Speaker and Abstract Information for

2024 Onsite Wastewater Mega-Conference

October 2024

Updated 8/2/24

All speakers listed alphabetically by last name. Subject to change.

Scott Andreasen, Excavation Marketing Pros

Septic Success: No-Cost Tips to Elevate Your Online Presence

Presentation, 25 minutes

Abstract:

Growing a septic business online for free involves strategic steps to establish expertise, generate leads, attract customers, and build a stellar reputation. Here's a blueprint to achieve tangible results: Optimize Your Website & Dial In Your Messaging: Ensure it's user-friendly, mobile-optimized, and includes essential information like services, contact details, and testimonials. Use SEO techniques to rank higher in local searches with keywords like "septic services near [Your City]". Leverage Google My Business (GMB): Create or update your GMB profile with accurate information and relevant keywords. Encourage satisfied customers to leave reviews to boost credibility and search rankings. Create Valuable Content: Start a blog to share expert advice, tips, and industry news to your GMB. Regularly posting helps optimize your business rankings. Engage on Social Media: Establish a presence on Facebook, Instagram, and LinkedIn. Share blog posts, testimonials, and behind-the-scenes looks. Engage with your audience by responding to comments and messages promptly. Utilize Online Directories: List your business on directories like Yelp, Angie's List, and HomeAdvisor. Ensure your listings are complete and up-to-date for better visibility. Network Locally Online: Join & leverage local online Facebook groups and forums related to home services. Offer advice and answer questions to demonstrate your expertise and build trust. Showcase Success Stories: Highlight top projects that demonstrate your ideal client avatar to attract similar clients. By following these steps, your septic business can build a strong online presence, generate leads, and establish an impeccable reputation in your service area without spending a dime.

Bio:

Scott Andreasen is a renowned expert in septic business development and branding, with a distinguished career in marketing for the septic industry and outdoor construction. In 2022, Scott published Excavation & Septic Internet Marketing Profits, a valuable resource for business owners seeking to enhance their online visibility and profitability. The book outlines practical strategies and insights from Scott's extensive experience to help septic businesses navigate digital marketing complexities. Since 2022, he has specialized in crafting innovative marketing strategies tailored to the unique needs of septic businesses, helping them establish a robust online presence and achieve substantial growth. Scott's marketing journey began in 2009, focusing on the outdoor construction sector. His extensive experience laid a solid foundation for his transition to the septic industry, where he quickly became a trusted advisor and strategist. His deep understanding of the industry's nuances has enabled him to devise effective marketing campaigns that drive significant result Scott leverages the latest digital tools and platforms to create comprehensive branding strategies that resonate with target

audiences. His client-centric approach and dedication to excellence have earned him a reputation as a leading figure in septic business development and branding. Through his consultancy, Scott has transformed numerous businesses, enabling them to dominate their local markets and achieve growth.

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Amal Bakchan, Texas A&M University

Stakeholders' Perception Towards Regionalization of Responsible Management of Decentralized Wastewater Infrastructure in the Rural Alabama Black Belt

Presentation, 25 minutes

Abstract:

The rural Alabama Black Belt region has long struggled from an acute wastewater problem, further exacerbated by high poverty, low-population density, and non-perc soils that cause hydraulic failure in conventional septic systems. Despite ongoing research efforts to explore alternative decentralized wastewater infrastructure systems and treatment technologies, how to best manage these systems through a responsible management entity (RME) is still acknowledged as a national need. Here, we investigate the regionalization of the responsible management of decentralized wastewater infrastructure (clustered systems), aiming to ensure economies of scale and address the limited customer base constraint. More specifically, this study (1) identifies challenges that impede effective regional management, based on stakeholders' perception; and (2) explores strategies for addressing the identified challenges considering socio-political dynamics in these communities. Inductive thematic analysis of 15 semi-structured interviews with key stakeholders reveals regionalization challenges across multiple dimensions i.e., technical, social, financial, institutional/regulatory, and political dimensions. For instance, the difficulty to ensure timely responses to issues in times of extreme events when operating at a large scale, as well as trouble getting community buy-in, emerged as challenges at the technical and social dimensions, respectively. Findings suggest increasing educational efforts that target the opportunities of regionalization with both institutional players and community residents. By capturing stakeholders' insights into strategies for addressing regionalization challenges, the study sets the stage for highlighting policy changes that are needed to enable successful operation of regional RMEs in the Black Belt (and other rural communities) moving forward.

Bio:

Amal Bakchan is an assistant professor at the Department of Construction Science at Texas A&M University. She holds a Ph.D. in Civil Engineering from the University of Texas at Austin. Her work seeks to improve access to basic services in underserved communities in the US and developing nations. Amal's research primarily focuses on water and wastewater infrastructures, in the broad areas of socio-technical infrastructure systems management in extreme contexts; infrastructure resilience; regionalization of responsible management entities of decentralized systems in rural communities; and workforce development.

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Derek Betts, Nassau County Soil and Water Conservation District

Nassau County, NY's Nitrogen Reducing Grant Program 2024 Update

Presentation w/Paper, 25 minutes

Abstract:

Nitrogen pollution from cesspools and septic systems is a leading cause of degraded surface water quality on Long Island, contributing to restrictions on shell fishing, toxic algae blooms, and massive fish kills. Approximately 40,000 residential properties on the North Shore of Nassau County are currently served by cesspools and septic systems. Reversing degradation of water quality depends on the replacement of existing systems with new nitrogen reducing technologies. This need is addressed in Nassau County's Nine Key Element Watershed Plan for Nitrogen which advances efforts to restore and protect the water quality of the groundwater and embayments around Nassau County by recommending the replacement of antiquated and failing septic systems and cesspools with innovative alternative on-site treatment systems. In an effort to incentivize the use of these technologies and protect public and environmental health, Nassau County and New York State have created a septic system replacement program for eligible properties. The Septic Environmental Program to Improve Cleanliness (S.E.P.T.I.C.) provides grant funding of up to $20,000.00 to eligible homeowners, not-for-profits, and small businesses to replace conventional septic systems and cesspools with nitrogenreducing innovative and alternative onsite wastewater treatment systems (IA OWTS). Launched in 2021, the S.E.P.T.I.C. Program is administered by the Nassau County Soil and Water Conservation District (the District) on behalf of Nassau County. The District has been awarded over $10 million to fund over 500 upgrades to nitrogen-reducing technologies. The Program has funded approximately 135 installations to date and has allocated over to 50% of the available funding and expended over $2.5 million in grant funds to property owners. The Program's success has led to national attention and a recent federal investment of an additional $4.125 million through Federal Bipartisan Infrastructure Legislation (BIL).

Bio:

Derek Betts assumed the role of District Manager for the Nassau County Soil and Water Conservation District in the summer of 2021. With over a decade of experience working in the conservation field, Derek began his career with a bachelor's degree in Physical Anthropology from the University of Miami, followed by a master's degree in Conservation Biology from Columbia University. Tapping into his love for conservation and a penchant for travel, Derek then spent several years in the field working for various international conservation NGOs. Beginning with the Peace Corps, Derek served as a natural resource management volunteer in Mali, working with local communities to promote sustainable ecotourism and elephant conservation. From there, Derek lived in Gabon, Switzerland, Kenya, and Ethiopia, and worked for organizations such as the United Nations, The Born Free Foundation, The Aspinall Foundation, and Princeton University. Since returning to the US in 2015, Derek worked for Panthera Cooperation, The African Parks Network, and the Wildlife Conservation Society, helping to manage a suite of conservation projects across the globe. As a native Long Islander with strong, long-lasting ties to Nassau County, Derek is thrilled to focus his conservation efforts back home and help safeguard Nassau County and its environs for generations to come. One of the main programs that Derek currently helps to manage is the Nassau County S.E.P.T.I.C. Program.

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Jason Birdsong, JT Septic Co

What Can We Do About Septage Disposal Problems

Presentation, 50 minutes

Abstract:

Panel discussion of industry leaders on the hot topic of septage management and disposal. They will be discussing and answering questions from participants on ideas and strategies that have worked and have not worked and their continuing efforts to bring this to the attention of regulators and government officials to help address this looming topic.

Bio:

Jason Birdsong is a seasoned professional with 15 years of experience in the wastewater industry, serving as the owner of JT Services a Septic and Plumbing company based in Claremore, Oklahoma. As President of the Oklahoma On-Site Wastewater Association for the past 3 years, Jason played a pivotal role in state rule revisions and has been instrumental in introducing a bill into legislation focused on licensing and installation standards for onsite systems. His leadership and advocacy have significantly contributed to advancing industry standards and promoting environmental sustainability.

In addition to his role in the state association, Jason has served as Vice President of the National Association of Wastewater Technicians (NAWT) for 2 years and is currently the President Elect, where he has actively participated in various committees, bringing valuable insights and expertise to the organization.

Outside of work, Jason cherishes time with his family, including his wife Erin and daughter Delia. He enjoys outdoor activities and is passionate about making a positive impact in his community and beyond through his work and leadership.

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Colin Bishop, Anua

Water Reuse: The Future is Now

Presentation w/Paper, 50 minutes

Abstract:

Water availability and supply adequacy are at the forefront of sustaining worldwide populations. Water scarcity issues are especially acute in the arid western U.S. and in other arid regions of the world. In developed nations, one water opportunity is replacing the use of potable drinking water to flush toilets in residential households and commercial facilities. This is an immediate boost of 25% "found water." Other opportunities exist for irrigation of native landscape vegetation and food crops. The challenges are many. Some of the implementation barriers are the high energy consumption and labor-intensive wastewater treatment systems that are designed to produce non-potable reuse water. Research for non-potable reuse water technology was conducted at the NSF-Waco testing center from July 2021 until September 2023 to develop a very simple, low-cost, and easy-to-maintain system with worldwide applicability. As part of the tested configurations, a coir (coconut) fiber media filter, in unsaturated single pass mode, was selected as the final test set-up. Coconut fiber has been used in onsite wastewater systems for over 25 years. Coconut fiber is a natural media that is low cost, readily available, and an upcycled material. The tested configuration uses a simple-to-operate timed dosing pump to optimize effluent application to the coconut fiber biofilter. Total combined pump run time was 18 minutes a day. In new research, the influent and final effluent was tested for MS2 coliphage. Other pathogen indicators tested include total coliform, fecal coliform, and Escherichia coli. The coconut fiber

biofilter system is especially promising for impoverished regions, developing countries, or regions that lack adequate sanitation. Non-potable water reuse, biofilter applications, and testing data will be presented.

Bio:

Colin Bishop is the Chief Executive Officer of Anua - a sustainable technology manufacturer that provides Clean Water and Clean Air solutions which are integrated into the One Place vision. He is a Registered Sanitarian in multiple states and a Registered Environmental Health Specialist through the National Environmental Health Association. He graduated from Brigham Young University with a Bachelor of Science degree in Zoology. Colin is a scientist, inventor, people connector, spiritual explorer, tech guru, outdoor enthusiast, and runner.

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John R. Buchanan, University of Tennessee

Hydraulic Properties of Drip Distribution Tubing

Presentation w/ Paper, 25 minutes

Abstract:

Tennessee has greater than 400 community-scale wastewater management systems that utilize drip irrigation tubing to place secondary-treated effluent into the soil. These systems range from 0.1 to just over 1 MGD. A typical drip application area will have more than 50,000 feet of tubing in the ground. With this much tubing, it is imperative that the design engineer has the best information about hydraulic properties of the tubing. The traditional pipe friction methods for determining head loss in a closed-conduit (Darcy-Weisbach and Hazen-Williams) do not directly apply to drip tubing because it is not a closed conduit. Water is lost through the drip emitters along the length, thus reducing the water velocity within the tubing. As such, the total head loss along the pipe is less than what would be predicted if the equivalent pipe was transmitting the full flow. A similar hydraulic condition exists in crop irrigation when a lateral has a series of sprinkler heads mounted along its length. J. A. Christianson (1942) developed a relationship between the friction in two pipes (of the same material and diameter), the first carries a flow of water the full length of the pipe and the second has the same flow entering the pipe but the pipe has multiple uniform outlets that results in zero flow at the distal end. This relationship allows the engineer to calculate the friction loss of an equivalent pipe with no outlets and use a factor to determine the friction loss in the lateral. This presentation will detail and discuss the results of a laboratory study that measured friction loss in several types of drip tubing that are commonly used to distribute effluent. Information will be provided as to the different effects on friction loss created by annular-ring or modular styles of emitters that are molded into the tubing during manufacture.

Bio:

Dr. John R. Buchanan is a Professor at the University of Tennessee and is on the faculty of the Biosystems Engineering and Soil Science Department. He has 35 years of teaching, research, and outreach experience in the areas of onsite and decentralized wastewater management, water supply, water quality, and storm water engineering. Dr. Buchanan has B.S. and M.S. degrees in AgriculÂ¬tural Engineering and a Ph.D. in Civil Engineering, all from The University of Tennessee. John is a member of NOWRA, and the American Society of Agricultural and Biological Engineers. He currently serves as the undergraduate director of the Construction Science and Management Program housed within the

Biosystems Engineering and Soil Science Department. John is a registered professional engineer in Tennessee.

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Carolina Cantu, Environmental Protection Agency

Co-presenters: Heidi Faller and Michael Mezzacapo

EPA's Decentralized Wastewater Program: Overview and Updates

Presentation, 50 minutes

Abstract:

EPA has managed a Memorandum of Understanding (MOU) on decentralized wastewater systems with partners in the federal, state and non-profit industry since 2005. The MOU is renewed with partners every 3 years and most recently in December 2023 with 25 industry partners. Priorities of the decentralized partnership include education and outreach, technical assistance for underserved communities, a focus on resiliency and sustainability, data collection and workforce. SepticSmart Week is hosted annually to bring attention to the importance of septic system care and maintenance. This presentation will cover collective results of the MOU partnership from the past year (including ongoing and planned activities) as well as SepticSmart Week involvement strategies to engage the public through an overview of the latest projects.

Bios:

Carolina Cantu is an Environmental Protection Specialist in EPA's Office of Wastewater Management (OWM) in Washington, DC. Carolina recently joined OWM in late 2023 and has supported the expansion of the Closing America's Wastewater Access Gap Initiative. She is also this year's lead for SepticSmart Week activities. Carolina holds a Bachelor of Science in Environmental Science from the University of Arkansas.

