

# ***New Partners for Smart Growth Conference***

***Smart Growth and Coastal Communities:  
Adapting to Sea Level Rise***

Friday 4 February, 2011

Charlotte, NC

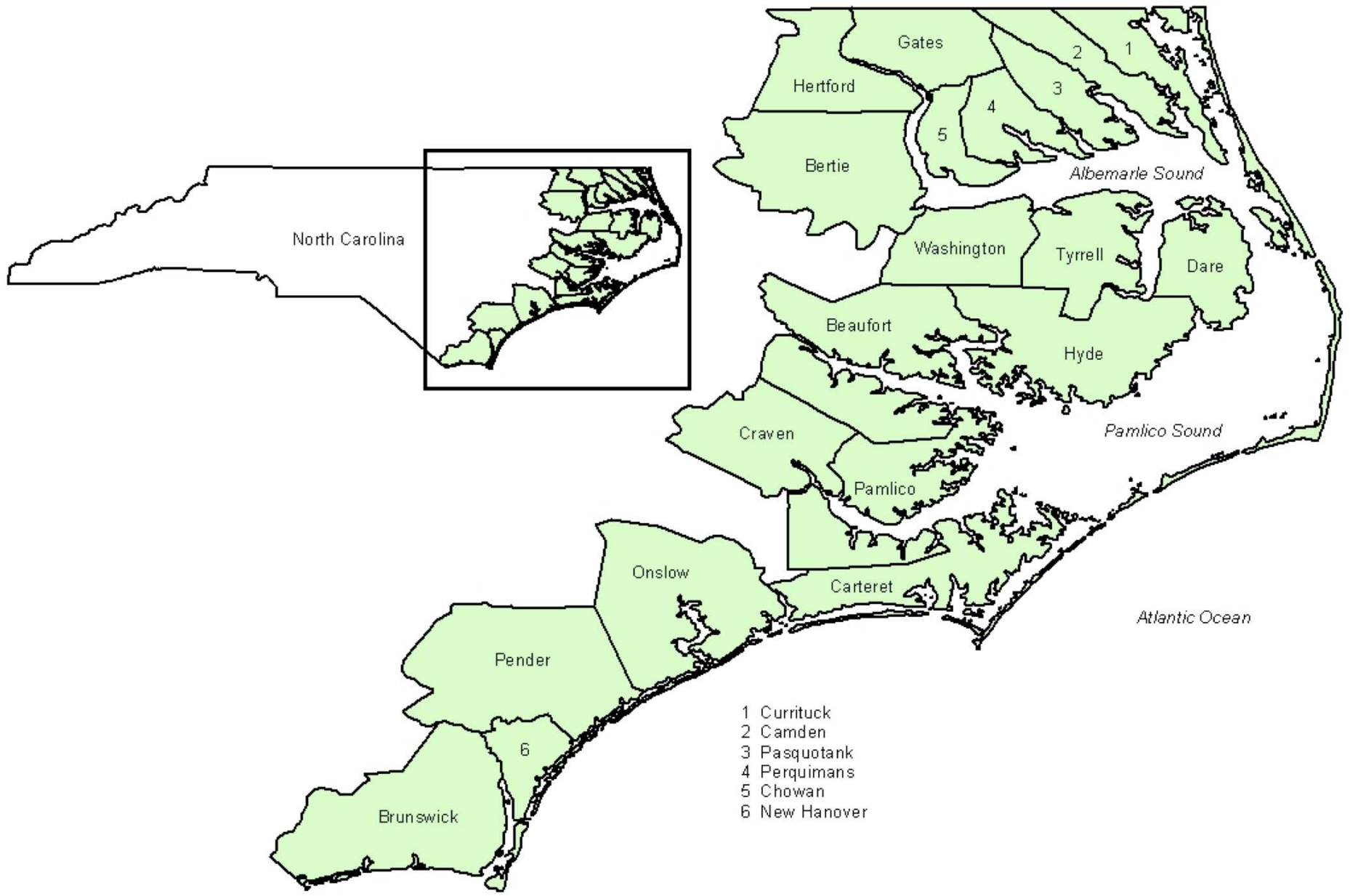
Tancred Miller

