



Northeast Coastal and Barrier Network

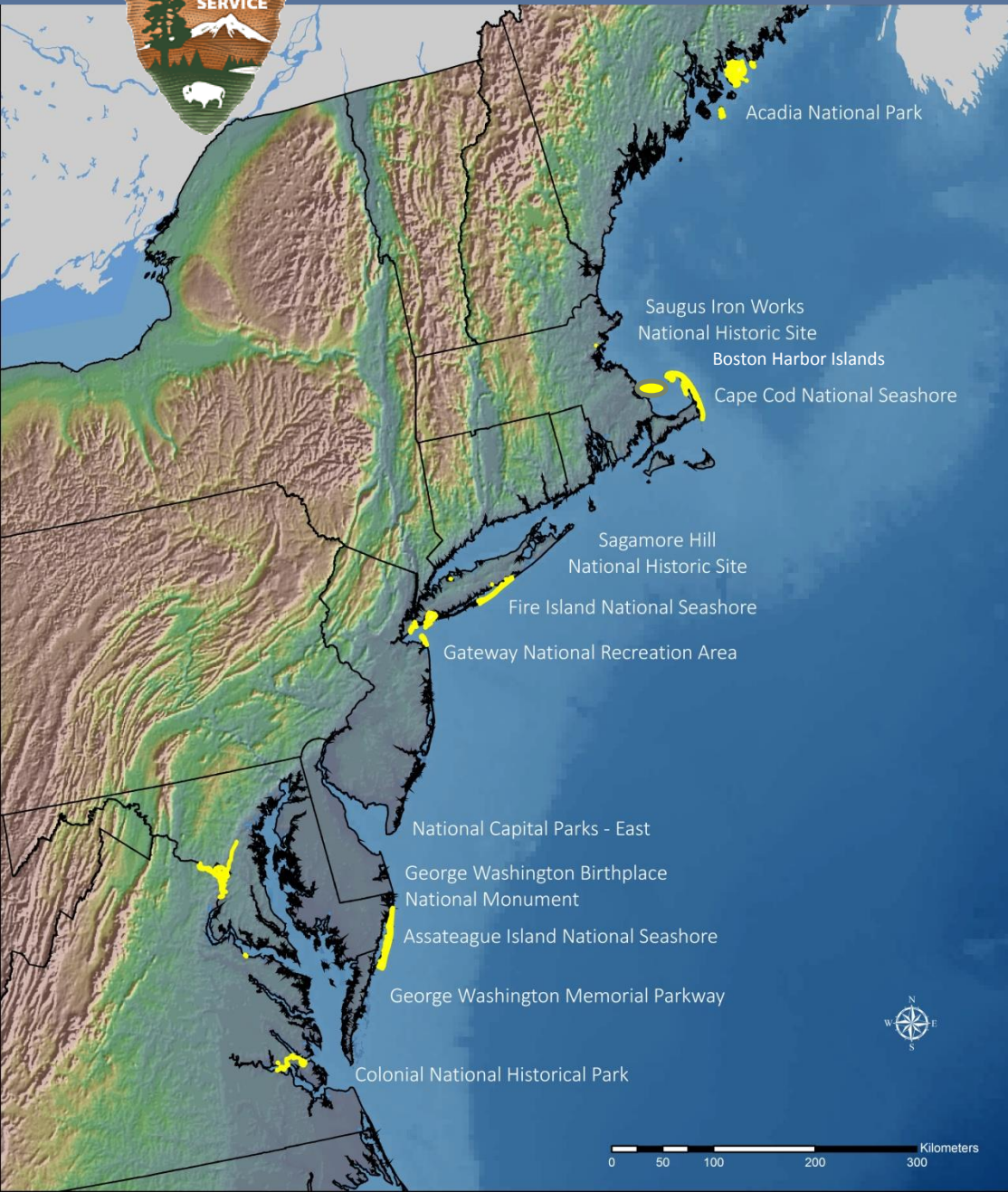
NPS Inventory and Monitoring Program

**Metrics and Protocols—
Monitoring Tidal Marsh
Condition
Update from the NPS**

**Tidal Marsh Resiliency Coordination Workshop
U.S. Fish & Wildlife Service, Hadley, MA
Dec 10, 2015**



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■ Northeast Region Inventory and Monitoring Program (I&M)

