

**Speaker and Abstract Information for  
2022 Onsite Wastewater Mega-Conference**

October 2022

Updated 10/19/22

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

Kwame Agyare, P.E., Acuantia, Inc.

***Is There a Case for Broader Nationwide Onsite Wastewater Regulations***

Presentation, 25 minutes

Abstract:

The overall goal of onsite environmental permitting is to protect the environment and public health by prescribing specific legal requirements for the design and installation of onsite wastewater systems, to help ensure their functional use over their intended lifetime. State and county regulations seek to follow this premise, and homeowners and their consultant agents generally seek to adhere to these requirements when addressing their onsite needs. Regulations however can vary significantly from county to county, and state to state, even though it is generally sought to achieve the same aforementioned goals. Costs, complexity, and length of permitting times, can be significant from jurisdiction to jurisdiction. Is there a case for broader national standards for onsite systems?

Bio:

Kwame Agyare, P.E. is the former head of onsite permitting for the Arizona Department of Environmental Quality. He is a former Arizona state representative to SORA. He is a currently a civil engineer and Head of Engineering, USA for Acuantia, Inc., a leading company in America that provides solutions for the storage, conveyance, treatment and recycling of water. He has over twenty years of experience in managing drinking water, wastewater, and onsite programs; building high performing teams, inspiring performance, and achieving bottom-line results. Kwame has a master’s degree in civil engineering from the University of Manitoba, Canada, and an MBA in business from Arizona State University. He is a professional engineer (Civil) in both California and Arizona and holds a D4 water treatment operator and T3 water treatment operator certifications in California.

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Mark Ahrens, A Advanced Septic & Construction

***Working with Industry, Not Against***

Presentation, 50 minutes

Abstract:

This presentation focuses on raising the bar within the industry in areas, including Working w/ Customers, Brand/Community Involvement, Recruiting/Hiring, Developing Individuals on the Team, Performance Management, Effectively Leading a Team, Planning/Execution and Strengthening Industry Relationships. WOSSA has both observed and received recent feedback from both business owners and supervisors/managers that there tends to be a gap in professional and career-oriented development within the industry. This presentation gives an introduction and overview to those areas of the business. The presentation touches on these topics from a high-level standpoint to get further thought and conversation started. This presentation is best suited for an audience comprised of: Owner/Operators and Supervisor/Managers that are developing Brands, Teams, and Processes.

Bio:

My name is Mark Ahrens, and I have been the Human Resources Director for A Advanced Septic & Construction in Auburn, WA for 3 years. While I am relatively new to the OSS Industry in a full-time capacity, I have been working with WOSSA since 2012 and currently serve as the President of WOSSA and sit on the WOSSA Conference and Scholarship Committees on the board as well. I graduated from the University of Minnesota (Carlson Scholl of Management) with a BS in Human Resource Management and Industrial/Organizational Psychology with an emphasis on Organizational Development. My areas of expertise include recruitment, culture, controls/compliance, performance management, operations system/process design/management, and corporate finance. Over the last 3 years, I have been able to help lead A Advanced Septic & Construction in growing from 35 to 100 team members with revenue growth from 9M to 20M. I have also been fortunate enough to be connected with numerous business owners and operators in WA State via my role as the President of WOSSA. This has allowed me to continue to learn more in depth about the industry, regulation, and the challenges that are faced on a regular basis in the industry. These partnerships have allowed me to collaborate with those counterparts to share professional and management insight that has been lacking in the industry with smaller family-owned operations.

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Lilith Astete Vasquez, San Diego State University

***Investigation of Biological and Chemical Properties in Waterless, Recirculating Flushing Toilets as Sustainable Sanitation Alternatives***

Poster Presentation

Abstract:

This study employed bench-scale anaerobic digesters (ADs) to simulate waterless flushing toilets with recirculated waste in real-world scenarios. Sanitation units currently deployed in disadvantaged situations employ substandard design features that contribute to public and environmental health concerns, calling for practical alternative solutions. While receiving non-dilute waste under four introduction regimes (mixed, unmixed, urine diversion (UD), and toilet paper exclusion), ADs were compared over three stages of operation: 1) 0-1 month service for unsheltered encampments; 2) 1-3 month disaster relief scenario; and 3) >3 months representing refugee camps and long-term household use. Monthly monitoring of chemical characteristics (pH, conductivity, nutrients, total solids), and fecal indicator bacteria indicated system performance, with results used to infer their most appropriate use at

full scale. pH in UD remained circumneutral, while other ADs increased to pH >8 and were accompanied by a prominent ammonia odor. UD demonstrated lowest total solids, while least suspended solids were observed in the unmixed tank due to solids settlement. Ammonia toxicity may be reflected by total coliform reduction in ADs containing urine. The results of this study demonstrate that stratification in the unmixed tank promotes suitable conditions for short-term use of recirculating toilets. Furthermore, the benefits of bacterial disinfection and reduction of H2S odor imply that recirculating toilets containing urine would be more desirable for prolonged use.

Bio:

Lilith Astete Vasquez, EIT is a PhD student in the Joint Doctoral Program offered between University of California, San Diego (Mechanical and Aerospace Engineering), and San Diego State University (Environmental Engineering). She completed a B.S. Environmental Engineering with a minor in Sustainability from SDSU in 2018, during which time she performed independent studies related to sanitation and natural water treatment techniques. Prior to pursuing a doctoral degree, Lilith worked with the California State Water Resources Control Board as part of a team that oversees regulatory enforcement of wastewater dischargers enrolled under the National Pollutant Discharge Elimination System in the San Diego Region.

Lilith’s research focuses broadly on sustainable wastewater treatment, and her work as a graduate student has primarily involved combining social sciences and experimental work to solve modern issues in sanitation for underserved communities. In San Diego, her work has involved consulting with a local nonprofit organization and the SDSU School of Public Affairs to identify unmet needs of unhoused San Diegans, and to apply knowledge gained from her experimental research on waterless flushing toilets to design a mobile sanitation unit that can be deployed for encampments, disaster relief zones, refugee camps, and other remote applications. Most recently, she has performed a study on the removal of antibiotic resistant bacteria from decentralized wastewater treatment

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Robert Bair, University of South Florida

***Automation in Onsite Systems: Progress, Future, and Classification System***

Presentation, 25 minutes

Abstract:

Centralized wastewater treatment facilities have greatly benefited from the adoption of advanced control systems and sensors in their treatment trains. Automation in these facilities has made biological processes more efficient by reducing expensive chemical inputs, aeration costs, and direct operator supervision. These benefits outweigh the additional cost of installing and maintaining more complex controls and sensors. The onsite treatment sector has been slower to incorporate automation schemes despite an exponential drop in the cost of computing power, sensors, and the increased interconnectivity of household devices and appliances. As regulations across the nation are becoming more stringent towards onsite treatment, and as the desire for onsite water recycling increases, better process control and failure detection is needed in the onsite sector. This presentation proposes a

classification system for defining onsite treatment systems based on the level of system automation. The system taxonomy includes five categories: no control, manual control, open-loop control, closed-loop control, and interconnected systems. These categories cover most of the existing onsite systems and lay a framework for the future of more interconnected onsite systems. Products common to the industry, including septic tanks, aerobic treatment units, and membrane bioreactors will be presented as case studies for the classification system. The presentation will also highlight existing sensor technologies and their potential applications to onsite system automation.

Bio:

Robert Bair is a Senior Development Engineer in the Civil and Environmental Engineering Department at the University of South Florida. He specializes in anaerobic membrane bioreactors for decentralized wastewater treatment. He has extensive experience in designing pilot skids for experimental testing and validation. His passion lies in seeing technological advancements serve the needs of marginalized communities. During his PhD, he served as the inventor, designer, builder, and operator of the NEWgenerator, a containerized wastewater treatment system designed to treat waste streams from informal settlements. He holds three patents on various reactor designs and has published over 12 peer-reviewed publications on topics spanning algal biofuel production, food waste digestion, bioaugmentation of anaerobic digestion, and anaerobic membrane bioreactor operation.

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Amal Bakchan, University of South Alabama

***Understanding Socio-technical Barriers to Decentralized Wastewater Management in the Rural Alabama's Black Belt***

Presentation, 50 minutes

Abstract:

Over the past few decades, the Black Belt region of Alabama has been struggling from a lack of access to wastewater management, due to extreme soil condition that causes hydraulic failure in conventional septic systems. While ongoing research efforts are investigating decentralized clustered wastewater systems as promising solutions in these communities, how to best manage these small systems is largely unknown. If improperly managed, decentralized systems do not provide the level of treatment necessary to adequately protect public health and water quality. This study (1) explores possible socio-technical barriers (e.g., technical, financial, institutional, social) that may hinder adequate operation and maintenance (O&M) in the Black Belt; and (2) provides practical and policy recommendations that could best overcome these barriers. A survey questionnaire is administered to various public and private rural management entities (e.g., water and sewer utilities). Using statistical inferencing, preliminary results indicate that not paying for O&M services, and difficulty to obtain funds are highly rated barriers by the respondents. As such, to further support the urgent need for decentralized wastewater management in rural communities, federal and state policy needs to prioritize more funds for the O&M to enhance systems' reliability. The study contributes to practice by contributing to addressing the wastewater challenges in the underserved Black Belt's communities.

Bio:

Amal Bakchan is a postdoctoral fellow at the Department of Civil, Coastal, and Environmental Engineering at the University of South Alabama. She holds a Ph.D. from the University of Texas at Austin. Amal's research couples engineering modelling approaches with qualitative analysis methods to gain new insights into socio-technical water-sector infrastructure systems to improve access to basic services for underserved communities in the US and developing nations. Amal is currently working on decentralized wastewater management in the rural Alabama's Black Belt region.

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Allison Blodig, Infiltrator Water Technologies

***Forgotten Factors Needed in Wastewater Treatment System Design***

Presentation, 25 minutes

Abstract:

Climate and altitude have an effect on how the biology reacts in a wastewater treatment system but they are often times not included when sending a system out in the field. They also affect how mechanical parts work and perform in the field. This presentation will review how these factors influence the system performance with specific examples.

Bio:

Allison Blodig has been in the onsite wastewater treatment industry since 1997 and has worked most of her career in the wastewater treatment manufacturing industry and is currently a Wastewater Treatment Systems Specialist for Infiltrator Water Technologies. Along with a degree in Biology from Benedictine College in Atchison, KS, she has been a Registered Environmental Health Specialist and member of the National Environmental Health Association since 1996. She is also very active with the National Onsite Wastewater Recycling Association (NOWRA) and is the President Elect for that organization. Allison received the Women in Manufacturing award in 2012 and was the 2017 recipient of the Raymond Peat Lifetime Achievement award for outstanding achievement in the Kansas onsite wastewater field.

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Gabriele Bonaiti, Texas A&M AgrLife Extension

***Improve Performance of Drip Irrigation in OSSF Systems in Texas***

Presentation with a paper, 25 minutes

Abstract:

Drip irrigation provides precise application and allows for improved use of the application area. Because of this, its use in OSSF systems is increasing in Texas in response to issues such as limited space and challenging site conditions. However, there is a lack of standard procedures needed by designers, installers, and maintenance providers. Professionals have frequently observed problems, and there is potential for improving drip performance, especially in terms of effluent distribution uniformity and maintenance. Drip irrigation systems are quite common in central Texas; demonstrated success in this region would encourage application in other parts of the state. Texas A&M AgriLife Extension has contracted with the Texas Commission on Environmental Quality (TCEQ) to gather and summarize information from surveys, existing literature, and original field experiments with focus on aspects specific to Texas conditions (i.e., dosing technique, application rate, effect of soil type, installation configuration, flushing method, filtering type and method, and tubing cleaning). This will result in a unique compilation of recommendations and guidance document that will support license holders, regulators, and landowners to implement successfully drip irrigation. The research will also identify gaps in current regulations and aid TCEQ when considering potential rule or policy change. This presentation will describe project objectives, methods, and preliminary results.

Bio:

Dr. Gabriele Bonaiti is an Extension Program Specialist and has been employed by Texas A&M AgriLife Extension since February 2009. During this time, he has developed and implemented educational programs for water districts focusing on water conservation and efficiency through irrigation scheduling, identification of head and seepage issues in open canals, soil water balance and quality modeling, data management, and use of Geographic Information Systems. He is currently supporting Texas Commission on Environmental Quality's - Coastal Zone Act Reauthorization Amendment projects by developing and implementing methodologies for building an inventory of On-Site Sewage Facility systems along the Texas coastal zone, the Lampasas River Watershed, and the Hidalgo and Cameron Counties. He is currently leading a new research project funded by the Texas Commission on Environmental Quality's Onsite Grant Program to evaluate onsite effluent Drip Irrigation system design, installation, and management.

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Elizabeth Boor, University of Minnesota Onsite Sewage Treatment Program

***Contaminants of Emerging Concern (CEC) Mobilization in Crop Field Application of Septage***

Presentation, 25 minutes

Abstract:

Contaminants of Emerging Concern (CEC) encompass a wide range of compounds including pharmaceuticals, endocrine disrupting compounds, flame retardants, and pesticides (Salimi et al., 2017). Despite their diversity and pervasiveness in the environment, research on how CEC move through and interact with the environment is still in its infancy. Current research shows that CEC are present in surface water, groundwater, soil, and even organisms (Maruya et al., 2013). There are many point sources of CEC; wastewater treatment plants are some of the most well-studied point sources.

However, research regarding CEC within decentralized wastewater treatment systems like septic systems is limited. Research investigating CECs in septage field application is even more limited. This study aims to fill this knowledge gap by examining how Contaminants of Emerging Concern (CEC) in septage move through and interact with soil, groundwater, and plant tissue. Crop field conditions were replicated in a soil column model and CEC were quantified with triple quadrupole mass spectrometry. The results of this study show how CEC from septic tank septage mobilize and break down in crop field application.

Bio:

Elizabeth is a Graduate Fellow at the University of Minnesota working under the supervision of Dr. Sara Heger in the University's Onsite Sewage Treatment Program. Elizabeth has a Bachelor's degree in Environmental Science and Geology from the University of Minnesota, Duluth and has spent time as a lab intern at the Hutchinson Wastewater Treatment Plant. She is currently putting her technical skills and background knowledge of the natural world into practice as she works towards her Master's degree. Her graduate work involves identifying and quantifying Contaminants of Emerging Concern (CEC) across different septic systems and different soil media. She has completed one year of her Master's degree in the University of Minnesota's Water Resources Science Program and will be sharing some of her thesis work at this conference. She will explain her model field experiment set up and explain how CEC can mobilize in septage field application and implications for environmental health as well as human health.