North Carolina Division of Coastal Management



# NC Major Transportation Routes







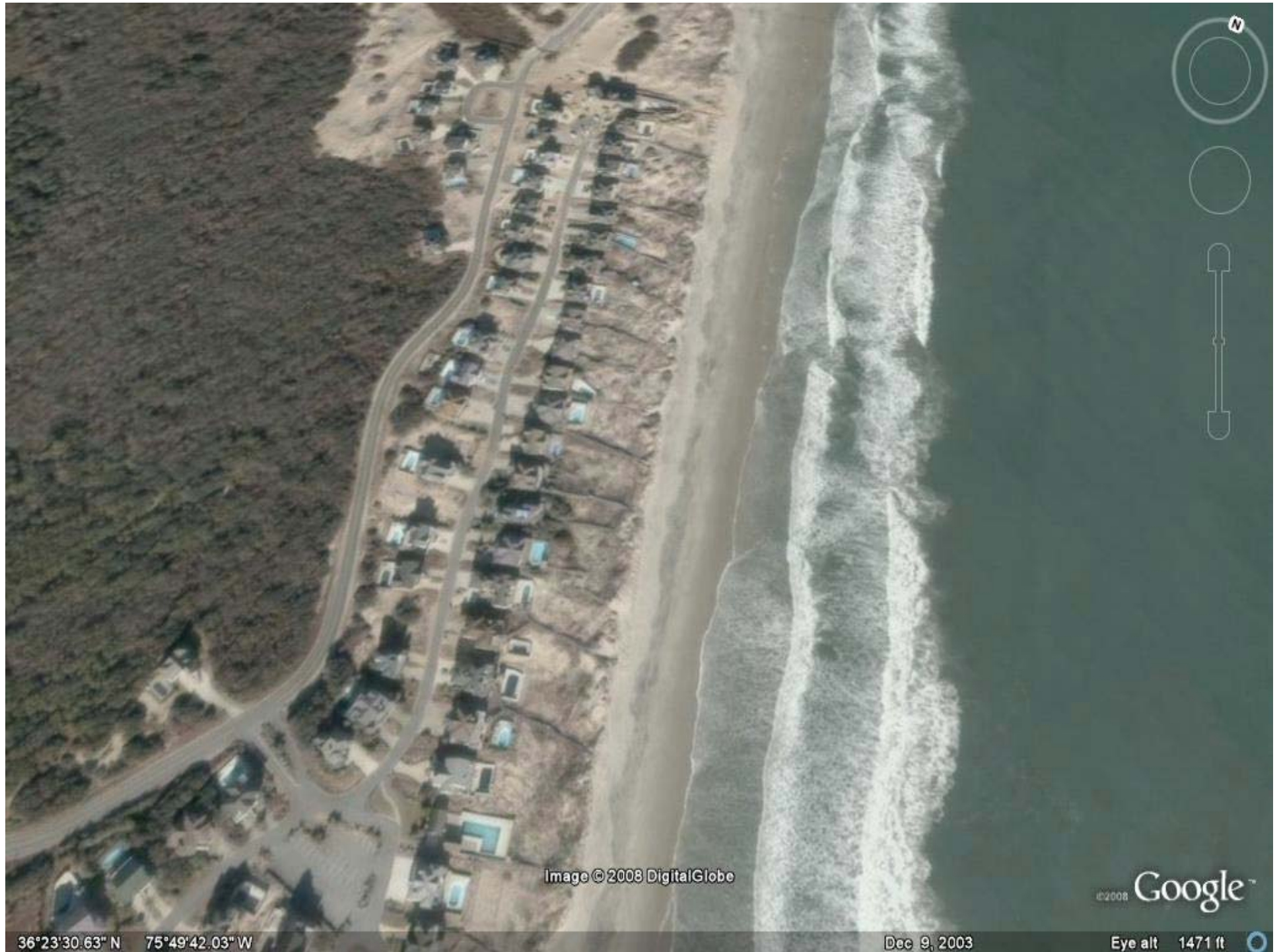


Image © 2008 DigitalGlobe

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36°23'30.63" N 75°49'42.03" W