Heidi Faller is an Environmental Toxicologist with EPA's Office of Wastewater Management (OWM) in Washington, DC. Her career with EPA has included working in the Office of Science and Technology, Office of International and Tribal Affairs, Office of the Chief Financial Officer and Office of Research and Development. Heidi joined OWM in 2011 and has served as the lead of the Decentralized Wastewater Program since 2015. She manages the Decentralized Wastewater MOU Partnership and is a leading team member of several of the decentralized program's initiatives, including Closing America's Wastewater Access Gap Initiative and SepticSmart Week as well as managing the septic program website. Heidi holds a Bachelor of Arts in Biology from DePauw University and a Masters of Environmental Toxicology from the University of Wisconsin-Madison.

Michael Mezzacapo, MS is a Physical Scientist with EPA Headquarters' Office of Wastewater Management, split between the Clean Water Technology Center and Decentralized Program, including the Closing America's Wastewater Access Gap Community Initiative. He is focused on wastewater technical assistance and technology advancement in underserved rural communities and previously held roles with the State of Vermont and University of Hawaii Water Resources Research Center and Sea Grant College Program.

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Rachel S. Chai, University of South Alabama

Assessment of Wastewater Needs in the Alabama Black Belt

Presentation, 25 minutes

Abstract:

The Alabama Black Belt is a region of central Alabama consisting of 17 counties which have historically and are currently facing wastewater challenges. Vertisol, clayey soils do not allow for water percolation, and that lack of impermeability into the soil matrix causes many of the existing wastewater treatment and disposal systems to fail. Other contributing factors to the Black Belt's wastewater challenges are the rural nature and low economic growth. While the problem of the limited infrastructure in the Alabama Black Belt is quite evident, the identification of the problem has been lacking. This wastewater needs study estimated locations of Black Belt residents, sewer service areas of wastewater utilities, and soil suitability for conventional septic tank systems to solve this complicated issue of the lack of viable (affordable) options for rural wastewater management and to determine potential solutions for the incorporation of decentralized infrastructure. The study identified population clusters of 90 homes or more to tie into existing treatment systems using liquid-only sewer and population clusters that would need their own decentralized clustered treatment systems. Residential homes excluded in the existing service area and clustering will need their own wastewater treatment systems. This clustering approach to connecting residents to wastewater treatment systems and to incorporating more decentralized infrastructure to the community is called the "Three-Legged Stool". Wastewater needs studies and cost estimations have been completed for 16 of the Black Belt counties: Barbour, Bullock, Butler, Choctaw, Crenshaw, Dallas, Greene, Hale, Lowndes, Macon, Marengo, Perry, Pike, Russell, Sumter, and Wilcox.

Bio:

Rachel S. Chai was born in Ocean Springs, MS in 1996. She received his B.S. and M.S. in Civil Engineering at the University of South Alabama in 2020 and 2022. She is currently pursuing a PhD student at the University of South Alabama under the Systems Engineering program focusing on lifecycle assessment for decentralized wastewater treatment systems. Drawing on her experience, her research applies systems thinking and civil engineering design toward finding innovative solutions in the Alabama Black Belt region under the guidance of Drs. Kevin White, Sean Walker, and Kaushik Venkiteshwaran.

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Stuart Coleman, WAI: Wastewater Alternatives & Innovations

The Environmental Entrepreneurship Model

Presentation, 50 minutes

Abstract:

WAI: Wastewater Alternatives & Innovations is an environmental non-profit in Hawaii that is working to protect water quality and reduce sewage pollution by introducing more efficient, eco-friendly and affordable sanitation technologies. Creating a new model of environmental entrepreneurship, our non-profit works with the private sector, government agencies and the public to help convert the 83,000 cesspools in Hawaii. After a long vetting process, WAI partners with leading companies from around the country to find the best sanitation technologies for communities across Hawaii. We also work with government agencies and homeowners to help with permitting, funding and the installation of the most appropriate systems. One example of our cross-sector work involves the EPA's Supplemental Environmental Projects (SEP), where we help companies create a SEP to help low-income homeowners

convert their cesspools. During this presentation, we will discuss different categories of tech partners, pilot projects and our most recent involvement in a SEP that help convert cesspools for three homeowners on Hawaii Island this summer.

Bio:

Stuart Coleman is a writer, public speaker, environmental entrepreneur and non-profit leader. He is the author of over eighty articles and several books, including the award-winning biography Eddie Would Go. After working as the Surfrider Foundation's Hawaii Manager for ten years, Coleman co-founded the non-profit WAI: Wastewater Alternatives & Innovations in 2019 and serves as the Executive Director.

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Alissa Cox, University of Rhode Island

Field Evaluation of Layered Nitrogen-reducing Soil Treatment Areas in Coastal Rhode Islan

Presentation, 25 minutes

Abstract:

For over 15 years, regulations in Rhode Island have required new onsite wastewater treatment systems installed in nitrogen-sensitive coastal areas to include nitrogen reducing advanced-treatment technology. Nearly all of the greater than 6,000 advanced systems installed to date are proprietary technologies, many of which are nitrogen-reducing and approved to discharge no more than 19 mg/L of total Nitrogen in the effluent flowing to the soil treatment area. While proprietary denitrification technologies reduce nitrogen loading in coastal communities, the costs of their design, installation and maintenance remain a significant hurdle to many property owners, and generally discourage voluntary system upgrades to these technologies. Based on lessons learned from field experiments and demonstration systems in nearby Massachusetts and other jurisdictions, staff from a municipal wastewater management program and university researchers collaborated to install and monitor an experimental lower-cost non-proprietary drainfieldbased nitrogen-reducing technology at four residential sites. These systems, called layered soil treatment areas, consist of a pressure-dosed 18" layer of sand (nitrification zone) above an 18" layer of sand amended with locallysourced hardwood sawdust in a 1:1 ratio (denitrification zone). Data from the first two years of operation show promising results: incoming total Nitrogen concentrations are reduced by as much as 94%, and effluent leaving the nitrogen-reducing drainfield meets the regulatory benchmark of 19 mg/L of total N more consistently than proprietary denitrification technologies in the same region sampled over the same time period. Attention to detail and best practices during installation and routine maintenance seem to be key to consistent performance over time.

Bio:

Alissa Cox, PhD, is a Clinical Assistant Professor in the Natural Resources Science department at the University of Rhode Island, and the Director of the URI Onsite Wastewater Resource Center, which includes the New England Onsite Wastewater Training Program. She teaches professional and student audiences about onsite wastewater treatment system function, design, installation, maintenance, troubleshooting and performance monitoring. Her applied research revolves around understanding threats posed by groundwater table dynamics and climate change to current and future onsite wastewater treatment systems along the coast, as well as documenting the field performance of diverse advanced residential wastewater treatment technologies. Effective education and community engagement are central to Alissa's interests, and she works with different stakeholders to examine how

research and holistic wastewater management approaches can help improve both local water quality and the resiliency of coastal communities facing myriad future changes and threats.

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Mick Credere, Advanced Wastewater Promotion

Decoding AI: Is It Relevant to the Septic, Plumbing, and Wastewater Industry?

Presentation, 50 minutes

Abstract:

The AI Boom & What It Means For Us In The Wastewater Industry As someone deeply ingrained in the septic, plumbing, and wastewater sector, I can affirm that the AI revolution is not a far-off phenomenon but a current reality and does have ways we can utilize it in our industry. Artificial Intelligence - once the stuff of sci-fi- has become the fabric of business operations across sectors. For those of us in the wastewater world, the question isn't if AI will impact us, but how, and to what extent. AI is already transforming our industry by automating routine customer service and interaction tasks. AI can be used to make our operations more efficient and cost-effective. But let's be clear, embracing AI doesn't simply mean investing in flashy, high-tech technology. It requires an understanding of its capabilities, limitations, and potential impact on our operations and interactions with our customers. But as we journey into the AI landscape, it's crucial to remember that integrating AI into our operations isn't about replacing the human element - far from it. AI is a tool, not a replacement for human intuition and decision-making. Our employees, with their years of experience and expertise, are irreplaceable assets. AI is simply another tool in our arsenal, helping us streamline our operations and customer interactions. So, as we navigate the rise of AI, let's remember to approach it with a measured and skeptical perspective. It's not about getting swept away in the wave of AI innovation but harnessing it intelligently, strategically, and cautiously to enhance our services and grow our businesses.

Bio:

With an unexpected background coming out as an officer in the US Marine Corps, Mick Credere translated his knowledge of weapon systems to leap into a successful startup that specialized in marketing for the defense sector working under what is now one of his mentors. With the successful growth and sale of that company, Mick was able to translate the knowledge he gained in digital marketing from the defense sector, to help start AWP with the help of a partner and his wife Kristina focusing on the unique challenges faced by businesses in the wastewater industry. Now representing clients in 17 states and across almost any part of the wastewater industry you might imagine, AWP has successfully grown into a well-known brand. Mick is proud to stand as a disruptive and aggressive leader in the wastewater industry and looks to upend the standard way of doing business. In his free time, Mick is an avid pilot and chauffeur for his children and his wife and daughter's horses.

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Nelson da Luz, University of Massachusetts Amherst

Machine Learning Based Estimates of Wastewater Infrastructure Coverage Across the United States

Presentation, 25 minutes

Abstract:

There has not been a comprehensive national data collection of wastewater infrastructure serving the United States Population since the 1990 US Census. This is a major data gap with implications for protecting and evaluating risks to human health and asset management of buried wastewater infrastructure. We propose the use of machine learning techniques (Random Forest) to close this data gap and lay the groundwork for use of these techniques across the United States. Using data from the Florida Water Management Inventory, we employ a two-stage machine learning approach to develop a statewide model for estimating wastewater infrastructure coverage for Florida. In Stage 1, we identify whether a parcel needs wastewater infrastructure of any kind. In Stage 2, we identify whether a parcel is served by an onsite wastewater treatment system or by a centralized sewer connection. To evaluate the approach's applicability to other geographies, an out of sample test in Virginia is conducted. Using the statewide model in Florida with a traditional formulation of random training and test partitions results in 96.8% Stage 1 accuracy 97.3% Stage 2 prediction accuracy. For a subset of locations in Virginia, we found 78.1% Stage 1 accuracy and 90.7% Stage 2 accuracy using the Florida based model. Thus far, we have generated inferences of wastewater infrastructure type in 257 counties (~25.7 million parcels) across 5 states (AL, CA, FL, NC, VA). We will present an overview of the model, its performance across the US, and use-cases for this novel dataset.

Bio:

Nelson da Luz is a Postdoctoral Research Associate at the University of Massachusetts Amherst. He earned his PhD under Dr. Emily Kumpel with the dissertation "Enhancing Management of Built and Natural Water and Sanitation Systems Using Data Science". In his research, he works at the confluence of data intensive computing and civil infrastructure related to water and sanitation. He employs investigative tools such as modeling, simulation, high performance computing, machine learning, and dataset usage and manipulation. He received his BS in Civil Engineering and ME in Environmental Engineering from Manhattan College in Riverdale, NY. He has had his Engineer in Training qualification since 2015. Past research projects have included bioaccumulation and sediment transport modeling, evaluating water quality monitoring programs for distribution systems, and developing tools for evaluating surface water quality monitoring programs. In the onsite/ decentralized industry space, he is actively involved in the state of California's ongoing Wastewater Needs Assessment, providing machine-learning model-based estimates of wastewater infrastructure coverage. More broadly, he is involved in the research and development of model-based tools for similar purposes for national use across the United States. He has also been a presenter as part of US EPA's Septic Smart Week.

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Derek DeLand, NSF

Conserve and Protect: NSF Onsite Wastewater Treatment and Reuse Standards

Presentation, 50 minutes

Abstract:

Protection of groundwater from contamination is an ongoing concern, particularly in areas with low permeability soils and water tables that are rising and/or already high. Over time there has been a shift away from simply disposing of onsite wastewater toward a focus on treatment prior to dispersal into the environment. Safer and healthier environments result as BOD, turbidity and nitrogen are reduced. Additionally, drought conditions alongside increased water demands and costs have strained water resources leading to the implementation of reuse systems which present additional treatment challenges. But, regardless of the type of onsite treatment system deployed, how do manufacturers

demonstrate the effectiveness of their systems/ technologies? Further, how are regulators and the public assured that adequate treatment is being achieved? NSF standards are developed to ensure that treatment technologies and systems are designed and function to treat onsite wastewater safely and effectively, matching performance to end-use needs. These national standards, and the certifications to them, are frequently referenced in regulations for compliance in protecting users and the environment. This presentation aims to increase attendees' knowledge of NSF/ ANSI 40 (onsite treatment), NSF/ANSI 245 (nitrogen reduction) and NSF/ANSI 350 (water reuse). The standards and certification process will be discussed, including performance testing details such as influent and effluent characteristics, dosing volume, and stress loading. Additionally, a significant update to NSF/ANSI 350 for commercial and multi-family systems that utilizes a risk-based approach incorporating pathogen log-reduction targets (LRTs) will be introduced.

Bio:

Derek DeLand is the Environmental Health Programs Manager in NSF's Government Affairs Division. In this role he serves as a point of contact for local and state regulatory agencies providing support with respect to NSF standards, certifications, and services. Additionally, he has served on several NSF standard development task groups, including chairing the task group charged with updating the NSF 350 standard to incorporate risk-based methodologies. Derek came to NSF after 19 years at a local health department in Michigan where he served as a sanitarian and Environmental Health Director overseeing food safety, drinking water, onsite wastewater, and various other programs. He received his MPH with an environmental health concentration from the University of Illinois-Springfield and is a credentialed REHS/RS.

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Bruce Douglas, Vermont Department of Environmental Conservation

Impact of Large-Scale Soil-Based Wastewater Treatment Systems on Surface Water Quality in Vermont

Presentation, 25 minutes

Abstract:

The Vermont Department of Environmental Conservation Indirect Discharge Program regulates 182 soil-based domestic sewage treatment and disposal systems with a design or disposal capacity over 6,500 gallons per day. The objective of this presentation is to present the results of a data-driven evaluation of the impact of medium to large scale soil-based wastewater treatment systems on the quality of surface water in Vermont. Seven Vermont on-site subsurface wastewater treatment systems were selected because sufficient data existed for each system (9 - 33 years), and the sites reflected a range of design flows (6,600 - 230,000 gpd), treatment levels (primary, secondary-plus and tertiary), and geographical locations. Effluent quality and receiving surface water quality data were collected from periodic inspection and monitoring reports of the selected Indirect Discharge systems and analyzed. The results show that all the systems met applicable ultimate receiving water quality standards, providing evidence of successful nutrient attenuation through unsaturated soil and groundwater flow for the protection of surface water quality.

