

# Alligator River National Wildlife Refuge/Albemarle-Pamlico Peninsula Climate Adaptation Project

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# Alligator River National Wildlife Refuge/Albemarle-Pamlico Peninsula Climate Adaptation Project

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## Project Summary / Overview

The Alligator River National Wildlife Refuge is located in Dare and Hyde Counties, North Carolina, in the Albemarle-Pamlico Estuary. This pilot project is the result of a partnership between the North Carolina chapter of The Nature Conservancy (TNC) and the U.S. Fish and Wildlife Service (USFWS) to evaluate the effects of different adaptation strategies on areas impacted (or likely to be impacted) by sea level rise. This is an adaptive management study to determine how to make the shoreline more resilient to rising sea levels. The strategies include constructing oyster reefs to buffer shorelines from waves and storm surges, restoring the natural hydrologic regime and associated wetland systems, and planting salt- and flood-tolerant species.

## Project Background

The Alligator River National Wildlife Refuge encompasses about 154,000 acres on the Albemarle Peninsula in North Carolina. The primary climate change impact of concern to the refuge and the whole of the Albemarle Peninsula is sea level rise. Models have shown that up to 469,000 acres of the peninsula could be flooded with a 12-inch increase in sea levels, and nearly 750,000 acres could be flooded with a 20-inch rise. This vulnerability is exacerbated by human alterations to the system, including an extensive network of drainage ditches used for agriculture and forestry. Sea level rise will in turn intensify other problems such as shoreline erosion, saltwater intrusion, and biodiversity loss. TNC and USFWS are working together to test three adaptive management strategies at the Point Peter demonstration site on the refuge to determine which approaches will enhance the resilience of the ecosystem.

The three adaptation strategies include:

- Using oyster reefs to dissipate wave energy, slow currents, and reduce shoreline erosion. An added benefit is that these reefs help in carbon sequestration and provide habitat for a variety of species.
- Using water control structures equipped with flashboard risers and tide gates to restore the hydrologic regime and prevent saltwater intrusion.
- Planting salt- and flood-tolerant vegetation like bald cypress and black gum to enhance future shoreline stability and combat expected biodiversity and habitat loss. In addition, the project leads are also working to establish migration corridors for species to move inland and upland from low lying areas.

– [Project Background Keywords](#)

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## Project Implementation

Several of the adaptation strategies require federal and state permits. Because the refuge is located in a wetland environment, USFWS had to acquire a permit through the Army Corps of Engineers. In addition, permits were required through the state's Coastal Area Management Act (CAMA) for any activities happening in the sound (i.e. oyster reef construction). This state permit caused some problems for the project because most of CAMA's rules are very specific to shoreline development but not to coastal restoration efforts. Because the materials used to construct the oyster reef did not conform to CAMA's idea of fill material, the permit was elevated to a "major permit" and it turned into an eight month process before it was finally approved.

This project is supported by a \$1 million donation from Duke Energy, a \$250,000 private donation, a Southeast Aquatic Resources Partnership Community-based Restoration Program grant, a NOAA Community-based Restoration Program grant, and several other smaller donations.

TNC and USFWS have already started implementing these strategies. Marl (calcium carbonate fossil rock) is being used to construct oyster reefs to buffer the shoreline, water control structures are being strategically placed in areas to restore the region back to a sheet flow system, and test plots of salt-and flood-tolerant species are being planted. Monitoring by two TNC staff members, with the assistance of several interns, is underway for all three strategies:

- Oyster reef: examining shoreline erosion rates, spat recruitment, faunal usage, water quality
- Water control structures: measuring water quality and flow within the ditches to figure out flow speed and direction, location of salt wedges
- Salt- and flood-tolerant vegetation: monitoring growth and survivability of species In addition, the project leads are looking into how to monitor peat accumulation after the restoration of flow.

The project managers have engaged with local communities, fishermen, NGOs, state and federal agencies, and the general public to educate them on the project through public meetings, volunteer involvement, a sign at the demonstration project area for refuge visitors, and a fact sheet.

– [Project Implementation Keywords](#)

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## Project Outcomes and Conclusions

This project aims to determine the adaptation strategies that will contribute to the resilience and stability of wetland ecosystems in the face of climate change and especially sea level rise. Successes would include reductions in the rates of ecosystem change, shoreline erosion, saltwater intrusion, and land subsidence, and an increase in the growth and survivability of salt- and flood-tolerant plant and tree species. The project leads hope to use the outcomes to inform adaptation efforts in other nearby conservation areas, including the Pocosin Lakes, Swan Quarter, and Mattamuskeet National Wildlife Refuges.

## Recommended Citation

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