



NUTRIENT BIOEXTRACTION INITIATIVE

Reducing Nitrogen in Our Waterways

Nutrient Bioextraction Overview

Excess nitrogen and phosphorus (collectively referred to as “nutrients”) can have negative effects on waterways. Nutrient bioextraction is a method where shellfish and seaweed are used to remove these excess nutrients and improve water quality. Growing and harvesting shellfish and seaweed, known as aquaculture, can reduce nutrients as the shellfish and seaweed use nitrogen and phosphorus to grow and develop, in the same way land plants do. The nitrogen and phosphorous become part of the shellfish and seaweed and are removed from the environment when they are harvested.

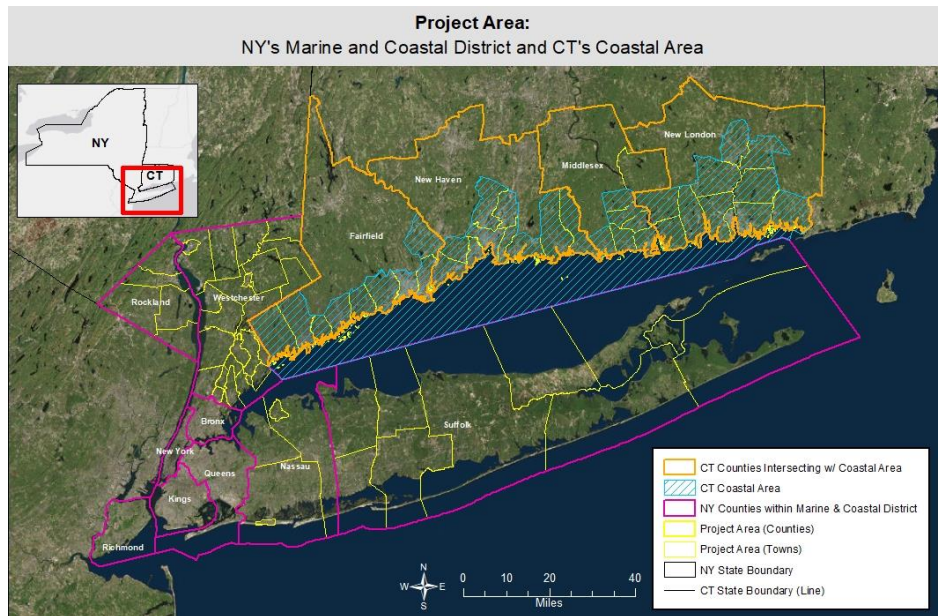
In addition to removing excess nutrients, shellfish and seaweed provide other benefits such as creating habitat for fish and other marine life, making nutrient bioextraction a valuable strategy in helping to improve water quality.

Impacts on Water Quality

High levels of nutrients can flow into coastal waters in a number of ways, including septic systems, municipal wastewater treatment plants in disrepair, excess fertilizer, and stormwater runoff (water from rain or snow melt collecting pollution as it flows over streets, parking lots, and roofs). These conditions are made worse in densely populated and heavily developed areas, such as the areas surrounding Long Island Sound. Over the years, large amounts of nutrients, especially nitrogen, have built up in Long Island Sound.

Nitrogen is the leading cause of water quality deterioration in Long Island Sound and in Long Island’s surface water and groundwater. Poor water quality has severely reduced acres of eelgrass beds and shellfish populations in Long Island Sound. Eelgrass is important to the coastal environment because it provides food and protection for young marine life, as well as food for waterfowl and turtles, and reduces coastal erosion. As long as the levels of nitrogen remain high, restoring eelgrass and shellfish populations will be difficult.

Removing excess nutrients is neither a quick nor an easy process. The excess nutrients come from a variety of sources, which adds to the difficulty and complexity of correcting the problem. In the past several years, the public has invested in upgrading sewage treatment plants to reduce the amount of nitrogen and phosphorous discharged into Long Island Sound and New York’s and Connecticut’s marine and coastal waters. However, nutrients continue to enter waterways via groundwater contaminated with nitrogen from septic systems, excess fertilizer, and stormwater runoff.



Nutrient Bioextraction Initiative

The Nutrient Bioextraction Initiative is part of New York State Department of Environmental Conservation's (NYSDEC) Long Island Nitrogen Action Plan (LINAP). The Initiative aims to improve water quality in New York's and Connecticut's marine and coastal waters by removing excess nitrogen through growing and harvesting shellfish and seaweed.

The Initiative is investigating how effectively aquaculture removes excess nitrogen from saltwater. The Initiative will also look into the potential challenges related to establishing nutrient bioextraction businesses.

Initiative Focus

The Initiative is centered around three themes.

- *Technical:* The Initiative seeks to address questions related to where and how shellfish and seaweed species can be used for nutrient bioextraction; past and current work includes pilot projects to determine how much nitrogen can be removed by these species, whether they pick up contaminants, best hatchery/nursery approaches, and investigating appropriate uses for harvested materials.
- *Regulatory:* The Initiative does not have regulatory jurisdiction but seeks to create resources for the understanding of existing regulations and upcoming regulatory and policy changes within Connecticut and New York that may affect a future nutrient bioextraction industry within Long Island Sound.
- *Economic:* The Initiative seeks to assess the economic viability of a bioextraction industry within Long Island Sound, including identifying the most appropriate species and harvested uses to allow for commercialization and industry development; this work currently includes an economic feasibility study for bioextraction within the Sound.



Sugar kelp being harvested from the East River, Bronx, NY in May 2022

Resources

Resources that have been developed through the Nutrient Bioextraction Initiative include the *New York and Connecticut's Shellfish and Seaweed Aquaculture Viewer*, and *A Guide to Marine Shellfish Aquaculture Permitting in New York State*, available through the websites listed at the bottom of this page.

For more information about the Nutrient Bioextraction Initiative, please visit <https://longislandsoundstudy.net/our-vision-and-plan/clean-waters-and-healthy-watersheds/nutrient-bioextraction-overview/> or lookup LISS Nutrient Bioextraction.

For more information about the Long Island Nitrogen Action Plan (LINAP), please visit <https://dec.ny.gov/nature/waterbodies/oceans-estuaries/linap> or lookup DEC LINAP.

The Nutrient Bioextraction Initiative is a project of NEIWPC in collaboration with the NYS Department of Environmental Conservation and the Long Island Regional Planning Council with funding from the U.S. Environmental Protection Agency's Long Island Sound Study.

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