Dec 9, 2003

Eye alt 1471 ft





Photo: Carteret County Shore Protection Office





Photo: Carteret County Shore Protection Office





Photo: Carteret County Shore Protection Office





Photo: Carteret County Shore Protection Office





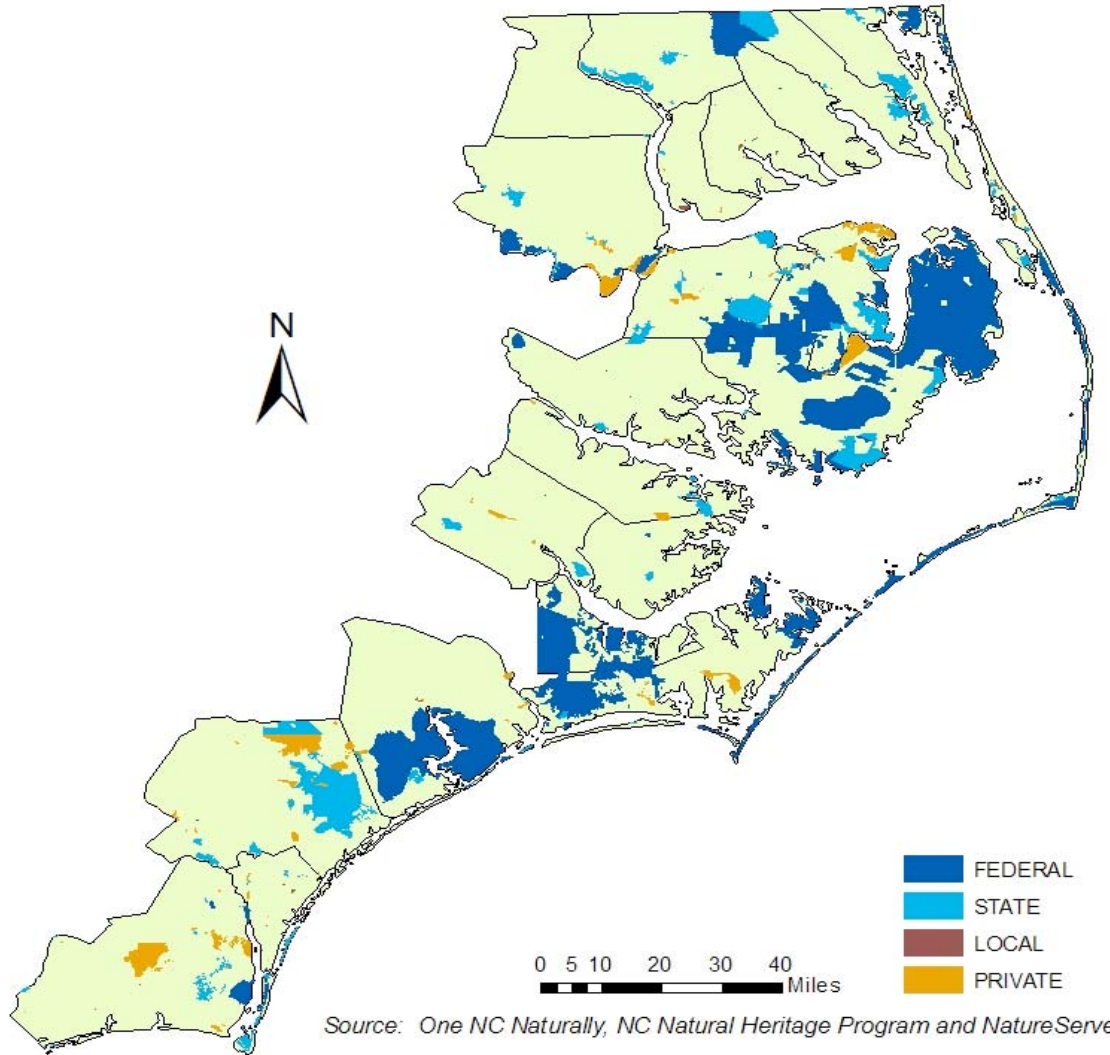
Photo: NC Wildlife Resources Commission



Washington, NC. Photo: The Rich Company



# Managed Lands in NC Coastal Zone



# NC Waterfront Access and Marine Industry Fund (WAMI)

- \$20 million fund in 2007
- Thirteen sites: Six, totaling \$6.8 million are in the northeast; four, totaling \$6.3 million, are in the central; and three, totaling \$6.9 million, are in the southeast.
- The sites were selected to provide waterfront access to a variety of user groups, including commercial and recreational fishermen, pier fishermen, recreational boaters and the marine industry. Several sites are in strategic locations for important state research and habitat enhancement efforts.
- The total cost of the projects exceeds \$71 million.



Waterfront Access Marine Industry Fund Project Funding

2008





## Sea-Level Rise

***“It Could Happen  
Tomorrow!!”***

# CRC Approach to Sea-Level Rise

## **1. Recognize the problem**

- A. CRC priority setting
- B. Review of international and state-level literature
- C. Presentations from staff and state experts

## **2. Develop an agency plan**

- A. Roadmap—interagency collaboration
- B. Be flexible, inclusive, opportunistic

