buzzards BAY COALITION

HOW RURAL HOMEOWNERS CAN HELP REDUCE THE BAY'S BIGGEST SOURCE OF POLLUTION:

Installing a Nitrogen-Reducing Septic System at your Home

THE NITROGEN PROBLEM

No source of pollution has done more to damage the health of our coastal waters over the past 40 years than nitrogen pollution. The majority of the nitrogen entering Buzzards Bay and Vineyard Sound comes from residential septic systems. It seriously harms our coastal water quality, our fisheries and our overall coastal economy.

Conventional "Title 5" septic systems and old cesspools contribute significant amounts of nitrogen pollution which drains into groundwater and eventually flows into our coastal waters. This excess nitrogen causes algae blooms that degrade water quality and habitats. Warmer waters spurred by climate change exacerbates algal blooms and water quality problems. Nitrogen from septic systems can also pollute drinking water wells, affecting human health.

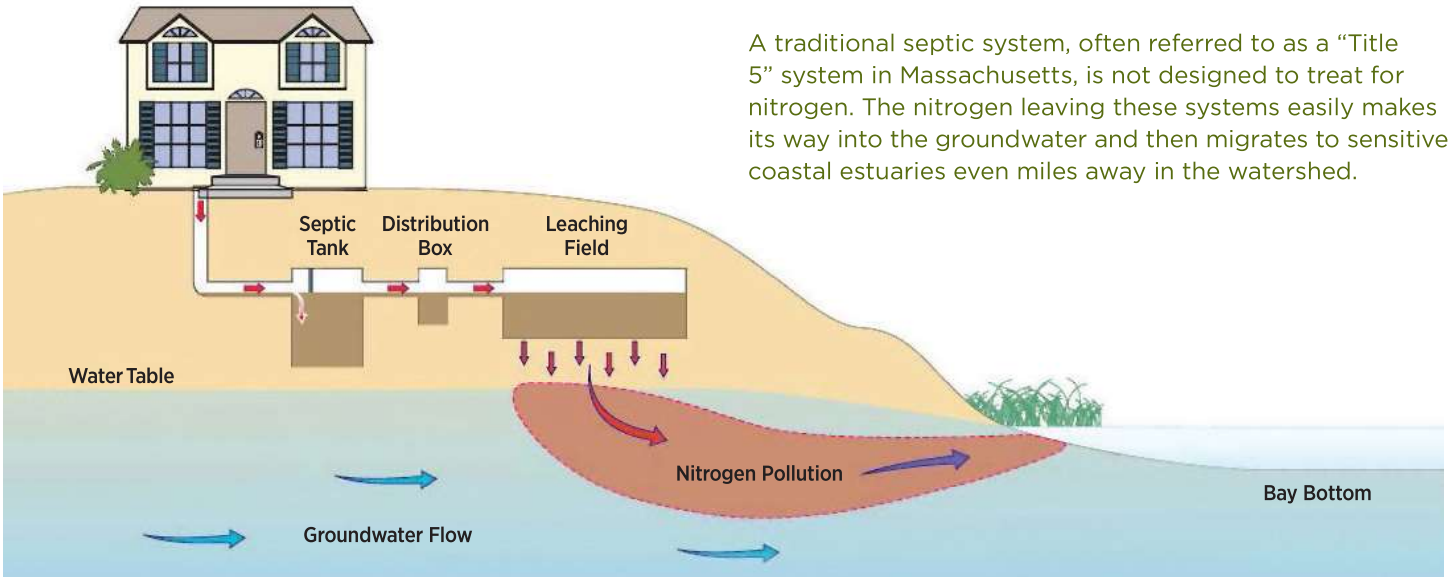
The solution requires improved wastewater treatment in every community along the Bay. In many suburban areas, new sewer line extensions to connect homes to one of the Bay's seven Wastewater Treatment Plants (WWTPs) are the answer. Modern WWTPs can remove as much as 95% of the nitrogen before it is discharged and are always the best option.

