THE Onsite Journal

NOWRA
National Onsite Wastewater Recycling Association

Summer 2025

Oregon Onsite Wastewater Association's 2025 Conference

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

Registration Opening this Summer

Rural Community Assistance Partnership (RCAP) train-the-trainer workshops in Washington and New Hampshire

IN THIS ISSUE:

Jim Donlin *(1956–2025)*

A decorated Afghanistan War hero (OEF, 2003 – 2004), Staff Sgt. Jim Donlin blazed a path for Eljen's first manufacturing facility in 1996 and helped develop the products and innovations still used today. As Eljen's president, his work has brought him worldwide and to many of the onsite organizations in the United States.

Jim was our friend, a brother-in-arms, a leader, an innovator, and a staunch supporter of our industry. We are where we are today, as a nation and a company, due to the service, dedication and hard work Jim exemplified. We will miss his presence and will always cherish his memory.

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U.S. DEPARTMENT OF LABOR HIRE Vets 2024 PLATINUM AWARD

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NOWRA
National Onsite Wastewater Recycling Association

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THE Onsite Journal

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A NOTE FROM THE **PRESIDENT**

The NOWRA family is growing by leaps and bounds. As shared in an earlier publication, the NOWRA Board of Directors dedicated considerable time last summer and fall—both virtually and in person—to developing a Strategic Plan aimed at sharpening our focus and aligning our efforts. One of the key goals established in that plan centered on **Engagement and Membership**: specifically, to grow industry representation by 15% in order to strengthen and unify the voice of the decentralized wastewater industry.

Since the plan's adoption in December, we're excited to report significant progress. **Three new state affiliates—South Carolina, Oklahoma, and New Hampshire—have officially joined NOWRA**, expanding our reach and reinforcing our commitment to industry collaboration. Additionally, we've had promising discussions with stakeholders in Hawaii, who are in the early stages of forming a statewide onsite wastewater association. They've already expressed strong interest in becoming a NOWRA state affiliate.

Another promising initiative underway is the development of a **professional message board** on the NOWRA website. Initially proposed by the newly formed **Regulator Task Force** as a platform for fostering communication among regulators, the concept has since evolved. We're now working to expand the message board to serve professionals across the broader industry—providing a space to tap into the collective knowledge and experience of our nationwide network. The goal is to have the message board developed and tested before the Mega-Conference in October.

In parallel, the **NOWRA Education Committee** is currently reviewing abstract submissions for the **2025 Mega-Conference**, set to take place this October. In addition to a strong technical program, this year's event will include a **dedicated training track for Service Providers**, helping ensure practical, high-value content for this essential segment of our community.

Finally, we're excited to announce a fun and impactful way to support the next generation of industry leaders. I've been working with the **Emerging Professionals Committee** to organize a 20-team Cornhole Tournament (or "bags," as we call it in Minnesota) at the Mega-Conference in Sandusky, Ohio. Proceeds from the tournament will go toward the **Emerging Professionals Committee Scholarship Fund**. Stay tuned—tournament details will be released in July!

— **Chris LeClair**

New Q&A Section

Your Questions, Answered!

We are excited to introduce a new Q&A section in our next issue, where industry professionals can ask and answer the pressing questions shaping our work. Whether you're an installer, designer, or regulator, we invite you to submit your questions—or suggest the ones you'd like to see answered.

- What challenges are you facing?
- What insights can help the industry move forward?

Send in your questions, and we'll tap into expert knowledge to provide practical, real-world answers.

Submit your questions today at info@nowra.org and be part of the conversation.

Now accepting nominations for the 2025-26 Board of Directors

Open industry categories: academic, designer/engineer, installer, and service provider.

For more information: info@nowra.org

MESSAGE FROM THE **EXECUTIVE DIRECTOR**

Welcome to the Summer issue of NOWRA's *Onsite Journal*. This is our second issue of 2025 and will feature two technical articles—one dealing with Reduced Disposal Areas Utilizing Secondary-Treated Effluent and another article on Reverse Osmosis. In addition to those technical articles, you will find many of the same regular features, such as our advocacy report from Washington D.C., state affiliate news, and more. We are also pleased to include some new features, such as our interview with Tammy Trantham, the Executive Director of Missouri Smallflows Organization as well as another committee spotlight. This time its Technical Practices.

Spring flew by with many of NOWRA's state affiliates holding successful annual conferences. Attendance was strong at those state events, which is great for our affiliates and the industry. We are now starting to prepare for our main event—the 2025 Onsite Wastewater Mega-Conference in October. We are pleased to be partnering with our typical MOU Partner groups—NAWT and SORA, as well as our Ohio affiliate—the Ohio Onsite Wastewater Association. The theme for this year's conference is ***Clean Water Strategies at the Heart of it All***, so make plans now to attend and bring the family to the family-friendly Kalahari Resort in Sandusky, Ohio, in October.

We are continuing to do all we can to provide additional benefits to our membership. This spring we held another free webinar on **Growing Your Septic Business Using Digital Marketing and AI**. Although this webinar was open to all, the webinar was recorded and posted to our online learning library exclusively for Members-Only where additional free modules were added. Our library of free resources continues to grow for our members as well as for the general public. If you have not done so already, I highly encourage you to check out our **Free Business & Industry Courses** in NOWRA's Online Learning Academy and featured on page 28 of this issue.

We are pleased to report that our partnership with RCAP for the US EPA-funded development of educational materials for the onsite industry is going great. The first phase of that project was a homeowners education guide and online course (see page 20). The Guide is now available in Spanish as well! NOWRA experts have been working hard for the past 18 months on the second phase of the project which will conclude in 2026. This spring we held several train-the-trainer workshops across the country to pilot the materials on topics related to Small Communities, Operation & Maintenance, and Difficult Sites. Information on all of these EPA funded RCAP projects can be found on the NOWRA website under the Resources menu.

Much of the great work that you will read about inside of the publication is due to the dedicated committee members and volunteers. This organization is only as strong as its members and volunteers. 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. We will be holding an election in September for open seats on the NOWRA Board. Check out our Board (page 14) and current openings listed on page 4. If not this year, please consider getting involved at your state association or national level. 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 as I have done.