## **3. Execute the plan**



# NC Coastal Resources Commission Sea-Level Rise Roadmap



Scoping Survey



Establish the  
Science

Develop a Policy

Recommendations  
to Executive  
Branch

Update  
Regulations

Local Government  
& Agency Support

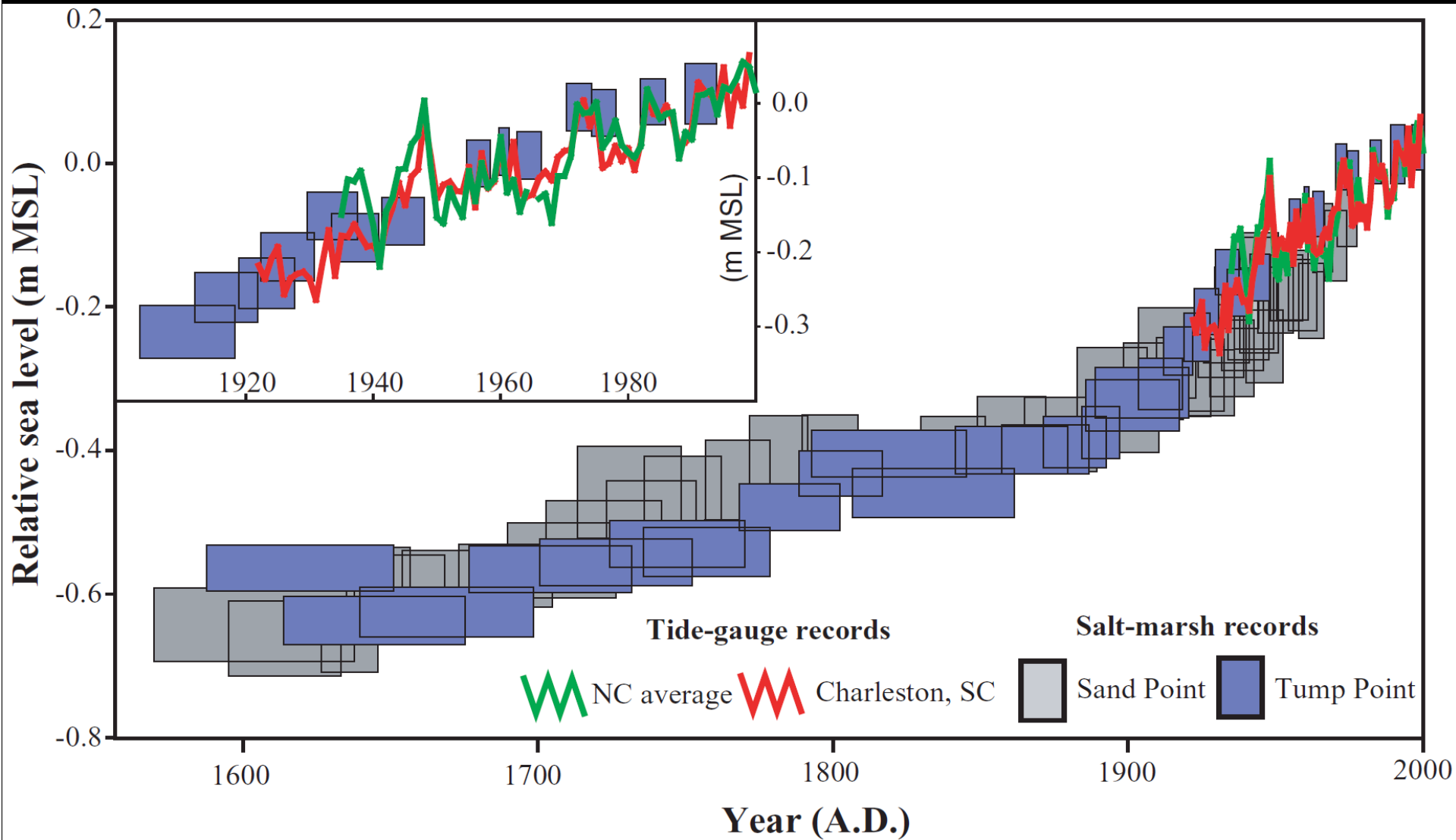
# MSL trends for N.C. water-level stations in mm/year

(adapted from Zervas, 2004)

