A MULTI-HAZARD VULNERABILITY ASSESSMENT OF COASTAL LANDMARKS ALONG CAPE HATTERAS NATIONAL SEASHORE

Michael Flynn and Thomas Allen, East Carolina University

Cape Hatteras National Seashore is located along the Outer Banks, a narrow string of barrier islands in eastern North Carolina. The seashore was established to preserve cultural and natural resources of national significance, yet these islands have shoreline rates of change that are predominately erosional, frequently experience storm surge inundation driven by tropical and extra-tropical storm events, and are highly vulnerable to sea level rise. The National Park Service recognizes the vulnerability of historic structures located within the park, and sought the utility of a coastal hazard risk assessment to assist park managers with long-term planning. This paper reports on an assessment that primarily used GIS to evaluate the susceptibility of 27 historical structures to coastal erosion, storm surge, and sea-level rise. The Digital Shoreline Analysis System was used to calculate a linear regression rate of shoreline movement based on historical shorelines. Those rates were used to simulate the future position of the shoreline along transects. NOAA SLOSH model output was down-scaled to a 2014 LiDAR-derived DEM to determine the potential extent and depth of inundation that would occur from storm events. Sea level rise was modeled for future scenarios referenced to existing MHHW, and also added to each SLOSH model output to determine the effect of a storm event under those sea level rise scenarios. Risk maps were developed to not only include areal coverage for existing structures and districts, but to also identify potential community impacts affecting areas of relocation or retreat in the long-term. In addition to evaluating vulnerability, timelines for potential impacts provided scenarios for the National Park Service to research adaption and mitigation strategies.