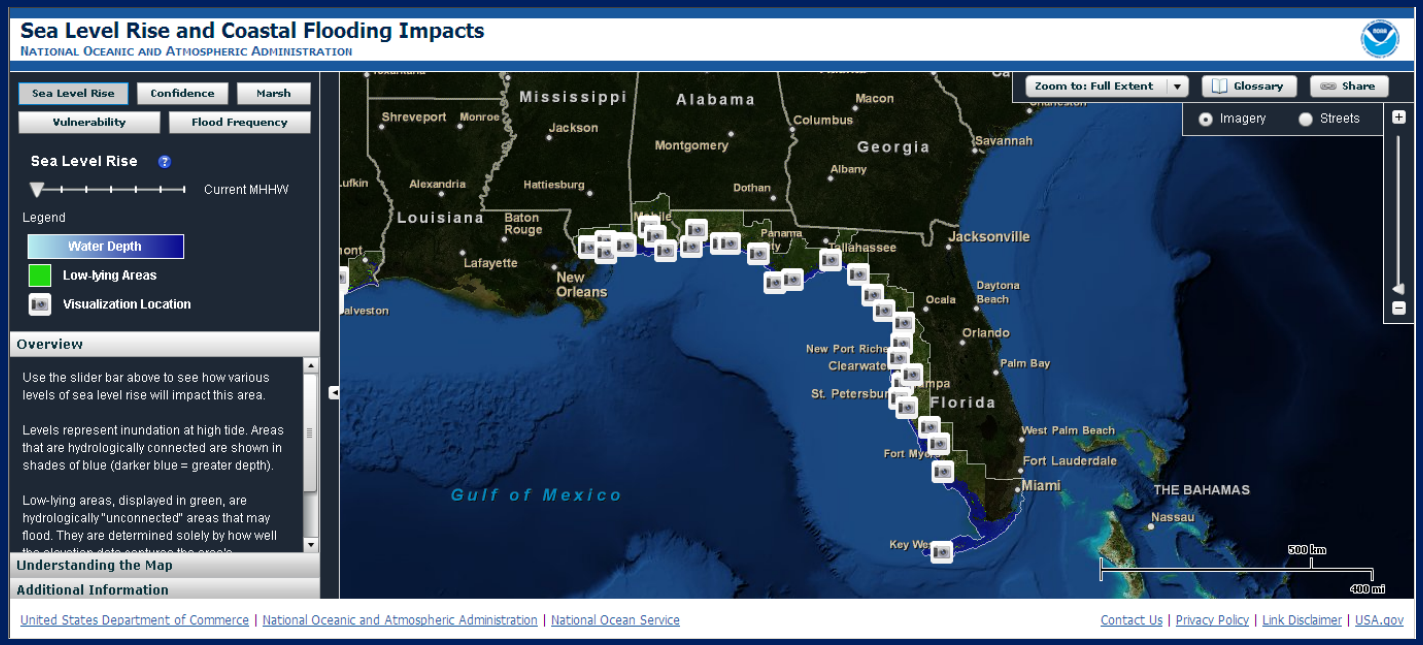
# Resilience Tools




2015 Gulf of Mexico B-WET Grantee Workshop

Heidi Stiller
NOAA Office for Coastal Management
May 29, 2015

OFFICE FOR COASTAL MANAGEMENT
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

# Topics

- Context: What do we mean by resilience and resilience tools?
- Discussion: How is resilience already a component of our work?
- Resilience Tools
  - Sea Level Rise Viewer (NOAA)
  - Coastal Flood Exposure Mapper (NOAA)
  - Coastal Resilience 2.0 (TNC)

# What Is Resilience?

- Ability to "bounce back" from a stress or disturbance
- Capacity of an ecosystem to respond to a disturbance by resisting damage and recovering quickly
- Capability of a community or system to bounce back after a disturbance or turbulent change
- Ability to prepare and plan for, absorb, recover from, or more successfully adapt to actual or potential adverse events

# Resilience in Coastal Management

# How did Resilience get to be such a buzzword?

# Katrina/Rita

# Superstorm Sandy

# Existing Sea Level Rise
# Big Impacts…with Big Price Tags

Ft. Lauderdale, Florida. Feb. 2013.

Norfolk, Virginia.

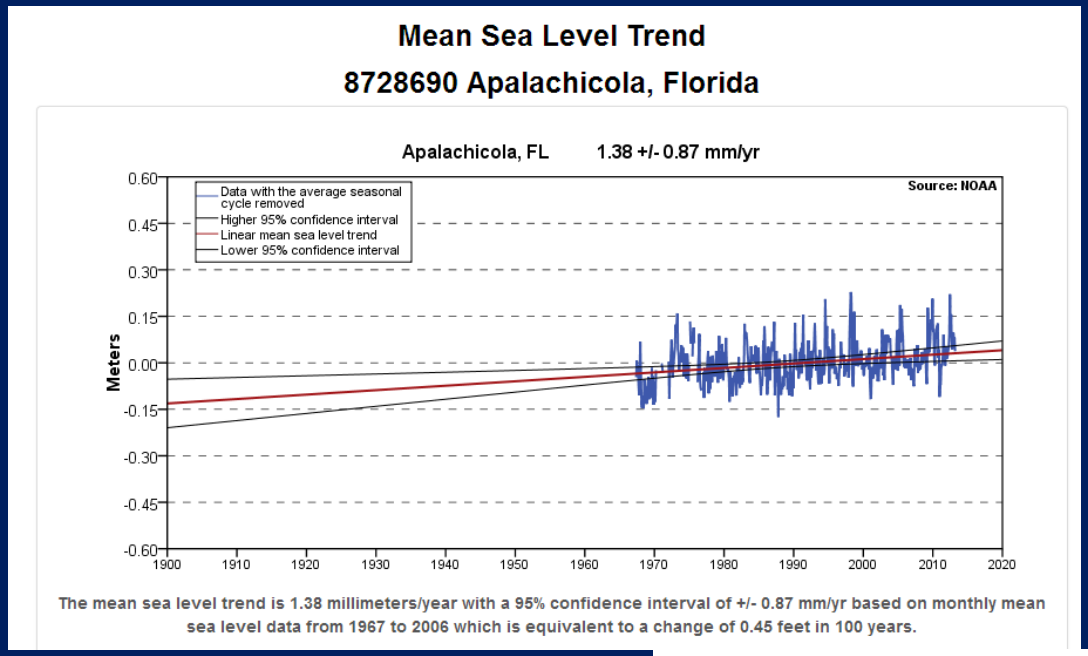
Key West, Florida. May 2013 rainstorm.

Charleston, SC

# Resilience Tools Take Many Forms

- Online Visualization and Decision-Support Tools Based on Geographic Information System (GIS) Data
- Indexes for Evaluating Resilience Variables
- Frameworks / Guides for How to Assess Vulnerabilities and Strategies for Increasing Resilience
- Risk Communication Materials
- Data on Current and Future Risk

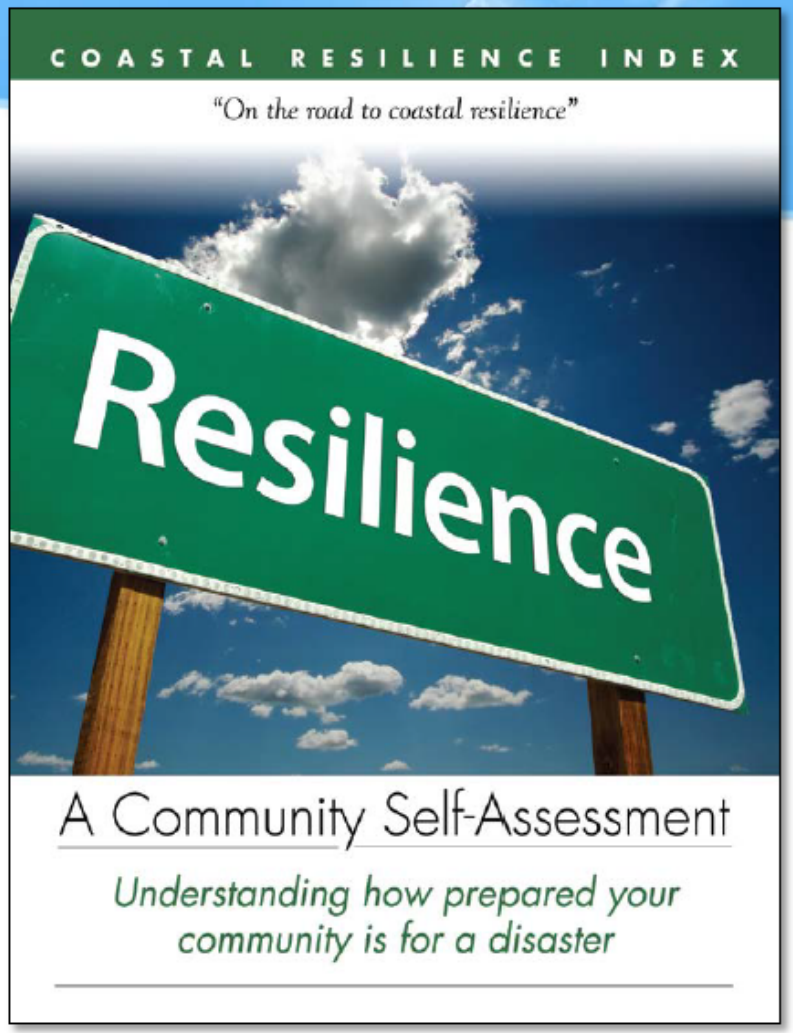
# Data


Mean Sea Level Trend
8728690 Apalachicola, Florida
Apalachicola, FL 1.38 +/- 0.87 mm/yr
Source: NOAA
Data with the average seasonal cycle removed
Higher 95% confidence interval
Linear mean sea level trend
Lower 95% confidence interval
Meters
0.60
0.45
0.30
0.15
0.00
-0.15
-0.30
-0.45
-0.60
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
The mean sea level trend is 1.38 millimeters/year with a 95% confidence interval of +/- 0.87 mm/yr based on monthly mean sea level data from 1967 to 2006 which is equivalent to a change of 0.45 feet in 100 years.