Some of the most nitrogen-degraded places on Buzzards Bay include the Westport Rivers, Slocums River and Apponagansett Bay in Dartmouth, Acushnet River, the Agawam and Weweantic Rivers in Wareham, and West Falmouth Harbor (shown here).

In more rural areas, far away from central sewer networks, **Nitrogen-Reducing Septic Systems** can be installed on individual homes and reduce nitrogen right at the source.

THE PROBLEM WITH CONVENTIONAL TITLE 5 SEPTIC SYSTEMS

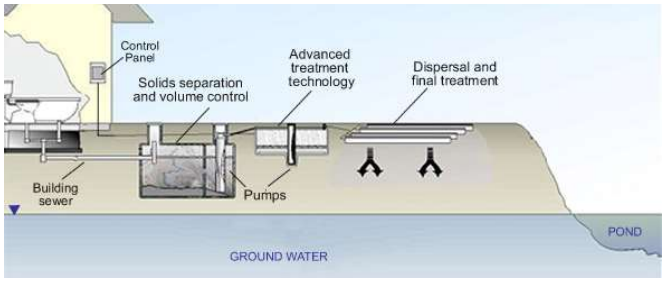
A traditional septic system, often referred to as a "Title 5" system in Massachusetts, is not designed to treat for nitrogen. The nitrogen leaving these systems easily makes its way into the groundwater and then migrates to sensitive coastal estuaries even miles away in the watershed.



THE IMPORTANCE OF NITROGEN-REDUCING SEPTIC SYSTEMS

Conventional Title 5 septic systems are designed to remove only bacteria and viruses, not nitrogen from household wastewater. Nitrogen-reducing septic systems are designed to also remove nitrogen.

Nitrogen reducing systems include additional components to remove nitrogen. Nitrogen is removed in a two-pronged approach, first through nitrification (adding air to convert raw waste to Nitrate) and then denitrification (removing oxygen to convert Nitrate to harmless nitrogen gas, which makes up most of the air we breathe).



A nitrogen reducing septic system is similar to a Title 5 septic but it incorporates an additional step to actively remove nitrogen in the wastewater.

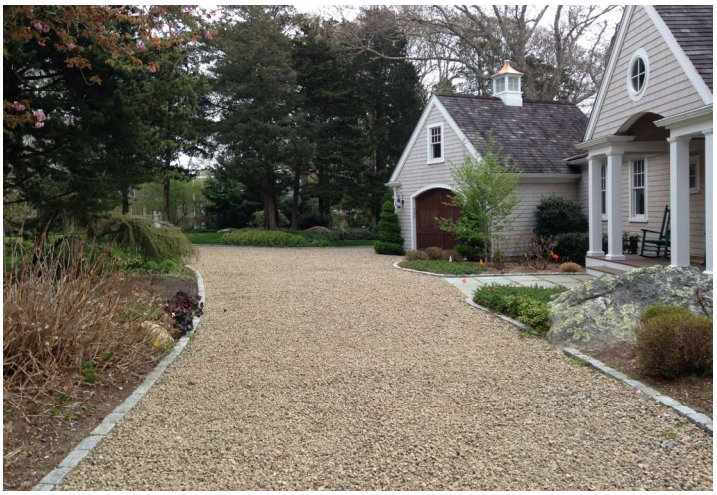
WHERE SHOULD NITROGEN-REDUCING SEPTIC SYSTEMS BE INSTALLED?

Nitrogen-reducing septic systems are needed in areas that drain to nitrogen sensitive areas and where centralized sewers are not available and will not be constructed in the future. The majority of the coastal communities around Buzzards Bay drain to nitrogen sensitive waters and will need to connect to sewer or upgrade to a nitrogen-reducing system to preserve our waterways in years to come.

