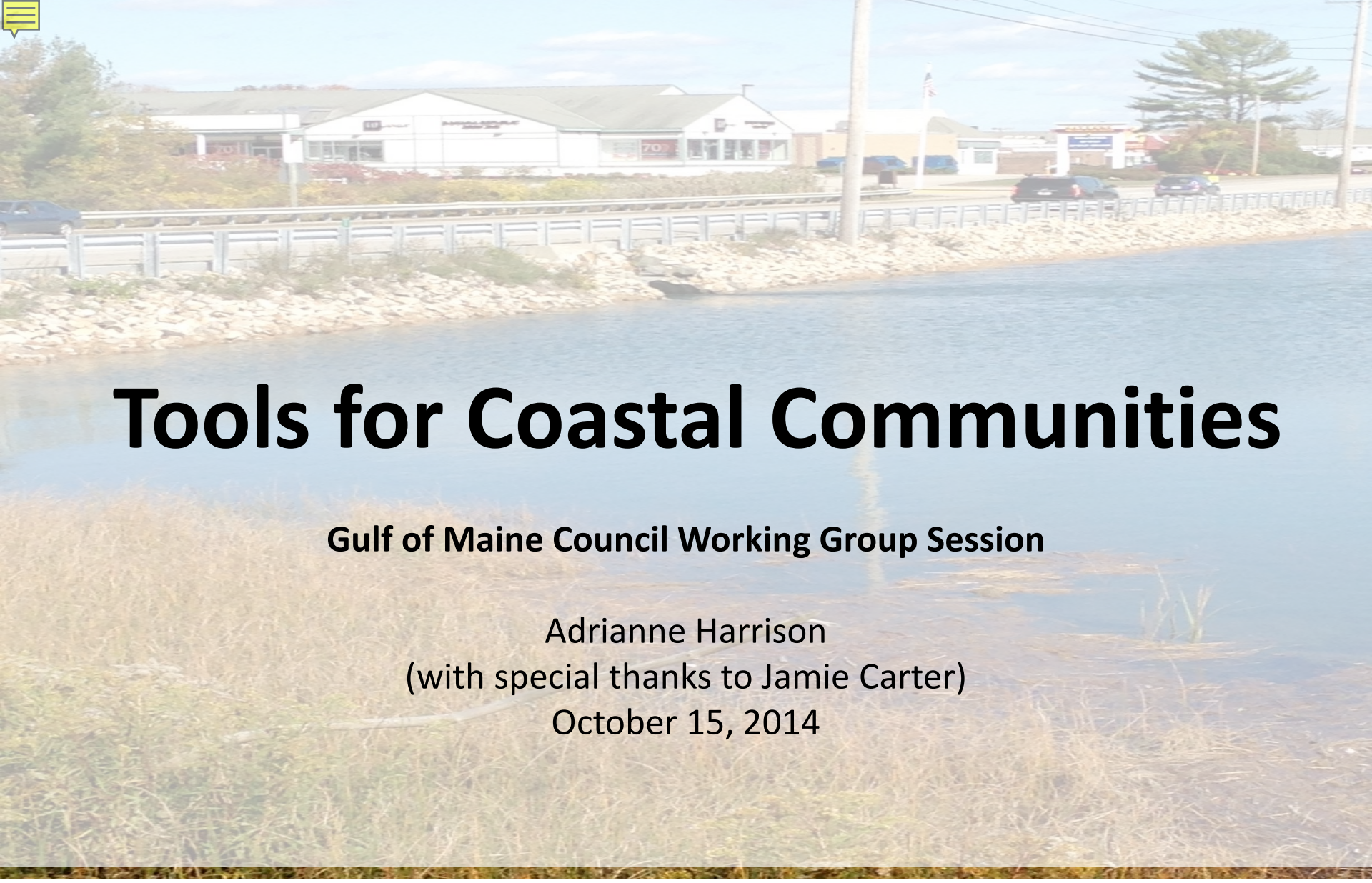


Tools for Coastal Communities

Gulf of Maine Council Working Group Session

Adrianne Harrison
(with special thanks to Jamie Carter)
October 15, 2014

Objectives

- Digital Coast overview
- Resilience and Climate related data, tools, training and stories
- Live demo, tool of your choice

Coastal Populations

U.S. Coastal Watershed Counties:

< 20 percent

of total land area

52 percent

of total population

Coastal Economies

In 2010, the U.S. Ocean and Great Lakes economy produced

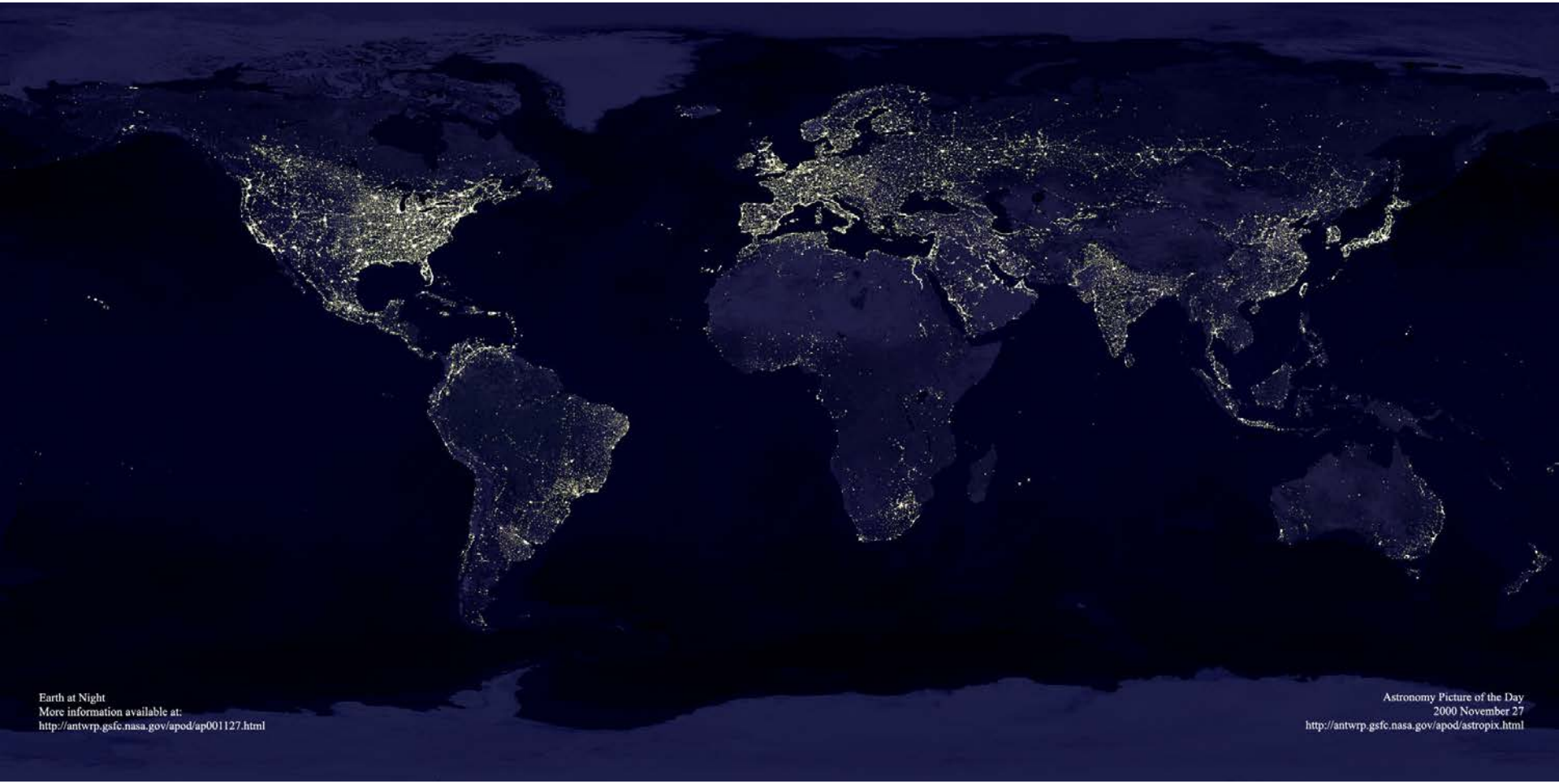
2.8 million

jobs and

$258 billion

in GDP

Coastal Vulnerability Around the World

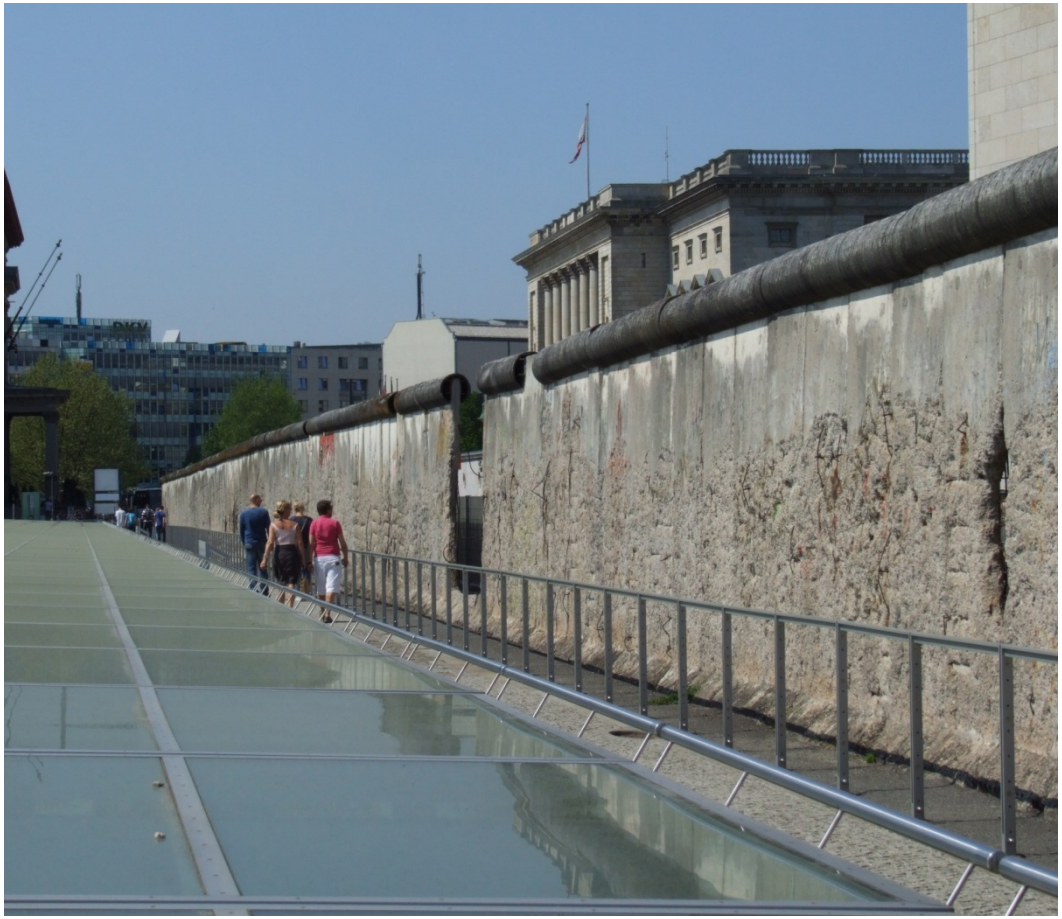


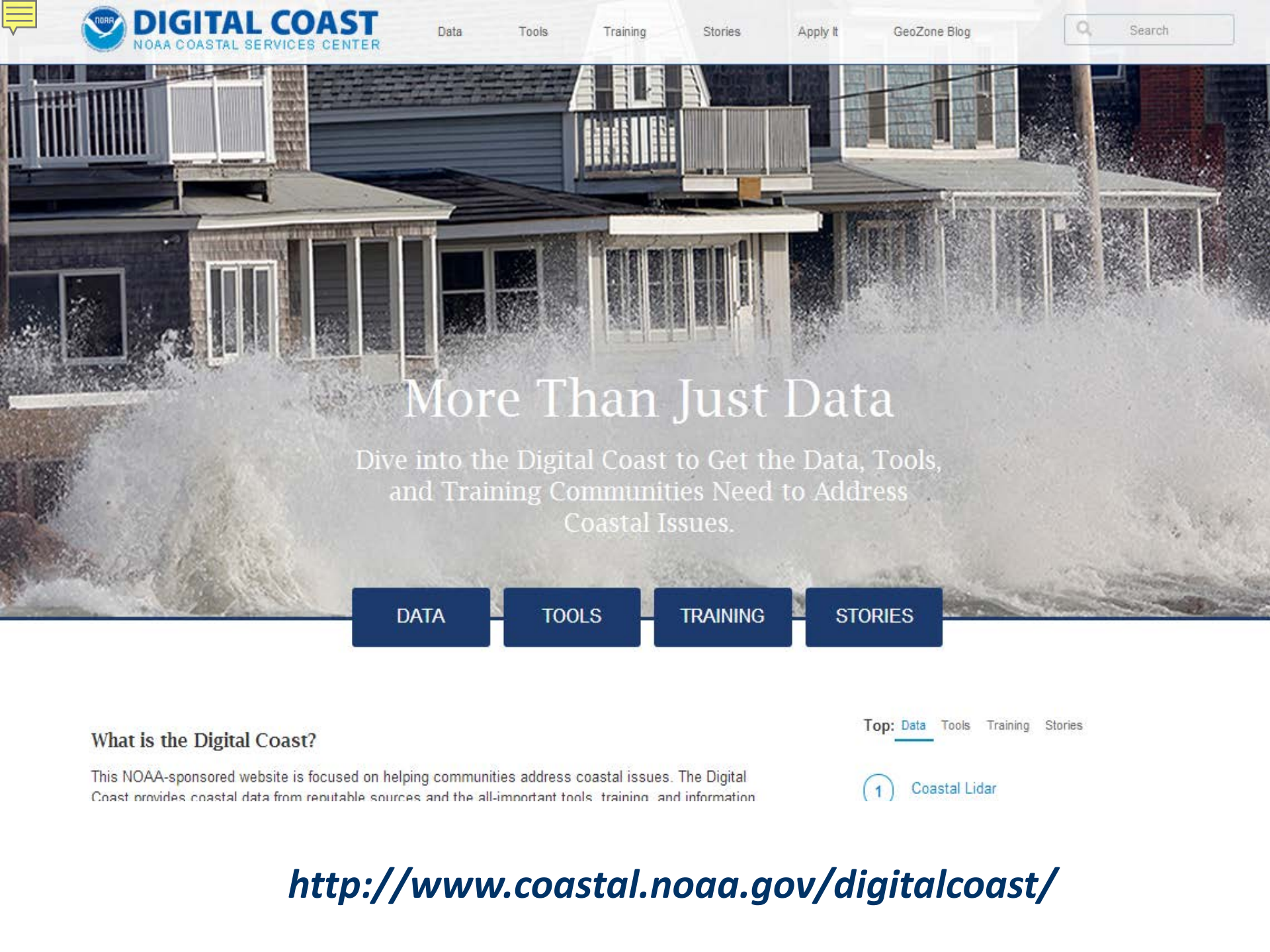
NOAA Office for Coastal Management

NOAA OCM provides the technology, information, and management strategies used by local, state, and national organizations to address complex coastal issues.

Barriers to Coastal Management

- Coastal data availability
- Data integration and accessibility
- Governmental coordination
- Techie and non-techie tools
- Training
- Outreach and awareness

