

# Scenario Planning for Coastal Adaptation

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# NOAA Forecast for this talk

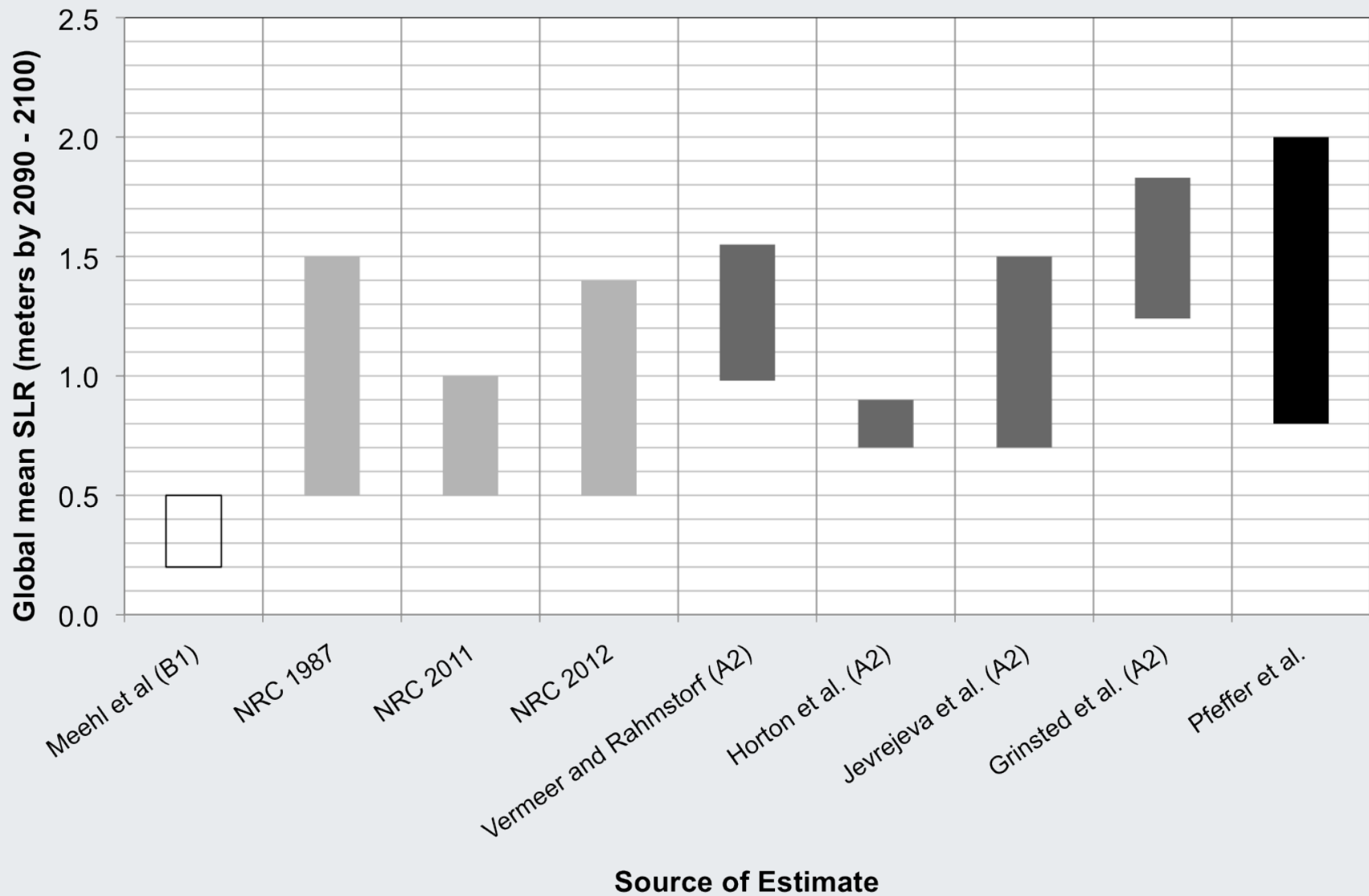
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NCA Scenarios and Scenario Planning

Global Sea Level Scenarios

Using Scenarios

# Wading through the literature



# Regions of the US National Climate Assessment



# An Interagency Effort

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Adam Parris, NOAA (Lead)

