



Waccamaw

National Wildlife Refuge

Climate Change Impacts



Waccamaw River



Swallow-tailed kite



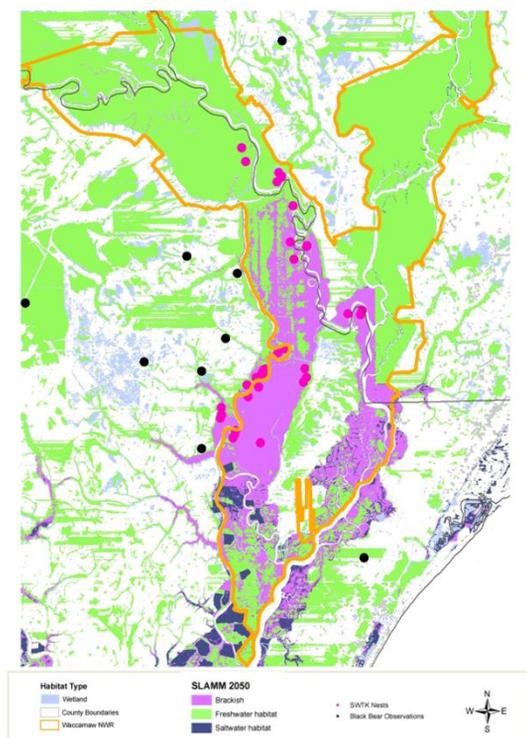
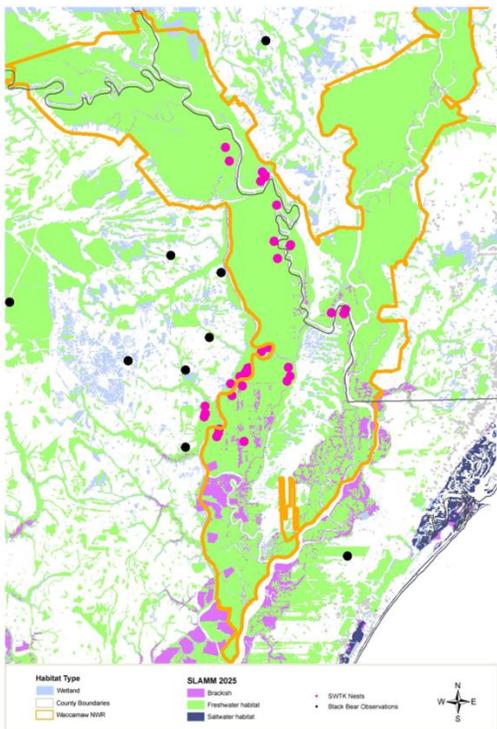
Cypress mortality on lower end of the Waccamaw River .

Located in portions of Horry, Georgetown, and Marion County, South Carolina, Waccamaw National Wildlife Refuge (NWR) is South Carolina's newest Wildlife Refuge. Waccamaw NWR was established on December 1, 1997 after completing a two-year environmental impact statement. The refuge acquisition boundary spans over 55,000 acres and includes large sections of freshwater tidal wetlands associated with the Waccamaw and Great Pee Dee Rivers and a smaller section along the Little Pee Dee River. The Refuge currently manages approximately 23,000 acres which translates to 34 square miles of floodplain wetlands. In addition to refuge lands, there are an additional 13,500 acres of land permanently owned and protected by either the state or through private easements within the Refuge Acquisition Boundary.

The wetland diversity within the Refuge is significant and includes some of the most diverse freshwater wetland systems in the world. Because of the proximity of these wetlands to the Winyah Bay Estuary, these systems are heavily influenced by daily tides and they serve an important role in providing essential ecological functions that sustain this estuary. Signature wildlife species throughout the refuge include wood storks, osprey, black bear, and swallow-tailed kites. Kites have made Waccamaw NWR their northernmost nesting area within their range. Recently Waccamaw NWR developed a Strategic Habitat Plan for swallow-tailed kites that is focused on understanding the relationship between conservation lands in and around the Refuge as well as adjoining unprotected private lands which are also important to kite nest productivity. It has been estimated that approximately 100,000 acres of contiguous forested wetlands are needed to provide enough foraging and nesting habitat for 80-100 pairs of swallow-tailed kites within the Pee Dee - Waccamaw River drainage basin. Currently within the Winyah Bay Focus Area, which includes the Refuge, over 130,000 acres have been permanently protected. Swallow-tailed kite nesting has been studied on the Pee Dee- Waccamaw River drainage basin since 1997 and the productivity rates in the Winyah Bay Focus Area are the highest in SC and possibly some of the highest in the North American nesting range.

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These habitats although protected, are beginning to show signs of environmental stress which appears to be related to sea level rise. Recent droughts and reduced flows in the Waccamaw and Great Pee Dee Rivers have allowed salt water intrusion to reach levels that have not been documented since the beginning of modern history. Old growth forested wetlands are slowly succumbing to salt stress and increased mortality in bald cypress is being documented on the lower reaches of this watershed. Bald cypress are capable of managing salt stress at low levels however prolonged periods on inundation from this stressor has facilitated marsh community shifts as well as mortality. Currently USGS is conducting research on the Waccamaw River to document and analyze both cypress mortality as well as marsh accretion rates over time. In addition to this study, the Refuge has partnered with NOAA Coastal Services Center to fine tune the Sea Level Affecting Marsh Model (SLAMM) so that more localized data can be used to better predict changes over time. This data will ultimately allow the refuge and other land use planners to make informed decisions on how to better manage existing and future lands to mitigate these impacts caused by climate change. The Refuge is also evaluating historic carbon sequestration rates of tidal freshwater marshes so that this ecological function can be measured as freshwater marshes are converted to brackish marsh communities through a USGS research proposal that was kicked off during the spring of 2010. Over the next few years research will continue to be focused on landscape conservation efforts including satellite and radio telemetry of swallow-tailed kites and black bears to better understand the relationship between protected lands and adjoining habitats that may be necessary for mitigating habitat losses due to climate change. Connective corridors between protected lands will be a major focus as well as wetland buffers and unprotected old growth forested wetlands.



Waccamaw NWR
21424 N. Fraser Street (Hwy 701)
Georgetown, SC 29440
Phone: 843/527-8069
<http://www.fws.gov/waccamaw>