Bio:

Mr. Bruce F. Douglas, PE. has over 40 years of private and public sector experience in hydrogeology, soil science, and environmental engineering, focusing on decentralized wastewater management, onsite wastewater soil absorption systems and non-potable water reuse. He has a Bachelor of Science degree

in Hydrology from the University of New Hampshire and a Master of Science degree in Plant and Soil Science from the University of Vermont. During his professional career, he has been involved in project planning, design, construction, operation, and management of wastewater treatment systems from the individual household level to small community systems. He is a member of the National Onsite Wastewater Recycling Association, the State Onsite Regulator's Association, and the New England Water Environment Association (NEWEA), where he has served as chair of NEWEA's Water Reuse Committee. He is also a member of the Water Environment Federation's Decentralized Water Infrastructure Task Force. He is currently the Wastewater Programs Manager in the Drinking Water and Groundwater Protection Division of the State of Vermont's Department of Environmental Conservation.

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Matthew Dowling, Town of Charlestown, RI

Relationship Between Groundwater Nitrate Concentration and Density of Onsite Wastewater Treatment Systems: Role of Soil Parent Material and Impact on Pollution Risk

Presentation, 25 minutes

Abstract:

Nitrate (NO3) pollution from onsite wastewater treatment systems (OWTS) is a concern in coastal communities that rely on groundwater for drinking water because of health risks associated with high levels of NO3âˆ’ and the potential for eutrophication in areas where ground and surface water are connected. We examined the relationship between OWTS density and groundwater NO3âˆ’ concentration in glacial soils with different parent material in a coastal watershed in the town of Charlestown, RI. The area is underlain by glacial till and fluvial deposits, with groundwater as the only source of potable water and OWTS as the only means of treatment. The density of OWTS/ha was not significantly different between glacial fluvial (median=1.0; range, 0.04-4.8; n=207) and till (median=1.3; range, 0.012-3.81; n=160) soil parent material. Nitrate levels (mg N/L) in shallow well samples taken from 2013 to 2022 were significantly higher in till (median = 3.7; range, 0-15; n=160) than in glacial fluvial (median=2.7, range, 0-9.7; n=207) parent material. Groundwater NO3âˆ’ levels increased linearly with density of OWTS, and the slope (mg N ha/L OWTS) and intercept (mg N/L) values for the regression were significantly higher for till (0.99; 2.28) than glacial fluvial (0.66; 1.95) parent material. Regression intercept values greater than 0.5 mg N/L, corresponding to a density of 0 OWTS/ha, point to widespread mixing of contaminated groundwater. Cumulative probability analysis showed that the proportion of samples with NO3âˆ’ levels corresponding to Extreme pollution risk (greater than 5 mg N/L) was much higher in till than in glacial fluvial parent material at the same OWTS densities. Fewer than 10% of the NO3 values were in the Low-risk category (less than 0.5 mg N/L) regardless of OWTS density or parent material. Our results suggest that OWTS density and soil parent material should be part of the criteria for water management and land use decisions to protect public and environmental health.

Bio:

Matt Dowling is the onsite wastewater management program manager for the Town of Charlestown (RI) and has nearly 25 years of project coordination experience in groundwater hydrogeology, watershed management and groundwater remediation. In his current role, Matt currently oversees the individual management of over 5,000 onsite wastewater treatment systems (OWTS) in Charlestown, including nearly 900 advanced nitrogen reducing OWTS for protection of public health and the environment. Matt's programmatic approach and methods are rooted in holistic watershed management practices.

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Tom Ferrero, Elkhart Environmental Processing Corp

Having Septage Disposal Problems?

Presentation, 50 minutes

Abstract:

This presentation will look at the options a septic tank pumper has to take control of his one disposal destiny. The presentation will include a comparison of land application, disposal at a publicly owned treatment works, and dedicated septage treatment facilities. The economics of each option is considered to allow a decision be made quantitatively. The template for comparison is useful for individuals to make their own disposal decision.

Bio:

Tom Ferrero, owner of Elkhart Environmental Processing Corp, Elkhart, IN. Beginning as a septic tank pumper in a family-owned business whish his father started in 1941, Tom never strayed too far from a septic tank. Tom has a BS in Civil Engineering and has been a certified Sewage Treatment Plant Operator and Sewage Enforcement Officer. From 1970 to 1998 he owned and managed a full-service septic system company and developed and continue to use daily (e.g. 20 million gallons in 2023) a process which pretreats septage prior to introduction of the liquid faction in to a municipal sewage collection system and landfills or beneficially uses the dewatered solids. Tom has held positions in the septage industry associations on a National, State, and local level, and his leadership includes being the National Association of Wastewater Technicians (NAWT) first Secretary. He is a past President of NAWT and currently the NAWT Secretary. While no longer flying, Tom, a private pilot could often be found flying around Pennsylvania and the surrounding states rallying support for the unification and training of septage haulers along with helping other develop septage processing facilities.

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Aaron Forbis-Stokes, Triangle Environmental Health Initiative

Onsite Treatment and Water Reuse Systems in Climate-Threatened Coastal Regions

Presentation, 25 minutes

Abstract:

Rural coastal Virginia is one of the most climate-threatened regions of the US. Within the next thirty years, nearly the entire Middle Peninsula region of VA will have less than 3 feet of usable soil above the water table. Local professionals refer to the region as the "septic repair capital of the East Coast." Some solutions do exist to address the septic challenges; however, these solutions have their own challenges - disruptive implementation, high capital expenses, and increased flooding in the region can still damage these alternatives. Meanwhile, sea level rise simultaneously impairs water supply via saltwater intrusion. The primary approach to improving water supply is drilling deeper wells which is also expensive and includes the risk of further contaminating groundwater. Further, sea level rise will likely consume many of these homes in the next fifty years, decreasing the interest in investing funds into systems that cannot be removed. In response to these challenges Growth & Opportunity Virginia provided funding to Triangle Environmental (TE) to pilot two onsite wastewater treatment and reuse systems in the region. TE's system can treat multiple sources of wastewater to a high-quality effluent

utilizing a small-footprint, above-ground, and modular design. These features mean that the system can be installed elevated above flood levels, can be installed (or moved to a new location) in a minimally invasive manner, and the effluent quality opens opportunities for onsite non-potable water reuse or direct discharge. These pilot systems will be tested with septic tank effluent, raw greywater, and advanced treatment system effluent to demonstrate performance from different types of wastewaters. TE will present a case study of the region's climate change challenges, the performance of the pilot systems, the implications of alternative treatment and reuse systems, and the challenges and opportunities of existing and emerging regulations for onsite systems.

Bio:

Triangle Environmental is a small business founded in 2016 and focused on the development of technologies and services related to Water, Sanitation, and Hygiene. Triangle Environmental partners with academic and research institutions and private companies to develop novel technologies that Triangle Environmental can then accelerate from the lab to the field and finally to market. Prior work includes research and development, implementation, consulting and execution services for Bill & Melinda Gates Foundation funded technologies ranging from "Reinvented Toilets", to improved pit latrine emptying, mobile septage treatment technologies, and community-scale treatment systems. Aaron Forbis-Stokes, Ph.D., serves as the Research and Development Manager for Triangle Environmental. His technical background includes biological waste treatment, nutrient removal, energy recovery, and membrane-based separation processes from bench-top to full-scale systems with a focus on decentralized systems. His work includes developing five different technologies through 12 full-scale pilot systems across five countries. Prior to joining Triangle Environmental, Aaron received Bachelor's and Master's degrees in Civil Engineering from Texas A&M University and then a PhD in Environmental Engineering at Duke University.

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Ryan Fox, Fox Onsite Solutions

Overcoming Challenges in Septic and Water System Recovery for California Wildfire Victims: Insights from the CZU Lightning Complex Fire

Presentation, 25 minutes

Abstract:

The CZU Lightning Complex Fire of 2020 devastated Santa Cruz County, CA leaving over 900 homes destroyed and thousands displaced. As a subcontractor for the County, Fox Onsite Solutions faced the daunting task of reviewing and implementing septic and water systems for fire-affected individuals for the regulatory review. This abstract explores the complexities encountered during this process and the innovative strategies employed to overcome them. High Cost of living, COVID, limited insurance coverage, and tight California regulations posed a significant challenge property owners with inadequate resources to address their needs. Coupled with unique property characteristics such as high groundwater levels, fast-percolating soils, tight lots, and shallow bedrock, installing new/replacement onsite systems became exceedingly difficult. This presentation/session offers a comprehensive exploration of the lessons learned from the CZU wildfire recovery efforts, providing valuable insights for policymakers, environmental regulators, and disaster response professionals. By sharing our experiences and best practices, we aim to contribute to the ongoing dialogue surrounding disaster recovery and resilience in the face of future environmental challenges.

Bio:

Ryan Fox, the owner of Fox Onsite Solutions in Santa Cruz, California, brings over a decade of experience in the onsite wastewater industry. Ryan earned a B.S. in Biological Sciences from the University of California, Davis. He is a third-generation wastewater professional. Initially starting as an inspector but then transitioning from a regulatory role into consultancy, Ryan founded Fox Onsite Solutions in 2018. His firm focuses on permitting, testing, and design of standard and enhanced onsite wastewater treatment systems in the California Bay Area.

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Trevor Gillespie, Infiltrator Water Technologies

Best Tools for Best Practices: There is More Than One Way to Design and Install a Septic System.

Presentation, 25 minutes

Abstract:

Get out of the same trench you have been digging, designing, or filling for the last 30 years. Septic design is not a plug and play business. Every lot has unique characteristics that should be considered when designing and installing septic systems. After covering Arizona for over a decade I have realized how important it is to have a state embracing new technologies and products as well as a design and installation community willing to look at each lot and install the septic system best suited for the lot. From advanced treatment systems (ATU's), Combine Treatment and Dispersal (CTD) and products for conventional systems, deciding what system components are best for the lot takes understanding your states regulations and knowing what technologies are available for optimal performance and functionality.

Bio:

Trevor's career in the building materials industry began in 1998 working for tool manufacturers including Stanley, Bosch, Skil and PorterCable. He went on to sell building materials in Southern California for Prime Source Building Materials, one of the largest purveyors of fasteners in the world and one of the largest distributors of building materials in the world. In 2013 Trevor began working for Infiltrator Water Technologies covering CA, NV and AZ as a sales representative. Trevor's industry involvement includes positions as board member for the Arizona Onsite Wastewater Recycling Association (AzOWRA) as well as a member of the California Onsite Water Association (COWA) and the National Onsite Wastewater Recycling Association (NOWRA). Trevor is based in Thousand Oaks, CA.

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Claude Goguen, National Precast Concrete Association

Coatings and Sealers for Precast Concrete Wastewater Tanks - What to Use Where and Why?

Presentation, 50 minutes

Abstract:

Concrete is the most widely used construction material in the world thanks in large part to its strength, long service life, wide accessibility to raw materials, ease of production, and its incredible durability. In certain conditions however, concrete requires additional durability-enhancement measures to preserve or improve its integrity throughout the structure's or system's service life. Coatings and sealers can

enhance concrete protection with anticipated exposure to higher levels of water, salts, hydrocarbons, acids, bacteria, and even sugar. During this session we will discuss precast concrete durability in onsite wastewater treatment applications that range from household to heavy industrial. We will first explain the difference between coatings and sealers in terms of applications and performance. We will define damp-proofing and waterproofing and explain applications for each. We will describe the significance of waterborne vs. solvent-borne coatings, factors impacted by the coatings' percentage of solids, outgassing, and corresponding installation considerations. We will discuss the corresponding durability-enhancement strategies that work best for each exposure.

Bio:

Claude Goguen has more than 30 years of experience in the precast concrete and construction industry. He holds a degree in Civil Engineering and is a licensed P.E. in Indiana. Prior to his role as VP of education with NPCA, Claude was an operations manager at a precast concrete manufacturing plant. Since starting with NPCA, Claude has focused on the onsite wastewater industry and has served as the staff liaison to the NPCA Water and Wastewater Structures Committee. Claude also serves on NAWT and NOWRA education and technical committees and served on IOWPA and NOWRA Board of directors. He has presented courses and seminars relating to precast concrete wastewater systems at various federal, state and regional onsite wastewater meetings over the last 17 years.

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Dennis Hallahan, Infiltrator Water Technologies

The Future of Onsite: What the Future Holds for Wastewater Treatment Systems

Presentation, 25 minutes

Abstract:

Onsite sewage treatment and disposal systems (OSTS) are a part of the nation's Decentralized Wastewater Treatment Infrastructure and play a large role in protecting public health and the environment. These systems have come a long way with the associated professionals, regulatory programs, and manufacturers. But where are OSTS's going? What are the next items on the horizon which our industry will face? There are advancements in technology from contractor's equipment to new advanced wastewater treatment technology and the implementation of regulations which require higher treatment levels. There will be new items to address such phosphorus and Contaminants of Emerging Concern (CECs), which are chemicals and toxics that have been found in waterbodies that may cause ecological or human health impacts and are not currently regulated. This presentation will discuss the potential future pathways where decentralized systems can face the next generation of challenges.

Bio:

Dennis F. Hallahan, P.E., is the Technical Director of Infiltrator Water Technologies. Dennis has over thirty years of experience with the design and construction of on-site wastewater treatment systems. He has authored several articles for on-site industry magazines and has given numerous presentations nationally on the science and fundamentals of on-site wastewater treatment systems. Dennis also oversees a department that is responsible for product research and testing for both Universities and private consultants. The department develops system sizing charts for national and international codes, and assists engineers in the design of large decentralized systems, some in excess of 1 million gallons per day. He received his MS in civil engineering from the University of Connecticut and his BS in civil engineering from the University of Vermont. Dennis is a registered professional engineer in Connecticut.

He has been with Infiltrator Water Technologies for over 20 years and in his current position as Technical Director, he is responsible for the technology transfer between Infiltrator and the regulatory and design communities. Dennis also holds several patents for on-site wastewater products. Member ASCE, WEF, NOWRA, has served as chairman of the NOWRA Technical Practices Committee and also serves on the NOWRA Educational Committee. Dennis is also a member of the New England Water Environment Federation and serves on the Small Communities Committee.

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Brian Harding, Service Industry Success

The Six Reasons Employees Do Not Do What We Need, And How to Overcome Each.

Presentation, 50 minutes

Abstract:

Are you tired of repeatedly asking, double checking, begging, or even threatening your employees to get support (or even compliance) with the initiatives, processes, and goals within your company? Have you had enough frustration resulting from your team not getting on board with what you and your customers need them to do? Are you tired of having the same unproductive conversations with them over and over again, without seeing any meaningful improvement? Don't you wish it was easier to get genuine buy-in and improvement? It can be!