Peter Bromirski, Scripps Institution of Oceanography

Virginia Burkett, USGS

Dan Cayan, Scripps Institution of Oceanography & USGS

Mary Culver, NOAA

John Hall, DOD

Radley Horton, Columbia University

Kevin Knutti, USACE

Richard Moss, University of Maryland, PNNL

Jayantha Obeysekera, South Florida Water Management District

Abby Sallenger, USGS

Jeremy Weiss, University of Arizona



# SCENARIOS...

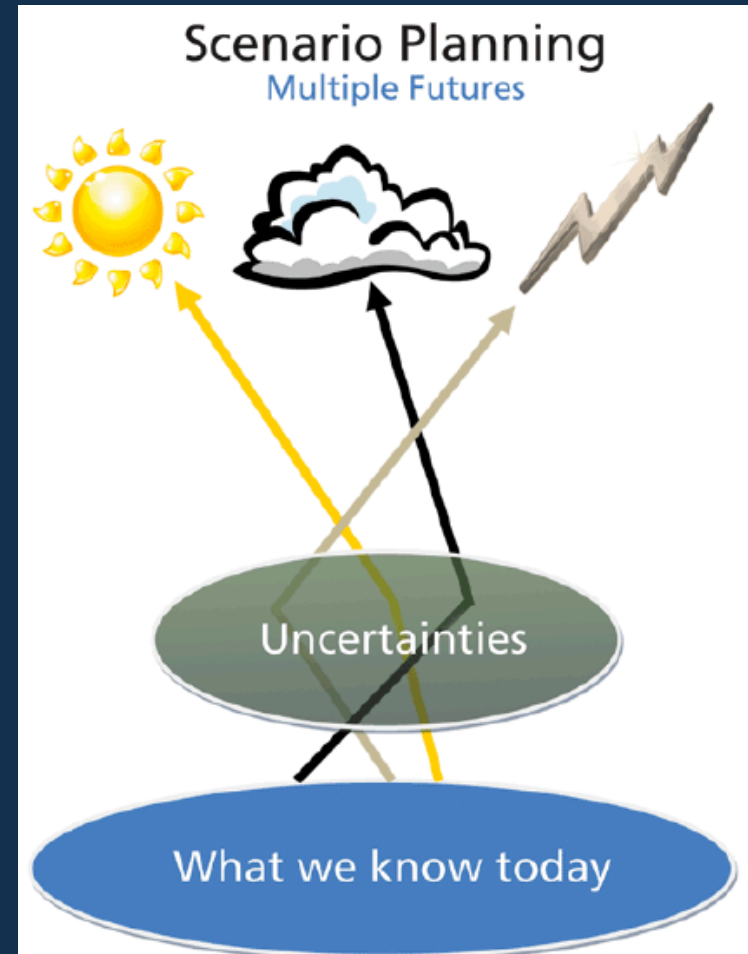
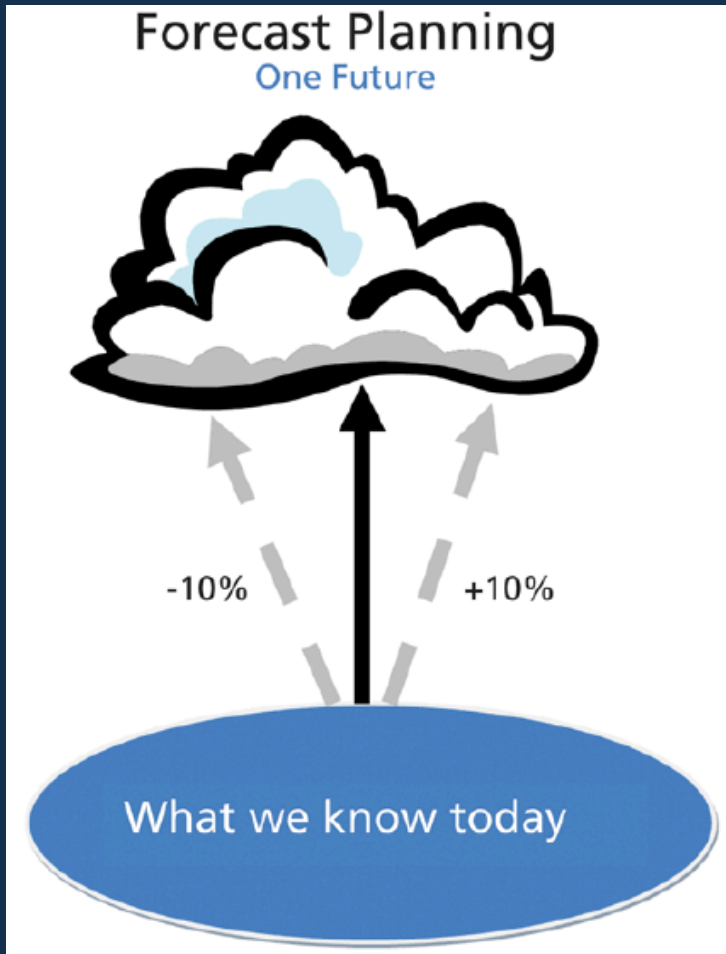
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...**ARE** trajectories of environmental change for the purpose of risk and vulnerability assessment to inform the development of robust adaptation options

