Reduce, Restore, Recover: Little Pond ecosystem's response to sewering

Photo by Poonam Narotam

Cape Cod's population has grown rapidly over the last 70 years, while wastewater infrastructure has not kept pace. As a result, significant amounts of nitrogen have entered local watersheds and downstream estuaries. Excess nitrogen in these delicate ecosystems fuels algal growth, degrades water quality, and leads to habitat loss.

In 2016, the Town of Falmouth installed a sewer system in the Little Pond watershed that was designed to reduce the input of household nitrogen enough to meet the Massachusetts Estuaries Project target for the pond's restoration. Researchers **Ken Foreman** and **Ketil Koop-Jakobson (Marine Biological Laboratory)**, and **Matt Long (Woods Hole Oceanographic Institution)** are assessing how the Little Pond estuary has responded to sewering over the past decade. However, reducing the source of nitrogen does not immediately erase its effects. This study aims to shed light on the indicators and timeline of recovery.

The researchers are evaluating all the ways nutrients enter, move through, and exit the Little Pond estuary through intense and multi-faceted fieldwork. The team is sampling nutrients near the pond's small inlet, where water flows between Little Pond and Vineyard Sound. They're using newly developed sensors to measure the amount of oxygen produced and consumed in the water column, called metabolism. This tells the researchers how much algae is growing, fueled by excess nitrogen.

They're using different tools to measure the metabolism of the benthic zone – the bottom layer of the pond where seagrass, shellfish and other animals live – to analyze this habitat's productivity. Because nutrients have built up in the pond's sediments through a legacy of eutrophication, the team is also assessing the release of those nutrients and examining sediment samples.

The findings of this research will improve our understanding of estuarine recovery from chronic nitrogen loading and help inform future water quality restoration efforts.

Funded by WHOI Sea Grant

WHOI Sea Grant funds research that addresses coastal issues in and around Massachusetts.

Based at Woods Hole Oceanographic Institution, the Sea Grant program encourages environmental stewardship, long-term economic development, and responsible use of Massachusetts' coastal and ocean resources. The program is part of the NOAA-funded National Sea Grant College Program, comprised of 34 programs across the country.

Photo by Ken Foreman

Sea Grant
WOODS HOLE OCEANOGRAPHIC INSTITUTION

SEAGRANT.WHOI.EDU
@WHOISEAGRANT
SEAGRANT@WHOI.EDU