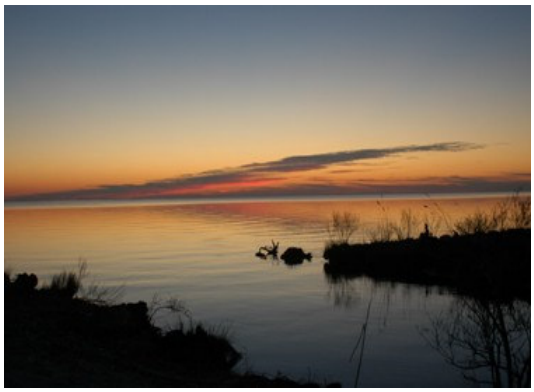
The Nature Conservancy
Protecting nature. Preserving life.™

Climate Change Adaptation

Alligator River National Wildlife Refuge

Dare County, North Carolina



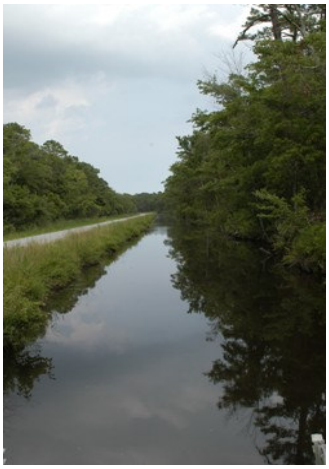
Alligator River National Wildlife Refuge

The 154,000-acre Alligator River National Wildlife Refuge was created in 1984 to protect pocosin – a unique wetland habitat characterized by poorly drained soils high in organic material. The Native American word pocosin translates as “swamp on a hill.” The refuge is home to one of the healthiest black bear populations on the east coast as well as a number of other animals including alligators, otters, migratory songbirds and waterfowl. Its most famous resident is the endangered red wolf, which has been reintroduced into the wild here since 1987. Today, about 150 red wolves roam the refuge.

This beautiful place – and other nearby conservation lands totaling more than a half million acres – is in danger today. An ever increasing rate of relative sea-level rise in North Carolina, partly due to global climate change, threatens to inundate these conservation lands. The peninsula’s ecosystems are being tremendously altered by increased shoreline erosion, saltwater intrusion, a rising water table and disintegration of peat soils. Climate change could also lead to shifts in species distribution and vegetation, a higher incidence of invasive species and alterations to fire regimes.

The Nature Conservancy, U.S. Fish and Wildlife Service and other partners are developing long-term management strategies that contribute to ecosystem resilience and the stability of the peninsula’s carbon-rich peat soils.

Extensive ditching has altered refuge hydrology. The artificial waterways not only release a massive amount of freshwater laden with tannins and low in dissolved oxygen into the adjacent estuary, but also serve as channels for saltwater intrusion into areas with peat soils. To reduce the impact of saltwater intrusion and manage water levels for wetland restoration, we are installing water control structures with check valves and flashboard risers at strategic locations. Smaller ditches will be plugged, backfilled and planted to stop saltwater inflow and encourage natural sheet flow. We are particularly interested in whether installation of these structures and plugs will encourage soil formation in peat-based systems and if they will reduce peat degradation.



Ditch on the Refuge

To ensure ecosystem stability and to reduce the likelihood of catastrophic change, we are planting salt- and flood-tolerant vegetation on altered lands. Shore zones likely to be submerged in the short term are being restored immediately using brackish marsh vegetation. Flood-tolerant black gum and bald cypress are being planted wherever the land has been cleared to ensure soil stability as the shoreline transitions inland.

Planting trees at the Refuge

Oyster reefs are being constructed along shorelines exposed to high energy wave action to provide a natural buffer for the projected increase in frequency and severity of nor'easters and hurricanes associated with a changing climate. The reefs diminish wave energy, reduce erosion and create semi-sheltered shorelines. Reefs also provide other valuable ecosystem services – filtering water and creating habitat. These fringing reefs may be located in areas that, although less than ideal today, should become more amenable to oyster survival under future climate conditions. Along lower energy shorelines, we are developing techniques to restore beds of submerged aquatic vegetation to reduce shoreline erosion.

Volunteers building oyster reef, which will reduce shoreline erosion

The lessons learned on the Alligator River refuge will inform management decisions for other nearby conservation lands, including Pocosin Lakes, Swan Quarter and Mattamuskeet National Wildlife Refuges. Our efforts will also provide valuable data for other low-lying coastal areas facing similar problems both within the the Southeast and around the world.

Pocosin Lakes National Wildlife Refuge

Project Highlights:

- Restore the area's natural hydrology by plugging ditches and installing water control structures
- Restore shoreline vegetation by planting native marsh grasses and trees
- Restore shell bottom habitat by creating oyster reefs