Appendix B. Natural Working Lands Background

This appendix contains background information about Sector 6. Natural Working Lands.

1.1. Measure 13. Coastal Protection and Restoration

1.1.1. Measure 13-1. Coastal Habitat Enhancement Initiative

Background and Status in NC

North Carolina is home to the largest estuarine system of any single Atlantic coast state, with approximately 2.2 million acres of estuarine waters, including approximately 100,000 acres of seagrass and 228,000 acres of salt marsh.

North Carolina's Coastal Habitat Protection Plan (CHPP) identifies the primary threats facing seagrass as decreased water clarity and increasing water temperatures and identifies the primary threats facing salt marshes as sea level rise and erosion. Seagrass in NC has been in decline for decades, and as water temperatures continue to increase due to climate change and water clarity suffers due to increased development. Salt marshes are on the front lines of sea-level rise (SLR), and losses of salt marsh are forecast to rapidly accelerate as the rate of sea level rise increases. Sea level rise will also result in salt marshes migrating inland into low-lying uplands as they are inundated by rising water levels, colloquially termed marsh migration corridors (CHPP, 2016.)

1.5ft of SLR is the most likely 2050 SLR scenario for NC, as identified by the 2022 NOAA SLR Technical Report. At this level, 92,000 acres of salt marsh can be expected to be lost. This constitutes 42-54% of NC's current salt marsh extent. While salt marshes could migrate inland, they will not be able to migrate into developed areas. Thus, there is a need to conserve areas for salt marshes to migrate into to preserve their carbon sequestration benefits, as well as to prevent increased community exposure to inundation and flooding risks in low-lying developments (NC Salt Marsh Action Plan, 2024.)

An analysis of submerged aquatic vegetation (SAV) surveys conducted by APNEP and NC DMF indicated net loss of 56,520 acres, or 39% of the historical extent, between 1981 and 2019. Low-salinity SAV has not been sufficiently mapped to provide a statewide estimate of change in areal extent, but APNEP's 2014-2017 surveys of the linear extent of shoreline-fringing low-salinity SAV indicated a net loss of over 51 km, or 33% of the historical extent.

Seagrasses (submerged aquatic vegetation, or SAV) and salt marshes are essential types of NWLs storing GHGs. Their loss would eliminate a significant portion of the benefits that NWLs provide statewide.

Beneficial types of projects to restore coastal habitats include:

- Conservation easements and acquisition of land that marshes could migrate into, focused on areas where there is development pressure
- Salt marsh enhancement and prevention of inundation of salt marshes due to sea level rise
- Restoration of lost seagrass beds

High-salinity seagrass has experienced large declines in acreage, particularly from Oregon Inlet to Beaufort Inlet. Future seagrass enhancement projects should focus on the high-salinity regions of North Carolina's estuaries, namely coastal sounds from the South Carolina line through Core Sound plus far eastern Pamlico Sound. Marsh migration corridor conservation should be supported in the low-lying uplands adjacent to those high-salinity estuaries (NC Salt Marsh Action Plan, 2024.)

State and nonprofit partners have decades of experience putting coastal properties into conservation and implementing coastal habitat restoration projects. Relevant partners include (but are not limited to) the North Carolina Wildlife Resources Commission (WRC), NC Coastal Reserve, Duke Restore, The Nature Conservancy (TNC), the NC Coastal Federation, the Conservation Trust for NC, and regional land trusts. DEQ divisions (including DCM, DMF, DNCR and APNEP) also maintain coordination among the many relevant federal, state, academic, and nonprofit partners.

