

Wareham Board of Selectmen
 283 Main St.
 Wareham, MA 02538

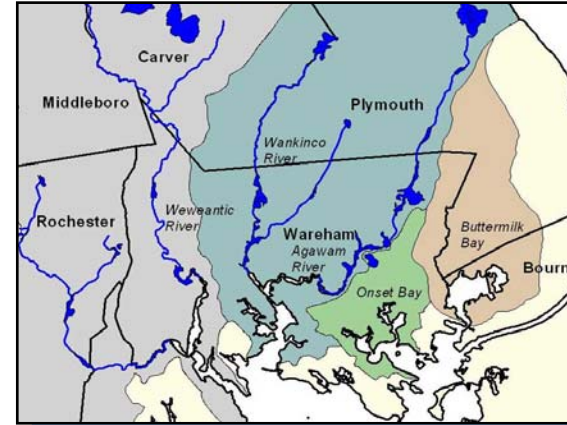
TO:

Protecting Wareham's Coastal Waters and Watersheds from Nitrogen Pollution



Why Protect Wareham's Estuaries and Coastal Bays?

The Weweantic and Wareham River estuaries, and Buttermilk and Onset Bays, are among the Town of Wareham's most precious resources. These estuaries, covering more than 3,000 acres, contain swimming areas, shellfish beds, and habitat for fish and wildlife. They are appreciated for their beauty, natural resources, and recreation opportunities by boaters, fisherman, and tourists, and they contribute to the local economy.



Wareham's coastal watersheds.

These bays have large watersheds stretching into the towns of Carver, Middleboro, and Plymouth, and include important rivers like the Agawam, Wankinco, and Weweantic. In these watersheds, dense development has occurred close to shore. However, the upper watershed areas contain some of the most expansive tracts of undeveloped

land in the region, and include drinking water supply wells for the Town of Wareham and neighboring communities, as well as rare and endangered species habitat and wetlands.

Despite their importance, water quality in these embayments is being altered by pollution, which is causing shellfish bed closures and the loss of habitat and living resources. Of special concern are excess nitrogen inputs from development and agriculture in the surrounding watersheds. Water quality monitoring suggests that the Agawam, Wareham, and Weweantic River estuaries are among the most eutrophic bays around Buzzards Bay, and have far worse water quality than other Wareham waters like Buttermilk and Onset Bay (see figure below, 10-year summary, Baywatchers III, Coalition for Buzzards Bay).

The Problem with Nitrogen

Nitrogen is a natural and essential nutrient in marine ecosystems. Too much nitrogen, however, causes a process called "eutrophication," which is largely the result of excessive growth of algae (seaweeds and phytoplankton).

While algae are an important part of a healthy bay ecosystem, an overabundance of algae can have adverse effects. Too much algae in the water makes the water turbid looking, and shades out beneficial plants like eelgrass. Eelgrass beds act as important nursery habitat for many fish and shellfish species, and the loss of eelgrass can lead to the loss of other species, like scallops. Too much algae can also decrease oxygen in the water, as both living and dying algae consume oxygen. In eutrophic bays, oxygen levels can become so low that fish can suffocate. Algae can also sink



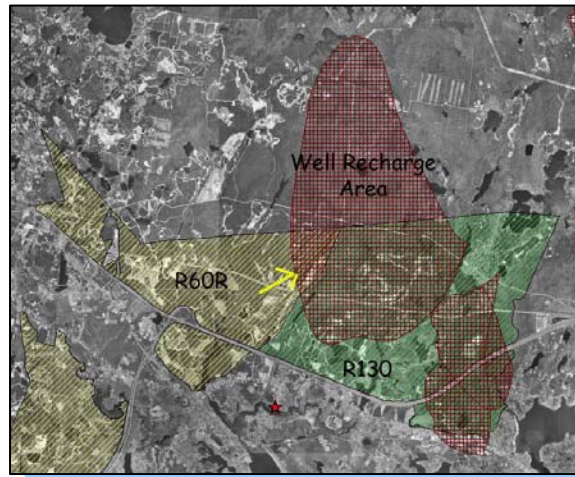
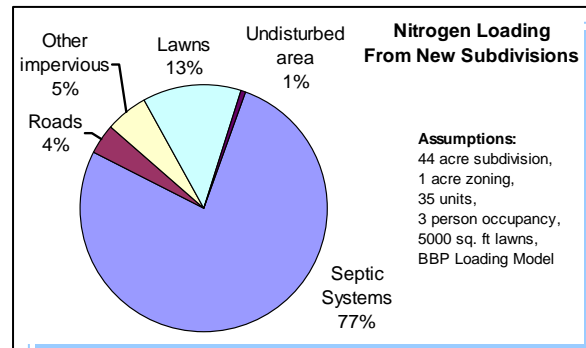
to the bottom where it accumulates in shallow bays, smothering shellfish and destroying valuable habitat. Eutrophic conditions are also believed to contribute to prolonged survival of fecal coliform bacteria in the water, contributing to the persistence of shellfish bed closures.

Where Does Nitrogen Come From?

Nitrogen is transported into coastal waters by groundwater, stormwater, rivers, and direct discharges. Nitrogen sources include septic systems, sewage treatment facilities, stormwater runoff, animal waste, and fertilizers added to lawns, golf courses, and agricultural land. The importance of each of these sources varies considerably among watersheds. For example, a recent study of the Wareham River watershed show that roughly 9% of the nitrogen to the estuary comes from the Town's newly upgraded sewage treatment plant on the Agawam River, 37% comes from residential septic systems, and 33% from fertilizer (mostly cranberry bogs; some from lawns), with the rest from other sources. In contrast, in the Buttermilk Bay watershed, septic systems are estimated to account for more than 60% of nitrogen.

