
Hoot Systems, LLC  
Netafim USA  
Roth Global Plastics  
WaterColor Insurance Management  
Wieser Concrete

**Copper Level**

Ashland Water Group  
Inspector Cameras, LLC  
JNM Technologies, Inc./LWRE  
FujiClean USA  
Hiblow USA, Inc.  
Residential Sewage Treatment Company

**Pewter Level**

10X Business Broker Mergers & Acquisitions  
Apollo Insurance Group  
Arris Water Treatment & Technology  
NSF International  
Premier Tech Water & Environment  
RioVation  
SJE Rhombus  
SludgeHammer Group, Ltd.

**To learn more about or to join NOWRA's Corporate Membership program, please contact us at 978-496-1800, by email at [info@nowra.org](mailto:info@nowra.org), or on our website at [www.nowra.org/about/corporate-members](http://www.nowra.org/about/corporate-members).**

# INDUSTRY NEWS

## Anua Appoints New CEO

Greensboro, North Carolina | August 8, 2025. Anua has appointed Sean Martin as Chief Executive Officer, effective immediately. Martin will lead Anua, Geoflow, and Sim/Tech with a focus on solving customer needs through delivering industry-leading support and customer service.

He succeeds Colin Bishop, who has served as President since 2018. Bishop's leadership guided Anua through a period of innovation, growth, and expanded market presence. He has chosen to step down to pursue other personal and professional interests.

**About Anua.** Anua is a Greensboro, NC-based provider of sustainable wastewater collection, treatment, and odor control solutions. With a focus on decentralized treatment technologies, Anua delivers environmentally responsible systems that serve residential, commercial, and municipal applications across North America.

**About Geoflow.** Geoflow, also based in Greensboro, NC, has been the leader in subsurface wastewater drip dispersal since 1990. Geoflow specializes in advanced drip dispersal systems for wastewater and irrigation. Known for its patented Nano-RootGuard® technology, Geoflow offers innovative solutions that promote water conservation and long-term soil health.

**About Sim/Tech.** Sim/Tech, based in Boyne City, MI, designs and manufactures high-performance filtration and operation and maintenance products for onsite wastewater systems. With a commitment to quality, reliability, and ease of use, Sim/Tech supports wastewater treatment professionals with tools that enhance system longevity and compliance.

## SJE Celebrates Milestone Anniversary

Detroit Lakes, Minnesota | July 1, 2025. SJE is celebrating their 50th anniversary. SJE was founded in 1975 and has spent five decades building their reputation as a leader in control systems for the wastewater industry. Their first product, the Tank Alert Alarm, was created when Steve Johnson helped his neighbor solve a septic tank holding issue.

**New!**  
**MicroFAST 0.4** wastewater treatment systems

### Install-ready ATU system for RESIDENTIAL applications

- Treats up to 400 GPD
- Fits into ANY tank with ease
- Advanced control panel, blower
- NSF 40/245 certified



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[sales@biomicrobics.com](mailto:sales@biomicrobics.com)

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# Reflections on the Forgotten Nutrient

By Kevin M. Sherman P.E., PhD. Dir. Engineering and Regulatory Affairs, SeptiTech, Inc.

## Introduction

Why is phosphorus worth worrying about? Phosphorus is an essential element found in animals, plants and microbes. There is a wide variation in the amount of phosphorus in the earth's crust and substantial phosphate ore reserves are plentiful in just a few places on the planet. The unequal distribution of phosphorus ore makes it critical that phosphorus be managed with care, especially in countries with limited phosphorus reserves.

## The Phosphorus Atom and its Chemistry

Some folks call phosphorus "the forgotten nutrient" because so much attention is given to nitrogen. Let's review some basic information about the atom phosphorus and its chemistry. Atoms are made up of three different subatomic particle types: positively-charged protons (+1 charge), neutrons with no electrical charge, and negatively charged electrons (-1 charge). The atomic number (number of protons) of phosphorus is 15. The number of neutrons and electrons are also 15. The atomic weight of phosphorus (sum of protons and neutrons) is 30.97. The center of the

atom, made up of protons and neutrons, is called the nucleus.

