

Potential release of legacy nitrogen from soil surrounding onsite wastewater leaching pools

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Excessive nitrogen loading to groundwater and coastal area in Long Island has become an emerging problem since it deteriorates the groundwater quality and causes eutrophication. Septic tanks and cesspools are the main onsite wastewater treatment systems in Suffolk county. Current cesspools can remove a limited portion of organic contaminants (BOD) and little nitrogen from onsite wastewater. A significant amount of nitrogen leaches to the adjacent soil environment and shallow groundwater. In this study, we examined whether the accumulation of nitrogen (legacy nitrogen) within and surrounding leaching pools for onsite wastewater treatment may act as a source of nitrogen contamination to groundwater upon changes to the quantity and/or composition of the influent to the pool. In this study, one concrete leaching pool with neutral pH (A, pH 6.9) and one leaching pool after acid washing (B, pH 3.7) were selected to examine the quantity and composition of legacy nitrogen in the surrounding soil, as well as evaluate the potential release of this nitrogen under two environmentally relevant leaching scenarios: (i) the concrete leaching pool serves as the final discharge unit for aerobic treatment unit (ATU) effluent; (ii) extreme weather events (flash flood/heavy rains) act to increase the quantity and dilute the composition of flow to the pool. Core sample analysis showed that organic nitrogen accounts for the majority of the total nitrogen (TN) at both sites, while ammonium was the major form of inorganic nitrogen present at the sites. The TN accumulated under the two leaching pools was equivalent to approximately 17–39 days of nitrogen loading to the system. The amount of TN leached from the soil matrix was not affected by the flow rate or flow pattern at the two leaching scenarios. The quantity of TN leached from soils was low and accounted for 2.6–8.9% of the total nitrogen in the soil.