Chowan Swamp Game Land

and

Chowan Game Land

Game Land Management Plan

2015 – 2025

N.C. Wildlife Resources Commission staff has extensively contributed to the development and preparation of this plan through their various fields of professional expertise. All content, management strategies, recommendations, goals, and needs for change were developed using the best available science and professional working knowledge of the Chowan Swamp and Chowan game lands, their habitats, and terrestrial and aquatic species. Careful consideration has been given to all input received from the public, external agencies, and organizations that have an interest in or use the game land to ensure a comprehensive management program is administered. The successful implementation of this plan will depend on the continued input and support from all interested parties.

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Executive Summary

The North Carolina Wildlife Resources Commission charged North Carolina Wildlife Resources Commission staff to develop Game Land Management Plans for all NCWRC-owned game lands. The creation of this plan was a joint effort from North Carolina Wildlife Resources Commission biologist and land managers, natural resource conservation groups and agencies, and the public. The primary goal for this plan was to establish a clear path for management activities for the Chowan Swamp Game Land and the Chowan Game Land for the next ten years and set a "Desired Future Condition" for habitat types beyond that ten year horizon.

Balancing increasing outdoor recreation demands with conservation objectives in protected areas presents a difficult challenge for land managers. Access to land has been a restricting factor in recruiting hunters since the 1980's. It is important to the hunting heritage of North Carolina that large areas of land are managed to provide opportunities to hunt. Hunters typically do not ask for much on our game lands. They ultimately just want a quality place to hunt with good access. The Chowan Swamp Game Land, like many other game lands across the state, is being used by many user groups other than the traditional hunters, fishermen, trappers, and wildlife viewers. These non-traditional users put strains on the wildlife, habitats, traditional users, and infrastructure on the game lands. Many of the non-traditional uses are acceptable on game lands at certain levels however; unrestricted and unregulated use by any group can negatively affect the natural resources that draw people to visit the game land. Other than hunting and trapping, all other uses are not regulated on either Chowan Swamp Game Land or Chowan Game Land. Many of these uses may be more appropriately conducted on State Parks, where conflicts between hunters and trappers do not exist and infrastructure is designed for such uses. Many of the amenities and uses asked for during the public input process are already being offered by State Parks who receive land acquisition funding from many of the same sources as the North Carolina Wildlife Resources Commission. It is hunter dollars that fund the majority of the land management activities on the game lands.

Chowan Game Land is 30 acres of Tidal Swamp Forest located on Pembroke Creek outside of Edenton, NC. Management consists only of land protection and boundary posting. Chowan Swamp Game Land totals 31,372 acres in Bertie, Gates, and Hertford counties. Habitats vary from Tidal Swamp Forest to Dry Coniferous Woodlands. Recent acquisitions to Chowan Swamp Game Land have added large expanses of uplands that once supported a Pine/Scrub Oak Sandhill natural community dominated by longleaf pine supported by a desired mix of native grasses and forbs. Today, remnants of the habitats with unique genotypes of flora are still present. Significant changes have occurred in the last decade on Chowan Swamp Game Land to restore habitat communities that were lost to loblolly pine plantations.

Chowan Swamp Game Land helps protect portions of small streams, swampy streams, large creeks, large rivers, and floodplain wetlands. Chowan Swamp Game Land provides the unique opportunity to experience a large, contiguous Coastal Plain ecosystem that harbors common, rare, and vulnerable species of anadromous fish, freshwater fish, freshwater mussels, and crayfish.

It is my hope that this plan sets a direction for the North Carolina Wildlife Resource Commission to preserve the hunting, fishing, trapping, and wildlife viewing tradition that so many people across the state come to enjoy on the Chowan Swamp and Chowan Game Land.

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Introduction

North Carolina Wildlife Resources Commission

The North Carolina Wildlife Resources Commission, hereafter known as NCWRC, was established in 1947. Prior to 1947, the tasks of managing state owned Wildlife Management Areas were executed by the Department of Conservation and Development. General dissatisfaction with the program led to the creation of the Wildlife Resources Law in 1947 that established the North Carolina Wildlife Resources Commission.

Since 1947, the NCWRC has been dedicated to the conservation and sustainability of the state's fish and wildlife resources through research, scientific management, wise use, and public input. The NCWRC is the state regulatory agency responsible for the enforcement of fishing, hunting, trapping, and boating laws and provides programs and opportunities for wildlife-related educational, recreational, and sporting activities.

Game Land Program Mission Statement

Consistent with the original establishment legislation for the NCWRC, the mission of the game lands program is to enhance, facilitate, and augment delivery of comprehensive and sound wildlife conservation programs. Inherent in delivery of a land conservation program consistent with this mission is the feasibility and desirability of multiple uses on lands owned by the state within the system. In addition to hunting, fishing, trapping, and wildlife viewing as primary uses, we recognize the desirability of providing opportunities for other activities on state-owned game lands that are feasible and consistent with the agency's mission and compatible with these traditional uses.

Game Land Program Management Objectives

- To provide, protect, and actively manage habitats and habitat conditions to benefit aquatic and terrestrial wildlife resources
- To provide public opportunities for hunting, fishing, trapping, and wildlife viewing
- To provide for other resource-based game land uses to the extent that such uses are compatible with the conservation of natural resources and can be employed without displacing primary users
- To provide an optimally sustainable yield of forest products where feasible and appropriate and as directed by wildlife management objectives

History

Prior to 1971, game lands in North Carolina were limited to designated and tightly controlled Wildlife Management Areas. In 1971, the current Game Lands Program was established. This change involved the expansion of game lands from about 700,000 acres to 1.5 million acres, changes in regulations, and reductions in fees to hunters and fishermen (Dean 1971). The old

Wildlife Management Areas were incorporated into the new Game Lands Program, but the new program also allowed the Commission to lease/incorporate additional lands as game lands to expand the land base. Beginning in the 1980s, land owners (both corporate and private) realized they could lease their properties for a higher rate to hunting clubs and private individuals and began to do so. These properties were subsequently removed from the Game Lands Program. Fortunately, the Natural Heritage Trust Fund was established in 1987 and the Clean Water Management Trust Fund in 1996. These funds provided money for the fee simple acquisition of select properties, many of which have been incorporated into the Game Lands Program. These Funds greatly compensated for the loss of game lands leased from the private sector and currently over 2 million acres are enrolled in the Game Lands Program.

