

# Defining Coastal Vulnerability Along the Delaware Bay

*A Protocol for Determining Resilience*



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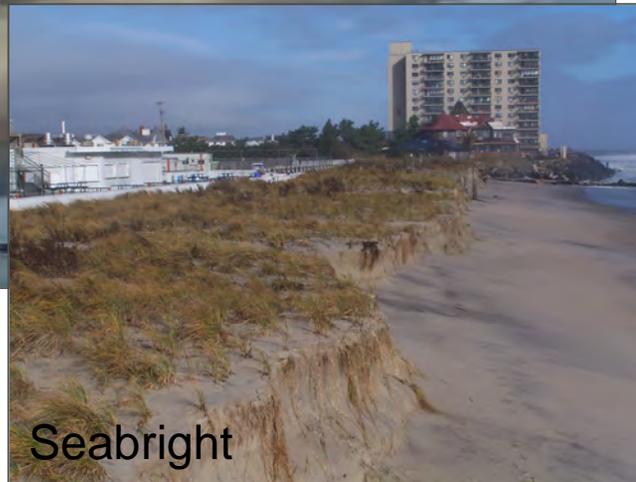
*NOAA Coastal Management Fellow*

# Last Week's Nor'easter



Wildwood

Source: Asbury Park Press



Seabright

Source: Dr. Karen D'Agostino



Long Beach

Source: Asbury Park Press

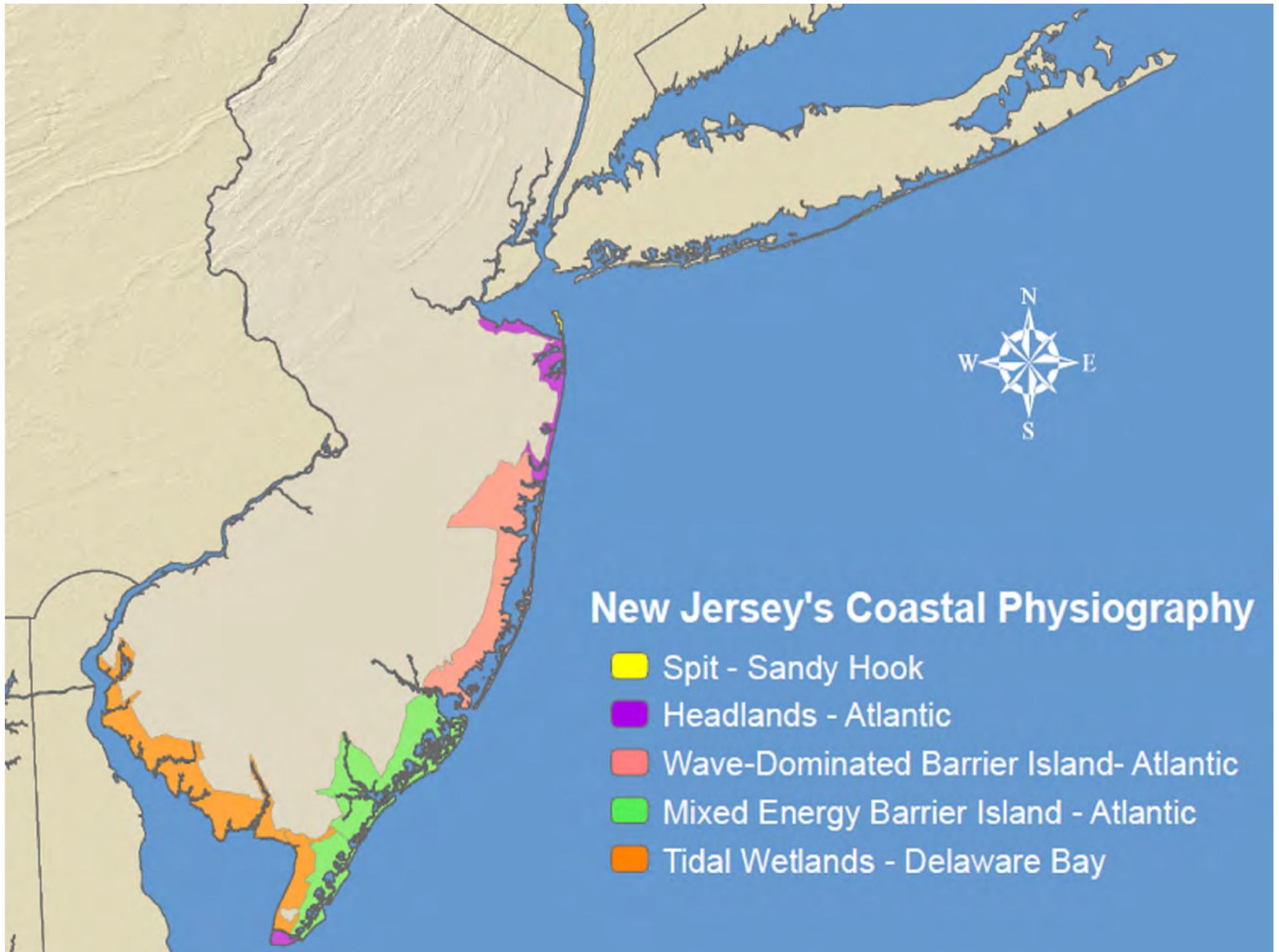
# Key Terms

- **Risk** includes “the type and severity of a hazard and its frequency of occurrence.” [1]
- **Vulnerability** is “a measure of the degree to which a human or natural system is unable to cope with adverse effects.” [2]
- **Resilience** is “the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt to stress and change.” [3]

[1] US Indian Ocean Tsunami Warning System. 2007. *How Resilient is Your Coastal Community?*

[2] Worldwatch Institute. 2009. *State of the World*.

[3] IPCC: Fourth Assessment



# How do we achieve resiliency?

## *First*

Identify what you are trying to make resilient- a community, a specific sector of the population, a particular species?

*(Depends on the user group)*

- This will help you determine the **scale** of your analysis- municipal, watershed, geographic region, etc.
