



# 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.

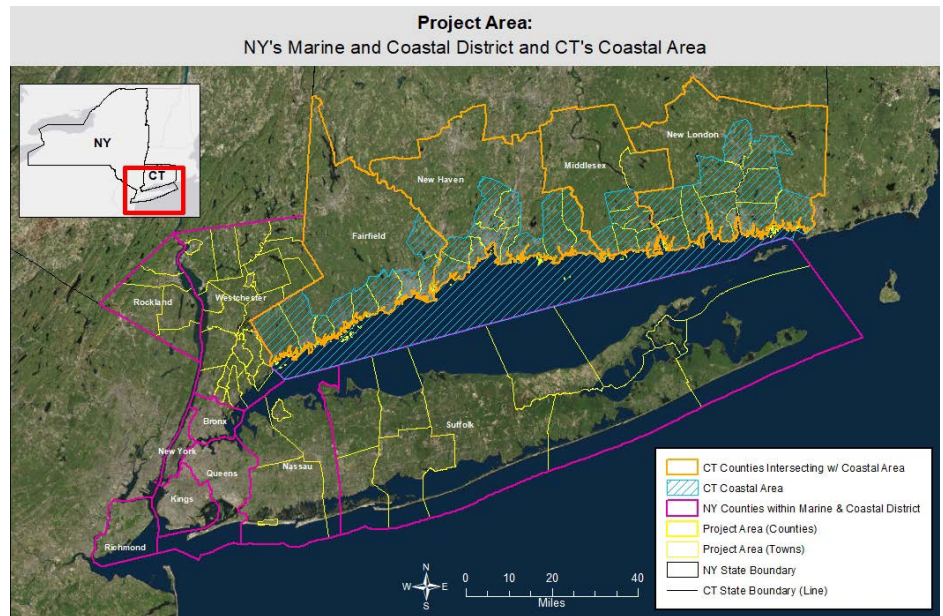
In addition to removing excess nutrients, shellfish and seaweed provide other benefits such as creating habitat for fish and other marine life, making nutrient bioextraction a valuable strategy in helping to improve water quality.

### 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 the Long Island Sound. Over the years, large amounts of nutrients, especially nitrogen, have built up in the Long Island Sound.

Nitrogen is the leading cause of water quality deterioration in the 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 the 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 the 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.

## Project Focus

The project is centered around four activities.

- Develop a map to help aquaculture businesses identify areas within New York's Marine and Coastal District and Connecticut's Coastal Area that are suitable for nutrient bioextraction and that may contribute most to nitrogen reduction. The map will be a siting tool, in a Geographic Information System (GIS), and will be publicly available as an interactive map that provides in-depth information about New York's and Connecticut's marine and coastal waters.
- Develop a guide for the permitting of shellfish aquaculture. This guide will help interested parties, such as potential aquaculture businesses, to understand the permitting process, and act as a roadmap through the regulatory processes required for permitting shellfish aquaculture. In addition, by creating this guide, New York is leading a coordinated effort between federal, state, and local regulatory agencies to develop a system for regulating commercial seaweed aquaculture in the state.
- Plan and develop nutrient bioextraction pilot projects. The Initiative will collaborate with local organizations and researchers to test how much nitrogen different species of seaweed remove from the water, measure growth rates of seaweed, and test for various contaminant and pathogen levels within seaweed tissue.
- Identify markets and determine the cost of cultivating different shellfish and seaweed species that could be used for bioextraction. This effort will also evaluate the overall economic viability of nutrient bioextraction operations.



Adelphi University professor examining kelp growth as part of the Hempstead Bay research project.

**For more information about the Nutrient Bioextraction Initiative, please visit <https://on.ny.gov/NutrientBioextraction>.**

**For more information about the Long Island Nitrogen Action Plan (LINAP), please visit [www.dec.ny.gov/lands/103654.html](http://www.dec.ny.gov/lands/103654.html).**

The Nutrient Bioextraction Initiative is a project of the New England Interstate Water Pollution Control Commission 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.

## CONTACT INFORMATION

### Nelle D'Aversa

Environmental Analyst  
Long Island Sound Study, Bioextraction Coordinator

### New York State Department of Environmental Conservation

50 Circle Road, Stony Brook, NY 11790  
P: (631) 380-3317 | F: (631) 444-0424 | [nelle.daversa@dec.ny.gov](mailto:nelle.daversa@dec.ny.gov)  
[www.dec.ny.gov](http://www.dec.ny.gov)