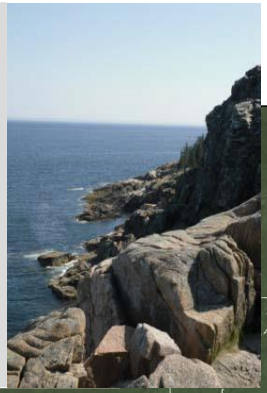
# Quantifying the coastal response to sea-level rise

**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).



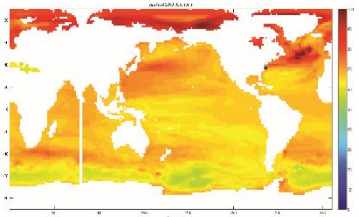




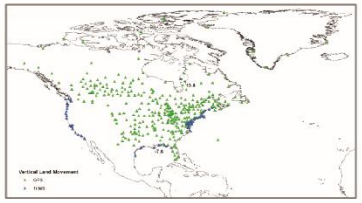
**Dynamic:** Maintain initial land class state or transition to another non-submerged state (e.g. beaches, unconsolidated cliffs, barrier islands, marshes, uplands).

# Modeling coastal response to sea-level rise

Inputs

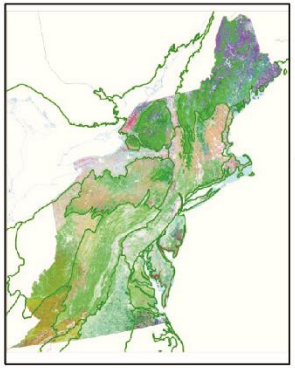


Sea-Level Projections



Vertical Land Movement

Elevation



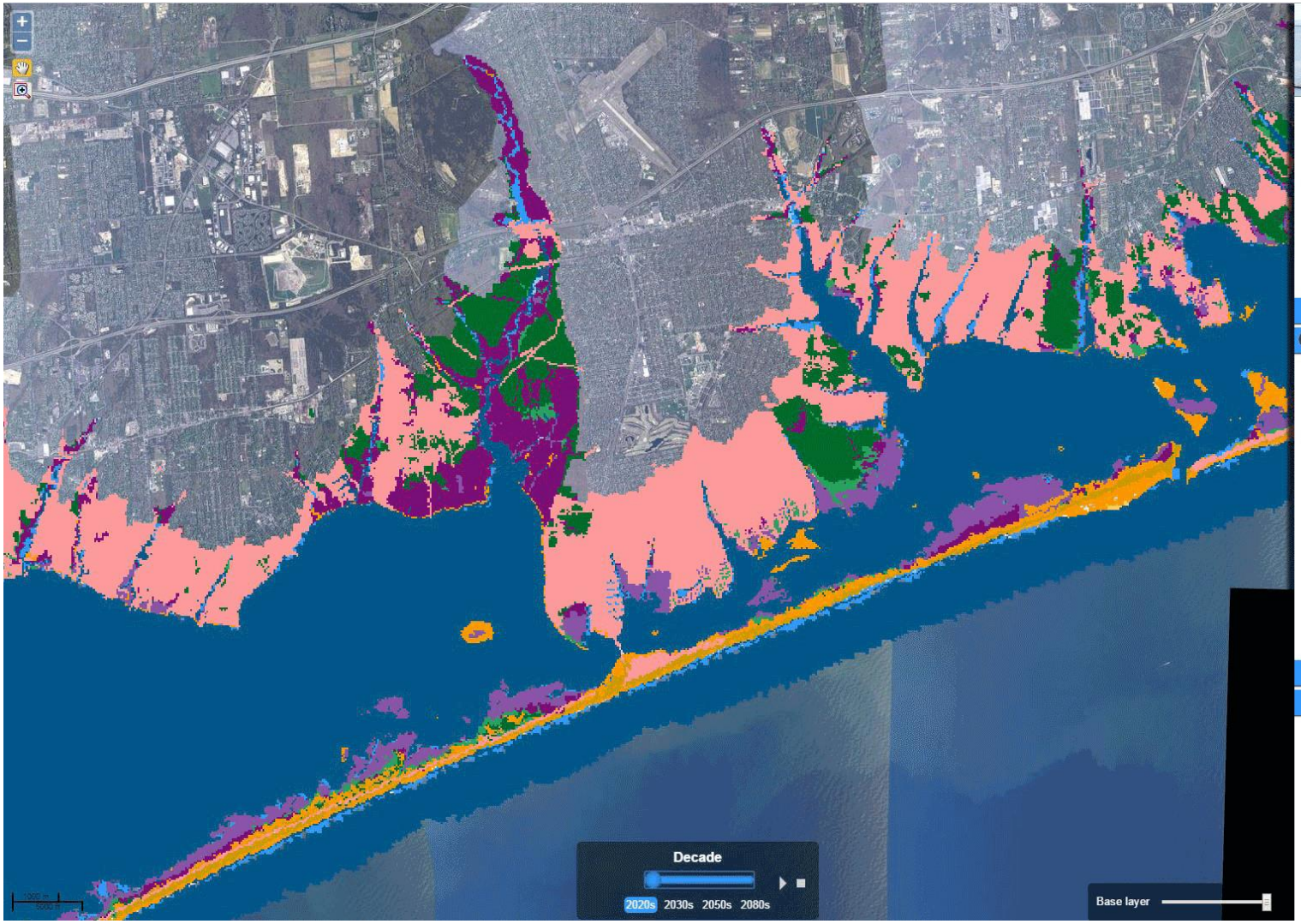
Land Cover

Probabilistic Outcomes

Adjusted Land Elevation

Coastal Response Type:
Dynamic vs. Inundation

# Visualizing the coastal response to sea-level rise

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**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 (66-90%) | Very likely (90-100%)

Land Class: Subaqueous, Marsh, Beach, Rocky, Forest, Developed

CLEAR

Inundate — Dynamic

Model Predictions

Additional Information

(DRAFT not for citation; Lentz et al., in development)

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## Woods Hole Coastal and Marine Science Center



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



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.