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Bryan Brooks, Ph.D., Baylor University

***OPENING SESSION: Lessons Learned from Horizon Scanning with a Focus on Needs for Onsite Wastewater Recycling Research (NOW-R2)***

Presentation, 50 minutes

Abstract:

Though formal horizon scanning efforts have presented opportunities to anticipate future priorities and provided benefits to other science and engineering professions, such strategic prospective approaches have not previously been initiated to identify research and professional practice needs for onsite wastewater recycling research. Leveraging experiences using a big questions approach through the Global Horizon Scanning Project, which identified priority research needs for environmental quality, and UNCOVER-EH (Understanding Needs, Challenges, Opportunities, Vision and Emerging Roles in Environmental Health; which identified timely practice-based research needs associated with essential environmental public health program areas and services, we recently performed NOW-R2 (Needs for Onsite Wastewater Recycling Research) with NOWRA and other key national partners to examine timely research needs for decentralized systems. Following previously reported methods, a NOW-R2 survey was distributed to professionals working in onsite wastewater, followed by a synthesis workshop with experts from business, government, and academia in which focus groups further distilled input to identify consensus-based research needs. Whereas priority research questions focused on timely

technical scientific topics and environmental management issues, priority problem statements examined future challenges within the profession and associated needs for individual professionals.

Bio:

Bryan W. Brooks, PhD, MS is a Distinguished Professor of Environmental Science and Public Health at Baylor University. The author of over 250 manuscripts, his current research is supported by the National Science Foundation, the National Institute of Environmental Health Sciences, the Strategic Environmental Research and Development Program, the United States Department of Agriculture, the World Health Organization, and the Centers for Disease Control and Prevention and Food and Drug Administration with the Texas Department of State Health Services. Prof. Brooks serves as Editor in Chief of Environmental Science & Technology Letters.

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John Buchanan, Ph.D., University of Tennessee

***A Method to Assess the Hydraulic Loading Rate of a Marginal Soil***

Presentation with a paper, 50 minutes

Abstract:

It is proposed to develop a drip-based permeameter to evaluate water movement through marginal soils. This should not be misconstrued as a return to the historic in-field percolation test that poorly simulated a falling-head permeameter evaluation. The proposed method will apply water over an area to determine the application rate that will saturate the soil profile and result in standing water on the soil surface. Once this rate is established, then the application rate can be reduced to determine a steady-state rate that matches the ability of the soil profile to move water. As currently constructed, the device is 6-ft by 6-ft grid of drip emitters (36 emitters), with emitters spaced 12 inches on-center and placed directly on the soil surface. Each emitter was rated for 0.55 gallon per hour. The system is operated by a programmable controller that was powered by deep-cycle 12 VDC battery (with solar panel). The drip system was supplied from a 330-gallon tank and pressurized by a 12 VDC diaphragm pump. The tank was refilled as needed. This session will report on the first deployment of this device on a clayey soil with a weak, blocky structure. The Tennessee Department of Environment and Conservation Division of Water Resources will allow this soil to be loaded at 0.075 gpd/ft<sup>2</sup> (based on table values). The drip permeameter provided evidence that this loading rate should be acceptable.

Bio:

Dr. John R. Buchanan is an Associate Professor and is on the faculty of the Biosystems Engineering and Soil Science Department at the University of Tennessee. He has 32 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 Agricultural Engineering and a Ph.D. in Civil Engineering, all from The University of Tennessee. John is a member of the Water Environment Federation, Soil and Water Conservation Society, NOWRA, and the American Society of Agricultural and Biological Engineers. He is a registered professional engineer in Tennessee.



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Cynthia Castro and Gary Shyu, University of South Florida

***Towards Meeting ISO 30500 Effluent Phosphorus Criteria for Non-sewered Sanitation Systems***

Poster Presentation

Abstract:

The NEWgenerator (NG) is an off-grid non-sewered sanitation system (NSSS) developed by the Membrane Biotechnology Group at the University of South Florida as part of the Gates Foundation's Reinvent the Toilet Challenge. Its development was spurred to address the lack of sanitation infrastructure solutions for urban informal settlements. NG underwent pre-commercialization field-testing at an informal settlement in Durban, South Africa to evaluate the sub-system performances and limitations while also identifying key operational and maintenance needs. The NG contains an anaerobic membrane bioreactor, a nutrient capture system (NCS), and an electrochlorinator. While the system was able to meet the ISO 30500 water quality criteria for COD, TSS, pH, pathogens, and total nitrogen, the effluent phosphorus criteria of 80% reduction was initially not met. To date, no NSSS has been able to achieve significant phosphorus removal near the criteria required. To this end, the NG's NCS, which comprises two clinoptilolite zeolite beds and a GAC bed, was chemically modified with the goal of achieving both nitrogen and phosphorus removal in a single step. A 6-week field trial of the NG showed that calcium-modified clinoptilolite zeolite removed an average of 76% and 89% of total phosphorus and total nitrogen, respectively. The NCS alone was able to remove 15-34 g N/d and 3.2-6.3 g P/d. The results indicate that calcium-modified zeolite may be a viable option for phosphorus treatment in NSSS.

Bio:

Dr. Cynthia Castro is a postdoctoral researcher in the Membrane Biotechnology Group in the Civil and Environmental Engineering Department at the University of South Florida and project manager for the NEWgenerator. Cynthia has spent the last decade working on the development of off-grid, autonomous decentralized wastewater treatment systems as sanitation solutions for low- and middle-income countries, particularly in western and southern Africa. Recently, her research efforts have been focused on developing efficient treatment techniques, including membrane-based separation technologies, ion exchange, and precipitation, for the efficient recovery of nitrogen and phosphorus from high-strength wastewater. Prior to joining USF, Cynthia worked on developing a fundamental understanding of energy-efficient and energy-positive biological wastewater treatment processes at the University of Massachusetts Amherst. Her work included studying metabolic competition in pilot-scale microbial fuel cell anodes for energy production and the granulation behavior of hydrostatic oxygenic photogranules for aeration-free wastewater treatment.

Hsiang-Yang "Gary" Shyu is a Ph.D. student in the Membrane Biotechnology Group in the Civil & Environmental Engineering Department at the University of South Florida. Gary's current research focuses on membrane-based separation technology, advanced adsorbent, and data analysis for developing an off-grid, autonomous decentralized wastewater treatment system named NEWgenerator™. As a part of his Ph.D. research, he analyzes data from a field test system in South

Africa. He uses the data to develop dynamic models and focused on water, nutrient, and energy cycles for further system optimization. Prior to he started his Ph.D. degree, Gary obtained his M.S in Environmental Engineering at the USF. His research included studying and developing a flotation microalgae bioreactor to apply in an aquaponic system and wastewater treatment plants.

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Chia-Yang Chen, University of Minnesota

***Evaluation and Application of Biochar and Iron Material in Septic Systems***

Presentation, 50 minutes

Abstract:

The University of Minnesota has undertaken a two-year study to determine if the addition of biochar and iron enriched sand (IES) could improve the performance of septic system. Conventional septic systems are composed of a septic tank, which primarily performs sedimentation, and soil treatment unit where final treatment and dispersal occurs. Biochar is produced by the thermal decomposition of biomass through pyrolysis, resulting in a highly porous material with interparticle surface area ranging from 100 - 500 m<sup>2</sup>/g, making it a highly effective sorbent. IES is sand with added iron fillings. Biochar and IES could be used to enhance the treatment in septic systems of organic matter, solids, bacteria and viruses, nitrogen, phosphorus, and emerging contaminants. Previous studies provide some evidence that biochar and IES may be effective at treating stormwater however, their performance for treatment of wastewater from septic systems is poorly understood. To fill the knowledge gap, this study is testing biochar and IES for enhancing treatment of septic effluent. Different kinds of biochar and IES are being investigated with a series of batch and column experiments. The purpose of this study is to find the best filtration material combination and the best operating and loading conditions. The outcome of this project can be a valuable reference for the future septic system design enhancements.

Bio:

Dr. Chen received his Bachelor and Ph.D. degree from the Department of Environmental Engineering at National Cheng Kung University in Taiwan. During the time in National Cheng Kung University, Dr. Chen concentrated on the research about clean energy, bioenergy, thermal treatment, and air pollution. Thereafter, Dr. Chen became a Postdoctoral researcher at National Taiwan University and his research focused on green energy, biomaterials, and wastewater treatment using various adsorbent and catalyst. After joining the University of Minnesota group, with the experience about biochar and wastewater treatment, Dr. Chen works on the projects regarding to biochar and iron material application on septic effluent purification. So far, Dr. Chen has 17 international journal articles with 658 citations and 2 patents. He served as reviewer for many international journals and consultant for some environmental industries as well. His research includes waste-to-energy, waste-to-material, biomass and bioenergy, thermal treatment, air pollution, water treatment, and hydrogen energy.

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Stuart Coleman, DigDeep Decentralized Wastewater Innovation Cohort Lead

***Reforming National and State Policies to Reduce Inequity of Safely Managed Sanitation in the United States***

Presentation, 25 minutes

Abstract:

DigDeep Right to Water Project (DigDeep) is a human rights non-profit working to ensure that every American has clean, running water and safe access to sanitation forever. Our work to close the Water Gap in the U.S. has taught us that communities facing materially similar water and sanitation challenges often lack the meaningful connection with one another that would enable them to share approaches, compare data, and exchange support and encouragement. The Decentralized Wastewater Innovation (DWI) Cohort is a nationwide community-driven research initiative by DigDeep elevating decentralized wastewater challenges, solutions, and policy opportunities. Given the unique intersection of (1) unprecedented federal funding for decentralized and alternative wastewater solutions, (2) the complex landscape of residential infrastructure needs, and (3) the diverse, comprehensive expertise of the DWI Cohort, the Cohort presented actionable policy opportunities to federal agencies on March 31, 2022, during a virtual roundtable.

Bio:

Wastewater Alternatives and Innovations (WAI) Executive Director, Stuart Coleman, MFA, worked for ten years as the Hawaiian Islands Regional Manager of the Surfrider Foundation, overseeing five Chapters and hundreds of volunteers across the state. He has led coalitions to help shape policy and pass landmark legislation to reduce pollution of Hawaii’s coastal areas, including the nation’s first and only bill to create smoke-free beaches & parks and the first bill to ban oxybenzone in sunscreens. Stuart also helped pass legislation to reduce wastewater pollution and mandate the upgrade of cesspools across Hawaii. He currently serves on the state’s Cesspool Conversion Working Group and on the Advisory Board of the University of Hawaii’s Sea Grant Program. Along with being a public speaker, teacher and freelance writer, Stuart is also the award-winning author of three books about modern Hawaiian history, surfing and culture, including Eddie Would Go, Fierce Heart and Eddie Aikau: Hawaiian Hero.

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Christian (Cricket) Corwin, MacConnell and Associates PC

***Creative Engineering for Onsite Coastal Properties***

Presentation, 50 minutes

Abstract:

Coastal properties often present unique challenges due to significant seasonal demands, wide fluctuation in flows, challenging soils such as marine sediment clay and dredge fill, a seasonal high-water table and limited land availability. However, in many instances obstacles can be overcome by simply

leveraging existing regulations. Different types of technologies such as PPBPS (Prefabricated, Permeable, Block Panel System) and GSF (Geotextile Sand Filter) can reduce drain field size by up to 50% which will allow for a reduction in area required for the system. Other treatment products in conjunction with these technologies can also be used to further reduce the drain field when space is limited. Good engineering practices help overcome the challenges presented at the coast. These practices include stacking treatment pods on top of tanks, creating an island to hide wastewater system construction and many others. This presentation will show various case studies where some of these technologies and practices were used on the coast of North Carolina to meet these wastewater challenges.

Bio:

Ms. Corwin is a Junior Project Engineer at MacConnell and Associates PC. She has a Bachelor’s Degree in Biological and Agricultural Engineering from North Carolina State University. While at MacConnell and Associates she has had the opportunity to work on numerous onsite wastewater projects. These projects include several challenging coastal properties.

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Victor D'Amato, NC Division of Water Infrastructure

***Decentralization in the Context of Resilient Utilities: North Carolina’s Viable Utility Program***

Presentation with a paper, 25 minutes

Abstract:

HB 1087 was signed into law (SL 2020-79) by North Carolina Governor Roy Cooper in July 2020. This legislation directs the Department of Environmental Quality (DEQ) to develop a process for assessing the infrastructure, organizational, and financial health of local government owned water and wastewater systems and to develop criteria for identifying distressed" utilities. Distressed utilities are statutorily required to inventory and assess their assets, and to develop a long-term plan for system viability. Distressed utilities are eligible for grant funding from the Viable Utility Reserve. Grants may be used to conduct studies, regionalize, rehabilitate infrastructure, and decentralize. This presentation will explore the role of decentralized systems in promoting viability across the three core pillars of effective utilities: Infrastructure Management, Organizational Management, and Financial Management. After an introduction to the Viable Utility program and the characteristics of utilities in North Carolina, we will discuss potential approaches for using decentralized systems to improve the performance of utilities, along with the implications on asset management and system architecture, ownership of assets and operational considerations, and utility financial management. The legalities of various management options along with barriers to more widespread implementation of decentralized solutions will also be addressed, using project examples as case studies.

Bio:

Victor D’Amato is a professional engineer with over 28 years of experience focused on sustainable water and wastewater management. Vic earned an MS in Water Resources Engineering from UNC-Chapel Hill and a BS in Civil Engineering from Penn State. He worked as a consultant for over 20 years before

rejoining the North Carolina Department of Environmental Quality as Supervisor of the Viable Utilities Unit in May 2021.

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Marcia Degen, Ph.D., VA Dept of Health

***Wastewater Surveillance for COVID-19: Here to Stay?***

Presentation, 25 minutes

Abstract:

Wastewater surveillance has been used for many years to track infectious diseases such as polio, especially in impoverished countries. In the United States, wastewater surveillance has only recently been utilized with research such as antibiotic resistance genes and opioids. With the onset of the COVID-19 pandemic, the Centers for Disease Control (CDC) initiated a plan to implement wastewater surveillance for COVID-19 nationwide with the National Wastewater Surveillance System (NWSS). Virginia was one of many states who received funding to create such a program. Being a new program, there were a number of barriers/roadblocks to easy implementation. This presentation will explore the issues associated with implementing the program in Virginia such as marketing to utility partners and public health professionals; lack of laboratory capacity; lack of standard analytical methods; and lack of interpretation tools. The status of the Virginia program will be presented along with data collected and lessons learned. Finally, the presentation will explore the applicability and feasibility of this type of surveillance to ongoing evaluation of COVID-19 and other public health threats.