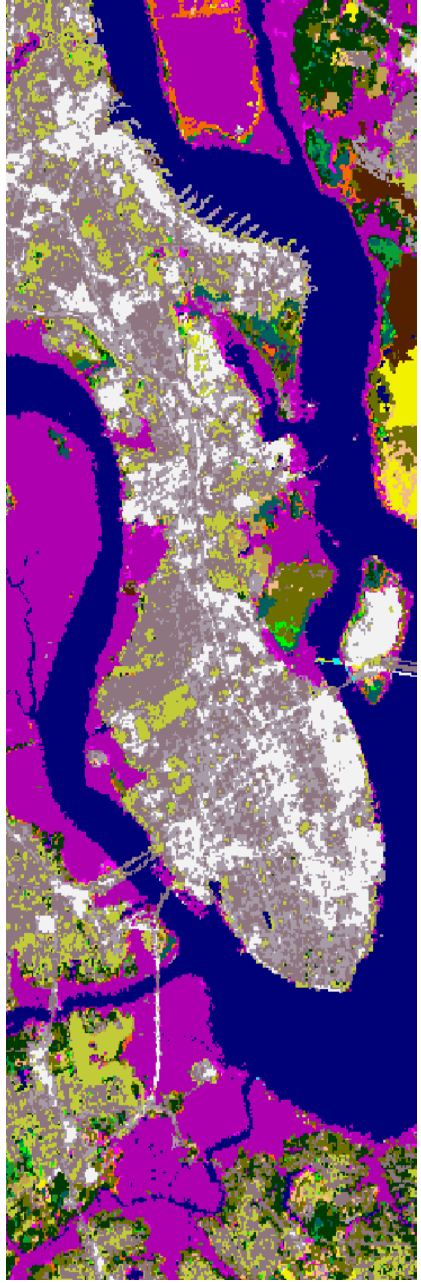


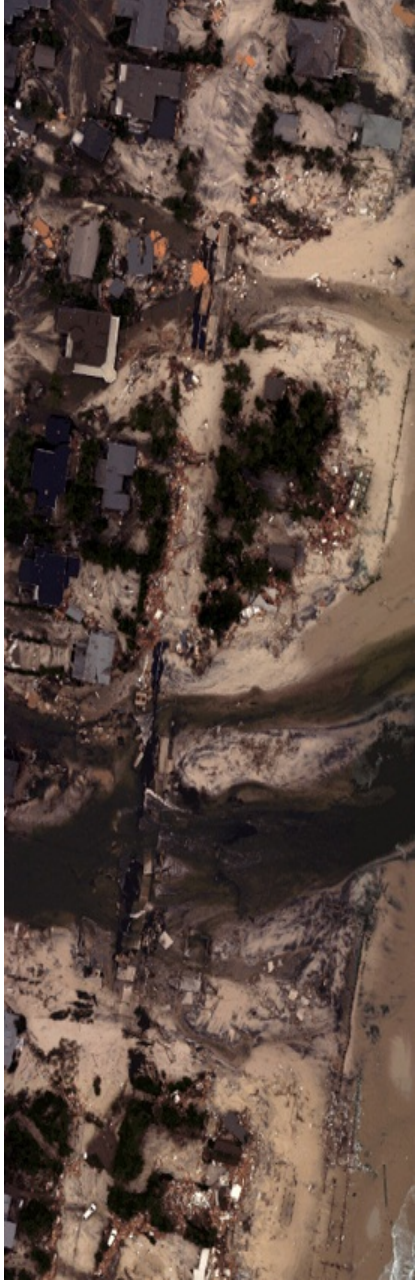


http://www.coastal.noaa.gov/digitalcoast/

Data

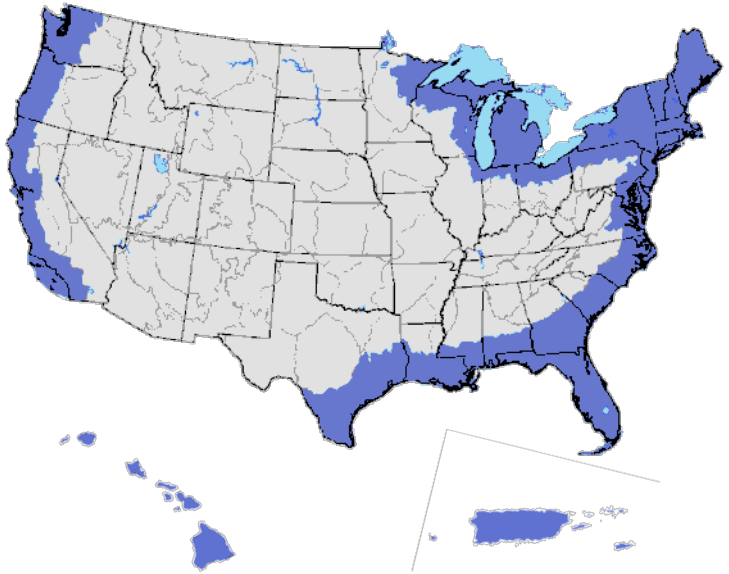
- Over 65 terabytes of high-resolution elevation data, land cover data, and orthoimagery
- 200-plus Web-mapping services
- Linkages to over 40 national-level coastal data sets





The Coastal Change Analysis Program (C-CAP)

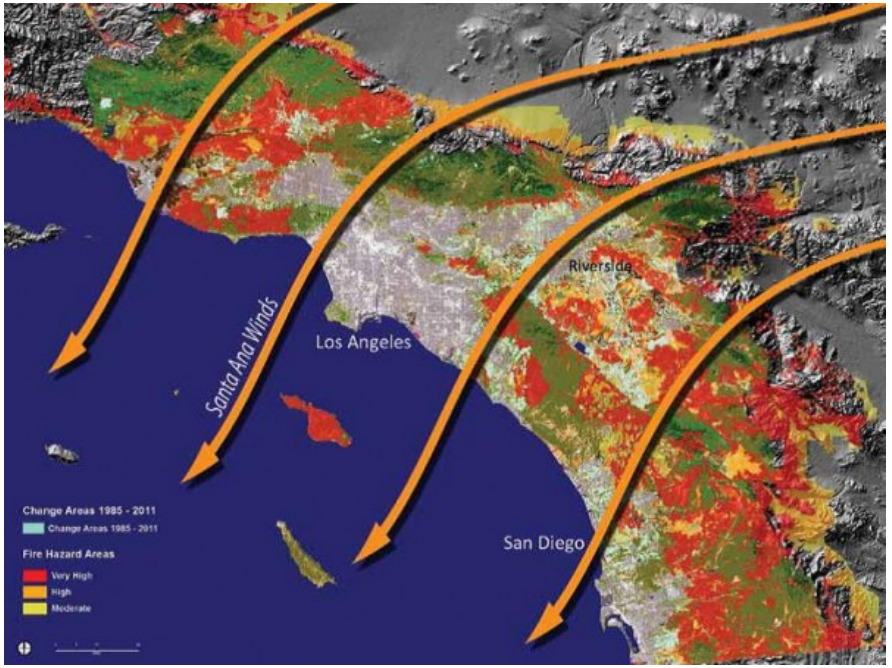
- National coastal land cover and change mapping program
- Authoritative source for land cover in coastal U.S.
- Detailed intertidal areas and wetlands
- Consistent, accurate products via standard data and methods



Designed to help understand links between land use change and the environment

C-CAP Data in Resilience Applications

- Dasymetric mapping
- Wind modeling
- Future growth modeling
- Fire risk mapping
- Inundation mapping and assessment
  - Used to map both what is at risk and what is providing protection
  - Used to model restoration potential and prioritize conservation areas

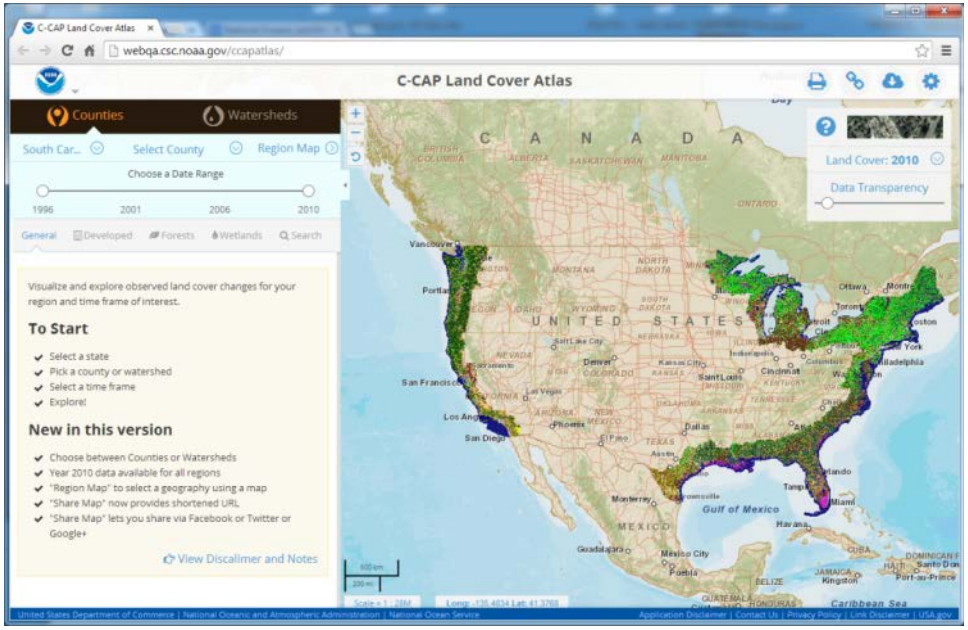


Change areas between 1985 and 2011 superimposed on a fire hazard layer. Generally, most urban development (turquoise) is near high fire risk areas. The direction of the Santa Ana winds is shown with orange lines.

New Land Cover Atlas

www.csc.noaa.gov/landcoveratlas

- Online data viewer
- Summarizes general land change trends
  - County
  - Watershed (8-digit HUC)
- Allows for custom analysis



Improvements:

- 2010 data included
- Printable reports
- Ability to add historic dates (and islands) will be added soon

Tools

Sea Level Rise and Coastal Flooding Impacts Viewer

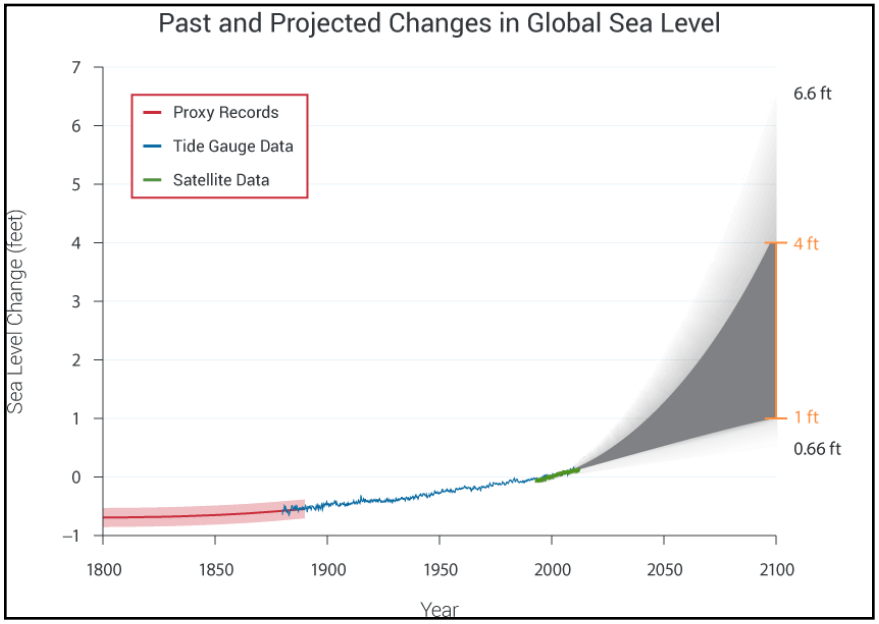
Coastal County Snapshots

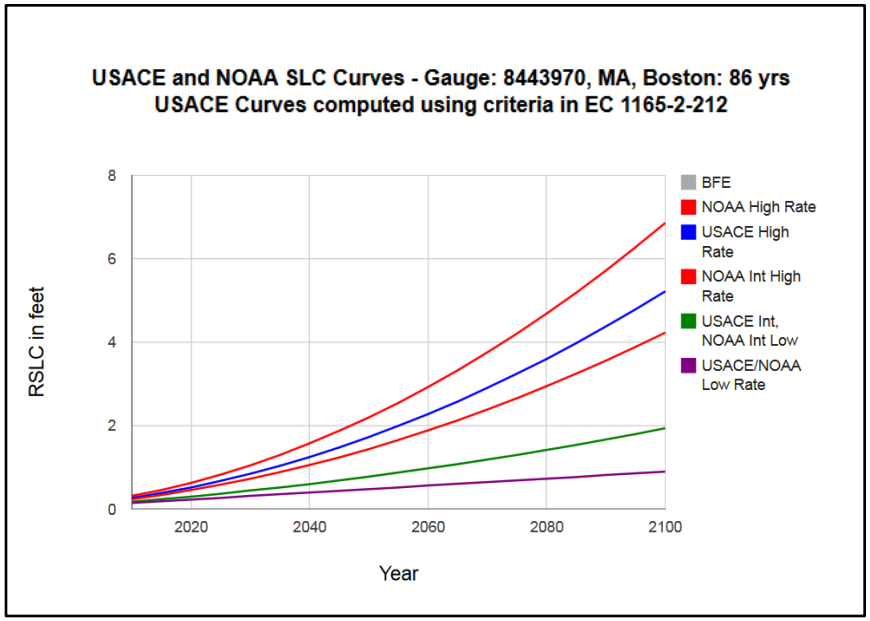
CanVis

- An inventory of over 50 decision-support and information visualization tools
- Many provide visualization and analysis capabilities without need for GIS software