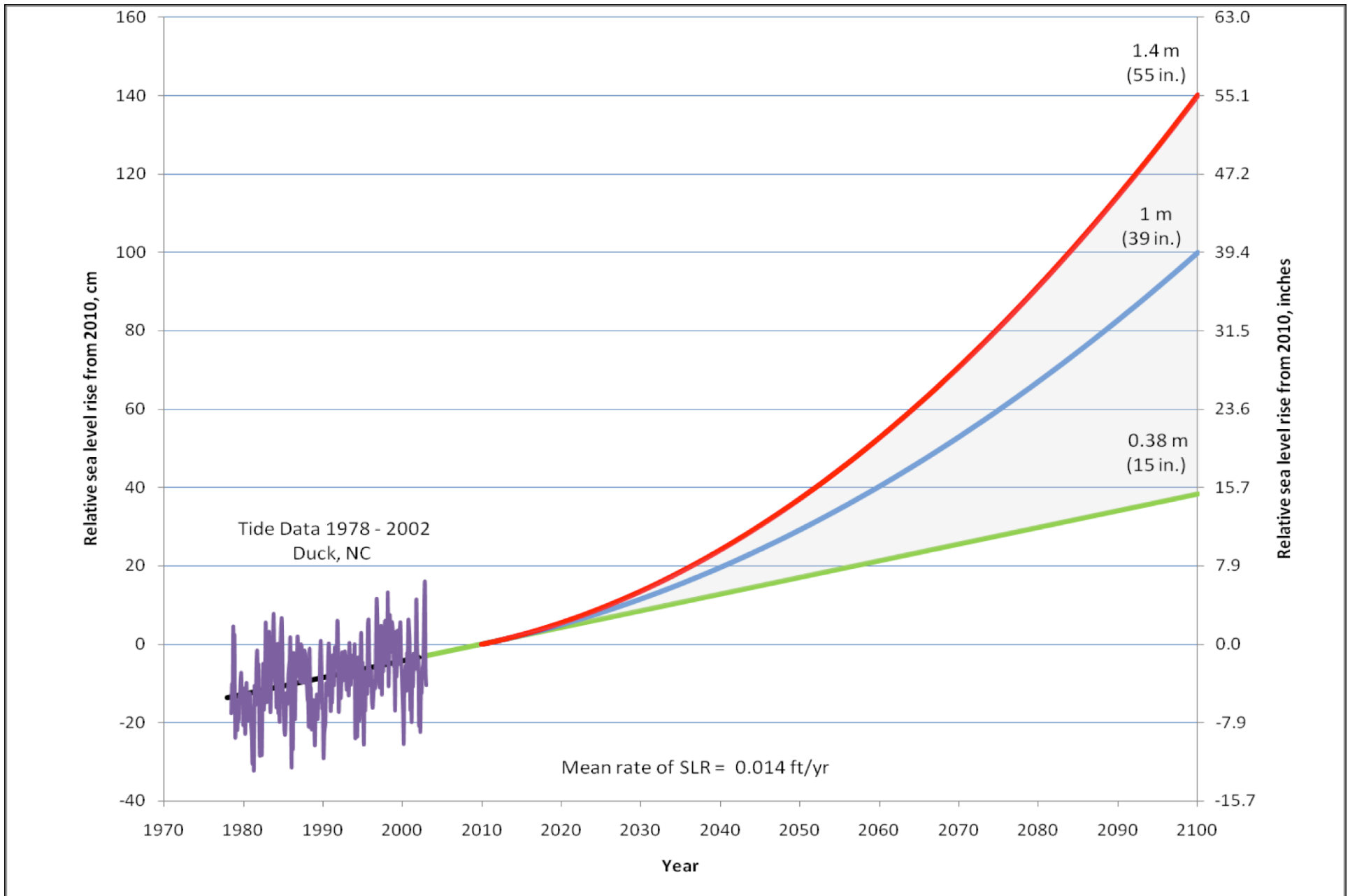
Station Number	Station Name	Mean Sea-Level Trend mm/yr	Mean Sea-Level Trend inches/century	Period of Data
8651370	Duck	$4.27 \pm 0.74$	$16.8 \pm 2.9$	1978-2002
8652587	Oregon Inlet Marina	$2.55 \pm 1.21$	$10.1 \pm 4.8$	1977-1980, 1994-2002
8654400	Cape Hatteras	$3.46 \pm 0.75$	$13.6 \pm 3$	1978-2002
8656483	Beaufort	$3.20 \pm 0.54$	$12.6 \pm 2.2$	1973-2002
8656590	Atlantic Beach	$2.48 \pm 1.99$	$9.7 \pm 7.8$	1977-1983, 1998-2000
8658120	Wilmington	$2.12 \pm 0.23$	$8.4 \pm 0.8$	1935-2002
8659084	Southport	$2.04 \pm 0.25$	$8 \pm 1$	1933-1954, 1976-1988
8659182	Yaupon Beach	$2.92 \pm 0.77$	$11.5 \pm 3$	1977-1978, 1996-1997