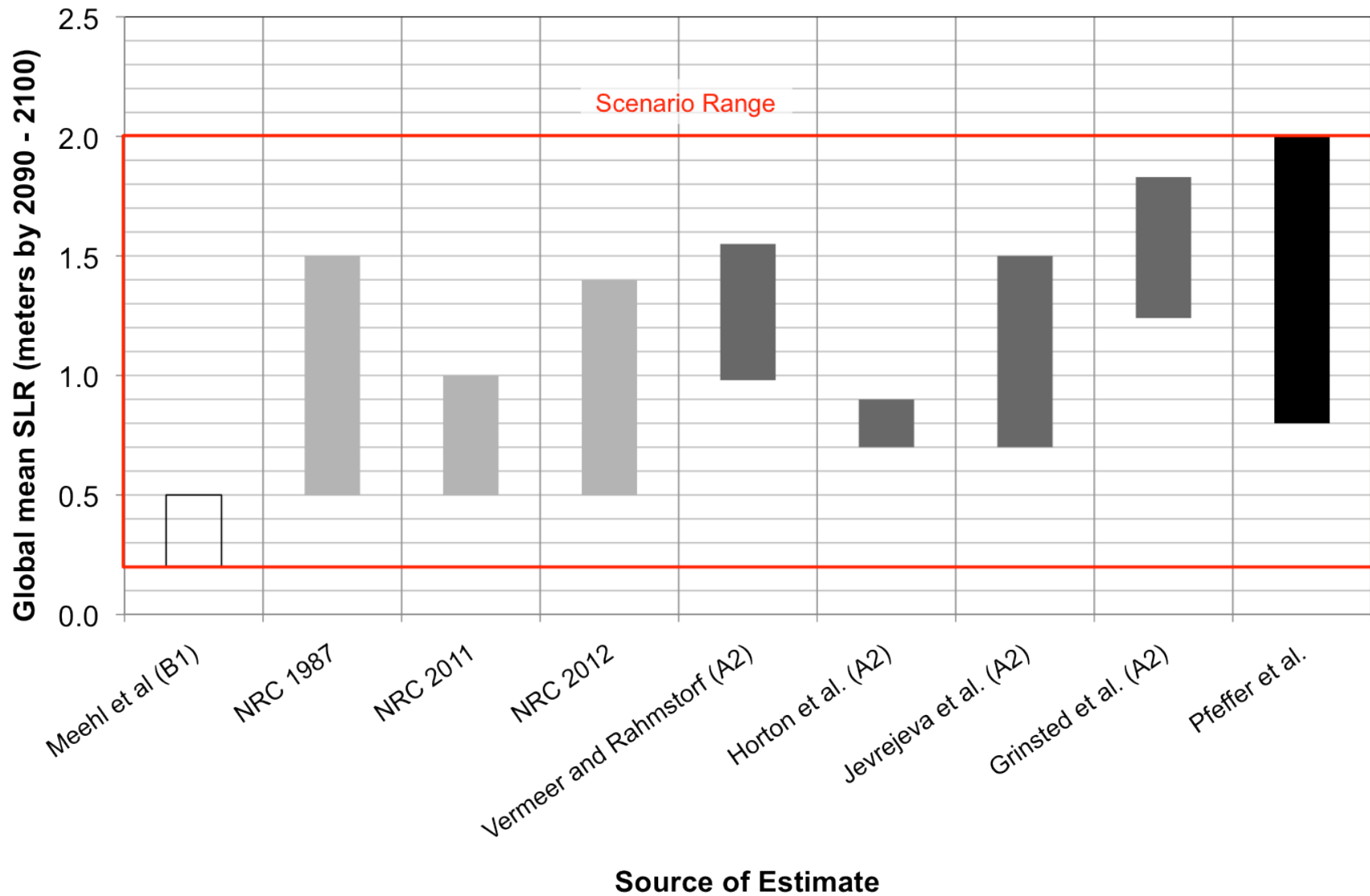
...**ARE NOT** predictions or projections of what will happen