Employees generally don't comply with or support company initiatives for only six reasons. Some of the reasons are likely to surprise you. Unfortunately, your team is not likely to tell you which of the six reasons is holding them up in a particular instance – whether it's individually or collectively. They might not even know themselves!

Noncompliance is not generally because employees don't care, or because they are lazy, selfish, or stubborn. Do those people exist, and have you employed some of them? Of course! But those are not likely to comprise the bulk of your workforce today. Like most business owners and leaders, you probably have a team you appreciate very much. You just need them to be consistent with their performance, follow through, and maybe even initiative.

If you're tired of feeling frustrated by employees not supporting your goals and objectives, you won't want to miss this session!

Bio:

Brian Harding is an author, podcaster, professional keynote speaker, and business consultant for entrepreneurs in service industries who want to build a business that can run without them. He has nearly 20 years' experience owning and operating a service-based business, and more than 25 years' experience leading and managing employees. Brian is a leading authority on creating, developing, and implementing proven, practical step-by-step solutions, strategies, and processes that allow his clients to attain the freedom and growth they want. Some of the most common benefits his clients cite are clarity, confidence, peace of mind, and accelerated growth. His strategies draw upon many years of practical experience in leadership, process improvement, accounting, sales and marketing, and of course leading and managing employees. After experiencing tremendous growth in his own company, helping others who had similar aspirations followed. Business owners frequently began approaching Brian for help and he learned that the solutions they created with Brian's help resulted in tremendous growth, efficiency,

improved profitability, peace of mind, more time off, and other significant kinds of progress. From there, creating Service Industry Success, a program to provide formal guidance for service industry entrepreneurs looking for similar results, was a natural progression. After selling his own multi-million-dollar business and moving to the sunshine in Arizona, Brian now spends most of his time helping business owners in service industries solve their people, process, and profitability problems and build the companies they are dreaming of.

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Brian Harding, Service Industry Success

How To Grow Your Small Business into A Larger Company

Presentation, 50 minutes

Abstract:

Have you established the foundations of your company and now are truly ready to scale?
Do you aspire to expand your 10-employee company to a 20-employee company, or grow your 25-person team to a 50-person operation? Are you ready to get that next level of leadership in place that will free you from doing tasks so you can focus on bigger plans and ideas? If so, this is the session for you!

Successfully scaling a company is about much more than just securing more customers and acquiring the in-the-field talent necessary to serve those customers. We must also prepare for and create plans to maintain our performance and service expectations in increasingly more frequent situations where we will have less direct oversight.

With a bigger leadership team, and probably a new layer of leadership to develop and incorporate, we will have to overcome new challenges, and make different kinds of decisions, than we did when we were much more hands-on in all aspects of our business operations. If you are interested in serious growth, want to prepare yourself for what is ahead, and get an idea of the kinds of challenges you may face, this is a must-attend session!

Bio:

See above.

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Sara Heger, University of Minnesota

Design, Installation and Management Considerations for Septic Systems Serving Vacation Home Rentals

Presentation, 50 minutes

Abstract:

US short-term rental supply hit record highs in 2022. That means more of your customers may be renting out their vacation homes either part time or full time. Vacation home rental can create numerous resulting in more frequent maintenance and management. Unaware property owners could irreparably damage their system if these issues are not addressed. The first concern is an overall

increased hydraulic loading. The second concern is peak loading of water and cleaning products. The third concern is having renters who do not understand how septic systems work and the limitations and rules around proper use. On the design side, increasing design flows, incorporating time dosing, and upsizing components are all items to address when new systems are installed. Installation topics focus on educating the customer and protecting the system from traffic. On the management and maintenance side, rental properties that are heavily used should have more frequent service visits. These visits can help alert owners of system abuse and needed maintenance before serious problems arise. On conventional systems, annual service visits to measure the accumulation of sludge and scum are advisable, along with an evaluation of overall system performance. Advanced treatment systems may also need increased maintenance.

Bio:

Dr. Sara Heger 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. Sara is the past president of the National Onsite Wastewater Recycling Association. For over 20 years, she has been conducting research and providing education and technical assistance to students, homeowners, small communities, onsite professionals, and local government units regarding decentralized onsite wastewater treatment. Sara coordinates the research program at the University of Minnesota with current projects evaluating the bioaugmentation of septic tanks and adding biochar and iron enhanced sand into septic systems. Dr. Heger serves on the NSF International Committee on Wastewater Treatment Systems and chairs Minnesota's Septic System Advisory Committee. She has a BS in Biosystems & Agricultural Engineering and a MS and PhD in Water Resource Science.

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Michael Hines, Southeast Environmental Engineering

Management/Maintenance of Decentralized/Distributed Wastewater Systems in Tennessee

Presentation w/ Paper, 25 minutes

Abstract:

Management structures must be in place for every wastewater system. These structures must be adequate to ensure systems perform as designed throughout their useful lives. In 2003, USEPA published recommended guidance on five Models of management based on increased complexity and level of risk posed by those systems. Conventional septic tank/drain field systems are the lowest Model 1 with biological/mechanical systems serving multiple properties in sensitive environments as Model 5. This presentation discusses how those Models are applied in the real world. In January/February 2024, Tennessee Department of Environment and Conservation conducted snapshot inspections of 350 advanced treatment/effluent drip dispersal systems in an attempt to identify how these were performing. Results of those inspections are presented in the discussion.

Bio:

Michael Hines holds a B.S. in Engineering from Southern Illinois University and M.S. in Environmental Health Engineering from Kansas University. He has worked in wastewater engineering for 56 years; 13 years with the Illinois Department of Public Health (Assistant State Sanitary Engineer); 14 years in corporate environmental management for the Tennessee Valley Authority (Manager, Environmental Compliance Branch); and 34 years to date as Founding Principal, Southeast Environmental Engineering and President, Utility Capacity Corporation. Mike has designed, constructed, and operated over 50

advanced treatment/effluent drip dispersal systems. He is active in NOWRA, AWWA, and WEF. In 1968-1969, Ronald "Tony" Favreau and Mike developed the recirculating sand filter process used around the world.

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Jiayi Hua, University of South Florida

Environmental and Economic Sustainability Assessment for Onsite Sewage Treatment and Disposal System (OSTDS)

Presentation, 25 minutes

Abstract:

Onsite sewage treatment and disposal system (OSTDS) is a major diffuse source of nutrients, causing harmful algal bloom in Florida. OSTDSs face significant challenges related to their environmental impact and insufficient maintenance management. This study focuses on how different scales, OSTDS types, and maintenance frequencies impact the environmental and economic sustainability of OSTDS. The study designed 24 hypothetical scenarios for evaluation. Life cycle assessment (LCA) and life cycle cost analysis (LCCA) were conducted to assess OSTDS with a functional unit of 100 houses over 20 years. The ReCiPe Midpoint (H) V1.09/World Recipe H impact characterization method was used for the assessment, analyzing seven impact categories for the scenarios. Cluster systems, where ten houses connect to one OSTDS, generated less emission across all categories compared to individual systems. Advanced systems, such as those with Fuji Clean or inground nitrogen reducing biofilter (INRB), performed better in eutrophication categories than traditional systems. Systems with improper maintenance frequencies, for example, 5-year maintenance frequency, may cause higher impacts under freshwater and marine ecotoxicity categories compared to properly maintained systems. Therefore, cluster systems are preferable to individual systems due to their lower emission across most impact categories. Advanced systems are preferred when prioritizing concerns of eutrophication. Proper maintenance frequencies result in lower environmental impacts across the majority of impact categories.

Bio:

Jiayi Hua is a Ph.D. student in the Department of Civil & Environmental Engineering at the University of South Florida. She obtained her B.S. in Environmental Engineering at Suzhou University of Science and Technology and her Master of Engineering in Environmental Engineering at the University of South Florida. She is an ENVISION Sustainability Professional (ENV SP) and a certified Water Sustainability Professional. She wants to contribute to the field of sustainability to help people survive and thrive in new living environments with limited natural resources.

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Charles Humphrey, East Carolina University

Mitigation of Septic-System Derived Nutrients and Fecal Indicator Bacteria by a Natural Wetland

Presentation, 25 minutes

Abstract:

A natural wetland receiving drainage from an urbanized watershed served by onsite wastewater systems was evaluated over a two-year period. Inflow loadings of phosphorus and E. coli were compared to outflow exports to determine if the wetland was providing ecosystem services. The exports of total phosphorus and E. coli leaving the wetland were significantly (p less than 0.05) lower in comparison to inflow loadings. The treatment efficiency of the wetland was greatest during warmer months of the spring and summer when evapo-transpiration rates and hydraulic residence times were also highest. Hydraulic head readings from three piezometers indicated the wetland was a recharge area. Concentrations of phosphorus and E. coli were lower in groundwater sampled from the deepest piezometer relative to the shallowest piezometer, thus treatment was occuring during infiltration and percolation. The wetland was treating drainage from the neighborhood, but sever erosion was observed along three of the wetland outlets. Some efforts to slow runoff and improve septic system functionality were implemented but more work is needed to stabilize the wetland and conserve it's ecosystem services.

Bio:

Charles Humphrey is a Professor of Environmental Health Sciences at East Carolina University (ECU). He earned a PhD in Coastal Resources Management: Geoscience concentration from ECU, a MS in Soil Science and a BS in Natural Resources: Ecosystems Assessment from North Carolina State University (NCSU). He has over 27 years experience in the onsite wastewater field including 3 years as an Environmental Health Specialist, 3 years as a research technician, 7 years as an Area Environmental Agent for NCSU Cooperative Extension, and 15 years a Professor at ECU. He is a Registered Environmental Health Specialist, NC Licensed Soil Scientist, and NC Authorized Onsite Wastewater System Evaluator.

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Travis Johnson, Infiltrator Water Technologies

Septic Tank Installation Strategies for Success

Presentation, 25 minutes

Abstract:

Septic tanks are strong and versatile and enable a wide range of installation possibilities, including shallow installations and multiple and serial tank configurations. In this presentation we will learn more about septic tanks for septic and potable water applications. The risk of flotation due to the presence of groundwater above the bottom of the tank will also be addressed. The goal of this presentation is to prompt regulators, designers, and installers to think about tank placement, installation, buoyancy for the installation of any tank installation keeping installation best practices and safety in mind.

Bio:

Travis Johnson has worked in the onsite wastewater industry for over 16 years. He spent the first ten years working for a large full-service septic contractor in Minnesota. During those ten years, he acquired all the Minnesota SSTS certifications including his advanced designer and inspector certifications. Travis specialized in tight lots and larger flow systems. He currently represents Infiltrator Water Technologies in Minnesota, North Dakota and South Dakota.

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Jonathan Kaiser, Infiltrator Water Technologies

Co-presenter: Ashley Donnelly

Flows and Loads - Wastewater Design Considerations

Presentation, 25 minutes

Abstract:

This presentation will take a holistic approach to wastewater treatment considerations, accounting for varying hydraulic flows, organic loads, and other related considerations. The impact of these critical variables on wastewater treatment systems will be analyzed through many design examples and case studies. Onsite wastewater treatment system component designs considered in this presentation include the septic tank, treatment tank, and drainfield. Overlooking unique influent wastewater characteristics in every design can lead to unsustainable treatment not meant for longevity. Innovative and specific solutions to these potentially challenging site conditions will be discussed.

Bios:

Jon joined Infiltrator Water Technologies in 2016 as a Project Engineer after graduating with his B.S. in Environmental Engineering from the University of Vermont. He is currently a project manager and spends his time at Infiltrator working on research and development initiatives and new product development. Jon also serves as the Chair of the National Onsite Wastewater Recycling Association (NOWRA) Emerging Professionals Committee. He is also a presenter and published author on many industry-related topics.

Ashley has a passion for building relationships within the onsite wastewater treatment industry through training and technical education. Ashley entered the industry over 20 years ago and works to preserve the environment through sound wastewater treatment solutions. In her position at Infiltrator Water Technologies (IWT), she manages the Inside Sales Team and is responsible for maintaining and building customer relationships. This involves assisting engineers, contractors and regulators with technical and design information, training, installation, and operation & maintenance. In 2020, she launched IWT's webinar program, which is currently accredited in over 14 states and has trained over 5,000 attendees on various contemporary industry topics. She serves on the National Onsite Wastewater Recycling Association (NOWRA) Board of Directors as well as committees within the industry (NOWRA Emerging Professionals (Social Outreach Chair) and NEWEA Small Communities Committee

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Jonathan Kaiser, Infiltrator Water Technologies

A Roadmap for Investing in Emerging Professionals

Presentation, 50 minutes

Abstract:

The onsite wastewater sector competes with other industries in the recruitment, retention, and development of new workers. Within today's tight labor market, the onsite wastewater sector has struggled to bring in new talent. This shortage has led to persistent job vacancies, overburdened staff, and some people within the sector staying well past retirement age to ensure company success. To reverse this trend, a concerted effort must be made by leaders within the onsite wastewater sector to actively engage with the future workforce. This panel consists of stakeholders who are leading recruitment and professional development initiatives aimed at young and emerging professionals in the

industry. The panelists will discuss their initiatives, impacts, successes, and challenges. The audience will also be encouraged to engage in a discussion and share their experiences on this topic. The session is intended to form a collaborative and supportive environment that will ignite ideas for expanding or developing new programs to support emerging professionals.

Bio:

NOWRA's Emerging Professionals Committee is dedicated to workforce development, recruitment, and advocacy on behalf of young and early career professionals in the onsite wastewater treatment sector. The committee was formed after the 2021 Mega Conference and is NOWRA's newest committee.

See above for Kaiser's bio.

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Ben Kele, Arris

Volcanic Media in Nature Based Treatment Systems

Presentation w/ Paper, 50 minutes

Abstract:

Nature based wastewater treatment solutions are becoming increasingly popular around the world. Because they are passive or have low-energy inputs, they are considered environmentally friendly with relatively low greenhouse gas emissions. It can be challenging to achieve higher treated water quality objectives using these technologies. This paper/presentation will discuss how using volcanic rocks, such as zeolite and scoria as filtration media in nature based treatment solutions can reduce nutrient concentrations, especially nitrogen, via ion-exchange. The difference between ion exchange and absorption will be discussed. As will the design principles required to calculate the effective life of the volcanic media in the on-site wastewater treatment system. The differences between lab-based experiments and real world installations will be examined. Results from a variety of on-site and decentralized case studies will examine how the volcanic media treated wastewater from domestic and commercial sources. The regeneration, replacement, and disposal of the volcanic media will also be covered. The use of volcanic media, instead of just gravel, can have a positive impact on treated water quality in on-site and decentralized systems.