■ Salt marsh condition monitored at 10 coastal parks from Maine to Virginia





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I&M Monitoring Program Salt Marsh Indicators

Marsh Nekton:

- Methods adapted from, “*Monitoring nekton in shallow estuarine habitats*”, developed by Raposa and Roman in 2001

Throw traps and/or ditch nets

Marsh Vegetation:

- Methods adapted from, “*Monitoring salt marsh vegetation: a protocol for the long-term Coastal Ecosystem Monitoring Program at Cape Cod National Seashore*”, developed by Roman, James-Pirri, and Heltshe in 2001

Braun Blanquet Cover Scale

Sediment Elevation Tables (SET):

- Protocol being developed by NPS (Jim Lynch), USGS (Don Cahoon) and NOAA (Philippe Hensel). Will be NPS Inventory and Monitoring protocol

Marsh Birds:

- NCBN developing protocol to meet NPS I&M program standards--method adapted from, Saltmarsh Habitat & Avian Research Program (SHARP).

Monitoring co-located on NPS marsh sites





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Other NCBN Monitoring:

- Estuarine water quality
- Seagrass condition and distribution
- Coastal shoreline position
- Beach/dune topography
- Forest health





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Vegetation and Nekton Monitoring

- Nine--5-10 hectare marsh sites/park
- 50 sampling points/marsh site
- Sampling occurs every two years



Metrics:

- Vegetation species percent cover and composition
- Nekton species composition, abundance, and size distribution

