

NOAA's Sea Level Rise Research Program: North Carolina Managers Meeting Fact Sheet January 2007

Introduction

Coastal managers must plan for the effects of storm surge and sea level rise due to coastal subsidence and climate change. In 2002, NOAA engaged management assistance from the NC Division of Coastal Management to help plan a new research program to address problems faced by coastal decision makers in North Carolina due to sea level rise and storm surge. With guidance from the North Carolina scientific and management community in the major areas of research needed to help coastal managers mitigate the regional ecological impacts of sea level rise, NOAA held a workshop in Beaufort, NC February, 2004. Results from this workshop were invaluable in designing a research program to study potential ecological effects of projected sea level rise scenarios. Since Fall 2005, NOAA is working with university partners and state managers to create ecological models that will integrate with a NOAA physical model. Our research goals include development of decision making tools, maps and models useful to managers. In order to ensure that our end product serves the resource management community, NOAA is conducting manager's workshops to achieve management feedback.



On the western Pungo River, the eroding platform marsh (foreground) is undercut, while the receding low sediment bank (background) leaves a trail of dead pines in the encroaching water (NC Sea Grant, Riggs & Ames)

Physical Models

Predicting future water and land elevations due to rising sea level and future storm surge.

Models:

VDATUM adjusted land elevations and water depths to have a common vertical datum.

Digital Elevation Model Bathymetry for the underwater study area integrated with the LIDAR based land elevations

Storm Surge Model developed to simulate wind-driven tides, and hurricane-driven surges, synoptic wind events, as well as changing shoreline and inundation patterns

Partners:

NC Coastal Management
East Carolina University
University of North Carolina
Vanderbilt University
University of South Carolina

Project Goal:

Creation of tools for coastal resource managers. These include enhanced mapping and model predictions.

Uses:

Natural Resource Protection
Land Use Decisions
Water Quality
Fisheries
Transportation

Landscape Model

Integration of physical and ecological models to examine the effect and extent of ecological change due to sea level rise and storm surge on coastal habitats.

Ecological Models

Developed to forecast the impacts of sea level rise on different various coastal habitats and physical locations.

Models:

•Neuse River & Pamlico Sound

The GIS-based predictive tool will incorporate the critical parameters controlling shore-zone dynamics as determined by the isolated shore zone studies.

•Wetlands of Pamlico & Core Sounds

Existing models for *Spartina* that integrate vegetation responses to changes in mean sea level with sediment accretion and supply will be adapted to the *Juncus* marsh communities and conditions.

•Back & Bogue Sounds

A habitat simulation module will forecast the effects of variable water levels and shoreline stabilization on the structure and ecological function of sub-tidal, SAV, inter-tidal flat, oyster, and marsh habitats.

Background

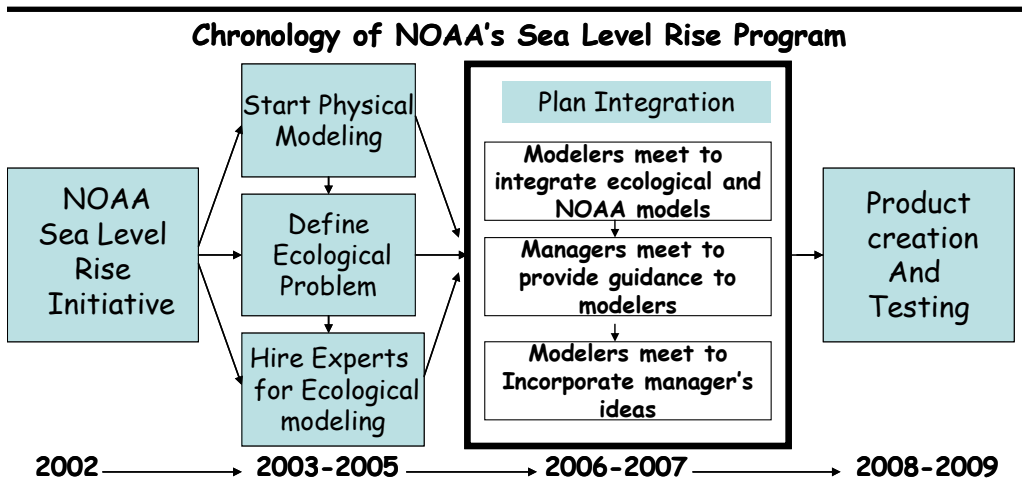
Sea-level rise is a projected outcome of climate change. Global average sea level has risen 10 to 25 cm in the past century and is projected to rise 20 to 86 cm by the year 2100 (IPCC, 2001). In other words, sea level rise is predicted to not only continue into the next century, but will continue at an accelerated rate. This acceleration will affect our coastal zone through:

- Coastal erosion of wetlands, beaches, and other types of shores
- Loss of important wetlands and mangroves
- Impact on coastal ecosystems
- Impact on human settlements
- Increases in intensity and frequency of storm surges
- Increased salinity of aquifers and estuaries,
- Increased coastal flooding during storm surges and extreme rainfall

An ecological forecast that is readily usable by resource managers will aide formulation of effective strategies for preventing, mitigating, and adapting to the effects of global change.



Eroded low sediment bank shoreline, NE shore of Cedar Island Bay (NC Sea Grant/Riggs)



On the Neuse River estuary, The shallow lateral roots Show the former soil surface (NC Sea Grant/ Riggs & Ames)

Plan integration- Manager's Meeting January 31-February 1, 2007, North Carolina

Receive input from managers for tool from the sea level rise models that may be applied towards:

- Prioritizing land acquisition for conservation
- Application of existing land use regulation
- Additional land and water use regulations
- Habitat protection/restoration/mitigation priorities
- Education material for land developers and real estate buyers
- Tracking changes in hydro geomorphology and biota

Who: Local, state ,federal, resource managers



A bluff sediment bank is actively eroding due to the sand composition of the bluff. (NC Sea Grant/ Riggs & Ames)