Bio:

Ben is an Australian on-site & decentralized wastewater treatment systems specialist. He has completed his Master's degree in Applied Science in on-site wastewater treatment and has high hopes of handing in his PhD thesis on this topic if he can ever find the time to write it. Ben has patented technologies from his research. He has built a company that focuses on providing on-site wastewater treatment options for difficult sites. He has a passion for working with difficult to treat effluents.

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Andy Lazur, University of Maryland Extension

Implications of Sea Level Rise on Onsite Wastewater Systems and Remediation Strategies for the Future

Presentation w/Paper, 25 minutes

Abstract:

Climate change and associated sea level rise (SLR) increasingly is being observed to be impacting important wastewater treatment infrastructure including septic systems, resulting in increased environmental and public health risk. SLR impact on septic systems is complex with remediation and sustainable solutions presenting significant challenges. By design, septic systems rely on prescribed soil quality and depth for a substantial portion of treatment of nutrients, organics, and pathogens. With elevated water tables, the depth of soil is reduced, subsequently decreasing wastewater treatment effectiveness and contaminating groundwater. Additionally, elevated chloride and sodium impacts important treatment characteristics of soil including structure and microbial communities and can interfere with the function of advanced treatment units by suspending organics and reducing beneficial microbial populations. SLR remediation will vary depending on local site conditions. Connection to wastewater treatment plants (WWTP) is often suggested as one solution, however significant investment costs hinder and limit expansion to adjacent areas, and that being in phases over decades. Onsite technologies such as elevated soil dispersal systems, drip dispersal, or advanced treatment units are commonly employed in areas with elevated water tables and offer comparable or greater treatment to WWTPs. As SLR impacts increase and subsequent number of failing systems, a commitment to truly innovative and alternative approaches are needed. A survey of coastal state and county environmental health personnel and industry members on their proposed solutions to SLR and onsite wastewater treatment will be presented to aid in elevating awareness and action on this important issue.

Bio:

Dr. Andy Lazur is a Statewide Water Quality Specialist with the University of Maryland Extension focusing on drinking water quality, private wells, groundwater protection, septic systems, and pond management education. He has been involved in various aspects of water quality in Research and Extension for 35 years. His work is applied and collaborative in nature, working directly with varied stakeholders to identify and solve issues. Andy serves as the vice-chair of NOWRA's Education Committee.

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Jake Lowe, Lowridge Onsite Technologies

Co-presenter: Dave Lowe

Efficiency in Wastewater Treatment

Presentation, 50 minutes

Abstract:

This presentation covers how to look at treating wastewater and what factors have the most influence on the treatment. There will be a brief history of where onsite systems have come from to how they have been improved upon. It will reference the thought behind how Lowridge Onsite Technologies (Washington state ATU manufacturer) went about testing products to what ultimately resulted in the OSCAR systems. The presentation will conclude with ideas on what can be done to not only treat the water more, but what can be done to reuse the water that has been treated.

Bios:

Jake Lowe has been working in the onsite industry for the last 6+ years. He works for Lowridge Onsite Technologies in various capacities. His experience has included supporting troubleshooting work with technical support on Lowridge systems, training classes through WOSSA, serving on the committee for

the most recent WAC re-write, and serving as the current manufacturers rep for the WOSSA board. The presentations Jake has given have been for service professionals, health inspectors, and realtors.

Dave Lowe earned a bachelor of science degree from Cal-Poly, San Luis Obispo, CA. He has over 30 years experience in the onsite sewage industry. His background includes pumping septic tanks, installing onsite systems, is a state licensed Onsite Sewage Designer in Washington, and has developed and manufactures wastewater treatment devices. Dave also owns two US utility patents for wastewater treatment devices. Dave has supported the industry by serving as President of the Washington Onsite Sewage Association (WOSSA), member of the Technical Advisory Group of Washington Department of Health, member of the Onsite Rule Revision Committee for Washington State, an instructor at the Northwest Onsite Training Center, and owner of Lowridge Onsite Technologies, Inc.

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Zach Lowenstein, US EPA

Co-presenter: Kruttika Gopal

EPA's Closing America's Wastewater Access Gap Initiative - Pilot and Expansion Update

Presentation, 25 minutes

Abstract:

In some rural communities across the U.S., yards regularly flood with sewage from failing septic systems or straight pipes from homes. Unfortunately, this is the reality for many communities across the country. Inadequate and failing wastewater infrastructure poses direct health risks to families, pollutes the environment, and hinders economic growth and community vitality. In 2022, EPA and USDA launched the Closing America's Wastewater Access Gap Community Pilot Initiative to leverage technical assistance resources and help 11 historically underserved communities develop a blueprint for accessing funding. After the pilots' success, EPA has expanded the initiative to 150 additional communities across rural America. This program along with historic funding availability through the Bipartisan Infrastructure Law and other federal funding programs for water infrastructure will change the odds for rural communities who are burdened by the lack of adequate wastewater services. This presentation will provide an update on both the pilot initiative and the expansion.

Bios:

Zach Lowenstein is a Physical Scientist in EPA's Office of Wastewater Management (OWM), located in Washington, DC. Zach has been with EPA's OWM since 2017, with the Decentralized Wastewater Program, managing initiatives such as SepticSmart Week and the Decentralized Wastewater MOU Partnership. He is now the Program Manager for the Closing America's Wastewater Access Gap Program which focuses on providing technical assistance to underserved communities and tribes with inadequate decentralized wastewater infrastructure. Prior to his employment at EPA, Zach worked for a couple of years in water use and well permitting at the South Florida Water Management District, and before that, as an environmental scientist at a small consulting firm in the oil and gas sector, focused on groundwater and soil remediation. Zach holds a Bachelor's in Environmental Science and Master's in Public Health, both from the University of Florida. Zach resides in Alexandria, VA with his wife and two children.

Kruttika Gopal is an Environmental Protection Specialist in EPA’s Office of Wastewater Management (OWM) in Washington, DC. She has been with OWM since 2023, supporting a variety of technical

assistance initiatives. She is a part of EPA's Decentralized Wastewater Program, which includes the Decentralized Wastewater Management MOU Partnership and SepticSmart Week. Since 2024, she has worked on the Closing America's Wastewater Access Gap Initiative, which provides underserved communities with technical assistance for their decentralized wastewater infrastructure. She also supports EPA's Lagoon Action Plan and Tribal wastewater program. Kruttika holds a Bachelor's degree in Environmental Studies from American University.

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Gary MacConnell, MacConnell& Associates, PC

Methodology for Evaluating Sites for Community Wastewater Systems

Presentation, 25 minutes

Abstract:

Community wastewater systems may be comprised of numerous entities (residences, businesses, schools, religious institutions, etc.) which share common wastewater collection, treatment, and disposal system. These systems are often the preferred option when municipal wastewater is not available or a viable option. They offer numerous environmental benefits when compared with municipal wastewater systems and individual on-site systems. Development of property for which a community system is under consideration offers unique challenges when compared with sites with sewer availability. The underlaying soils and site considerations hold the key with respect to how the property may be developed. These factors determine where treated wastewater may be disposed of and at what rate (gallons/day /area). Failure to initially consider these factors can result in lost time, lost money, and in some cases, failure. A methodology is presented for evaluating properties considered for development which reduces risks and leads to success. Case studies are presented which show failures and successes. The goal is to provide the audience with a sequence of steps which lead to the efficient and optimal development of a property considering a community wastewater system.

Bio:

Mr. MacConnell is a registered engineer in five states and is President of both MacConnell and Associates, PC and Green Global Technologies. He has a Bachelors Degree from Gettysburg College and three Masters Degrees from Duke University. He has over 40 years of experience in engineering and specializes in onsite wastewater. He has presented over 70 presentations and papers, both nationally and internationally.

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Phal Mantha, Ridge to Reefs, Inc.

Bioreactor Gardens: A Circular Economy Approach

Presentation w/ Paper, 25 minutes

Abstract:

The Bioreactor Garden is a green infrastructure, nature-based wastewater treatment system that purifies effluent discharged from traditional septic systems. Bioreactor Garden systems use passive, naturally-driven processes which mimic the actions of wetland filtration in an optimized footprint. Multi redundant treatment arises from phytoremediation, filtration through layers of activated biochar,

beneficial bacteria, treatment media, and wood chips made from invasive species. Nitrification is performed through aerobic treatment media (which can utilize recycled crushed glass), and denitrification is performed by bacteria which grow on the wood chips and biochar. This process safely converts Nitrate into harmless N2 gas. Bioreactor Gardens treat water to a high standard; this treatment results in nearly total removal of key nutrients and contaminants of concern. By efficiently removing nutrients and contaminants that pollute water resources, Bioreactor Gardens protect ecosystems and community health. This presentation will review the utilization of these systems in diverse locations internationally. Data related to system performance for key parameters such as nutrient removal and removal of pharmaceuticals will be reviewed. In addition, the use of local materials and development of local circular economies will be highlighted as a strategy to lower costs and the carbon footprint associated with traditional onsite wastewater treatment. Furthermore, strategies for reduction of effluent volume and the reuse of treated effluent will be covered in this presentation.

Bio:

Phal Mantha is the Director of Agriculture and Sustainability at the non-profit organization Ridge to Reefs, which was established in 2011 to protect coastal communities and restore coral reef ecosystems by reducing land-to-sea pollution with innovative green infrastructure and regenerative agricultural practices. Phal has worked to implement innovative solutions to complex agricultural and environmental challenges in globally diverse regions including North America, Asia-Pacific, and the Caribbean. In his role at RTR, Phal has worked closely with academia, environmental practitioners, and community-led organizations to design, develop, construct, and monitor numerous innovative nature-based treatment systems including Denitrifying Bioreactors, Denitrifying Nutrient Curtains, Inoculated Deep Litter Piggeries (IDLS), Constructed Wetlands, and "Bioreactor Gardens" for Onsite Wastewater treatment, disposal, and reuse. Phal holds a Bachelors of Science in Agriscience from Michigan State University and a Masters of Natural Resource Management from Virginia Tech's Center for Leadership in Global Sustainability. He serves on the Board of Directors for The National Center for Appropriate Technology (NCAT) and is a member of the Development and Personnel Committees in this role.

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Bryer Manwell, CaulWell Engineering and Geoscience Ltd.

Co-presenter: Krista Podwin

State of Nitrogen Reduction Regulation and Certification in North America and a Brief Update on Two Case Studies Involving the use of Permeable Reactive Barriers for Passive Nitrate (and pathogen) Removal from Onsite Wastewater Effluent.

Presentation, 25 minutes

Abstract:

Human activities, on the global scale, have doubled the natural cycle of nitrogen in the environment; therefore, there is a need to expand international cooperation and capacity -building support for wastewater treatment, recycling, and reuse technologies. The United Nations Department of Economic and Social Affairs has created Sustainable Development Goals. Goal 6 "Clean Water and Sanitation" addresses improving water quality by reducing pollution. Aligning regional wastewater management of nitrogen with the UN Sustainable Development Goals is prudent to achieving the UN Sustainable Development Goals. The presentation will provide an update on the state of nitrogen reduction regulation and certification in North America as it relates to the UN Goal 6. Operation of onsite

wastewater systems has the potential to create deleterious effects on human health and the environment. Nutrient and pathogen loading from onsite wastewater systems to near-surface groundwater and surface water bodies is of particular concern in areas of high population density and high groundwater levels. Nutrient loading to surface waters can cause algal blooms and negatively effect fish spawning habitat. Permeable reactive barriers (PRB) are a cost-effective inground passive polishing treatment for onsite wastewater effluent elevated in nutrients and pathogenic bacteria. This presentation will provide an update, from the 2020 presentation for the Mega Conference. Presenting recent water quality results and estimates of actual nitrogen reduction to the receiving environment from empirical case studies in British Columbia, Canada where PRBs have been installed to passively sequester nitrogen and pathogens from onsite wastewater systems installed near sensitive lake foreshores.

Bios:

Bryer Manwell, M.Sc., P.Eng. is a registered professional engineer in both Alberta and British Columbia, Canada. She received her bachelor's degree in Materials Engineering from the University of Alberta and her master's degree in Environmental Engineering from the University of Calgary. Ms. Manwell is a current member of Canadian Onsite Technical Resource Association (COTRA) and past president of WCOWMA-Onsite Wastewater Management of British Columbia. Within the onsite wastewater industry, she works to implement environmentally sound practices; specifically, she has focused on researching the use of permeable reactive barriers for passive treatment of nitrogen and pathogens in onsite waterer effluent for the past ten years.

Krista Podwin, M.Sc., P.Eng. is a seasoned environmental engineer with over 25 years of experience. Her career encompasses a broad spectrum of engineering projects, with a recent and dedicated focus on the impacts of onsite sewage systems on watersheds. Mrs. Podwin earned her bachelor's degree in Environmental Engineering from the University of Regina, followed by a Master's of Applied Science in Chemical Engineering from the University of Waterloo. She is involved in research projects aimed at identifying and mitigating environmental impacts of onsite wastewater systems.

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Dolores "Lola" Maratita, USDA, Rural Development

The Rural Utilities Service's, Water and Environmental Programs (WEP) Decentralized Water Systems

Presentation, 25 minutes

Abstract:

The Rural Utilities Service's, Water and Environmental Programs (WEP) provide loans and grants for water, centralized and decentralized wastewater, and solid waste facilities in rural areas with populations of 50,000 or less. Our programs are structured to support infrastructure development and we also have several technical assistance programs. During Fiscal Year 2023, WEP invested $1.7 billion in rural communities to finance these systems, across rural America gain access to or improve their drinking water, wastewater, solid waste, and storm drainage infrastructures and impacted 2.48 million rural residents. This paper will provide an overview of WEP funding that includes funding purposes, set aside and special emphasis programs. The Rural Decentralized Water Systems (DWS) is one of many programs under Rural Utilities Service's, Water and Environmental Programs (WEP). DWS provides grants to qualified nonprofits to create loans revolving loan funds to increase access to safe and reliable drinking water and helps improve sanitary conditions caused by inadequate septic systems for eligible

individuals in rural areas with populations of 50,000 or less. With 30% of US population living on decentralized systems, all rural residents deserve the long-term public health, environmental and economic benefits to adequate decentralized water and wastewater systems. This paper will provide an overview of WEP funding programs, discuss eligibility and the application process.

