
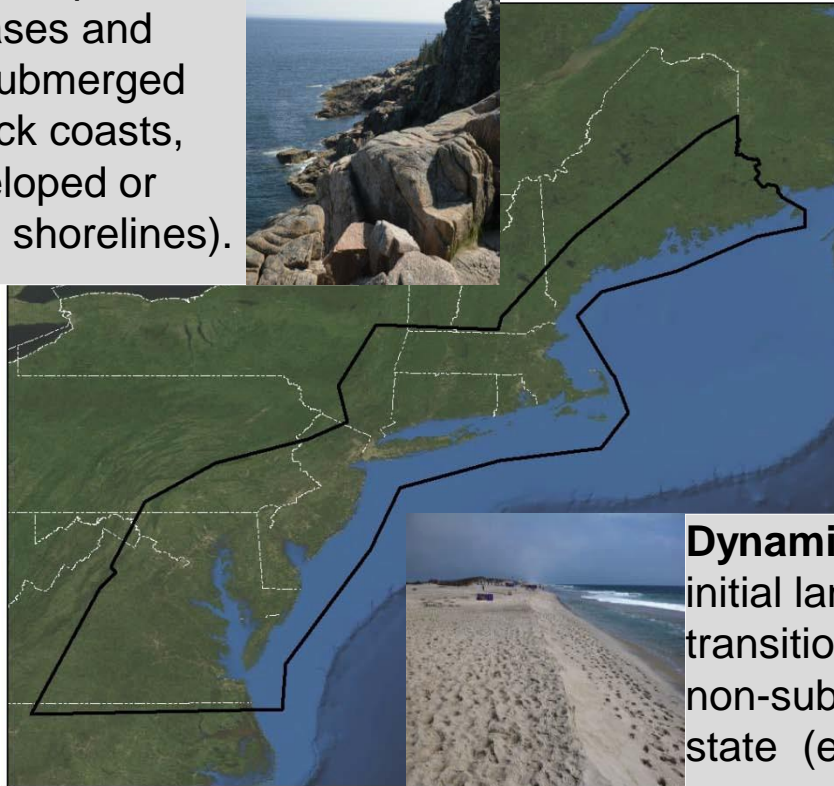



Quantifying the coastal response to sea-level rise

Objective: Predict coastal landscape response to sea-level rise for next 85 years throughout the Northeast region



Inundate: land cannot change or adapt to sea level increases and becomes submerged (e.g. bedrock coasts, highly developed or engineered shorelines).

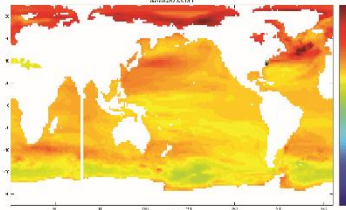


Dynamic: Maintain initial land class state or transition to another non-submerged state (e.g. beaches, unconsolidated cliffs, barrier islands, marshes, uplands).

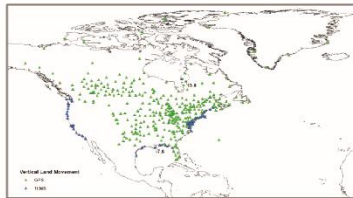


Modeling coastal response to sea-level rise

Inputs



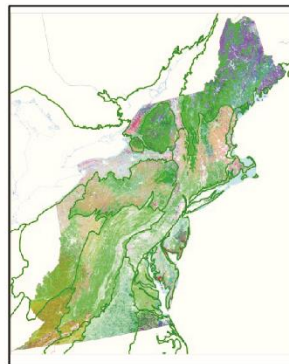
Sea-Level Projections



Vertical Land Movement



Elevation



Land Cover

Probabilistic Outcomes



Adjusted Land Elevation



Coastal Response Type:
Dynamic vs. Inundation

Visualizing the coastal response to sea-level rise



Data Visualization

Coastal Response Likelihood

The coastal response to sea-level rise is assessed for the northeastern U.S. using sea-level projections, vertical land movement rates and elevation and land-cover data. The landscape response to sea-level rise is presented on maps showing the likelihood of a dynamic landscape response. A higher dynamic response likelihood suggests the ability for a land cover type to adapt to rising sea-level, whereas a lower dynamic response likelihood (less than 50%) indicates the potential for inundation.