Have a great summer. I hope to see many of you at our Mega-Conference in the fall. Thank you for allowing me to serve as the Executive Director of this great organization!

— **Thomas Groves**

STATE AFFILIATE NEWS

CPOW (COLORADO) — The Water Quality Control Commission of the CDPHE adopted rules for On-Site Wastewater Treatment Systems (OWTS) called Regulation 43, which governs on-site wastewater treatment or septic systems and sets minimum standards for how OWTS in Colorado should be located, designed, constructed, and used.

CPOW has a completely updated course that was developed to address growing needs for a Colorado-specific, comprehensive, design course. The course is a hybrid of online modules, created by both CPOW and NOWRA, followed by a two-day, in-person classroom instruction with a field component. The course presents science-based principles of design, while including practical applications using the Colorado Department of Public Health and Environment Regulation 43 OWTS requirements.

Check the CPOW website for details on upcoming classes.

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 Ro-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) — Oklahoma has enacted SB 111, a pivotal law championed by the Oklahoma Onsite Wastewater Association (OOWA), reducing the threshold for mandatory certification; enhancing oversight and professionalism in the onsite wastewater industry. OOWA will spotlight this and other industry advancements at its Annual Conference and Trade Show, September 23–25, 2025, at the Renaissance Tulsa Hotel & Convention Center. Themed "Rooted in Knowledge, Growing for the Future," the event will feature expert-led sessions, regulatory updates, and networking opportunities for installers, pumpers, inspectors, and environmental professionals. You can visit www.oowaok.org for conference tickets or information on reserving a booth.

O2WA (OREGON) — The spring 2025 conference was a great success. Special thank you to Sara Heger for her commitment to the industry. She brought so much knowledge and passion to each talk. This year we had the opportunity to recognize Randy Trox, Onsite Program Coordinator, Oregon Department of Environmental Quality, Western Region—Eugene. He will be retiring this summer. A partner in making the industry better. O2WA and NOWRA exists to serve you, the onsite wastewater professional. Whether your focus is onsite system design, installation, service, operation/maintenance, regulation, sales or research, programs and services can help you succeed professionally.

Backhoe Roe-D-Hoe event from the O2WA 2025 conference. See cover for group photo.

YOWA (NEW ENGLAND) — The Yankee Onsite Wastewater Association (YOWA) has planned a variety of in-person and virtual trainings for 2025. Just in time for the June Title 5 renewal deadline, YOWA will be hosting an I/A Systems Field training, featuring both classroom instruction and hands-on experience in the field, in the Spring. Also planned for this Spring is a webinar on septic system pressure distribution. Later this year, YOWA will hold an in-person septic system training. More information about these events, as well as recaps from past trainings, will be posted to YOWA's website.

See full listing of NOWRA state affiliates.

STATE AFFILIATE SPOTLIGHT

*The Onsite Journal is proud to present a new feature, the **State Affiliate Spotlight**. For our first installment, we interviewed **Tammy Trantham, the Executive Director of the Missouri Smallflows Organization**. Tammy is a registered Onsite Soil Evaluator with the Missouri Department of Health and Senior Services and has been active on several NOWRA committees over the years. The Missouri Smallflows Organization (MSO) was established in 1995 and has 643 members.*

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

T: MSO's membership is dominated by installers. However, the private inspector industry is growing. Several installers also have their own pumping business so there is cross-over to pumpers as well. By and large, we are made up of professionals that install, inspect and regulate OWTS. There are also Onsite Soil Evaluators professionals in Missouri that are part of our association. These professionals provide soil morphology reports for OWTS. While we need more OSE professionals across the state, we have a robust membership of these professionals.

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

T: The MSO Conference & Trade Show is an annual event in January. We host over 340 professionals and 35 companies for exhibitors. The conference has 3 concurrent tracks of education that have a variety of topics covered. We host our state Roe-D-Hoe competition which is highly popular. The conference seems to grow each year. MSO is excited to have it in Osage Beach at Margaritaville on January 19-21, 2026. This new location is sure to bring in new topics and activities.

The MSO Conference & Trade Show is growing each year and members often come to this single event to earn CEUs. The other benefit of this is the networking. MSO is working to build more opportunities for professionals to network and grow their professional circles. Businesses thrive when you have more than "competition." It is great to have other companies or colleagues to discuss difficult projects or ideas with when you are looking at challenges.

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

T: *The Outhouse Post* is our quarterly newsletter that goes out to members through mail or email. We strive to put articles about Missouri news or members' stories to make it a great read. We highlight different upcoming events or issues that are popping up, too. Our association also has a large email list that any professional can sign up for regardless of membership. This list sends our reminders about upcoming classes once a week. It's a great way to remind professionals to sign up for a class when it's in their area.

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

T: About seven years ago, MSO started attending the certification classes for installers that Missouri Department of Health and Human Services (Missouri DHSS) put on.

Pictured above are photos from Missouri DHSS' OWTS installer certification classes. As part of this program, MSO is given the opportunity to provide information about the organization and the resources available to its members.

These classes are mandatory for anyone that wants to become registered to install OWTS in Missouri. I attend the class to talk about MSO and the resources it provides for professionals. The presentation takes only about 20–30 minutes with questions, but it provides a great opportunity to get in front of the new professionals. In addition,

continued on page 12

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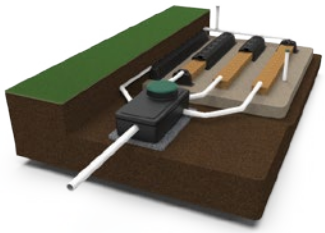

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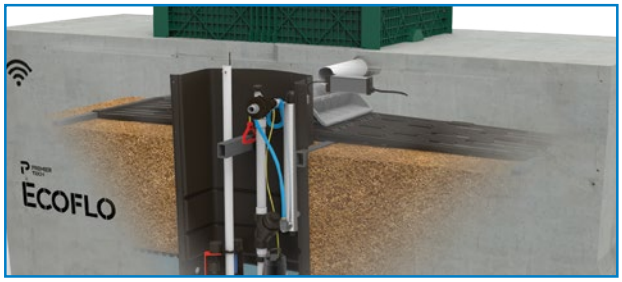