- And determine how you will assess **vulnerability**- structural, ecological, socio-economic, etc.

# Defining a Protocol for NJ Coastal Communities

## ***Steps***

2. Define the area of geographic risk, both present and future.
3. Determine vulnerability, both present and future, including vulnerable populations, infrastructure, and natural resources.

## ***Then...***

4. Evaluate the appropriateness and effectiveness of planning and policy- this may include and evaluation of floodplain management plans, comprehensive plans, ordinances and zoning practices, shore protection measures, wildlife management and restoration initiatives, etc.
5. Take an adaptive management approach to improve resiliency through planning and policy.

# What can this reveal?

Page last updated at 13:16 GMT, Tuesday, 27 October 2009

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## Australia coastal living at risk

Australians may have to leave coastal areas as rising sea levels threaten homes, according to a new report.

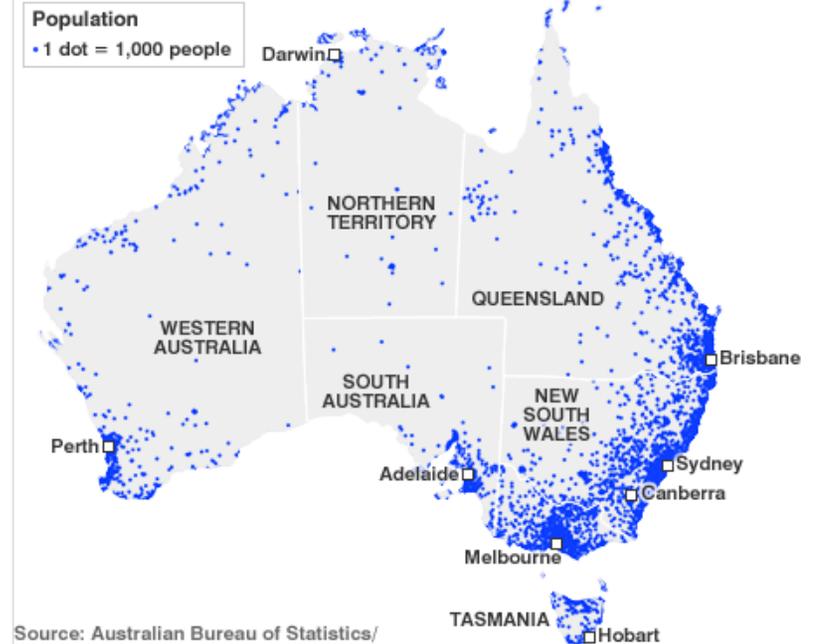
The parliamentary committee report says urgent action is needed, as seas are expected to rise by 80cm (31 inches).

