

Buzzards Bay



National Estuary
Program

January 30, 2007

Chuck Gricus, Town Planner
Wareham Planning Board
54 Marion Road
Wareham, MA 02571

Re: Draft Nitrogen Loading Bylaw for the Town of Wareham

Summary

- We have updated and simplified our draft model nitrogen loading bylaw for Wareham. It now establishes a 7.5 pounds of nitrogen wastewater discharge limit for all of Wareham. This standard translates into 2.5 bedrooms per acre for conventional wastewater disposal.
- This limit was based on available information and will help protect Wareham's waters and coastal resources in unison with the town's ongoing efforts to sewer coastal areas to its upgraded wastewater facility.
- The bylaw allows for creative solutions to meet this standard, including the use of individual or shared nitrogen removal wastewater systems, purchase of conservation restrictions, and perhaps even opens the door for nitrogen trading credits.
- It offers protection for existing systems and grandfathered lots and single-family 4 bedroom homes on parcels greater than 1.6 acres in size are not affected.

Mr. Gricus:

As you know, over the years, the Buzzards Bay National Estuary Program has worked with the Wareham Planning Board, and other boards in the Town of Wareham to develop management strategies to address coastal pollution problems caused by nitrogen discharges and runoff from septic systems, lawns, agricultural lands, and discharges from the town's wastewater facilities. The impacts of these discharges, also referred to as eutrophication, have caused the loss of eelgrass beds, increased abundance of algae, decreased water transparency, loss of shellfish habitat, and has contributed to increased frequency of fish and shellfish kills from low oxygen concentrations in the water.

Past studies have shown that the recent wastewater treatment facility upgrade and the town's sewer expansion program alone will not fully restore Wareham's estuaries, or protect them from impacts of new growth. This past summer, at the request of the planning board, we developed a draft nitrogen overlay planning district bylaw that sought to establishing loading districts and loading standards based on sound science, and the local regulatory framework. However, you reported that the draft bylaw was not well received, and board members found the draft bylaw too complicated.

¹ We have ignored nitrogen contributions from lawns and impervious surfaces. We have added a margin of safety to the wastewater calculations and these inputs could also be addressed by stormwater and subdivision regulations, or other town policies and regulations.



In response to this critique, we have "gone back to the drawing board" and developed a simpler, more pragmatic approach that is far less complicated, but which we believe achieves the same outcome. Attached is a one-page nitrogen loading general bylaw that focuses on wastewater systems only¹. The bylaw is written as a town-wide bylaw; there would be no watershed boundaries or high and low nitrogen contribution zone boundaries to consider. The bylaw would exempt sewered areas and areas scheduled to be sewered. Some flexibility would be provided to existing homes and grandfathered lots (for example, you could build a 3-bedroom home on a small lot if you install a DEP approved nitrogen removal septic system).

The goal of our approach was to not only develop regulations that would limit and reduce nitrogen discharges to Wareham's coastal waters, but to create regulations that would allow property owners and developers some flexibility in achieving the proposed standard. We believe market forces would also encourage developers to select community or package treatment systems for new subdivisions as a cost-effective solution in meeting the nitrogen loading standard, but this is not explicitly required by the bylaw.

The core of these regulations is that the town would adopt a standard discharge limit of 7.5 pounds per acre for wastewater disposal. These new draft regulations would also require nitrogen removal septic systems on single lots for new construction or retrofits if the bedroom density of the lot exceeds 2.5 bedrooms per acre. This standard would be evaluated using a simplified set of nitrogen loading assumptions. Specifically, occupancy would be assumed to be one person per bedroom, and annual nitrogen loading would be presumed to be 3 pounds per person. With the use of conventional Title 5 systems, this would create a de facto town-wide standard of 2.5 bedrooms per acre. Nitrogen removal septic systems or community or package wastewater systems could be used to exceed the 2.5 bedrooms per acre limit. For example, a nitrogen removal septic system that just meet the state performance requirements under this bylaw would allow development at a density of 3.75 bedrooms per acre. The phrasing of the bylaw allows for the placement of permanent conservation restrictions on non-contiguous parcels as another a way of achieving the nitrogen loading limit

To ensure that any nitrogen removal septic systems installed under this bylaw are performing properly, the Board of Health should adopt supporting regulations to require Operation and Maintenance ("O&M") agreements for all alternative wastewater systems installed in the Town of Wareham. These Board of Health regulations can be adopted through a regular Board of Health hearing, after public comment. For technologies installed that claim to exceed the state certified standard of 19 ppm discharge for nitrogen removal systems, the Board of Health should also adopt regulations that require testing twice per year with the results provided to the town.