With the Management Area system, Commission staff was housed on each management area. These personnel were assigned both law enforcement and habitat management duties on their respective areas. Administration of the new Game Lands Program was assigned to the Division of Wildlife Management. Depot locations with equipment and habitat development crews were established and strategically located in the vicinity of all game lands in the state. All law enforcement on these properties was assigned to the Division of Law Enforcement. With some minor organizational changes, this system remained intact until 2012. In 2012, land management staff in the Division of Wildlife Management and certain similar positions in the Division of Inland Fisheries were merged with Division of Engineering staff into the Division of Engineering and Lands Management. This organizational change was made to deliver a more comprehensive and efficient wildlife and fisheries management program on all public lands and waters in the state. Depots remained at former locations with the establishment of new depots/crews at certain remote locations that were not efficiently served under the former program.

Purpose and Need

The purpose of this Game Land Management Plan is to provide a guide for managers to follow in the creation of wildlife and land management prescriptions. Fish and wildlife habitat needs were given priority; outdoor and wildlife related requests/activities were considered individually depending on compatibility and appropriateness. All aspects of game land management were considered in the development of this plan and include but are not limited to; fish and wildlife communities, forest management, infrastructure development and maintenance, public uses, fish and wildlife information needs, financial assets and future needs, future plans for acquisition, regulations and enforcement, and existing and needed partnerships and collaborations. While this plan was written to a ten-year horizon, it will remain a living document able to adapt to change.

More specifically, this plan will:

- Provide a clear direction for game land management.
- Provide the public, local, state, and federal officials with a better understanding of game land management and objectives.
- Provide clear management objectives to ensure that these actions are consistent with the game lands program goals.

- Provide a basis for future budgetary operational expenses and manpower needs.

Regional Context

The Chowan Swamp Game Land (CSGL) and the Chowan Game Land (CGL) are located in the Mid Atlantic Coastal Plain. In North Carolina, a huge diversity of fish and wildlife habitats exist across the three distinctive regions of the state: the Coastal Plain, the Piedmont, and the Mountains. These regions fall within larger ecoregions that span state borders and link North Carolina to neighboring states (Fig. 1). Elevations ranging from sea level to over 6,000 feet provide habitat for over 1,000 species of birds, mammals, fish, reptiles, amphibians, mollusks, and crustaceans, in addition to thousands of other invertebrate species.

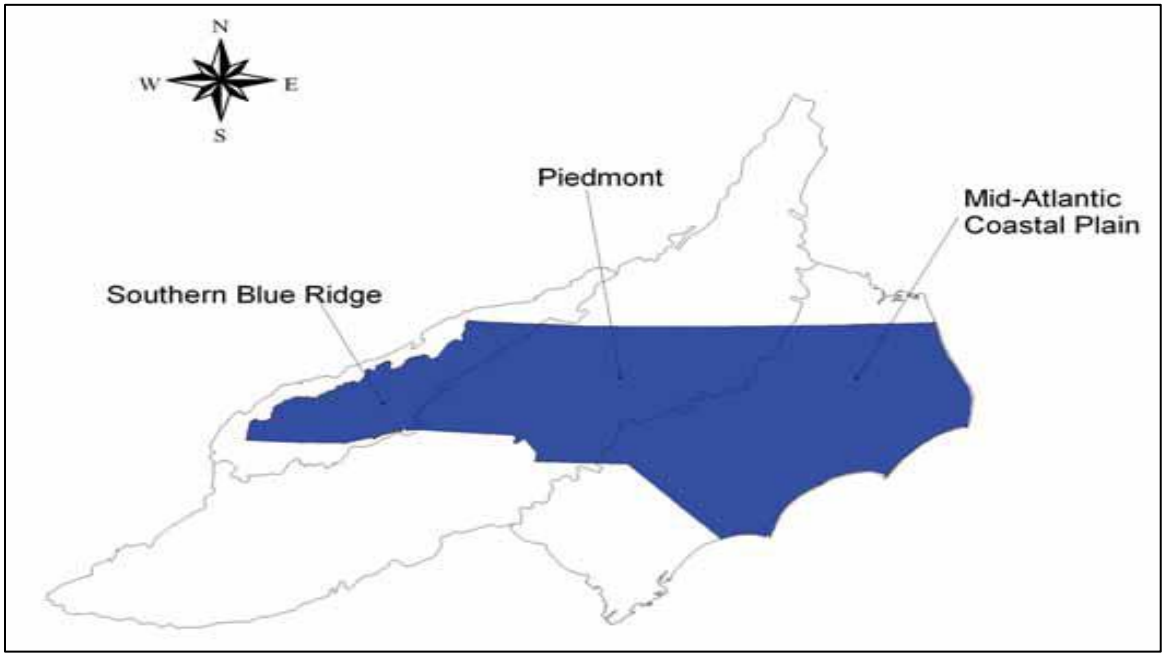

Fig. 1. Ecoregional delineations in North Carolina (Bailey 1995).

The Coastal Plain region is characterized by flat lands extending from the coast inland an average of 125 miles. Elevations in the region increase inland at approximately one foot per mile. The region covers almost two-fifths of the area of the state.

The Chowan River is formed near the North Carolina and Virginia state line by the confluence of the Nottoway and Blackwater rivers (Fig. 2). Two other rivers that flow into the Chowan include the Meherrin, just north of Winton, NC and the Wiccacon near Harrellsville, NC. Other major North Carolina tributaries within the basin include Potecasi Creek, Sarem Creek, Bennetts Creek, Indian Creek, and Rockyhock Creek. The Chowan River section of the basin stretches 50 miles before emptying into the Albemarle Sound near Edenton, NC. Approximately 73% of the basin lies in Virginia. In North Carolina, the Chowan River Basin comprises of 1,315 square miles. Both the Chowan Swamp Game Land and the Chowan Game Land fall within the Chowan River Basin (North Carolina Division of Water Quality 2007).

