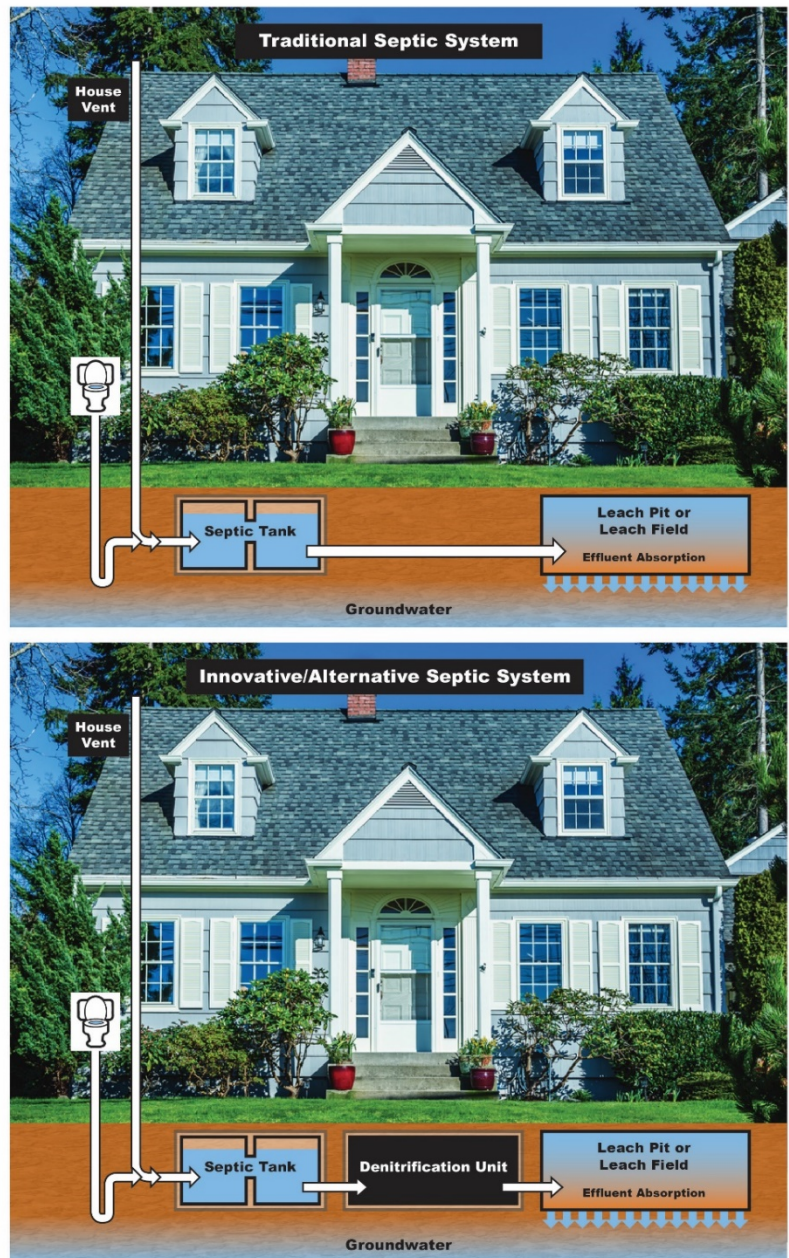


A Neighborhood-Scale Demonstration of Innovative/Alternative Septic Systems in the Cape Cod Region

EPA is partnering with the U.S. Geological Survey, Barnstable Clean Water Coalition (BCWC) and others to implement a neighborhood-scale demonstration of enhanced innovative/alternative (IA) septic systems in Barnstable, Massachusetts.

From 2020 into early 2021, BCWC will be leading the replacement of traditional septic systems for up to 40 homes to more novel systems capable of removing nitrogen from wastewater. EPA will be advising on locations for septic replacement and coordinating subsequent monitoring of system performance. The new IA septic systems are designed to prevent excess nutrients from entering estuaries and freshwater ponds in the Cape Cod region. Excess nitrogen from septic systems and other human activity can threaten estuaries, wetlands, drinking water sources, and freshwater ponds as they contribute to algae blooms, low dissolved oxygen, degradation of seagrass, impaired freshwater and estuarine ecosystems, and in extreme cases, fish kills.

Additional partners on the project include the Town of Barnstable, the Massachusetts Department of Environmental Protection, Massachusetts Alternative Septic System Test Center, and The Nature Conservancy.



Upgrades from traditional septic systems (top image) to innovative/alternative septic systems (bottom image) are being offered by BCWC to homeowners in a Barnstable, MA neighborhood.

Issue

The Three Bays watershed in Barnstable (Cape Cod region) contains more than 5,000 traditional septic systems. These traditional septic systems do little to remove nitrogen from wastewater, which has resulted in excess nitrogen in the surrounding environment. This excess nitrogen has impacted groundwater, estuaries, and freshwater ponds in the Cape Cod region within the watershed.

Enhanced IA septic system designs have shown promise for removing much of the nitrogen before it enters surrounding groundwater, estuaries and ponds, but only a limited number have been field-tested. More installations and testing are needed to evaluate performance of the latest enhanced IA septic systems before they're considered for broader use.

Acceptance of these systems by homeowners can depend on social factors, cost, aesthetics, perceived risks, and local ordinances.

Demonstration Project Research Approach

After examining groundwater quality in four candidate Barnstable neighborhoods with elevated nitrogen levels, EPA and partners identified one with high housing density on approximately one quarter-acre, regularly spaced lots for the IA septic systems demonstration project.

The IA septic system upgrades are being offered by BCWC to neighborhood homeowners with properties situated along groundwater flow paths to a nearby pond. Each system will be monitored for nitrogen removal performance for approximately three years following installation.

Groundwater monitoring wells located up- and downgradient from participating homes will be monitored to determine the total effects of IA septic systems on groundwater nitrogen levels.

EPA scientists will conduct concurrent research on the social acceptability and user experience of IAs to inform outreach to potential future participants. Information gathered from focus groups of IA septic system adopters and non-adopters will be shared with stakeholders in the Cape Cod region and other areas seeking to better manage nitrogen from septic systems.

Goal and Expected Outcomes

This study is part of a larger pilot project at EPA focused on evaluating promising interventions with a goal of reducing excess nitrogen in the Cape Cod region.

It is expected that this demonstration project will provide 1) performance measures and cost effectiveness information for the deployed IA septic systems; 2) an impact

evaluation of the systems on groundwater nitrogen levels; and 3) lessons learned that local, state, regional and federal partners can use in watersheds similarly compromised by traditional legacy septic systems.

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