About 80% of Australians live in coastal areas, and the report recommends new laws banning further development in coastal regions. [4]



About 80% of Australians live in coastal areas

### RISK TO AUSTRALIA'S COASTAL POPULATIONS



- ♦ **Queensland:** 250,000 buildings at risk
- ♦ **New South Wales:** 200,000 buildings at risk
- ♦ **Western Australia:** 94,000 buildings at risk
- ♦ **Victoria:** 80,000 buildings at risk
- ♦ **South Australia:** 60,000 buildings at risk
- ♦ **Northern Territory:** 900 buildings at risk
- ♦ **Tasmania:** 20% of coastline at risk

[4] BBC News. <http://news.bbc.co.uk/2/hi/8327224.stm>

# Step 1: Defining the Area of Interest

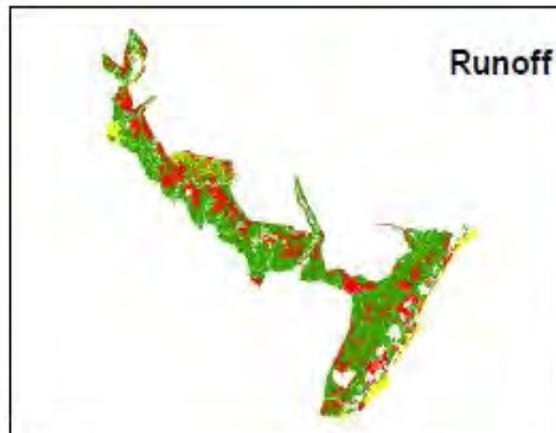
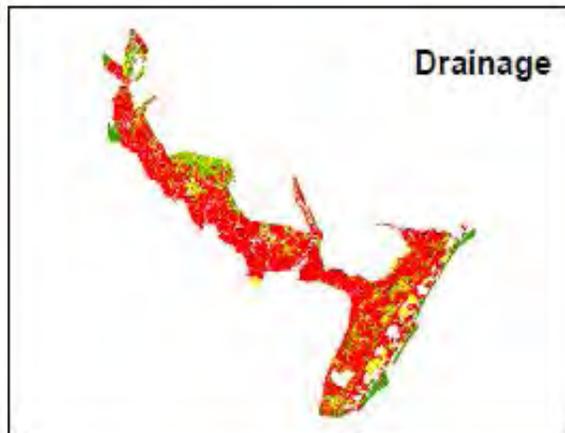
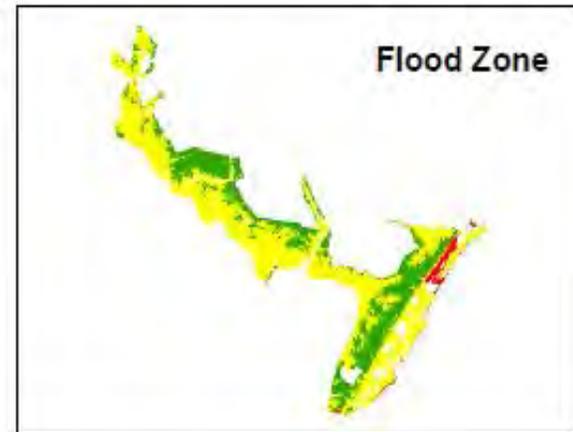
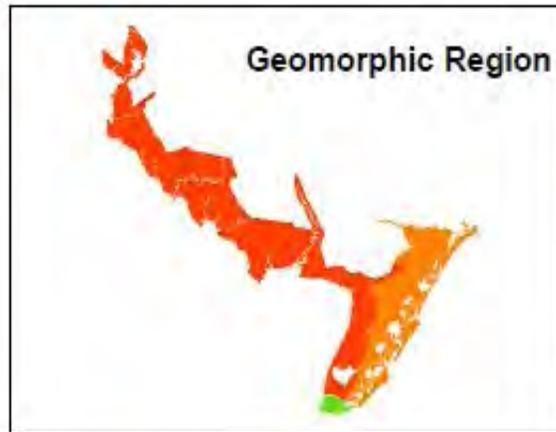
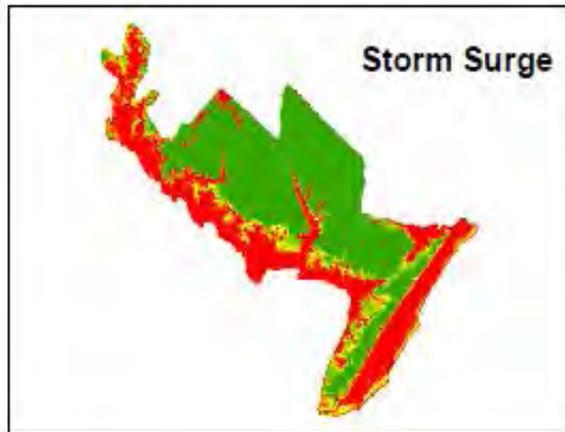
## The Delaware Bayshore

