

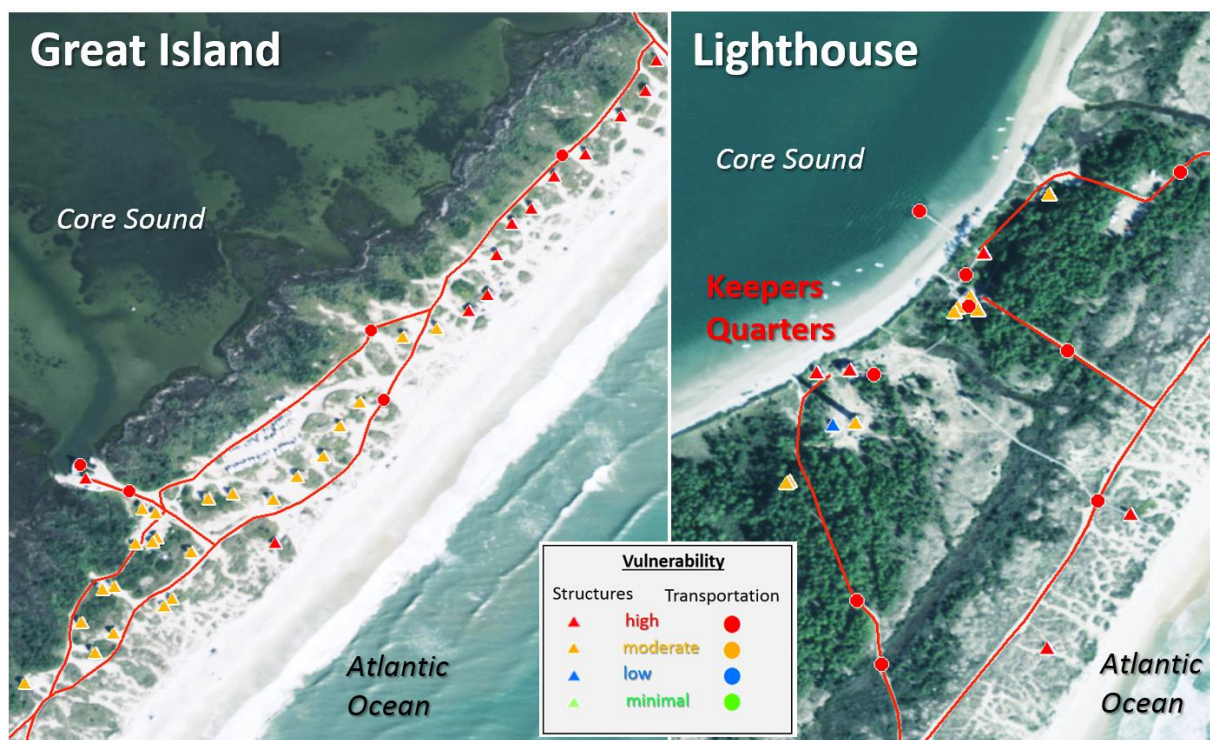
Hurricane Florence and the Vulnerability of Cape Lookout National Seashore

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Hurricane Florence is currently projected to have major impacts along the southern coast of North Carolina. While much of the focus has been on populated areas, there will also be major impacts to relatively undeveloped areas such as Cape Lookout National Seashore. In 2017, the Program for the Study of Developed Shorelines at Western Carolina University assessed the coastal hazard vulnerability of infrastructure at Cape Lookout. This assessment evaluated the vulnerability of buildings and transportation infrastructure to storm surge, sea-level rise, coastal erosion, and flooding.

Results of the coastal vulnerability assessment show that over two-thirds of the infrastructure evaluated at Cape Lookout have high vulnerability to coastal hazards, and have a combined replacement value of over \$40 million. The highest vulnerability infrastructure is primarily in Portsmouth Village, which is located on the low-lying (within 6 feet of sea level), soundside of Portsmouth Island. Most of the infrastructure in Portsmouth Village are historic buildings in poor condition, built at-grade, and with little storm-resistance. However, this area of the park is located furthest from the current forecast track.

Areas of greatest concern during Florence: High vulnerability areas of Cape Lookout closer to the current forecasted track, and therefore more exposed to storm processes, include Great Island Campground, Lookout Village, and Cape Lookout Lighthouse (see maps below). This includes the high priority, high value Lighthouse Keepers' Quarters, and several historic houses and cottages within Lookout Village. At Great Island, the oceanfront location of many campground cabins increases their exposure to storm surge, wave action, and erosion. Most Great Island cabins are elevated several feet above ground level (and base flood elevation), and it will be interesting to see how they perform. In addition to the barrier island infrastructure, the Visitor Center at Harkers Island could also see impacts, as the building is built at-grade and only 4 to 5 feet above sea level.



Above. Coastal hazard vulnerability of infrastructure in the Great Island and Cape Lookout Lighthouse areas of the park. Red lines are the high vulnerability sand roads at Cape Lookout.



Above: Lighthouse, Keepers Quarters, and Kitchen at the coast of Core Sound at Cape Lookout National Seashore.

Natural Response of Barrier Islands to Storms

Undoubtedly, there will be significant shoreline erosion, overwash, and possibly island breaching along the Cape Lookout shoreline. These relatively undeveloped barrier islands naturally move and adapt to changing coastal conditions. Shoreline change and overwash may seem destructive, but these processes are an essential part of long-term barrier island maintenance. Many species are specifically adapted to living on or in these mobile sands. Piping Plovers, for example, live and nest within the bare sand of overwash deposits.

Island breaches that are created by storms are also an important aspect of long-term barrier island evolution. These naturally occurring inlets are often temporary, but while open they transport sand from the nearshore zone into the back-barrier, adding width to the island. Inlets, and their associated sand shoals and flood tidal deltas, build land and wetlands. This is visible in numerous locations up and down the east coast. The widest portions of barrier islands are frequently those with old inlet locations. This is true for Fire Island, Assateague Island, and significant portions of the North Carolina Outer Banks.



Above. New Drum Inlet and flood tidal delta at Cape Lookout National Seashore. Note the older delta and overwash deposits are now colonized by marsh vegetation, widening the island.

National seashores, such as Cape Lookout, preserve these natural processes, and remind us how resilient these systems can be when human interference is minimized. During Florence, there will likely be substantial changes to the natural resources of Cape Lookout. These changes are important to the dynamic evolution and health of this barrier island system.