When zoning is 1 acre or larger, the construction of individual alternative septic systems is generally considered more cost effective than the construction of conventional gravity sewer systems. Please keep in mind there are financial costs for operating and maintaining these alternative wastewater systems. These costs are often comparable to the annual sewer fees paid by residents tied into the sewer system. An attractive alternative to either individual innovative alternative systems, or to conventional gravity sewer mains tied to a centralized wastewater plant, is to encourage the installation of shared community package treatment systems for new subdivisions. The operating costs of these facilities for homeowners is often less than the costs of individually owned alternatives systems, and a fewer number of community systems would be easier to track by town officials than many more individual onsite systems.

If you would like to discuss this draft model bylaw further, please do not hesitate to call me. This draft bylaw would of course require legal review by town council and review by town boards before it is presented to town meeting. Please forward this email to any board member or resident that you feel may be interested in this model bylaw.

Sincerely,

Joseph E. Costa, Ph.D.
Executive Director

The Wareham Wastewater Nitrogen Bylaw

A sample General Bylaw prepared by the Buzzards Bay Project National Estuary Program
at the request of the Planning Board. Draft date: January 30, 2007

This draft model bylaw has not been adopted.

1.0 Purpose and Intent:

It is the purpose of this bylaw to establish town-wide nitrogen loading standard for wastewater discharges and disposal in the Town of Wareham to protect the public health and welfare of its citizens, and to minimize quantifiable impacts to drinking, fresh and coastal water quality and natural resources. This bylaw is adopted pursuant the home rule amendments of the Massachusetts Constitution.

2.0 Performance Standards and Applicability

2.1 No town board, officer, or employees thereof shall issue a permit or approval for the installation, repair, or replacement of an onsite wastewater disposal system, or use thereof, that will result in the discharge of a wastewater nitrogen loading rate that exceeds 7.5 pounds per acre.

[Commentary: Applicants could achieve this standard through different mechanisms including: limiting activity on the lot, reducing density of development, tying into a municipal sewerage, constructing individual nitrogen removing onsite systems, constructing nitrogen removal package treatment plants, protecting land in other parts of Wareham through the placement of permanent conservation easements that include prohibition of nitrogen applications, or a combination of any or all of these techniques.]

3.0 Exemptions

3.1 Areas that are now sewered or are planned to be sewered according to the Town of Wareham's wastewater facilities plan dated _____.

3.2 The repair or replacement of existing septic systems installed that cannot meet the standard of Section 2.0 because of lot size and land use that existed on [effective date] where a Massachusetts DEP approved nitrogen removal septic system is installed.

3.3 A proposed single-family house up to three bedrooms in size on a lot created before [effective date] where a Massachusetts DEP approved nitrogen removal septic system is installed.

3.4 Expansion of an existing septic system for an existing single-family house up to 3 bedrooms on a lot, both in existence before [effective date] where a Massachusetts DEP approved nitrogen removal septic system is installed.

4.0 Definitions and calculations methods

4.1 **Average Occupancy:** For the purposes of nitrogen loading calculations in this bylaw, average occupancy shall be presumed to be 1 person per bedroom.

4.2 **Wastewater Nitrogen Loading Rate (pounds per acre):** The presumed annual number of pounds of nitrogen emanating from a wastewater system to groundwater using the rates specified in section 4.4 though 4.6, divided by the acreage of land used to meet the performance standards of this bylaw.

4.3 **DEP approved Nitrogen Removal Septic System:** An onsite wastewater disposal system certified by the Massachusetts Department Environmental Protection to achieve an average discharge of 19 ppm or less total nitrogen.

4.4 **Per capita nitrogen loading for conventional systems:** For the purposes of nitrogen loading calculations in this bylaw, annual per capita discharge of nitrogen is presumed to be 3 pounds per person for conventional Title 5 wastewater disposal systems.

[Commentary: This is somewhat higher than 2.9 lbs/person typically used and represents a margin of safety to account for non-point sources of nitrogen associated with development.]

4.5 **Per capita nitrogen loading for nitrogen removal systems:** For the purposes of nitrogen loading calculations in this bylaw, DEP approved nitrogen removal septic systems shall be presumed to discharge at a rate of 2 lbs per person. Systems claiming performance better than 19 ppm are allowed a credit proportional to their performance. A system that discharges 9.5 ppm shall be presumed to have one-half of 2 lbs of nitrogen per capita loading, and so forth. Any system installed that claims performance lower than the 19 ppm DEP certification level must be tested twice per year, and the results of that testing submitted to the Board of Health as per regulations adopted in support of this bylaw.

4.6 **Nitrogen loading for commercial development:** For the purposes of the nitrogen loading calculations in this bylaw, nitrogen loading for commercial development shall be calculated using wastewater system design flows, multiplied by a presumed concentration of 30 ppm discharged to groundwater, for a conventional wastewater treatment system, unless a nitrogen removal septic system is installed, in which case nitrogen performance values shall be used.

5.0 Severability

5.1. Failure of any board to adopt regulations under this bylaw shall not invalidate regulations by another board under their authority.