# Reconstructed NC Sea Levels

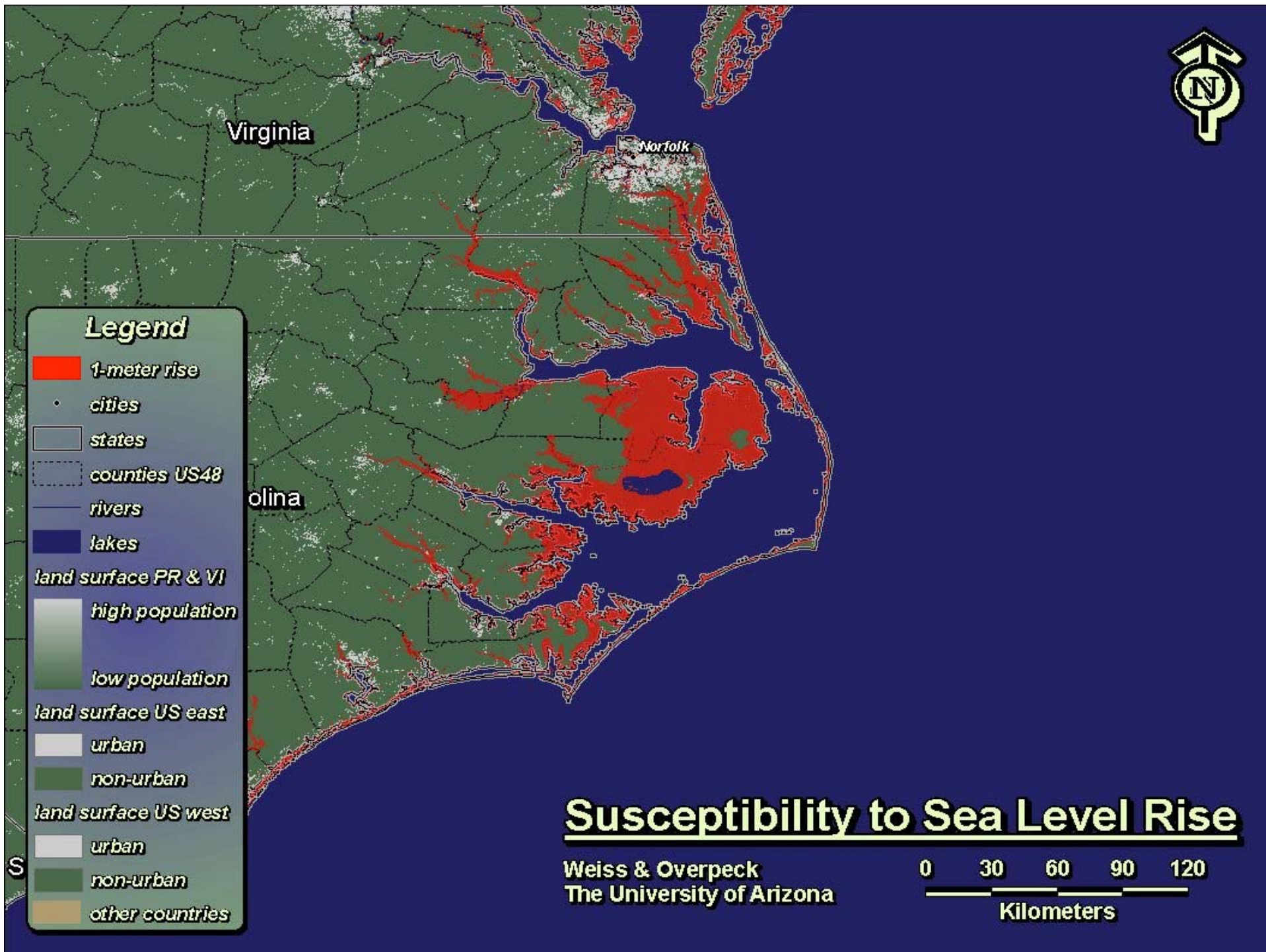
(Source: Kemp et al., 2009)







Magnitude of SLR resulting from differing scenarios of acceleration. Most likely for 2100 AD is a rise of 0.4 meter to 1.4 meters (15-55 inches) above present.





# North Carolina Sea-Level Rise Risk Management Study

- The NC SLRRMS was initiated in February of 2009 and is expected to conclude in June 2011.
- Funded with a \$5 million grant from FEMA to comprehensively study the change in risk to built and living systems, and to develop science-based mitigation and adaptation strategies that will pro-actively reduce future risk.
- overarching goal of this study is to inform State and Federal policy makers on the subject of the sea-level rise impacts and foster development of risk management policy.
- Study products will include a final report describing the identified hazards and risks, in addition to mapping products presenting future vulnerability.

# Why a SLR Policy

- Codify a planning benchmark for the coastal counties
- Set the stage and direction for rule review and amendment
- Signal to the public that the Commission recognizes the threat of sea-level rise and is actively engaged in guiding the coast towards planned adaptation

# Draft Statement (outline)

- Declaration of General Policy
  - What the policy seeking to accomplish
- Definition of terms
  - Terms with context-specific meaning
- Policy Statements:
  - a. Public education
  - b. Planning benchmark
  - c. Regional approach
  - d. Coastal habitats
  - e. Local government
  - f. Research & monitoring
  - g. Private development
  - h. Public infrastructure
  - i. Rule updates
  - j. Land-use planning



(e) The Commission has the responsibility to assist local governments with land-use planning guidance and support that shall include standards, policies and tools that address appropriate strategies for planned adaptation in specific situations.

Due to the technical nature of sea-level rise science and the need for a coordinated adaptation strategy, the Commission shall, to the best of its ability, provide local governments with scientific data to support local education and planning efforts.

Specific guidance and planning requirements will be incorporated into the Commission's Subchapter 7B Land-Use Planning Guidelines. The Commission may provide financial assistance for local adaptation planning and implementation as available.