...**ARE NOT** formed under the assumption of reducing uncertainty

# Why use multiple scenarios?

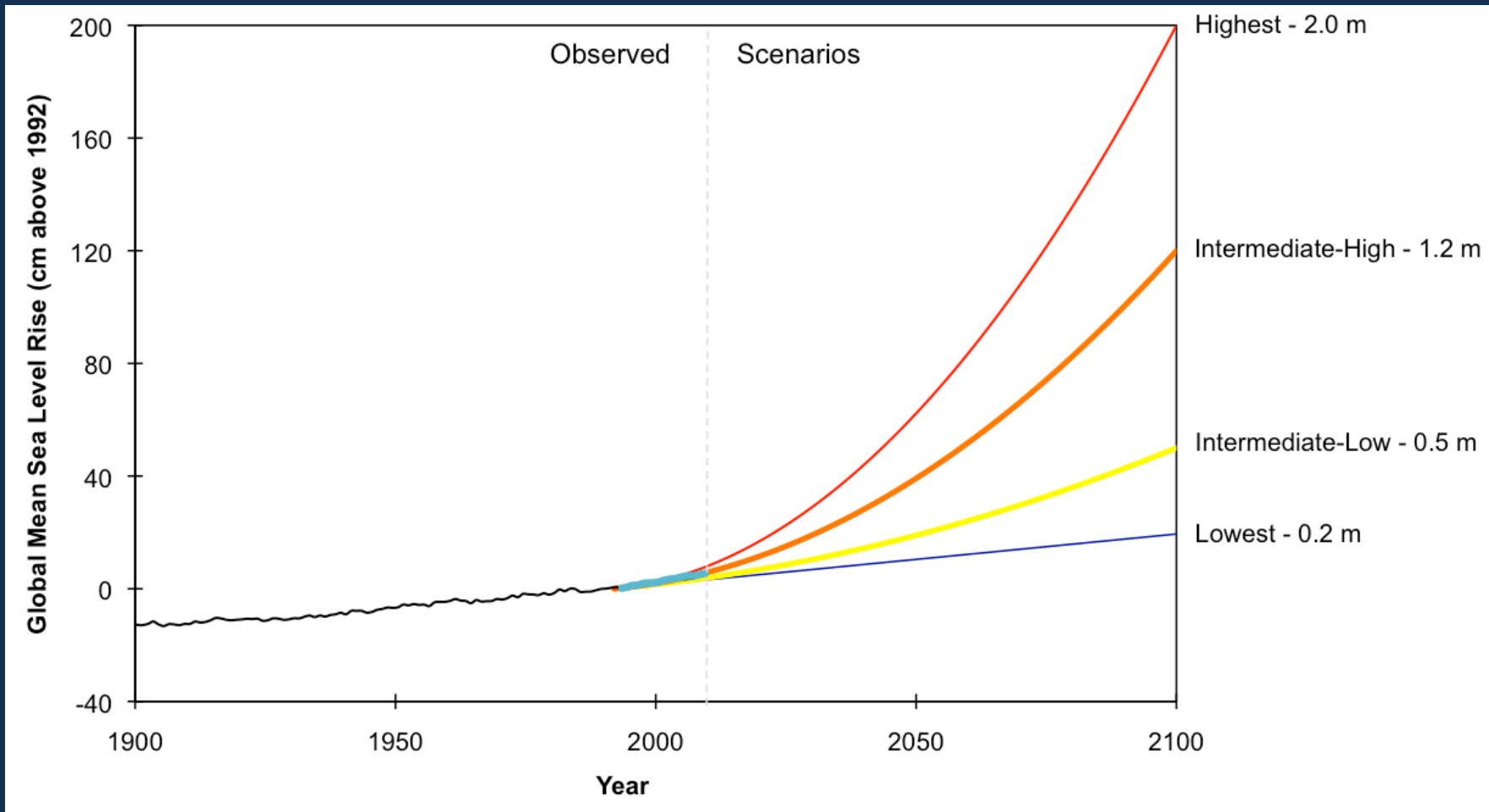


# What does the literature say?





# Global SLR Scenarios

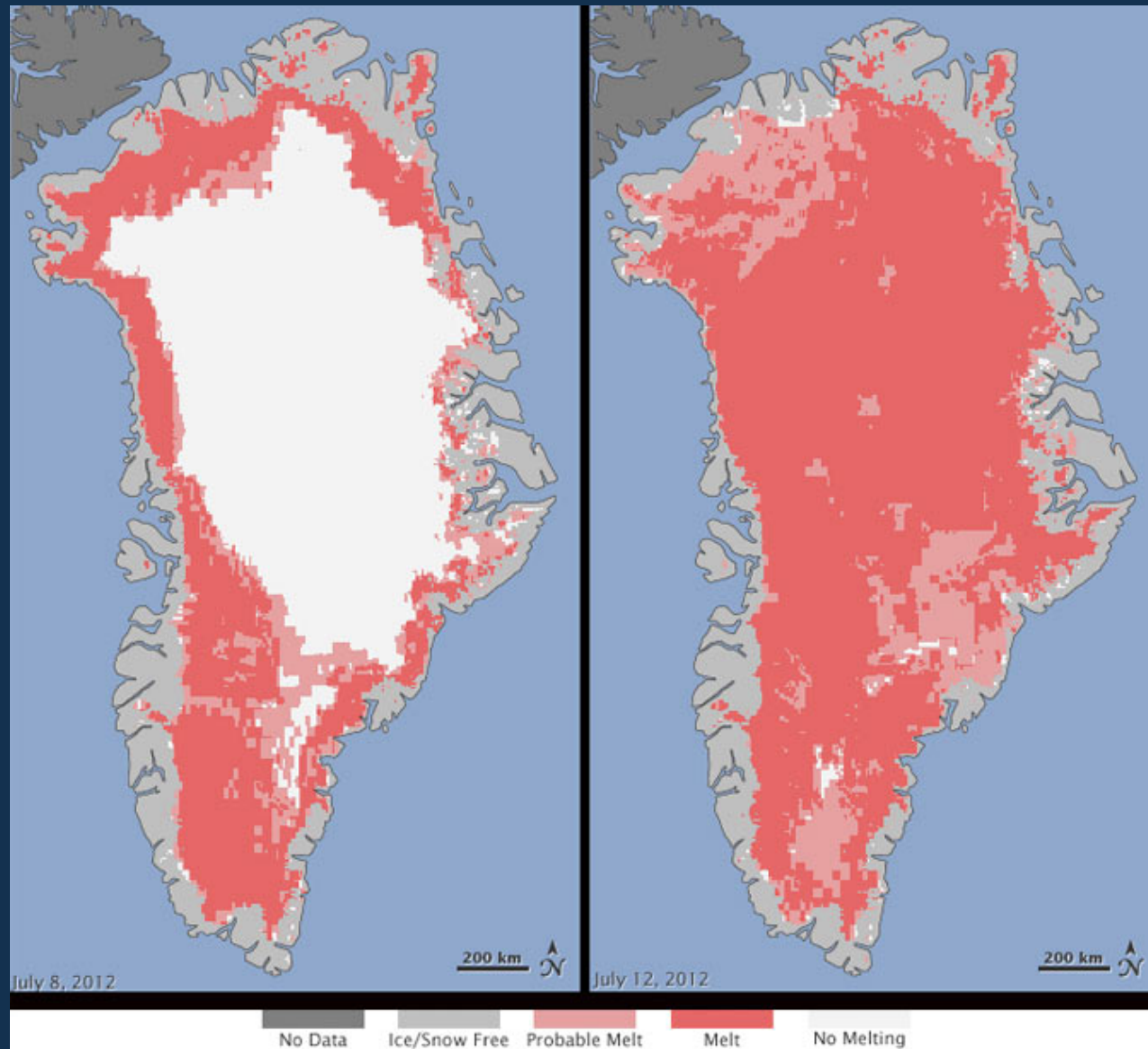


# Risk-based framing

We have very high confidence (>9 in 10 chance) that global mean sea level will rise at least 0.2 meters (8 inches) and no more than 2.0 meters (6.6 feet) by 2100.

Confidence Level	Possible Contributing Factors
Very High	Strong evidence (established theory, multiple sources, consistent results, well documented and accepted methods, etc), high consensus
High	Moderate evidence (several sources, some consistency, methods vary and/or documentation limited, etc.), medium consensus