Electrons surround the nucleus in distinct shells. The innermost shell of electrons (called K in Figure 1a) contains two spaces for phosphorus's 15 electrons. There are now 13 electrons unaccounted for. The second shell of electrons (called L in Figure 1b) contains 8 electrons in 8 possible spots filling that shell completely. There are now 13 minus 8 or 5 electrons unaccounted for. The third electron shell, called (M shown in Figure 1c) also has eight spots available for electrons. The shell is filled by the five remaining electrons in phosphorus with three empty spaces (in gray) remaining. The number of occupied and unoccupied spaces in the outermost electron shell determines the most likely chemical reactions involving phosphorus.

On the periodic table of elements (Figure 2), Nitrogen (N) is at the top of column 15. Directly below nitrogen is phosphorus. Rows K and L are the two electron shells closest to the nucleus. The third electron shell, with 8 available electron spaces, five of which are occupied, is called M. The right-most column of elements is called the noble gasses which starts

with helium then neon then argon then krypton, then xenon, then radon, and finally ununoctium. Noble gases have the property of being unreactive with other elements because their outermost electron shells are fully occupied. The column one space to the left of the noble gases is called the halogens. The left-most column or elements are Alkali metals. These elements combine with halogens to make salts.

Basic chemistry boils down to atoms trying to alter their outermost shell electron patterns to make them identical to that found in a noble gas. The prime directive is to lose or gain electrons during interactions with other atoms until all the atoms' outermost electron shells are full. For phosphorus specifically, the goal is to add (or take) three electrons from other atoms. Doing this would give the electrons around the outermost shell of the phosphorus atom the same pattern as the noble gas argon. Note the number of other subatomic particles protons and neutrons are not changed. If gaining electrons isn't a workable option, the phosphorus atom may lose (or give up) 5 electrons, completely emptying its M shell. If this were to happen the remaining electrons in the L shell would have the same pattern as the noble gas neon.

Note that in order for phosphorus to gain three electrons, both sulfur and chloride stand in its way. Oxygen (one row up and to the right) is a common element on earth and is also a fierce competitor for taking electrons from atoms further away from the noble gasses than it is. Based on oxygen's position in the periodic table, it would

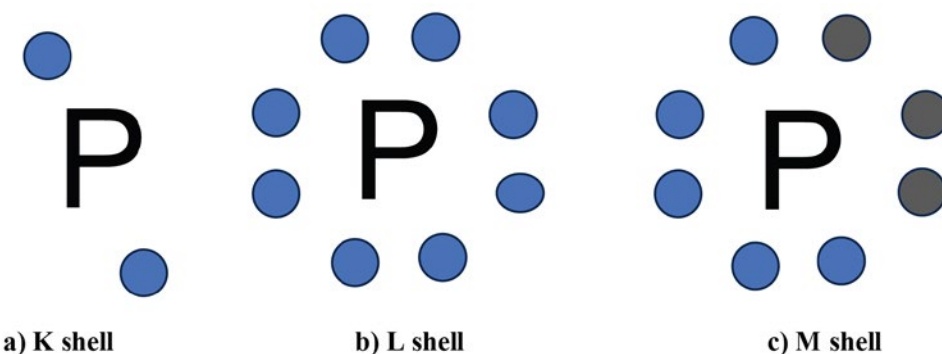


FIGURE 1a, 1b and 1c. The three electron shells of phosphorus.

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## Reflections of the Forgotten Nutrient *(continued)*

**Periodic Table of the Elements**

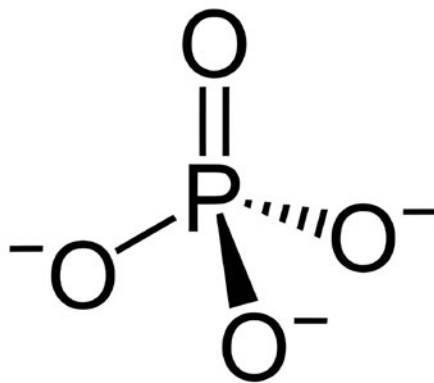
The periodic table shows elements from Hydrogen (H) to Oganesson (Og). Elements are color-coded: red for metals, green for semimetals, and yellow for nonmetals. Key groups are labeled: Alkali Metals (Group 1), Halogens (Group 17), and Noble Gases (Group 18). A legend indicates: Metal (red), Semimetal (green), Nonmetal (yellow). A callout for Carbon (C) shows its atomic number (6) and atomic weight (12.01). Electron shells are labeled: K shell (1), L shell (2), M shell (3), and N shell (4).