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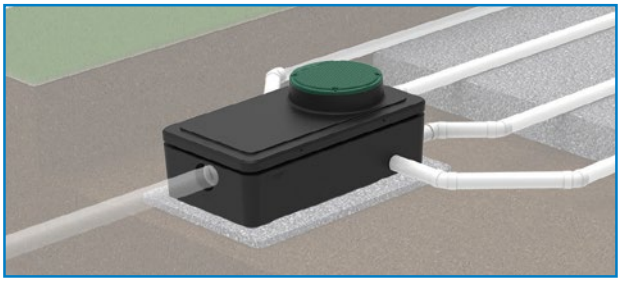

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the MSO Board of Directors graciously offers these individuals 30 days to take advantage of a 50% off membership for their first year. This gives them the opportunity to join the association, see the benefits, and hopefully keep them renewing membership every year. This type of push has helped our membership grow to over 600. Another way to help membership grow is to keep in contact with your members about when their membership expires. Notifications are important and appreciated by many members.

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

T: MSO provides its membership with many different benefits. Discounts on seminar classes, online classes and our annual conference are the most popular. While education has been the most popular benefit, MSO is building more benefits that make members come back year after year. Our new database program, Pipevine Tracks, has enabled members to log in and see their course history and calculate their continuing education units (CEUs) and determine if they need classes. In addition, they can check membership status and sign up for classes or the conference. We have found that online registration is very popular, as we work with busy contractors who are most likely doing paperwork in the evenings or weekends.

The full list of MSO member benefits can be found on our website: www.mosmallflows.org/mso-members.html

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?

T: Missouri's Minimum Construction Standards for On-Site Sewage Disposal Systems (19 CSR 20-3.060) were written in 1996. The standards need updating with the multiple new technologies available to professionals for OWTS. About 10 years ago, several professionals provided input to update this document. However, with staffing shortages, and a pandemic, DHSS has not been able to bring this back to the forefront. MSO is putting together a task force to begin this process of review with DHSS so that changes can be proposed in 2026. We are fortunate that we have a written rule for construction standards. Several states do not have this and Missouri benefits from having a minimum standard to protect public health and environment.

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

T: Missouri faces similar challenges that other states see. One of these is building a better training program for county regulators. Missouri has seen a sharp decline in counties providing their own staff to process permits and inspections for OWTS. Most of this is due to the financial constraints of the permit fee, so MSO is promoting a change for that in the Missouri Legislature. Once counties can set "reasonable fees" for permits, more counties will be able to staff locally and provide resources to the professionals. The training program we are developing will help these county regulators learn their duties and responsibilities. Currently, there is no training program and many of these individuals juggle more than just OWTS permits (i.e., restaurant inspections, daycare inspections, etc.). We have a graduate student at Missouri State University working on this curriculum and hope to have it pilot in 2026. MSO will be looking for funding to help this program get off the ground throughout the state. The building of a better workforce will help our industry flourish.

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

T: NOWRA provides many benefits to its members and affiliates. As a state affiliate, it's difficult to stay up to date on issues at the federal level. NOWRA provides this benefit and continues to provide support for our industry. Since Missouri requires continuing education to renew professional registrations and licensures, our membership has benefited from NOWRA Online Learning. This has enabled our membership to diversify their learning experiences and training. NOWRA has been adding more benefits for our members. The health insurance option is a great new option.

MSO is also a part of the Board of Governors that participates in the NOWRA lobbying effort in Washington, DC. The MSO Board of Directors decided to join this effort a few years ago to continue the push to bring more awareness and funding to our industry. Every state's needs are different, but Missouri would like to see more funding go to decentralized wastewater. This is part of the reason we participate in the effort to gain more federal funding.

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LEGISLATIVE UPDATE

Emerging Legislative Issues for Decentralized Wastewater

By Tim Perrin, Polsinelli

While much of Washington is focused this summer on tariffs, immigration policy, the size and role of the federal government, and consideration of budget reconciliation legislation, NOWRA is looking further down the road to ensure decentralized wastewater stakeholders are positioned to take advantage of policy opportunities when they emerge. While passing the budget reconciliation package and enacting fiscal 2026 appropriations bills to fund government programs are top priorities for Congressional leaders, the House of Representatives and Senate are expected to consider other pieces of legislation that will impact federal support for the decentralized wastewater industry. NOWRA is working now to make sure we are prepared to advance our policy priorities at the right time. Here are two examples:

1. Clean Water Allotment Modernization Act

In an effort to better distribute Clean Water State Revolving Fund (CWSRF) resources, Members of Congress in both the Senate and the House proposed linking the CWSRF allocation formula to the U.S. Environmental Protection Agency's (EPA) Clean Watersheds Needs Survey Report to Congress. The latest version of this report recognizes for the first time funding deficiencies in the decentralized wastewater infrastructure. In this 2022 report, the EPA estimates that nearly $75 billion, or about 12% of the CWSRF, is needed to close the decentralized wastewater needs gap.

To address this tremendous need, Members of Congress are again exploring how to maximize limited federal resources. If enacted, the Clean Water Allotment Modernization Act would significantly boost federal support for decentralized wastewater projects identified by state water agencies and represent a significant step forward in improving public health and protecting the environment. Bipartisan efforts are afoot to reintroduce this legislation and third-party stakeholder organizations are positioning themselves to weigh in at the appropriate time to elevate the bill's profile, so it is considered and passed as soon as possible.

2. Farm Bill Reauthorization

Reauthorizing the Farm Bill is a top priority for Congress. The Farm Bill, which was last reauthorized for five years in 2018 and has since been extended through September 2025, authorizes spending on all federal rural development programs and safety-net nutritional assistance programs. Now under Republican control, the House and Senate agriculture committees are working to pass a reauthorization package that addresses key issues like supply chain disruptions, trade policies, crop insurance, conservation issues and climate challenges.

Included in the House's draft of the Farm Bill released last year is a reauthorization of a program that provides federal 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. Funding for this program, which is administered by the U.S. Department of Agriculture (USDA), has been a NOWRA public policy priority for years. Over the past two fiscal years Congress has appropriated $5 million for this program and provided an additional $1 million for grants specifically designated to decentralized wastewater systems. We are working with Congressional agriculture policy leaders to ensure that this program is re-upped for another five years and that the funds available to eligible recipients are higher than in previous years. It is not clear at this time when Congress will take up the Farm Bill reauthorization package, but most stakeholders believe it will be later this year when the current extension is set to expire.