Sea Level Rise Projections

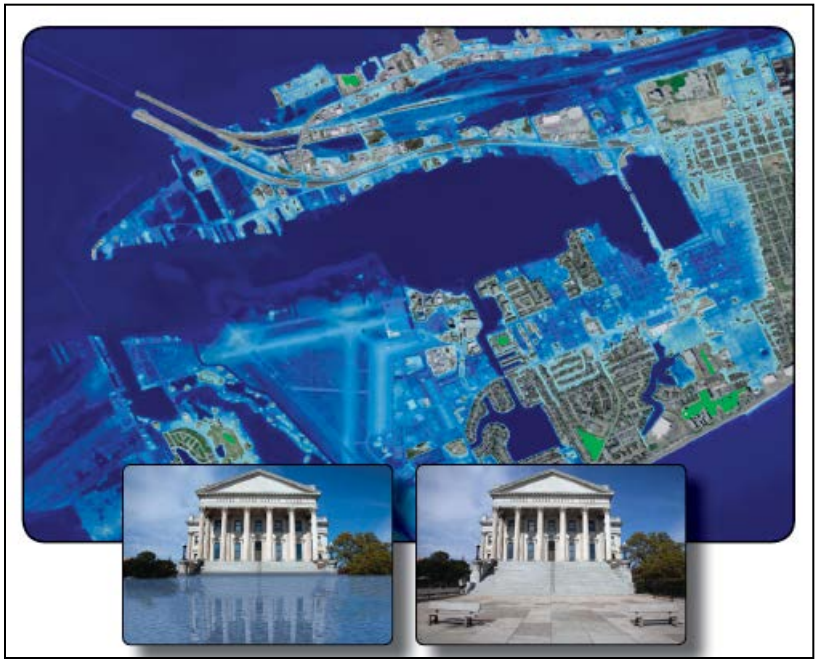
- Global sea levels are rising, but rates vary locally
- Federal agencies collaborating and using best available science and data in new tools for state and local applications
- Uncertainty remains…so scenario planning is wise





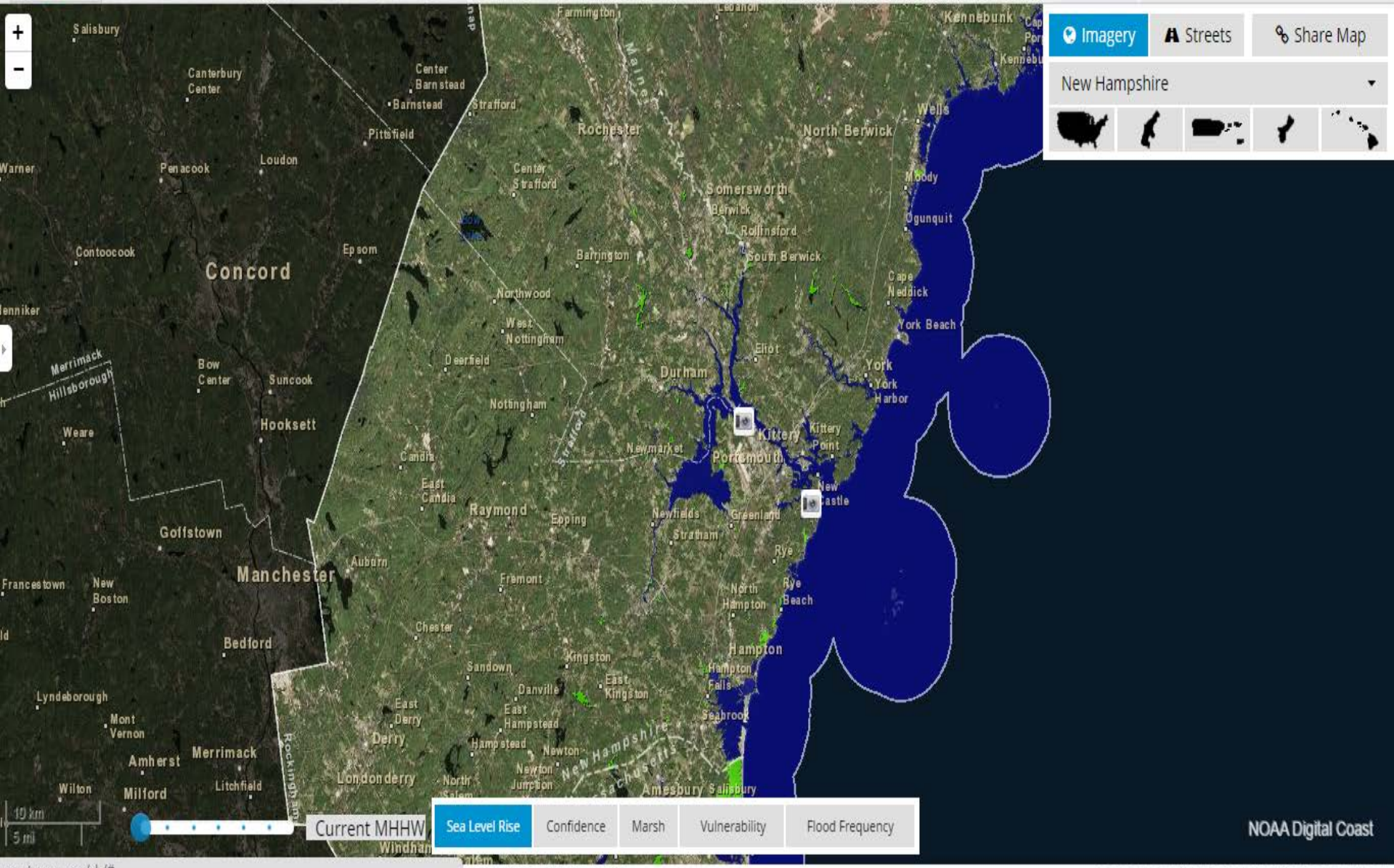
Sea Level Rise and Coastal Flooding Impacts Viewer

- Displays potential flooding
- Provides simulations of flooding at local landmarks
- Communicates the spatial uncertainty of mapped sea levels
- Overlays social and economic data onto potential flood scenarios