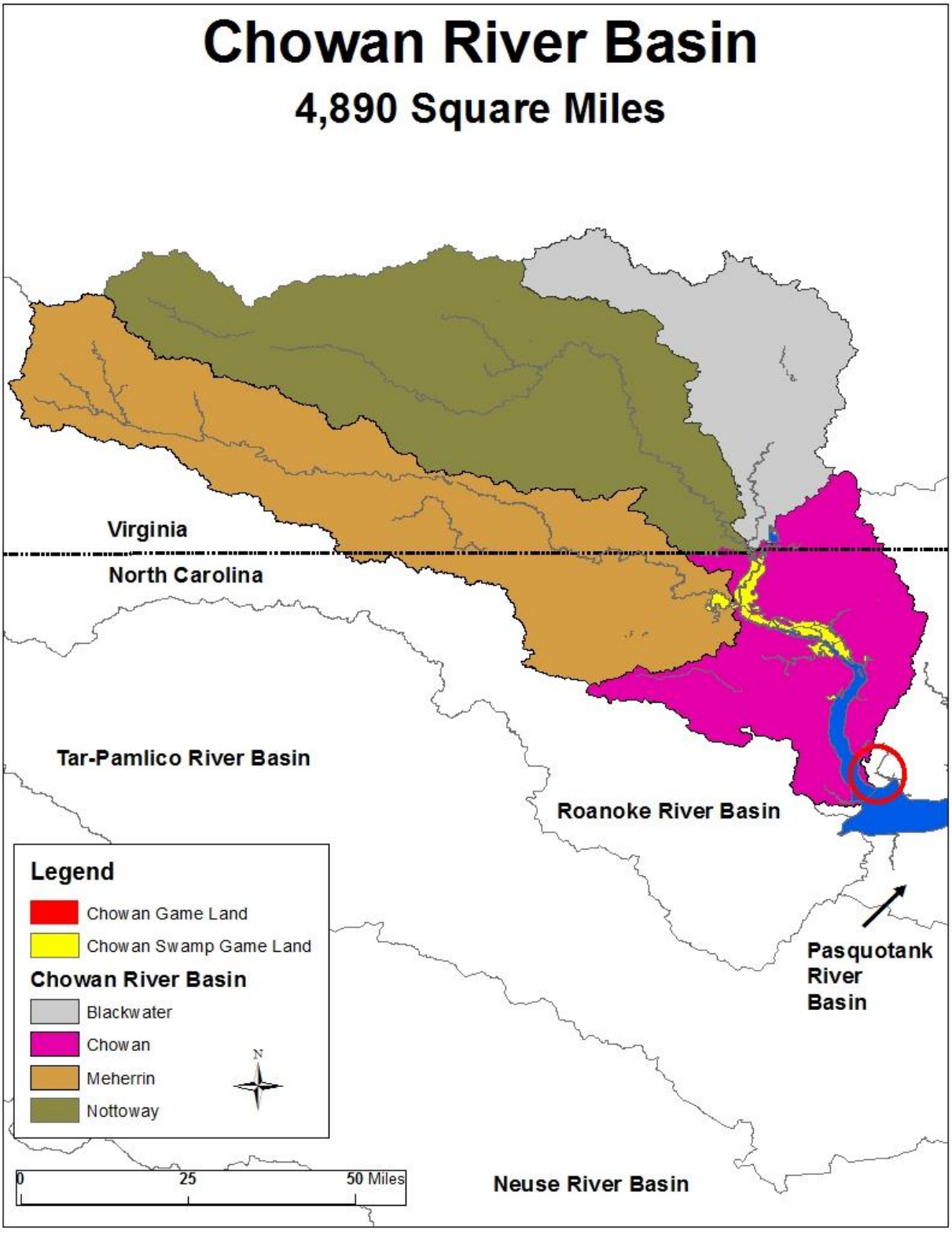

Fig. 2. Map of the Chowan River Basin.

Role of Chowan Swamp Game Land and Chowan Game Land in Regional Conservation

The Chowan River swamps are considered one of the most extensive swamp forests in North Carolina. Most of the tidal swamp forests, as well as the pine/scrub oak sandhill habitats, are designated as Significant Natural Heritage Areas by the North Carolina Natural Heritage Program (2013). Both the Chowan River and the Meherrin River are designated as Aquatic Significant Natural Habitat Areas due to their importance to freshwater mussel populations (North Carolina Natural Heritage Program 2013). Significant natural areas contain examples of natural communities, rare plant or animal populations, or geologic features that are among the highest quality or best of their kind in the state.

The Chowan River empties into the Albemarle Sound which is part of the Albemarle-Pamlico Estuary, the second largest estuary system on the United States. In 1972, the Chowan River experienced the first large-scale algae bloom in coastal North Carolina. Excessive discharges from wastewater treatment systems, fertilizer runoff, and livestock operations lead to blue-green algae to deplete oxygen levels in the river and its tributaries resulting in fish kills (North Carolina Department of Environment and Natural Resources 2013). In 1979, the North Carolina Division of Water Quality classified the Chowan River as Nutrient Sensitive Waters.

Spurred by plummeting waterfowl populations, the North American Waterfowl Management Plan (1986) called for the protection, restoration, and enhancement of black duck migrating and wintering habitats on the east coast of the United States. The North American Waterfowl Management Plan (NAWMP) identified regions where partnerships could implement the goals of the NAWMP. The Atlantic Coast Joint Venture (ACJV) was formed in 1988 to offer a stepped down approach to fulfill the goals and objectives of the NAWMP. The South Atlantic Migratory Bird Initiative (SAMBI) is the vision and process in conservation planning and implementation. The acquisition of lands that now make up the Chowan Swamp and Chowan game lands aid in reaching goals set by the NAWMP to protect habitats for migrating and breeding waterfowl and SAMBI which include restoring longleaf pine communities and supporting red-cockaded woodpecker habitat (North American Waterfowl Management Plan 1986 and South Atlantic Migratory Bird Initiative 2006). A 2005 revision to the Atlantic Coast Joint Venture Waterfowl Implementation Plan combined the Roanoke River and Chowan River into one focus area (Atlantic Coast Joint Venture 2005).