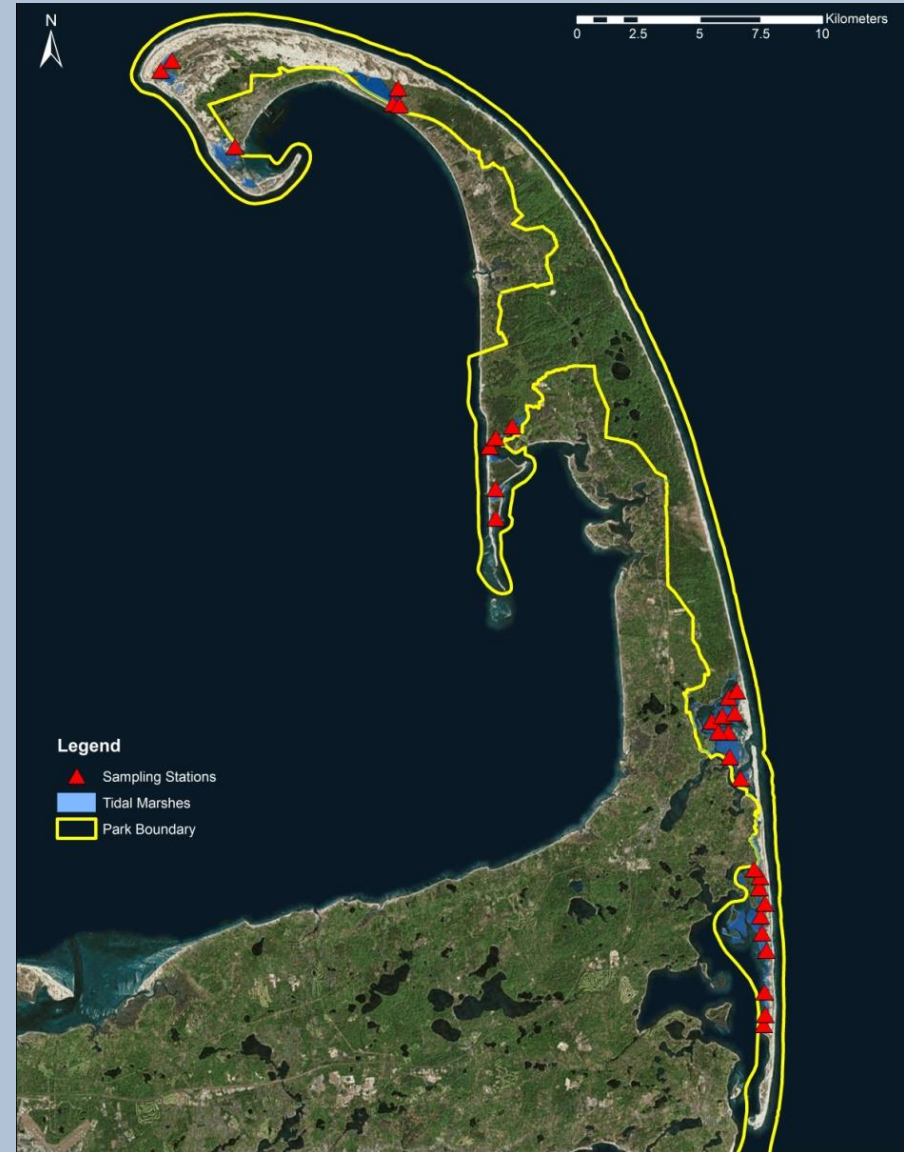




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Marsh Bird Monitoring

- Colonial NHS, Assateague Island NS, Gateway NRA, Fire Island NS, Cape Cod NS
- Based on the SHARP program
- Higher resolution sampling design than SHARP, 50-60 points per/park
- Annual monitoring



Cape Cod NS Marsh Bird Monitoring Points



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Sediment Elevation Monitoring

- 120 SETs across 12 parks
- Data collection 2 x/yr
- Co-located with other sampling
- Continuous water level data associated with SETs

Metrics:

- Relative elevation
- Sediment accretion
- Shallow subsidence





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Hurricane Sandy NPS Salt Marsh Resiliency Project



- 38 marsh sites-across four parks (Cape Cod, Fire Island, Gateway, Assateague)
- All I&M Long-term monitoring marshes and other select marshes
- RTK Elevations collected on a 20-m grid for each marsh
- Vegetation-Braun Blanquet 1-m² plots on a 20-m grid for each marsh
- Water level, 10-20 loggers/park deployed for 12 months or more
- Assuring permanent tide stations and calculated tidal datums for each park (NOAA and USGS partners)
- Modeling following data collection - Jim Morris