www.coast.noaa.gov/slr/viewer

Sea Level Rise and Coastal Flooding Impacts



Sea Level Rise and Coastal | Extreme Water Levels - Se

coast.noaa.gov/slr/

Sea Level Rise and Coastal Flooding Impacts

Sea Level Rise | Confidence | Marsh

Vulnerability | Flood Frequency

Sea Level Rise

Current MHHW

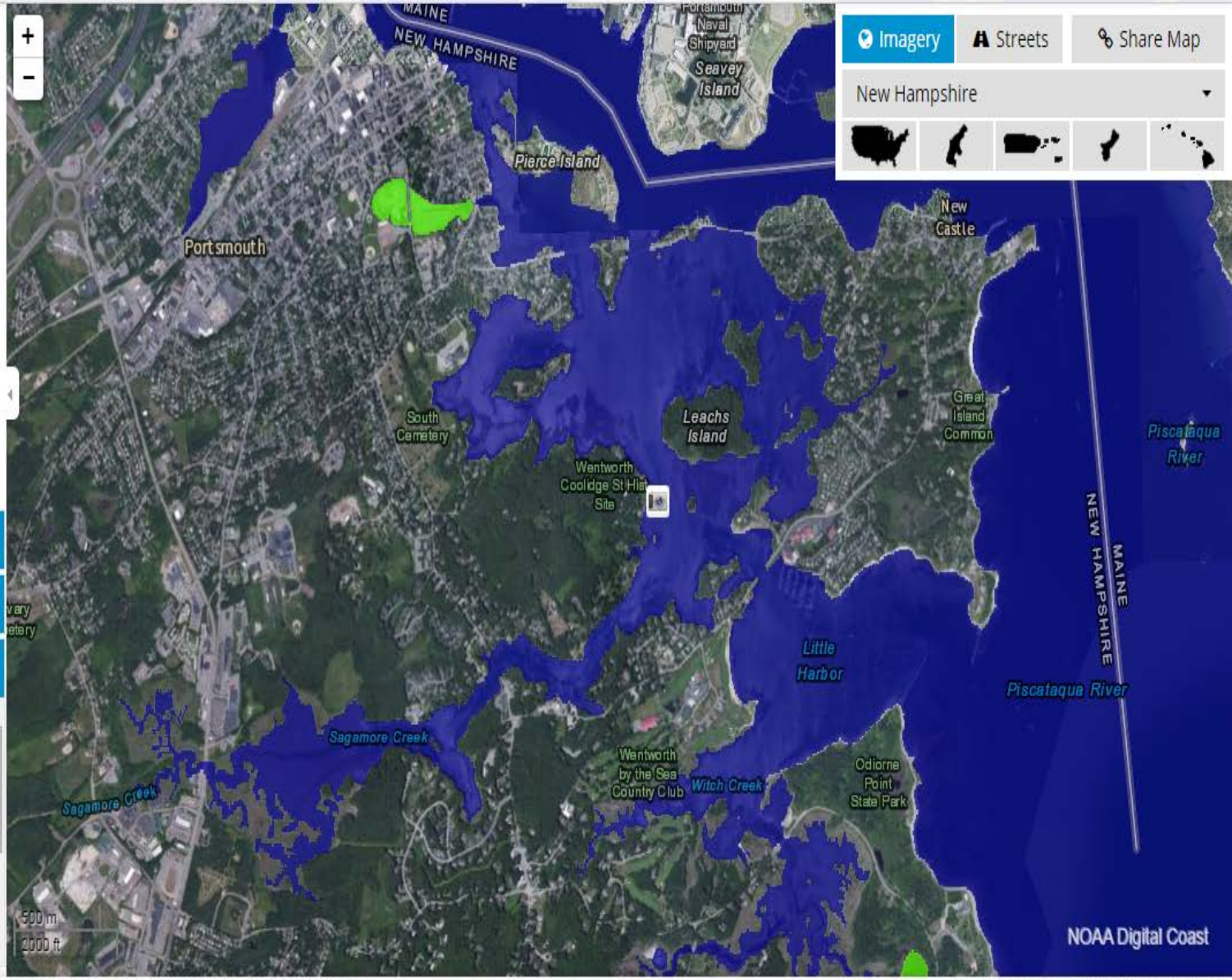
Legend

- Water Depth
- Low-lying Areas
- Area Not Mapped
- Visualization Location

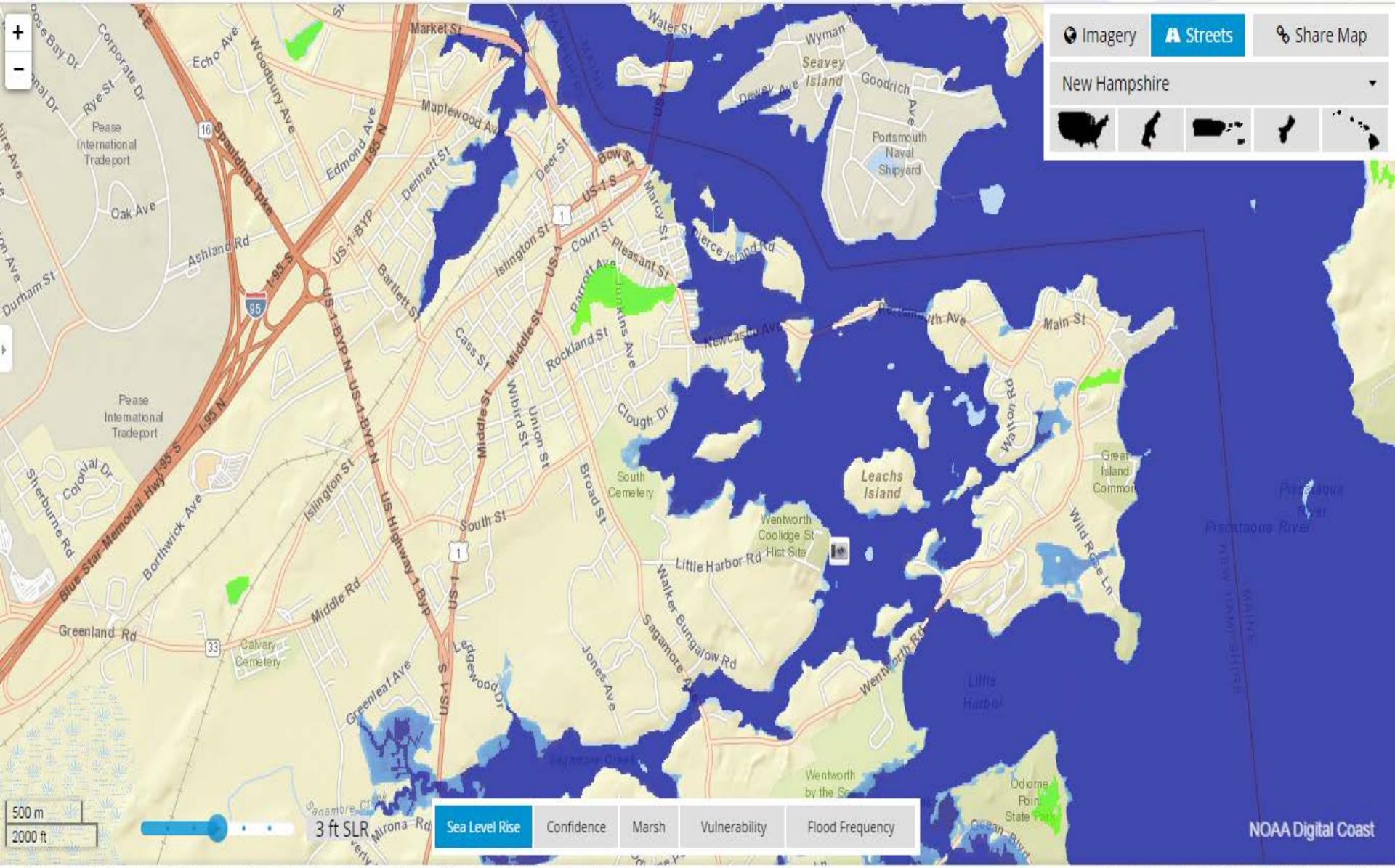
View Levees

- Overview
- Understanding The Map
- Additional Information

Frequently Asked Questions about the Tool (PDF)
Coastal Inundation Toolkit
Mapping Methodology
NOAA CO-OPS Sea Level Trends
Elevation Data
Coastal Climate Adaptation



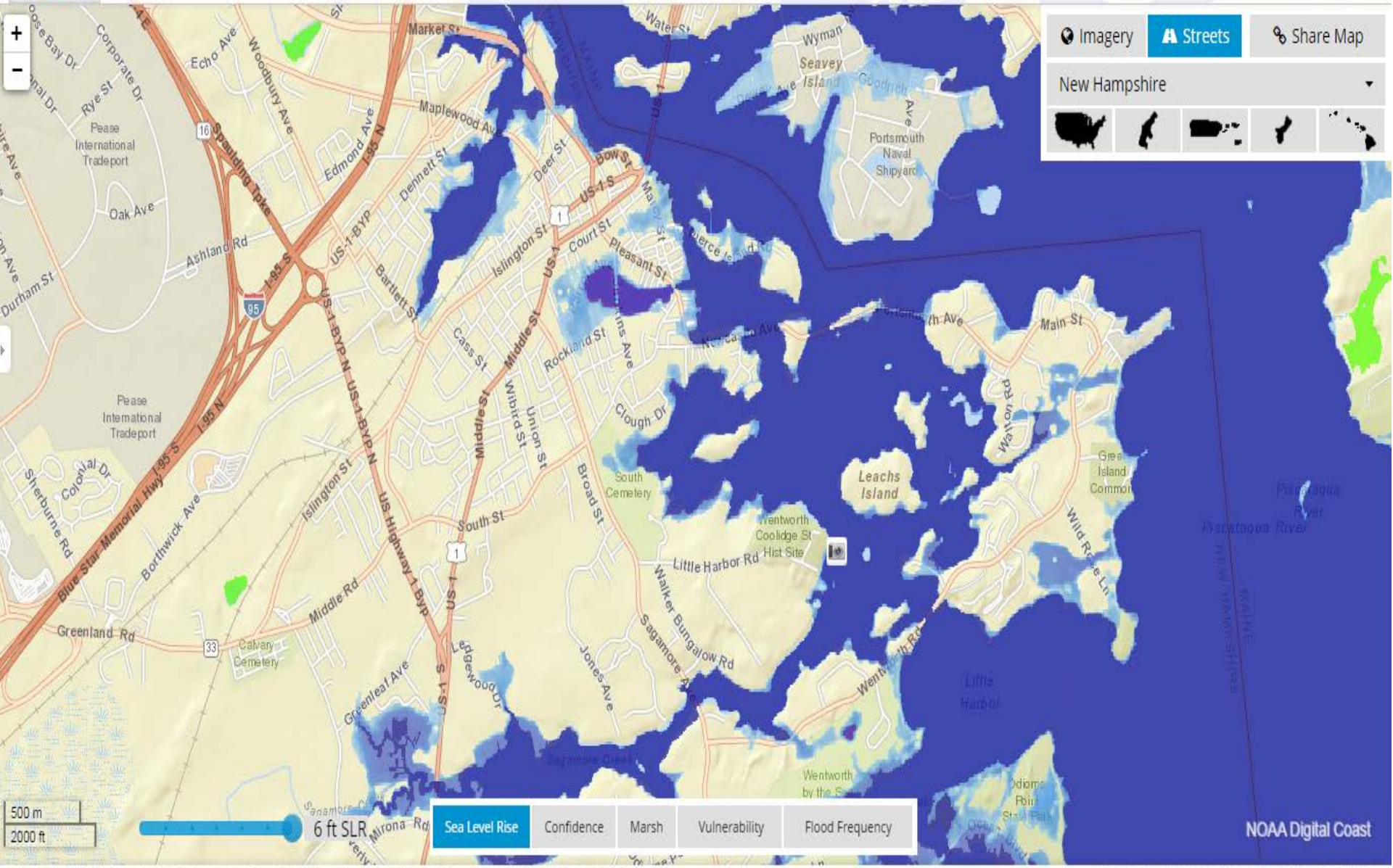
Sea Level Rise and Coastal Flooding Impacts