The National Audubon Society recognizes the Chowan Swamp Bottomlands as a Globally Important Bird Area for breeding neotropical migrant songbirds and wood ducks (National Audubon Society 2014). Longleaf pine community restoration objectives will aid in supporting red-cockaded woodpeckers and other early-successional species. The Chowan Swamp Game Land is an important link in the regional conservation of waterfowl, black bears, and red-cockaded woodpeckers (Fig. 3).

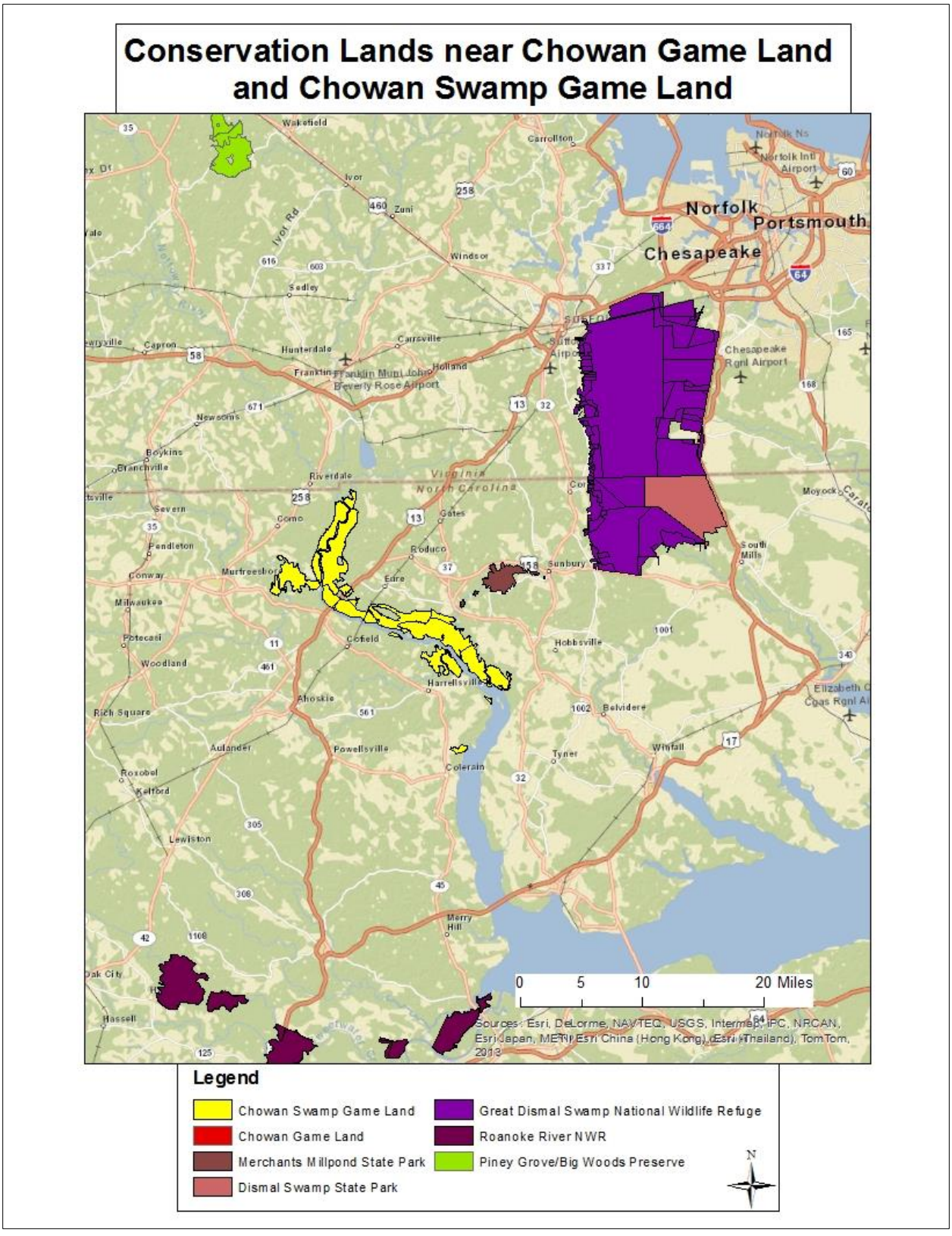

Fig. 3. Conservation lands near Chowan and Chowan Swamp game lands.

Game Land Specific Information

Location and Size

The Chowan Swamp Game Land lies in Gates, Hertford, and Bertie counties and encompasses 31,372 acres of northeastern North Carolina, according to Global Information System data. The Gates County tracts mostly lie on the Chowan River and extend inland as much as 2.5 miles. Nearly 34 miles of the Gates County river shore is enrolled in the game lands program. A 95 acre tract is located on Catherine Creek, 1.8 miles upstream from the Chowan River. Of the 20,059 acres of the Gates County portion of the game lands, 12,220 acres are allocated to the NCWRC.

Five tracts make up the Hertford County 8,944 acres of the Chowan Swamp Game Lands. The largest is the Mapleton Tract (3,333 acres) nestled between the Meherrin River and Potecasi Creek. Just to the northeast and across the Meherrin River from the Mapleton Tract lies the Upper Chowan West Tract. This tract consists mostly of tidal swamps along 11.5 miles of Chowan River shore. A small tract of tidal swamp is located near the Petty Shores community lying on the Chowan River. The Collins-Cooper Tract is located on the Chowan River across from Holiday Island. The Wiccacon River bisects the final Hertford County tract. The two portions of this 2511 acre tract near Harrellsville also border the Chowan River.