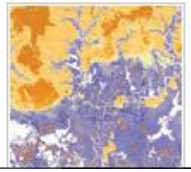
### Decision-Support Tools

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

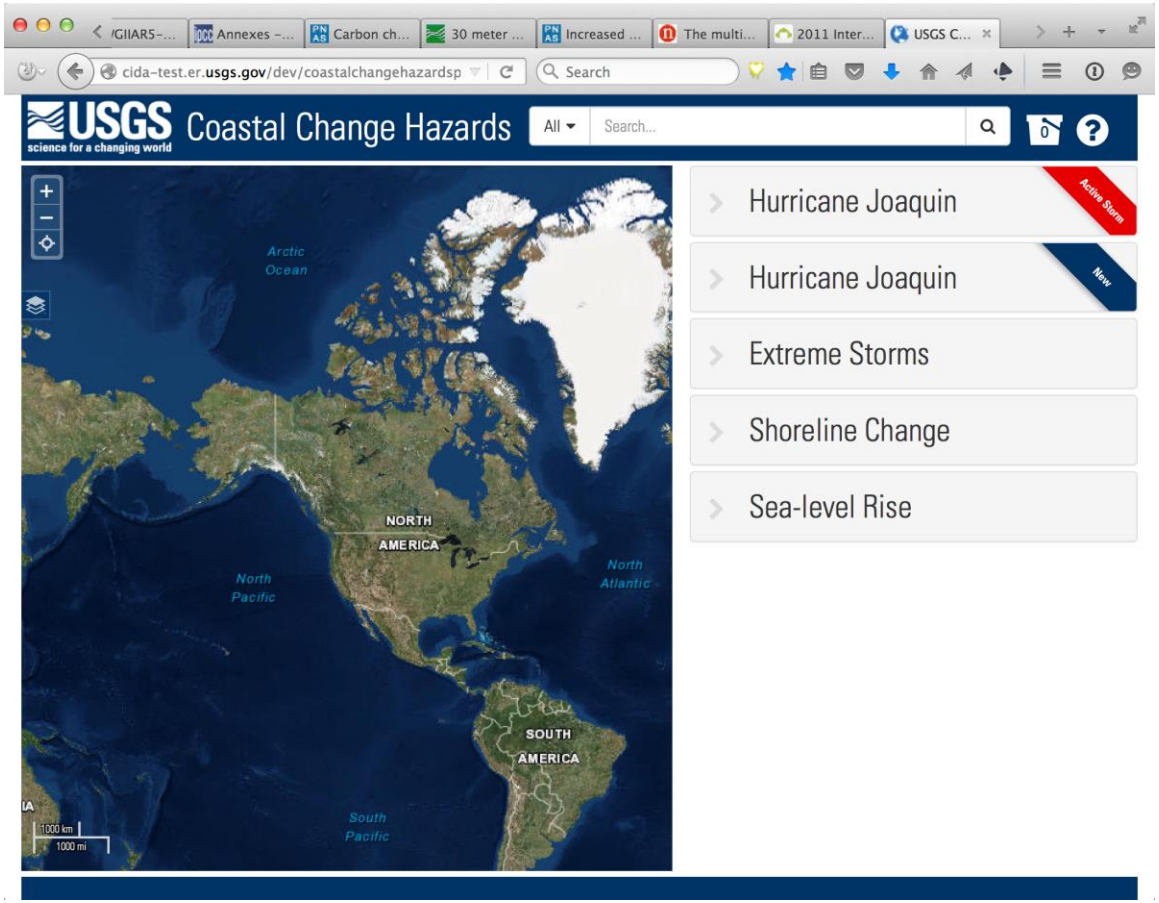
Landscape change predictions for the 2020s, 2030s, 2050s, and 2080s.