Sea Level Trends
East Coast
West Coast
Gulf Coast
Alaska
Hawaii
Global
View in Google Earth
Map
Satellite
Canada
United States
Mexico
North Pacific Ocean
North Atlantic Ocean

# Resilience Index

- http://masgc.org/ri
- Self-assessment completed by local decision makers to identify community's resilience to coastal hazards
- Implementation and evaluation portion of the project began fall 2010
- 36 communities have completed the CRI (from all Gulf states)



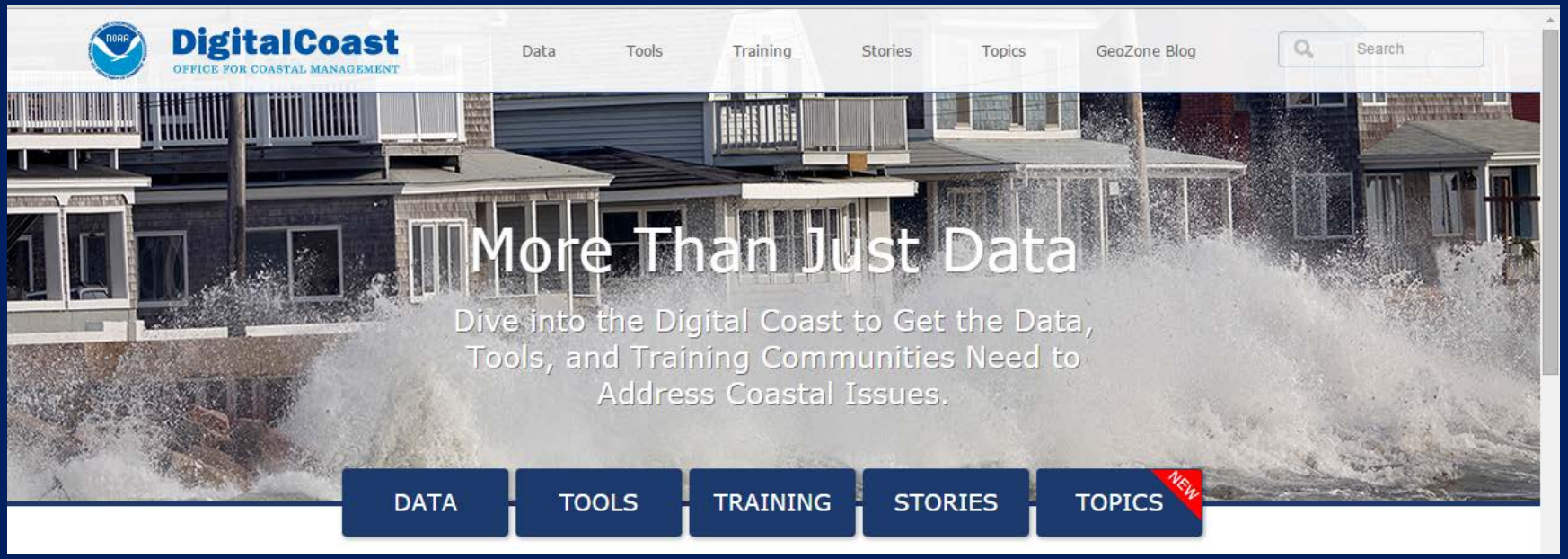
# And now some questions for you…

Is resilience already a component of your work?

How might you incorporate resilience in your programming in the future?

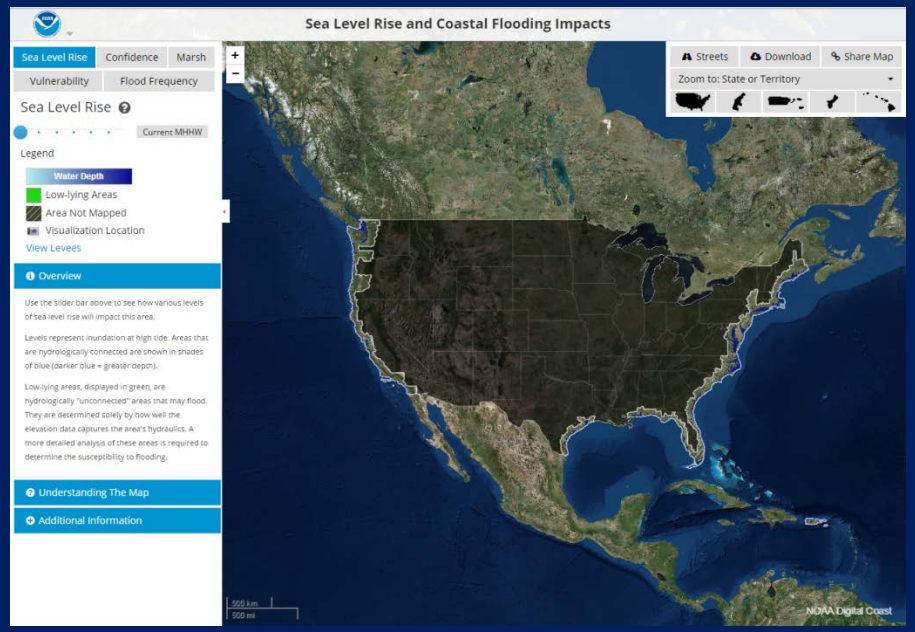
Are there particular concepts you would teach about if you wanted to increase your audiences' knowledge of climate and/or hazards?

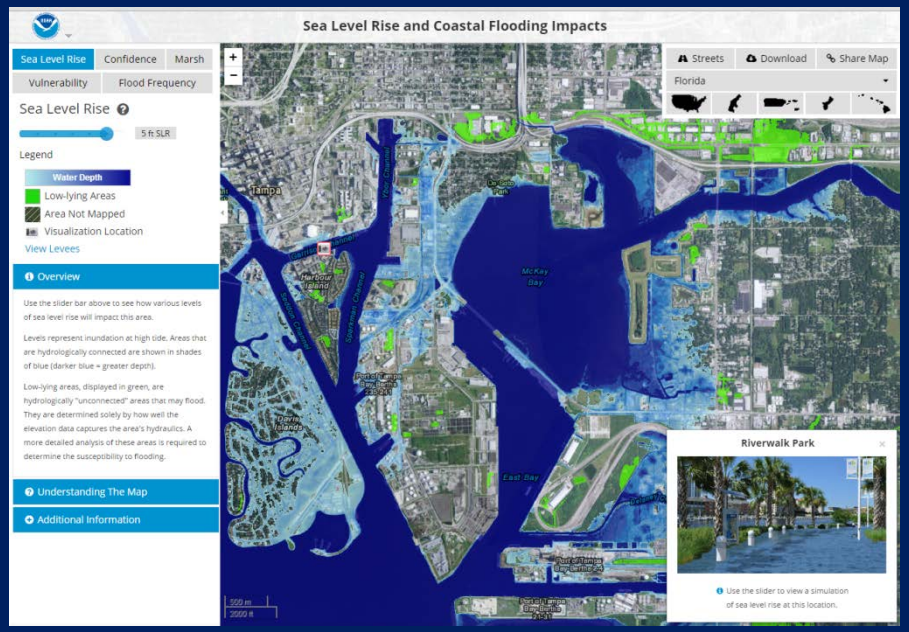
# Digital Coast
# http://coast.noaa.gov/digitalcoast/