Medium	Suggestive evidence (a few sources, limited consistency, models incomplete, methods emerging, etc.), competing schools of thought
Low	Inconclusive evidence (limited sources, extrapolations, inconsistent findings, poor documentation and/or methods not tested, etc.), disagreement or lack of opinions among experts

# Greatest source of uncertainty

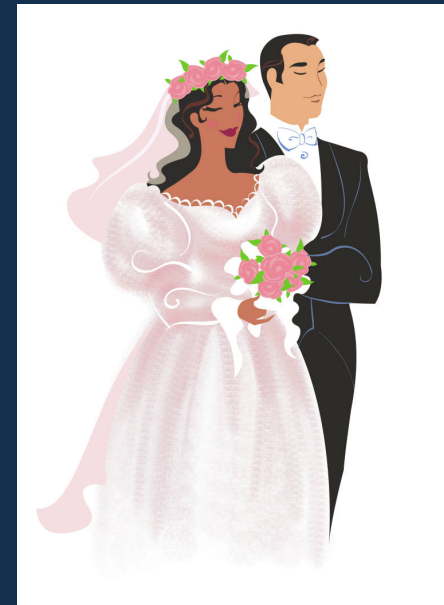


Source: NASA

# A decision analogy

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Tomorrow there is a chance of rain, but what do you have planned for tomorrow?



# Why such a large scenario range?



Higher risk tolerance:

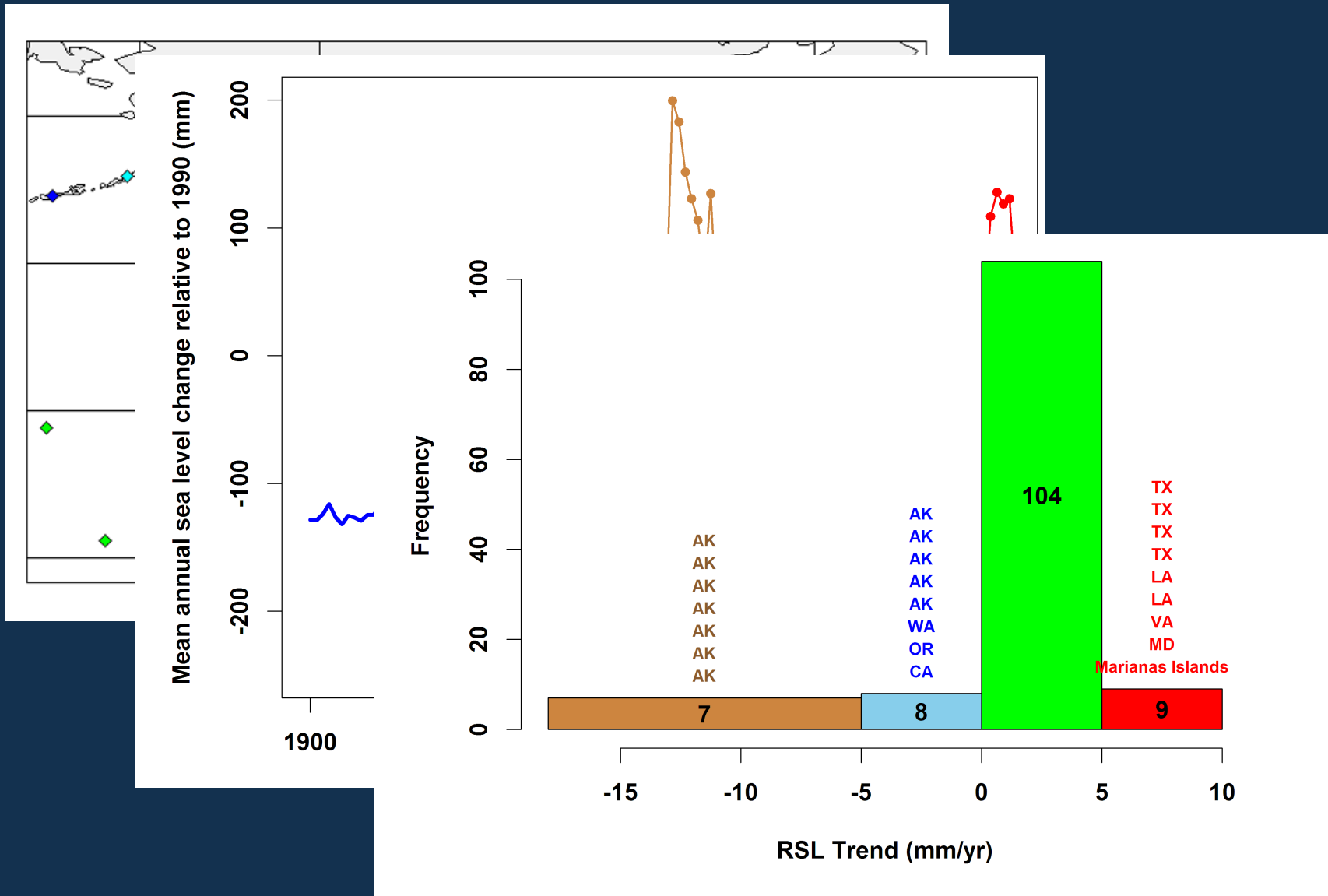
- Greater flexibility to accommodate flooding
- Lower consequence
- Ability to change in near term