Despite differences among watersheds, it is clear that new sources of nitrogen originate largely with wastewater disposal from new development. For example, for new residential development in unsewered areas, 77% of the nitrogen originates from septic system discharges.

The replacement of forests and wetlands with residential and commercial development, roads, and parking lots is affecting coastal ecosystems in other ways. Undeveloped lands, forests and wetland areas help filter out nitrogen in groundwater and surface waters. The loss of these areas is contributing to coastal eutrophication.



Well recharge areas (zone 2s), and large lot zoning in the areas of Wareham north of Rt. 25.

What is the Town of Wareham Doing to Help?

The Town of Wareham has recognized the seriousness of the nitrogen-loading problem to the Wareham River estuary, and in 1998 funded a study of water quality and nitrogen sources in the watershed. Based on this information, the town agreed to upgrade its wastewater facility to enable both expanded sewerage, and to reduce nitrogen inputs into the estuary. Completed in 2006, the new facility is now discharging only 4-ppm nitrogen most of the year, as compared to levels of 18-ppm a decade ago. These improvements are reducing total nitrogen loading to the estuary by at least 25% or 50,000 lbs. This amount of nitrogen is equivalent to the nitrogen produced by nearly 3,000 homes in the upper watershed.

The expansion and upgrade to the town's wastewater facility cost more than \$27 million, and is now benefiting the Wareham River estuary. However, the watershed has tremendous growth potential. State projections for Wareham suggest that the town could nearly double its population, and add more than 15,000 new residents at build out conditions. This new growth not only affects the cost of municipal services, but it has an environmental impact as well, particularly because most new homes would be built with onsite septic systems. This new growth will eliminate the

water quality benefits of the planned wastewater facility upgrade. Consequently, to improve water quality, the Town of Wareham must simultaneously reduce nitrogen from existing sources, and limit nitrogen from new development.

In past years, various boards attempted to regulate nitrogen, but the town has never adopted a comprehensive strategy. In October 2007, Wareham Town Meeting members will vote on a wastewater nitrogen management model bylaw developed by the Buzzards Bay NEP that will establish a town-wide standard of the equivalent 3 bedrooms per acre for residential development.

Another ongoing effort has been the Massachusetts Department of Environmental Protection's Estuaries Project, which will develop state-of-the-art nitrogen management recommendations based on the latest nitrogen loading models. The Massachusetts Estuaries Project will issue a report on nitrogen loading recommendations for the Wareham River watershed at the end of 2007.

How Can You Make a Difference?

You can do many simple things to control nitrogen on your property.

- Septic systems are a major source of nitrogen entering our local bays and harbors. Conventional septic systems (both properly operating and failing) release large amounts of nitrogen to the groundwater. These septic systems are designed to remove bacteria and are not very effective at reducing nitrogen in residential wastewater. If you own a septic system, have the tank pumped every 2 years. When your system needs replacing, consider installing one of the new innovative septic systems that are specifically designed to remove nitrogen from wastewater. If you are connected to municipal sewer, support your town's efforts to reduce nitrogen in their wastewater facility's discharge.

- Lawns and paved surfaces increase nitrogen loads to coastal waters. Rainwater runoff carries nitrogen from these sources directly into the bay. You can reduce these nitrogen loads by maintaining a buffer strip of native vegetation that is at least 15 feet wide abutting the edge of any water body or wetland. Additionally, converting some of your lawn to a more naturalized landscape, stabilizing any areas that may be prone to ero-

sion, and reducing or eliminating fertilizers will also help. Watering your grass in the early morning and late evening will keep it green without fertilizers because you'll be avoiding water loss caused by evaporation. It also helps if you cut your grass long (at least 2") to encourage strong roots. However, if you feel you must use fertilizer, apply it only when necessary and always according to the manufacturer's directions.

- Preserving open space and better managing new development are excellent methods for controlling future nitrogen problems in the bay. Several Buzzards Bay towns have already adopted new zoning regulations that control and manage growth in sensitive areas. In addition to having a positive impact on water quality, land preservation can also protect plant and wildlife habitats, wetlands, forests, scenic vistas, and historic sites.

- Private landowners can protect open space with several conservation tools. Many of these strategies offer substantial financial benefits and tax incentives, such as reductions in estate and property taxes. One popular option is the use of a conservation restriction, which can be tailored to the needs of each individual and property. You can continue to live on the land and pass it to heirs, all while protecting its natural resource values. Your local land conservation organization can assist you in determining your best options.

- Support local regulations and bylaws that help protect the water quality and living resources of Wareham. Participate in town government by learning about these issues, attending Town Meeting, and voting on articles.

Your actions can help ensure that the healthy coastal waters we all enjoy today will still exist for future generations.

The Buzzards Bay National Estuary Program, at the request of the Wareham Planning Board, prepared this brochure in October 2001. It was updated in 2003 for the Planning Board, and again in spring 2007 for Wareham Town Meeting, and again in the fall of 2007 in support of a warrant article submitted by the Board of Selectmen at Town Meeting. The contents do not necessarily reflect the views of the US EPA or Commonwealth of Massachusetts.

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