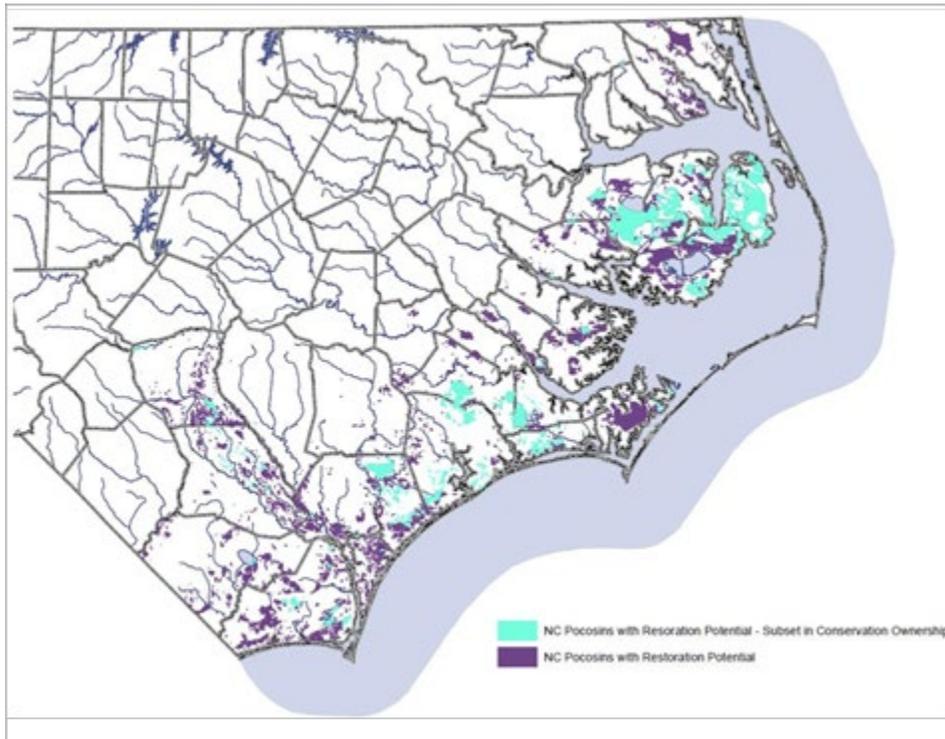## 1.1.2. Measure 13-2. Peatland Conservation and Rewetting

Background and Status in NC

North Carolina's Albemarle-Pamlico Peninsula has more peatland pocosins than anywhere else in the US (NWL Action Plan 2020). Pocosins are "naturally occurring, freshwater, shrub-dominated wetlands of the Southeastern Coastal Plain with deep, acidic, sandy, peat soils" that take thousands of years to build up (Pocosins | NHP). Drained pocosins (or pocosins during drought conditions) slowly release CO_2 from their soils, but little methane (NWL Action Plan 2020.) Draining makes pocosins vulnerable to severe peat fires that rapidly release tons of CO_2, converting them from carbon sinks to sources.

Prior to ditching and draining of North Carolina's pocosins, these wetlands covered a much wider extent of North Carolina's Coastal Plain. They covered 2.25 million acres in the 1960s, but due to drainage only 700,000 acres remain (NWL Action Plan 2020.) North Carolina's peatlands are ecologically significant as part of the State's tremendous natural community

diversity and for the habitat they provide, as well as for their ecosystem services. Peatlands are home to plants and wildlife including Venus flytraps and other carnivorous plants, critically endangered red wolves, red cockaded woodpeckers, and the American black bear.

Implementation Needs and Capacity

Peatland restoration has been conducted in a number of areas in North Carolina, including on Pocosin Lakes and Great Dismal Swamp National Wildlife Refuges, through a partnerships between US Fish and Wildlife Service and The Nature Conservancy, and on the Angola Bay Game Land, through a partnership between the NC Wildlife Resources Commission and The Nature Conservancy. Peatland pocosin restoration generally involves using water control structures to return water to pocosin soils ("peatland rewetting") rather than draining the water away. This makes peat soil less susceptible to burning and restores the conditions for the soil formation, improving pocosins' net GHG emissions. The figure below presents the conservation opportunities for peatland pocosin acquisition and rewetting (NWL Action Plan, 2020):

NC Pocosins with Restoration Potential - Subset in Conservation Ownership
NC Pocosins with Restoration Potential

Figure B-1. North Carolina Map of Potential Pocosin Restoration

Peatland Rewetting Opportunities

Future peatland pocosin restoration will need to occur on both public and private lands, as many opportunities on public lands have been implemented already. Restoration projects require ongoing maintenance and management to ensure hydrologic measures and ecological uplift are retained (NWL Action Plan, 2020). Measurements of carbon emissions

in restored pocosins show that this process can reduce carbon emissions by more than 90% or even convert the restored pocosins to net carbon sinks, depending on the final water table depth after restoration (Richardson et al., 2022).