# Sea Level Rise Viewer

http://coast.noaa.gov/slr/

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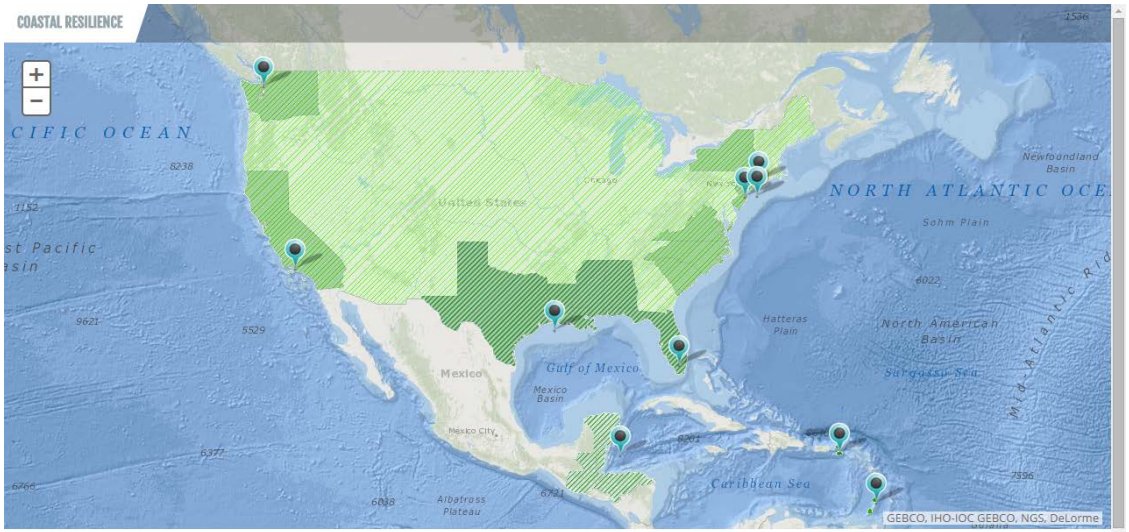
# Coastal Flood Exposure Mapper

http://coast.noaa.gov/digitalcoast/tools/flood-exposure

# Coastal Resilience 2.0

## http://coast.noaa.gov/digitalcoast/tools/coastalresilience
## http://maps.coastalresilience.org/network



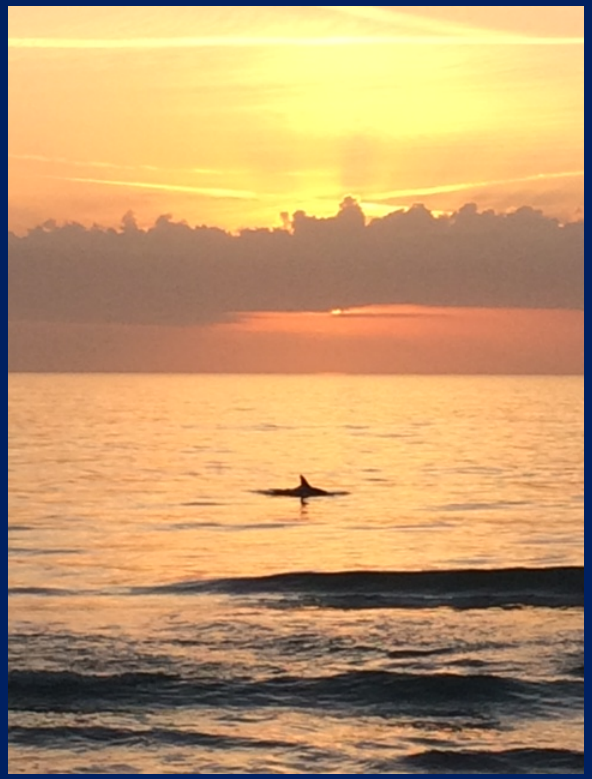

**Coastal Resilience mapping portal**

Click on the blue point markers on the map to navigate to specific geographies, or scroll down to see a list of places where we work. The green hatching on the map represents our Coastal Resilience coverage across countries, regions and states.

Coastal Resilience supports a community of practitioners around the world who are applying spatial planning innovations to coastal hazard risk, resilience and adaptation issues. This is a global network providing access to peer practitioners, tools, information and training focused on nature-based solutions. For more information see our **Coastal Resilience website**

TNC Gulf of Mexico Point of Contact for the Tool is Nicole Love (nlove@tnc.org)

# Questions?



Heidi.Stiller@noaa.gov
850.728.1810

# ADDITIONAL SLIDES
# (includes SLR viewer and Flood Exposure Mapper Demos if cannot get online)

# Climate Literacy Principles

1. The Sun is the primary source of energy for Earth's climate system.
2. Climate is regulated by complex interactions among components of the Earth system.
3. Life on Earth depends on, is shaped by, and affects climate.
4. Climate varies over space and time through both natural and man-made processes.
5. Our understanding of the climate system is improved through observations, theoretical studies, and modeling.
6. Human activities are impacting the climate system.
7. Climate change will have consequences for the Earth system and human lives. (This one ties in with Coastal Hazards, concepts A and C especially)

# SLR Projections

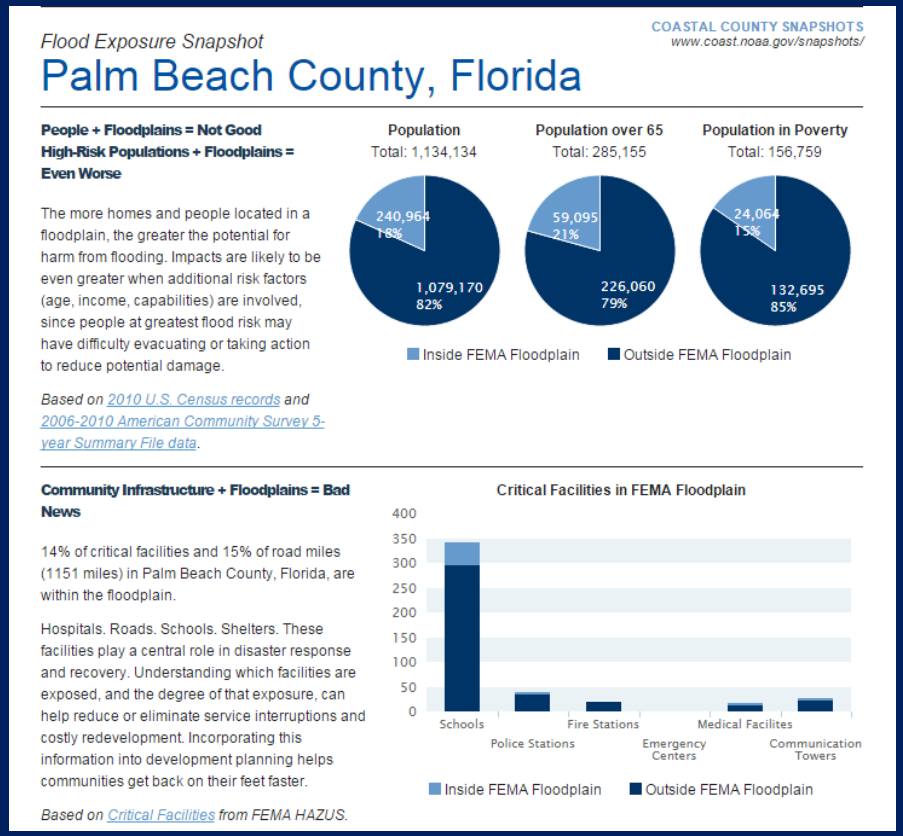
- Global sea levels are rising, but rates vary locally
- Uncertainty remains…so  scenario planning is wise
- Global Sea Level Rise Scenarios for the United States National Climate Assessment (Dec. 2012)

| SLR Scenario | Physical conditions scenario is based on | SLR by 2100 (ft)* |
|---|---|---|
| **Lowest** | Based on historical rates of observed sea level change | 0.7 |
| **Intermediate-low** | Based on projected ocean warming | 1.6 |
| **Intermediate-high** | Based on projected ocean warming and recent ice sheet loss | 3.9 |
| **Highest** | Based on ocean warming and the maximum plausible contribution of ice sheet loss and glacial melting | 6.6 |

# “Snapshots” of County Flood Hazards

## Coastal County Snapshots

**http://coast.noaa.gov/digitalcoast/tools/snapshots**

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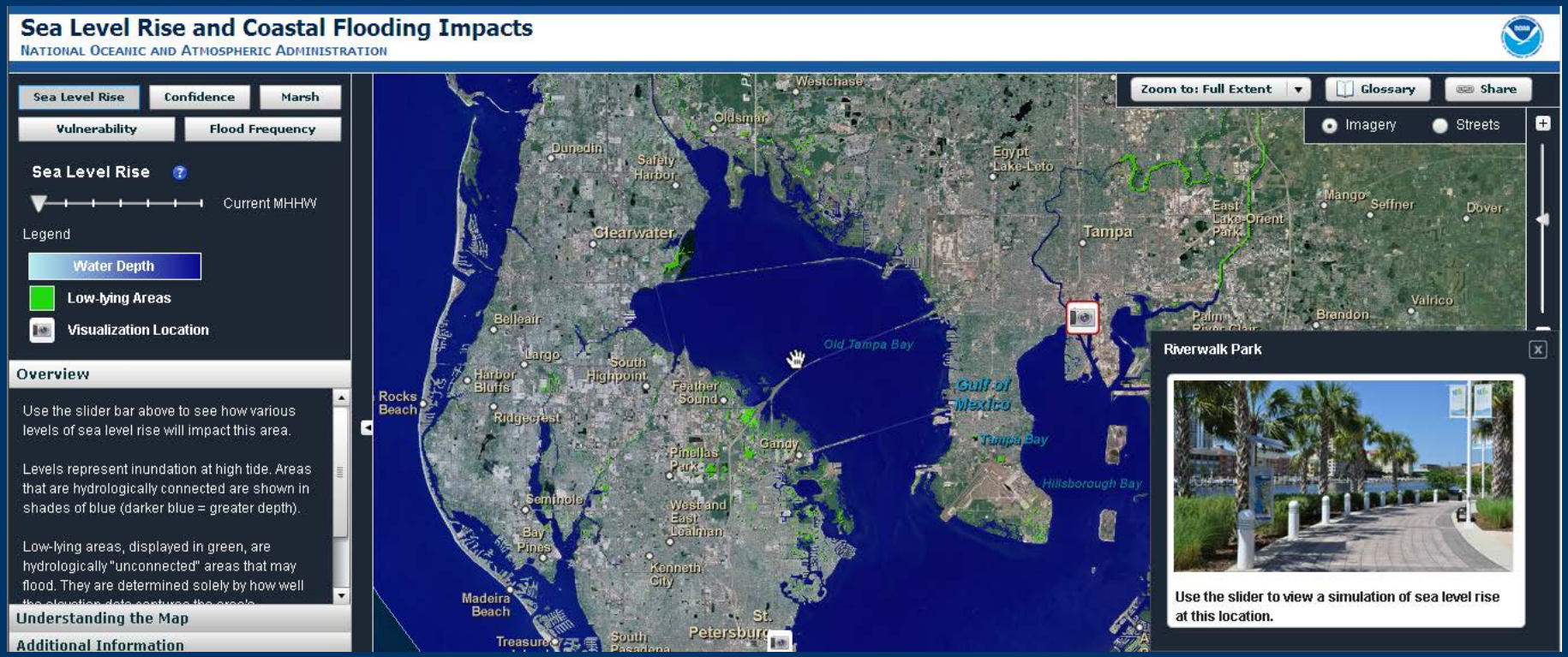
# Sea Level Rise and Coastal Flooding Impacts Viewer