Sea Level Rise and Coastal | Extreme Water Levels - Se

coast.noaa.gov/slr/

Sea Level Rise and Coastal Flooding Impacts



Sea Level Rise and Coastal | Extreme Water Levels - Se

coast.noaa.gov/slr/

Sea Level Rise and Coastal Flooding Impacts

Sea Level Rise | Confidence | Marsh

Vulnerability | Flood Frequency

Mapping Confidence

6 ft SLR

Legend

- High Confidence
- Low Confidence
- Area Not Mapped

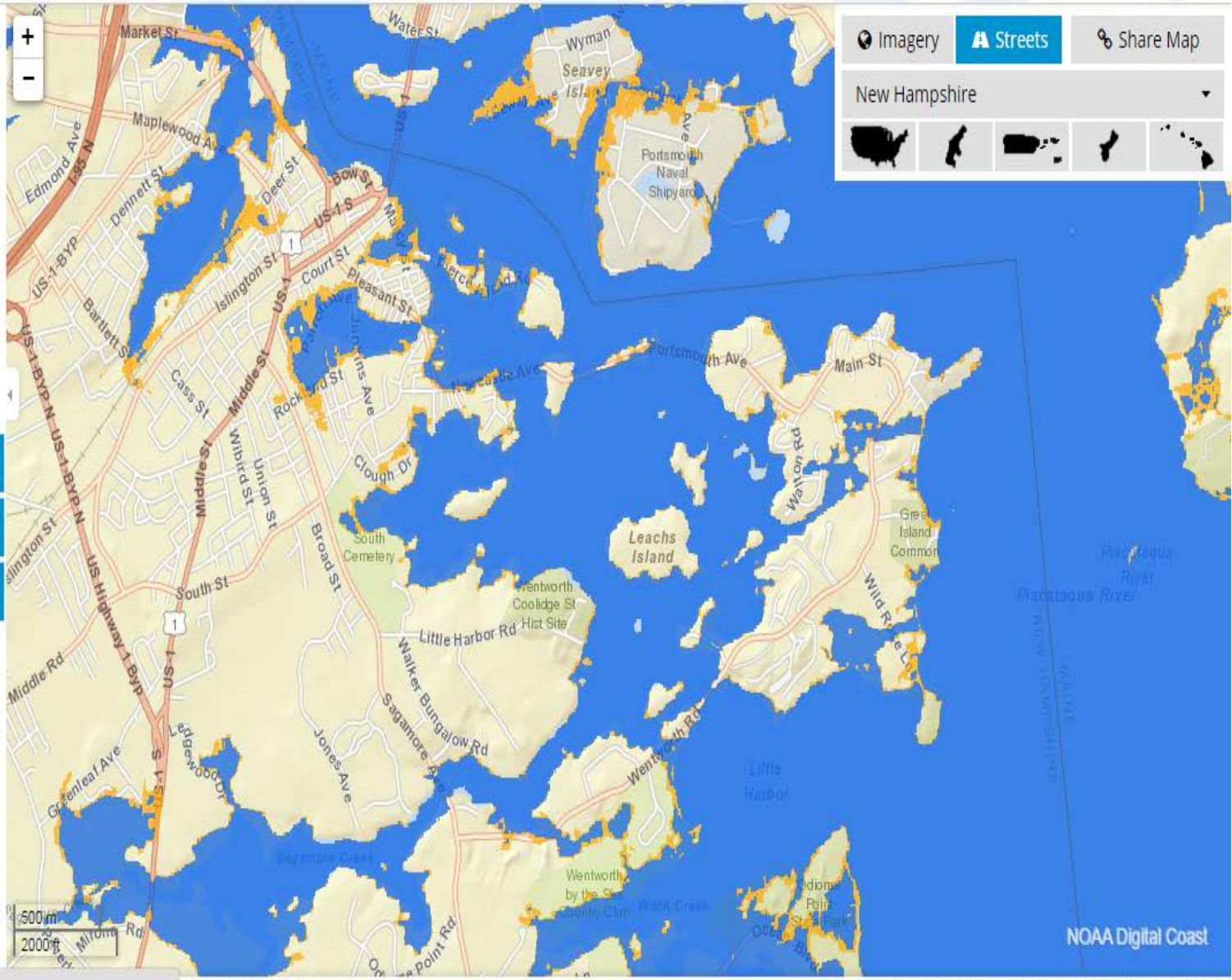
Overview

Understanding The Map

Additional Information

Imagery | Streets | Share Map

New Hampshire



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Sea Level Rise and Coastal | Extreme Water Levels - Se

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Sea Level Rise and Coastal Flooding Impacts

Sea Level Rise | Confidence | Marsh

Vulnerability | Flood Frequency

Socioeconomic Vulnerability

6 ft SLR

Legend

Water Depth

Unconnected Areas

Area Not Mapped

Social Vulnerability

High | Med | Low

Social | Economic

Overview

By overlaying social and economic data on a map that depicts sea level rise, a community can see the potential impact that sea level rise can have on vulnerable people and businesses.

Understanding The Map

Additional Information

Imagery | Streets | Share Map

New Hampshire

500 m

2000 ft

NOAA Digital Coast

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Sea Level Rise and Coastal | Extreme Water Levels - Se

coast.noaa.gov/slr/

Sea Level Rise and Coastal Flooding Impacts

Sea Level Rise | Confidence | Marsh

Vulnerability | Flood Frequency

Flood Frequency

Legend

- Shallow Coastal Flooding Areas
- Area Not Mapped
- Tide Gauges

Overview

Flooding will become more frequent as sea level rises. In a sense, today's flood will become tomorrow's high tide, as sea level rise will cause flooding to occur more frequently and last for longer durations of time.

The red layer in the map represents areas currently subject to shallow coastal flooding.

Click on a NOAA tide station in the map to see information on the current frequency of coastal flood events and durations as compared to

Understanding The Map

Additional Information

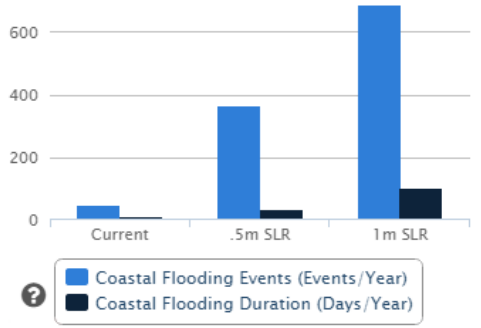
Imagery | Streets | Share Map

New Hampshire

Coastal Flood Frequency

Fort Point Tide Gauge #8423898

Flooding begins at 10.75 ft MLLW



Real-Time Tidal Data | Sea Level Trends

500 m
2000 ft

NOAA Digital Coast

coast.noaa.gov/slr/#

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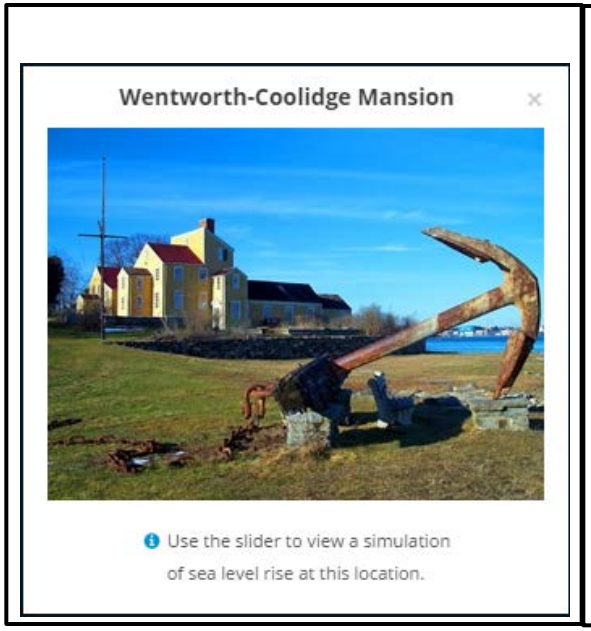
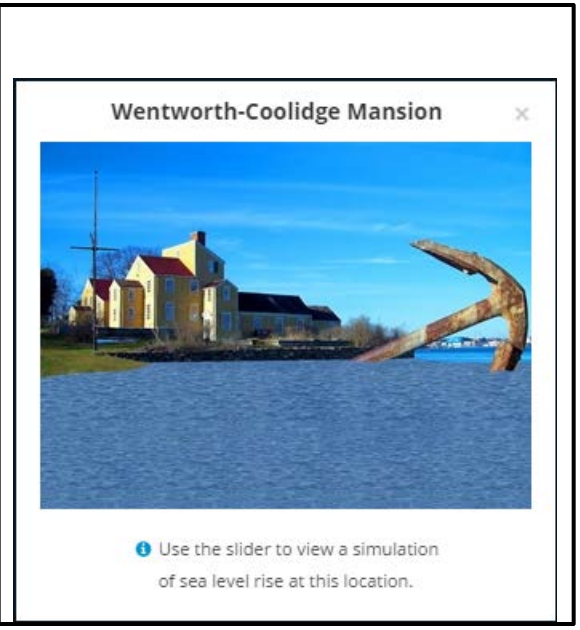
Simulating SLR at Landmarks



Current High Tide (MHHW)