(h) In order to minimize the impacts of hazards, disruption and losses associated with rising water levels, new public infrastructure should be designed and constructed to incorporate sea-level rise impacts within the infrastructure's design life, except in instances where the infrastructure is built to serve an adaptation purpose.

New public infrastructure should not enable development that would be impacted by sea-level rise within its design life. Water dependent structures should be designed to accommodate projected sea-level rise within their design life.

The Commission may require additional development standards for new and replacement structures built within areas subject to sea-level rise impacts.

# CAMA 7B Land Use Planning

- NC Coastal Resources Commission performing a required periodic review of its land use planning guidelines.
- Considering how to incorporate SLR into local land use planning.
- Initial focus is on starting to build awareness of risk and vulnerability, not limiting development.
- Could ask communities to map bathtub SLR scenarios or provide to them.
- Could ask for an assessment of property at risk.
- State providing data and assistance.



# FEMA Community Rating System

- FEMA expects to start offering CRS credits this fall to communities that are planning for sea-level rise impacts.
- Credits count toward community-wide discounts on federal flood insurance.
- Will be available to communities that implement any of a number of [TBD] adaptation strategies.
- Coordinating FEMA adaptation strategies with CRC policy to avoid conflicts.



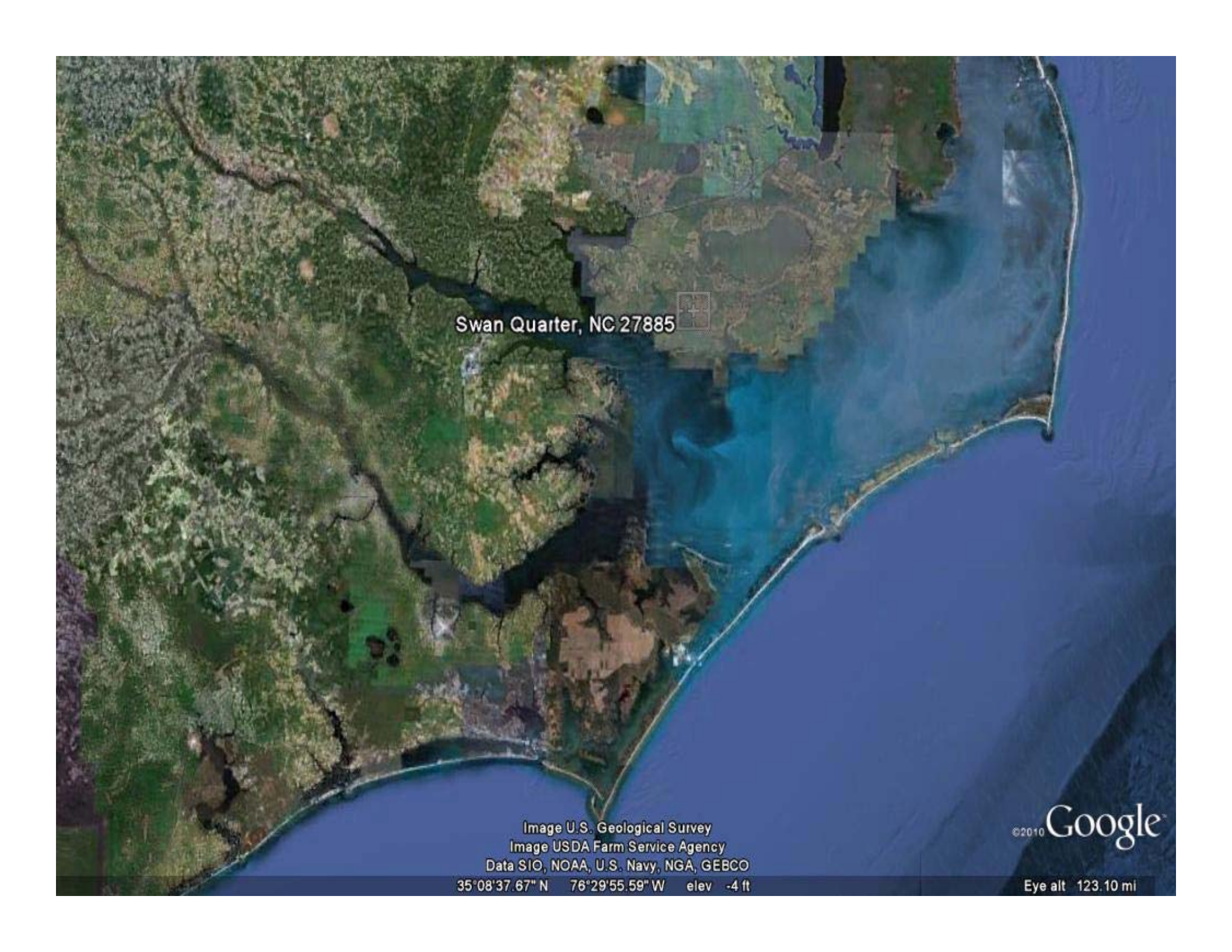
Photo: Appalachian State University





Photo: NC DCM



A satellite map showing a coastal area with a large body of water on the right and a landmass on the left. The land is covered in green vegetation and has a network of roads and waterways. A small square icon is located in the center of the landmass, and the text "Swan Quarter, NC 27885" is overlaid on the map.