Overview

Legend

Dynamic Response Likelihood*

Unlikely (0-33%)
About as likely as not (33-66%)
Likely (66-99%)
Very likely (99-100%)

Land Class	Unlikely (0-33%)	About as likely as not (33-66%)	Likely (66-99%)	Very likely (99-100%)
Subaqueous				
Marsh				
Beach				
Rocky				
Forest				
Developed				

CLEAR

Inundate Dynamic

Model Predictions

Additional Information

Decade

2020s 2030s 2050s 2080s

Base layer



Woods Hole Coastal and Marine Science Center

[Woods Hole Coastal and Marine Science Center](#) > Coastal Landscape Response to Sea-Level Rise Assessment for the Northeastern United States

Coastal Landscape Response to Sea-Level Rise Assessment for the Northeastern United States

- Home
- Overview
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- Data ▾
- Publications and References
- Contacts



As part of the USGS [Sea-Level Rise Hazards and Decision-Support project](#), this assessment seeks to predict the response to sea-level rise across the coastal landscape under a range of future scenarios by evaluating the likelihood of inundation as well as dynamic coastal change. The research is being conducted in conjunction with resource managers and decision makers from federal and state agencies, and non-governmental organizations and utilizes a structured decision-making approach to ensure research outcomes meet decision making needs.

APPROACH



Landscape Change Predictions

The coastal response to sea-level rise is assessed for the northeastern U.S. using sea-level projections, vertical land movement rates, and elevation and land cover data. The landscape response to sea-level rise is presented on maps showing probabilistic predictions of the level of potential landscape submergence and the likelihood of landscape change.



Decision-Support Tools

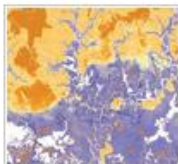
Tools allow users to explore and identify which areas may be best-suited to meet their land adaptation or management requirements for a variety of planning horizons. Coming soon!



Structured Decision Making

Structured decision making (SDM) is a formalized approach to problem solving that requires consideration of the objectives, management options, alternative actions, and tradeoffs related to the decision problem from the outset. Outcomes from an SDM workshop were used to inform coastal response model development at the beginning of this project to ensure predictions can be applied to specific land and resource management objectives.

DATA



Datasets

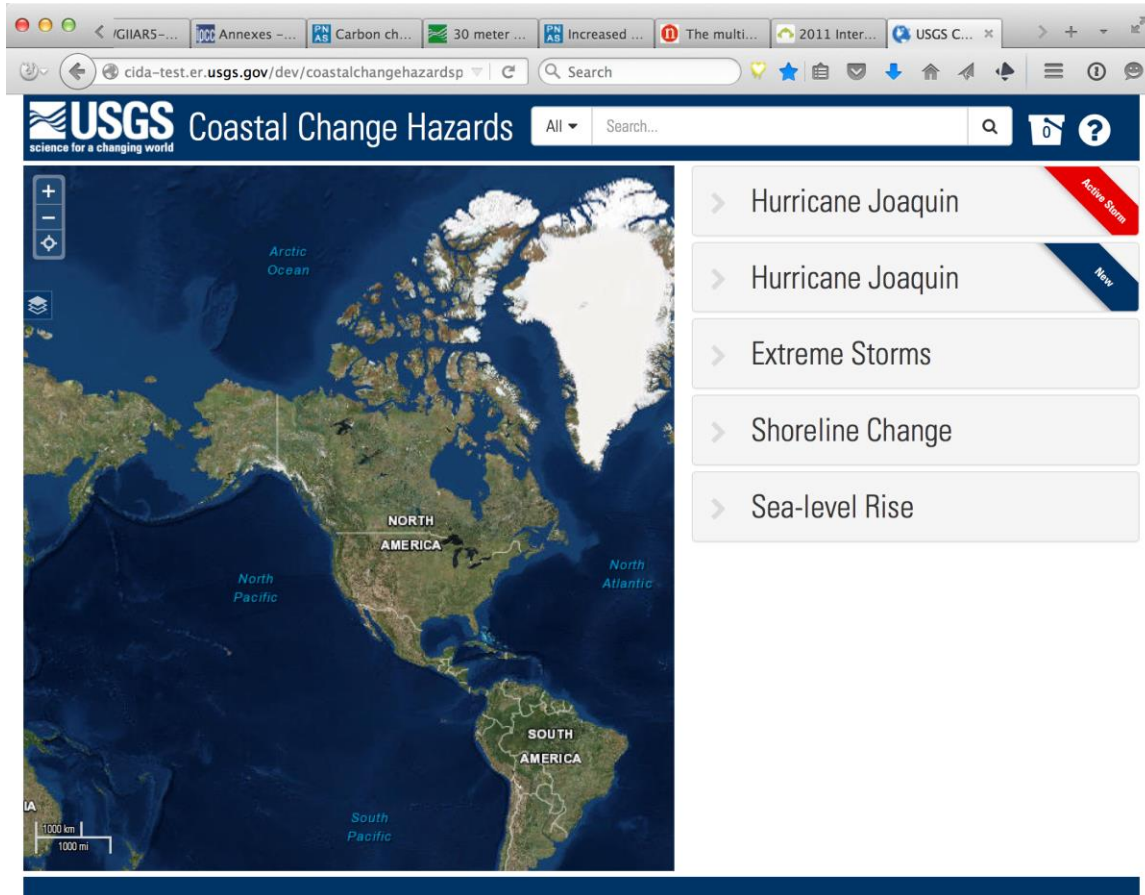
Landscape change predictions for the 2020s, 2030s, 2050s, and 2080s.

