A Not-So-Distant Future: Pushing the Ball Forward on I/A Septic Systems in Southeast New England

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On June 2, 3, and 10, EPA's Southeast New England Program (SNEP) and the Atlantic Coastal and Environmental Sciences Division (ACESD) at the Office of Research and Development (ORD) hosted a three-day workshop on innovative and alternative (I/A) septic systems titled "Developing and Evaluating Promising Technologies: Pushing the Ball Forward on I/A Septic Systems." The presentations, key breakout session discussion points, and a summary report, are now available to the public on the <u>SNEP</u> website.

The goals of the workshop were three-fold: to 1) hear from practitioners involved in recent I/A pilots and increase collaboration and knowledge sharing between them; 2) learn about the current state of I/A

system performance, technological opportunities, and limitations, and determine what is needed to develop these technologies to make them more available for widespread implementation; and 3) explore solutions to key challenges preventing more widespread I/A development and implementation.

Standard septic systems consist of a septic tank and a soil-based leachfield and are common throughout the SNEP region and beyond. They are designed to protect public health by reducing bacteria, but not nutrients in wastewater. In areas that solely rely on septic systems, they can release a significant amount of nitrogen into ground water that then travel downgradient and discharge into estuaries. If an estuary has too much nitrogen, it can lead to a host of environmental problems. Where this is happening, expansion of sewering and development of new wastewater

facilities will be an important part of the solution. However, sewering is not a one-size-fits-all model and may take decades and millions of dollars to implement in some municipalities. Non-traditional technologies and new management approaches will be needed, especially in places where traditional wastewater facilities are less cost-effective, suitable wastewater effluent discharge sites are not available, and/or land is highly vulnerable to the impacts of climate change. The question then becomes what to do in areas where the use of septic systems is likely to continue, and how can/should I/A systems be implemented as a more effective solution to address the nitrogen problem?

There are several new and promising I/A systems currently being tested that are achieving high levels of nitrogen reduction. A handful of these new enhanced I/A systems have even demonstrated their ability to efficiently reduce nitrogen in wastewater down to levels of 12 mg/L and below. This is exciting because their reduction exceeds the current threshold of 19 mg/L of nitrogen for I/A systems approved for general use. But they must still demonstrate their reliability over time, undergo pilot testing with homeowners, and get state and local permits before they will be available for general use.

Workshop participants explored challenges and opportunities for the development and use of I/A septic systems. Such as using systems in areas that suffer from algal blooms and loss of eelgrass due to an excess of nutrients. According to Dr. Nate Merrill of EPA's ORD, these systems could also be a cost-comparable option to sewering for many areas provided that system installation costs can be kept below \$40,000 per unit, assuming a nitrogen reduction target of less than 10 mg/L. Because of this potential variability, it is recommended that system type be considered in concert with municipal environmental management goals.

WHAT MAKES I/A SEPTIC SYSTEMS SO SPECIAL?

Traditional septic systems can be a significant source of nutrient pollution. I/A systems are specifically designed to remove nutrients from wastewater at the source before it enters groundwater. In Massachusetts, state regulators currently require several years of field testing before new I/As may be permitted for general use. They have good reason to be cautious and require testing, since no one wants to approve systems that don't work or leave residents stuck with the bill for a poorly functioning I/A system. To permit new I/A systems, homeowners are essentially being asked to take a risk by installing and allowing testing of a system that is still at a pilot stage. However, the potential benefits of testing these systems are tremendous, and could lead to a whole new generation of enhanced I/A septic systems capable of achieving big reductions in nitrogen.

To get new systems installed, presenters highlighted the importance of shielding the risk of technical failure away from the homeowner and improving their confidence in new I/A systems once they are permitted. Options to generate buy-in include the provision of grants, loans, or subsidies to make them more affordable, and educating homeowners about their performance and their contribution to the restoration of nearby water quality. Charlestown, RI, is an example of a town that is actively working with homeowners to install I/A systems to demonstrate their effectiveness.

Much of the conversation during the workshop turned to the importance of ongoing maintenance and opportunities for establishing responsible management entities (RMEs). Depending on the RME design, a community can choose how to assign responsibility for system ownership, repair, and maintenance. An RME can take the form of a public or private entity tasked with supporting the operation and maintenance of septic systems. These entities can be as small as a neighborhood organization or as large as a county; but would be primarily responsible for managing septic systems in their area. Versions of this model can vary, and EPA has guidance that presents different options for their use. In one scenario where the RME is limited in its involvement, a town could chose to have septic systems remain privately owned and permitted and the RME is responsible only for providing educational opportunities and awareness to the homeowner-- leaving most of the risk with the homeowner; in a more involved model, the homeowner owns the system, but the RME is the permittee and therefore responsible for the operation and maintenance of the system and could support its cost by charging a fee. In that latter model, the responsibility to the homeowner is reduced and their fee could be roughly equivalent to what non-septic homeowners now pay to wastewater utilities in sewered areas. The Cape Cod Commission recently formed an RME workgroup comprised of towns, regulators, consultants, and environmental organizations to explore these options and recommend potential RME options for Cape Cod. EPA's SNEP staff are hopeful that the workgroup will provide models for other areas across the SNEP region.

There are significant opportunities for I/A systems to reduce nutrients released from homes throughout the SNEP region and beyond. The results that many I/A systems have demonstrated to date have been promising, which speaks to the importance of getting more of these systems into widespread use. While there are still ongoing concerns about the application of this technology, the more we're able to test and demonstrate the effectiveness of these systems, the closer we'll get to this goal. EPA's recent I/A workshop was resoundingly successful in outlining critical steps for EPA and others to move the ball forward on I/A system implementation. The presentations and products that have come out of this workshop are now available online. Our hope is that these tools will be helpful in supporting key regional stakeholders in their work to address nutrient pollution throughout the region.