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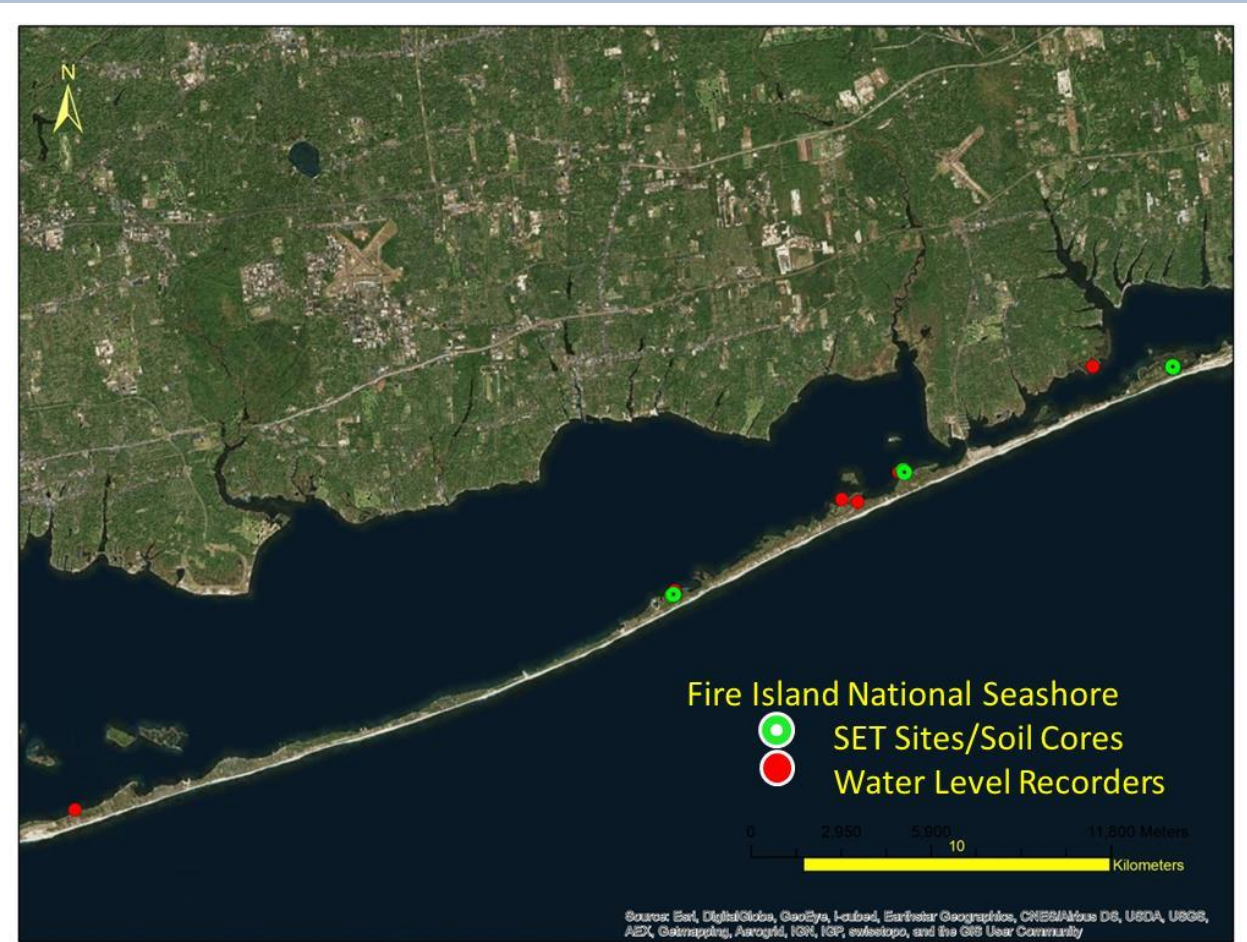
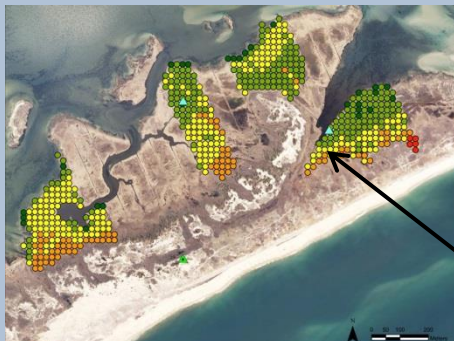
Hurricane Sandy NPS Salt Marsh Resiliency Project

Example of Data Collection Effort

Fire Island National Seashore

- 11 Salt marsh sites
- 83 total hectares
- 1926 Elevation points
- 1926 Vegetation plots
- 7 water level loggers
- 9 SETs with associated soil core samples at each

New USGS **Tide Gauge** and **Weather Station** Being Installed Dec 2015-Fire Island NS at Watch Hill Marina