As NOWRA members and partners know all too well, significant resources are needed to upgrade

continued on next page

LEGISLATIVE UPDATE

continued

decentralized wastewater systems throughout the United States. At a time when the scope and role of the federal government is being debated, it's important to let your Senators and House Member know that addressing and resolving decentralized wastewater needs should be a bipartisan priority. This will help us capitalize on policy opportunities when they arise.

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

ADVOCACY EFFORTS

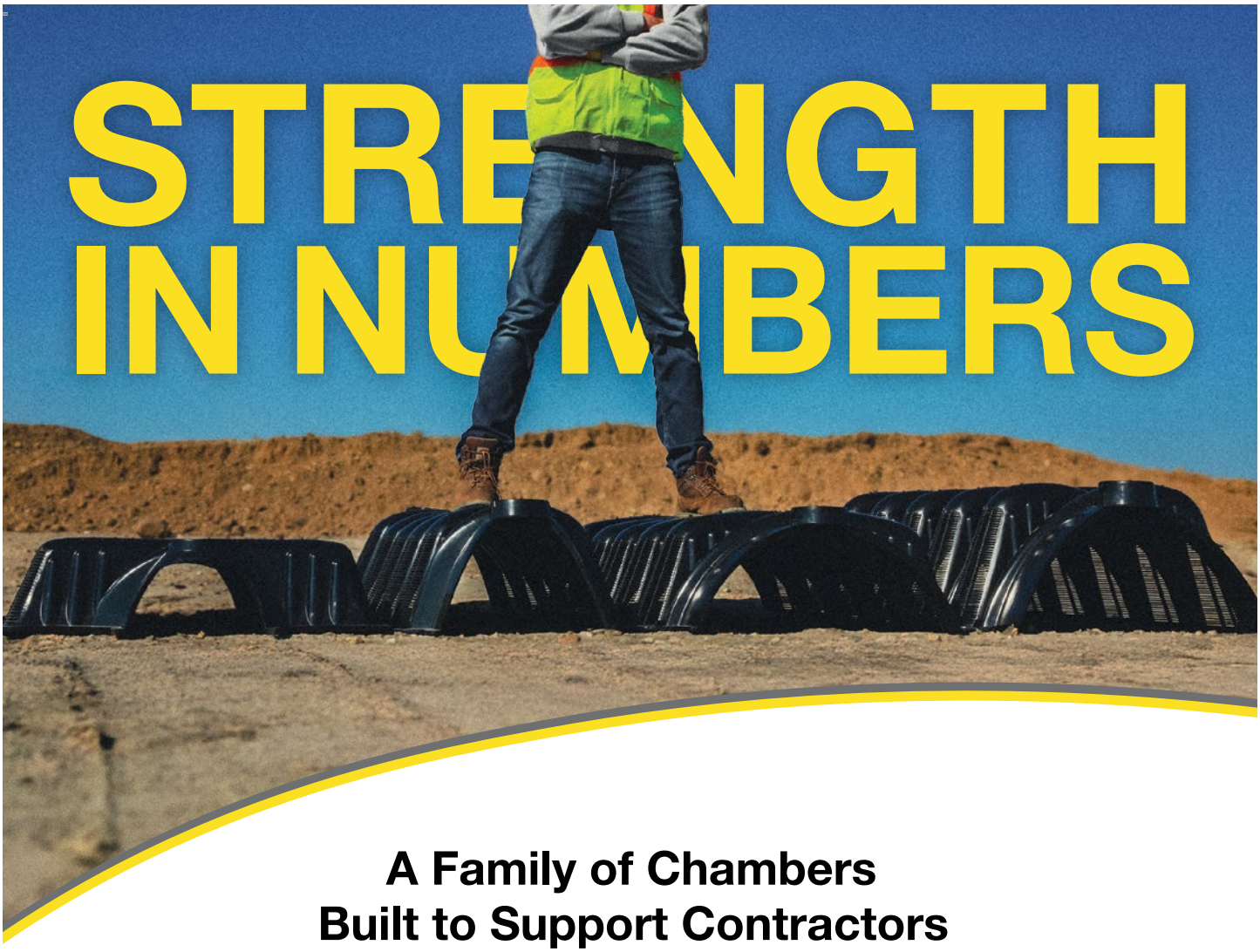
The following companies and organizations are supporters of NOWRA's advocacy efforts for 2025 and comprise our Lobbying Board of Governors. We thank them for their efforts & support.

- 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.



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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.

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

Technical Practices Committee

The Technical Practices Committee of the National Onsite Wastewater Recycling Association (NOWRA) plays a vital role in advancing the science, application, design, and operation of onsite and decentralized wastewater systems. Its primary responsibility is to develop and review best management practices, standards, and technical guidelines and provide these materials to our members to be used locally to support the advancement of the industry. The committee meets monthly and is dedicated to ensuring its work is based on sound science and engineering principles, while considering system performance, environmental protection, and public health in different geographic and climate conditions.

Additionally, the committee serves as a technical resource to all NOWRA members by responding to technical inquiries, reviewing and contributing to training materials and educational content. It examines emerging technologies and research trends, to evaluate how they may be used in the onsite and decentralized wastewater industry. The committee collaborates with state affiliates, academic institutions, manufacturers, and environmental professionals to help shape policies and support NOWRA's mission of promoting sustainable decentralized wastewater solutions.

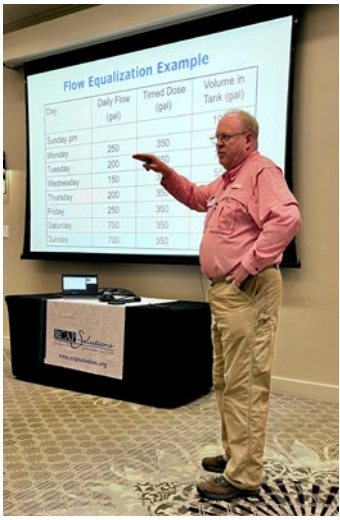
If any of this work sounds like something you would like to be a part of, please contact outreach@nowra.org.

