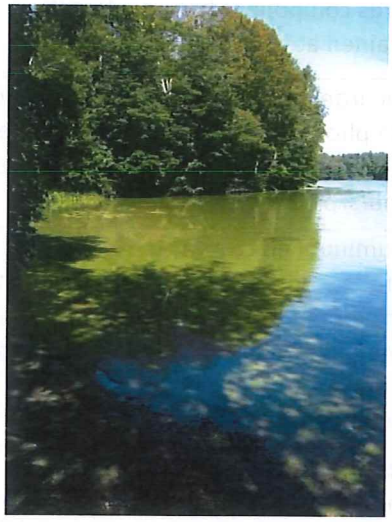
Why Treat for Phosphorus?



Although phosphorus is essential to life, when an excessive amount enters our freshwater lakes and water sources through discharges or groundwater, it can cause nuisance growth of algae and cyanobacteria (also known as "blue-green algae"), and in some cases, toxins that present an exposure risk for ingestion, inhalation and exposure. Human activity, including the placement of septic systems, fertilizer use and poor land management, is largely responsible for the increase in phosphorus and the resulting water quality problems.

Recently, the Barnstable County Department of Health and Environment obtained a grant from the Massachusetts Department of Environmental Protection to run a pilot project and determine the effectiveness of selected technologies and strategies to reduce phosphorus from septic systems in the watersheds of ponds.

This project will provide a subsidy in the amount of $5,000 toward the design and/or installation of these systems. In addition, the equipment in most cases is donated to the homeowner through the project. If interested, call for details on this exciting demonstration project that is focused on limiting the inputs of phosphorus into our fragile ponds and lakes.

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In this demonstration project, participants will install one of eight different options to limit phosphorus from their septic systems for the protection of freshwater resources or to use upper soil-layer dispersal.

The technologies will be installed and then tested over a period of at least one year. Following this period, the owner will be responsible for maintaining the unit per the permit approval's and the manufacturer's requirements. The technology options are given below in no particular order of efficacy.

Method	Description
PercRite™	Using the soils to adsorb phosphorus can be an effective way to cycle phosphorus in the vegetation above the septic system leachfield and attenuate the amount that migrates downward to the water table. Two shallow-placed systems will be an option for homeowners under this project. These systems will be placed in the shallow, undisturbed soil layers and will serve as the leachfield. Because they are in the finer-textured soil layers, they will take up more space than the conventional leachfield placed in sand. The two products (Perc-Rite™ - https://oakson.com/ and GeoMat™ - https://www.geomatrixsystems.com/gmf_area/GMF_description.html) presently have approvals in the Commonwealth. Sampling devices called lysimeters will be placed beneath these systems for the purpose of monitoring.
GeoMat™	

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Phos-4-Fade®	For this technology, a patented, non-mechanical component is installed downstream of an advanced treatment unit (a Singulair or Hydro-Kinetic system). The phosphorus component has an adsorption media that can be replaced. Information on the system can be obtained at www.norweco.com
PhosRid®	This technology removes phosphorus from water through reductive iron dissolution (iron dissolving in an anaerobic environment and freed to combine or mineralize with phosphorus). The system involves the installation of a media tank and a polishing filter prior to the leachfield. More information on the performance can be obtained at http://lombardoassociates.com/pdfs/phosrid.pdf
DpEC® by PremierTech	This technology employs an electrical coagulation process using aluminum electrodes to remove phosphorus. The process is conducted in a small tank or chamber following a conventional septic tank. Patented processes isolate the precipitate and allow the septic tank effluent to pass to the soil absorption system and the aluminum-phosphate complex is returned to the tank to be removed upon pumping. More information on this product and process can be found at https://www.premiertech.com/global/en/products/water-treatment/.
Waterloo EC-P®	This technology removes phosphorus by the precipitation of iron-phosphate minerals. Natural iron electrodes are installed in the septic tank or in a small chamber immediately thereafter and a small current is applied to the electrodes. The iron is dissolved into the sewage stream where it reacts with phosphorus to form highly stable and insoluble iron-phosphate minerals. The Waterloo EC-P effluent then passes thought to the leachfield where the iron-phosphate minerals precipitate out preventing phosphorus from reaching the natural environment. More information on the system can be found at https://waterloo-biofilter.com/products/nutrient-removal/phosphorus-removal-products/waterloo-ec-p-residential/ .
CRX II by FujiClean USA™	The CRX II technology is based on installation of over 4,000 phosphorus removal systems in Japan and Australia. This technology integrates iron electrolysis into its standard denitrification treatment process to simultaneously maximize reduction of both nitrogen and phosphorus nutrients as well as BOD and TSS. Treatment is accomplished in a continuous flow process through a 3-chambered tank sized according to hydraulic flow and organic strength. The entire process is driven by air flowing from one small linear diaphragm blower positioned external to the treatment tank. The device consists of a control box, relay box, and iron electrodes. The electrodes release ferric ions that react with phosphate and orthophosphate ions that exist in the wastewater. The reaction produces an insoluble byproduct. This byproduct settles to the bottom of the device. See more at https://www.fujicleanusa.com/

Method	Description
Composting Toilet	Composting toilets utilize biological decomposition under properly maintained conditions, including aeration, moisture content, and temperature. Blackwater (wastewater from toilets) is separated from graywater (wastewater from sinks, showers, kitchen) and enters a contained tank where waste is broken down by bacteria and fungi. The end results are liquid and solid products which are disposed of separately. The end products, which may include much of the phosphorus of household waste, never enter the groundwater on site and so cannot contribute to local eutrophication.

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