Bio:

Dr. Degen has a B.S. in Biology, a Masters in Environmental Sciences and Engineering, and a Ph.D. in Environmental Engineering, all from Virginia Tech. She is also a licensed Virginia professional engineer. Dr. Degen’s Ph.D. research was in onsite wastewater disposal systems, specifically looking at the effect of several variables on the in-ground denitrification rate. Dr. Degen’s career has involved consulting and teaching at the community college level, but has primarily been with state government working in permitting, loan programs, and engineering all for wastewater facilities. Dr. Degen moved to the VA Department of Health in 2009 to assume the role of Technical Services Manager in the onsite sewage and water division. She is currently a member of the Virginia Onsite Wastewater Recycling Association Board, the Virginia Environmental Health Association, the Virginia Water Environment Association, and the State Onsite Regulators Association and is a past member of the Virginia licensing Board for onsite wastewater professionals. She currently serves on the Boards of the National Onsite Wastewater Recycling Association and the State Onsite Regulators Association. She is the current President of SORA. Dr. Degen has participated in several EPA committees including technical review panels that developed onsite BMPs for use in the Chesapeake Bay watershed. Currently she is overseeing wastewater surveillance for SARS-CoV-2 in Virginia in addition to her other duties.

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Daniel Delgado, University of South Florida

***Biological Nitrogen Removal for Passive Onsite Wastewater Treatment Systems Using Saltwater Toilet Flushing***

Presentation with a paper, 25 minutes

Abstract:

Incomplete treatment of wastewater is a source of anthropogenic nitrogen pollution that has adverse effects on water bodies, aquatic life, and public health. In addition, freshwater resources continue to become overstressed by growing human needs, prompting some communities to utilize seawater for toilet flushing instead of potable water. This research investigates constraints and solutions towards construction of robust and sustainable onsite wastewater treatment systems (OWTS) with biological nitrogen removal for systems that use salt water for toilet flushing. Keeping sustainability in mind, a laboratory scale OWTS was designed to make use of passive treatment options, meaning limited to no inputs of energy and chemicals. The system treated domestic wastewater with added salts to bring the salinity to 1.5% and 3.0% to mimic different OWTS seawater flushing scenarios. No salt added wastewater was used as a control. Trickling columns achieved 76% conversion of ammonia to oxidized nitrogen (NOx) under non-saline conditions and 72% conversion at 1.5% and 3.0% salinity. Microcosms were constructed to evaluate different industrial and agricultural waste stream electron donors for denitrification at 3.0% salinity with freshwater controls. Electron donors used were sulfur pellets, sugar cane bagasse, banana stem, and pine chips, with pine chips and banana stem showing the best nitrogen removal rates. Results show biological nitrogen removal as a viable sustainable option.

Bio:

I spent six years in the Navy as a nuclear plant operator onboard a submarine. This led to an interest in engineering that motivated my decision to pursue a bachelor's degree in Environmental Engineering at San Diego State University (SDSU). While at SDSU I became a research assistant investigating the use of algae as a biofuel feedstock and treatment processes for nutrient removal of municipal wastewater. After completing my bachelor's degree at SDSU in 2018, I enrolled in a PhD program for Civil and Environmental Engineering at the University of South Florida (USF) that same year. I have spent the last four years pursuing my PhD at USF and I have earned a master's degree along the way in Civil Engineering. I have also spent those four years investigating the use of biological nitrogen removal in saline waster for onsite wastewater treatment systems.

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Kyle Dierolf, Premier Tech Water and Environment

***Impact of Cumulative Sludge Release from OWWTS***

Presentation, 50 minutes

Abstract:

Over the last 20-plus years, it has been largely documented that some OWT technologies are more prone to sporadically release sludge into the environment, contributing over time to the premature clogging of the drain field. Indeed, performance results from both testing on controlled platforms and

in-situ, reported in many studies, suggest that biofiltration technologies are more robust and fit than ATUs to support on-site pollutants and hydraulic load fluctuations. Deficient operation and lack of regular maintenance were pointed out as the main contributing factors to these poor performances. Nevertheless, ATU performances are not as stable and consistent, and present a lower reliability level in case of malfunction or abuse than media filters that are inherently fail-safe. A fail-safe mechanism prevents partially or untreated effluent, or sludges produced and accumulated within the system from short-circuiting the treatment process and reaching the drain field. But still, it is difficult to evaluate and quantify the real impacts of these events over time on drain field performance and dispersal capacity. Based on its extensive expertise in biofiltration and physical barrier to retain and treat pollutants, PTWE conducted a study to further document these cumulative impacts to develop a compact post-filtration system ensuring the protection of the drain field from sludge surges and any fluctuation in the effluent quality. Preliminary results and observation will be presented.

Bio:

Kyle is a Product Manager with Premier Tech Water & Environment. Kyle’s experience in the onsite septic industry began in regulation in Pennsylvania where he is a certified Sewage Enforcement Officer. In this role he performed site and soil evaluations for onsite septic systems, design reviews, regulatory compliance, and installation inspections. In addition to working with septic systems Kyle was also a Building Code Official. With Premier Tech Kyle started as a Regional Supervisor working with residential applications of the Ecoflo Biofilter. Kyle has worked with onsite wastewater projects in various states. Kyle has served as a member of the Board of Directors for the Maryland Onsite Wastewater Professionals Association.

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Nicholas Dykes, Dykes Construction LLC

***Drip Irrigation 101***

Presentation, 50 minutes

Abstract:

All the good Soil is gone. All the good Lots are gone. As the population grows in the United States, the places we are building residences are changing. Nowadays, Sites are often smaller and being built in less desirable locations. Leaving us as Onsite Professionals having to find new options to treat wastewater flows. Drip Irrigation can solve many of the roadblocks we encounter when designing and installing Wastewater Treatment Systems. Often Emerging Installers and Legacy Installers are intimidated by Drip Irrigation Onsite Systems. They have concerns over time of Install and complexity. This presentation will consist of a brief overview of Drip Irrigation, History, Site Layout, and Best Practices when installing Drip Irrigation Systems. Understanding Drip Systems and proper Installation is key to Drip Systems long term functionality. My goal for this presentation is that any installer that has not installed a drip, will not hesitate to the next opportunity they are given.

Bio:

I grew up in the onsite wastewater industry, been working with my father Scott Dykes since I was old enough to come to work. Some of my earliest memories are using a grade stick and laying infiltrators. I can't quite remember a time when setting an ATU, chlorinator, and pipe to daylight was common practice. But it was, and perfectly legal! I am 32 years old now, and so much has changed for the better. I am grateful to have watched Onsite Wastewater Treatment in the State of Missouri grow to what it is today. I am 3rd Generation in a Business who puts Workmanship and Best Practices First. I have been Blessed to learn this trade from many great men in the Kansas City area whom I consider the best in the business. I am a registered Advanced installer and Inspector with DHSS. I have Installed systems from 360 gpd to 3000 gpd systems, conventional, LPP, Drips, Lagoons, Mounds, UV Discharge (DNR), even the experimental ones we do not talk about. I love what I do and this industry, I look forward to watching it grow and evolve in the future.

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Tom Fritts, Residential Sewage Treatment Company and Nicholas Dykes, Dykes Construction LLC

***OPENING SESSION: OWTS Looking Back and Moving Forward***

Presentation, 50 minutes

Abstract:

Wastewater Treatment has changed considerably over the last 100 years. New Developments and Technologies have enabled our industry to be able to provide efficient wastewater treatment to many areas where it was not previously possible. Often with a much smaller footprint. By using the many different types of treatment systems, our industry will continue to protect the public health and environment. Where have we been and where do we see the industry going? We can only imagine where the industry will be 100 years from now, but we know that workmanship and education will be key in Onsite successfully growing. We must be willing to accept changes in system design, when new technologies are available. While not ignoring Legacy Systems place in our world, not all Systems fit all Sites. How do we work with existing non-compliant systems for homeowners? As professionals, what can we do to further our states and national professional development and workforce for our industry? This keynote will touch on the history of wastewater treatment, how we have grown over time and look forward to how our industry will continue to thrive through intelligent management of wastewater treatment systems.

Bio:

Tom Fritts is vice-president of Residential Sewage Treatment Company, Inc. in Grandview, Missouri where they design, sell and service alternative onsite wastewater systems. Tom is past president of the Missouri Smallflows Organization (MSO), the Kansas Small Flows Association (KSFA) and the National Onsite Wastewater Recycling Association (NOWRA). He is an approved instructor for NOWRA, the Consortium of Institutes for Decentralized Wastewater Treatment and several states across the country. Tom is the 2016 recipient of the NOWRA Dick Otis Industry Achievement Award and the 2015 Kansas Small Flows Association Raymond Peat Industry Achievement Award.

Bio:



Previously listed.

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Paul Ganey, Ganey Engineering LLC and Kerry Clark, University of Missouri

***Case Studies of Engineered Systems for Site Limitations in On-site Soil Treatment Systems***

Presentation, 50 minutes

Abstract:

While most homeowners hope for the cheapest, simplest solutions to dealing with their on-site sewage treatment, many sites are not suitable for conventional soil treatment systems due to limitations such as high clay levels, bedrock, shallow depth of permeable soil, slope, coarse fragments, space, and high-water tables. Site evaluations conducted by a soil morphologist are used to document how both the soil and the landscape affect on-site decisions and designs. When site limitations necessitate the use of an engineered design, the engineer relies on the site evaluation to develop a system that will best suit the site. In this presentation, a soil scientist and engineer have teamed up to show four case studies of sites with severe limitations and the systems that best fit the soil, landscape, and space. Case studies include photos, site evaluations, and system designs.

Bio:

Both Kerry Clark and Paul Ganey will be presenting. Kerry Clark is a soil scientist/assistant research professor at the University of Missouri and teaches soil morphology, pedology, and soil genesis. Additionally, she has been a licensed soil evaluator for on-site systems since 2007. Paul Ganey is a licensed engineer and on-site treatment system designer. He is the owner of Ganey Engineering LLC in Arnold, MO, a St. Louis suburb.

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Claude Goguen, National Precast Concrete Association

***A Close Look Inside Concrete and How to Make the Most Durable Wastewater Treatment Tanks***

Presentation, 50 minutes

Abstract:

This presentation will address how concrete is manufactured and what is done during that manufacturing to enhance durability of precast concrete tanks. We will examine raw material such as aggregates. Why are certain sizes and types of aggregates selected? How are they tested, and how aggregate moisture is determined for mix design adjustments. We will talk about cements. What types of portland cement are used and why. What supplementary cementitious materials are used and how do they contribute to tank watertightness and durability. We will discuss admixtures, what they do, and why certain ones may be needed for septic tanks. We will examine how mix designs are developed and

why one mix design does not work for all precast applications. We will use videos to show how ingredients are batched and mixed in precise sequence and quantities. We will also talk about tank reinforcing. Why do we use rebar or welded wire fabric and determine placement. We will discuss fibers and their potential uses in precast concrete wastewater tanks. We will use video to demonstrate placement of concrete in tank forms. We will talk about proper curing of precast concrete tanks and discuss how they are stripped from the forms, inspected and made ready to deliver. A thorough and insightful look inside concrete that will help manufacturers, designers, contractors and inspectors better understand the process of delivering a product that contributes to treatment system resiliency.

Bio:

Claude Goguen has more than 28 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 in technical services 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 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 14 years.

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Roxanne Groover, Florida Onsite Wastewater Association

***Overcoming the Challenges of High Strength Waste in OSTDS - Panel Discussion***

Presentation, 50 minutes

Abstract:

Onsite sewage treatment and disposal systems (OSTDS) are much more than a conventional septic tank and drainfield. We'll start the conversation by looking at what we perceive high strength waste to be and what we are really seeing in the field. Then join us for a lively discussion on overcoming the challenges of high strength waste as it relates to OSTDS. Small towns mean big business for the entrepreneur. See how the industry has adapted to meeting the needs of waste streams that go FAR beyond domestic and embrace the niche market of local distilleries, breweries, and anything else today's small business owners can "throw at and IN them"! This panel discussion encourages the attendees to become involved in the process and share learned experiences (both the good and the bad). Some walk away points we hope to achieve: 1. Be creative when finding solutions for unconventional wastewater needs 2. Encourage attendees to "think outside the box" and become innovators 3. Become proactive with difficult OSTDS situations 4. Realize it's about more than just conventional systems.

Bio:

Roxanne Groover is currently the Executive Director of the Florida Onsite Wastewater Association (FOWA). She holds an Engineering degree from ODU. She wears various hats for FOWA by coordinating and teaching continuing education, outreach to the community regarding onsite wastewater treatment

systems, running a not for profit association, and staying extremely active in the politics that affect the Industry. Prior to FOWA she worked for Bord na Mona as an Environmental Engineer. She belongs to various organizations including ASAE, NAWT, and NOWRA. She is a member of NSF's Wastewater Joint Committee. Florida's Technical Advisory Committee, NAWT's Board of Directors and other state committees which assist her in the different aspects of her career.

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Roxanne Groover, Florida Onsite Wastewater Association

***DWTS...Giving the Septic Industry Another Option.***

Presentation, 25 minutes

Abstract:

The concept of Distributed Wastewater Treatment Systems (DWTS) is NOT new but is not commonly utilized as a viable option when talking about onsite (advanced) septic systems. This presentation will discuss how this option is being used in Florida to challenge the "Septic-to-Sewer" mentality often seen when developing long-term wastewater treatment options. An overview will be given regarding treatment requirements, permitting requirements, and how State and Federal funding is being used to offset the costs to property owners that are either being required to "upgrade" their current legacy systems or unable to build on new lots because of nutrient concerns in Florida's waters. The walk away the presenter hopes to provide are the following: 1. Introduce/Re-introduce the concept of DWTS. 2. Share the steps required to make this concept a viable option versus "septic-to-sewer". 3. Discuss various options for funding that are often unavailable for OSTDS projects. 4. Share the "lessons learned" as the process has been implemented in Florida.

Bio:

Bio Listed previously.

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Dennis Hallahan, Infiltrator Water Technologies

***Decentralized Strategies and Solutions for Small Communities***

Presentation, 25 minutes

Abstract:

Small Communities face challenges with wastewater: protecting their local environment and economic drivers in tourist destinations, lack of staff to negotiate the labyrinth of funding, increasing regulatory discharge limits, lack of land area or surface discharge location to dispose of community system flows, very bad site conditions such as expansive clay soils, or small clustered villages with tight lots that will not fit conforming onsite systems. The problems are many, fortunately the solutions are many as well

due to the flexibility of the decentralized wastewater treatment model. In response to a lack of a surface discharge, small communities or private businesses can investigate a subsurface discharge and thereby also provide the benefits of groundwater recharge. Large decentralized systems have not typically been recognized historically as a viable alternative however with the advent of new technologies it is becoming accepted. This presentation will review the design criteria necessary for the design of large subsurface discharges and discuss the benefits and challenges of decentralized systems. This will allow decision makers to review options to provide a cost-effective solution that protects the public health. Case studies will be reviewed to demonstrate the viability.