Bio:

Dolores "Lola" Maratita, a Community Program Specialist in the Portfolio Management Branch. I am currently the grant manager for the Solid Waste Management and Decentralized Water System grant programs. I have worked with USDA, Rural Development for 20 years. Prior to joining my USDA family, I worked for Department of the Army.

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Jillian Maxcy-Brown, Auburn University

Evaluating Approaches to Decentralized Wastewater Treatment and Management for Diverse Coastal and Island Environments

Presentation, 25 minutes

Abstract:

While many wastewater technology and decision-making guides are available, most lack specific guidance that are well suited for Pacific Island Communities (PICs), particularly in terms of mitigating impacts on coastal and freshwater ecosystems. These Pacific islands include Hawaii, U.S. Territories (American Samoa, Guam, the Northern Mariana Islands), Freely Associated States (Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau), and many other nations (e.g., Papua New Guinea, Fiji, Vanuatu, Kiribati). This presentation shares the findings of a project focused on identifying criteria for effective decentralized wastewater treatment in diverse coastal environments, including high, volcanic islands, and low, coral atolls. The presentation examines examples of successful implementation of innovative technological and managerial solutions in similar contexts and provides guidance for applying proven solutions. This study's objectives are to (1) determine key factors for effective decentralized wastewater treatment in PICs, considering both ecosystem and public health protection, (2) examine case studies of successful technology and management practices applicable to PICs, and (3) formulate practical guidance for community-scale wastewater treatment projects.

Bio:

Jillian Maxcy-Brown is an assistant professor in the Civil and Environmental Engineering Department at Auburn University. She earned a Ph.D. in Civil Engineering from the University of Alabama and a B.S. in Engineering with a Civil Engineering concentration from LeTourneau University. Her research focuses on equity challenges for wastewater access in the U.S. and served as a consultant for the Nature Conservancy to address sanitation challenges in the Pacific. She is the vice chair for the Emerging Professionals Committee.

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Christine McTavish, E/One

Pressure Sewer for Septic Tank Abatement Projects

Presentation w/Paper, 50 minutes

Abstract:

Throughout the U.S. many communities are experiencing failing septic systems due to age, and these have a negative effect on area water sources such as lakes, streams, rivers, and aquifers. These utilities seek cost-effective methods to mitigate soil contamination, without overly invasive infrastructure projects and major disruptions to the neighborhoods served. Pressure sewer has grown to be a very common solution for septic tank abatement projects. This session will look at the pressure sewer system components and design, and discuss how to efficiently apply grinder pump when abandoning an existing septic system. Looking at tank shape and size, discharge piping from the home, and a variety of lateral discharge options, participants will become familiar with the best practices to ensure trouble-free and long-lasting operation of the new grinder pump station.

Bio:

Christine has 13 years of experience in wastewater collection and conveyance, and specializes in pressure sewer systems. A University of Alberta graduate, she has had the opportunity to work with wastewater professionals across Canada, the United States, Australia, New Zealand, and Malaysia. Christine is passionate about reducing the environmental impact of wastewater systems, starting from the construction of collection systems, through operation of the network, and to the ultimate destination at the wastewater treatment plant.

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Kelsey McWilliams, Point of Shift

Pathways to Permit Innovative Onsite Systems: An Overview of the Complexities of Permit Novel Systems

Presentation, 25 minutes

Abstract:

Onsite sanitation systems are an integral component of the United States sanitation ecosystem, currently serving approximately 30% of the population based on 2011 census information. However, onsite sanitation systems are failing in many regions due to climate change, rising groundwaters, and the pressure of excess nutrients in water bodies. New innovations, such as source separation, urine diversion, and innovative membrane technologies, are needed to protect human health and the environment. The current regulatory framework for onsite sanitation systems in the U.S. currently hinders innovation. It makes it challenging for new technologies from small start-ups and large corporations to find footing in the US market. This presentation will highlight the findings from a recent study that analyzed the onsite regulations from all 50 states to determine pathways for innovative technology. This presentation will highlight how various states help or hinder innovation in wastewater. This presentation will also review case studies where innovative pilots have been implemented and how they were permitted. It will also highlight the organizations working on changing regulations across the US and present a path forward to consolidate regulations regionally to help foster innovation.

Bio:

Kelsey McWilliams is the CEO and founder of Point of Shift. Point of Shift is a sanitation design consultancy that designs, permits, and implements circular sanitation systems for single residencies, communities, and ecovillages. Point of Shift also assists new sanitation technologies to enter and scale in the US market. This combination of technology and consumer insights gives Point of Shift a broad and

detailed view of the US innovative sanitation ecosystem. Kelsey has worked in the circular onsite sanitation sector for 8 years throughout India, east Africa, and the Americas. Previously, she was the first full-time hire for a start up focused on treating urine collected from portapotties into fertilizer. She was also an Associate Director for the Toilet Board Coalition, where she led the Agricultural program assessing the feasibility of circular sanitation systems on tea plantations. Kelsey also sits on a few regulatory task forces in Vermont and across the US that are focused on changing policies to allow easier pathways to innovations in onsite sanitation systems.

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Anne Mitchell, Michigan Department of Environment, Great Lakes and Energy

Michigan Department of Environment, Great Lakes and Energy: Septic Replacement Loan Program

Presentation, 25 minutes

Abstract:

In Michigan, more than 1.3 million septic systems treat millions of gallons of sewage every day. A recent report by Public Sector Consultants estimated that between 130,000 and 325,000 of these systems are failing to adequately process wastewater, threatening not only drinking water sources and nearby rivers and streams but also public health and safety. A major barrier to replacing septic systems is affordability and in Michigan, a lack of a statewide sanitary code for the construction of onsite wastewater systems. The Michigan Department of Environment, Great Lakes, and Energy (EGLE) Onsite Wastewater Management Unit recognized the gap between the need for septic system replacements statewide and the lack of available funding options for homeowners and a lack of standardized installation requirements and began working to bring a solution to Michigan through a 35-million-dollar appropriation from the Michigan Legislature and the development of The Septic Replacement Loan Program (SRLP). The SRLP is a statewide, low interest loan program for the replacement of failing and near failing septic systems. EGLE has contracted with nonprofit green bank, Michigan Saves, to design, and manage the program. The SRLP is divided into two tiers, with both income based financing (Tier 1) and a market-based loan (Tier 2). In an effort to protect both public and environmental health, systems supported by the SRLP must be evaluated, designed, and installed in accordance with EGLE's Program Minimum Standards, and must be installed by a Michigan Saves Authorized Contractor. Eligible project costs include system evaluation, design and permitting, septic tank pumping and system evaluation. This presentation will explore the basis for and development of the Septic Replacement Loan Program.

Bio:

Anne Mitchell graduated from Michigan State University in 2014 with a master's degree in public health and toxicology. After graduating, Anne worked for the Ingham County Health Department as a registered sanitarian within the Land and Water Program for eight years, designing, permitting, inspecting and regulating onsite wastewater systems and drinking water wells. Anne began working for The Michigan Department of Environment, Great Lakes, and Energy Onsite Wastewater Management Unit in October of 2023 as the Program Manager for the Septic Replacement Loan Program.

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Stephen Moeller, Riovation

A Perspective on Treatment in the Soil vs Treatment in the Tank

Presentation, 50 minutes

Abstract:

Collectively, onsite systems in the US generate more than 4 billion gallons of septic effluent daily. This is likely a conservative estimate! This presentation looks back in history beginning with the Biblical injunction found at Deuteronomy 23:12, 13 which states: "A private place should be designated for use outside the camp, and there is where you should go. A peg should be part of your equipment. When you squat outside, you should dig a hole with it and then cover your excrement" to where we are today in the onsite wastewater industry. We look at modern history to get an understanding on what has and has not been working with soil-based treatment of septic effluent. While Soil is an Excellent Medium for Wastewater Treatment less than 1/2 of the soils making up the United States are suitable for Wastewater Treatment according to most estimates. Additionally, we are facing increasing challenges from climate change which is compounding the issues of environmental degradation resulting from incomplete septic effluent treatment in the soil. These and other issues come with various quantifiable costs. We explore the options of more advanced treatment in the tank while allowing the soil to provide final treatment and polishing of the effluent. The advantages of both suspended growth and attached growth biofilm technologies are considered along with the costs associated with advanced treatment.

Bio:

Stephen Moeller's career journey in the industrial sector began with a solid foundation in the electrical wholesale business. Building on this early experience, he transitioned into the field of industrial electrical, controls, and instrumentation contracting, gaining valuable expertise in these areas. For over a decade, Stephen played a pivotal role in a global organization, where he focused on developing and managing business relationships and procurement for large-scale construction projects. His dedication and strategic approach contributed significantly to the success of these initiatives. In collaboration with Gig Drewery, Stephen is involved in the development and marketing of the RioVationÂ® BioMazeÂ® product line, demonstrating his entrepreneurial spirit and ability to bring innovative solutions to market. Stephen's interest in wastewater treatment led to extensive research into the field's current state and historical evolution. More recently, he has delved into microbiology, recognizing its importance in advanced wastewater treatment. Stephen's commitment to continuous learning and exploration is a testament to his drive to stay at the forefront of his fields of interest.

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Kim Nace, Brightwater Tools

The State of Source-Separation: Real-World Implementations, Real-World Benefits

Presentation, 25 minutes

Abstract:

Source-separation of toilet waste has moved from an area of predominantly academic research to a fully realizable, technically robust method for more efficient, environmentally beneficial wastewater treatment. Separating toilet waste from greywater facilitates water reuse, and, when the nutrients in the toilet waste are recovered for agricultural reuse, dramatically reduces the nutrient content of the onsite system's effluent. In this presentation, we will introduce the audience to the concept of distributed, source-separated treatment trains and the real-world places where they are currently being used. In particular, attendees will learn about the inherent climate resiliency of distributed, onsite systems in a range of environments and how centralized and decentralized wastewater management professionals are collaborating to accommodate increased flows and loads, tightening regulations, and

insufficient plant capacities. Additionally, this discussion will introduce relevant concepts such as urine diversion, complete toilet water diversion, volume reduction methods, as well as some additional benefits of source separation relevant to achieving other water quality goals (e.g., water reuse and micropollutant removal). Attendees will also gain quantitative insight into how implementing source-separated treatment trains can achieve a nitrogen load reduction of up to 93% just by physically separating out the toilet waste (i.e., without nitrification/denitrification). Finally, we will invite a discussion among the attendees to discover how source-separating treatment trains may benefit the regions and watersheds in which NOWRA members work.

Bio:

Kim Nace has a B.S. from Lewis and Clark College, holds an M.A. in International Administration from World Learning and an M.A. in Educational Leadership from Keene State College. Prior to working in the sanitation sector, she was a Peace Corps volunteer in Botswana and taught children of all ages. She coordinated research funded by the MacArthur Foundation and later served as a school Principal - in rural Vermont and in Chennai, India. Kim was Co Founder and Executive Director of the Rich Earth Institute prior to leading Brightwater Tools. She has focused her leadership and organizational strengths to build a high-performance team at Brightwater Tools and to engage others in the possibilities and practicalities of regenerative sanitation. Kim and her family use a urine diverting composting toilet.

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Drew Nickoli, Eljen Corporation

The Value of Military Veterans in Wastewater

Presentation, 25 minutes

Abstract:

This presentation will focus on recognizing the invaluable assets that Military Veterans bring to the workforce. I will discuss the diverse skill sets and multifaceted benefits of hiring Military Veterans for your business. Veterans often have a tremendous amount of experience in high pressure situations that foster innovation, adaptability, and leadership. We will discuss real world examples on how integrating Veterans into organizations can benefit your company's team cohesion, commitment to excellence and reduce your company's turnover rate. This presentation will highlight how the decision to hire veterans for your organization will benefit your company as well as supporting those who have served. I will also share from a Veterans' perspective how the right job and correct utilization of Veterans' skill sets in the workplace can give a renewed sense of meaning and accomplishment. I will cover benefits, resources, and tips to help an employer be successful when hiring Military Veterans.

Bio:

Drew has been in the onsite industry since 2014, and started off working at a test site servicing, installing, and sampling wastewater treatment systems. Drew began his career with Eljen as a Technical Representative in April 2022. He conducts trainings regularly both in the classroom and on site at installations. Drew has presented at countless conferences and trade shows across the country in his 10 years in the industry and sits on the Board of Directors for The Ohio Onsite Wastewater Association. Mr. Nickoli served in the U.S. Army as a Combat Engineer from 2008 - 2016. Drew served in Operation Enduring Freedom in Afghanistan in 2013, performing counter IED and route clearance operations. He also served on the Ohio National Guard's search and extraction team after returning home from Afghanistan before retiring from the Army in 2016 He is an active member in the "Save A Warrior"

community that helps veterans and first responders to overcome the symptoms and addictions associated with Complex Post-Traumatic Stress.

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Kwabena Darko Okyere, University of South Florida, Tampa

Novel In-Ground Hybrid Adsorption Biological Treatment System (HABiTS) for Enhanced Onsite Wastewater Treatment

Presentation, 25 minutes

Abstract:

Approximately 32 million US households use Onsite Wastewater Treatment Systems (OWTS), with approximately one-third of these located in Florida. OWTS have a limited removal of nitrogen (N), phosphorus (P), pathogens, and trace organics. Due to problems with eutrophication, sea grass mortality, and harmful algal blooms, there has been a major push in Florida to convert septic to sewer systems; however, this is not feasible in rural and suburban areas. Advanced OWTS are often complex and energy intensive, while "layer cake" processes, using sand and wood chip layers for biological N removal, are prone to geotechnical failures, and their long-term effectiveness has not been proven. The goal of this research is to develop and test a novel in-ground hybrid adsorption biological treatment system (HABiTS) for onsite wastewater treatment to enhance biological nutrient removal. The novel In-Ground HABiTS includes (a) a sand and zeolite layer to adsorb ammonia and promote nitrification and (b) a lower layer that contains a nitrate adsorption medium (e.g., sepiolite and perlite) and biochar to adsorb P and trace organics and promote denitrification. We are developing strategies for dosing household wastewater into the drain field to enhance N and P removal. The novel In Ground HABiTS prototype is being operated at a laboratory scale to optimize N, P, and organics removal compared with controls. The novel In-Ground HABiTS will improve onsite wastewater treatment in rural, suburban, and marginalized communities, protecting ground and surface waters from impairment.

