

Inventory and Monitoring Program Northeast Coastal and Barrier Network



Assateague Island National Seashore
Cape Cod National Seashore
George Washington's Birthplace NM

Colonial National Historical Park
Thomas Stone National Historic Site

Gateway National Recreation Area
Fire Island National Seashore
Sagamore Hill National Historic Site

MONITORING NUTRIENT ENRICHMENT

Estuaries are among the most productive ecosystems on earth. The tidal, sheltered waters of estuaries support unique communities of plants and animals, specifically adapted for life at the margin of the sea. Many different habitat types are found in and around estuaries, including shallow open waters, salt marshes, swamps, sandy beaches, mud and sand flats, rocky shores, oyster reefs, mangrove forests, river deltas, and tidal pools.



Estuary with seagrass at Cape Cod National Seashore

Photo by Blaine Kopp

Threats to estuaries include, natural disturbances (e.g. storms, sea level rise), direct impacts of human activities (e.g. fishing, boating, dock construction), and indirect effects of watershed development, and disasters (e.g. oil and toxic spills). Over the years, scientific studies have demonstrated that land clearing, fertilizer use, sewage discharge, and fossil fuel combustion have accelerated nutrient enrichment of our coastal ecosystems. Although estuaries can generally assimilate some degree of nutrient enrichment without major ecological ramifications, excessive inputs typically leads to dense blooms of phytoplankton and fast-growing macroalgae which in turn create loss of seagrass, and decreased oxygen availability in sediments and bottom waters. Cascading effects include changes in the species composition and abundance of invertebrates, decline in fish and wildlife habitat value, and the collapse of fin- and shellfish stocks.



Measuring Dissolved Oxygen at FIMS

Photo by Charles Roman

Within the Northeast region, the National Park Service protects a total of about 1,891 square kilometers of land between Maine and Virginia. Approximately one quarter of this land is submerged as estuaries. Much of the watershed area of these coastal ecosystems lies outside park boundaries, making them subject to intense development pressures with the potential to dramatically increase nutrient loading in park waters. Because of the threat to these delicate systems, park managers have repeatedly identified coastal water quality as one of their highest priority issues.

Protecting the ecological integrity of park estuaries depends on detecting changes in nutrient loads and determining if nutrient inputs are exceeding thresholds that might result in degradation of the structure and function of these systems. The NCBN program will be monitoring the condition of park estuaries through the implementation of both estuarine water quality and seagrass monitoring. The goal of this monitoring effort is to assess how park estuarine natural resources are affected by changing nutrient inputs. In cooperation with the United States Geological Survey, the Network has developed a protocol to measure a variety of water quality variables such as dissolved oxygen levels, salinity and chlorophyll a concentrations, as well as the condition and distribution of seagrass, identified as key indicators of eutrophication. Water quality sampling will be conducted annually-biennial during a summer index period at Assateague Island National Seashore, Colonial National Historical Park, George Washington's Birthplace National Monument, Gateway National Recreation Area, Fire Island National Seashore and Cape Cod National Seashore.



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