**FIGURE 2. Periodic Table of the Elements.**

like to take two additional electrons if at all possible. Then its new electron configuration would be identical to neon's. If oxygen is one of the atoms in a compound, it is much more likely that oxygen would take electrons from any atoms further away from noble gases than it is. The takeaway is that if oxygen and phosphorus create a compound, oxygen will take electrons from phosphorus, and not the other way around.

The atom phosphorus is an extremely reactive element. It is never encountered on earth without other atoms also being present. The compound orthophosphate is shown on Figure 3. Ortho means straight or right as in correct. Orthophosphate is the least complicated phosphorus compound. It contains one phosphorus atom centrally located and surrounded by 4 oxygen atoms. The compound has the geometry of a tetrahedron. One of the oxygen atoms forms a double bond with phosphorus (two parallel

lines directly above P in the drawing). That means this oxygen atom took two electrons from phosphorus. Two was the optimum number for oxygen to take generally. The other oxygen atoms take one electron each of the three remaining electrons in the outer shell of phosphorus because one is better than none. This reaction leaves a negative charge on three oxygen atoms and an overall charge of negative 3. By far and away phosphorus

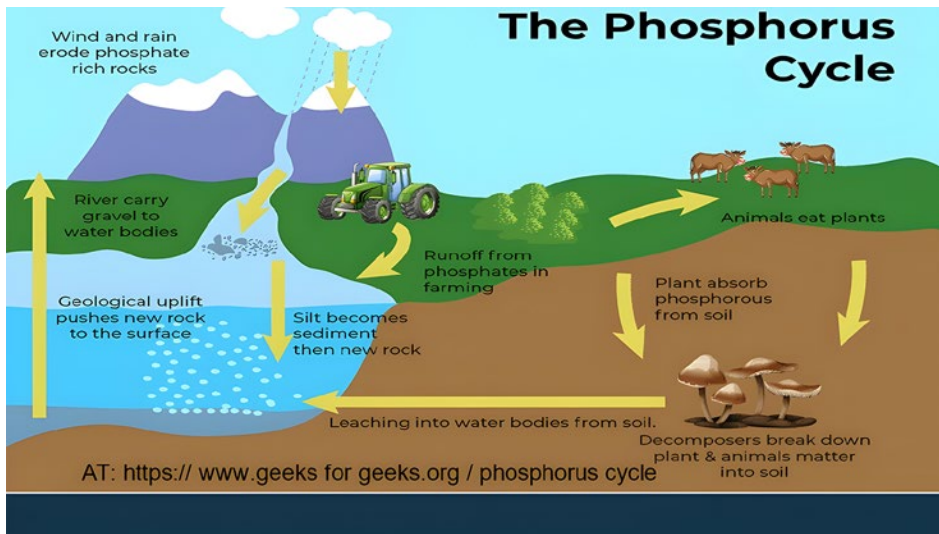


**FIGURE 3. Orthophosphate anion.**

on our planet is found in a phosphate configuration.

An ion is defined as an atom or molecule that has gained or lost one or more of its valence (fancy term for outer shell) electrons giving it a net positive or net negative electrical charge. In other words, there is an imbalance between the number of protons (positively charged particles in the nucleus) and electrons (negatively charged particles orbiting the nucleus). Orthophosphate has a charge of minus three. An attraction exists between anions and cations because they carry opposite electrical charges. You will never be confused about the type of ion by recognizing the plus sign in the word cation.

