

## The Problem with Nitrogen?



Nitrogen is a natural and essential part of both marine and terrestrial environments. In marine environments, the growth of algae is directly influenced by the amount of nitrogen in the water. Algae, which include seaweed and microscopic plants called phytoplankton, are the basis of aquatic food webs. Increased supplies of nitrogen can cause the rapid growth and accumulation of algae.

While aquatic plants are an important part of a healthy bay ecosystem, an overabundance of algae can have several detrimental effects. In large quantities, algae can decrease light transmission through water. Inadequate light can stress and eventually cause the death of eelgrass beds, which act as important nursery habitat for many fish and shellfish species. Excessive amounts of algae can also decrease oxygen levels in the water, as both living and dying algae consume oxygen. In the most severe cases, oxygen levels can become so low that fish kills occur. Algae can also sink to the bottom where it accumulates in shallow bays, smothering shellfish and destroying valuable habitat.

These negative impacts resulting in poor water clarity, loss of habitat, and low oxygen levels are referred to as *eutrophication*.

## Where Does Nitrogen Come From?

Nitrogen is transported into Buzzards Bay by various water sources, including groundwater, stormwater, rivers, and streams. The majority of nitrogen entering the bay originates from on-site septic systems, sewage treatment facilities, stormwater runoff, waterfowl, and fertilizers added to lawns, golf courses, and agricultural land.

The way the land surrounding Buzzards Bay is used can have a significant impact on water quality. Oftentimes, activities that are viewed as a way to stimulate the local economy, such as increasing the amount of development, can result in long-term ecosystem impacts if not carefully planned. In-



creased population growth and the tendency for dense development to occur on the coast have affected water quality in Buzzards Bay. Excessive nitrogen from residential communities has increased dramatically as summer homes built close to the water and in dense clusters are rapidly being converted into year-round homes.

The gradual replacement of forests and wetlands with residential homes, commercial buildings, roads, and other paved surfaces affects many ecological processes that are critical to the natural absorption of nitrogen in the environment. Undeveloped forest and wetland areas filter out and

consume nitrogen before it ever has the chance to reach the bay. As unaltered vegetated areas continue to disappear, and the amount of nitrogen reaching Buzzards Bay increases, more harbors and shallow bays will begin showing signs of eutrophication.

## How Can You Make a Difference?

There are many simple things that you can do to control nitrogen in your own backyard.

- ♦ 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 waterbody or wetland. Additionally, converting some of your lawn to a more naturalized landscape, stabilizing any areas that may be prone to erosion, and not using 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.

◆ A favorite past time of many people is feeding the ducks. Fecal matter from waterfowl contains nitrogen as well as bacteria that can contribute to shellfish bed closures. It may also be harmful to the animals to feed them food they would not normally find in the wild. Do the bay and the birds a favor and don't feed the waterfowl.



◆ Preserving open space and developing stricter controls on 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 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 have the power to protect open space with several conservation tools available today. Many offer substantial financial benefits and tax incentives, such as reductions in estate and property taxes. One of the most flexible is a conservation restriction, which can be tailored to the fit 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 the best options for you.

## Summary

Increased development and the gradual loss of forests and wetlands are contributing to more nitrogen entering Buzzards Bay. Excessive nitrogen can have detrimental effects on bay water quality by stimulating the growth of algae, which affects not only the health of the bay but the public's enjoyment of it. You can minimize nitrogen sources from your property in several ways, including maintaining your septic system, using natural landscapes, not feeding the waterfowl, and protecting open spaces. Your actions can help ensure that the healthy coastal waters we all enjoy today will still exist for future generations.

## What Is the Buzzards Bay Project?

The Buzzards Bay Project is one of 28 National Estuary Programs in the United States, and is jointly administered by the Massachusetts Office of Coastal Zone Management and the U.S. Environmental Protection Agency. The primary role of the Project is to provide technical assistance to municipalities, environmental organizations, and citizens surrounding the bay to facilitate implementation of the recommendations contained in the Buzzards Bay Comprehensive Conservation and Management Plan. The Management Plan outlines research findings and identifies management strategies to protect and restore water quality and living resources in the bay and its 432 sq. mile watershed.



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# Coastal Water Quality and Land Use

## *A Watershed Resident's Guide to the Effects of Nitrogen in Buzzards Bay*



We are attracted to Buzzards Bay because of its beauty and the recreational and economic opportunities it provides. However, water quality in many harbors around the bay is impacted or threatened by nitrogen inputs originating from development and other land uses in the surrounding watershed. This is your guide to reducing nitrogen and protecting Buzzards Bay.