*http://coast.noaa.gov/digitalcoast/tools/slrviewer/*

# Sea Level Rise Impacts

## Current

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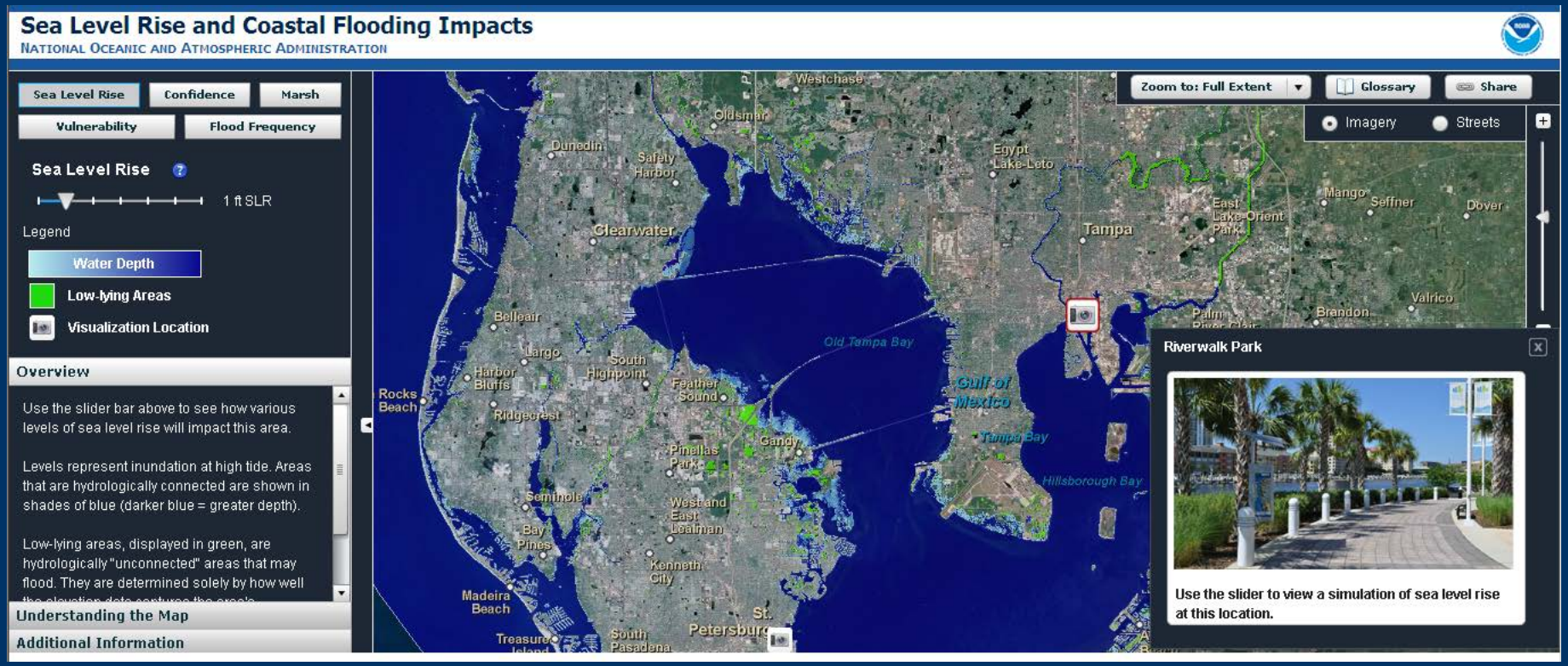
# Sea Level Rise Impacts

## 1 Foot SLR




NOAA Coastal Services Center
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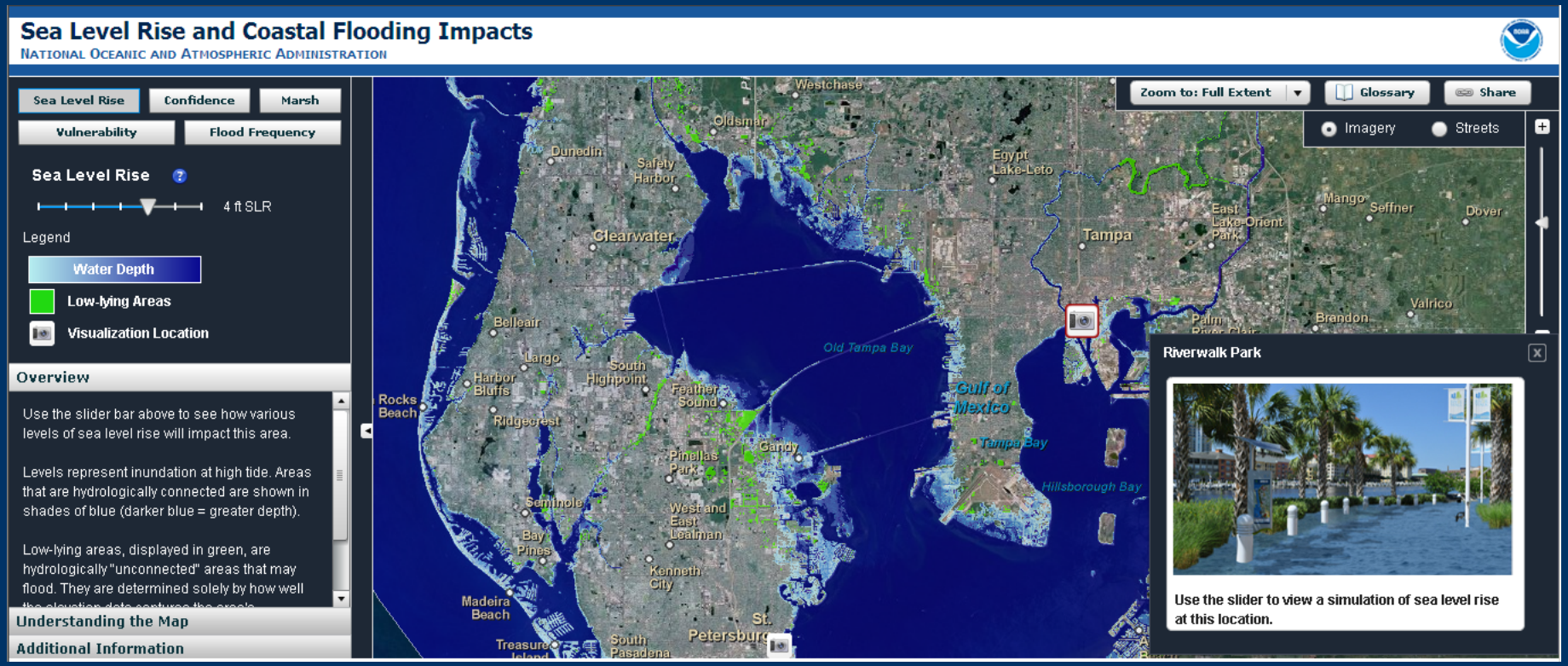
# Sea Level Rise Impacts