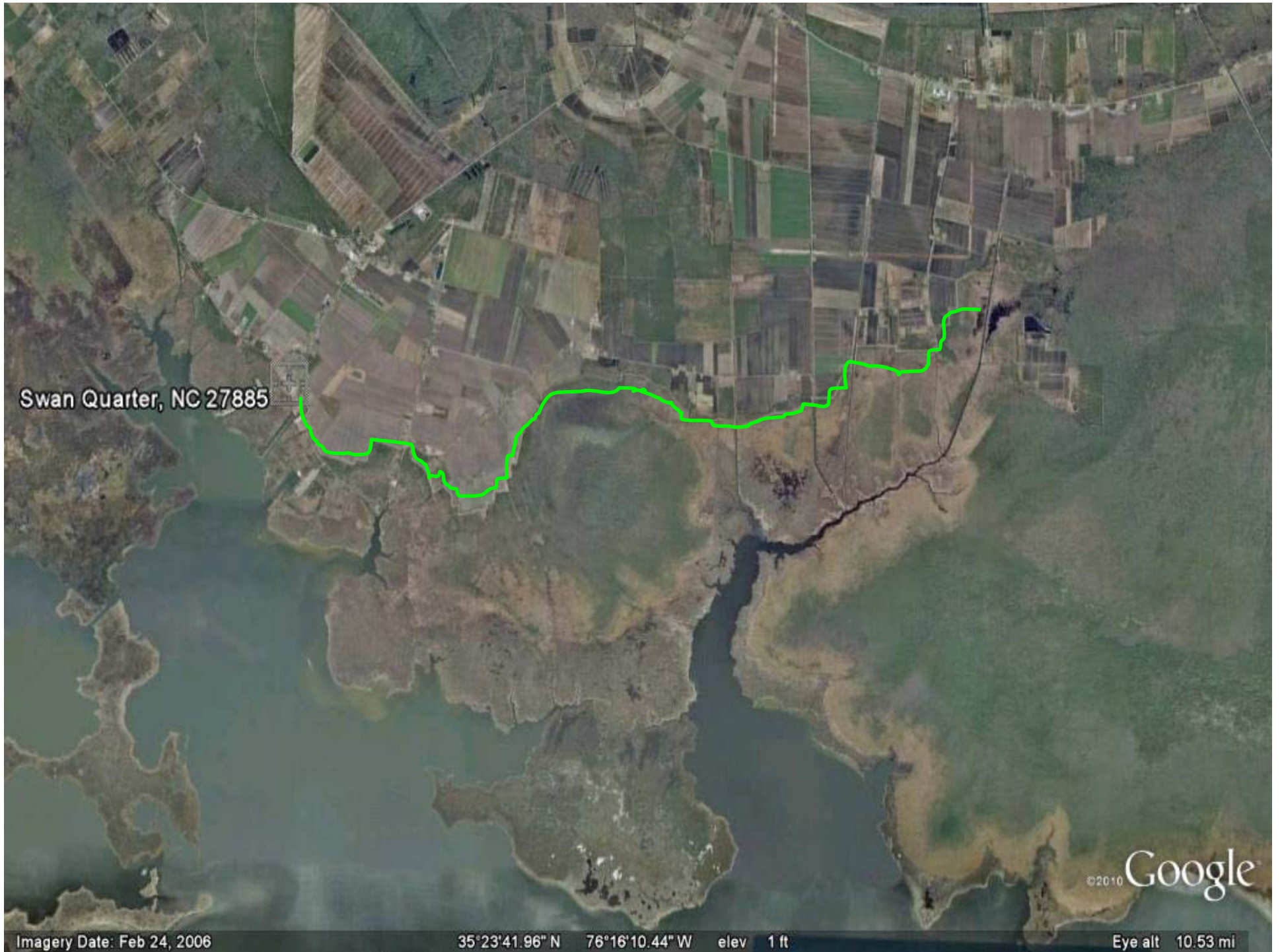
Swan Quarter, NC 27885

Image U.S. Geological Survey  
Image USDA Farm Service Agency  
Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
35°08'37.67" N 76°29'55.59" W elev -4 ft

©2010 Google

Eye alt 123.10 mi





Swan Quarter, NC 27885

©2010 Google

Imagery Date: Feb 24, 2006

35°23'41.96" N 76°16'10.44" W elev 1 ft

Eye alt 10.53 mi

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