The phosphorus cycle is the biogeochemical cycle that tracks the movement of phosphorus through the lithosphere (the rocky shell of our planet), the hydrosphere (waters on the earth's surface and in clouds) and the biosphere (the global ecological system). Unlike many other elements' biogeochemical cycles, the atmosphere does not play a role in the movement of phosphorus. Consequently, the phosphorus cycle is primarily examined by studying the movement of phosphate ( $\text{PO}_4^{3-}$ ) through terrestrial and aquatic ecosystems. In the long-term global cycle, the major transfer is driven by tectonic movement over geological time and weathering of phosphate containing rock such as apatite. Phosphate moves quickly through plants and animals. The processes that move phosphorus through the soil and the ocean are very slow, making the phosphorus cycle overall one of the slowest biogeochemical cycles



**FIGURE 4. The Phosphorus Cycle.**

in existence. Humans have caused major changes to the global phosphorus cycle primarily through the mining and subsequent shipping of phosphorus minerals for use in plant fertilizer and other industrial products. The United States was a major exporter of phosphate rock up until the 1980s when ore deposits in peninsular Florida were exhausted.

So, where is phosphate found in nature? Phosphorite rock is a sedimentary rock. The chemical formula for phosphorite pentoxide is  $P_2O_5$ . There are two phosphorus atoms and five oxygen atoms in this compound. Think back to earlier in the article. How many electrons are in phosphorus' outer shells? (5). So, two phosphorus atoms would have twice that many electrons in its outer shell (or 10). How many oxygens atoms are there? 5. How many electrons does oxygen need to reach a noble gas electron configuration? 2. 2 two times five is ten. Phosphorite pentoxide is a very stable material because all the atoms present have achieved a noble gas configuration. This compound succeeds in achieving the prime

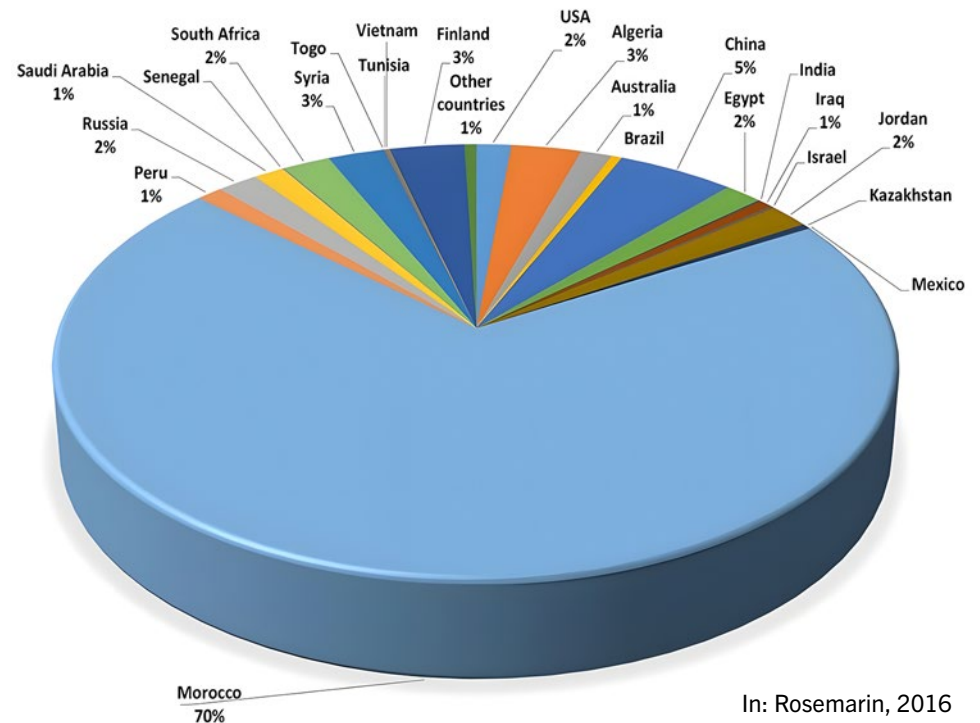
directive of chemistry. It is so stable it forms a rock.