Bio:

Dennis has over thirty years of experience with the design and construction of on-site wastewater treatment systems. He has authored dozens of articles for on-site industry publications and has given numerous presentations nationally on the science and fundamentals of on-site wastewater treatment systems. Dennis also is responsible for product research and testing at universities, test centers and with private consultants. His department develops system sizing charts for national and international approvals and assists customers and field representatives in the design, planning and review of large commercial decentralized systems. Some of these systems have design flows in excess of one 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 21 years and holds the current position of Technical Director. Dennis also holds patents for on-site wastewater products and is a member of the Water Environment Federation and of the National Onsite Wastewater Recycling Association. Dennis has served for several years on the NOWRA Technical Practices (past chairman) and Educational Committees and is also a member of the NEWEA and WEF Small Communities Committee.

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Tracy Hammond, Polsinelli, LLC

***OPENING SESSION: How NOWRA Represents Your Interests in Washington***

Presentation

Abstract:

Tracy Hammond is a member of the firm's National Public Policy group and assists clients interested in shaping energy, environmental, and infrastructure legislation and regulation. He is part of the team which represents NOWRA on Capitol Hill. He will provide an analysis of the legislative and regulatory landscape, initiatives underway which may have an impact on the onsite/decentralized industry, and steps the industry can take to increase its influence in Washington on those initiatives.

Bio:

Tracy has spent over 15 years representing clients before Congress and many executive branch agencies. Tracy entered politics, serving as an aide to the Minority Floor Leader of the Missouri General Assembly in Jefferson City. Upon arriving to Washington, D.C., he began working for the Campaign Media Analysis

Group (CMAG) where he serviced both electoral and issue advocacy campaigns by providing analysis on political media activity. Prior to joining Polsinelli, Tracy served as Vice President at Dutko, advising clients with the firm's Energy, Environment and Sustainability practice.

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Charles Harwood, Missouri Department of Natural Resources

***Residential Housing Development Rule in MO***

Presentation, 25 minutes

Abstract:

The Missouri Department of Natural Resources is often asked What's the smallest lot I can put a septic on? Onsite wastewater treatment (septic) systems (OWTS) installed on undersized lots have long been a concern so the MODNR developed the residential housing development rule, 10 CSR 20-6.030 to ensure lots are sized and configured in a manner where the soil-landscape model is a true component of the system. The rule is an evaluation of the geology and soil-landscape properties which is then used to calculate lot sizes within a subdivision ensuring that the use of OWTS are protective of public health and the environment. Once a subdivision receives written approval under 10 CSR 20-6.030 an individual would then contact the Department of Health and Senior Services, Onsite Wastewater Treatment Program or the local onsite wastewater authority (commonly the local health department) to permit an OWTS on an individual lot. This presentation reviews the approval process as contained in the residential housing development rule, 10 CSR 20-6.030 as well as jurisdiction of wastewater in Missouri.

Bio:

Charles Harwood is a soil scientist with the Missouri Department of Natural Resources, Water Protection Program, Operating Permits Section with over 35 years as a soil scientist. After earning a BS in Plant & Soil Science from Southern Illinois University-Carbondale, he started his career as a county soil scientist in Pike County, Illinois with the USDA-SCS (now NRCS) Soil Survey. He then returned to his home state of Missouri as a soil scientist for the Missouri Department of Natural Resources where he continued to map soils as part of the USDA-SCS Soil Survey. After that he worked as a consultant conducting soil & site evaluations for onsite wastewater treatment (septic) systems, subdivisions, wetlands, etc. He returned to the Department where his primary responsibility is the approval for the method of wastewater treatment within subdivisions under the residential housing development rule, 10 CSR 20-6.030, for all 114 counties. Other duties include technical support for Department staff along with various other state and local agencies as well as the general public. He is also the liaison for the Department with the Missouri Department of Health and Senior Services, Onsite Wastewater Program. He is a member in good standing with the Missouri Association of Professional Soil Scientist, Missouri Smallflows Organization and the National Onsite Wastewater Recycling Association.

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Gary Hawkins, University of Georgia

**Education Associated with the On-Site Waste Treatment Industry at the University of Georgia**

Presentation with a paper, 25 minutes

Abstract:

Flushing the toilet or pulling the plug in a sink starts the process of managing on-site wastewater in on-site waste disposals system (OWDS). In Georgia, on-site waste treatment is regulated by the Georgia Department of Public Health (DPH). Educating people from those at the Department of Public Health who permits and approves these systems, to the installers, to the pumpers, to the homeowners who use the systems need to know how the systems work. At the University of Georgia (UGA) we have and are developing an educational facility to provide education for the listed groups to help them better understand their role in the OWRS system. We have one demonstration and training facility and one being constructed at two of UGAs campuses. As mentioned the facility have many of the items and demonstrations typically seen when permitting, installing, pumping, and using OWDS. This presentation will show how we are using the sites to educate participants in various education events to better understand OWDS and how to maintain them. Besides the on campus facilities, we also provide education outside the university with mobile educational presentations and displays. Join us for this presentation to learn what we are doing to help better educate persons associated with the OWDS.

Bio:

Dr. Gary L. Hawkins works for the University of Georgia as the Water Resource Management Specialist in the Crop and Soil Science Department. He is an Agricultural Engineer and graduated from Clemson University, Auburn University and the University of Tennessee. He is responsible for extension programming in the areas of water quality, water quantity and water resources. His current extension and research programs are related to water resource issues in the areas of soil and water conservation, water retention, water management in various crops, nutrient movement, well water protection and education, septic systems, water quality, water quantity and small-scale irrigation.

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Sara Heger, Ph.D., University of Minnesota

***NOW-R2: Identifying Priority Research Questions for Onsite Wastewater Recycling Research***

Presentation with a paper, 25 minutes

Abstract:

As part of the NOW-R2 survey, onsite wastewater recycling professionals were asked two research-based questions. Whereas the first question focused on technical scientific research needs (Question 1: What technical scientific research question (e.g., innovation, design, resiliency, resource recovery), if answered, would substantially advance the science of decentralized wastewater over the next decade?), the second question focused on management research needs (Question 2: What environmental management (e.g., science-policy, implementation, enforcement) research question, if answered, would substantially advance the practice of decentralized wastewater over the next decade?). These responses were then taken to a workshop with focus groups at the 2021 NOWRA Mega-Conference, where

submissions were further synthesized by experts from business, government, and academia to produce a final list of priority research questions through a consensus process. For Question 1, 17 priority research questions were identified within the general themes of Treatment, Performance and Resource Recovery, Resiliency, Efficacy and Sustainability, and Environmental Quality and Public Health. For Question 2, 16 priority research questions were identified within the themes of Assessment, Monitoring and Operation and Maintenance, Implementation, and Regulations, Enforcement, and Environmental Justice. This presentation will specifically examine these research needs.

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, teaching Sustainable Waste Management Engineering. For over 20 years, she has been conducting research and providing education and technical assistance to homeowners, small communities, onsite professionals, and local units of government regarding decentralized onsite wastewater treatment. Sara coordinates the research program at the U of MN with current projects evaluating contaminants of emerging concern and the addition of biochar and iron-enhanced sand into septic systems. She regularly provides training across the US and Canada and contributes regularly to the Onsite Installer providing technical information regarding the science of wastewater treatment including design, installation, and management. Sara is the president of the National Onsite Wastewater Recycling Association, serves on the NSF International Committee on Wastewater Treatment Systems and chairs Minnesota's SSTS Advisory Committee. She has a BS in Biosystems & Agricultural Engineering and a MS and PhD in Water Resource Science.

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Jamie Holodak, Baylor University

***NOW-R2: Identifying Priority Education, Training and Outreach Needs in Onsite Wastewater Recycling***

Presentation, 25 minutes

Abstract:

As part of the NOW-R2 survey, onsite wastewater recycling professionals were asked questions focusing on research needs and the practice. Responses identified challenges with workforce preparation, recruitment and retention, existing education and training programs, and public awareness and outreach. This presentation will specifically examine common themes among NOW-R2 submissions focusing on education, training and outreach.

Bio:

Jamie Halodak is a senior University Scholar at Baylor University, where her honors thesis research examines the current status of the workforce, education programs and professional training efforts in onsite wastewater recycling within the United States. Jamie recently received a 2022 Dr. Gerald Lage Academic Award, the Big 12 Conference's highest academic honor given to student-athletes.

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Anish Jantrania, Ph.D., Texas A&M AgriLife

***REEU Program at TAMU: Getting Undergraduate Students Excited about Onsite Wastewater Treatment & Reuse***

Presentation, 50 minutes

Abstract:

In 2016 and 2018, Texas A&M Onsite Wastewater team was selected for a multi-year USDA-NIFA grant to support a summer fellowship program for undergraduate students. The program focuses on Integrated High Impact Extension, Research, and Education Program for Undergraduate Students in Water Quality using onsite wastewater treatment and reuse systems. Program started in June 2017 with 15 undergraduate students as the first cohort and the participating students learned about onsite wastewater treatment systems operation and monitoring of effluent quality from aerobic and anaerobic treatment systems operating at the Onsite Wastewater Center on A&M campus. A second cohort of 15 students participated in the course in June 2018 and studied treatment performance of two proprietary on-site aerobic wastewater treatment technologies to determine possibilities for on-site reuse. The five-week program is designed to give hands-on training in sample collection, field analysis to measure dissolved oxygen, pH, conductivity, chloride, and nitrate, along with a variety of laboratory parameters including total coliforms, E. coli, and turbidity. Students also get classroom lectures on soil and water quality, onsite wastewater treatment and reuse technologies, and role of extension in society. At the end of the program the students present their findings and experience in a poster and video presentation. This paper presentation will summarize results from 2017 to 2022 programs and future plans.

Bio:

Dr. Anish Jantrania is an Associate Professor/Extension Specialist in the Biological & Agricultural Engineering Department at Texas A&M University. Texas. Dr. Jantrania has over 30 years of experience working in the wastewater industry, in the public and private sectors, with a focus on On-Site Sewage Facilities (OSSF/septic systems), and decentralized wastewater and water systems. His research and extension interests focus on sustainable infrastructure to ensure the availability of clean water to meet society's water demands, and to ensure safe sanitation to protect public health and environmental quality. Before coming to Texas, Anish has worked in Virginia, Massachusetts, and West Virginia, and has studied in West Virginia, South Carolina, Ohio, and India. His work in Texas focuses on developing a statewide extension education and research program related to surface and groundwater quality protection with specific emphasis on non-point sources, OSSF, and other environmental issues.

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Anish Jantrania, Ph.D., Texas A&M AgriLife

***From Waste to Taste: An Analysis of Reuse Wastewater Systems***

Poster Presentation



Abstract:

As the rate of water consumption increases due to the growing human population, the amount of readily available water resources continues to decrease. The need to reuse and recycle wastewater is growing to support a more sustainable water supply for future generations. The Reuse Water Quality Research and Extension Experiences for Undergraduates (RWQ-REEU) program provided students the opportunity to learn about reuse water quality through hands-on experience during a five-week summer program (Figure 1). The students studied four on-site wastewater treatment trains at the Texas A&M University System RELLIS campus to determine the efficacy of those treatment trains in reducing physical, chemical, and biological parameters from the raw wastewater to final effluent. This poster presents the objectives of the research project, methods used to conduct the project, and findings of the project conducted during the 2022-REEU program in June on the Texas A&M RELLIS Campus.

Bio:

Bio listed previously.

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Anish Jantrania, Ph.D. Texas A&M AgriLife

***Onsite Wastewater Treatment and Reuse Research and Extension Experiences for Undergraduates (REEU) Program at Texas A&M University***

Poster Presentation

Abstract:

In June 2017, Texas A&M University hosted 15 undergraduate students as the first cohort of the USDA-NIFA-sponsored project Integrated High Impact Extension, Research, and Education (REEU) Program for Undergraduate Students in Water Quality which focused on onsite wastewater treatment systems. A second cohort of 15 students participated in the course in June 2018 and studied treatment performance of two proprietary on-site aerobic wastewater treatment technologies and a proprietary water treatment technology to assess possibilities for on-site direct potable reuse. The program was renewed in late 2018 for five years, with the goal to enroll eight students per year. Two advanced onsite wastewater treatment and reuse technologies and four water treatment systems were installed at the center. During 2019, 2021, 2022 programs, students examined the efficacy of onsite wastewater reuse systems under normal and abnormal operating conditions. The students gained an understanding of the role of soil for treating wastewater by sampling and analyzing soil water from a septic drain field. The students measured field parameters including dissolved oxygen, pH, conductivity, chloride, and nitrate, along with a variety of laboratory parameters including total coliforms, E. coli, and turbidity. This poster will summarize the program from 2017 to 2022 along with plans for the next year program. Note that the 2020 program was cancelled due to Covid-19.

Bio:

Bio listed previously.

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Justin Jobin, Coastal Wastewater Solutions

***Nassau County, NY's Nitrogen Reducing Septic System Grant Program***

Presentation with a paper, 50 minutes

Abstract:

Nassau County, NY has initiated a streamlined and robust septic system replacement grant program for residents and small businesses. The SEPTIC program provides grant funding to eligible recipients to replace septic systems and cesspools with nitrogen-reducing systems. Nassau County is offering grants up to \$20,000 for homeowners or small businesses to install these state-of-the-art nitrogen-reducing septic systems. Nitrogen pollution from cesspools and septic systems has been identified as the largest single cause of degraded water quality on Long Island, contributing to beach closures, restrictions on shellfishing, toxic algae blooms, and massive fish kills. A conventional onsite septic system was never designed to remove nitrogen. The average residential septic system discharges approximately 40 pounds of nitrogen per year. Approximately 40,000 homes and small businesses in Nassau County are currently served by cesspools and septic systems. Reversing degradation of water quality will depend on replacement of existing systems with these new nitrogen-reducing technologies. The SEPTIC grant program provides funding for up to 200 systems per year using State and County funding sources.

Bio:

Justin Jobin started Coastal Wastewater Solutions after leaving his position as Environmental Projects Coordinator with the Suffolk County Department of Health Services in March of 2021. Justin is a soil scientist and wastewater management expert with over 20 years of experience with Innovative and Alternative Onsite Wastewater Treatment Systems (I/A OWTS). Coastal Wastewater Solutions was founded to further Justin’s commitment to advancing I/A OWTS to address the region’s nitrogen pollution crisis. Justin ran several pilot programs in Rhode Island and on Long Island evaluating onsite treatment system viability and performance. Justin previously served 13 years as the Wastewater Management District & GIS Coordinator for the Town of Jamestown, RI, a small island community designated by EPA as a sole-source aquifer, where nutrients from septic systems pollutes ground and surface water just as it has similarly affected Long Island waters. Justin has also authored several publications on wastewater management and developed curriculum for the New England Onsite Wastewater Training Program at the University of Rhode Island.