A river access only 369 acre tract in Bertie County lies on the Chowan River just south of the Hertford/Bertie county line.

The Chowan Game Land is located 2 miles east of Edenton on Pembroke Creek. This 30 acre game land is accessible by boat only.

Climate

Bertie, Chowan, Gates, and Hertford counties fall into the humid subtropical climate zones as does most of North Carolina. The average annual temperature for years 1981-2010 is 58.2 degrees Fahrenheit. July and August are typically the warmest months with daytime temperatures close to 86 degrees Fahrenheit (National Oceanic and Atmospheric Administration 2015). The average yearly precipitation is 47.9 inches, with June, July, August, and September being the wettest months. November is typically the driest month with just under 3 inches of precipitation a year (National Oceanic and Atmospheric Administration 2015). The first freeze for Williamston averages November 5th and the average last freeze is March 26 (National Weather Service 2015). Winds are typically out of the west and northwest during the fall and winter months and south and south west through the spring and summer (State Climate Office of North Carolina 2015).

Significant rainfall occurs with tropical systems. Hurricanes that have severely impacted the area in recent history were Floyd in 1999, Isabel in 2003, and Irene in 2011.

Soils

The Chowan River has had a pronounced impact over much of the soils found on both the Chowan Game Land and the Chowan Swamp Game Land. The tidal swamps make up a large portion of both of the game lands. Near all of the Chowan West Tract and most of the tidal swamps on the Sand Banks portion of the game land are made up of Dorovan mucks, which are organic in nature throughout its profile. The sandy ridges parallel the Chowan River are primarily Alaga, Pactolus, and Leon series soils (Fig. 4). Alaga soils are well to excessively well drained sands, whereas Pactolus and Leon soils are found closer to drains and are less well drained compared to Alaga soils. The drains between the sandy ridges are commonly described as Ballahack loams that are very poorly drained.

As with all the Chowan Swamp tracts, the swamps along the rivers are classified as Dorovan mucks. Along the Wiccacon River, the Meherrin River, and Potecasi Creek, Dorovan mucks make up a large portion of the Mapleton Tract (Fig. 5) and the Lower Wiccacon Tract soils (Fig. 6). Much of the uplands on both tracts are Craven soils. These sandy loams can be nearly level or have moderate slopes to 12 percent where soil erosion could be a management concern.

The Fort Island area tracts (Fig. 7) and the Catherine Creek Tract (Fig. 8) in Gates County, the Petty Shore Tract and Collins-Cooper Tract in Hertford (Fig. 7 and 9 respectfully), and the Bertie Tract (Fig. 10) in Bertie County are nearly completely consisting of Dorovan mucks. There are a few sand ridges on the Fort Island area tracts and the Bertie tract has some sandy loam and loamy sand slopes on the western portion of the tract.

The dominate soil on portions of Chowan Swamp Game Land that are not owned by the NCWRC are Dorovan mucks. The 30 acre Chowan Game Land is made up entirely of Dorovan muck. Soil symbols on the maps are described in Table 1. USDA-NRCS online Web Soil Survey data were used to create soil maps below (U.S. Department of Agriculture 2013, 2015*a,b,c*).