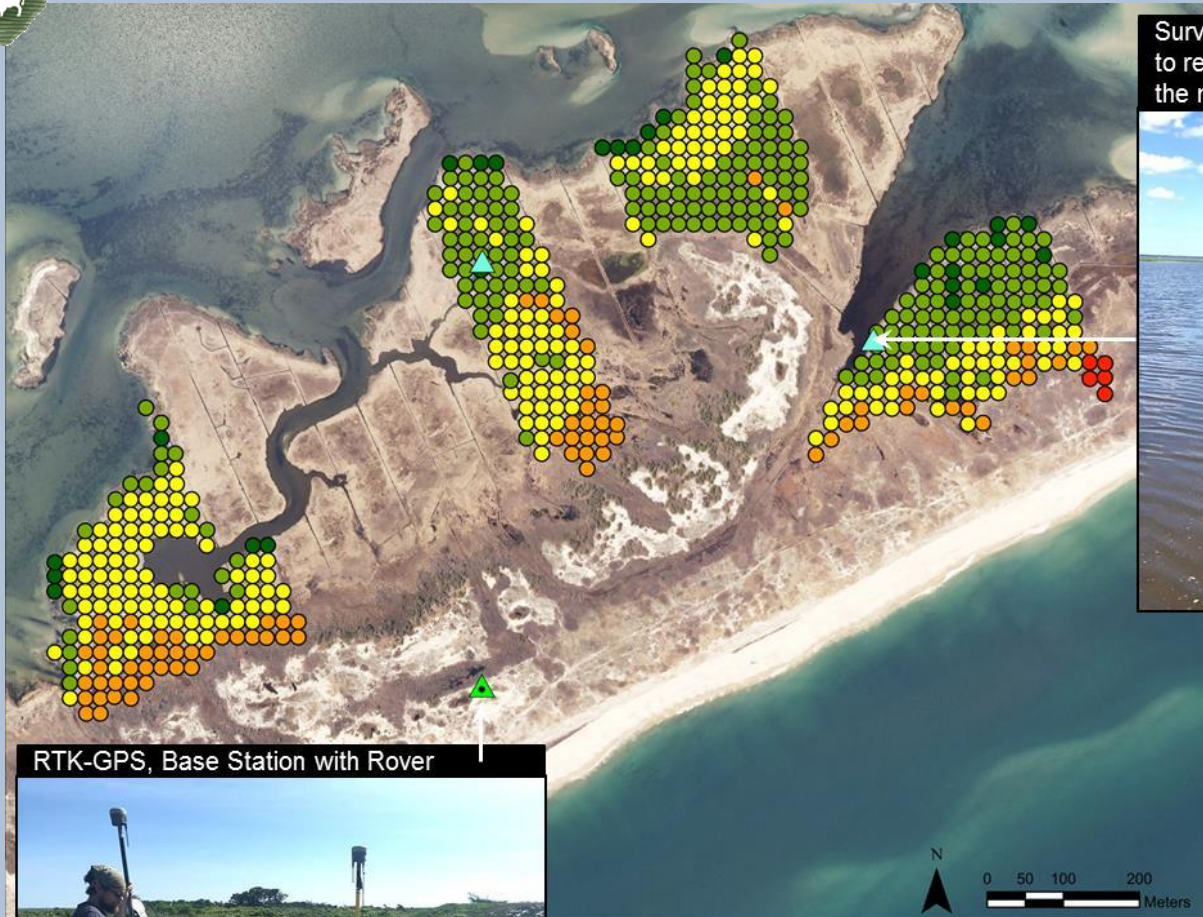


Example of 20 m grid marsh elevation points



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Elevation and vegetation grid points