The world's phosphate ore reserve totals nearly 69.5 billion tons, but its distribution is markedly uneven. There are "haves" and "have-nots" in the world when it comes to phosphate

ore. Frankly, I don't feel entirely comfortable with North America's status in this competition. More than 80% of the world's phosphate rock reserves are located in Northern African and Middle Eastern countries. Morocco and the Western Sahara are the world's richest countries in phosphate resources, with reserves of 50 billion tons, accounting for nearly 72 percent of the world's total. In the United States, after multiple decades of phosphate mining and shipping, the states of Florida, North Carolina, Idaho and Utah still contain about 2% of the world's phosphate rock reserves.

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**FIGURE 5. Global distribution of phosphate rock reserves.**

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## Reflections of the Forgotten Nutrient *(continued)*

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### Recycling/Recovery of Phosphorus

Based on the limited amount of phosphorus reserves found in North America, it is clear that single uses of phosphate will have to end. The first two options to consider are urine diverting toilets and waterless urinals. These options allow the recovery and potential reuse of a valuable nutrient by never letting phosphates enter the wastewater stream. The third option, phosphorus removal and reclamation technologies use the manipulation of the phosphate anion by adding cations such as iron, aluminum, potassium, magnesium, sodium and calcium to encourage the formation of precipitates from the waste stream. Once the phosphorus has precipitated the technology's job is not over. It must then capture the solid end products that can then be harvested and returned for agricultural reusage. Large municipal wastewater plants have been removing phosphorus from wastewater for decades. These types of treatment systems are complex and expensive, and take

advantage of frequent operator visits. These advantages are generally not available and are impractical for a small system. Precipitation creates a sludge byproduct rich in phosphorus that still has to be dealt with. Chemical addition requires chemical storage, metering pumps, and control systems to ensure the proper dose of chemical is being added. Often pH has to be controlled as well. Adsorption reactions also concentrate phosphorus and those adsorbents have to be regenerated and phosphorus collected must be moved to a final disposal point. Biological phosphorus removal requires multiple tanks and recycle lines to initiate the process. In many cases, volatile fatty acids are added to enhance the biological removal process. Again, another chemical feed system to deal with. One last method used by large systems for phosphorus removal is land application either through the liquid fraction or biosolid spreading. In these cases, the phosphorus is applied at a rate that is taken up by the crop being grown. This rate is called the agronomic rate. While these methods are effective at managing phosphorus, they do require large acreages of land. Also, the wastewater or biosolids cannot be applied year-round in temperate climates so storage or an alternate disposal method must be used when the crops are not actively growing. These types of systems are generally not practical for small systems. Nevertheless, some small-flow solutions are now available to this market sector.

The removal of phosphorus from wastewater can be performed using physico-chemical methods, biological treatment, and/or combinations

of both. Many large-scale centralized system techniques are well established. However, translating such technologies to effective use at smaller scales has rarely been done and, as such, there is little information regarding the implementation and-or success of such systems. Small-scale treatment plants are different in that they may be less accessible than larger urban facilities; influent flows tend to be much more variable and subject to wider seasonal fluctuations; they are less closely managed and monitored; and wastewater composition often differs from urban sources (Bunce et al., 2018).

### Most Recent Decentralized Phosphorus Capture Technologies

Phosphorus' reactive nature allows designers to enhance phosphorus capture by precipitation of phosphate rich minerals. Phosphorous is favored to form compounds with the cations aluminum, iron and calcium. In a filtration option, water is dripped over or through lightweight expanded clay aggregate LECA with naturally high levels of aluminum, iron or calcium. Electrochemical solutions are also available. An iron or aluminum electrode is slowly dissolved into the wastewater using direct electric current. The phosphorus can form crystalline minerals mentioned earlier (in particular Struvite and Vivianite) in the treatment unit. These minerals permanently capture the phosphate molecule.

The Phos-4-Fade phosphorus removal filter is a non-mechanical solution that can be easily installed as part of any onsite wastewater treatment system. Flow enters the inlet chamber of the Phos-4-Fade filter where it then

*continued on page 36*

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## Reflections of the Forgotten Nutrient *(continued)*

moves downward and passes into the media chamber through transfer ports. Concrete support channels direct flow beneath the media where evenly spaced apertures provide uniform dispersal of flow. Progressively sized layers of primary and secondary filtration media further distribute the flow to the adsorptive media layer (primary is the red bag, secondary is the green bag, adsorptive media is loose). As the flow passes through the adsorptive media, final polishing takes place as phosphorus adheres to the porous media surfaces.