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Justin Jobin, Coastal Wastewater Solutions

***Fostering the Use of Nitrogen and Phosphorus Removing Septic Systems in New York***

Presentation, 50 minutes

Abstract:

Owasco Lake, located in Cayuga County is one of the New York Finger Lakes and encompasses an area of approximately 6,660 acres. The lake serves as the primary source of drinking water for the City of Auburn and the Town of Owasco. The lake is also a popular spot for fishing and recreational activities. Owasco Lake is on the NYS impaired waterbodies list due to high bacteria counts along the north shore and a recent surge of blue-green algae blooms (cyanobacteria) which are fueled by non-point source nutrient pollution from runoff, wildlife, agriculture, and lakefront septic systems. Historically the algal blooms have been limited to nearshore areas. However, in 2020, although the overall phosphorus loading seemingly decreased, data has shown an increase of cyanobacteria in open water. Coastal Wastewater Solutions, LLC was contracted by The Nature Conservancy to provide a review of the current state of phosphorus removal and loading associated with septic systems and develop and implement phosphorus and nitrogen reducing septic system demonstration program to assist in the advancement of these initiatives.

Bio:

Bio listed previously.

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Jonathan Kaiser, Infiltrator Water Technology

***Top Wastewater Treatment Myths***

Presentation, 25 minutes

Abstract:

There are common industry misconceptions in the life cycle of an active wastewater treatment system. This presentation will address these misconceptions through design examples in an audience-interactive format. Addressing these myths can help industry professionals properly design, install, and maintain active treatment systems for optimal system performance and longevity. Some of the myths that will be addressed include misconceptions about septic system odors, the NSF certification (residential vs. commercial applications) and NSF testing specifications, advanced treatment unit performance, septic system sizing (hydraulic loading vs. organic loading), and advanced treatment system startup best practices. Septic system odors could depend on a number of factors including venting, plumbing (overall system design), and influent wastewater characteristics. With NSF-certified advanced treatment system design, it's critical to understand how the treatment systems were tested and what they're certified to. This allows the designer to specify the appropriate treatment technology based on required effluent concentrations. There's also a misconception within the industry on system sizing based on hydraulic loading versus organic loading for advanced treatment systems. In what situations would a designer choose to incorporate organic loading into system sizing versus hydraulic loading alone. Lastly, this presentation will analyze the many myths regarding system startup.

Bio:

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. At Infiltrator, Jon works with on the design

and construction of decentralized wastewater treatment systems. He also works on product regulation and research and development initiatives. Jon is currently perusing a Masters of Engineering at the University of Connecticut with a concentration in Environmental Engineering.

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David Lentz, Infiltrator Water Technologies

***Achieving Secondary Wastewater Treatment Standards using Zero-Energy Combined Treatment and Dispersal Technology***

Presentation with a paper, 50 minutes

Abstract:

Combined treatment and dispersal technology (CTD) is a reliable, sustainable, non-electric, low-impact means of treating domestic wastewater to secondary standards and dispersing the treated water to the native soil within the CTD system footprint. CTD technology uses naturally occurring microflora and chemical processes to degrade wastewater organic matter, achieving NSF/ANSI 40 standards for carbonaceous 5-day biological oxygen demand (25 mg/l) and total suspended solids (30 mg/l). Extensive third-party testing has shown CTD technology to meet NSF/ANSI 40 standards immediately upon system start up. CTD technologies include a manufactured wastewater distribution device surrounded by sand conforming with ASTM C33 particle gradation specifications. Septic tank effluent enters the manufactured CTD device, where distribution and filtering occur, followed by additional microbial and chemical treatment in the surrounding ASTM C33-conforming sand, resulting in a treated effluent. Rather than discharging primary-treated wastewater to native soil like a conventional pipe and filter material dispersal field, CTD systems disperse the secondary-treated effluent directly to native soil through an open-bottom design, providing a tangible environmental benefit that is required by Authorities Having Jurisdiction for certain building sites. CTD technology serves both single-family home and large-flow onsite wastewater treatment and dispersal challenges. This presentation focuses on passive.

Bio:

Dave Lentz manages Infiltrator Water Technologies' government affairs department, with responsibility for regulation of the company's effluent dispersal, tank, and treatment product lines. Nationally, Infiltrator is involved in rulemaking, legislation, and industry standards development supporting the onsite wastewater treatment system industry. Dave has over 25 years of experience related to soil and groundwater systems. He holds a Bachelor's degree in structural engineering and a Master's degree in geotechnical engineering, and is a licensed professional engineer.

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David Litchfield, Central Connecticut State University

***The Need to Mandate Openings at Surface on Septic Tanks***

Presentation with a paper, 25 minutes

Abstract:

Abstract Within the United States the use of onsite wastewater systems (septic systems) is estimated to be between 20 and 30 percent, with the number of new homes built today approaching 50% reliance on the use of this type of liquid wastewater disposal. Septic systems are one of the most practical forms of recycling in use today. Water is extracted from the ground by way of wells, and is reintroduced as wastewater which gets filtered back, often into the same area of its extraction. It is the process of this natural cleansing that leads to the importance of proper care of wastewater disposal. Only through appropriate maintenance of on-site wastewater disposal systems can we improve/safeguard our ground water. The lack of practical access to septic tanks for service technicians leads to potential issues of improper maintenance, risk of complete neglect, and possible injury to service providers. This paper seeks to explore these issues and address why it is imperative that decision and policy makers understand the difficult tasks associated with keeping onsite wastewater from contributing to water contamination by mandating the simple solution of bringing covers/inspection openings to the ground surface where the septic tanks can be easily located, accessed and maintained.

Bio:

David Litchfield David Litchfield holds an MBA and has completed requirements of an MS in Construction Management at Central Connecticut State University. He is the owner of The Christopher Bryant Company in Simsbury, Connecticut, a company specializing in septic services. He is also a home builder and remodeler. Having taught “Successfully starting your own business” at Holyoke Community College in Massachusetts, with a passion for trying to improve service quality. Mr. Litchfield continues to look for ways to safeguard groundwater quality by improving the liquid wastewater service industry.

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Zachary Lowenstein, US EPA

***EPA's Decentralized Wastewater Program Update***

Presentation, 50 minutes

Abstract:

The U.S. Environmental Protection Agency (EPA)'s, Office of Wastewater Management, Decentralized Wastewater Program provides resources, education, and outreach at a national level regarding the management and care of decentralized wastewater systems. This presentation will highlight the major accomplishments and updates of the Decentralized Wastewater Program in 2022, including the 10-year anniversary of SepticSmart Week and the ongoing work of the Decentralized Wastewater MOU Partnership. The Decentralized Program's annual outreach campaign, SepticSmart Week, promotes proper care and maintenance of septic systems primarily for homeowners. EPA's Decentralized Wastewater MOU Partnership, which consists of associations and experts in the decentralized field, play a key role in the success of SepticSmart Week. This presentation will include progress updates on the

Program's priorities such as homeowner outreach, data needs, technology, finance, and workforce development.

Bio:

Zach Lowenstein is an Environmental 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. 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 kids.

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Cory Lyon, Orenco Systems Inc.

***Delivering More Efficient and Scalable O&M with Modern Remote Monitoring***

Presentation, 25 minutes

Abstract:

In recent years modern wastewater control system technology has diversified to offer everything from very sophisticated monitoring, command and & control, and on-board intelligence to very accessible remote alarm notification. This progress has reached the point where there are four main tiers of capability that have developed in the market. All this functionality has prompted many operators and system owners to ask how they can best leverage these technologies. Matching control system capabilities to the needs of system owners, operators, and service companies can help create opportunities for improved system operation, greater O&M efficiency, and operational flexibility. This presentation will highlight five aspects of remote monitoring technology. One, it will help operators determine which tier of remote monitoring capability may best suit their clients, business, or management model needs. Two, it will share information on how the four primary tiers of remote monitoring technology may apply to large deployments of systems. Three, it will illustrate how remote monitoring technology can be used to optimize O&M management. Four, it will show how remote monitoring technology and data can be used to optimize individual system operation. Five, the presentation will review the operational considerations of currently available sensors and the underlying onsite wastewater collection and treatment equipment.

Bio:

Cory Lyon is an Account Manager for Orenco Systems, Inc., a wastewater equipment manufacturing firm. In this role, he helps customers grow and improve their business by providing information about Orenco products, product applications, and day-to-day business operations. He also introduces new products, supervises system startups, and performs program audits. A skilled presenter, Cory regularly gives trainings to diverse groups, including regulators, engineers, installers, service providers,

electricians, and distributors. Cory holds an Associate of Applied Science degree in civil engineering technology from Umpqua Community College.

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Gary S. MacConnell, P.E., MacConnell and Associates PC

***Overcoming Challenging and Difficult Sites***

Presentation, 50 minutes

Abstract:

There are many factors that can make the development of properties with onsite wastewater treatment and disposal systems challenging. Some of these factors include: soils, surface waters, topography, drainage features, setbacks, regulatory constraints and other issues. To overcome these issues, it is important to be creative and to think outside the box". Using various technologies, coupled with good engineering practices and in conjunction with local and state regulations can often make these difficult sites developable. Various challenging situations with respect to onsite wastewater are presented. Situations presented include: coastal sites, mountainous areas, limited space, soil restrictions and other impediments. Case studies are presented on how some of these impediments may be mitigated through good design practices. While many of these situations are site specific, the methodologies used in solutions implemented can be applied to other applications. Numerous photos are used to show how mitigative methods are used to make challenging sites developable.

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 Bachelor's Degree from Gettysburg College and three Masters Degrees from Duke University. He has over 38 years of experience in engineering and specializes in onsite wastewater. He has presented over 65 presentations and papers, both nationally and internationally.

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Zahra Maleki Shahraki and Fanjian Zeng, Stony Brook University

***Phosphorous Removal in Onsite Wastewater Systems Using Passive Biofiltration***

Poster Presentation

Abstract:

Excessive discharge of P from wastewater may cause eutrophication in fresh water. In this study, the total phosphorus (TP) level in the influent and effluent of 11 in-ground nitrogen removal biofilters (NRBs) with different configurations (lined, unlined, and box systems) were monitored on a monthly basis to evaluate the performance of the system. The NRB comprises an unsaturated layer of sand or

sandy soil on top and a bottom layer of sand mixed with a solid phase organic carbon source, such as woodchips. The systems have been shown to be effective in the removal of nitrogen; however, the phosphorous removal in such systems has yet to be fully investigated. Septic tank effluent (STE) and final effluent samples were collected monthly from June 2021 to June 2022. The STE samples contained a range of 0.6 to 18.7 mg P/L with an average of 9.3  $\bar{x}$   $\pm$  3.4 mg P/L. The results showed that 64.2% (86 out of 134) effluent samples had TP levels higher than 1 mg P/L, with an average TP removal efficiency of 74.3  $\bar{x}$   $\pm$  25.0%. No significant seasonal change in TP removal was observed during warm seasons (71.8  $\bar{x}$   $\pm$  21.2%) and cold seasons (76.5  $\bar{x}$   $\pm$  28.1%). In addition, no significant difference in TP removal efficiency was observed between the young system (< 2 years age, 5 systems, 75.5  $\bar{x}$   $\pm$  17.2%) and the older system (> 2 years age, 6 systems, 73.9  $\bar{x}$   $\pm$  13.2%). Collectively, the results suggested passive NRBs are efficient in removing P from onsite wastewater during the monitoring period.

Bio:

Zahra is a Ph.D. from Stony Brook University and was working for New York Center for Clean Water Technology on the onsite wastewater treatment systems for five years which resulted in the publication of three papers as the first author.

Fanjian Zeng is a Ph.D. student in the Department of Civil Engineering at Stony Brook University, and a graduate research assistant at New York State Center for Clean Water Technology. He is interested in nutrients (N & P) removal and recovery from on-site wastewater. His current research focuses on efficient and cost-effective passive technologies to remove and recover P from onsite wastewater.

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Jillian Maxcy-Brown, University of Alabama

***How-to-Guide for Wastewater Management of Rural, Underserved Communities in the Black Belt Region of Alabama: A Resource for Local Stakeholders***

Presentation, 25 minutes

Abstract:

In the Black Belt region of Alabama, shrink-swell clays are the most common surface soils and become practically impermeable when wet which makes a septic tank drainfield unable to operate properly. Some households are unable to afford alternative, advanced onsite treatment systems and resort to using failing septic systems or surface discharging raw wastewater into nearby trenches, forested areas, or other surfaces which is a practice known as straight piping. The resources needed to comprehensively address these wastewater problems are scattered in numerous sources and are typically written for an audience that has ample wastewater background knowledge rather than the homeowners, local officials, and other stakeholders who are key to mobilizing solutions. For this project, we are developing a “how-to” guide for onsite wastewater management in the Black Belt region of Alabama to serve as a comprehensive resource for stakeholders interested in addressing the wastewater management challenges in this underserved area. It explains (1) the importance of proper wastewater management, (2) available treatment technologies, (3) relevant laws and regulations, (4) opportunities for involving and educating the local communities, (5) potential management strategies, and (6) available funding



sources. The resource will guide stakeholders on how to identify the right funding source for a community's specific needs and how to successfully apply for these funding mechanisms.

Bio:

Jillian Maxcy-Brown is a Graduate Research Assistant in the Civil, Construction and Environmental Engineering Department at the University of Alabama. She earned a B.S. in Engineering with a Civil Engineering concentration from LeTourneau University in 2019. She is a student member of NOWRA and part of the Young and Emerging Professionals Committee. Her research primarily focuses on water and wastewater treatment technologies for underserved, low-resource communities.

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Harry McCaskill IV and Rachel Chai, University of South Alabama

***The Hydraulic Performance and Treatment Capabilities of a Hybrid Sand Filter for Application as an Onsite Wastewater Treatment System in the Alabama Black Belt***

Presentation, 25 minutes

Abstract:

Onsite wastewater treatment is used by approximately 25% of the population in the United States of America. Up to 85% of the residents rely on decentralized wastewater in the Alabama Black Belt (ABB) counties. This region can be characterized by its rural nature, low population density, and limited economic development. The average median household income in the Black Belt is \$28.8K (~50% of US average). Wastewater treatment systems are largely unaffordable for the local residents of the ABB due to the cost and size requirements of such systems. The Civil Engineering Department at the University of South Alabama built a bench-scale hybrid evapotranspiration/ lateral flow sand filter as a low cost, effective treatment option for this region. The hybrid sand filter is 8.5-ft x 12-ft x 3-ft sand mound designed to treat 51-GPD of post septic wastewater. The wastewater moves laterally and upwards via capillary reaction. The wastewater gets treated within the microbial layers of the sand. Preliminary hydraulic data shows that discharge rates are directly proportional to humidity and ambient temperature, which means higher temperatures and humidity lead to lower discharge rates. Preliminary treatment findings of the hybrid sand filter are treatment percent reductions of the following: Ammonia (64%), Phosphorus (92%), COD (76%), and BOD (96%). Preliminary results are promising and hope to offer an alternative system when traditional drain fields and mound systems are not applicable.