Bio:

Kwabena Darko Okyere is a graduate student pursuing a Master of Science in Environmental Engineering at the University of South Florida (USF), Tampa, with a projected graduation in May 2025. With a strong academic foundation, including a BSc in Chemical Engineering from Kwame Nkrumah University of Science and Technology (KNUST) in Ghana, Kwabena has dedicated his career to advancing sustainable solutions in environmental engineering. As a Graduate Research Assistant at USF, Kwabena's research focuses on mesocosm studies using adsorbent media to modify drain fields for enhanced nitrogen removal for onsite wastewater treatment. Additionally, he collaborates with the Florida Department of Environmental Protection (FDEP) to monitor in-ground nitrogen-reducing biofilters (INRB), crucial for mitigating nutrient loading in sensitive watersheds. Kwabena's professional experience extends to his tenure as a Chemical Engineer and Environmental Analyst at Aluworks Limited in Ghana, where he contributed to quality management and environmental monitoring. An active leader, he has spearheaded initiatives to promote leadership and problem-solving skills among students and participates actively in the American Water Works Association (USF Student Chapter). Kwabena is dedicated to leveraging his expertise in environmental engineering to drive innovative solutions for wastewater treatment and environmental protection.

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Michael Payne, Payne Engineering Geology Ltd.

Higher Linear Loading Rates Based on Water Table Mounding Measured During Full-Scale Multi-Day Testing

Presentation, 50 minutes

Abstract:

Our research in BC supports using higher hydraulic linear loading rates to drainfields based on full-scale testing. The province of British Columbia (BC) is larger than Texas with a varied geography and one million septic systems. BC has a hierarchy of septic system rules including a public health act, a sewage regulation, and a set of standards called the Standard Practice Manual (SPM). Our SPM sets minimum standards for design and installation. It is not a design manual but serves as a design guide. This SPM includes minimum setback distances and vertical separation and maximum hydraulic loading rates. BC standards include allowable linear loading rates (LLRs) based closely on Tyler and Kuns (2000). In BC we use a two-prong approach for selecting allowable soil loading rates. A designer must consider both (1) the soil type and (2) results of soil permeability tests. Over the last 20 years, several professionals in BC have used full-scale "Water Table Mounding Tests" (WTMT) to support using a higher LLR (a shorter contour length) than what Standards would otherwise allow. In my presentation I will discuss the WTMT procedure and results of 40 full-scale tests. CONCLUSION: Based on test results, I conclude that we can safely use Linear Loading Rates 1.5 to 5 times higher than recommended in the Tyler and Kuns tables, depending on the soil texture. DISCUSSION: The small water table mound measured during our large-scale tests reflects scale effects on permeability, what some researchers call hillslope-scale permeability.

Bio:

Michael Payne is a professional groundwater engineer and hydrogeologist. He graduated from the University of British Columbia in Geological Engineering in 1982, and Water Resources Engineering (Masters) in 1985. After ten years of project engineering in BC, Alberta, and Africa, Michael formed Payne Engineering Geology in 1992. During his 39 years of engineering practice, Mr. Payne has evaluated site hydrogeology and designed solutions for 250 onsite wastewater treatment systems, ranging in size from a small cottage to small towns. Michael was a co-author of all three versions of BC's Standard Practice Manual (SPM) for onsite sewage systems. He is one of the primary authors of the Engineers and Geoscientists of BC Professional Practice Guidelines - Onsite Sewerage Systems. Michael has been appointed as an expert witness for disciplinary investigations and legal disputes relating to engineering of onsite sewage systems.

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Sushama Pradhan, NC DHHS

PFAS in Septic Systems and Private Drinking Water Wells: What's Next?

Presentation, 25 minutes

Abstract:

While the detection and elimination of PFAS in public water and wastewater systems have garnered significant attention from state and federal agencies, the presence of PFAS in private drinking water wells and on-site wastewater treatment systems (OWTSs) remains largely overlooked. While there is extensive data on PFAS from public water and wastewater systems, information on private wells and OWTSs is severely lacking. To address this gap, water and wastewater samples from 18 sites with OWTSs and private wells were collected to determine the presence and concentration of PFAS, including PFOA,

PFOS, and GenX. The results revealed that 89%, 94%, and 100% of septic tanks had detectable concentrations of PFOA, PFOS, and GenX, respectively. Additionally, detectable levels of PFOA were found in 61% of private wells, while PFOS and GenX were found in 39% of private wells. Alarmingly, 50% of these private wells exceeded the EPA's recently established National Primary Drinking Water Regulation maximum contaminant levels for PFAS. Funding for the assessment of PFAS in private wells is as crucial as providing assistance for PFAS treatment systems to support residents with contaminated well water. Unlike public systems, private wells are not mandated to be tested and are only tested at the property owner's request and expense. Furthermore, assessing PFAS in drinking water could significantly help determine if OWTSs can effectively reduce the amount of PFAS potentially reintroduced to the natural water cycle. Such mitigation efforts could subsequently reduce potential health impacts on vulnerable communities.

Bio:

Sushama Pradhan, Ph D, is the Nonpoint Source Pollution Control Program Coordinator at the On-site Water Protection Branch in North Carolina Department of Health and Human Services. She specifically engages in impact assessments of onsite wastewater systems and prevention of surface and ground water quality degradation from such systems. She got her Doctoral degree in Soil Science at North Carolina State University. Dr. Pradhan has over 15 plus years of research experience in onsite water management, onsite system technologies performance evaluation, and modeling onsite systems derived pollutant loadings using GIS based hydrologic model. Currently she is overseeing 'Decentralized Wastewater Infrastructure: Septic Systems Needs in Marginalized Communities of North Carolina' project funded by CDC and Restoration of Waste Detection and Elimination (WaDE) program. Dr. Pradhan has successfully managed/completed numerous multidisciplinary projects including addressing PFAS and other contaminants in septic systems and private drinking water wells, on-site system field performance surveys, evaluation of nutrient contributions from septic systems to water resources in the piedmont of North Carolina, efficacy of saprolite removing E. Coli from septic system effluent.

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Jeff Rook, Goulds Water Technology, Xylem

Wastewater Pumps: Basics, Sizing, Selection, Rules of Thumb

Presentation, 50 minutes

Abstract:

The presentation will focus on submersible wastewater pumps. We will discuss the basics of a wastewater pump and a wastewater system and show how to properly size and select the right pump for the application. The presentation will include troubleshooting tips and basic rules of thumb to consider when installing or troubleshooting a wastewater system. The presentation will also look at the accessories of a wastewater system including panel, basin, and switches.

Bio:

Jeff Rook: National Wastewater Sales Manager Education: BS Economics, State University of New York, College at Cortland I've been employed at Goulds Water Technology, Xylem for 29 years spending all my time on the sales end of wastewater product. I started in sales in the Michigan territory for 5 years. I then moved back to upstate NY and covered the NY and New England region for 20 years. I am from and live in Seneca Falls, NY, in the Finger Lakes Region of NY, and am now responsible for the national sales of wastewater product.

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CeCe Rudnicki, The Septic Gal

Riding the Treatment Train: Practical Soil Concepts and Design Strategies

Presentation, 50 minutes

Abstract:

Soil is the end of the treatment train when it comes to onsite systems. Are we considering both dispersal and treatment when it comes to designing onsite systems? In my presentation, I will discuss how soil provides treatment, the limiting factors which may impact treatment and designing systems to take these properties into consideration. As systems become more complicated and soils become more difficult, uniform distribution may be the best option. So, in addition, I will discuss the importance of pressure distribution and relevant concepts of designing pressure distribution networks.

Bio:

CeCe Rudnicki has been involved in the onsite wastewater industry in Wisconsin since 1995. Over the years, she has worked as a licensed soil tester, designer, installer, pumper, county regulator and state regulator. She is currently the owner and operator of The Septic Gal - doing soil testing and septic design and specializing in industry training. CeCe is a lifelong learner and loves to share her passion of finding solutions to onsite wastewater issues with others. She holds licenses in Wisconsin as a Master Plumber-Restricted Service, Certified Soil Tester, POWTS Inspector and Designer of Engineering Systems. Her contact information can be found at www.thesepticgal.com

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Gabrielle Saba Zimmer, Wastewater Alternatives & Innovations

Surfing the Silver Tsunami with Work-4-Water: Addressing the Wastewater Workforce Shortage in Hawaii

Presentation, 25 minutes

Abstract:

Titled "Surfing the Silver Tsunami with Work-4-Water: Addressing the Wastewater Workforce Shortage in Hawaii," this presentation focuses on the urgent need for investment in wastewater workforce development. This necessity arises from Act 125's mandate to convert 83,000 cesspools across the islands by 2050 and the "Silver Tsunami" rapid increase of vacancies within the industry. The presentation highlights Wastewater Alternatives & Innovations efforts to establish the first decentralized wastewater workforce development and training program in the state. Specifically tailored for Onsite Wastewater Treatment Systems, this program aims to address the shortage of trained personnel crucial for successful conversion and operational & maintenance efforts on Maui and Hawai'i Island. A pivotal aspect of the program's approach is its focus on community engagement and prioritization of underrepresented populations. This is achieved through strategic partnerships with the Council for Native Hawaiian Advancement, along with initiatives such as teaching lessons at local schools, town halls and involving women. The program aims to create a more inclusive and diverse industry through a culturally responsive curriculum and instructional design that is customized to meet the needs of recent high school graduates, displaced workers, incumbent workers, rural and remote community members, and Native Hawaiians. The presentation presents data metrics demonstrating the

program's current achievements and outlines pathways for future expansion. It emphasizes the critical importance of scaling up wastewater workforce development initiatives across Hawai'i and nationwide to meet the escalating demands of wastewater conversion projects and operations & maintenance of onsite decentralized systems. By showcasing the successes and potential of this innovative program, the presentation will inspire collective action and investment towards building a sustainable wastewater workforce ecosystem.

Bio:

Gabby Saba Zimmer brings eight years of experience in education and curriculum development to the Wastewater Alternatives & Innovations (WAI) team as the program manager, curriculum developer and instructor for the Work-4-Water program. The Work-4-Water program is funded by the Department of Labor and has a large ripple effect as the first decentralized onsite wastewater workforce development and educational training program in the state of Hawai'i. Gabby received her Bachelor of Arts in Sociology and Masters of Teaching from the University of Virginia. Her previous work as a kumu (educator) for Kamehameha Schools, KapÄlama inspires her passion to create pathways built on a pedagogy of aloha that empower Hawaii's next generation of changemakers to contribute to their communities both globally and locally. Her dedication to restore healthy watersheds, clean water and resilient reefs is fueled by a lifelong passion for Hawai'i's beaches and water.

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Elisabeth Schlaudt, Environmental Protection Agency

Co-presenter: Joshua Klein

The 2022 Clean Watersheds Needs Survey and Decentralized Needs

Presentation, 25 minutes

Abstract:

The Clean Watersheds Needs Survey (CWNS) compiles data on existing clean water infrastructure (wastewater, stormwater, decentralized, and nonpoint source pollution management infrastructure) and the need for future investment to address the water quality objectives of the Clean Water Act (CWA) over the next 20 years. The total nationwide reported needs are $630.1 billion as of January 1, 2022, and decentralized needs accounted for 12% of this total. All U.S. states and territories participated in this voluntary survey, marking the first time in the survey's history that it has achieved 100 percent participation. 43 states reported decentralized needs, including needs for both individual onsite septic systems and clustered systems. Based on the estimated populations receiving centralized wastewater treatment, the CWNS estimates that 18% of the United States is served by decentralized systems. The objective of this presentation is to dive into these results and discuss strategies used by states to estimate their needed decentralized system investments.

Bios:

Elisabeth Schlaudt joined the State Revolving Fund Branch in the Office of Wastewater Management within the Office of Water in March 2020. She was the federal co-lead for the Clean Watersheds Needs Survey. Elisabeth has master's degrees in Water Resources Management and Hydrogeology from the University of Wisconsin-Madison.

Joshua Klein has been with EPA for over 7 years in the State Revolving Fund Branch in the Office of Wastewater Management within the Office of Water. He was the federal co-lead for the Clean

Watersheds Needs Survey. Josh graduated with a Master of Science in Environmental Science from American University in 2010 and has undergraduate degrees in Economics and Politics from Brandeis University.

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Patricia Scott, Nebraska Dept of Environment and Energy

Talking To Regulators, the Good, the Bad, and the Nonsensicle

Presentation, 50 minutes

Abstract:

Tricia Scott and other SORA members will host a round-table discussion on regulatory processes, enforcement, and what day to day life working for the government is like. The range of job duties required and the way different states determine compliance is interesting, and may help answer some questions about why many states may not accept another state's certification process for both professionals and products. Our panelists will share insights into how regulations are created and what it takes to get regulations passed. The regulatory environment presents its own challenges and pitfalls, which can often require creativity and persistence to resolve, as well as cooperation from all stakeholders. While every state will have its own procedures, there are many commonalities in creation and ratification of statutes. The discussion will include ways onsite professionals and industry representatives can provide input, as well as some tips for helping discussions with regulators go more smoothly. We will also discuss the limitations we face due to policies, procedures, and politics. The intent is to include audience participation, so, please, be sure to bring your questions for us.

Bio:

Tricia Scott has worked for the State of Nebraska for 20 years. She has spent eight of those years working in the Onsite Section of the Department of Environment and Energy and finds working in onsite regulation very rewarding. She holds a geology degree from the University of Nebraska-Lincoln. Tricia grew up in rural Western Nebraska (practically Wyoming) on a true family farm, which was homesteaded by her family over 100 years ago, and where her parents still live. She maintains ties to her rural roots and tries to make sure the issues which affect rural onsite system owners are considered. She began serving on the NOWRA Board in December 2020 as a regulator representative. In her spare time, she writes fiction, reads, and does various crafting projects. She resides in Lincoln in a home which some might say has too many books and far too many terrible old science fiction movies.

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Kevin Sherman, SeptiTech, Inc.