## 4 Feet SLR

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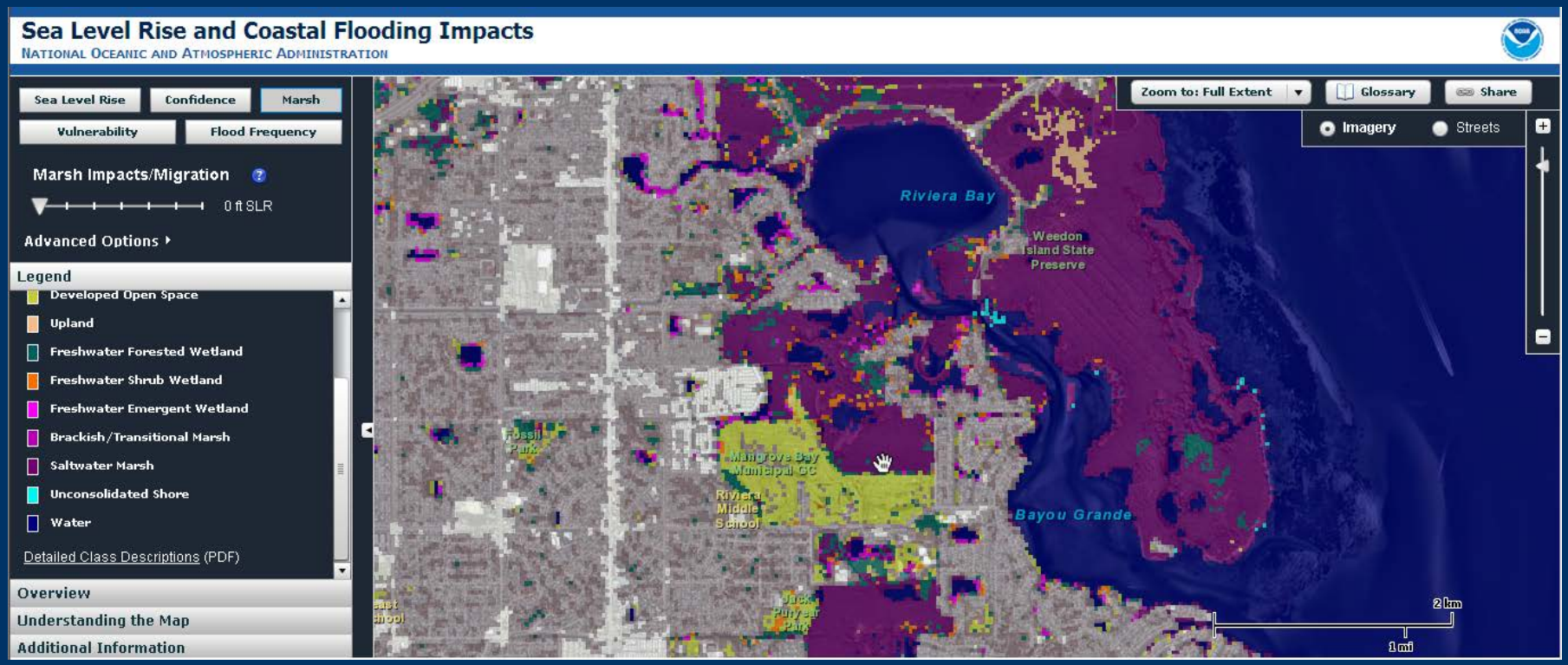
# Marsh Impacts

## Current

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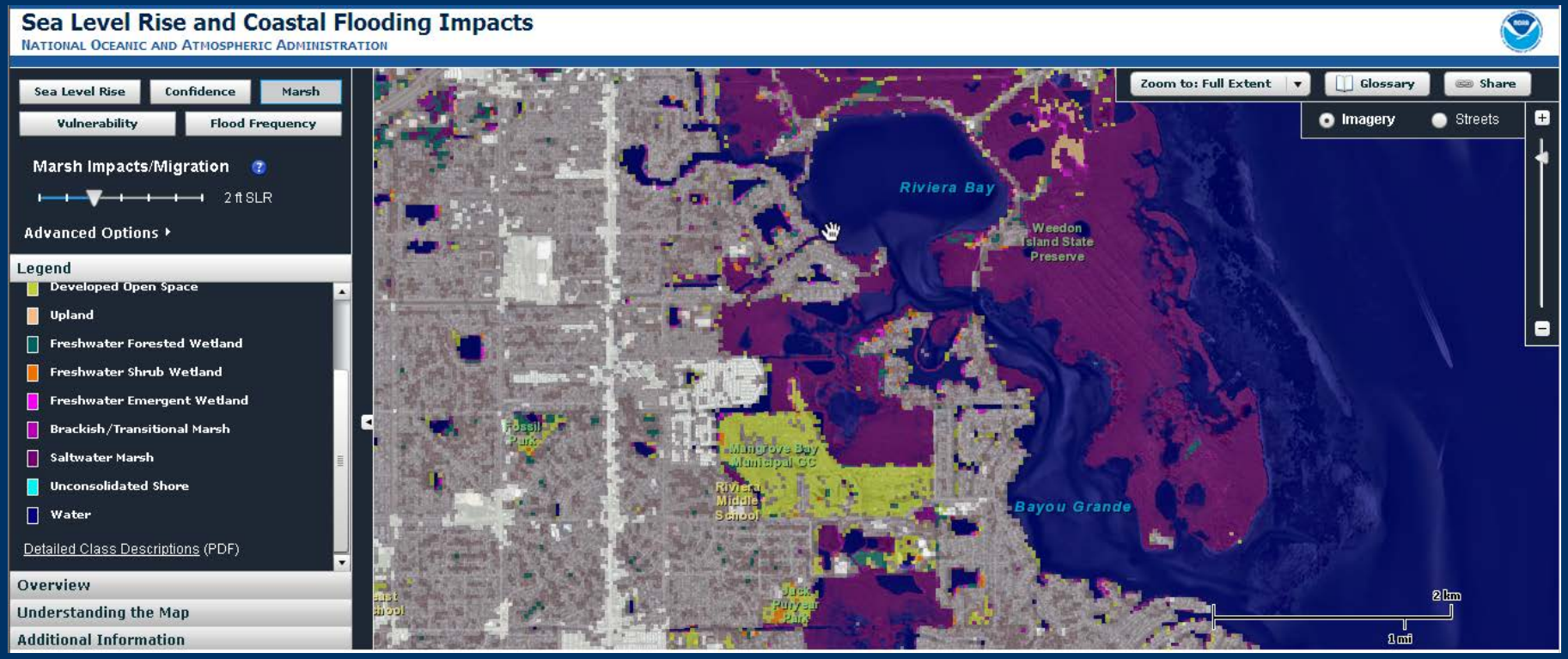
# Marsh Impacts

## 2 Feet SLR

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# Social Vulnerability Index (SoVI) Data at the Block Group Level

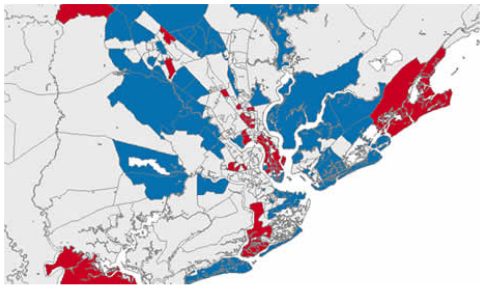
**Data**

## Social Vulnerability Index (SoVI) Census 2000 Block Groups

NOAA Coastal Services Center **and** University of South Carolina Hazards and Vulnerability Research Institute

### Overview

The Social Vulnerability Index (SoVI) measures the social vulnerability of U.S. counties to environmental hazards and has been applied to Census block groups through a collaboration with the NOAA Coastal Services Center. The index is a comparative metric that helps users examine differences in social vulnerability among counties or, in this case, block groups. SoVI graphically illustrates the geographic variation in social vulnerability.



It is a valuable tool for policy makers and practitioners because it shows differences in capacity for preparedness and response, as well as areas where resources might be used most effectively to reduce vulnerability. SoVI is also useful as an indicator in determining the level of recovery from disasters.

For more information, visit http://webra.cas.sc.edu/hvri/products/sovi.aspx

### Data Specifications

**Area of Coverage:** National (coastal)

**Dates Available:** Census 2000

**Format:** Shapefile

**Scale:** Census Block Group

### Get It Now

FTP Download

- Zip file containing all coastal states

Data Access Viewer

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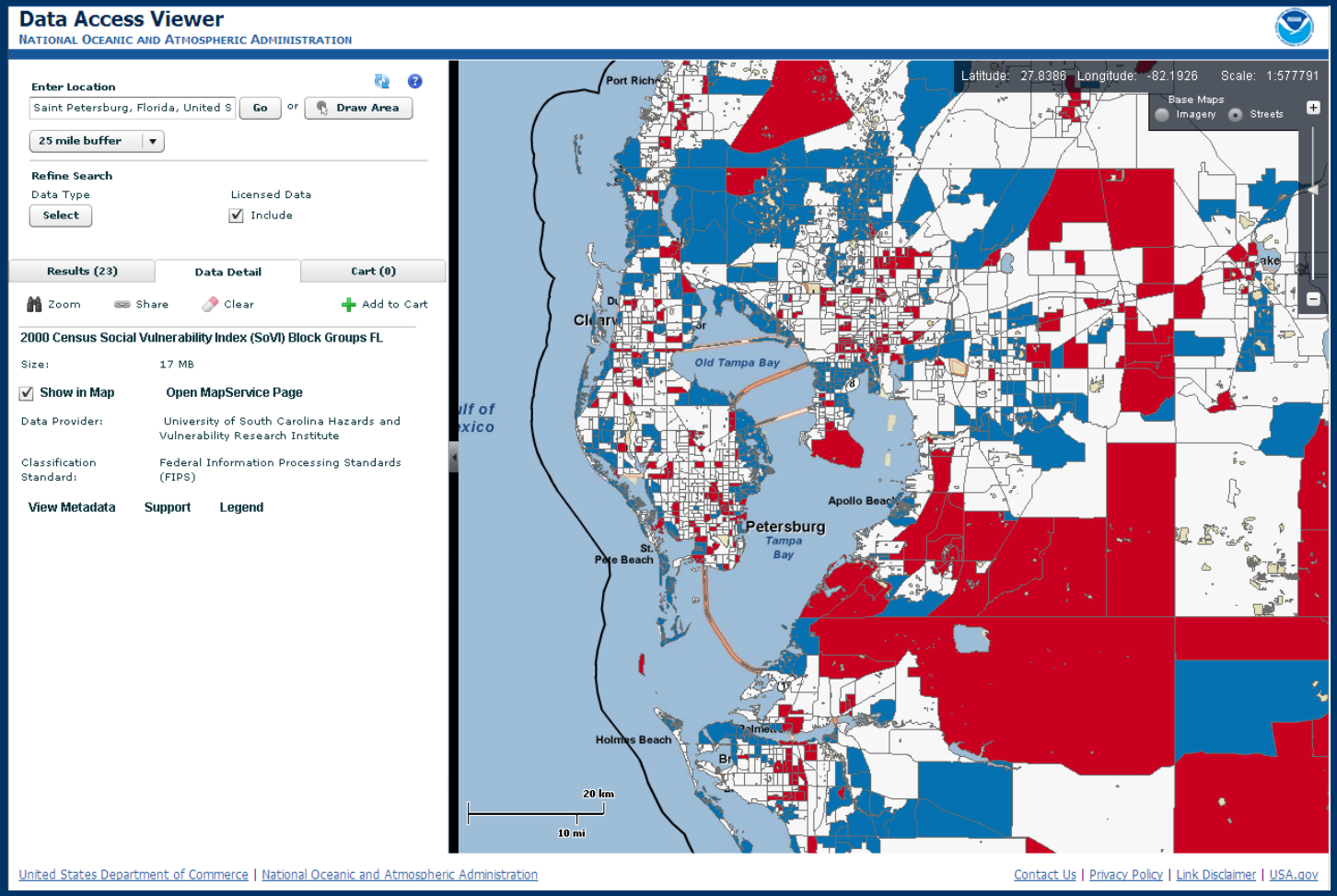
# SoVI: Data Access Viewer

