

The Ecological Effects of Sea Level Rise Research Program

Issue:

Worldwide sea level has risen about 20 cm during the past century and will inevitably be affected by climate change in the future. The rate of sea level rise during the twentieth century has been nearly 2 mm per year, which is an order of magnitude higher than the average over the last several millennia. By 2095 the projected rise worldwide is 18 cm-55 cm (IPCC 2007). Locally, the rate of sea level rise can differ significantly from the global mean due to vertical movements of the land, which can be of the same order (mm/yr) as sea level changes. In the U.S., the Southeast and Gulf coasts are particularly vulnerable.



Sea Level Rise Impacts in the coastal zone include:

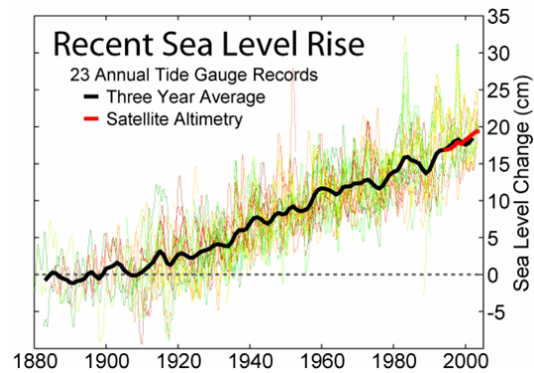
- Higher and more frequent flooding
- Shoreline Erosion
- Increased near-shore wave energy
- Upward and land-ward migration of beaches
- Loss of coastal habitats
- Salt water intrusion into coastal freshwater aquifers
- Damage to coastal infrastructure
- Economic impacts

Approach:

The Ecological Effects of Sea Level Rise (EESLR) program brings together University researchers and NOAA scientists to help coastal managers and planners better prepare for changes in coastal ecosystems due to land subsidence and sea level rise. Specialists in biology, geomorphology and coastal modeling join forces to integrate storm surge models with ecological models for more precise predictions of how future sea level will affect coastal wetlands, submerged aquatic vegetation, sub tidal habitat and oyster reefs.

Management/Policy Issues:

Rising sea level has worldwide consequences because of its potential to alter ecosystems and habitability of coastal regions. The vulnerability of coastal areas varies with shoreline physical attributes and the amount of development. Low lying developed areas in the Mid-Atlantic, Southeast, and Gulf Coast are especially at risk. Damages and economic losses could be reduced if decision makers understand the potential impacts of sea level rise and use this information for planning. This research will develop tools useful for coastal managers to mitigate regional ecological impacts of sea level rise. In addition, our goal is a planning process made flexible enough to incorporate future improvements in scientific understanding, both of climate change and of coastal processes.



Accomplishments:

Initiated in 2003, our partners within NOAA have developed a hydrodynamic tide and storm surge model of Pamlico, Albemarle, Core, and Bogue Sounds as well as adjacent estuarine and coastal waters. A high-resolution, topographic/bathymetric digital elevation model (DEM) is combined with the hydrodynamic model to integrate recent airborne LIDAR topographic data and bathymetric data. In addition, CSCOR has competitively funded three research proposals that will integrate ecological models and the hydrodynamic model into a broad based landscape model to incorporate spatial structure affects on the behavior and functioning of the landscape as a whole. Completion of the North Carolina project is projected in 2008, and we are currently planning expansion of EESLR to the Florida/Alabama Panhandle.

To learn more about this program and its accomplishments, go to <http://www.cop.noaa.gov/stressors/climatechange/current/slr/welcome.html>.

FOR MORE INFORMATION CONTACT:
NOAA/NOAA Ocean Service/NCCOS /CSCOR
Carol Auer, Ph: (301) 713-3338
e-mail: carol.auer@noaa.gov