2020 USDA Multistate Project NE 2045 Annual Meeting

Onsite Wastewater Treatment Systems (OWTS): Assessing the Impact of Climate Variability and Climate Change

January 13, 2021

11:30 am – 2:30 pm

Virtual via Zoom

<https://uri-edu.zoom.us/rec/share/LudBzxZfiP_U_5GHw9or3MlG_bQuioxyyyY-MBjQG3g6DYtbsTyex9JTTOhgehPY.zJrrPtlcO-fVmqhT> Passcode: !7sb.c&w

# Impact Statements

## Impact – Influencing OWTS designs

### University of Rhode Island (URI)

The URI team delivered three design related training classes reaching 82 practitioners. One class focused on new design guidelines to create greater separation distances from drainfield bases to groundwater tables, which results in dispersal of wastewater into more biochemically reactive soils, reducing the potential impacts of climate change. We conducted required classes that enabled 29 new RI and MA wastewater practitioners to receive regulatory jurisdiction approval to design and install bottomless sand filters.

In partnership with Massachusetts Alternative Septic System Test Center we are conducting experiments to test the nitrogen removal potential of new layered soil treatment areas (STA). These experimental layered STAs increase sequential nitrification (in a sand layer) and denitrification (in a sand layer mixed with sawdust) as septic tank effluent percolates through the layered system, into the underlying native soil and ultimately into groundwater. These layered systems are designed to be a relatively small footprint, passive (low energy consuming), and cost-effective non-proprietary system for removing nitrogen in N-sensitive watersheds.

## Impact – Homeowners and/or Practitioners trained and professional licenses maintained

### University of Arizona

(1) 153 professionals know how to inspect an onsite wastewater treatment system for the Arizona Transfer of Ownership Inspection Program. Without taking this course, these professionals would not have been eligible to participate as an inspector for the statewide program. Thus, 153 professionals either expanded their business model or were able to continue conducting business in this area. An exam is required to demonstrate knowledge.

(2) 23 practitioners (both regulators and in-the-field professionals) know more about conducting soil and site evaluations for onsite wastewater treatment systems and can use the Arizona code to conduct the evaluations. Without attending this class, these practitioners would not be able to conduct these evaluations as part of their jobs. An exam, that includes both a written portion and a practicum, is required to demonstrate knowledge and the ability to texture and color a sample of soil.

(3) 11 practitioners have increased knowledge for designing residential, gravity-distributed septic systems using Arizona rules. A homework assignment was used to provide practical application of material learned in the workshop. This class is not required by Arizona law, so those attending really want to learn best practices.

(4) 12 practitioners (both regulators and in-the-field professionals) have increased knowledge about designing systems using pressure distribution and pumps. The course covered installation, inspection and operation and maintenance issues regarding pumps. This class is not required by Arizona law, so those attending are interested in improving their life-long skills.

(5) 20 septic-system owners have a better understanding of their septic systems and the management needed to extend the life of their system. Conventional septic systems in Arizona have typically cost around $5000, but newer construction is happening on more marginal land and costs are increasing to $15,000-$20,000 for a standard system. Knowing how to take care of their septic system can save the homeowners at least that much. 58 contacts in UA Extension, Arizona County Health Departments, and ADEQ received timely educational materials from ACE Onsite Wastewater Education Program and are more aware of the services that the program can and does provide.

(6) 12 undergraduate and 3 graduate students completed BE 459/559, Design of Onsite Wastewater Treatment Systems. After taking the class, the students were able to After taking BE 459, students will be able to: 1) Demonstrate an awareness of the science and social disciplines that affect onsite wastewater treatment and the design of those systems. 2) Describe onsite wastewater treatment technologies and their design considerations. 3) Use the Arizona Administrative Code in designing wastewater collection and treatment systems for Arizona. 4) Evaluate the choices of onsite wastewater technologies for clients’ needs and desires, soil and site constraints, and regulatory environment.