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# Coastal Flood Exposure Mapper

## http://coast.noaa.gov/digitalcoast/tools/flood-exposure

# Assessing Coastal Community Exposure to Flood Hazards

## Select the Flood Hazards Map or One of the Community Exposure Maps

Select a section below to view maps showing flood hazards or different aspects of community exposure to those flood hazards.

First-time user? Starting with Flood Hazards is a good idea.

### Flood Hazards

Flooding events are among the more frequent, costly, and deadly hazards that can impact coastal communities. There are two types:

- Short-term (episodic) – Temporary flooding caused by extreme conditions, including storm surge, tsunamis, inland flooding, and

### Societal Exposure

Understanding the populations that live in or near coastal flood-prone areas is an important information need, since residents who are elderly, who live in high-density areas, or who are impoverished may merit special considerations.

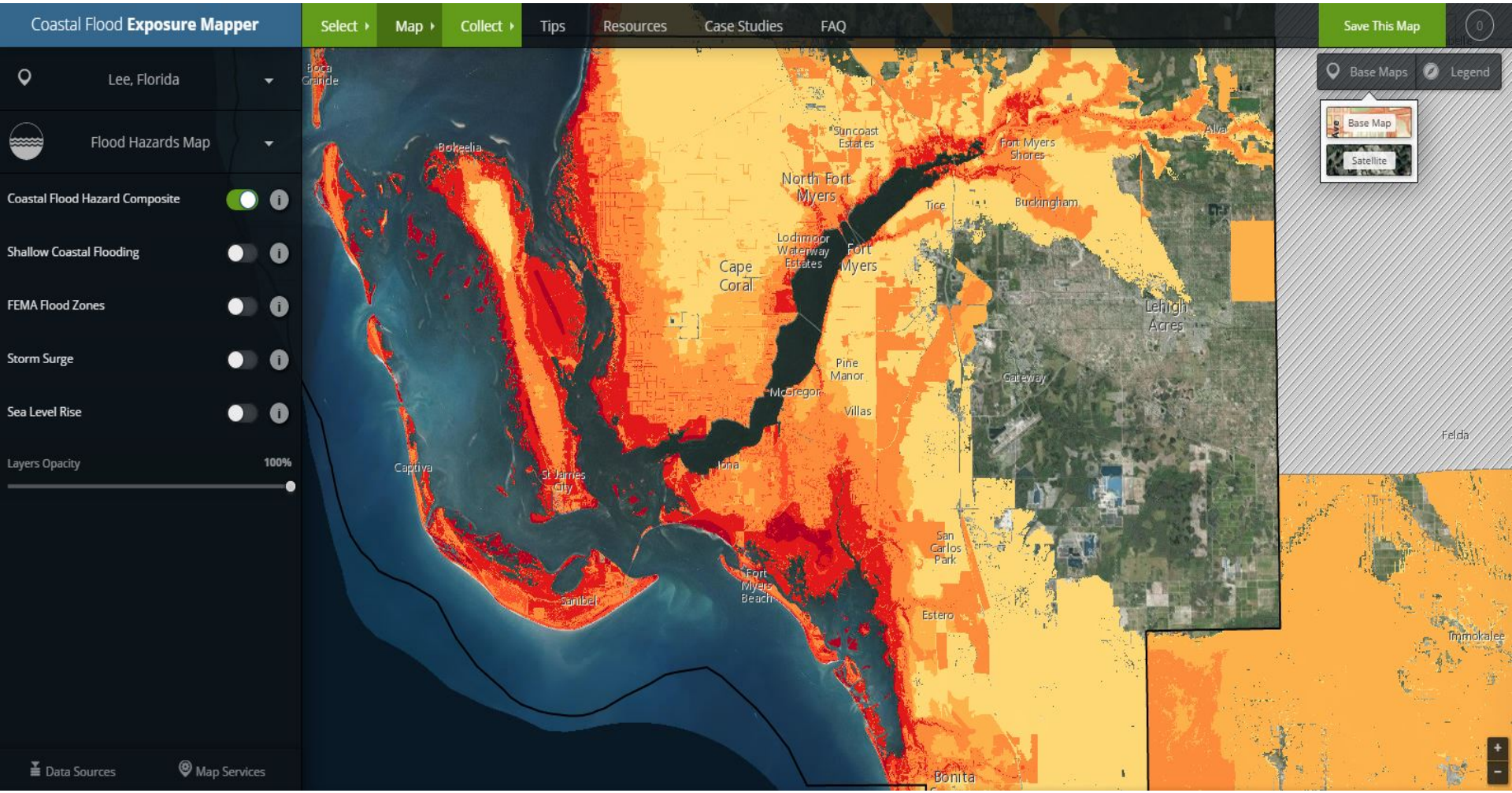
### Infrastructure Exposure

Community infrastructure, including roads, bridges, and water and sewer systems, can be damaged by coastal flooding. Communities should first assess infrastructure vulnerabilities and associated environmental and economic issues to determine what steps are needed to protect these assets.

### Ecosystem Exposure

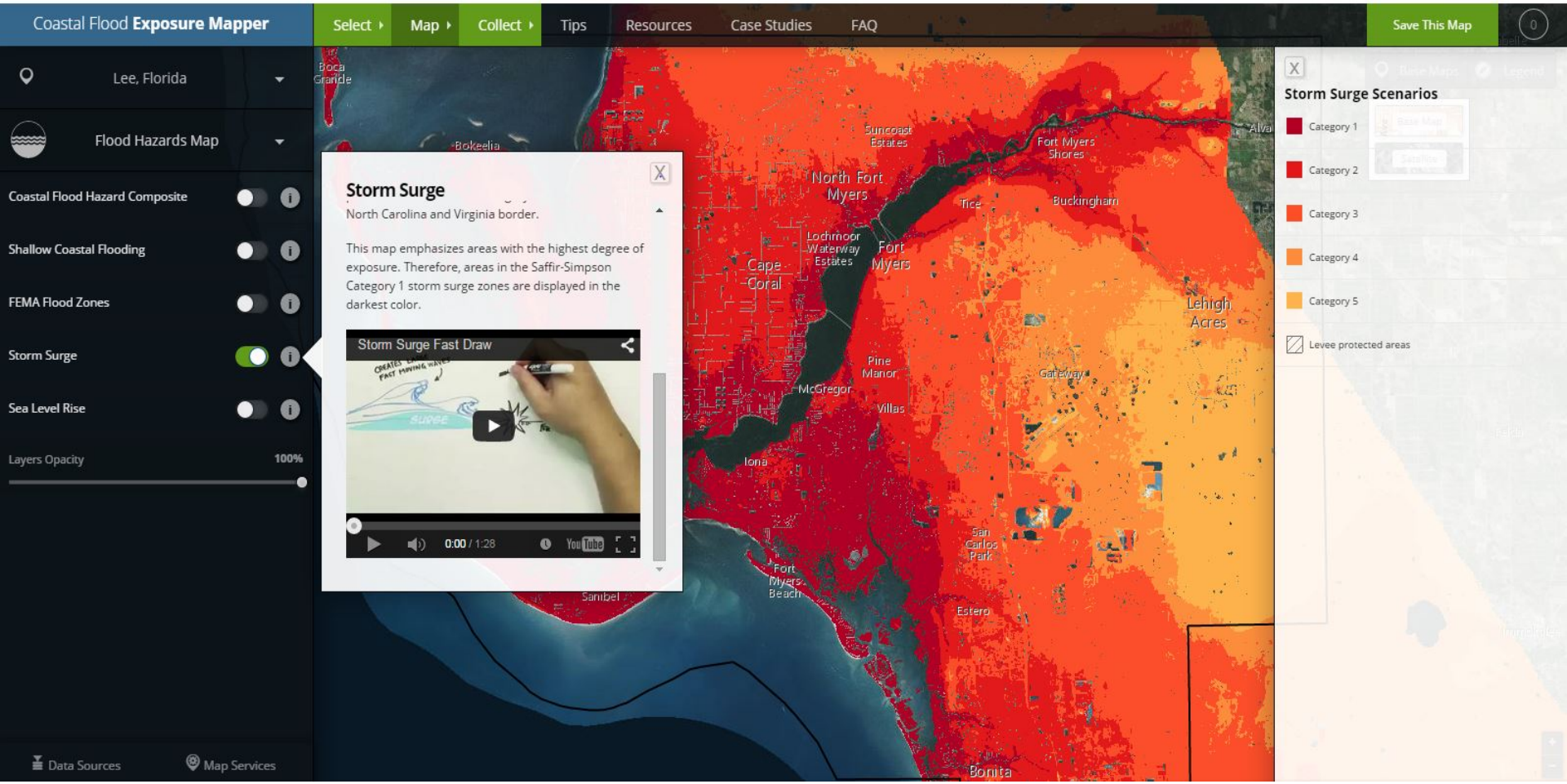
Natural areas provide important benefits to coastal communities, including hazard protection, flood storage, water quality maintenance, fisheries support, and recreational opportunities. Communities can increase resilience by protecting natural areas along the coast that are exposed to flooding and adjacent inland areas