FOUR STEPS TO INSTALL A NITROGEN-REDUCING SEPTIC SYSTEM:

The process of installing a nitrogen-reducing system can seem daunting, but we are here to help! The process to installing a nitrogen-reducing system looks like this:

1. **Contract with a local engineering firm**. They will help you choose a technology that fits your property, do the septic system design, and navigate permitting to get the project ready for construction. In Massachusetts, septic permits are issued by each town's Board of Health and the engineering firm will handle this process. If you have trouble finding an engineer, the local Board of Health can provide information about the local permitting process and may be able to assist with locating local engineers and installers to get you going.
2. **Board of Health Approval**. Your engineer will file an application with the local Board of Health. A public hearing may be held and a permit issued. If you live near wetlands, a permit may also be required by the local Conservation Commission.
3. **Select an installer**. Once a completed design and permit are in hand, a septic system installer must be hired. The selected engineering firm should be able to assist with locating qualified contractors. It is always best to get multiple quotes for the project to ensure that the best qualified contractor is selected.
4. **Locate and contract with an Operation & Maintenance contractor**. Once your system is in the ground, you will be required to enter into an operation and maintenance contract to ensure the system stays in peak operating performance. This protects your investment in the system and ensures the system continues to effectively remove nitrogen and protect the Bay. On average these contracts cost approximately $800 a year, but vary depending on the individual requirements of the selected system.



"Like they were never even here"

Photos during and after construction of a Nitrogen-Reducing Septic System on a small existing residential house site

NITROGEN-REDUCING SYSTEMS TECHNOLOGY AND PERFORMANCE

There are a wide variety of systems on the market. The Buzzards Bay Coalition recommends looking at systems that can achieve the highest nitrogen reductions. The MA Department of Environmental Protection (DEP) considers a system Nitrogen-Reducing if it can meet 50% removal of nitrogen. You should work with your engineer to select the technology that meets your needs as every property and home is different.

TECHNOLOGIES CAPABLE OF REDUCING NITROGEN BY >70%

Nitroe	www.kleantu.com/wastewater-treatment-systems
Nitrex	www.lombardoassociates.com/nitrex.php
Orenco	www.orenco.com/international/advantex-treatment-systems
Hoot	www.hootsystems.com
Eliminite	www.eliminite.com

** The Massachusetts Septic System Test Center continues to evaluate the performance of nitrogen reducing septic systems. This list will be updated based on their findings.*

WHEN IS THE BEST TIME TO INSTALL A NITROGEN-REDUCING SEPTIC SYSTEM?

A nitrogen-reducing septic system can be installed at any time, but the most convenient and cost-effective time is when a new or expanded septic system is required. This could be at the time of building or substantially renovating a home or at the time of buying or selling a home.

COST OF NITROGEN-REDUCING SYSTEMS

The equipment cost for a nitrogen-reducing septic can vary depending on the technology, the size of your home (daily flow of household wastewater) and your property's characteristics. Costs can also range depending on whether an existing conventional system is retrofitted with a nitrogen-reducing system (i.e., use an existing leach field and/or tank), or if the entire conventional system must be replaced. For a 3-4 bedroom home, the cost of purchasing and installing an entirely new nitrogen-reducing system is approximately $35,000 for the most commonly installed nitrogen reducing technologies. If a conventional system is in good functioning condition upon the installation of a nitrogen reducing system, a system retrofit can cost $15-20,000 dollars, including installation.

These costs are based on nitrogen-reducing septic systems installed between 2017-2022 and include all costs for engineering, permitting, and installation.

FUNDING SUPPORT

There are a number of financial tools existing and under development in 2023 to assist homeowners looking to install Nitrogen-Reducing Septic Systems.

1. Expansion of the **Community Septic Loan program** to provide low-interest loans to residents to upgrade their systems to a nitrogen reducing system is currently pending in the Massachusetts legislature. Loans are repaid as part of your property tax bill and can be spread over as many as 20 years. Funding for this program comes from the Commonwealth but each town administers the loans separately. Contacting your local Board of Health will be the first step in inquiring about these low interest loans.

2. A **Tax credit** is also available in Massachusetts for costs related to upgrading a failed septic system. The law was expanded in 2023 to provide Massachusetts residents a credit of up to $18,000 to design and replace a failed system on their primary residence. Homeowners can recoup the credit over four years on their state tax return.