The Phos-4-Fade filter can be quickly and easily installed downgradient from any onsite wastewater treatment

system. The innovative adsorptive media technology begins working immediately upon start-up. Completely non-mechanical, the filter requires no electricity and operates continuously with minimal maintenance. A single riser extends to grade from the tank to allow inspection and service of the filter contents. The Phos-4-Fade filter is user friendly, easy to install and maintain, and provides effective total phosphorus removal for any onsite wastewater treatment system. Components are backed by a one-year limited warranty and lifetime exchange program. Media replacement will normally be required at two-to-five-year intervals.

A favored approach in industry to remove phosphorus is the injection of chemical coagulants in liquid or solid form into the wastewater flow. Removal of phosphorus occurs by precipitation and chemical adsorption. A significant fraction of phosphorus precipitates in the form of insoluble crystals with the metal coagulating agent, while the remaining phosphorus is adsorbed by the flocs of metal hydroxides formed during dissolution. Thus, the injection of coagulant into a mixed basin makes it possible to form both flocs and particles decantable in a subsequent separation step. The principle of electrocoagulation requires the passage



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of a low electrical current between two electrodes (a submerged anode and cathode).

In the Premier Tech Water Environment DpEC, raw wastewater is first sent to the primary reactor. This reactor allows sedimentation of particles and allows storage of sludge. The primary reactor also receives recirculate from the electrocoagulation unit. The recirculation loop consists of a pump located in the lamellar decanting basin, whose operation is coordinated with the treatment system feed pump. Each pair of electrodes is installed in a mesh basket allowing the free circulation of water, while confining particles created around the electrodes. A stirring pump ensures vigorous mixing of the water, increasing the speed of the water fivefold and increasing its turbulent energy. The DpEC effluent then passes through a filtration component, such as a Ecoflo Biofilter or compact Sand Filter Bed system, where the aluminum-phosphate minerals are filtered out of the effluent.

The DpEC can be used for both retrofits and new installations at individual homes. The technology is certified under the CAN/BNQ 3680-600 for either configuration shown on this slide. The DpEC unit itself achieves 92% total phosphorus removal. The Ecoflo biofilter contributes additional total phosphorus capture for a total of 99%. A sand filter bed contributes even more total phosphorus capture for a total of 99.4% using a hydraulic loading rate of 1.84 gallons per square foot per day

The Waterloo Biofilter EC-P from Waterloo Biofilter Systems captures phosphorus from residential and commercial wastewater streams using

an electrochemical process. These EC units can be used for both retrofits and new installations at individual homes. The EC technology can be used in combination with advanced treatment units or following conventional septic systems. The EC-P is simple to install and can be configured to the level of phosphorus removal desired. The system requires no liquid chemical addition, does not appreciably increase sludge production and uses very little energy. Electrodes typically last for up to two years before requiring replacement. More than 98 percent of phosphorus can be removed from effluent before it enters groundwater supplies. Through electrochemistry the Waterloo EC-P removes phosphorus by the precipitation of iron-phosphate minerals. A natural iron electrode is installed in the septic tank or in a small tank immediately thereafter. An ~3-amp current is applied to the electrode. Iron is dissolved into the sewage stream where it reacts with phosphate to form highly stable and insoluble iron-phosphate minerals. The Waterloo EC-P effluent is then passed through a filtration component, such as a Waterloo Biofilter treatment unit, sand filter, or other unsaturated media filter or conventional leach field, where the iron-phosphate minerals are filtered out of the effluent preventing phosphorus from reaching groundwater.

#### About the Author

Kevin Sherman is director of engineering and regulatory affairs for SeptiTech, Inc. of Lewiston, ME. SeptiTech is a wholly owned subsidiary of BioMicrobics, Inc. In addition

to 20 years working in the manufacturing sector, Dr. Sherman has been a state-level regulator, a designer, researcher, instructor and association executive during his career. He was the third president of NOWRA. In 2024, Kevin received the Richard J. Otis Industry Achievement Award.