Bio:

Harry McCaskill IV is a graduate student at The University of South Alabama under the mentorship of Dr. Kevin White. He is pursuing a Master's degree in Systems Engineering. My research is focused on decentralized wastewater management for the Alabama Black Belt. This includes designing, modeling, researching, testing, and data collection of alternative wastewater treatment/disposal systems. I am also part of a laboratory team that performs onsite wastewater analysis for a private entity. Additionally, I am involved in several publications. I greatly enjoy the work that I do. I am surrounded by an incredible environmental team and I look forward to accomplishing much more as we move forward.

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David Meints, Meinco, Inc.

**Reduced Disposal Area Performance Utilizing Secondary-treated Effluent in Profile-limiting Soils**

Presentation, 50 minutes

Abstract:

Onsite wastewater systems dispose of primary treated effluent by utilizing the soil for final recycling and renovation of wastewater into the environment. Soil and site limitations have become a challenge to design a system and dispose of onsite wastewater using the traditional pipe and gravel method. Using secondary treated effluent from an advanced treatment unit applied to a reduced absorption area offers additional alternatives when developing an onsite wastewater system. The objective of this study was to determine the feasibility of hydraulically loading limiting soils with secondary treated effluent in a reduced absorption area. A reduced absorption area was constructed at six existing residences within the same subdivision that had shallow redoximorphic features that precluded using a traditional pipe and gravel system. Each residence had an existing advanced treatment unit with surface discharge of secondary treated effluent. Flows were diverted from the surface discharge to the reduced absorption area. Wastewater flows were recorded at regular intervals, along with ponding depths in the absorption area and fluctuations in the local water table over a 12-month period (March 2017 to April 2018). The absorption areas were hydraulically loaded at 2 to 3.8 times the rate required for secondary treated effluent. Wastewater strength was sampled throughout the study.

Bio:

Onsite business 26 years Owner of Onsite business, 2.5M annual sales Design, Install and Service Onsite systems 500 - 40,000 gpd MS, Soil Science, University of Arkansas. I have been a NOWRA attendee for years. It is time to share what I have learned. The research I did was unique and we still manage the experimental sites which continue to work.

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Dominic Mercier, Enviro-STEP Technologies, Inc.

**Domestic Strength, Really?**

Presentation, 50 minutes

Abstract:

For decades, we have been designing residential Onsite Wastewater Treatment Systems with the assumption that domestic sewage complies with a certain range of pollutant concentrations. The official certifications such as NSF and BNQ also rely on those recognized values found in literature and regulations. Are we sure that those are still representative of today's reality? Let's say, domestic wastewater concentrations would differ from the theory, are we sure that our design criteria would still

provide the expected performance and longevity? This talk will discuss the actual representativity of our traditional design criteria for domestic wastewater strength and potential impacts on septic systems.

Bio:

Dominic Mercier is a professional Engineer with a Master's Degree in Environmental Engineering. He has been working in the Onsite Industry for the past 26 years as a design Engineer and product developer and distributor doing business in most of Canada. He owns Enviro Neptune, a company dedicated to the Research and Development of Onsite products as well as Enviro-STEP Technologies specialized in technology distribution and manufacturing. Dominic had the opportunity to give several conferences in Canada and the US and enjoys sharing his observations and findings from being involved in several hundreds of installations every year.

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Mike Miller, Infiltrator Water Technologies

***Convenience Store Wastewater***

Presentation, 25 minutes

Abstract:

Convenience stores are often constructed in areas that are not served by central sewers; therefore, onsite wastewater is their only option. The wastewater produced by these facilities is often times high strength and a conventional system is rarely a good option but they are often utilized. This approach leads to failures and multiple replacement systems in a short time and has led to some store chains to avoid building utilizing onsite systems. This presentation will look at some of the commercial offerings of convenience stores and their impact on the wastewater stream. It will also offer some examples of operating convenience store wastewater influent and treatment trains that can provide a long-lasting solution.

Bio:

Michael Miller has 20 years of experience in the Life Sciences industry, specifically in automation of bioanalytical sample preparation, high-throughput compound screening, genomics, and forensics. He was a nominee in 2014 for Businessperson of the year by student panel at Indiana University, Kelly School of Business and holds a B.S. Degree in Management from Purdue University. Michael currently works for Infiltrator Water Technologies as an Engineered Systems Consultant in the Midwest and brings a unique perspective to the field of wastewater treatment.

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Brenden Murphy, Show Me Soils

***Setbacks, The Forgotten Inconvenience***

Presentation, 50 minutes

Abstract:

An estimated 25 percent of homes in Missouri rely on an onsite wastewater treatment system (OWTS) in areas where public sewers are not available. Onsite systems treat wastewater and disperse it on the property where it is generated. Factors that affect the proper functioning of onsite systems include the site and soil conditions, design, installation, operation, and maintenance. Once the completed application has been reviewed and compliance with the rule has been verified, the permitting authority will visit the site to determine if the system that was proposed in the application will fit" the site. If the proposed system does not fit on the site, then changes will need to be made to the application and proposed system design. All parts of the system must be installed as indicated in the application and permit, including fences around lagoons, distribution devices, pumps operational, etc. A site/setback plan is to a building site what a blueprint is to a home. It is a plan to follow, regardless of the size of the property being built on. The site/setback plan will illustrate, among other things: Well, /Septic location or stipulation for water/sewer tap-on location if water/sewer are provided. The instructor will heavily focus on mishaps and the perceived inconvenience when things can and do go wrong.

Bio:

Brenden Murphy is from St. Clair, Missouri. He has been in the septic industry for seven years and works for Show Me Soils. He has an OWTS Advanced Installer Certification and an OWTS Inspector Certification. Since he has worked with Show Me Soils, he has done soil evaluations with Chris Chapman, routine services on Norweco systems, completed installations as well as repairs, and mainly completes inspections on onsite wastewater treatment systems for real estate transactions. He has performed over 2000 inspections. He enjoys being on the Meramec River floating, boating and fishing when he's not working.

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NAWT - Multiple Presenters

***Inspecting Advanced Technologies/Things to Know from the Manufacturer***

Presentation, 50 minutes

Abstract:

As an OWTS inspector you will run across many types of systems some with very complex advanced proprietary units as part of the system. This session will be facilitated by some of the units that are encountered across the country. The representative from the manufacturer will discuss the finer points of their unit with regard to completing an inspection and ensuring that their until within the system is functioning as intended. While many of the units output goals are similar the method to get there can be drastically different. That is to say that just because the unit is an Advanced Treatment Unit, does not mean that the inspection protocol will be the same across the board. This advanced discussion is to educate the inspectors on the finer points of the specific units included in this discussion. At the end of this session the participate will be able to identify the different types of proprietary advanced treatment

units. They will be able to describe the different function and purpose of each unit. And they will be able to explain the inspection protocol for the different units presented. They will also expound on the importance of having a complete understanding of the proprietary unit for the purposes of completing a thorough OWTS inspection.

Bio:

Multiple panel members.

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NAWT - Multiple Presenters

***How to Work with Regulatory Agencies to Promote OWTS Inspections***

Presentation, 50 minutes

Abstract:

This session will be a panel discussion of the different steps that have been taken to help regulators adopt rules regarding title transfer/use permit inspections in different areas across the county. The participant will gain knowledge on the different tactics that were used and are being used to help move forward the concept of requiring OWTS inspections as the time of sale and/or when a property changes "use". The discussion will include some of the pitfalls and lessons learned about introducing this concept to regulatory authorities to help move this type of program forward. There will be some interaction with the participants where questions from the audience can be addressed. At the end of this session the participant will be able to define specific steps they can use to encourage local and state regulatory support for OWTS inspections at the time of sale or any change of use to an OWTS. They will be able to justify the importance of an OWTS Inspection program for their local area. At the end of this session the participant will be able to discuss different and unique issues that can be found during an OWTS inspection. Through the interactive presentation participants will be encouraged to share different situations they have run across and how they dealt with them with regard to an OWTS inspection. The participant will be empowered to discuss their perspectives and opinions of OWTS inspections. They will be able to define tools that have been used in other circumstances that may help them with future inspections they are involved in.

Bio:

Multiple panel members.

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Douglas Nelson and Alexis Countryman, Milwaukee School of Engineering

***Nitrogen and Phosphorus Removal in Onsite Wastewater Treatment Systems Utilizing Microbial Inoculator Generators and Nutrient Removal Devices***

Presentation, 50 minutes

Abstract:

The project is a full-size pilot onsite system that is designed to remove BOD, TSS, TN, and TP. As of this writing the system has been installed and sampling and testing will begin shortly. There should be preliminary results available by October of 2022. Project Goals and Objectives: 1. Assess the phosphorus and nitrogen removal effectiveness of a Microbial Inoculator Generator (MIG) onsite wastewater treatment system, 2. Determine the phosphorus removal capabilities of a phosphorus adsorption media, 3. Identify the maximum loading rates and flow rates to the MIG system while achieving groundwater discharge limits. Pilot Anticipated Outcomes: 1. Enhanced nutrient removal capabilities of small-scale onsite wastewater treatment systems, 2. Increased availability of low maintenance phosphorus removal technology.

Bio:

Alexis Countryman is a Masters Candidate in Civil Engineering with a specialization in Water and Wastewater Treatment at the Milwaukee School of Engineering (MSOE.) She has spent the past 4 years focusing her studies on wastewater treatment systems. She is very active in student organizations including Engineers Without Borders (EWB) and Central States Water Environment Association (CSWEA.) In EWB she has been on design teams and travelled to Guatemala pre pandemic and will travel again in July 2022. Douglas Nelson, PE is an associate professor in the Civil and Architectural Engineering and Construction Management Department at MSOE. He teaches courses in all three programs within the department. His experience with onsite wastewater systems dates back to the mid 1980s when he started teaching and then designing systems. He started and was the charter director of the New York State Onsite Training Network. His memberships include WEF, CSWEA, ASPE, and WOWRA/NOWRA. He has been a certified inspector, maintainer, and soil tester in Wisconsin.

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Christopher Nothstine, Tall Guy Waste Water Solutions & Soils, LLC.

***Low Pressure Pipe System Design and Construction***

Presentation, 50 minutes

Abstract:

I have lived and worked in northwest Missouri the last two decades and have designed and helped install twenty plus low pressure pipe systems, as well as a similar number of drip irrigation systems. A basic explanation of low pressure pipe systems would cover the advantages of better waste water treatment and dispersal through improved distribution, shallow placement and time dosing. A brief portion of the introduction would be dedicated to the need for professional design, installation and understanding of engineered systems for system success and owner satisfaction. Some common dos and don'ts would also be shared. The primary goal of the presentation would be to highlight a few of the most common design and installation challenges. Particular attention would be given to the need for appropriate field placement based on a soils morphological site evaluation and the need for minimum

pumping volumes of one hundred gallons or more to facilitate improved distribution in the lateral field. The inherent challenges presented by system installation on sloping sites would also be discussed, sharing common failures and suggested solutions. Lastly, the presentation would conclude by re-visiting the need for professionalism in our industry, particularly when installing engineered systems. Considering roughly eighty percent of Missouri's drinking water comes from groundwater sources (Mo DNR website), it is everyone's responsibility to preserve and protect this natural resource.

Bio:

After graduating from the University of Missouri at Columbia, I was employed by MIKON Corporation. The skills of general civil design were learned working on strip mine reclamation projects and street/storm design projects. I changed jobs in the fall of 1996 and for three years, I worked at a Christian residential care ministry for young men. I achieved my professional registration as a civil engineer during my time at the ministry. Upon joining Scott Gann Construction, INC in 2000, I learned and worked on sub-division design and wastewater treatment and dispersal. Some of the design highlights include design/permitting of a 2,500 gpd recirculating sand filter for a rural trailer park, designing a wetland mitigation plan for the Army Corps of Engineers and many low-pressure pipe and drip irrigation onsite systems. I was responsible for the technical design responsibilities as well as the installation duties including plumbing, pumps and control panels. While working for Scott Gann Construction, I became a licensed on-site soils evaluator through the Missouri Department of Health. In 2022 I left Scott Gann Construction and started my own consulting business, Tall Guy Waste Water Solutions & Soils, LLC. I plan to concentrate on engineering design of onsite waste water systems and providing soils evaluations, while taking time to share my excitement and experience through speaking/teaching opportunities. I look forward to continued learning in the waste water field.

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Allison Osredker, AmeriCorps-Missouri Smallflows Organization

***Protecting Our Resources Through Homeowner Education Programs***

Poster Presentation

Abstract:

Missouri is a diverse state in geology. Karst topography presents many challenges to protect our groundwater resources. Homeowner education programs that promote hiring a certified professional and ongoing maintenance of onsite wastewater systems is just the first step in protection. Printed brochures have been created to build an informational center for professionals to pass education onto homeowners. This can occur at the completion of building an OWTS or when one is serviced for maintenance. Brochures were created for septic tanks, ATUs, lagoons, media filters, LPP, and drip dispersal. These materials can be handed out at local health departments and regulatory authorities across the state. The brochures and folder can also be provided to registered installers as a handout once they have completed their project. Installers can talk to the homeowners about a maintenance plan and provide these materials to help the homeowner better understand their system and how to properly maintain and use it. Future work will involve conducting workshops for homeowners at the

Springfield Onsite Wastewater Demonstration Site. In cooperation with Watershed Committee of the Ozarks, 319 Grant funds have been acquired to do workshops for homeowners along with promotion of the Septic Pump Out Program.

Bio:

Allison Osredker is a junior at Missouri State University. She is pursuing a bachelor's degree in Natural Resource Management, as well as a minor in forestry and sustainability. She began working with Missouri Smallflows as well as the James River Basin Partnership as an Americorps member in January of this year. During her service she has really enjoyed focusing on protecting water quality in my area and working to education others on the importance of water quality, and the difference everyone has the power to make on their environment.