Surveying Water Level Logger to relate local tidal datums with the marsh surface

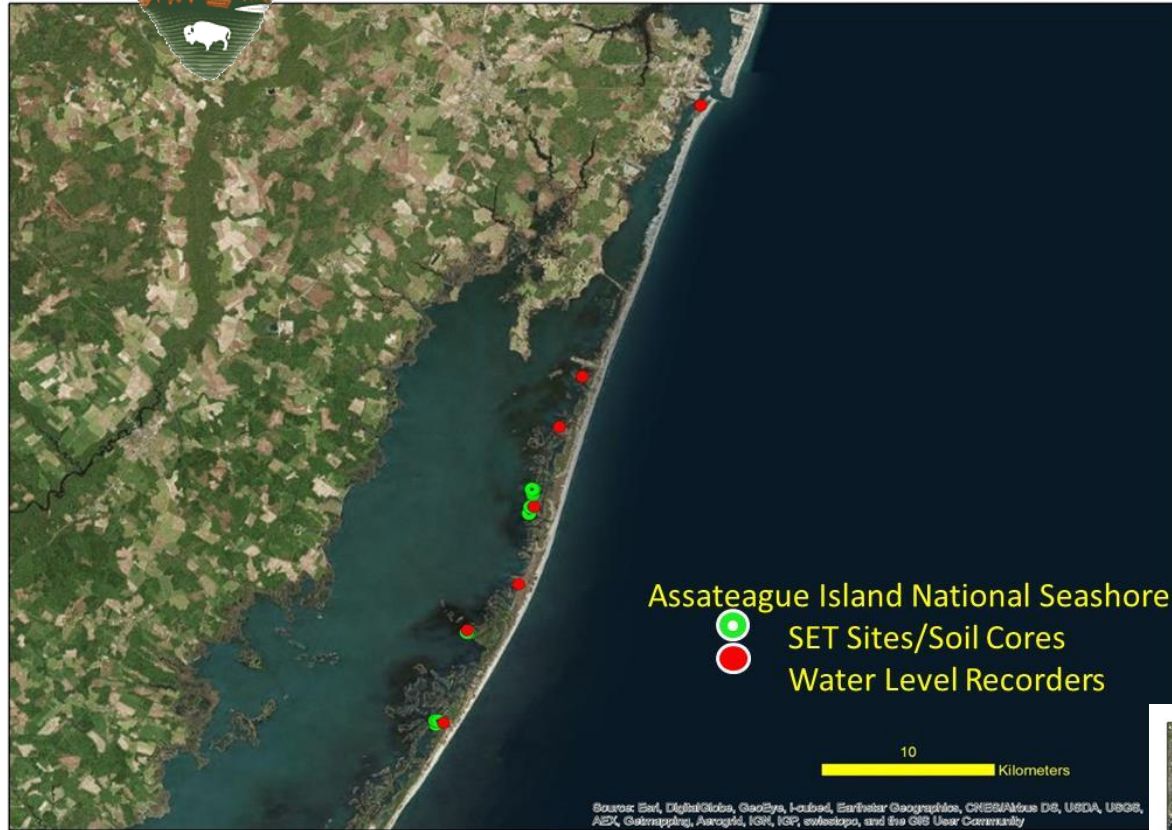


RTK-GPS, Base Station with Rover





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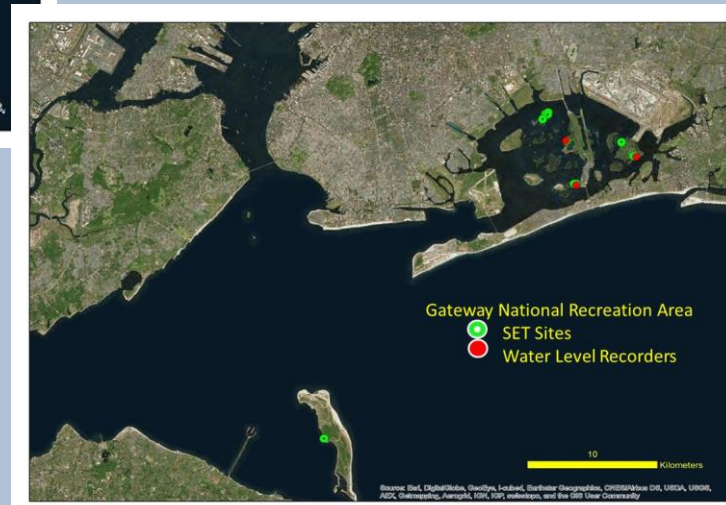


Assateague Island NS

- 16 salt marsh sites
- 98 total hectares
- 2,462 elevation points and vegetation plots
- 8 water level loggers
- 16 SETs with associated soil core samples at each