### University of Minnesota (UMN)

The UMN trained over 2,000 professionals to either gain a new license or maintain their existing one. Specifically related to septic system design 31 septic professionals were trained. The UMN trained 300 homeowners on proper maintenance and operation in 12 training events.

### North Carolina State University (NCSU)

NCSU provided in person and virtual training in OWTS installation, operation, and associated soil evaluations to a total of 487 individuals for licensing or continuing education credit. Total extension contact hours related to OWTS was 5,732. COVID-19 restrictions allowed for the creation of new virtual and online content that will be utilized for OWTS trainings in the future. In addition, NCSU project participants provided two poster presentations (1 state, 1 national level) and one invited talk at the state level about rising sea level and OWTS vulnerability.

### University of Rhode Island (URI)

The URI conducted 15 OWTS workshops and trained 225 wastewater practitioners in the New England and New York region enabling them to gain a new wastewater license or retain their existing one.

## Impact – Expansion of employment opportunities

### University of Rhode Island (URI)

Twelve onsite wastewater professionals took the URI wastewater inspector training classes, were tested and passed their exams, and received OWTS Inspector Registrations that are required in order to conduct inspections in several Rhode Island communities having wastewater management programs. Twenty-nine professionals took required classes needed to receive RI or MA regulatory agency permission to design and install bottomless sand filters. Sixteen onsite wastewater professionals took the URI installer preparation course to prepare them for the RIDEM installer’s licensing exam - 100% passed the exam and received an installer’s license, required to install OWTS in RI. Eight professionals took the URI designer preparation course to prepare them for the RIDEM designer licensing exam.

### University of Minnesota (UMN)

In both Minnesota and Iowa, new septic professionals have gained over 300 new certifications and/or licenses during the reporting period.

### Ohio State University (OSU)

A new extension online/hybrid course on Soil and Site Evaluation for Onsite Wastewater Treatment was completed and piloted in fall 2019. The course has 3 online segments – 6 CEUs each, followed by 3 field labs – also 6 CEUs each. The complete 6-session course was scheduled for full offering starting in June 2020, but was postponed to 2021 since continuing education requirements were suspended.

An on-line workshop was help for 300 engineers “Low-cost wastewater treatment for small flows”, Sponsored by the Engineering Foundation of Ohio.

## Indicators of Impacts

### University of Minnesota (UMN)

A total of 608,720 septic systems were reported in Minnesota and total of 15,099 existing systems were evaluated for compliance in 2019. The number and percentage of estimated compliant SSTS has increased over the past 10 years, from approximately 383,000 (74%) compliant systems in 2010 to 494,500 (81%) compliant systems in 2019. 40% of the local program is MN reported that they track the maintenance of septic systems. Since 2010, LGUs reported that approximately 95,500 construction permits were issued. This means that over 15% of Minnesota’s 608,720 septic systems are less than 10 years old or contain components that are less than 10 years old.

### University of Rhode Island (URI)

One undergraduate student and three doctoral students were trained in analyses of physical, chemical and microbiological properties of soil and wastewater. We delivered 17 workshops/ outreach classes in professionals in four states in the region, reaching 225 practitioners, decision makers and students. These classes provided continuing education credits needed by licensed professionals to renew their professional licenses. Approximately, 30% of all OWTS applications that designers submit to the RIDEM are for advanced OWTS. Use of nitrogen removal OWTS are now required in state-designated watersheds that are nitrogen sensitive. This increased designer knowledge level has helped protect these watersheds and groundwater from further degradation.

Furthermore, the team at URI delivered a total of 16 talks (4 of which were invited) and one poster to academic and professional audiences relative to OWTS and climate change at conferences in RI, CT, MA, NY,and TX. Our audience reached scientists, wastewater practitioners, board of health officials, regulatory decision makers and coastal resource managers. In addition, we published 10 peer-reviewed papers. We provided direct OWTS technical assistance to Suffolk County Health Dept., NY and RI Department of Environmental Management.