# Flood Hazard Composite Map




*coast.noaa.gov/digitalcoast/tools/flood-exposure* **Office for Coastal Management**

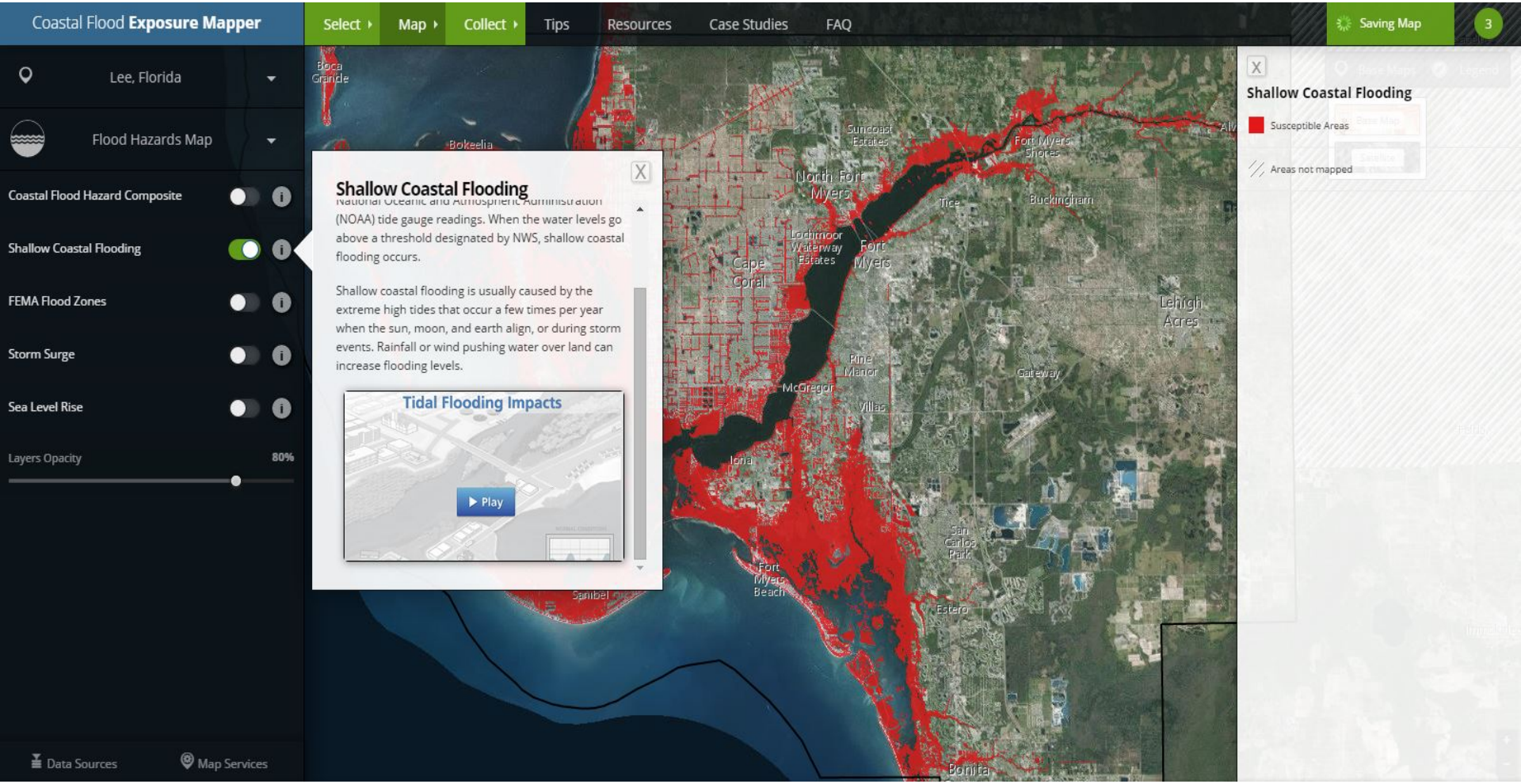
# Storm Surge Map




[VIDEO: Storm Surge Fast Draw]

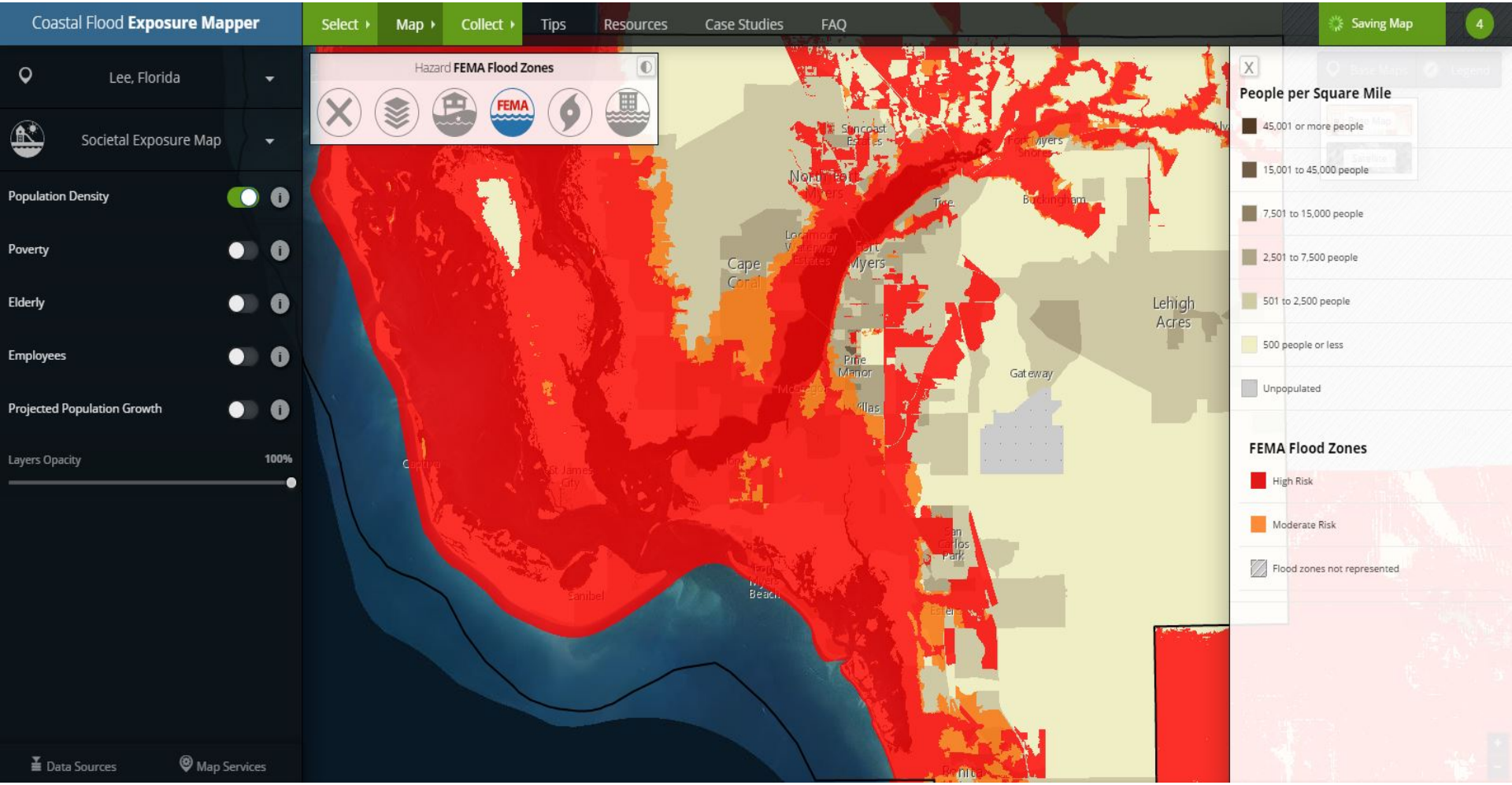
**Office for Coastal Management**

# Shallow Coastal Flooding Map




*coast.noaa.gov/digitalcoast/tools/flood-exposure* **Office for Coastal Management**