Gateway National Recreation Area

- 24 SETs
- 3 water level loggers
- Elevation rid data
- Vegetation plot data

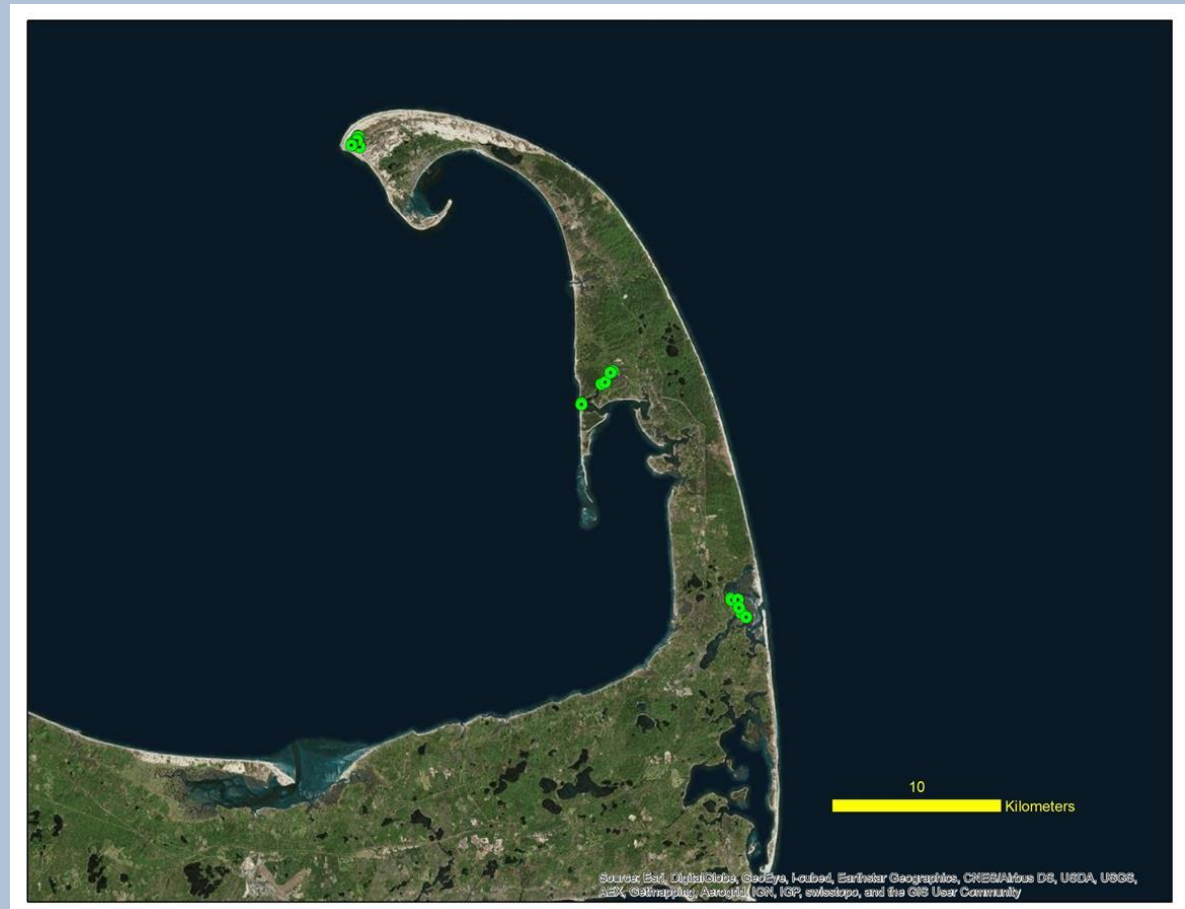




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Cape Cod NS

- 8 salt marsh sites
- 406 total hectares
- 9,635 elevation points
- 452 vegetation plots
- 15 water level loggers
- 22 (1998-2015) SETs, with associated sediment cores
 - 9 SETs added 2014 and 2015





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Other Hurricane Sandy Projects