- Ecological importance.
- Low density development with mitigation and planning opportunities.
- Data availability, Lidar.



*Source: The Smithsonian Institution*

# Step 2: Present Geographic Risk



## Legend

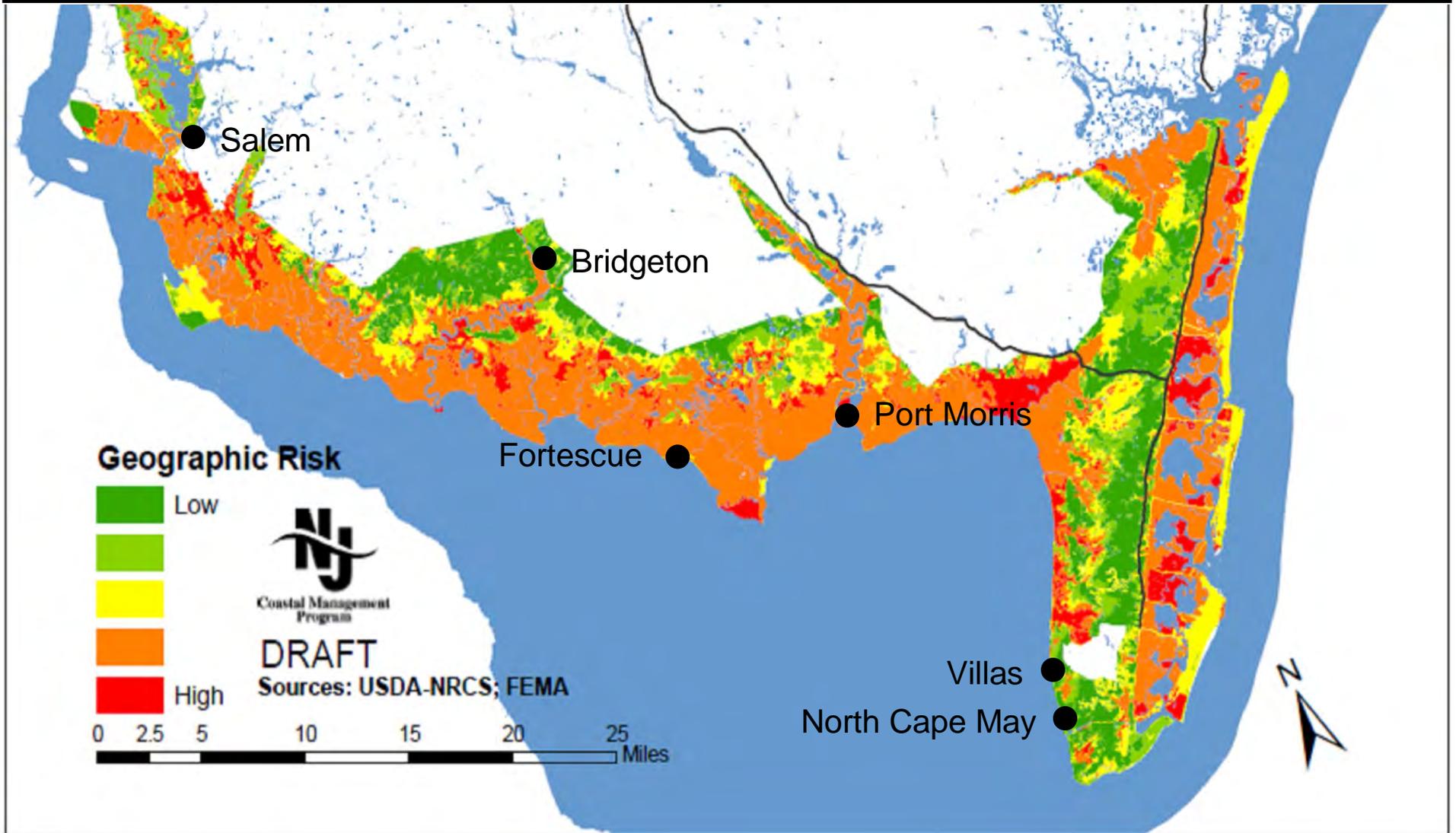
- Low Risk
- Medium-Low
- Medium
- Medium-High
- High Risk