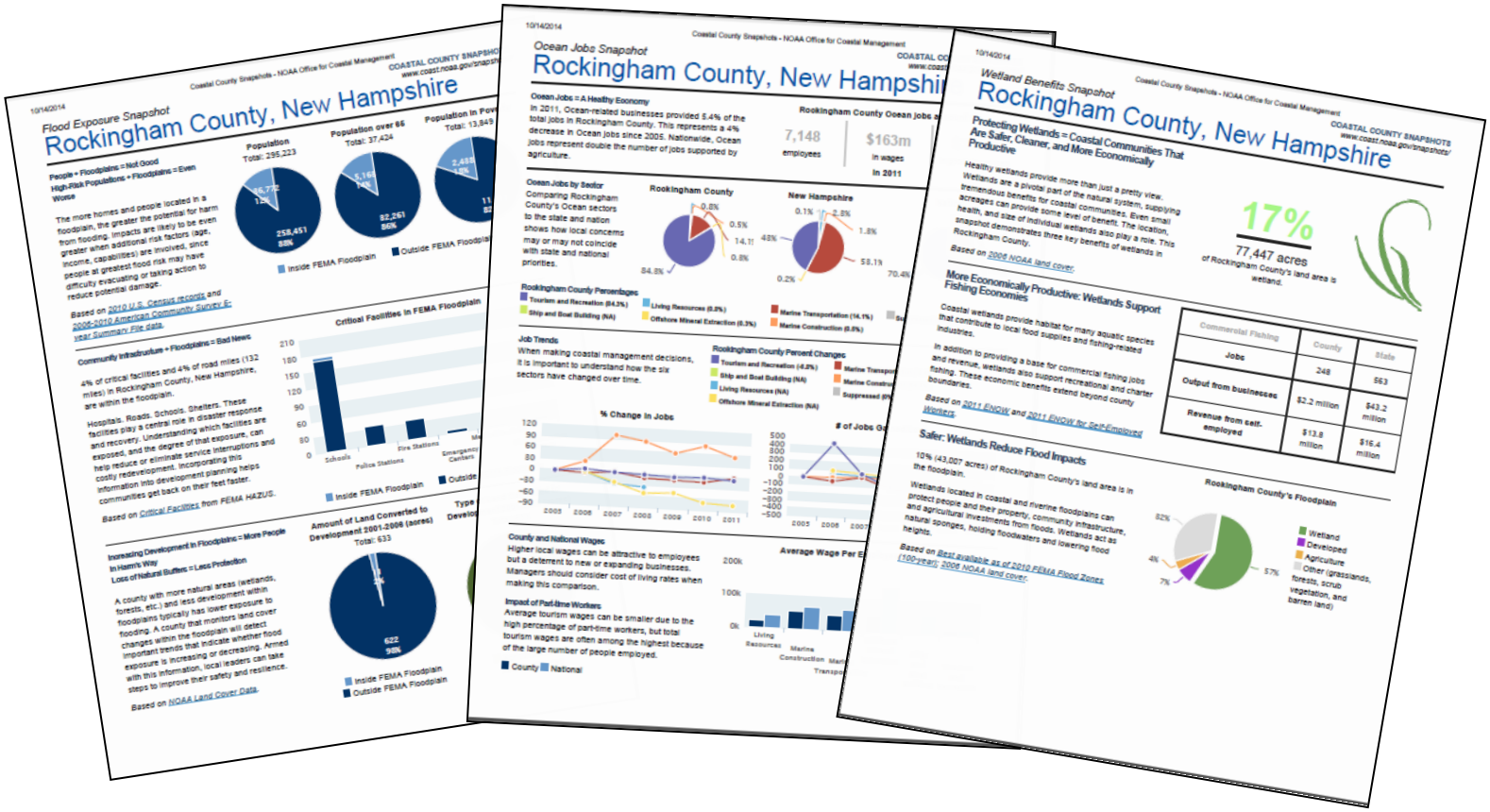
3 feet of SLR



6 feet of SLR

Coastal County Snapshots:

Flood exposure, Ocean jobs, Wetland benefits



Office of Ocean and Coastal Resource Management | Coastal Services Center

Rockingham County Snapshot

in 2011

7,148

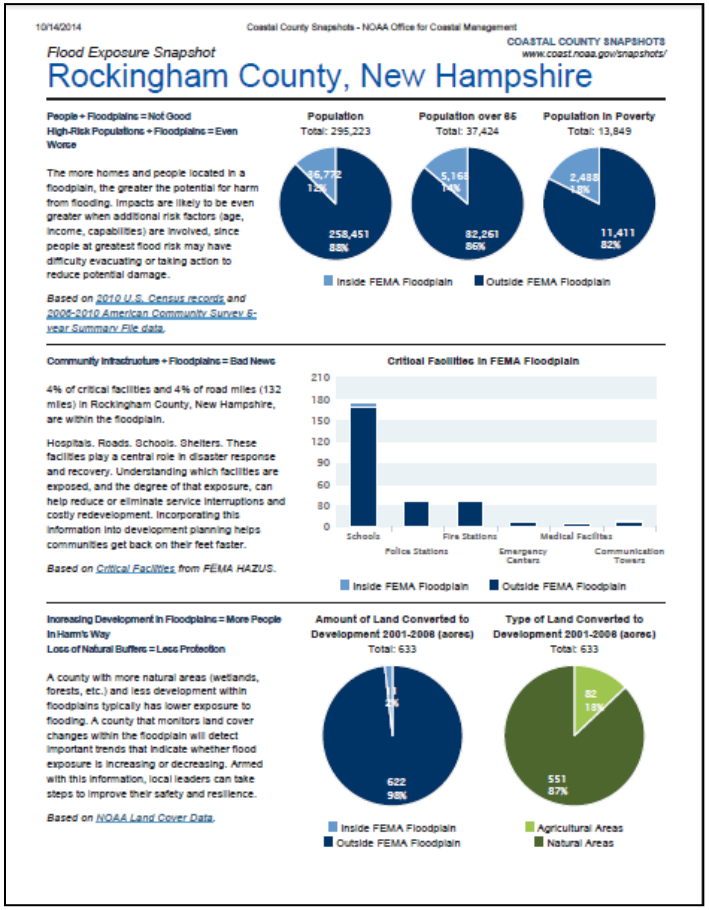
employees

$163m

in wages

$344m

in goods & services



10/14/2014 Coastal County Snapshots - NOAA Office for Coastal Management

Flood Exposure Snapshot

COASTAL COUNTY SNAPSHOTS
www.coast.noaa.gov/snapshots/

Rockingham County, New Hampshire

People + Floodplains = Not Good
High-Risk Populations + Floodplains = Even Worse

The more homes and people located in a floodplain, the greater the potential for harm from flooding. Impacts are likely to be even greater when additional risk factors (age, income, capabilities) are involved, since people at greatest flood risk may have difficulty evacuating or taking action to reduce potential damage.

Based on 2010 U.S. Census records and 2006-2010 American Community Survey 5-year Summary File data.

Population
Total: 295,223

Population over 65
Total: 37,424

Population in Poverty
Total: 13,849

Community Infrastructure + Floodplains = Bad News

4% of critical facilities and 4% of road miles (132 miles) in Rockingham County, New Hampshire, are within the floodplain.

Hospitals. Roads. Schools. Shelters. These facilities play a central role in disaster response and recovery. Understanding which facilities are exposed, and the degree of that exposure, can help reduce or eliminate service interruptions and costly redevelopment. Incorporating this information into development planning helps communities get back on their feet faster.

Based on Critical Facilities from FEMA HAZUS.

Critical Facilities in FEMA Floodplain

Increasing Development in Floodplains = More People in Harm's Way
Loss of Natural Buffers = Less Protection

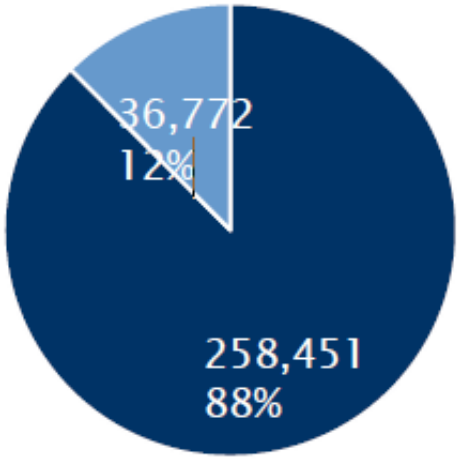
A county with more natural areas (wetlands, forests, etc.) and less development within floodplains typically has lower exposure to flooding. A county that monitors land cover changes within the floodplain will detect important trends that indicate whether flood exposure is increasing or decreasing. Armed with this information, local leaders can take steps to improve their safety and resilience.

Based on NOAA Land Cover Data.