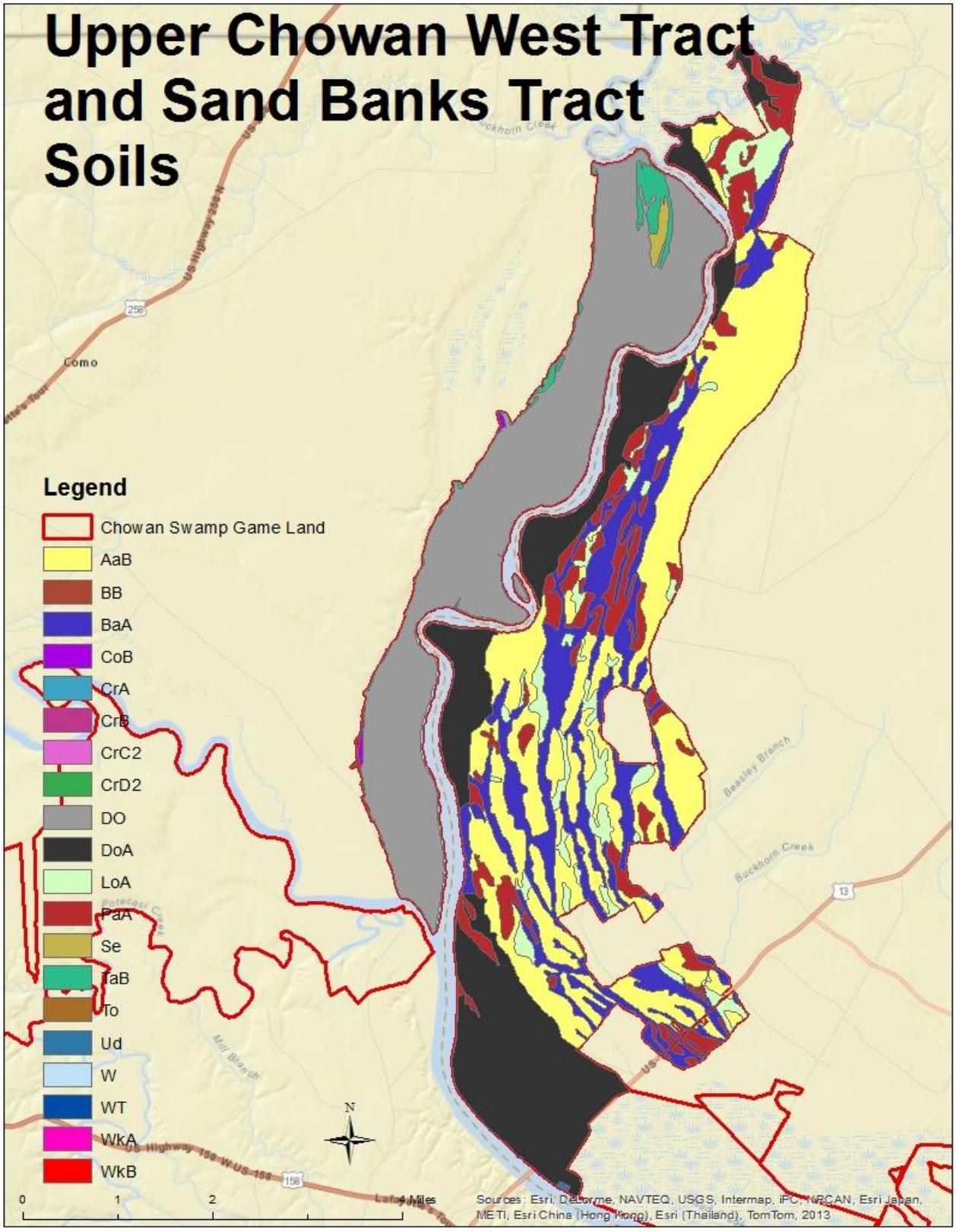

Fig. 4. Soils map for Upper Chowan West and Sand Banks.

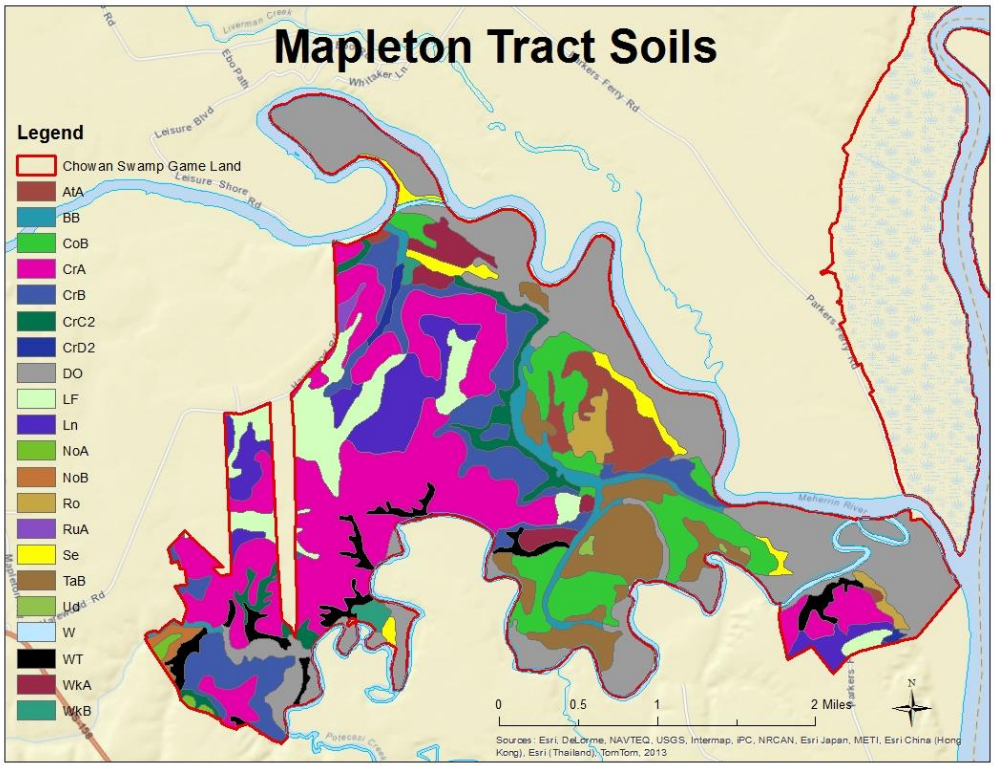

Fig. 5. Soils map for Mapleton Tract.

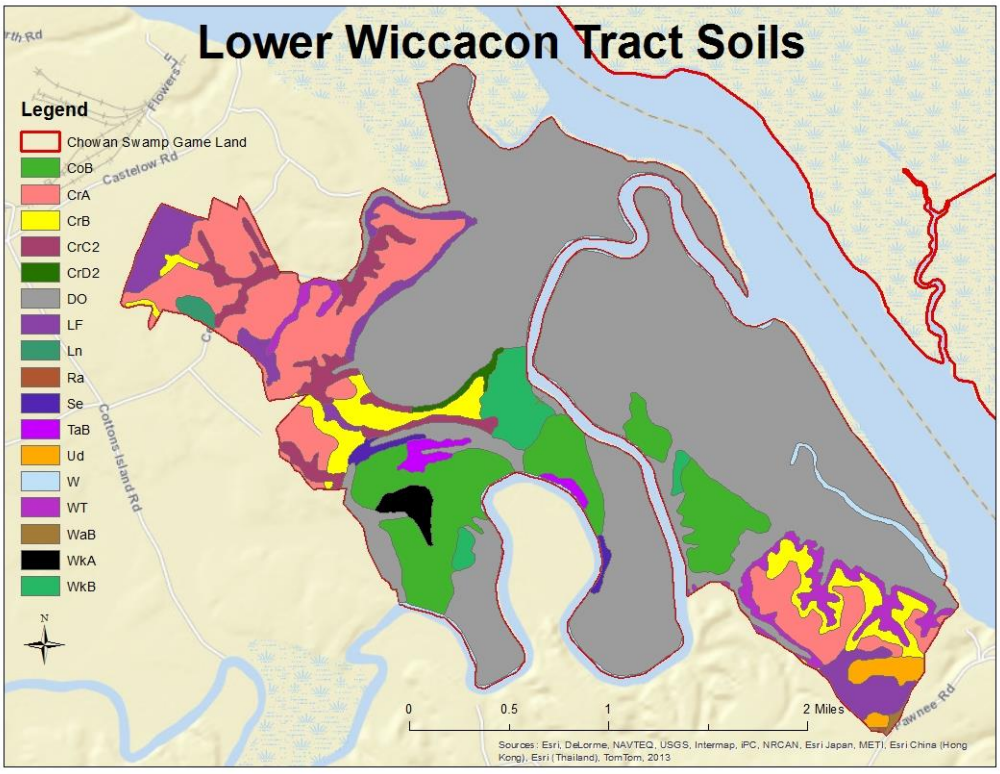

Fig. 6. Soils map for Lower Wiccacon Tract.