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Larry Oxenham, American Society for Asset Protection

***Don't Kill your Golden Goose Protect & Perpetuate Your Business***

Presentation, 50 minutes

Abstract:

Is your financial house in order? Discover the tools you can use to become invincible to lawsuits, save thousands in taxes, and achieve financial peace of mind. By the end of the presentation you will know how to: 1) Protect 100% of your assets from lawsuits. You will learn how to make yourself so unattractive to a plaintiff attorney that they will never pursue a lawsuit against you. 2) Save thousands of dollars each year in taxes. You will learn five tax reduction strategies most people fail to utilize, which could save you more than \$10,000 each year in taxes. 3) Avoid probate and eliminate all estate taxes. You will be taken through a checklist of items that are important to every estate and business succession plan. You will learn what you should be doing now to prepare for successful business and estate succession. It takes a lifetime to accumulate your assets. Take the time to protect them.

Bio:

Larry Oxenham is one of America's top asset protection experts, having helped thousands of professionals achieve financial peace of mind by teaching them how to properly structure their assets for lawsuit protection and tax reduction. He has authored and co-authored several articles and books on the subject including The Asset Protection Bible and How to Achieve Financial Peace of Mind through Asset Protection. His career has been credited with helping thousands of people save millions of dollars. Larry Oxenham is a nationally recognized speaker who has trained thousands of professionals at hundreds of conventions, conferences and seminars across the country.

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Frank Parker, Parker Wastewater Consulting, Inc



***Important Points for Inspecting Drip Irrigation Systems***

Presentation, 50 minutes

Abstract:

The drip irrigation system for wastewater treatment is becoming a more utilized system. It has been found to be a very versatile system for complex sites. As we see more and more of these systems being installed, it is becoming more crucial that the OWTS Inspector gain training and education for these systems. This session will discuss how they are designed, why this type of system would be installed. The installation methods that are used and the need for ongoing operations and maintenance of these complex, multi component systems. Because of the complexity of these systems there is a need for the advanced training for OWTS Inspections. The OWTS Inspector needs to understand how to evaluate each component and what to recommend if there are items that need to be addressed. This course is from the "PSAM Drip Irrigation Inspection during a real-estate transaction". It covers how to test the manual and the automatic functions of the system and report back to the customer any malfunctions and probably causes they can determine. A valuable training for those in the Inspection sector of the OWTS industry. At the end of the session the participant will be able to discuss the finer points of a drip irrigation system. They will be able to define the important components of a drip system as they relate to the inspection process. The participant will explain the proper inspection protocol for drip irrigation systems. And they will be able to express why these systems should have regular operations and maintenance service to ensure the longevity of the system.

Bio:

Frank has been in the Onsite Wastewater System industry since 1981, gaining ground up experience through service work, problem solving, installation, design, inspection, maintenance and management. Past certifications have included sewage enforcement officer credentials, numerous conferences, industry related courses, onsite inspection of wastewater systems for real estate credentials, and an inspection course trainer/instructor for more than 25 years with Pennsylvania Septage Management Association (PSMA). Frank has also enjoyed participating in the development of inspection standards, and training courses for many years, as a member of the Education Committee with PSMA. This industry has a unique and rewarding network of colleagues, from which, one can continuously hone knowledge, skills and methodic practices, to deliver marketplace consistent conclusions and reporting. Frank has been operating his own business(es) in this ever-growing, ever-changing, interesting occupation for the last 24 years. He enjoys sharing industry knowledge and practices with those in the Onsite Wastewater industry regionally and nationally.

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Sushama Pradhan, On-Site Water Protection Branch, NC DHHS

***Serving the Underserved: Environmental Justice for Communities with Septic Systems***

Poster Presentation

Abstract:

Septic systems are an important part of North Carolina’s wastewater infrastructure, especially in rural and remote areas. After the installation of a septic system, it is the owner’s responsibility to ensure their system is properly maintained and functioning to keep the public and the environment safe. In historically marginalized communities (HMCs), many homeowners may not have learned how to maintain their septic system and/or may not be financially able to address a septic system issue. Also, many communities that rely on septic systems also use private groundwater wells for their drinking water. Water from private wells is not routinely tested unless the property owner requests and pays for a sample analysis. Such proactive water quality assessments may be cost-prohibitive for individuals and families in impoverished communities, and the inability to properly assess the drinking water may be a contributing factor to health disparities experienced in North Carolina. This project aims to provide field-based information on the operational status and the presence of emerging contaminants found in septic systems and private wells in HMCs. These socially vulnerable communities suffer from inequities that include the deterioration of their surrounding environment and require viable methods and means to address the public health threats they face.

Bio:

Sushama Pradhan, PhD, 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 on-site subsurface wastewater systems and prevention of surface and ground water quality degradation from such systems. She got her Doctoral degrees in Soil Science at the North Carolina State. Dr. Pradhan has over 15 years of research experience in on-site water management, on-site system technologies performance evaluation, and modeling on-site systems derived pollutant loadings using GIS based hydrologic model. Dr. Pradhan has successfully managed/completed numerous multidisciplinary projects including on-site system field performance surveys, evaluation of nutrient contributions from septic systems to water resources in the piedmont of North Carolina, efficacy of saporlite removing E. Coli from septic system effluent.

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Lisa Prcin, Texas A&M AgriLife Research

***Addressing Nonpoint Source Pollution from Failing OSSFs Through a Local Financial Assistance Program in Central Texas***

Presentation with a paper, 25 minutes

Abstract:

In 2009, Texas A&M AgriLife, local stakeholders, and other state and federal partners, established the Lampasas River Watershed Partnership with assistance from a Clean Water Act §319(h) grant to address surface water quality concerns in the Lampasas River. The Partnership identified water quality issues that were of importance to the surrounding communities within the primarily rural watershed through the development of a Watershed Protection Plan. Stakeholders included concerns about contributions from failing OSSFs near the Lampasas River and its tributaries since much of the watershed is not served by a municipal wastewater system. They recommended the development of a watershed wide OSSF

database and the development of a financial assistance program to repair or replace failing OSSFs. Records of OSSFs varied between counties based upon funding and resources. AgriLife developed a watershed-wide database with data from various sources to locate and identify OSSFs within the watershed. This database included datasets and permit records from each of the seven counties. In 2019, AgriLife secured funding to develop this financial assistance program for homeowners living on OSSFs. This project developed criteria and ranking to select homeowners to participate in the program. To date, the project has replaced nineteen systems that were failing within the watershed. This presentation will summarize the efforts to address failing OSSFs within the Lampasas River watershed.

Bio:

Lisa Prcin is a Senior Research Associate at Texas A&M AgriLife Research in Temple. In this role, Prcin serves as the Watershed Coordinator and manages all aspects of the Lampasas River Watershed Partnership, including coordination of educational programs, water quality data collection, and grant and report writing. She has worked in water resources since 2004 and holds a Bachelor's of Science in Animal Science from Tarleton State University (2003) and a Master's of Science in Rangeland Ecology and Management from Texas A&M University (2009). For the last 12 years, she has worked with landowners, homeowners, and local, state and federal agencies to improve surface water quality in the Lampasas River and its tributaries. This culminated in the development of the Lampasas River Watershed Protection Plan (WPP). This WPP was the fourth in the state of Texas to receive EPA acceptance and stakeholder approval in 2013. Lisa now oversees the implementation of the WPP through projects which provide financial and technical assistance and educational programs to stakeholders and seeking funding to facilitate these programs. She manages the daily operations and administration of the Lampasas River OSSF Repair and Replacement program. These responsibilities include working with potential applicants to determine eligibility, coordinating with OSSF installers to secure estimates, and county permitting authorities to ensure that the work completed conforms with state standards.

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Jeff Rachlin, OnSite Management, Inc.

***Hydraulic Load Testing – Why, When and How – What the OWTS Inspector Needs to Know***

Presentation, 50 minutes

Abstract:

There are times during an OWTS inspection that questions arise about the viability of the STA. Under certain circumstances it may be beneficial to complete a Hydraulic Load Test. This test is different than the standard operations test. There are specific instances where it should and should not be used. And there is a specific protocol for the steps that must be taken to complete the test. This process can be a very useful tool in the toolbox for the OWTS inspector. It would be considered an advance protocol and not part of the standard NAWT OWTS Inspection. Participants will gain the information and knowledge as to when this test is recommended and how to properly administer this process. They will understand how to evaluate the outcomes from the test and how to move forward with the appropriate

recommendations once the test has been completed. At the end of the session participants will be able to define what a Hydraulic Load Test is. They will be able to explain the necessary steps that must be taken to complete an HLT. The participant will be able to fully explain the differences between an HLT and a Standard Operations Test. The participant will be able to describe when an HLT is contraindicated and when and what types of systems they should not be performed on.

Bio:

Jeff has been working in the onsite industry since 1980. He is a Partner in Onsite Management, Inc., a full-service wastewater company located in West Chester, PA. Onsite inspects, designs, services, pumps, maintains and installs septic systems. Jeff has been a PA certified sewage enforcement officer (SEO) since 1997. He also holds a master plumber's license and a master electrician's license. Jeff is a member of the Pennsylvania Septage Management Association's (PSMA) Educational Committee and teaches the PSMA inspection protocol.

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Jeff Rachlin, OnSite Management, Inc.

***Septic Super Sleuth – Evaluating Those “Rarities” Found During an OWTS Inspection and What to do About Them***

Presentation, 50 minutes

Abstract:

This session is designed to be interactive with the participants. Different scenarios will be presented to the participants with leading discussion on how to evaluate and/or remedy the situation with regard to the OWTS inspection. Participants will be encouraged to share their experiences with the group to allow for an exchange of ideas and methods of remedy. This guided approach will also help to refine their inspection protocol and evaluation skills as they are introduced to situations and scenarios that they may not have experienced to date. The sharing of experiences and networking provided to participants can be an invaluable resource to the participant in the future. At the end of this session the participant will be able to discuss different and unique issues that can be found during an OWTS inspection. Through the interactive presentation participants will be encouraged to share different situations they have run across and how they dealt with them with regard to an OWTS inspection. The participant will be empowered to discuss their perspectives and opinions of OWTS inspections. They will be able to define tools that have been used in other circumstances that may help them with future inspections they are involved in.

Bio:

Bio previously listed.

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Danna Revis, Old Dominion Onsite, Inc.

***Strategic Site Evaluation***

Presentation with a paper, 50 minutes

Abstract:

Many factors contribute to site evaluation and selection for onsite wastewater systems. Developing a strategy that begins with some research, a sanitary survey, landscape position and topography, and includes the owner’s plans for the property is essential to finding a proper site for a dispersal area. While soil evaluation is a crucial part of the process, the soils alone do not make or break system function so site evaluation strategy must include a multifactorial approach. Building on the scientific method helps create an efficient and effective process for site evaluation.

Bio:

Danna Revis has a degree in Geology from the College of William and Mary and a master’s degree in learning technologies from Pepperdine University. She began evaluating soils for drainfields as a private consultant in 1983. In 1987 she began working for the Virginia Department of Health as an environmental health specialist in Manassas, VA. She became the Training Coordinator for the central office in 2002 and retired from that position in 2018. Danna is a licensed onsite soil evaluator and operator currently working for Old Dominion Onsite, Inc., in Ashland VA. She is the president elect of the Virginia Onsite Wastewater Recycling Association. She is particularly interested in the environmental justice challenges facing homeowners with respect to onsite wastewater systems.

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Alex Rice, Residential Sewage Treatment Company

***Electricity for Onsite Wastewater Systems***

Presentation, 50 minutes

Abstract:

The presentation will cover electricity for control panels, pumps, aerators, floats, power feed wiring and tank wiring, and some trouble shooting issues that come up in servicing onsite systems.

Bio:

Alex Rice has been in the onsite wastewater industry for 17 years, and has worked as a service technician, customer service representative, wastewater specialist, service manager, sales manager, and team leader at Residential Sewage Treatment Company. Alex has worked on many different types of wastewater systems from Norweco, Jet, Clearstream, Delta, Hydroaction, Orenco, Multiflo, Bio Microbics, Fusion, to name a few. Alex has also installed and serviced Drip irrigation, Low Pressure Pipe, Mounds, which includes minor repairs along with service. Alex is also the Kansas Small Flows Association current President and has served as a board member in the past. Alex is also a member of the Fraternal Order of Eagles who’s mission statement is people helping people. Alex has attended many training

classes over the years from basic onsite to trouble shooting onsite systems and have been mentored and trained by Tom Fritts.

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Matt Rousseau, T.G. Rankin Co., Inc.

***Pump Sizing and Choosing the Right Pump for the Application***

Presentation, 25 minutes

Abstract:

Power point presentation discussing the difference between Sump, Sewage, Effluent, and Grinder pumps. Going over the SSPMA (Sump and Sewage Pumps Manufacturing Association) information on sizing a pump for the right application, what information is needed to size a pump system, explaining the concept of friction loss in different diameter pipes and determining TDH (total dynamic head), reviewing pump curves, reviewing the filters and screens used in pump applications focusing on drip irrigation systems and the explaining the different filters used on pumps, and on supply lines for drip systems (spin filters vs disk filters). When to use zones for drip systems, talking about size of zones and how the correct pump is needed to supply the zone sizing and why zoning is used in larger systems tying in the discussion on how zones allow the soils to rest between each pump cycle.

Bio:

Matt Rousseau has over 25 years of experience in the on-site wastewater industry. Graduating with a Bachelor of Science degree in Wildlife Conservation and Land Management from (Southwest) Missouri State University, he emphasized in Soil Science. After graduating, while working for SCI Engineering in St. Louis metro area he was involved with field studies for construction services, then producing wetland delineations field studies and reports. In 1998, Matt received his certification through the MO Dept. of Health and Senior Services for Certified Soil Evaluator to perform soil morphology reports for new and repair septic system evaluations. In 2001, Matt started MR Soil Consulting, continuing to perform soil evaluations and soils related preliminary development and construction reports for local and state permits. During that time, Matt also received his certification as a Basic and Advanced Septic Installer and Septic Inspector. In late 2014, Matt decided to take the opportunity to work for T.G. Rankin Company, becoming an outside sales representative for plumbing and on-site septic wastewater products. Currently as a sales rep. covering Eastern MO and Southern IL territories, Matt manages many plumbing wholesale and OEM accounts, while keeping his Soil Evaluator and Advanced Installers certifications current.

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Kevin Sherman, SeptiTech, Inc., Director of Engineering and Regulatory Affairs

***Design Aspects of Time Dosing and Flow Equalization***

Presentation, 50 minutes

Abstract:

Time dosing is used to control pump off and on times so wastewater is sent to the next downstream component evenly throughout the day, When activated during high-flow events, a peak enable sensor shortens the rest period between doses to allow the system liquid level to gradually return to normal levels. Flow equalization is a management tool that can help reduce stress on system performance due to high variation in flows. In flow equalization, the peak flows are stored for a period of time to be delivered in equal doses to the next downstream component over a longer period of time. By sizing downstream components based on equalized flow and not peak flow, system cost and performance can both be improved.