## 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**

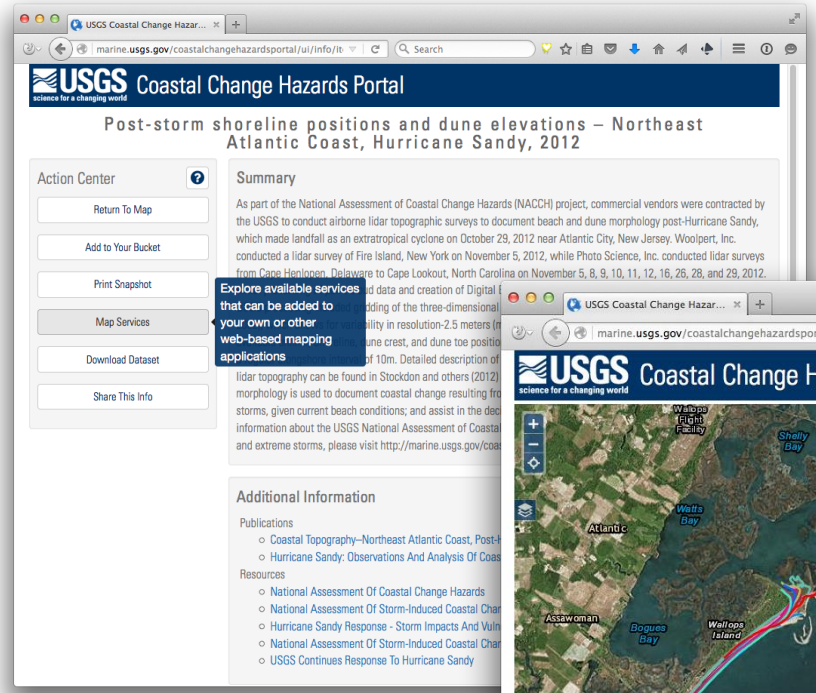


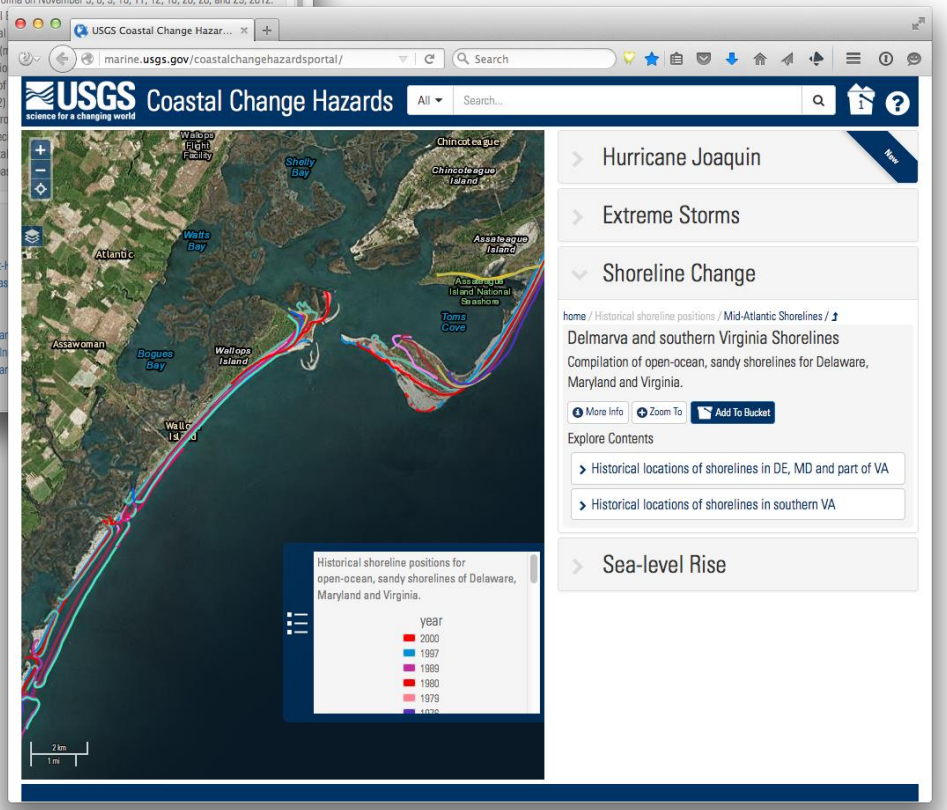

## Requirements

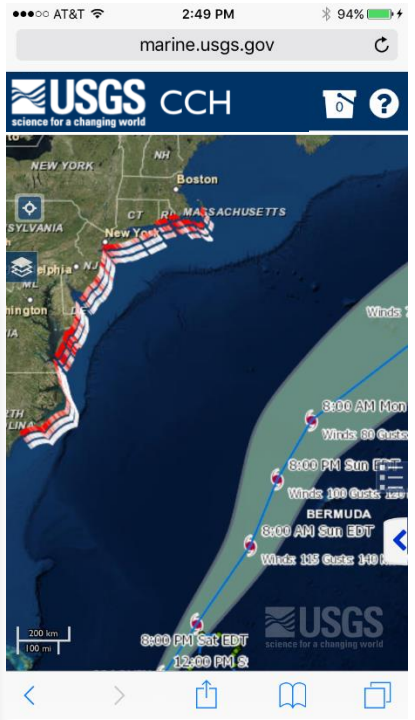
- **Include storm, historical shoreline change (erosion) and sea-level rise assessments and data**
- **Visualization tool for near-real-time storm impact probability assessment**
- **Interactive decision support tools for coastal change hazards**

# 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



# National Assessment of Coastal Change Hazards

**Integration across relevant time scales and topics**