Design Concepts of Unsaturated Media Filters

Presentation, 50 minutes

Abstract:

Unsaturated media filters use either naturally occurring or man-made media to encourage oxygen found in media air spaces to diffuse into thin liquid films surrounding media particles. As microorganisms colonize, attach and reproduce on the media, their combined respiration reduces wastewater contaminant concentrations over the film and creates an oxygen diffusion gradient leading into the

media filter. Because media filters promote the growth of oxygen breathing (aerobic) microorganisms, they are a subclass of the aerobic treatment unit category. In media filters attached microorganisms are encouraged to thrive. The typical performance of an unsaturated media filter is robust - meaning the effluent concentration is consistent even if the influent concentration is variable, and resilient - meaning the performance of the filter quickly regains functionality after a stress event. Unsaturated media filters designed for single family residences usually are sized based on expected sewage loading found in local codes. Designers should note that a minimal increase in design flow would have no negative impact on the system performance. This statement relies on the nearly universal use of time dosing of effluent throughout a 24-hour period with these systems and the rapid transfers of single-family residences. Media Filter systems scale up proportionately based on simple hydraulic residence time and volume of media to accommodate larger flows such as from a multi-residence cluster system. In larger flow designs more expensive investments such as flow equalization tanks and remote monitoring control panels become feasible options.

Bio:

Kevin Sherman received a B.S. in ecology & evolution from Stony Brook University. He also has a B.S. in civil engineering from the FAMU/FSU College of Engineering. Kevin has a M.S. in Biology from the University of South Carolina, and a M.P.H. in Public health management from the University of South Florida. He also has a Ph.D. in Biological Oceanography from Florida State University. Kevin worked for the Florida Department of Health for fourteen years. From 1989 to 1992 he served as administrator of the state's onsite sewage program. For six years, Dr. Sherman served as the Executive Vice President of the Florida Onsite Wastewater Association. Currently, he is Director of Engineering and Regulatory Affairs for SeptiTech, Inc. Dr. Sherman is author or co-author of over 25 publications. He is a past-president of the Florida Environmental Health Association and the National Onsite Wastewater Recycling Association. He is a Professional Engineer in seven states and is a Registered Sanitarian in Florida.

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Jeremy Simmons, Washington Department of Health

Washington's On-site Sewage System Rule Update

Presentation, 25 minutes

Abstract:

The Washington Department of Health (DOH) conducted a routine review of the On-site Sewage Systems Rule, WAC 246-272A, in 2017. In 2018, the State Board of Health directed the department to develop proposed revisions to the rule. The department convened a committee of experts and impacted parties to develop recommendations and proposed revisions. This process was interrupted and delayed by the department's and local health jurisdictions' response to the COVID pandemic. The rule revision was completed in 2023, approved in 2024, and goes into effect in 2025. The proposed new rule adds several new requirements and options, including a requirement that all OSS are inspected at time of property transfer, new options for smaller lots if the OSS provides nitrogen treatment, and a requirement that many proprietary treatment devices are field tested. This talk will briefly review the on-site rule review and revision process and will provide a high-level summary of the most important changes to the rule.

Bio:

Jeremy Simmons leads the Wastewater Management section at DOH. He earned a Bachelor's of Environmental Science from the University of Colorado and has several years of experience working on wastewater, environmental, environmental health, and public health issues with private industry, local health, and state health agencies.

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James Stiksma, Canadian Septic Inc

Mastering Job Costs & Strategic Project Pricing for Long Term Business Success

Presentation, 50 minutes

Abstract:

Job costing is essential for businesses to figure out the real costs of completing their projects. This presentation will show why it's important to understand all costs, not just the obvious ones like materials and labor. We'll talk about the often-missed indirect costs such as office expenses, insurance, and administration. By shining a light on these overlooked expenses, attendees will learn how to make their job costing more accurate. We'll also look at how to keep track of costs better and make smarter decisions. This session will give participants the tools to improve their job costing, making sure they consider every cost to make their projects more profitable.

Bio:

James Stiksma, owner of Canadian Septic Inc., has over 7.5 years of experience as a Registered Onsite Wastewater Practitioner for Design & Install in the Greater Vancouver area in British Columbia. His company is known for high-quality septic services for residential and commercial clients. James has served on the WCOWMA-BC board for 4 years and was recently elected Vice President. He is committed to continuous learning, attending conferences like the WWETT Show, Septic-Con, AOWMA Convention, and is looking forward to the NOWRA show in Spokane later this year. James also is passionate about educating the public about septic systems through social media, emphasizing the importance of proper design, installation, and maintenance.

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Robert Sweeney, Environmental Management Systems, Inc

Wastewater Recycling & Reuse: Comparison of Oregon and Washington Rules, Codes and Policies

Presentation w/Paper, 50 minutes

Abstract:

Modern Onsite Wastewater Treatment and Recycling Systems now have all the capability of public systems, with heavy reliance on the natural environment for the final tertiary treatment. Where needed or desirable, these more complex systems do not follow cook-book approaches, but require a deeper understanding of wastewater characteristics, quantity and quality, the treatment technologies and the interaction of effluent with the receiving ecosystem. This presentation also compares and contrasts performance-based recycling systems as regulated in the states of Oregon and Washington.

Bio:

President & Founder of Environmental Management Systems, Inc. specializing in finding solutions for challenging sites & projects. Current NOWRA Board Member and Chair of the Technical Practices Committee. Former President & Board Member of WOSSA and Former Board Member of O2WA. 46 years in Onsite Wastewater Treatment and Recycling. 20 years as a Regulator and 26 years as a Consultant / Designer / Maintainer. 33 Years with military health, safety and environmental protection. Registered Environmental Health Specialist / Sanitarian (OR & NV) / Professional Onsite Wastewater Treatment System Designer (WA). BS Science / Public Health Certificate / MS Management / MBA Veteran Entrepreneurship / Army Medical Service & Civil Affairs Officers Advanced Courses / Wetlands / Erosion and Sediment Control / Food Protection / Water Quality / Epidemiology / Disaster Preparedness and more.

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Hideyuki Terashima, University of Illinois

Online Support and Resources for Onsite Wastewater Professionals

Presentation, 25 minutes

Abstract:

DecentralizedWastewater.org is a clearing house of publicly available resources for professionals working in the onsite wastewater industry. The website launched in 2024 in collaboration with the Rural Community Assistance Partnership (RCAP) with funding from the US EPA. The website features a document library with links to resources that cover every aspect of operating, installing, and maintaining onsite wastewater systems. The calendar tool provide links to training events from all 50 states that provides continuing education or recertification certificates all in one place. All information is free and publicly available for download. This presentation will feature resources currently available for onsite professionals as well as a demonstration of how to use the website to find similar resources.

Bio:

Hideyuki Terashima is a geologist with the Illinois State Water Survey located at the University of Illinois. He graduated from the U of I with a bachelors of science in geology with a focus on environmental geology. He has been with the state water survey for the past 10 years working on an outreach based program called WaterOperator.org to help municipal water and wastewater operators maintain compliance. His team now has launched DecentralizedWastewater.org which aims to expand their focus area to the onsite wastewater industry.

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Tammy Trantham, Missouri Smallflows Organization

Lessons Learned on Replacing OWTS in Missouri with Grant Funds

Presentation, 25 minutes

Abstract:

Greene County, Missouri, awarded the James River Basin Partnership (JRBP) ARPA funds to help local residents replace failing onsite wastewater treatment systems in the county. The group formed a coalition of non-profits to help work on the project: JRBP, Watershed Committee of the Ozarks, H2Ozarks and Missouri Smallflows Organization. These groups formulated a method for residents to

apply for funding if they were low-income to provide aid in replacements. The project is on-going and a total of five projects have been completed. The project will likely be complete by October 2024. The group of non-profits learned a great deal about their methodology of screening applicants and working with contractors. This presentation will discuss the method used for grant awardees and examine how the systems were replaced. One of the surprising results was that all of the systems were located in suburban areas and not rural areas. The presentation will share the lessons learned working on a grant project with the public, contractors, and non-profits.

Bio:

Tammy Trantham has extensive experience in water quality education. She obtained her Bachelor of Science degree in Biology from Viterbo University in La Crosse, Wisconsin. She completed her Master's of Biology from Missouri State University with an emphasis in Aquatic Biology. Tammy has hosted educational presentations all around southwest Missouri pertaining to stream ecology, lake ecology and wastewater treatment. As the Executive Director of Missouri Smallflows Organization, she coordinates educational presentations around the state for continuing education opportunities including the only Missouri onsite wastewater conference - MSO Conference & Trade Show in Columbia. Over her last 14 years of working in the onsite wastewater industry, she has helped plan the NOWRA Mega-Conference in different parts of the nation. She is also a registered Onsite Soil Evaluator through the Department of Health and Senior Services (DHSS) to conduct soil evaluations for onsite wastewater treatment systems. Tammy is also the Executive Director of the Minnesota Onsite Wastewater Association (MOWA).

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Joseph Valentine, VW Consultants.com

Delaware Valley College Research Project: 'What Was Learned from a Decade of On-Lot Sewage System Research?"

Presentation, 25 minutes

Abstract:

A case study in Sewage System Research and what was leaned about onsite systems, how they are designed, how they function and what impacts systems positively and negatively throughout their life.

Bio:

Joseph is a soil scientist and biologist who as 48 years of experience in public health as it relates to on-lot sewage treatment systems and land development utilizing soil as a treatment media for land application and treatment of wastewater. Mr. Valentine has 11 years regulatory experience and 37 years as a consultant. In addition to land application of wastewater, his expertise includes hydric soil and wetland delineations, stormwater infiltration studies and alluvial soils investigations, Mr. Valentine has also been an adjunct soil instructor at Delaware Valley College/University from 1983 to 2022

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Joseph Valentine, VW Consultants.com

How Water Moves Through Soil

Presentation, 50 minutes

Abstract:

The direction of water flow through soil is the result of three forces: saturated flow, unsaturated flow, and vapor flow. This session will review these three basics forces of water flow through soil and will discuss their relationship to wastewater renovation by soil.

Bio:

See above.

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Joseph Valentine, VW Consultants.com

Biomats

Presentation, 25 minutes

Abstract:

Biomats: What are they…how are they formed…how do they affect wastewater treatment.

Bio:

See above.

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Joseph Valentine, VW Consultants.com

Soil as a Treatment Media

Presentation, 50 minutes

Abstract:

Soil is a three-dimensional living filter that we use to renovate wastewater. The information discussed at the previous seasons on water movement in soil and soil properties will be used to explain how soil is a living filter that we use as a treatment media for on lot sewage.

Bio:

See above.

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Huiyun Wu, Washington State University

Viral Metagenomic Analysis Workflow for Characterization of Particle-Associated Virus Community in Wastewater

Presentation w/Paper, 25 minutes

Abstract:

Viruses can interact with a board range of inorganic and organic particles, enhancing their transmission, survival, and infection. Wastewater acts as a significant reservoir of human enteric viruses, with treated wastewater having a profound impact on natural aquatic environments and human health, especially when reused. This study characterizes human enteric viruses and their indicators associated with

particles of various sizes from thirty secondary effluents collected from five full-scale water reclamation facilities (WRFs) across the U.S. by next-generation metagenomic sequencing. The objectives of this study were to (i) develop a sequencing and bioinformatic workflow to streamline viral metagenomic analysis, and (ii) characterize the communities of particle- associated viruses in wastewater using metagenomics. (iii) investigate novel viral indicator from treated wastewater for water reuse. Nearly complete genomes were assembled from wastewater samples including a novel water quality indicator Tomato Brown Rugose Fruit Virus (RNA virus, alignment length 4479 bps). This study provides insights on particles-associated viruses in secondary treated wastewater which is the source water for reclamation. A robust metagenomic analysis can guide the development of novel viral indicators and surrogates for assessing the performance of wastewater treatment and water reuse processes.

Bio:

Dr. Huiyun Wu is an Environmental Engineer specialized for microbial water quality research. Dr. Wu will start the role as a tenure-track Assistant Professor in Environmental Engineering at Washington State University in August 2024. Dr. Wu received a Ph.D. in Environmental Engineering from Michigan State University. Following the doctoral studies, Dr. Wu undertook a two-year Oak Ridge Institute for Science and Education (ORISE) fellowship with the U.S. Environmental Protection Agency (EPA) in Research Triangle Park, North Carolina, and served as a Postdoctoral Fellow in the Department of Environmental Health Sciences in the School of Public Health & Tropical Medicine at Tulane University. Dr. Wu's research is focused on data-driven strategies for advancing water sustainability, molecular microbiology applications, and environmental microbiome investigation. Dr. Wu has worked on multiple interdisciplinary research projects, including water reuse, wastewater-based epidemiology and sanitary sewage overflow survey, environmental metagenomics, microbial source tracking, stormwater management, and microbial water quality modeling.

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Paul Young, Swiftwater Solutions, LLC

Navigating the Currents: Strengthening Hawaii's On-Site Wastewater Future Through Collaboration and Innovation

Presentation, 25 minutes

Abstract:

Hawaii and other US island territories rely upon onsite wastewater treatment systems to meet the needs of their rural residents. However, due to high energy costs, proximity to sensitive ecosystems, small lot sizes, and high costs of traditional septic systems, converting the 80,000 household cesspools to more appropriate technologies is not happening fast enough to meet the state mandate of complete conversion by 2050. Cesspool conversions are a sensitive topic in Hawaii, with conflict at all levels of government to determine the need for a thorough understanding of the problem, which includes who is responsible for the 3-4-billion-dollar economic impact of conversion. Through a National Science Foundation Convergence Accelerator Grant, Team RESSI-H2O sought to gain a complete understanding of the problems in Hawaii, although recognized as a national problem. Team RESSI-H2O found it best to understand the problem by conducting research interviews, structured stakeholder mapping, and completing a sector-wide strengths, weaknesses, opportunities, and threats (SWOT) analysis. This presentation synthesizes our research findings and analysis to assess on-site wastewater in Hawaii. Key findings from our research underscore the importance of stakeholder collaboration and the need for enhanced public education on wastewater issues, increased investment in infrastructure modernization,

and adaptive regulatory frameworks that can accommodate technological advancements. These recommendations, when implemented, can significantly contribute to the industry's resilience and sustainability.

Bio:

Paul Young is a seasoned industry expert and dedicated Army Reservist with a distinguished career spanning over 15 years. He holds a Master of Public Administration (MPA) from American Public University and a Bachelor of Arts in Environmental Science from the University of Denver. Paul's academic background is complemented by extensive practical experience in onsite waste management, where he has demonstrated expertise in advocacy for state and local policies that provide cost-effective means for homeowners to design, install, and maintain onsite waste systems. As a Warrant Officer in the Army Reserves, Paul has undertaken numerous humanitarian missions, utilizing his skills to enhance sanitation infrastructure in diverse and challenging environments. His work in foreign countries has improved public health outcomes and fostered sustainable practices within local communities. Paul's leadership and technical acumen have been pivotal in executing complex projects under stringent conditions, ensuring environmental safety and compliance with international standards.