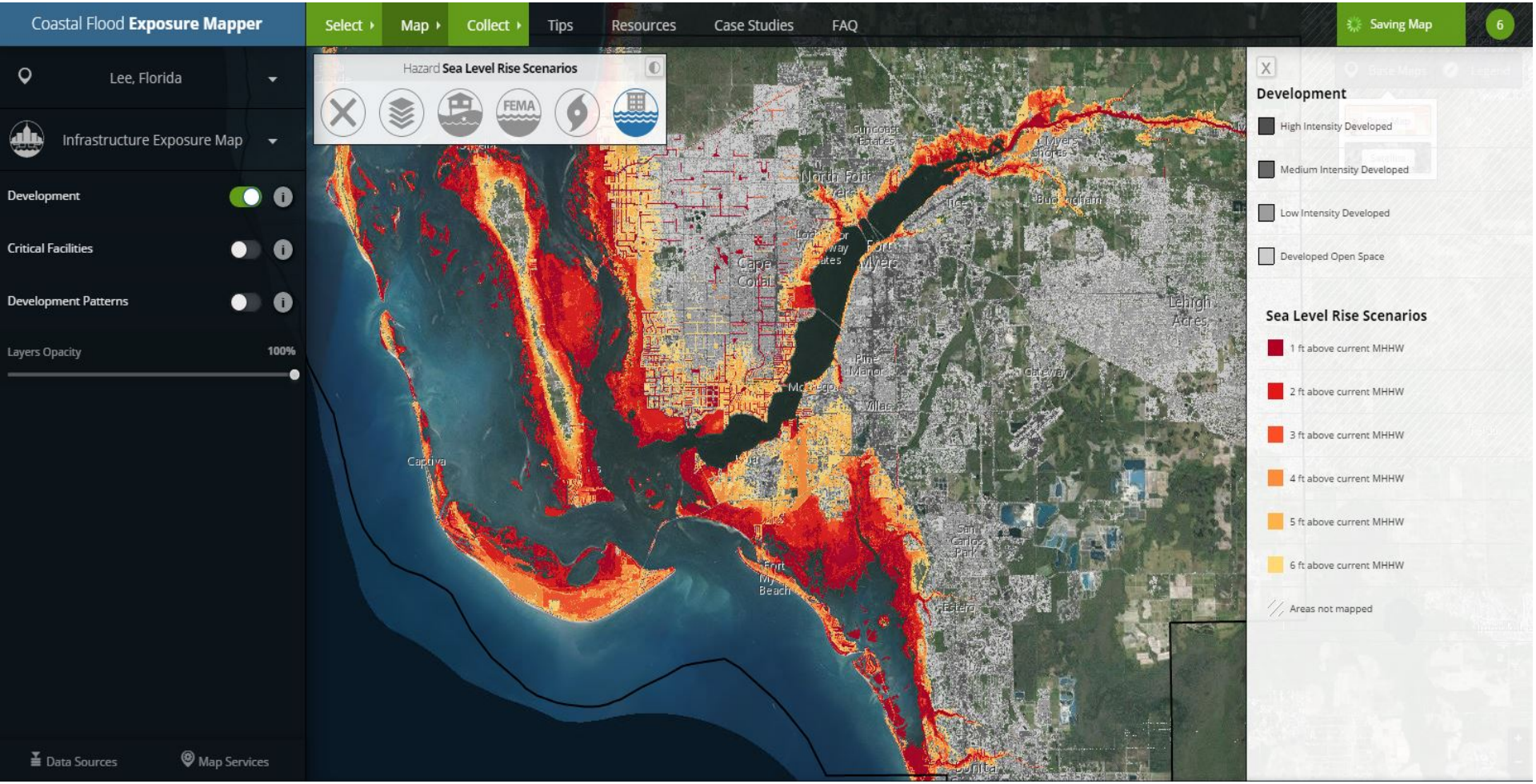
# Population Density and FEMA Flood Zones




*coast.noaa.gov/digitalcoast/tools/flood-exposure*

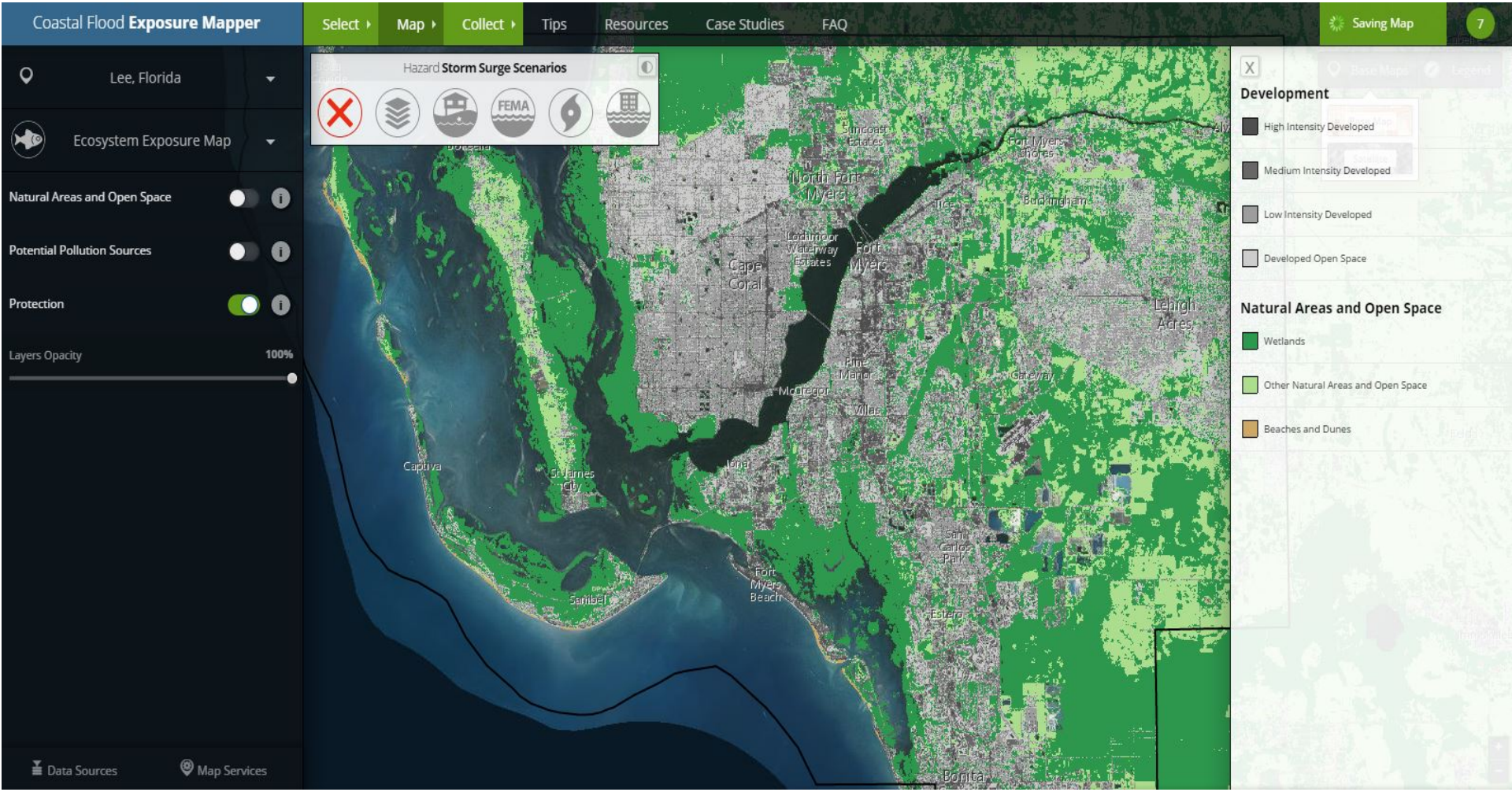
**Office for Coastal Management**

# Development and SLR Scenarios




*coast.noaa.gov/digitalcoast/tools/flood-exposure* **Office for Coastal Management**

# Natural Protection Map




*coast.noaa.gov/digitalcoast/tools/flood-exposure* **Office for Coastal Management**

# Collecting and Sharing Maps!

Coastal Flood **Exposure Mapper** | Select | Map | Collect | Tips | Resources | Case Studies | FAQ | Save This Map | 9

## Collect and Share Your Maps

Download and print these maps or copy the link to share online with colleagues or in a community workshop.

Important: These maps will not be saved once you leave this site. To ensure your work is safe, either create and download a PDF or save and share the map URLs.

Tips for using these maps

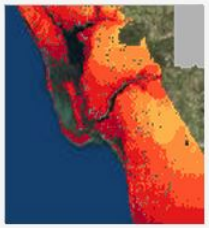
**Coastal Flood Hazard Composite**

View Map

Map URL

http://go.usa.gov/3WNrB

**Storm Surge**



View Map

Map URL

http://go.usa.gov/3WNrQ

**Shallow Coastal Flooding**

View Map

Map URL

http://go.usa.gov/3WNgk

**Population Density**

View Map

Map URL

http://go.usa.gov/3WN2T

**Projected Population Growth**

**Development**

**Protection**

Print Maps

*coast.noaa.gov/digitalcoast/tools/flood-exposure*

**Office for Coastal Management**