3. If you live in **West Falmouth**, the Buzzards Bay Coalition provides $5,000-$15,000 subsidies to select homeowners to upgrade their systems to Nitrogen-Reducing Septic Systems. Contact the Coalition to see if your home falls within one of the designated areas.

4. **Other Financing Considerations** If you have to replace your septic system because you're selling your home, talk with your real estate agent, lender, engineer, septic contractor, and legal representative about timing and payment options. There are two common approaches:

   A) System installation completed before sale: Many times an engineer and septic contractor will agree to be paid out of "closing funds" when your house sells, eliminating the need for you to come up with payment in advance.

   B) System installation completed after sale: Because of contractor scheduling or the weather/time of year, a new septic system installation might not be possible until after your house has sold. As a result, a lender might consider holding back some of your home's sales proceeds "in escrow", usually in the amount of one-and-a-half times the construction estimate, until the job is completed. Once completed, the contractor is paid from those escrow funds and any remaining balance is returned to you.

ENGINEERS FREQUENTLY USED TO DESIGN AND PERMIT NITROGEN-REDUCING SYSTEMS

LOCATION	COMPANY/CONTACT	PHONE NUMBER
Berkley	DMG Engineering Co.	(508) 951-1169
Buzzards Bay	Bracken Engineering, Inc.	(508) 833-0070
Carver	Arthur F. Borden & Associates, Inc.	(508) 880-3439
Dartmouth	AVT Associates	(508) 992-0015
Fall River	Gorodetsky Engineering LLC	(508) 324-1163
Fall River	Analysis & Design Engineering	(508) 679-8508
Fall River	George Ayoub	(508) 674-4128
Falmouth	Falmouth Engineering	(508) 826-9200
Falmouth	John Doyle	(508) 563-1994
Falmouth	JE Landers-Cauley	(508) 540-7733
Falmouth	Merrill Corporation	(508) 563-2183
Kingston	Grady Consulting, LLC.	(781) 585-2300
Mashpee	Cape and Islands Engineering	(508) 477-7272
Mattapoisett	Field Engineering Co. Inc.	(508) 758-2749
Mattapoisett	Schneider, Davignon & Leone, Inc.	(508) 758-7866
Middletown, RI	Northeast Engineers & Consultants, Inc.	(401) 849-0810
Rochester	Charon Associates, Inc.	(508) 763-8362
Taunton	W. Engineering, LLC	(508) 821-8245
Wareham	Foresight Engineering	(508) 245-2148
Wareham	Thomas Roux	(774) 678-9066
Westport	S & K Engineering, LLC	(774) 319-5305
Westport	Wendy Henderson	(508) 636-8981
Westport	Westport Environmental Design	(508) 636-2757
Woods Hole	DH Martin Engineering	(774) 836-0693
Yarmouth	All Cape Septic, LLC	(508) 771-4200

** This list of engineers was created by reviewing the minutes of local boards of health and identifying the most frequently used engineers for nitrogen reducing systems. Please contact the Coalition if an engineer with nitrogen reducing experience should be added.*

TOWN BOARD OF HEALTH CONTACT INFORMATION

TOWN	PHONE NUMBER
Acushnet	(508) 998-0275
Aquinnah	(508) 645-2309
Bourne	(508) 759-0600 ext. 1513
Carver	(508) 866-3420
Chilmark	(508) 645-2105
Dartmouth	(508) 910-1804
Fairhaven	(508) 979-4023 ext. 8125
Falmouth	(508) 495-7485
Freetown	(508) 644-2202
Gosnold	(508) 990-7408
Little Compton	(401) 222-4700

TOWN	PHONE NUMBER
Marion	(508) 748-3533
Mattapoisett	(508) 758-4112
Middleborough	(508) 946-2408
New Bedford	(508) 991-6199
Plymouth	(508) 322-3339
Tisbury	(508) 696-4290
Tiverton	(401) 222-4700
Rochester	(508) 763-5421 ext. 201
West Tisbury	(508) 696-0105
Wareham	(508) 291-3100 ext. 3197
Westport	(508) 636-1015