Relevant stakeholders and partners include (but are not limited to) The Nature Conservancy, NC Coastal Federation, DNCR, DEQ, NCFS, NC WRC, APNEP, the Eastern NC Sentinel Landscape program, private landowners, engineering consultants and contractors, universities, Department of Defense, USFS, USGS, and USFWS.

Additional Benefits

Restoring pocosins to their natural condition has the potential to reduce the risk of flooding, improve water quality, provide habitat for biodiversity, improve ecosystem health, retain soil, and protect against wildfires. Stopping soil loss in low-elevation peatlands is particularly important to reduce the impacts of relative sea level rise (SLR).

The protection provided by restoring pocosins would result in reduced loss of property due to flooding and fire, improved public health due to improved air quality (in the absence of sustained peatland fires), and potential buffering of relative SLR impacts.

1.2. Measure 14. Forest Protection and Development
1.2.1. Measures 14-1 through 14-4.

Background and Status in NC

Forests cover more than 60% of NC and offset 25% of the state's gross GHG emissions (NC GHG Emissions Inventory, 2019). Most (~85%) of NC's forests are privately owned (NWL Action Plan 2020). Forests are under intense development pressure, particularly near urban areas; if not protected, these forests will likely be lost.

Restoring forest lands offers one of the largest NWL sector pathways to carbon sequestration, by storing carbon aboveground in standing tree biomass as well as increasing soil carbon. Forested floodplains and wetlands also provide significant climate resilience, biodiversity, and water quality benefits (NWL Action Plan 2020).

Forest restoration and reforestation have been successfully conducted across the state through numerous cost-share programs which provide financial assistance to landowners to lessen high upfront costs to forest landowners of implementing forestry practices. The NC Forest Service's Forest Development Program is one such long-standing example. Forest restoration generally involves site preparation, tree planting, prescribed burning, and forest stand improvement treatments (N.C. Forest Service - Forest Development Program | NC Agriculture, 2024).

Implementation Needs and Capacity

North Carolina has 11.7 million acres of forests and 2.2 million acres of forested wetlands with high carbon storage potential that are currently unprotected. Additionally, about 5.1 million acres of land is not currently forested or developed that could potentially support reforestation (NWL Action Plan, 2020).

Organizations with experience protecting and restoring forestlands in North Carolina include (but are not limited to) state agencies NCFS, DEQ, DNCR, NC WRC, NC State Extension, and NC Soil and Water Conservation; nonprofits like the Roanoke Cooperative, The Nature Conservancy, the NC Coastal Federation, Coastal Land Trust, Conservation Trust for North Carolina, The Conservation Fund, Pew Charitable Trusts, and the Forest Legacy Program; universities like NC State University and NC A&T University; and federal programs like NRCS, USFS, USFWS, and NPS.

Additional Benefits

Restoring forest lands can increase biodiversity by providing food and habitat for native species. 441,000 acres of land in North Carolina that could be reforested and that was highly rated (> 5) on the NHP Biodiversity and Wildlife Habitat Assessment ([Biodiversity and Wildlife Habitat Assessment | NC OneMap](), 2023).

Urban forests can reduce the urban "heat island" effect, reduce household energy demands for both heating and cooling, absorb rainfall and as such, reduce flooding and water quality issues, and recharge drinking water supplies. Natural areas can also positively influence real estate values and local tax revenue (NWL Action Plan, 2020).