0 5 10 20 30 40 50 Miles

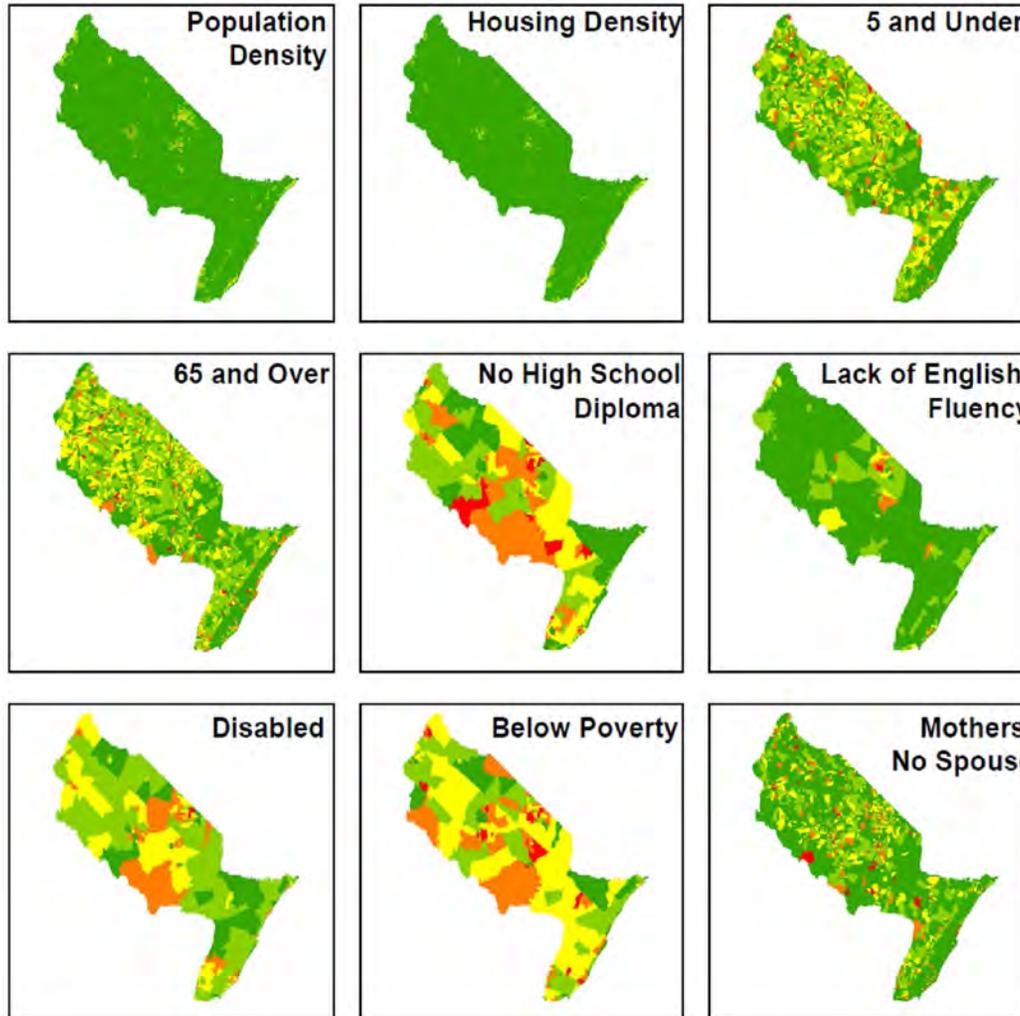


NJ Coastal Management Office  
September 2009- DRAFT  
Contact: John D'Agostino or Leigh Wood

