Vulnerability Analysis Mapping

Nancy J. Gassman, Ph.D.
Assistant Public Works Director
Sustainability Division

Regional Impacts of Climate Change and Issues for Stormwater Management (WS-12, PO-10)
Objectives

- Regional SLR Scenario Maps
- Assessing Risk at the Regional, County and Local Levels
- Vulnerability Tools for Planning
Assessing Vulnerability to Sea Level Rise

- **Inundation Mapping**
  - Regional digital elevation model
  - 1, 2, and 3 foot scenarios
  - Common way to express potential risk

- **Vulnerability Analysis**
  - Prioritized regional infrastructure for analysis
  - Tested geospatial analytical methods

[www.southeastfloridaclimatecompact.org/compact-documents/]
Monroe County

1-Foot Sea Level Rise – Ocean Reef -- Key Largo
Miami-Dade County

2-Foot Sea Level Rise – Miami-Dade

Legend

Inundation
- Possible
- More likely

Legend

Inundation
- Possible
- More Likely
Broward County

2-Foot Sea Level Rise – Broward County

LEGEND
Inundation
- Possible
- More likely
Palm Beach County

2-Foot Sea Level Rise – Boynton Beach Area

LEGEND

Inundation
- Possible
- More likely
Regionally Vulnerable Assessment

Physical Features
- Ports and Airports
- Power Plants
- Railroads
- Water and Wastewater Treatment Plants
- Landfills
- Hospitals
- Emergency Shelters
- Schools
- Evacuation Route
- Marinas

Results of Analysis
Taxable Value of Property
Acres of Future Land Use

SE FL Hospitals with Property below Sea Level

- 1 foot
- 2 foot
- 3 foot
County Vulnerability Analysis

- Parks
- Fire Rescue
- Police Stations
- Libraries
- Roads
- County Facilities
- CRA
- Water
- and Wastewater
Scope of Florida Coastal Zone Management Grant

- Thirteen tidally influenced communities East of salinity control structures.

1. Deerfield Beach
2. Hillsboro Beach
3. Lighthouse Point
4. Sea Ranch Lakes
5. Lauderdale-by-the-Sea
6. Pompano Beach
7. Wilton Manors
8. Fort Lauderdale
9. Oakland Park
10. Lazy Lake
11. Dania Beach
12. Hollywood
13. Hallandale Beach
Fort Lauderdale
Sea Level Rise Vulnerability Assessment

* Airports
* Bridges
* City Arterial Roads
* City Hall
* City Parks
* Community Re-development Areas (CRA)
* County Parks
* Evacuation Routes
* Fire Rescue Stations
* Hospitals
* Law Enforcement Assets
* Schools
* WTP/WWTP
* Wave
* Regional Activity Centers (RAC)
Tidal Valves in Blue

LEGEND
- CITY STORM LINE - 177.58 miles of pipe.
- COUNTY STORM LINE - 13.40 miles of pipe.
- STATE STORM LINE - 48.03 miles of pipe.
- PRIVATE STORM LINE - 45.12 miles of pipe.
- CITY STORM INLET - 8559 Inlets.
- PRIVATE STORM INLET - 519 Inlets.
- STORM MANHOLE - 1337 Inlets.
- STORM OUTFALL - 2750 Inlets.
- DRAINAGE WELL
- STORM PUMP STATION
- STORM ENDPOINT
- LAY FLAT
- BLUE
- RED VALVE
TideFlex - Tidal Control Valves
Other Tools for Assessing Vulnerability to Sea Level Rise

- **Surging Seas**
  - Sea Level Rise & Flood Threats in Florida

- **NOAA Digital Coast**
  - Sea Level Rise Viewer
    - Contributing Partners: NOAA Office for Coastal Management
Sea Level Rise & Flood Threats in Florida

WHERE

Sea level and flood forecasts

WHEN

> Click on tiles below to access tool

WHAT

> Research Report

COMPARE

Surging Seas Version 1: All States

RELATED RESILIENCY RESOURCES

- Southeast Florida Regional Compact Climate Change
- The Southeast Florida Regional Partnership (SFRP)
- Broward County: Climate Change Action Plan
- Miami-Dade County: Miami-Dade Greenprint
- FL Department of Economic Opportunity: State of Florida Community Resiliency Project
- The Florida Center for Environmental Studies (CES)
- The Nature Conservancy: Coastal Resilience - Gulf
- NOAA: Sea Level Rise, Coastal Flooding Impacts Viewer

Help | About | Science Behind the Tool
Sea level rise and coastal flood risk for Broward County, Florida

What could submerge:
- Broward County exposed buildings on land below 2 feet.

- Homes: 14% of homes below 4 feet
- Fire and EMS stations: 7% of stations below 4 feet
- Hospitals: 4% of hospitals below 4 feet
- Police stations: 3% of stations below 4 feet
- Public Schools: 3% of schools below 4 feet
- Libraries: 12% of libraries below 4 feet
Sea Level Rise Viewer

Contributing Partners: NOAA Office for Coastal Management

Overview  In Action  Support  Get It Now

Launch Viewer

Select a geography and use the slider bar to simulate various sea level rise scenarios (from one to six feet above the average highest tides) and the corresponding areas that would be impacted by flooding. Click the camera icons for pictures that depict how local landmarks could be affected. Additional tabs provide information about marsh impacts, nuisance flood frequency, and social and economic data.

Maps are not currently available for Alaska and Louisiana due to the accuracy of existing elevation data, the hydraulic complexity of the coast, and gaps in vertical datum transformation.

Features

- **Models** potential marsh migration due to sea level rise
- **Examines** how tidal flooding will become more frequent with sea level rise
- **Enables** access through mobile devices
- **Produces** shortened URLs for easy map sharing through email and social media
- **Provides** access to Web map services and underlying geospatial data
- **Offers** supporting documents and information on sea level rise mapping

Acknowledgments

The NOAA Office for Coastal Management acknowledges the many organizations that helped guide the development of this tool.
Sea Level Rise Viewer

Contributing Partners: NOAA Office for Coastal Management

Sea Level Rise and Coastal Flooding Impacts

Socioeconomic Vulnerability

Legend

Water Depth
- Unconnected Areas
- Area Not Mapped

Social Vulnerability

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.

The Social Vulnerability Index, which shows areas of high human vulnerability to hazards, is based on population attributes (e.g., age and poverty) and the built environment. By looking at the intersection of potential sea level rise and vulnerable block groups, one can get an idea of how vulnerable populations might be affected by sea level rise.

Dark red indicates block groups having a high vulnerability, and the lighter reds indicate decreasing vulnerability.

Understanding The Map

Additional Information
Questions?