Sea Grant
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Development of Historically-Calibrated Sea Level Rise Projections for Risk Management Along the New Jersey Shore R/6410-0014

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Chris Vane, a collaborator of Benjamin Horton, works with high school students in the coastal marshes of New Jersey to collect sediment cores that will be used to reconstruct past sea-level changes.

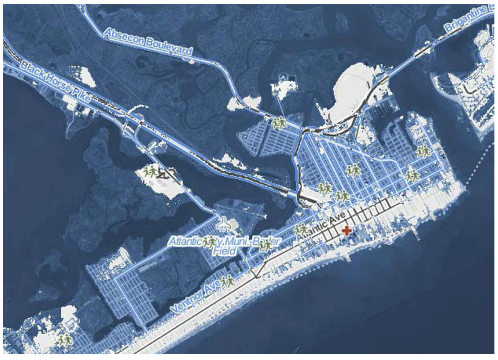
Photo - Benjamin Horton

The devastation caused by Superstorm Sandy highlighted the vulnerability of communities, economies and ecosystems in our region to sea-level rise and the associated increase in the intensity of coastal flooding. A mere 1.1 ft. of sea-level rise would be sufficient to cause the 1-in-10 year storm at Atlantic City to exceed the worst known from the historical record, including both Superstorm Sandy and the December 1992 nor'easter. Both tide gauge and satellite records show that the rate of sea-level rise is increasing globally and in New Jersey. In fact, geological records show that the twentieth century rate of sea-level rise in New Jersey was faster than during any other century in at least 4,300 years.

Decisions on how to adapt to rising seas and protect vulnerable ecosystems require probabilistic sea-level rise projections to inform risk analysis. Accordingly, this project, led by Dr. Robert Kopp, Assistant Professor of Earth & Planetary Sciences at Rutgers University and Associate Director of the Rutgers Energy Institute, in collaboration with other researchers at Rutgers and Climate Central, will produce state-of-the-art sea-level rise projections for the region, grounded in the best available science on historical and pre-historical sea-level change, sea-level physics, and uncertainty analysis.

The project will develop a database of geological and observational sea-level and ice sheet volume constraints and use it to disentangle the different factors that have driven sea-level rise in New Jersey over past millennia, among them: the ongoing effects of adjustment to the end of the last ice age, compaction of coastal sediments, uptake and loss of heat from the oceans, changes in ice sheet and glacier volume, and changes in ocean dynamics. The past responses to changes in climate will be used to calibrate a model of future sea level change, the projections from which will be integrated with statistical analysis of extreme flooding to provide predictions of changing flood risks over the next century on the Jersey Shore.

The results will be used to identify vulnerable developed and undeveloped land areas, infrastructure, assets, ecosystems and populations exposed to flooding during the 21st century. The research team will communicate the results to federal, state, and local policymakers and the broader public through direct outreach and through tools such as Surging Seas (sealevel.climatecentral.org) and NJ Flood Mapper (www.NJFloodMapper.org).



Flooding in Atlantic City due to an increase in water level of 5' above mean highest high water, indicated by blue shading. This level exceeds the highest known from the observational record (4.4 ft.), and is expected to be comparable to a 1-in-10 year storm after 1.7 ft. of sea-level rise. Children icons indicate schools, red cross indicates a hospital.

Source: Surging Seas, sealevel.climatecentral.org