Interested in getting more involved with NOWRA?

Joining a committee is a great place to start!

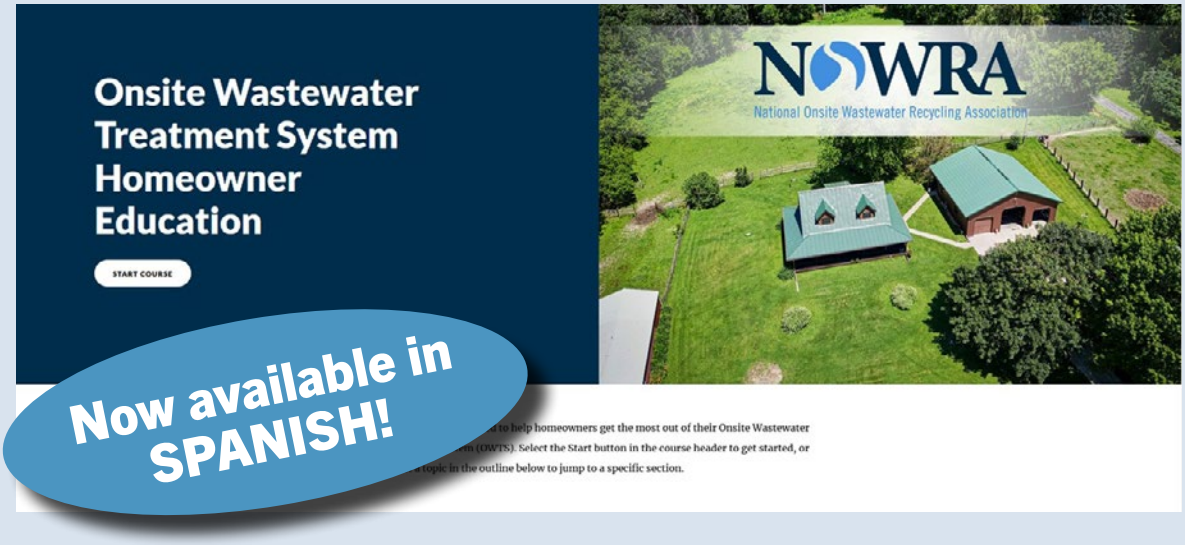
Contact the NOWRA office: info@nowra.org

Homeowner Education Pilot Workshops



Throughout the Spring, NOWRA, along with the Rural Community Assistance Partnership, hosted our first three pilot events for the material under development. The first training was held in Des Moines, Iowa, with the Midwest Assistance Program and the Iowa Onsite Waste Water Association and piloted the *Small Community Curriculum*. The second event highlight *O&M Training* was hosted by RCAP Solutions with our new state affiliate – Granite State Onsite Wastewater Association in Nashua, New Hampshire. The final spring pilot, *Solutions for Difficult Sites*, was held in University Place, Washington, with Rural Community Assistance Corporation and the Washington Onsite Sewage Association.

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 next pilot events. For more information about future pilot events: www.nowra.org/library/rcap-projects/rcap-phase2/workshops. The materials will be ready to use by affiliates and other training programs in the Fall of 2025.



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.

Reduced Disposal Areas Utilizing Secondary-Treated Effluent

*By **David Meints, MS**, President and CEO, Meinco Wastewater Systems*

Effective household wastewater management is essential for protecting public health and ensuring environmental sustainability, especially in rural areas. Traditional septic systems that utilize conventional pipe and gravel disposal designs are not always feasible in areas with soil limitations, such as large clay content, shallow seasonal water tables, or shallow bedrock. This study explored the feasibility of using secondary-treated effluent in reduced disposal areas as an alternative method, focusing on rural Arkansas where nearly half the population depends on on-site systems. Six residential sites equipped with advanced treatment units were studied over a 12-month period to evaluate system performance based on wastewater flow, ponding depths, and water table fluctuations.

Arkansas, our home state, imposes strict regulations on on-site wastewater systems, specifying minimum soil loading rates and seasonal water table restrictions. Conventional systems rely heavily on natural soil filtration for contaminant removal, posing challenges when soils are unsuitable. *Advanced treatment units producing secondary-treated effluent, which is effluent with reduced biochemical oxygen demand (BOD), total suspended solids (TSS), and increased dissolved oxygen, can potentially overcome these challenges.*

Prior research from other states has indicated that secondary-treated effluent may work in reduced disposal areas under certain conditions, but specific data for Arkansas soils had been lacking prior to the study we conducted.

Methodology: Site Selection and Description

Six homes (Figure 1) within a 64-ha (about 160 ac) subdivision in Saline County, Arkansas, were selected. The sites shared characteristics, such as large clay contents, shallow bedrock, and/or the presence of a shallow seasonal water table, where one or more of the factors rule out conventional systems. Four sites used non-mounded disposal areas and two used mounded designs. Advanced treatment units (from Orenco Systems and Bio-Microbics, Inc.) producing secondary-treated effluent were already operational at these sites.

Disposal Area Construction

Each disposal area was comprised of four gravel-filled trenches (21 m long, 35 cm deep, and 45 cm wide) with low-pressure-distribution piping to evenly disperse effluent (Figure 2). Infrastructure included flow meters, gate valves, and monitoring ports to gather data on flow rates and ponding depths.