Bio:

Kevin Sherman has bachelor’s degrees in biology and civil engineering, master’s degrees in biology and public health and a doctorate degree in oceanography. He has written over 50 technical papers on decentralized / onsite wastewater systems. Kevin is a past president of the Florida Environmental Health Association and the National Onsite Wastewater Recycling Association. Over his career Dr. Sherman has worked as a regulator, a researcher, an onsite association leader, as a designer, and for multiple onsite product manufacturers. He is currently Director of Engineering and Regulatory Affairs for SeptiTech, Inc. Kevin holds Professional Engineering licenses in seventeen states and is a Diplomate of Water Resource Engineering through ASCE.

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Shelly Smith, H2Ozarks and Morgan Keeling, Illinois River Watershed Partnership

***Septic Remediation Pilot Programs in Priority Arkansas Watersheds***

Presentation, 25 minutes

Abstract:

Septic systems are a source of impairment for groundwater and surface-flowing waterways across the nation. Most homeowners do not have sufficient savings to address failures fully, nor timely. Our nonprofit organizations have piloted a Septic Tank Remediation Program in Northwest Arkansas to offer financial and technical assistance to landowners in efforts to reduce the health and environmental impacts caused by failing systems. This presentation is a dive into how our organizations utilize Clean Water State Revolving Funds (CWSRF) from the Clean Water Act to fund operations, outreach, design, and construction of projects that meet our eligibility criteria. We will discuss how we manage a partial grant and zero-interest loan program that services all landowners, regardless of income. Additionally, we will outline how we set up the program(s), the challenges we face across different demographics and in our high-growth market, and the opportunities we have identified for others who are considering offering such assistance. Attendees will leave with a toolkit that will prepare qualifying entities for starting the conversation with their state agencies about launching similar programs using CWSRF.

Bio:

Co-presenters Shelly Smith, Program Manager for H2Ozarks and Morgan Keeling, Program Manager for the Illinois River Watershed Partnership have worked together to develop the Septic Remediation Programs. H2Ozarks is a nonprofit organization working to protect and improve water quality in the Upper White River Basin and the Ozarks. With offices in southern Missouri and northwest Arkansas, we fulfill our mission through research, policy, and action projects throughout the watershed. The Illinois River Watershed Partnership is a nonprofit organization whose mission is to improve the integrity of the Illinois River Watershed, a region covering rapidly urbanizing Northwest Arkansas and Eastern Oklahoma, through public education, outreach, and the implementation of conservation and restoration practices.

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Jacob Stanley, Ph.D., Baylor University

***NOW-R2: Identifying Priority Practice Needs on the Horizon for Onsite Wastewater Recycling***

Presentation, 25 minutes

Abstract:

As part of the NOW-R2 survey, onsite wastewater recycling professionals were asked two questions focusing on the practice. Whereas one question focused on future needs within the profession (Question 3: Within the next 5-10 years, what decentralized wastewater issues or challenges will require new or modified programs or technologies?), a second question focused on future needs for individual professionals (Question 4: What resources or tools will you need to do your job in the future?). These responses were then taken to a workshop with focus groups at the 2021 NOWRA Mega-Conference, where submissions were further synthesized by experts from business, government and academia to produce a final list of priority problem statements through a consensus process. For Question 3, 18 priority problem statements were identified within the general themes of Technology, Infrastructure and Reuse, and Emerging Issues. For Question 4, 10 additional priority problem statements were identified within the themes of Information Systems and Data, and Garnering Support. This presentation will specifically examine these priority problem statements.

Bio:

Jacob Stanley, PhD, MS is a research scientist with the Center for Reservoir and Aquatic Systems Research at Baylor University. He has also served as Managing Editor for Environmental Management ([www.springer.com/journal/267](http://www.springer.com/journal/267)), and as Team Leader of Environmental Assessment for the US Army Corps of Engineers' Engineer Research and Development Center. Dr. Stanley has published broadly on water resource assessment and management.

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Scott Steiger, Sump Alarm Inc.

***WiFi Survival Guide for the Septic Installer***



Presentation with a paper, 50 minutes

Abstract:

Wi-Fi and Cellular enabled devices are becoming prevalent in today's market. As a septic installer, your customers either are now or will be requesting them. This session will provide you the knowledge and tools to you need to know to be able to successfully define scope, quote, and execute projects containing wireless devices. Learning Objectives: 1--Identify if a customer's site is suitable for Wi-Fi enabled devices, 2--Wireless signal strength: How to test for it, and what to do if it's not there, 3--Wireless and non-wireless solutions in power loss situations, 4--Wi-Fi versus Cellular Technology: Which one to choose, 5--How to define and communicate your scope on a Wireless Installation, 6--Ways to use wireless technology as a business development opportunity.

Bio:

Scott Steiger is one of the founders of Sump Alarm Inc. Sump Alarm put the first Wi-Fi Septic Alarms onto the market in 2016 and has continued to be a front runner in outdoor Wireless Technologies for the Sump Pump and Septic sectors. Scott is an Electrical Engineering graduate from Missouri S&T and oversees new product development and engineering for Sump Alarms various product lines. He has 25 years in industry and enjoys presenting on this technology.

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Raffael Stein, US EPA Headquarters

***OPENING SESSION: US EPA Update***

Presentation

Abstract:

Mr. Stein will discuss EPA's activities in support of onsite and decentralized wastewater systems. He will cover the high-level activities of EPA's Decentralized Wastewater Program, and place particular emphasis on the recently announced Closing America's Wastewater Access Gap Community Initiative.

Bio:

Raffael Stein is the Director of EPA's Water Infrastructure Division and oversees the Clean Water State Revolving Fund (SRF) program which has provided over \$150 billion in assistance since its inception. Raffael also has responsibility for the decentralized wastewater program, the WaterSense program and a number of targeted wastewater funding programs. He helped establish the Water Infrastructure Finance and Innovation Act (WIFIA) program as well as the Water Infrastructure & Resiliency Finance Center. Raffael has been with the Agency for over 30 years. During the course of his EPA career he worked as an economist in the Office of Water and served in several management positions in the Agency's Office of the Chief Financial Officer including Director of EPA's Office of Financial Services where he was responsible for all of the Agency's financial operations. Prior to coming to EPA, Raffael was an economist for the Commonwealth of Virginia and a financial analyst in a consulting firm

specializing in municipal finance research. He earned a B.A. from Grinnell College and an MPP from Duke University.

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Carl W. Thompson, P.E., Vice President, Sales & Delta Advanced, Infiltrator Water Technologies

***Decentralized Wastewater Treatment Funding Needs, Challenges, and Solutions***

Presentation, 25 minutes

Abstract:

Outdated, poorly operating, and non-existent onsite wastewater treatment systems can be hazardous to the environment and public health. Technology exists to replace these systems with highly efficient and effective means of treatment but funding for those initiatives lags well behind the demand and the need. The pathway to clean water and public health depends on access to project funding sources and new funding initiatives to support commercial and residential decentralized wastewater treatment system installations. Community leaders and local and state onsite wastewater program administrators need to engage in actively developing and championing expanded funding options beyond the current Clean Water State Revolving Fund programs which largely focus on centralized treatment not decentralized treatment. The “luxury” of clean water and reliable sanitation, essential for health and wellness, is out of reach for many in rural, marginalized communities. To solve the challenge, there is a need for a comprehensive analysis of the scope of the wastewater treatment deficiencies and a concerted effort to identify new financing approaches to ensure that all Americans have the opportunity for their basic human needs to be met. The presentation will define the challenge of inadequate funding for decentralized wastewater treatment systems, review the current funding sources available, and estimate the gap between needs and available funding.

Bio:

Carl Thompson is responsible for sales, technical services, and government affairs at Infiltrator. He is also responsible for the operations of Delta Advanced and Infiltrator’s advanced/active wastewater treatment business unit. He has been with Infiltrator since 1997. Prior to his role as Vice President of Sales and Delta Advanced, Carl held several positions at Infiltrator including Vice President of Sales and Marketing, National Sales Manager, Regulatory Director, and Technical Director. He was also the project manager for the development of Infiltrator’s first thermoplastic tanks - the TW-Series line. Prior to joining Infiltrator, Carl spent nine years in technical sales and marketing management roles at Contech Construction Products. Carl serves on the National Onsite Wastewater Recycling Association where he is currently on the executive committee (past-president) and chairs the government relations committee. He is a registered professional civil engineer and holds a BS in Mechanical Engineering from Virginia Tech, a MS in Civil Engineering from Drexel University and an MBA from the University of Delaware.

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Breanna Werdehausen, Missouri Department of Health & Senior Services - Onsite Wastewater Program

**MODHSS Continuing Education Tracking**

Presentation, 50 minutes

Abstract:

According to Missouri Regulations 19 CSR 20-3.070 and 19 CSR 20-3.080; Missouri Onsite Wastewater professionals must submit documentation of their department approved continuing education units (CEUs) when renewing their registration and/or license. The regulations do not require that the Onsite Wastewater Program (Program) track the CEUs during their renewal period or provide current status of CEU balances. Historically, the Program has provided CEU balances to professionals as a courtesy. However, the Program no longer has the capacity to provide this courtesy. This presentation will explain CEU requirements for all Missouri professionals and show new resources available on our website to assist professionals with CEU tracking.

Bio:

Breanna has a degree in Business Administration and 15 years of experience with the State of Missouri in Public Health of which 7 years has been with Environmental Health Services. She has been with the Onsite Wastewater Program for 2 years and provides day to day assistance to professionals regarding registration/licensure, continuing education information, permitting, and inspecting for real estate transactions.

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Kevin White, University of South Alabama

***Wastewater Needs (and Plans) for Rural Underserved Communities--the Alabama Black Belt***

Presentation, 25 minutes

Abstract:

The Alabama Black Belt Region is characterized by its low population density, poverty, limited economic development, and rural nature. Much of the region faces wastewater challenges due to a lack of municipal sewer systems and clay soils that do not allow for onsite wastewater percolation. Ultimately, the region is high-risk for public health and environmental health hazards due to the failing onsite wastewater systems and lack of insufficient infrastructure. The Consortium for Alabama Rural Water and Wastewater Management (CARWW) was formed in 2018 to foster and encourage collaboration between academics, regulators, industry professionals, elected officials, and citizens. An overall plan was developed to 1) expand municipal systems, 2) install cluster systems, 3) install cost-effective onsite systems, 4) develop a sustainable management infrastructure, and 5) consider regulatory modifications. In partnership with Columbia World Projects (CWP), CARWW recently received American Rescue Plan Act (ARPA) funds to demonstrate a decentralized cluster wastewater system in Hale County. This demonstration hopes to show the effectiveness of decentralized collection, treatment, and disposal infrastructure in minimizing capital and operation and maintenance costs. The implementation of remote monitoring allows for the management of multiple systems, reducing labor costs.

Bio:

Kevin D. White, Ph.D., P.E. is Professor Emeritus and former Chairman of the Department of Civil, Coastal, and Environmental Engineering at the University of South Alabama. Specializing in wastewater and stormwater treatment, his research has focused on small community and onsite wastewater systems for over 30 years, including constructed wetlands, decentralized infrastructure, bioremediation of environmental contaminants, and low impact development. Dr. White led an EPA National Decentralized Wastewater Demonstration project in Mobile, demonstrating sewer mining and treated wastewater reuse in public parks in 2005. He is currently working to test innovative wastewater strategies (onsite and clustered systems) in the rural Alabama Black Belt. Dr. White is a licensed professional engineer in Alabama and a member of the American Society of Civil Engineers and the Water Environment Federation.

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Kyle Wilkens, State Director Rural Development - Missouri, USDA

***OPENING SESSION: USDA Update***

Presentation

Abstract:

Mr. Wilkens will discuss USDA’s activities in support of onsite and decentralized wastewater systems. Kyle will provide a general overview of the Rural Utilities Service, Water and Environmental Programs specifically focusing on programs to assist rural communities with decentralized water and wastewater systems. USDA and EPA work together for years to support the infrastructure needs of small and underserved communities.

Bio:

Kyle Wilkens is a native of rural west-central Missouri and a committed public servant. Since 2012, he has served on the congressional staff for Congressman Emanuel Cleaver of Missouri as his Rural Policy Director, and from 2002 to 2011, he served on the staff of Congressman Ike Skelton, also of Missouri. Both Congressmen represented his home district, keeping with Kyle’s lifelong commitment to Missouri. He has extensive experience working with elected officials, community leaders, USDA and agencies at all levels of government on local economic development and rural development programs. Wilkens holds a Master of Arts degree from Missouri State University.

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June Wolfe, Texas A&M AgriLife Research

***Characterizing OSSF Wastewater Streams in Texas RV Parks***

Presentation with a paper, 25 minutes

Abstract:

The number of Recreational Vehicle (RV) parks catering to short-term campers, long-term seasonal visitors, and full-time residents has increased dramatically in recent years for a variety of reasons. The amenities offered at these facilities range from simple dump stations and toilets to complex arrangements of showers, baths, group kitchens, restaurants, laundries, and numerous combinations. Both the regulated community and the regulators in Texas report an increase in On Site Sewage Facility (OSSF) design challenges, compliance/operational issues, and system malfunctions. The lack of real-world data on which to base new OSSF designs, improve operation, and understand malfunctions of existing designs has become clear. Texas A&M Agrilife Research contracted with the Texas Commission on Environmental Quality to monitor and characterize RV park wastewater streams (i.e., flows, biochemical oxygen demand, total suspended solids, etc.) associated with different amenity arrangements and patron stay-lengths. This presentation will describe the project's objectives, methods, and preliminary results to date.

Bio:

Dr. June Wolfe is a Research Scientist with Texas A&M AgriLife Research and has more than 35 years of service at the Blackland Research and Extension Center (BREC) in Temple, Texas where he directs the Water Science Laboratory. The lab conducts basic scientific research involving plant-soil-water interactions and performs water quality assessments related to applied environmental topics. Dr. Wolfe holds an undergraduate degree in biology from the University of Texas at Austin and graduate degrees in horticulture and aquatic microbiology from Texas A&M University and Baylor University, respectively. His experience with environmental instrumentation and monitoring has allowed the lab to pursue many water-related projects addressing many topics such as flood mitigation, erosion and sedimentation assessment, agricultural nutrient management, and OSSF wastewater treatment. He currently manages two research projects funded through Texas' OSSF grant program related to real-world data collection of RV park wastewater streams and sampling of domestic and non-domestic ATU designs.

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