

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

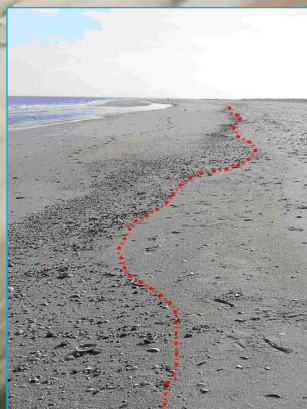
MONITORING SHORELINE CHANGE

A management concern of the NCBN coastal parks is the magnitude and rate of change in the position of the shoreline. Changes in the shoreline occur in response to seasonal weather patterns and storm events, but are also affected by sea-level rise and increased manipulations by humans, such as dredging, jetty creation, and beach and dune manipulation.

Shoreline change can impact the structure and function of park natural resources, including the extent and distribution of specific wildlife habitats, as well as groundwater quality and quantity. The dynamic nature of the shoreline also poses challenges to the administration and protection of cultural resources and park infrastructure. To better describe the condition of these coastal areas and to make effective management decisions, resource managers need accurate, long-term information about the temporal and spatial patterns of shoreline change within a park.



Shoreline monitoring with GPS
Photo by NPS staff



Neap high tide swash line
Photo by NPS staff

The NCBN has partnered with cooperators at Rutgers University's Institute of Marine and Coastal Sciences to develop methods for tracking shoreline change by using Global Positioning Systems (GPS) to map the position of the shoreline over time. The focus of this program is to characterize the variability of the shoreline's position and to identify seasonal, annual, and long-term trends.

GPS surveys are conducted twice per year—in the spring when the beach is at its most narrow due to the erosional effects of winter storms, and in the fall when the beach has recovered and is at its widest. Surveys are conducted by mounting the GPS unit on a four-wheel drive vehicle and driving at a relatively constant speed along the neap high tide swash line. GPS surveys can map the shoreline with an accuracy of less than a meter.

Multiple shoreline features are then brought into a GIS, and shoreline position is calculated using the Digital Shoreline Analysis System (DSAS) developed by the USGS. Statistical measures of the changes in position of points along the shoreline over time can then be used to describe the overall dimensions and rates of change and to identify areas of significant erosion or deposition where management actions may be warranted.

The NCBN Ocean Shoreline Position Monitoring Protocol represents an important component of the Network's overall Geomorphological Monitoring Program. This program will provide resource managers with a better understanding of the condition of coastal and marine systems within the parks, allowing managers to make more scientifically informed, effective decisions.

This protocol is currently being implemented in the following NCBN parks:

- Assateague Island National Seashore
- Cape Cod National Seashore
- Fire Island National Seashore
- Gateway National Recreation Area



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