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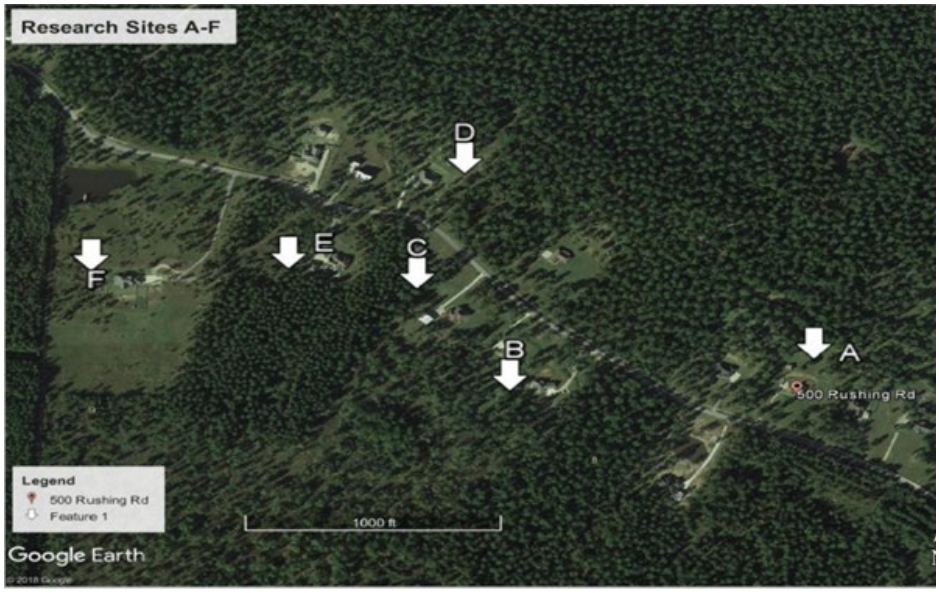


***Figure 1:** Location of six home sites selected for this project in rural Arkansas.*

***Figure 2:** Example of a gravel-filled trench with low-pressure-distribution piping installed for uniform dispersal of treated effluent at each site with the infrastructure installed to monitor groundwater depth.*

Effluent Characterization

Effluent samples were collected biannually to assess BOD, TSS, dissolved oxygen, and pH levels to ensure compliance with Arkansas standards.

Data Collection and Monitoring

Researchers collected data every 14 days from March 2017 to March 2018, recording wastewater flow rates, trench ponding depths, water table fluctuations, and rainfall. Electronic continuous monitoring was also deployed at one site for ponding-depth measurements.

Failure Criteria

A disposal trench was deemed failed if the ponding depth exceeded 27 cm for more than 14 consecutive days, which is a threshold based on prior research and regulatory guidelines.

Effluent Characteristics

The secondary-treated effluent consistently met or surpassed the required standards:

- BOD: < 5.3 mg/L
- TSS: < 8.5 mg/L
- Dissolved Oxygen: > 6.3 mg/L
- pH: ~ 7.4

These results confirmed that secondary-treated effluent was environmentally safe for use in reduced disposal areas.

Impact of Rainfall and Seasonal Water Tables

Rainfall varied significantly over the study period, with greater-than-average precipitation in spring and lower-than-average in fall seasons. Seasonal water tables fluctuated accordingly, influencing ponding depths in the disposal trenches.

Non-Mounded Sites

At the four non-mounded sites, ponding depths varied from 0 to 39 cm. Fluctuations were strongly correlated with seasonal water table movements and rainfall. Despite temporary ponding, the trenches mostly stayed within safe thresholds, demonstrating that non-mounded systems can work under certain conditions. Figure 3 shows an example of a non-mounded site.

Mounded Sites

The two mounded sites showed better performance. Their elevated construction allowed more separation from the seasonal water table, preventing excessive ponding. No failures were recorded at these sites, highlighting the advantages of mounded systems in areas with poor soil conditions. Figure 4 shows an example of a mounded site.

Hydraulic Loading and Site Performance

Effluent was applied at 2 to 3.8 times the recommended loading

Figure 3: *Example of a non-mounded site (Site E).*

Figure 4: *Example of a mounded site (Site B).*

rate, where the typical loading rate is 0.75 gal/ day/sq ft in suitable soil. Figure 5 gives details of the "Design" and "Actual" loading rates. Three of the six sites maintained acceptable ponding depths despite the large effluent loads. The remaining three sites experienced temporary ponding, but none met the defined failure conditions. These findings suggested that reduced disposal areas using secondary-treated effluent can sustain large effluent loads without system failure if managed properly.

Environmental Considerations

Use of secondary-treated effluent in on-site systems minimizes the risk of nutrient runoff and the need for surface discharge permits. Additionally, improved vegetation around the disposal areas were observed at our project sites, indicating potential benefits in soil productivity.

Conclusions

1. Secondary-treated effluent was safe and effective: Effluent consistently met environmental standards, reducing contamination risk.
2. Reduced disposal areas can succeed under large loading rates: Even with aggressive effluent applications, most sites remained within acceptable performance thresholds.
3. Seasonal water tables influenced performance: Success depended heavily on site-specific water table behavior, reinforcing the need for careful monitoring.
4. Mounded systems out-performed non-mounded systems in challenging soils: Increased separation between the water table and disposal trenches enhanced reliability.
5. Regulatory updates are needed: Current Arkansas regulations do not adequately address the use of secondary-treated effluent in reduced disposal areas. Policy adjustments would help enable broader adoption of this approach.

Future Studies Should Explore

- Long-term system performance over multiple years
- Broader testing across different soil types beyond those studied
- Cost-benefit analyses comparing reduced disposal systems with traditional and centralized options
- Homeowner perceptions and willingness to adopt alternative systems
- The development of the best practices for operation, maintenance, and monitoring to ensure lasting performance

Expanding the research base would offer valuable insights into optimizing designs and regulations for secondary-treated effluent systems, ultimately supporting greater resilience in rural wastewater management.

Site	Flow ($L\ d^{-1}$)	Disposal area (m^2)	Design ($L\ m^2\ d^{-1}$)	Actual ($L\ m^2\ d^{-1}$)	Multiplier
A	1749	37.6	12.2	46.5	3.8
B	863	7.0	32.5	123.3	3.8
C	458	5.6	32.5	81.5	2.5
D	488	9.8	12.2	49.7	2.0
E	697	29.3	12.2	23.8	2.0
F	772	29.3	12.2	26.3	2.2

Figure 5: *Details of the average daily flow, size of the disposal area (trench bottom area), design and actual loading rate observed at each site. Refer to the adjacent unit conversion table to determine loading rate values in gallons per square foot per day.*

Metric Unit	English Unit
1 Liter	0.2642 Gallon
1 Square meter	10.764 Square feet
1 Liter/Square meter/day	0.0245 Gallons/ Square foot/day
1 Hectare	2.47 Acres

ABOUT THE AUTHOR: David Meints is a Professional Soil Classifier with experience in the onsite wastewater business for the past 30 years. He is the owner of MEINCO, Inc., an Arkansas company offering design, installation, and maintenance services for residential and commercial applications.

