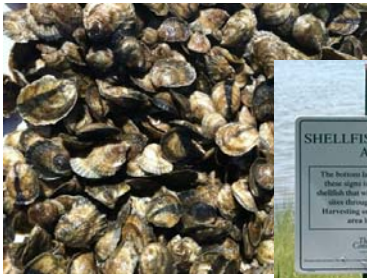




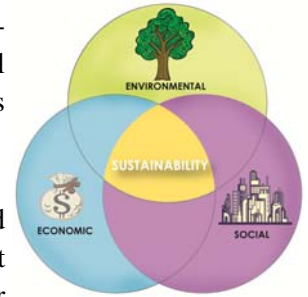
The Narragansett Bay Commission has envisioned a project that will holistically evaluate ecosystem-based sustainable solutions to improve water quality in the upper Narragansett Bay. This project will evaluate “out of the box” solutions to reduce nitrogen loadings and improve dissolved oxygen levels within the Bay and surrounding bodies of water.



Aquaculture, Shellfish Restoration, and Bio-extraction



Shellfish and seaweeds utilize nutrients to live and grow, and through their natural metabolic processes can reduce nutrient concentrations in surrounding waters. Restoring RI's oyster and shellfish population in upper Narragansett Bay to its status in the early 1900's could remove over 100,000 pounds of nitrogen per year once the shellfish are harvested. Aquaculture can assist in this endeavor by transplanting shellfish to restore various populations throughout the estuary, while building RI's green



economy and creating local sustainable jobs. Projects in Falmouth, MA and White Oak, NC are investigating the use of shellfish restoration to meet water quality standards. Similarly, studies and pilot projects to evaluate aquaculture and bio-extraction of non-commercial shellfish species and commercially viable seaweed species are being conducted in Woods Hole, MA and Long Island Sound.



Circulation Improvements



Modification of the Bay hydrodynamics through dam removal, breakwall alteration, or channel creation may help restore natural temperatures & dissolved oxygen, improve flushing, and break up gyres and water column stratification patterns that contribute to water quality impairments. Local examples of such hydro-modifications can be seen in Falmouth and Cotuit, MA where the opening of channels lead to improved flushing of nutrients within estuaries.

Restoration/Creation of Wetlands

Wetlands have been known to provide a value of about \$75,000 per acre due to their ability to improve surrounding water quality and filter runoff. They provide critical habitat to support local biodiversity, enhance long-term water quality, provide storm protection and flood mitigation, and contribute aesthetically to the region. To create or restore wetlands, dredged material, particularly sand, has been incorporated into geotextile (GeoTubes) to make and protect wetlands and islands. These methods were first used in Galveston Bay, TX and have been used many times since. Floating wetlands, piloted in Baltimore, MD are being used to boost nitrogen removal in an effort to make the inner harbor swimmable and fishable by 2020.



Fertilizer Controls

Fertilizer is a large source of nitrogen to the Bay, mainly through stormwater runoff. Several states throughout the country have recently enacted legislation to gain better control on fertilizer use and subsequent entry to waterways. For example, New York signed a fertilizer law in January 2012, Florida instated laws and requires licenses and specialized labeling for fertilizer, and Maryland requires professional certification and has particular directions for application. Watershed-wide fertilizer education on proper uses, timing, and application regulations could go a long way in improving water quality in Rhode Island.

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