ONLINE DATA OR MULTI-MEDIA

- [Adjusted Elevation](#)
- [Adjusted Elevation Probability](#)
- [Coastal Response Type Likelihood](#)

USGS Coastal Change Hazards Portal

Objective: provide one-stop portal to facilitate access to and application of USGS Coastal Change Hazards knowledge (publications, assessments), data, and tools



Requirements

- **Include storm, historical shoreline change (erosion) and sea-level rise assessments and data**
- **Visualization tool for near-real-time storm impact probability assessment**
- **Interactive decision support tools for coastal change hazards**

USGS Coastal Change Hazards Portal

- Products are easily searchable and shareable
- Interactive tools integrate across time, space, and hazards
- Others can build products that support their particular requirements

The screenshot shows the desktop version of the USGS Coastal Change Hazards Portal. The page title is "Post-storm shoreline positions and dune elevations – Northeast Atlantic Coast, Hurricane Sandy, 2012". On the left, there is an "Action Center" with buttons for "Return To Map", "Add to Your Bucket", "Print Snapshot", "Map Services", "Download Dataset", and "Share This Info". The main content area includes a "Summary" section with text about the National Assessment of Coastal Change Hazards (NACCH) project and a "Summary" section with text about the National Assessment of Coastal Change Hazards (NACCH) project. A blue callout box highlights the text: "Explore available services that can be added to your own or other web-based mapping applications".

The screenshot shows the desktop version of the USGS Coastal Change Hazards Portal with a map view. The map displays historical shoreline positions for open-ocean, sandy shorelines of Delaware, Maryland, and Virginia. A legend indicates the years: 2000 (red), 1997 (orange), 1999 (yellow), 1980 (green), 1979 (blue), and 1978 (purple). The map includes labels for various locations such as Atlantic, Sholly Bay, Wetts Bay, Assawoman, Bagurus Bay, Walllops Island, and Tom's Cove. A scale bar shows 7 km and 1 mi. The right sidebar contains a navigation menu with "Hurricane Joaquin", "Extreme Storms", "Shoreline Change", and "Sea-level Rise". The "Shoreline Change" section is expanded, showing "Delmarva and southern Virginia Shorelines" and "Compilation of open-ocean, sandy shorelines for Delaware, Maryland and Virginia." Below this, there are buttons for "More Info", "Zoom To", and "Add To Bucket", and a section for "Explore Contents" with links to "Historical locations of shorelines in DE, MD and part of VA" and "Historical locations of shorelines in southern VA".

The screenshot shows the mobile version of the USGS Coastal Change Hazards Portal. The page title is "USGS CCH". The map displays historical shoreline positions for open-ocean, sandy shorelines of Delaware, Maryland, and Virginia. A legend indicates the years: 2000 (red), 1997 (orange), 1999 (yellow), 1980 (green), 1979 (blue), and 1978 (purple). The map includes labels for various locations such as Atlantic, Sholly Bay, Wetts Bay, Assawoman, Bagurus Bay, Walllops Island, and Tom's Cove. A scale bar shows 200 km and 100 mi. The right sidebar contains a navigation menu with "Hurricane Joaquin", "Extreme Storms", "Shoreline Change", and "Sea-level Rise". The "Shoreline Change" section is expanded, showing "Delmarva and southern Virginia Shorelines" and "Compilation of open-ocean, sandy shorelines for Delaware, Maryland and Virginia." Below this, there are buttons for "More Info", "Zoom To", and "Add To Bucket", and a section for "Explore Contents" with links to "Historical locations of shorelines in DE, MD and part of VA" and "Historical locations of shorelines in southern VA".



National Assessment of Coastal Change Hazards

Integration across relevant time scales and topics

DATA

- Raw
- Derived
- Data management

KNOWLEDGE

- Research
- Assessments
- Gaps

TOOLS

- Morphology extraction
- Trend analysis
- Vulnerability models

PORTAL

data
tools
assessments