Lower risk tolerance:

- Little flexibility to accommodate flooding
- Higher consequence
- Inability to change in near term

# Sea level change will vary regionally and locally

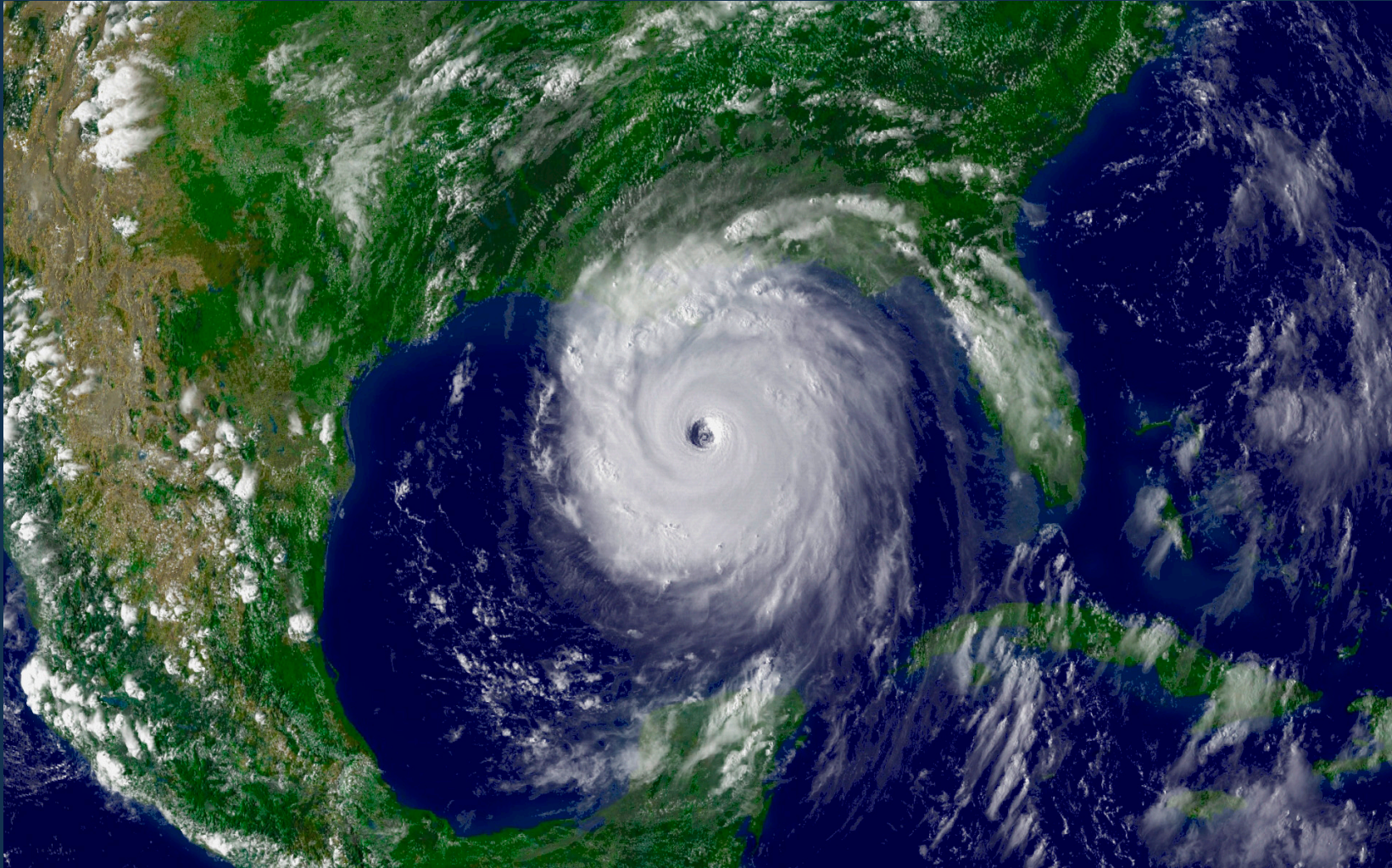


Data Source: NOAA CO-OPS



# Coastal flooding and extremes

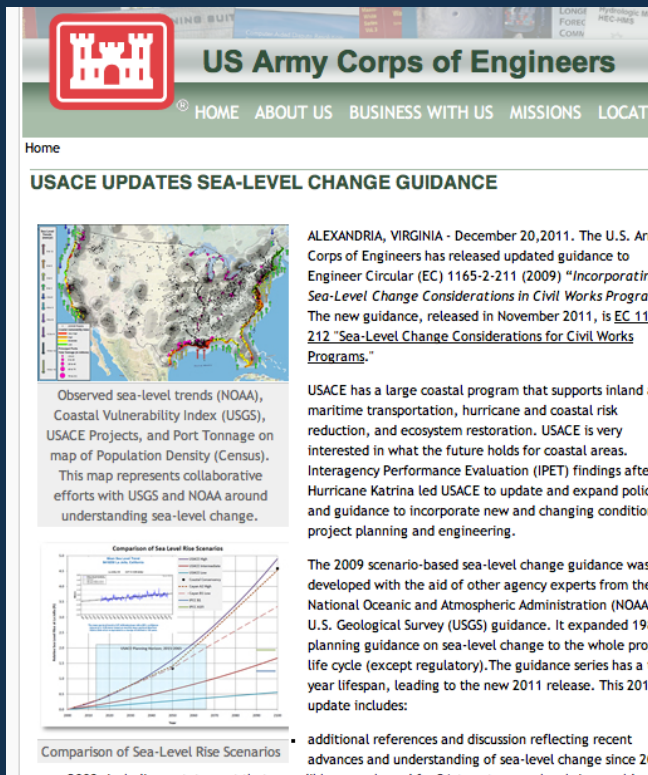
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Source: NOAA



# Resources



**US Army Corps of Engineers**

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### USACE UPDATES SEA-LEVEL CHANGE GUIDANCE

ALEXANDRIA, VIRGINIA - December 20, 2011. The U.S. Army Corps of Engineers has released updated guidance to Engineer Circular (EC) 1165-2-211 (2009) "Incorporating Sea-Level Change Considerations in Civil Works Programs." The new guidance, released in November 2011, is EC 1165-2-212 "Sea-Level Change Considerations for Civil Works Programs."

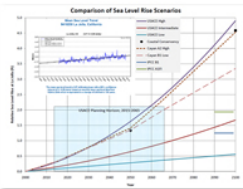
Observed sea-level trends (NOAA), Coastal Vulnerability Index (USGS), USACE Projects, and Port Tonnage on map of Population Density (Census). This map represents collaborative efforts with USGS and NOAA around understanding sea-level change.