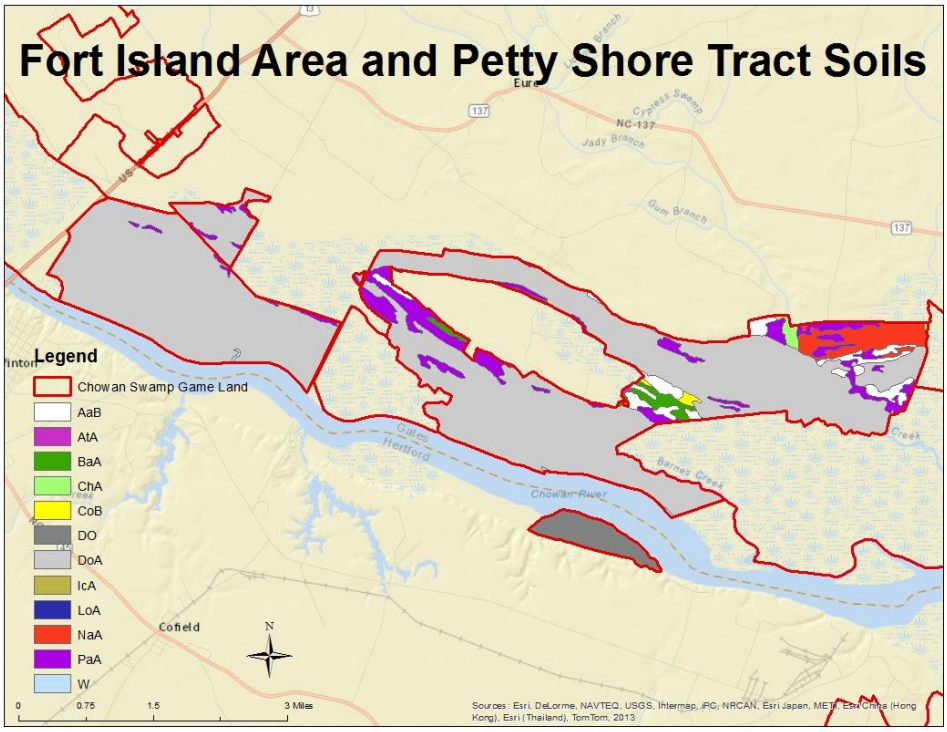

Fig. 7. Soils map for Fort Island Area and Petty Shore Tract.

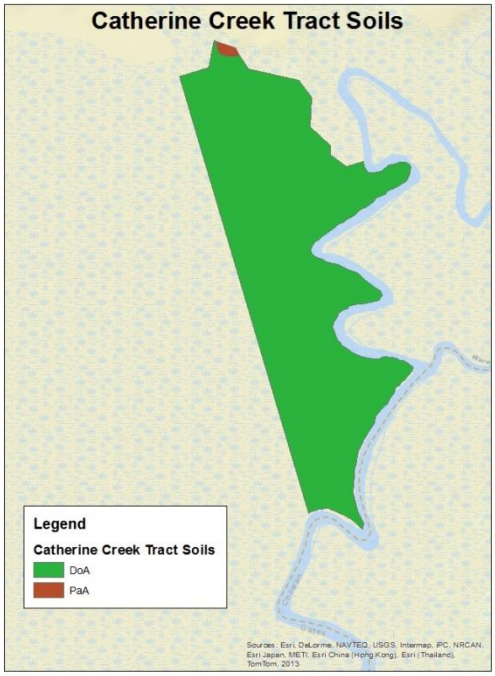

Fig. 8. Soils map for Catherine Creek Tract.

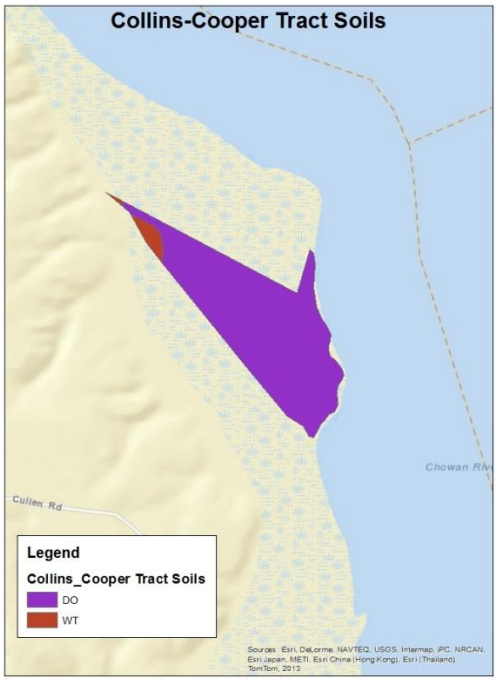

Fig. 9. Collins-Cooper Tract soils map.