Kevin has Bachelor's degrees in Biology and Civil Engineering, Master's degrees in Biology and Public Health, and a Ph.D. in Biological Oceanography. He currently serves as a member of the Technical Practice Committee for NOWRA.

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# The National Septage and Portable Sanitation Disposal Crisis

## *A Nationwide Analysis of Septage and Portable Sanitation Disposal Challenges*

Prepared by: National Septage Disposal Crisis Alliance Task Force

- NAWT (National Association of Wastewater Technicians)
- NOWRA (National Onsite Wastewater Recycling Association)
- PSAI (Portable Sanitation Association International)
- GOWA (Georgia Onsite Wastewater Association)
- OK DEQ (Oklahoma Department of Environmental Quality)

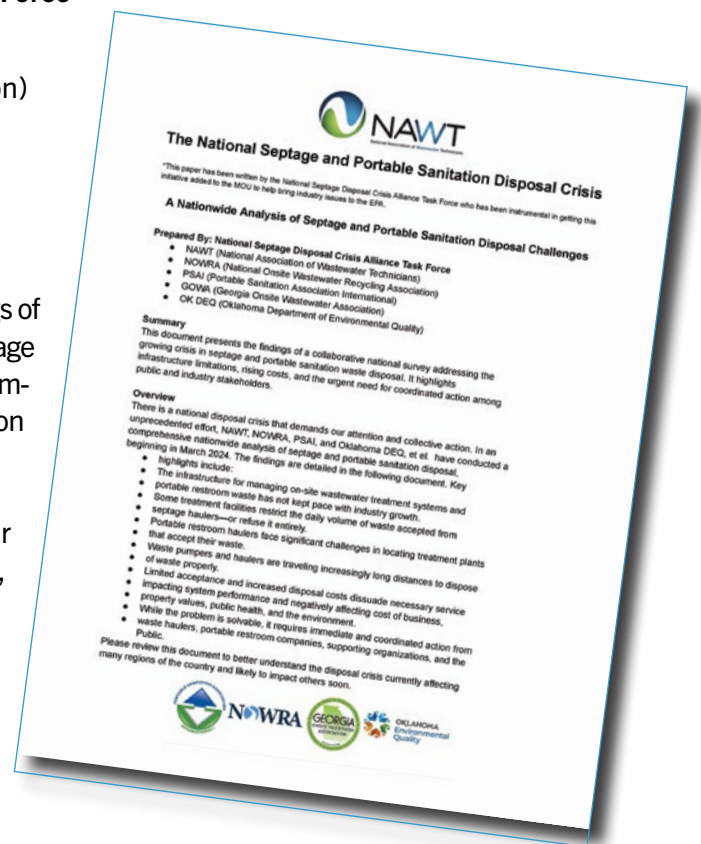
**SUMMARY.** The report prepared by the task force presents the findings of a collaborative national survey addressing the growing crisis in septage and portable sanitation waste disposal. It highlights infrastructure limitations, rising costs, and the urgent need for coordinated action among public and industry stakeholders.

**OVERVIEW.** There is a national disposal crisis that demands our attention and collective action. In an unprecedented effort, NAWT, NOWRA, PSAI, GOWA, and OK DEQ have conducted a comprehensive nationwide analysis of septage and portable sanitation disposal, beginning in March 2024. The findings include the following key highlights:

- The infrastructure for managing on-site wastewater treatment systems and portable restroom waste has not kept pace with industry growth.
- Some treatment facilities restrict the daily volume of waste accepted from septage haulers—or refuse it entirely.
- Portable restroom haulers face significant challenges in locating treatment plants that accept their waste.
- Waste pumpers and haulers are traveling increasingly long distances to dispose of waste properly.
- Limited acceptance and increased disposal costs dissuade necessary service impacting system performance and negatively affecting cost of business, property values, public health, and the environment.
- While the problem is solvable, it requires immediate and coordinated action from waste haulers, portable restroom companies, supporting organizations, and the public.

We encourage everyone to review the report to better understand the disposal crisis currently affecting many regions of the country and likely to impact others soon.

You can access the report on [NAWT's](#) and [NOWRA's](#) websites.





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