Reverse Osmosis with Residential Wastewater Treatment

*By **Sara Heger, PhD,** University of Minnesota*

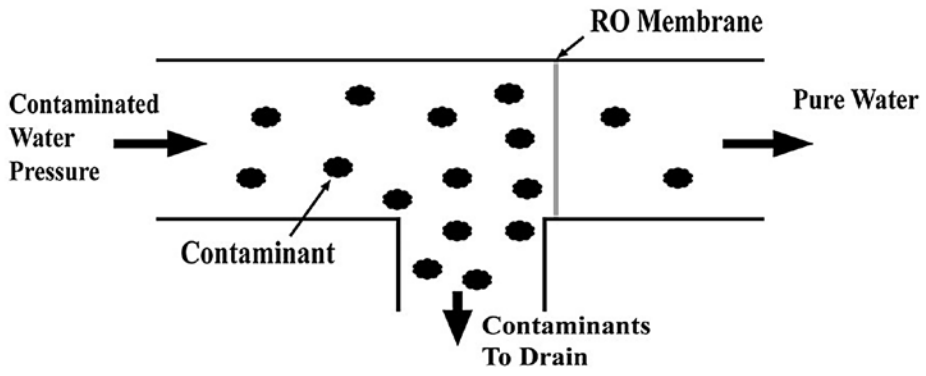
Recently we have had two interesting questions arise related to reverse osmosis (RO). The first was from a property owner in Saskatchewan.

QUESTION #1: *Could my RO system have ruined my OWTS?*

This home had a three-year-old onsite wastewater treatment system (OWTS) that was surfacing and the owner believed it was due to their water treatment system including a RO system and an iron filter. They want to be assured their drinking water was "clean" removing fluoride, lead, chlorine, pesticides, sulfides, and wanted to minimize discoloration of fixtures from high iron levels. RO is a separation process that uses pressure to force water through a membrane that retains the solute contaminants on one side and allows the pure solvent to pass to the other side. More specifically, it is the process of forcing a liquid from a region of high solute concentration through a membrane to a region of low solute concentration by applying a pressure more than the osmotic pressure.

Looking into the RO unit, the system they installed produced up to 0.8 gallons per minute of clean water while producing nearly double that in wastewater (1.4 gallons per minute). The system installed was a whole-house RO/point of entry (POE) system that generated RO water for all sinks, showers, and appliances throughout a home and was installed in their basement. Although POE RO systems are typically more efficient than units installed just for drinking water (commonly below the sink), this unit creates a large wastewater load the septic system was not designed to manage. The wastewater from POE RO systems should not go into the OSWT as it discharges more load than the system can manage. The OWT was designed for 337 gallons per day, but with the RO system hooked up and a family of four, it was certainly getting more than that. This extra water suspends solids in the septic tank and reduces retention times. The extra water also hydraulically overloads the soil component of their septic system.

Most iron filter discharge contains iron particles that are removed during oxidation. These particles are removed from the filter during the backwash cycle. Microorganisms do not decompose these iron solids and will build up in the septic tank (increasing the frequency of cleaning) and soil treatment system. This typically results in 150 to 200 gallons per backwash cycle, resulting in 10,000 to 20,000 additional gallons of wastewater annually containing these solids if discharged into the septic system. If the particles do not settle in the septic tank or resolubilize. In that case, the solids may plug downstream components, particularly reducing the soil's ability to infiltrate water due to high iron content. This is highly likely when combined with a POE RO system. For this property, the recommendation is this water treatment effluent be routed out of the OWTS to reduce the risk of overloading the system with extra water and solids.



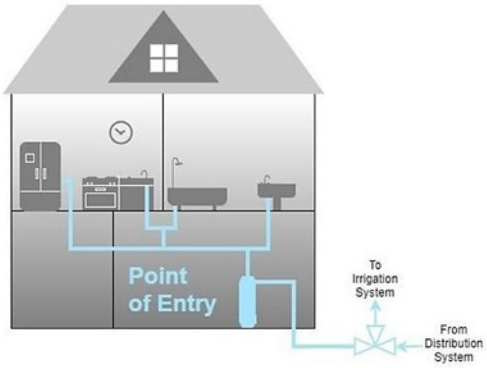
QUESTION #2: *Will an RO system installed to remove nitrates add extra water to the OWTS and nitrogen to the groundwater?*

This question came from a regulatory group in Minnesota where point-of-use (POU) RO units are recommended to deal with elevated nitrate levels in drinking water. High nitrate levels in drinking water supplies can cause methemoglobinemia in infants, especially those less than six months old. There is also concern about elevated levels of cancer and birth defects with elevated nitrate levels. This is the other common reason property owners will install an RO unit – when there is a specific contaminant/constituent in the water supply they want to remove. These are typically naturally occurring substances that cause water supplies to be unhealthy or unappealing (foul tastes, smells, or

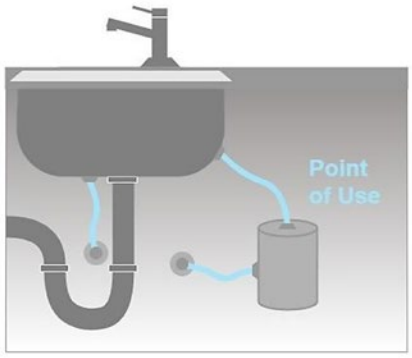
colors) or from unnatural contamination sources. RO systems have been shown to remove anywhere from 83-92% of nitrates.

These POE RO units can be inefficient at creating "clean" water with the remainder being discharged as wastewater. The amount recovered for use within the home depends on the unit but can range from 10% to 50% efficient meaning it will generate one – nine gallons or more of reject water for every gallon of clean water. In recent years, membrane technology has improved and some POU systems have been designed to operate more efficiently, with some manufacturers advertising a 1:1 ratio of clean to dirty water. Regardless of the type of technology, unless malfunctioning a POU RO system should not over-burden a septic system.