USACE has a large coastal program that supports inland maritime transportation, hurricane and coastal risk reduction, and ecosystem restoration. USACE is very interested in what the future holds for coastal areas. Interagency Performance Evaluation (IPET) findings after Hurricane Katrina led USACE to update and expand policy and guidance to incorporate new and changing conditions for project planning and engineering.

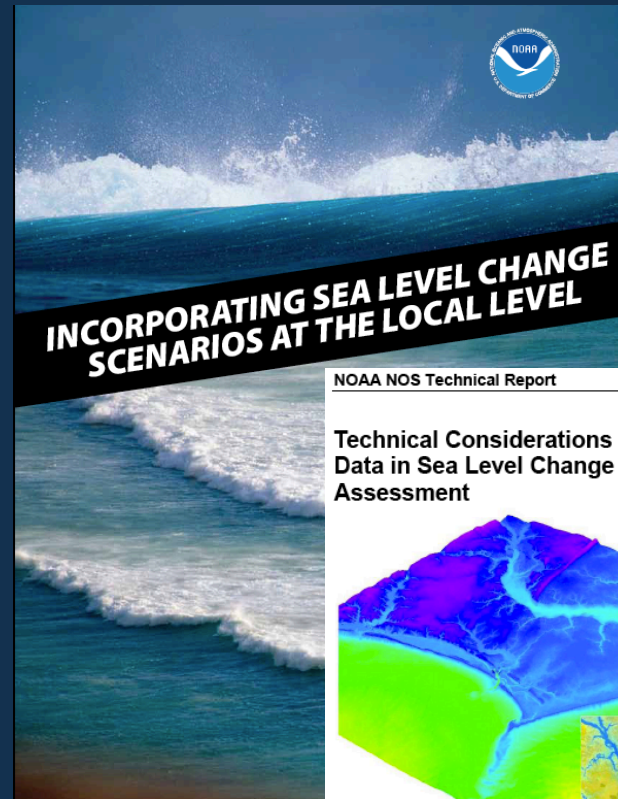
The 2009 scenario-based sea-level change guidance was developed with the aid of other agency experts from the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Geological Survey (USGS) guidance. It expanded 1980s planning guidance on sea-level change to the whole project life cycle (except regulatory). The guidance series has a 10-year lifespan, leading to the new 2011 release. This 2011 update includes:

- additional references and discussion reflecting recent advances and understanding of sea-level change since 2009.