<http://arcg.is/1KY1EpT>

National Park Service Hurricane Sandy Coastal Resiliency Projects

NE Coastal Parks & Hurricane Sandy

High Resolution Elevation Data

Ecological Impacts of Breaches

Submerged Habitat Mapping

Jamaica Bay Science

Resource Briefs

Personnel Profiles

Photo Stories

Hurricane Sandy, October 2012

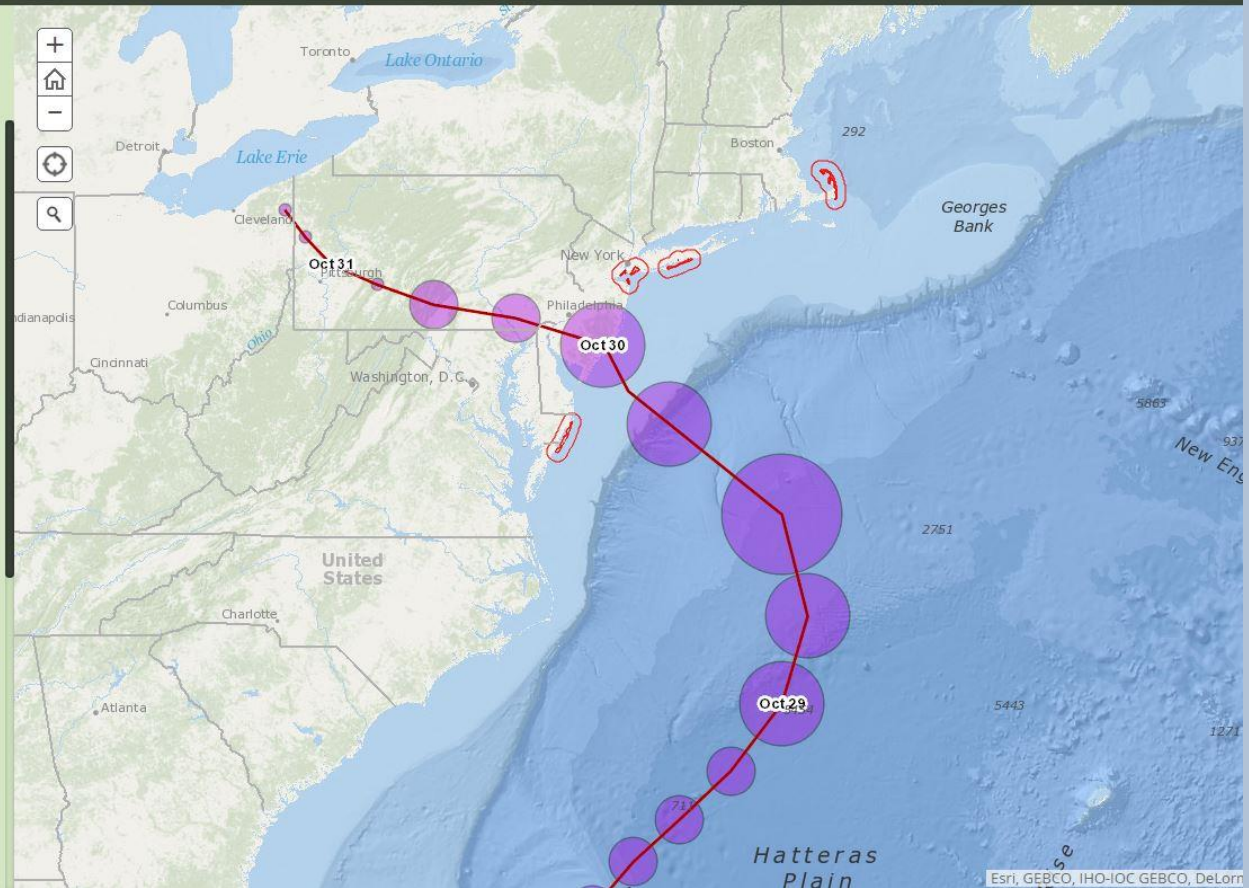


The following four National Parks along the northeastern U.S. coast were significantly affected by Hurricane Sandy, which made landfall in New Jersey on October 29, 2012:

- [*Assateague Island National Seashore, VA & MD*](#)
- [*Cape Cod National Seashore, MA*](#)
- [*Fire Island National Seashore, NY*](#)
- [*Gateway National Recreation Area, NY & NJ*](#)

These four parks (see red areas on map to right) received funding from the Department of the Interior and are conducting scientific research to better understand the effects of the hurricane, the resilience of natural systems, and how to better prepare for future storms.

The tabs at the top of the page allow you to explore different topics related to Hurricane Sandy science in these parks. After clicking on a tab, you can scroll down to explore different sub-sections of that tab's theme, and click on text links to view related reports, web sites





Northeast Coastal and Barrier Network

Contact information:

Sara Stevens

Northeast Coastal and Barrier Network
Program Manager
National Park Service
University of Rhode Island
Coastal Institute in Kingston, #102
1 Greenhouse Road
Kingston, RI 02881
sara_stevens@nps.gov
401-874-4548

Holly Bayley

Cape Cod National Seashore
Coastal Resiliency Specialist &
Data Manager
National Park Service
99 Marconi Site Road
Wellfleet, MA 02667
holly_bayley@nps.gov
508-487-3262 ext. 0502