The other issue that arose was concerns about adding extra nitrogen to the septic system and potential further contamination of groundwater with the nitrate concentrated wastewater. This is not a concern as the septic tank is the perfect environment to remove nitrogen via denitrification. Denitrification is a biological process that uses nitrate as the electron acceptor instead of oxygen to oxidize organic matter (heterotrophic denitrification) or inorganic matter such as sulfur or hydrogen (autotrophic denitrification) under anoxic conditions. In the process nitrate is reduced to nitrogen gas which is not a concern as 72% of the atmosphere is nitrogen gas.



1. Point of Entry (POE) Treatment



2. Point of Use (POU) Treatment

1. A whole-house RO system/point of entry (POE) creates RO water for all sinks, shower, and appliances throughout a home and sometimes even the irrigation water. The volume will be too high for an OWTS. To determine the best location for the reject water from a POE RO a wastewater professional should understand the volume of water and the concentration of contaminants removed. It may be that this water could be used for irrigation or discharged to a separate trench, but before that determination is made the characteristics of the discharge are needed.
2. Under the sink RO systems/point of use (POU) are typically used to treat only drinking and cooking water—little concern with over-burdening of an OWTS.

Source: www.mass.gov/info-details/home-water-treatment-devices-home-water-treatment-devices-point-of-entry-and-point-of-use-drinking-water-treatment

POE RO system

Summary

When evaluating if an RO unit could be impacting a OWTS it is critical to understand what the RO units is treating—just the drinking water or the entire house. RO units will continue to gain in use and should be part of every homeowner questionnaire when evaluating a new or existing septic system. Hopefully, efficacies will improve over time and reduce the amount of wastewater created in the process.

ABOUT THE AUTHOR: Sara Heger, Ph.D., is a researcher and instructor at the University of Minnesota in the Onsite Sewage Treatment Program where she is faculty in the Water Resources Science program. She is a past president of NOWRA.

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CORPORATE MEMBER BENEFITS

Corporate Membership in NOWRA is an investment that enhances your business marketing efforts while showing your support of our mission to advance and grow the onsite and decentralized wastewater industry.

Corporate Membership Benefits

- Conference booth, sponsorship, & advertising discounts
- *Onsite Journal* advertising discounts
- Individual NOWRA memberships
- Recognition in the industry
- Federal advocacy on your behalf

Advocacy Successes

1. NOWRA worked with Congress on the Infrastructure Investment and Jobs Act (H.R. 3684) that was signed into law by President Biden on November 15, 2021. The water infrastructure bill creates a Decentralized Wastewater Grant Program for the repair or replacement of failing or non-existent septic systems owned by low-income homeowners. The Act authorizes $50 million of funding for each of the Fiscal Years 2022–2026, for a total of $250 million.
2. NOWRA is working with EPA on implementation of legislation we sponsored which was passed into law as part of the 2018 Water Bill (America's Water Infrastructure Act of 2018) requiring EPA to create a Decentralized Technology Clearinghouse and to share information about the cost-effectiveness of decentralized systems with local governments and other groups. EPA must regularly report back to Congress about how they are supporting the increased use of decentralized systems.
3. NOWRA is monitoring the U.S. Census Bureau's efforts to include a "sewer or septic" question added to the Annual American Community Survey (ACS). This question was removed from the decennial Census after 1990. NOWRA worked with EPA to get them to submit a request to have this question included on the survey. In October 2018 the U.S. Census Bureau accepted the EPA proposal and the question is moving forward to the next stage of approval. This is on track for addition to 2026 ACS.

Learning Just Got SIMPLE!

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Online Courses to Meet Everyone's Needs

NOWRA's Online Learning Academy makes it easy for you to obtain high quality onsite wastewater training by bringing the classes to you! It's a great option when:

- you are unable to attend in-person training events,
- you want to train new employees quickly,
- you are a few CEUs short for professional license renewal, or
- you need to better understand onsite wastewater fundamentals.

Our suite of courses has been developed by respected industry professionals from academia, engineering, soil science, and contracting. Each course offers a dynamic mix of classroom lectures, external videos and required readings, along with periodic tests of your knowledge. When you pass a course, you get a personalized Certificate of Completion, which can be used as continuing education documentation.

▶ Onsite A to Z

An overview of onsite wastewater treatment provides a foundation of relevant courses for many professionals.

▶ Installer Training

Ideal for new installers, those preparing for a certification exam, or those looking to brush up on skills.

▶ Troubleshooting

Step-by-step component troubleshooting—for designers, installers, regulators, service providers and more!

▶ Design Courses

These courses lay the groundwork for design and are continuously being expanded with new additions.

▶ Technical Sessions

These courses cover a wide variety of topics and were selected for their continued relevancy to the decentralized industry.

FREE BUSINESS AND INDUSTRY COURSES

The NOWRA Online Learning Academy has free online business and regulator courses available for our members and affiliates.

Our newest business course is **The Ultimate Guide to Growing Your Septic Business Using Digital Marketing and AI Tools**. This course shows how to use a variety of free and low-cost tools to create marketing and bring in more business. *(Available to members only.)*

Other classes offered include:

Building and Running a Quality Business discusses how to better run a small onsite wastewater business. *(Available to members only.)*

Insurance Costs and Risk Management was hosted in partnership with Watercolor Insurance Management and shares ways to get the best coverages for your business, focusing on the different kinds of liability management that are most relevant to the onsite industry. *(Available to members only.)*

The Regulator's Role in Onsite/Decentralized Wastewater gives an overview of the regulator's role in the onsite wastewater industry, as well as safety, ongoing education, and other important concepts.

Onsite Wastewater Treatment—What is it and Where Can I Go for Information? is one of two webinars presented in partnership with NEHA, covering onsite wastewater treatment function, the various types of onsite treatment systems, educating homeowners, and where to find additional resources and training.

Sewage Disposal-A Priority Item you May be Overlooking as a Food Inspector is the second webinar presented in partnership with NEHA. It discusses onsite wastewater treatment systems in relation to food codes, which government agencies may be involved in evaluations, how to help facilities solve issues that may occur, and other resources and training which are available.

Watch for more business courses to be added to the Online Learning Academy in 2025

Participants can select class length based on continuing education requirements, the subject matter, or how much time they have to commit to training.

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