Comparison of Sea-Level Rise Scenarios

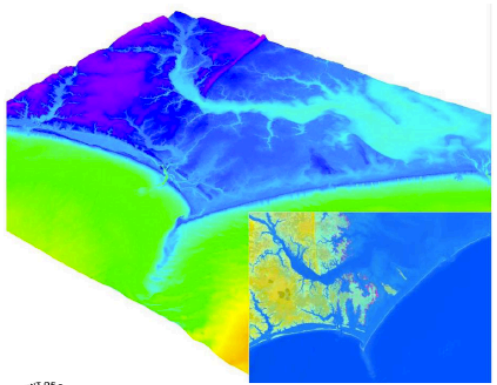


Comparison of Sea-Level Rise Scenarios



NOAA NOS Technical Report

### Technical Considerations for Use of Geospatial Data in Sea Level Change Mapping and Assessment



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Ocean Service  
Silver Spring, Maryland  
September 2010

NOS SLR tech report [http://www.csc.noaa.gov/publications/slc\\_tech.pdf](http://www.csc.noaa.gov/publications/slc_tech.pdf)

Incorporating Sea Level Change Scenarios at the Local Level - <http://www.csc.noaa.gov/digitalcoast/publications/slscenarios>

Marshes on the Move - <http://www.csc.noaa.gov/publications/marshesonthemove.html>

SLR viewer <http://www.csc.noaa.gov/slr>



# Available via NOAA Digital Coast Tools

[www.csc.noaa.gov/digitalcoast/](http://www.csc.noaa.gov/digitalcoast/)



Home Data Tools Training Approaches ▾ In Action

## Tools

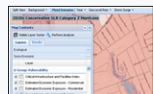
Welcome to the new Digital Coast. If you have questions or comments, please [take a video tour](#) or [contact us](#).

The tools on this page support coastal decision-making by transforming Digital Coast data into information tailored for specific issues. Some tools are Web-based, providing direct online analysis and viewing, while others are downloadable extensions that provide new functionality for desktop geographic information systems. Have an idea for a tool you would like to see in the Digital Coast? [Make a tool suggestion to the Digital Coast](#).

Filter by Category:  Filter by Issue:

### Data Visualization Tools

Present dynamic views of spatial data. Some may offer data download capabilities



#### Coastal Resilience Long Island

**The Nature Conservancy**

Enables users to visualize coastal hazards impacting Long Island, New York

[More Info](#) [Get It Now](#)



#### Community Resource Inventory (South Carolina)

**Clemson University**

Provides an online mapping atlas of the natural and cultural resources in a community

[More Info](#) [Get It Now](#)



#### Historical Hurricane Tracks IMS

**NOAA**

Enables viewers to find tropical cyclone data in the Atlantic and Eastern Pacific Basins

### Featured Tool

#### Multipurpose Marine Cadastre

Provides a framework for marine spatial planning efforts

### Tool Resources

#### Ecosystem-Based Management Tools Network

Supports the implementation of



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## Tools

### Sea Level Rise Impacts Viewer

NOAA Coastal Services Center

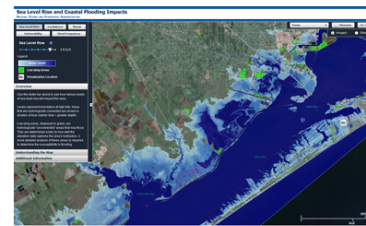
#### Overview

Being able to visualize potential impacts from sea level rise is a powerful teaching and planning tool, and the Sea Level Rise Viewer brings this capability to coastal communities. A slider bar is used to show how various levels of sea level rise will impact coastal communities. The initial project areas include Texas' Houston and Galveston coasts and Mississippi, with additional coastal counties to be added in the near future. Visuals and the accompanying data and information cover sea level rise inundation, uncertainty, flood frequency, marsh impacts, and socioeconomics.

[Launch Now](#)

#### Acknowledgements

The NOAA Coastal Services Center would like to acknowledge those organizations that provided direct content used in this tool or feedback, ideas, and reviews over the course of the tool's development. Specifically the Center would like to acknowledge the following groups.



#### Features

**Displays** potential future sea levels

**Provides** simulations of sea level rise at local landmarks

**Communicates** the spatial uncertainty of mapped sea levels

**Models** potential marsh migration due to sea level rise

**Overlays** social and economic data onto potential sea level rise

**Examines** how tidal flooding will become more frequent with sea level rise

For Questions, please contact:

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