Synthesizing Monitoring Data to Improve Coastal Wetland Management Across New England

Project Location

Great Bay National Estuarine Research Reserve, New Hampshire
Narragansett Bay National Estuarine Research Reserve, Rhode Island
Waquoit Bay National Estuarine Research Reserve, Massachusetts
Wells National Estuarine Research Reserve, Maine

Project Duration

September 1, 2018 to August 31, 2019

Project Lead

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Project Type

Catalyst – Targeted investment for advancing collaborative science

Project Collaborators

- Great Bay National Estuarine Research Reserve
- Narragansett Bay National Estuarine Research Reserve
- University of New Hampshire
- Waquoit Bay National Estuarine Research Reserve
- Wells National Estuarine Research Reserve

Overview

Sea level rise and climate change present major threats to salt marshes nationwide. In an effort to better track and understand their impacts on marsh vegetation and sediment accretion, the National Estuarine Research Reserve System has established Sentinel Sites at reserves around the country. However, most reserves have not yet analyzed their Sentinel Site data, and there has been no attempt to conduct regional syntheses, despite the fact that regional-scale processes can strongly influence marsh vulnerability to sea level rise.

This project is synthesizing Sentinel Site data for four New England reserves (Great Bay, Narragansett, Waquoit Bay, and Wells), which have individually been monitoring salt marsh vegetation and elevation changes since at least 2011. Using Sentinel Site data sets, the team will develop statistics-ready data packages linking vegetation change with surface elevation and other data, including output from an inundation tool. The New England reserves and coastal managers will be equipped with new information that can inform and improve the management, protection, and restoration of salt marshes. The project will also improve Sentinel Site protocols and establish a methodology for analysis of marsh condition that can be utilized by other reserves and coastal managers nationwide.

Anticipated Benefits

- New England reserves will receive new information about the impact of sea level rise and climate change on marsh vegetation and sediment accretion that can assist them in their efforts to plan for salt marsh protection, restoration, and sustainability.
- Regional coastal resource managers may incorporate parameters and techniques developed by the project into their monitoring protocols to help them assess salt marsh change. These analytical tools may inform policy and management strategies to improve salt marsh management in New England.
- Templates and statistical approaches developed to analyze the regional Sentinel Site data may be adopted by other research reserve system regions or working groups. This work may also identify discrepancies in data handling and collection for marsh vegetation monitoring among reserves, as well as inform the development of national protocols for new biomonitoring components.

Project Approach

To establish a shared understanding of project goals and confirm the range of end user needs, the project team will host a kickoff meeting with team members from each participating reserve and local end users. The team will work with each of the four New England reserves to organize and prepare their Sentinel Site data for analysis and synthesis, reviewing their methods for data collection and reformatting data as needed to ensure uniformity among reserves. They will conduct a variety of univariate and multivariate statistical analyses of marsh vegetation, accretion, and elevation data and create parameters to allow for comparisons across reserves. An interim meeting will be held to review progress and elicit feedback from end users. Field data, calculated metrics, and detailed descriptions of the derivation of each metric will be compiled into statistics-ready templates (compatible with PRIMER and R) and will be shared with end users in a final workshop.

Targeted End Users and Anticipated Products

- The project team will produce data packages for each participating reserve containing relevant Sentinel Site data; a "How to" report detailing the methodologies and templates used to convert data into databases ready for statistical analyses; and a final report detailing project methods, approach, and findings.
- Representatives from the stewardship and research sectors of the four New England reserves comprise one group of end users, and expect that the results of the analyses will inform restoration and approaches to mitigate climate change impacts at the reserves.
- Coastal managers from Maine, New Hampshire, Massachusetts, and Rhode Island coastal management agencies comprise a second group of end users. They will gain an increased understanding of salt marsh response to sea level rise from this project, which will inform their states' respective salt marsh restoration, protection, and sustainability strategies.

About the Science Collaborative

The National Estuarine Research Reserve System's Science Collaborative supports collaborative research that addresses coastal management problems important to the reserves. The Science Collaborative is managed by the University of Michigan's Water Center through a cooperative agreement with the National Oceanic and Atmospheric Administration (NOAA). Funding for the research reserves and this program comes from NOAA. Learn more at coast.noaa.gov/nerrs or graham.umich.edu/water/nerrs.