Amount of Land Converted to Development 2001-2008 (acres)
Total: 633

Type of Land Converted to Development 2001-2008 (acres)
Total: 633

Population
Total: 295,223



Inside FEMA Floodplain

Outside FEMA Floodplain

Coastal Flood Exposure Mapper

Geospatial and Process-Based Training

Roadmap for Adapting to Coastal Risk

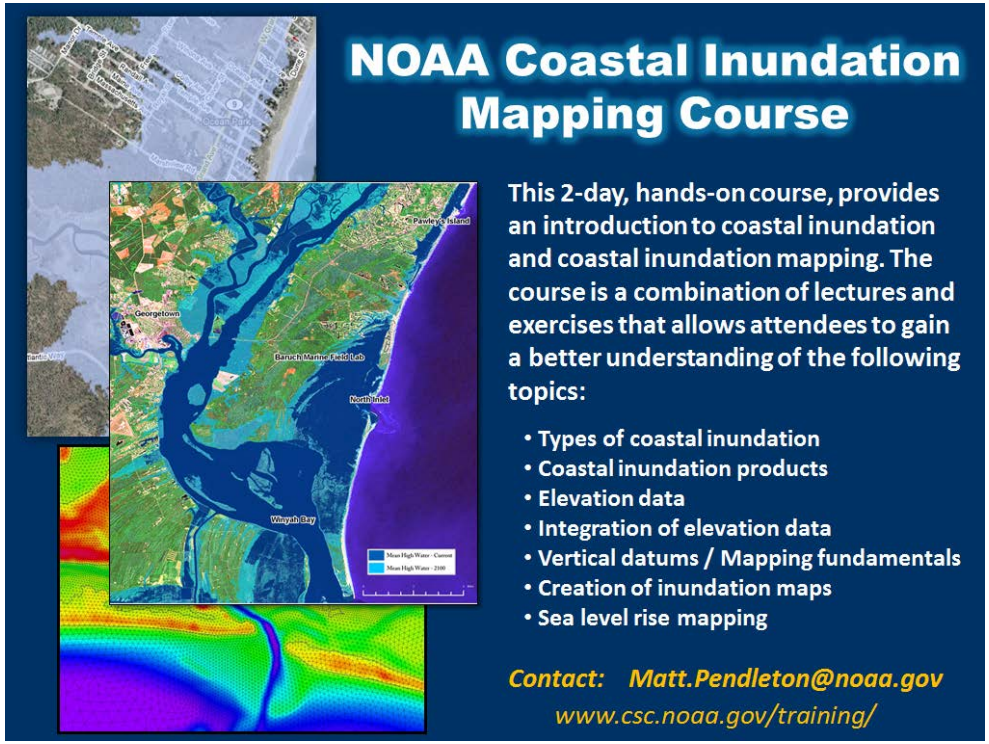
- Three-hour instructor-led online course

Climate Adaptation for Coastal Communities

- Three-day instructor-led

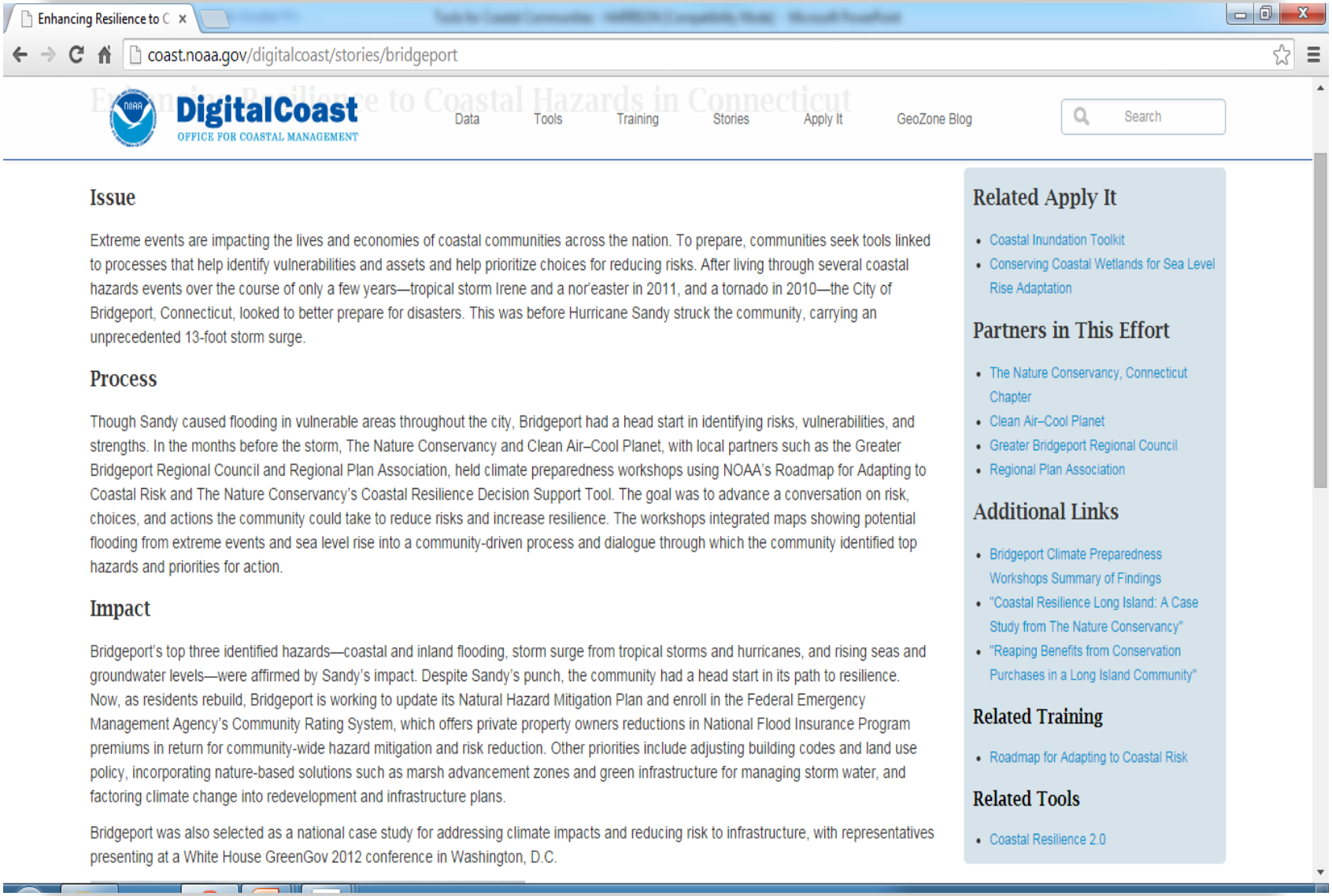
Coastal Inundation Mapping

- Two-day instructor-led



Stories from the Field

- 90-plus place-based narratives highlighting the application of Digital Coast resources to coastal management issues
- Focus on partners and outcomes


Enhancing Resilience to C
coast.noaa.gov/digitalcoast/stories/bridgeport
DigitalCoast
OFFICE FOR COASTAL MANAGEMENT
Data
Tools
Training
Stories
Apply It
GeoZone Blog
Search
Issue
Extreme events are impacting the lives and economies of coastal communities across the nation. To prepare, communities seek tools linked to processes that help identify vulnerabilities and assets and help prioritize choices for reducing risks. After living through several coastal hazards events over the course of only a few years—tropical storm Irene and a nor'easter in 2011, and a tornado in 2010—the City of Bridgeport, Connecticut, looked to better prepare for disasters. This was before Hurricane Sandy struck the community, carrying an unprecedented 13-foot storm surge.
Process
Though Sandy caused flooding in vulnerable areas throughout the city, Bridgeport had a head start in identifying risks, vulnerabilities, and strengths. In the months before the storm, The Nature Conservancy and Clean Air–Cool Planet, with local partners such as the Greater Bridgeport Regional Council and Regional Plan Association, held climate preparedness workshops using NOAA's Roadmap for Adapting to Coastal Risk and The Nature Conservancy's Coastal Resilience Decision Support Tool. The goal was to advance a conversation on risk, choices, and actions the community could take to reduce risks and increase resilience. The workshops integrated maps showing potential flooding from extreme events and sea level rise into a community-driven process and dialogue through which the community identified top hazards and priorities for action.
Impact
Bridgeport's top three identified hazards—coastal and inland flooding, storm surge from tropical storms and hurricanes, and rising seas and groundwater levels—were affirmed by Sandy's impact. Despite Sandy's punch, the community had a head start in its path to resilience. Now, as residents rebuild, Bridgeport is working to update its Natural Hazard Mitigation Plan and enroll in the Federal Emergency Management Agency's Community Rating System, which offers private property owners reductions in National Flood Insurance Program premiums in return for community-wide hazard mitigation and risk reduction. Other priorities include adjusting building codes and land use policy, incorporating nature-based solutions such as marsh advancement zones and green infrastructure for managing storm water, and factoring climate change into redevelopment and infrastructure plans.
Bridgeport was also selected as a national case study for addressing climate impacts and reducing risk to infrastructure, with representatives presenting at a White House GreenGov 2012 conference in Washington, D.C.
Related Apply It
Coastal Inundation Toolkit
Conserving Coastal Wetlands for Sea Level Rise Adaptation
Partners in This Effort
The Nature Conservancy, Connecticut Chapter
Clean Air–Cool Planet
Greater Bridgeport Regional Council
Regional Plan Association
Additional Links
Bridgeport Climate Preparedness Workshops Summary of Findings
"Coastal Resilience Long Island: A Case Study from The Nature Conservancy"
"Reaping Benefits from Conservation Purchases in a Long Island Community"
Related Training
Roadmap for Adapting to Coastal Risk
Related Tools
Coastal Resilience 2.0

The Digital Coast in Action: Facilitating Use and Application

Discover
Information on the C-CAP land cover data set on the Digital Coast website

Download
Land cover data for your community via the Data Access Viewer

Map
Develop mash-ups with ESRI and OGC map services

Analyze
Change in your county with the Land Cover Atlas

Learn
From data experts through recorded webinars

Share
Outcomes with others though Stories in the Field

Data → **Information** → **Action**

Office of Ocean and Coastal Resource Management | Coastal Services Center

Thank You

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603-862-4272

www.coastal.noaa.gov/digitalcoast