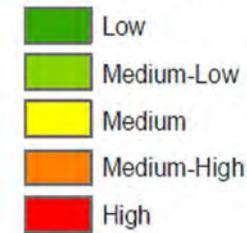
# Step 2: Present Geographic Risk



# Step 3: Social Vulnerability Index

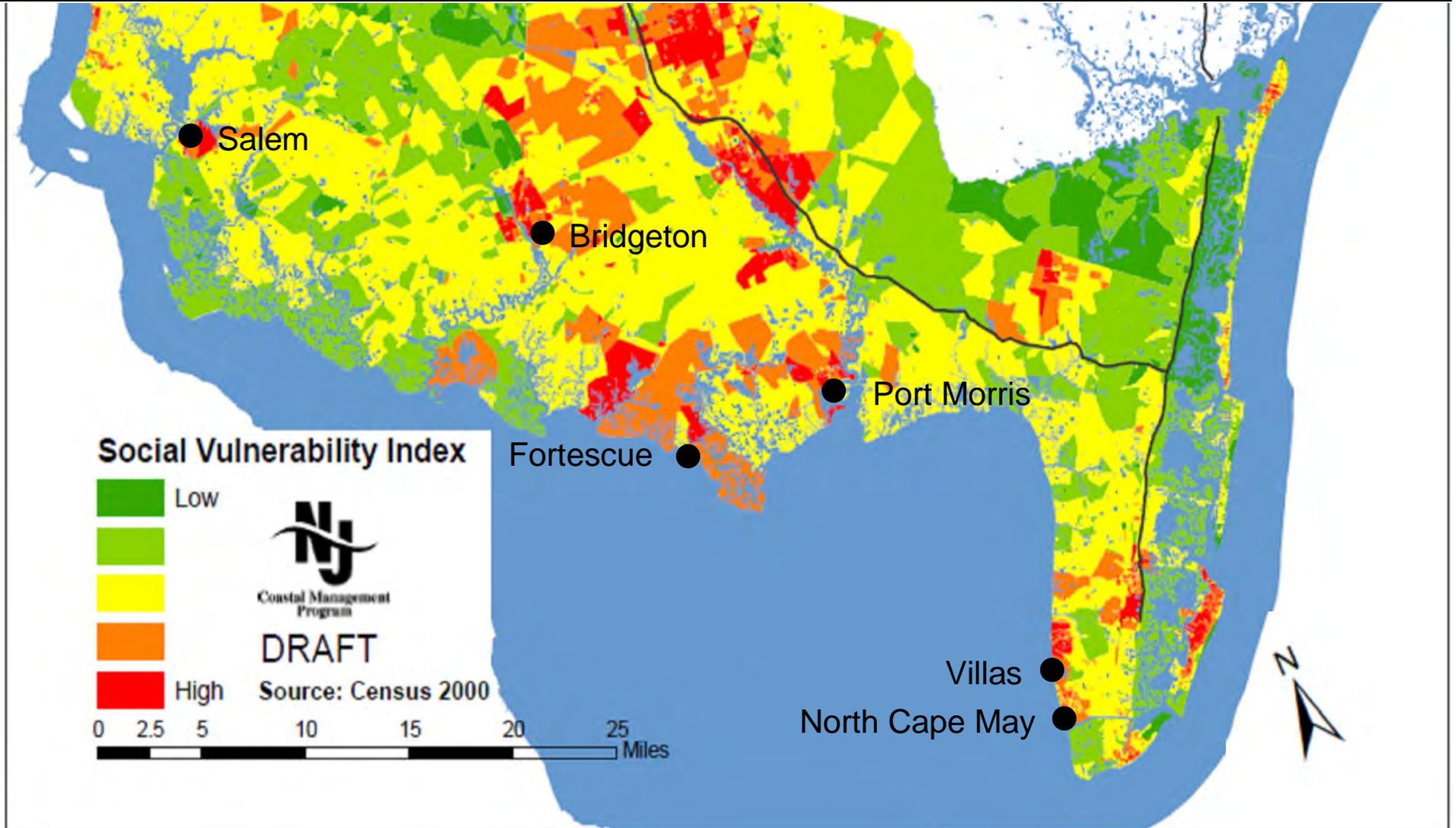


## Social Vulnerability

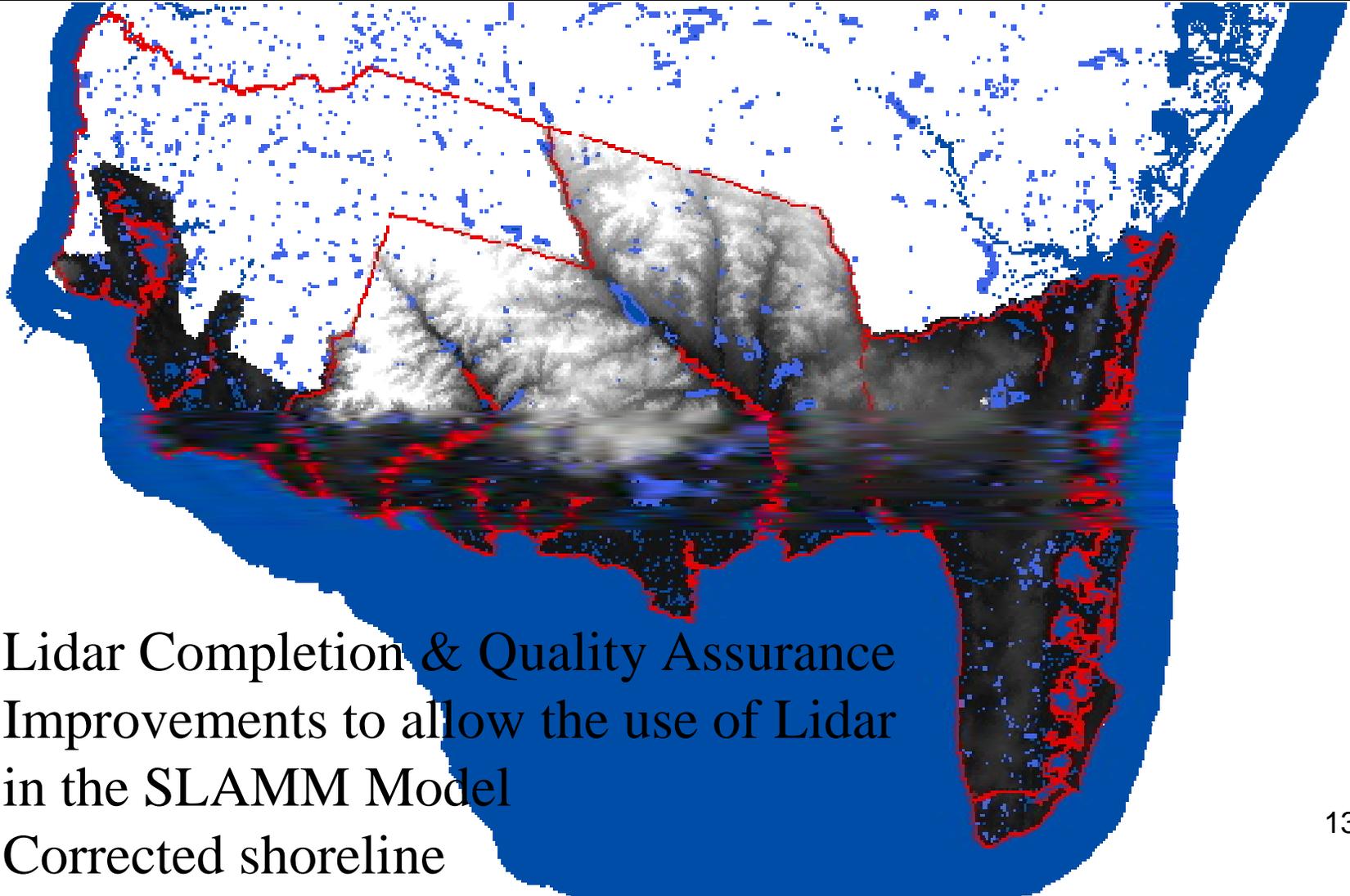


Source: Census 2000  
NJ Department of Environmental Protection  
Coastal Management Office  
October 2009  
Contact: John D'Agostino or Leigh Wood

# Step 3: Social Vulnerability Index



# There are still some data needs



- Lidar Completion & Quality Assurance
- Improvements to allow the use of Lidar in the SLAMM Model
- Corrected shoreline

# Shoreline Data

## Money Island, NJ Delaware Bayshore



Source: NJDEP, 2007



Source: Google Maps, 2009

# Next Steps...

- Accurately define the existing shoreline using NOAA's **VDatum** to serve as a baseline for sea-level rise modeling. [5]
- Run the **Sea Level Affecting Marshes Model (SLAMM)**. [6]
- Determine populations, infrastructure, and ecological systems that are vulnerable to accelerated sea-level rise.
- Generate a **checklist of policies and ordinances** that support resiliency in coastal communities (in progress).
- Utilize the resiliency checklist to provide **outreach** to Delaware Bay communities.
- Generate a laundry list of adaptation tools and strategies for shoreline change- both migration and stabilization measures.

[5] VDatum <http://vdatum.noaa.gov/>

[6] SLAMM Model <http://www.warrenpinnacle.com/prof/SLAMM/index.html>

# Implications

- State and municipal planning and policy
  - Capital improvements
  - Shore protection
  - Natural resource protection
  - Mitigation efforts
  - Emergency management
  - Post-Disaster recovery and reconstruction
- ...and MUCH MORE!

# Questions?

## Contact Information

NJ Coastal Management Office

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