

NUTRIENT LOADING

Addressed by 11 management objectives, 33 action plans

“THE MOST PRESSING PROBLEMS FOR THE ESTUARIES RELATE TO POPULATION GROWTH AND THE ASSOCIATED INCREASES IN NUTRIENT LOADS AND NONPOINT SOURCE POLLUTION.”

.- PISCATAQUA REGION ESTUARIES PARTNERSHIP STATE OF THE ESTUARIES REPORT, 2009

Nitrogen, a common nutrient, is a major chemical component of all living things. It is found in human and animal waste, decomposing plant materials, fossil fuels, and products derived from these sources such as fertilizer, exhaust, and cleaning products. Nitrogen is used by plants and animals for nutrition and growth. However, the excess nitrogen that plants and animals cannot consume may become a pollutant in groundwater and surface water. In freshwater systems, increased levels of nitrate and nitrite in drinking water can cause health risks, especially for infants and children, and high levels in surface waters can cause problems for fish and other aquatic species.

Excess nitrogen in estuaries can lead to eutrophication, a process characterized by an increase in primary productivity due to an abundance of nutrients. In estuaries, this may lead to proliferation of nuisance macroalgae and increased phytoplankton growth, which may decrease water clarity. The excess algae and phytoplankton that is not consumed may cause low dissolved oxygen levels as these organisms die and decompose. The combination of decreased water clarity and low dissolved oxygen significantly impacts ecosystems. Eelgrass habitat, which supports many estuarine species, is impaired by reduced water clarity.

Recent increases in nitrogen in the Great Bay Estuary threaten the overall quality of the system. The total nitrogen load and dissolved inorganic nitrogen load to the Great Bay Estuary has showed increases over the past five years. The increase may be as high as 43% and 44% respectively. (Piscataqua Region Estuaries Partnership, 2009). To better understand how nitrogen levels have changed over time, researchers must next normalize the data for precipitation to determine the actual percent increase for each nutrient component.

The Great Bay Estuary is at the most risk of impacts from nitrogen loading due to increased population growth and development within the watershed, the relatively low rate of estuary water exchange in the bay, and finally, the loss of the assimilative capacity previously provided by eelgrass as well as oysters and other filter feeders. At this time, the Hampton-Seabrook Estuary is at low risk for eutrophication due to the rapid ocean flushing in this estuary.

PREP and NHDES estimate that approximately one-third of the nitrogen load to the Great Bay Estuary comes from wastewater treatment plant discharge. The majority of other nitrogen load comes from nonpoint sources including stormwater, septic system discharge, agricultural and lawn runoff, groundwater, ocean water, and atmospheric deposition. Much of the nonpoint source load is delivered to the estuary via the major tributary systems.

Reducing nitrogen loading in the Region requires a broad range of activities, such as:

- Reducing nitrogen loads from WWTFs through permit limits and improved treatment technologies
- Improving watershed management and regional control of nutrient loads
- Protecting and restoring riparian and shoreland buffers
- Promoting use of Low Impact Development (LID) techniques and innovative stormwater controls to improve treatment of stormwater
- Initiating outreach and training to local decision makers and watershed residents on the impacts of nitrogen loading to estuarine waters and habitats
- Reducing impervious surfaces and their impacts
- Reduce or eliminate illicit connections to stormwater drains and leaky sewer pipes
- Minimizing growth of impervious surface cover in small and undeveloped watersheds
- Improving septic system treatment and maintenance
- Obtaining a better understanding of the nitrogen cycle in the Piscataqua Region watershed
- Increasing health and abundance of the existing oyster population and promote aquaculture of oysters and other filter feeders that help reduce water clarity and sequester nutrients in fresh and estuarine waters