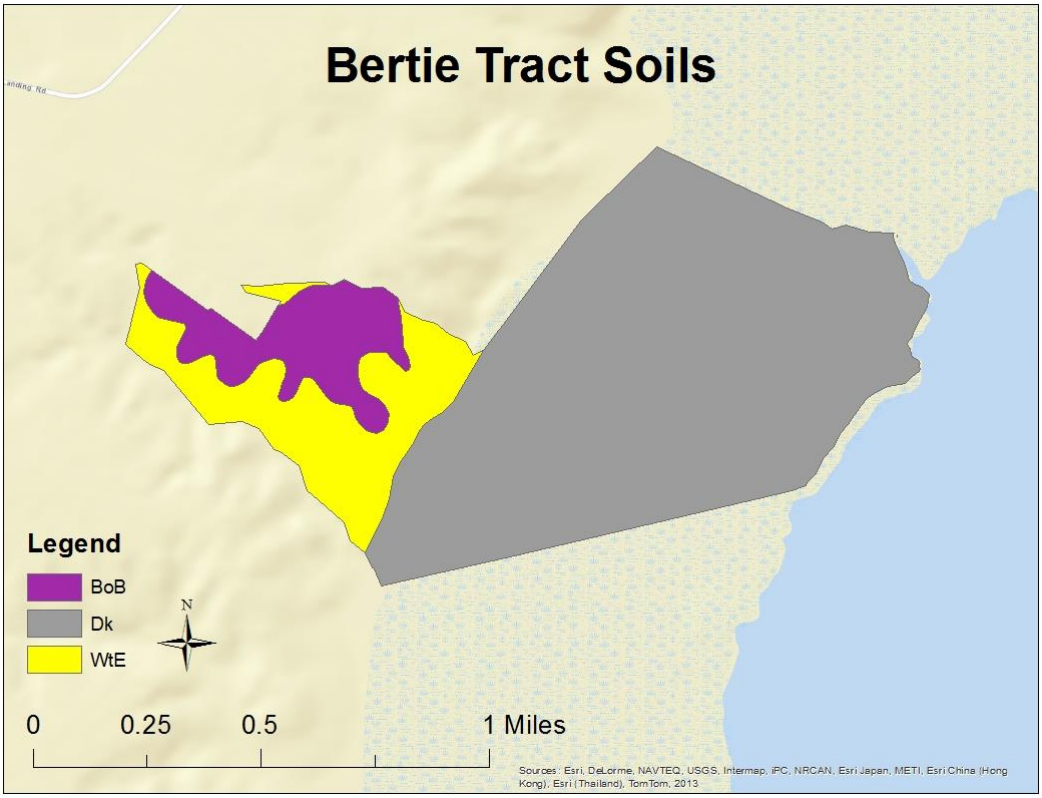

Fig. 10. Soils map for Bertie Tract of Chowan Swamp Game Lands.

Table 1. Table of soil series and abbreviations for Chowan Swamp Game Land.

Abbreviation	Soil Series
AaB	Alaga sand, 0 to 5 percent slopes
AtA	Altavista fine sandy loam, 0 to 3 percent slopes
BaA	Ballahack loam, 0 to 2 percent slopes, occasionally flooded
BB	Bibb soils
BoB	Bonneau loamy sand, 0 to 6 percent slopes
ChA	Chowan loam, 0 to 2 percent slopes, frequently flooded
CoB	Conetoe fine sand, 0 to 5 percent slopes
CrA	Craven fine sandy loam, 0 to 1 percent slopes
CrB	Craven fine sandy loam, 1 to 4 percent slopes
CrC2	Craven fine sandy loam, 4 to 8 percent slopes, eroded
CrD2	Craven fine sandy loam, 8 to 12 percent slopes, eroded
Dk	Dorovan mucky peat, frequently flooded
DO	Dorovan muck
DoA	Dorovan mucky peat, 0 to 2 percent slopes, frequently flooded
IcA	Icaria fine sandy loam, 0 to 2 percent slopes
LF	Leaf loam
Ln	Lenoir loam
LoA	Leon sand, 0 to 2 percent slopes

NaA	Nawney loam, 0 to 2 percent slopes, frequently flooded
NoA	Norfolk sandy loam, 0 to 2 percent slopes
NoB	Norfolk sandy loam, 2 to 6 percent slopes
PaA	Pactolus sand, 0 to 3 percent slopes
Ra	Rains fine sandy loam
Ro	Roanoke loam
RuA	Rumford loamy sand, 0 to 3 percent slopes
Se	Seabrook loamy sand
TaB	Tarboro loamy sand, 0-5 percent slopes
To	Tomotley fine sandy loam
Ud	Udorthents, loamy or sandy
W	Water
WaB	Wakulla sand, 0 to 4 percent slopes
WkA	Wickham sandy loam, 0 to 2 percent slopes
WkB	Wickham fine sandy loam, 2-6 percent slopes
WT	Winton soils, 12 to 60 percent slopes
WtE	Winton fine sandy loam, 15 to 60 percent slopes

Hydrology

Much of the land area of Chowan Swamp Game Land and all the area of Chowan Game Land are directly impacted by the Chowan River, Meherrin River, Wiccacon River, or major creeks. Much of the game lands are low-lying tidal swamps adjacent to these waterways. Heavy rain events can inundate thousands of acres and wind driven tides can either push water upstream into the swamps or flush water from the system into the Albemarle Sound. Both events are typically short lived and the system returns to its normal waterlogged state.

Most of the lands on Gates County portion of the game land that are not classified as tidal swamps typically drain into natural drainages between ridges. There are a few artificial ditches that assist in surface water removal and these ditches typically empty into the drainages. Few have direct links to the creeks or rivers. The sandier soils on the ridges absorb most of the rain water.

The ridges found on the Hertford and Bertie County tracts, like the Gates County tracts, typically drain into natural drainages between the ridges. The soils on the Hertford and Bertie tracts generally consist of more loams with clayey subsoils. These soils, along with the gently sloping nature of the upland tracts, limit the amount of surface water infiltration. Ditches accompany nearly all the roads and trails on these tracts. Most of the ditches empty into natural drains however; a few connect directly to creeks.

Creeks that border the game lands include Somerton, Potecasi, Mud, Buckhorn, Spikes, Barnes, Island, Sarem, Cole, Hodges, Beef, Goose, Bennetts, Catherine, Trotman, Keel, and Pembroke.

Natural drain found on Mapleton Tract of Chowan Swamp Game Land in Hertford County. Taken by David Turner.

Habitats

The major habitat types on the Chowan Game Land and the Chowan Swamp Game Land are classified as Tidal Swamp Forest and Wetlands and Floodplain Forest. The rivers and creeks adjacent to the game lands have a pronounce influence on the habitat through wind tide flooding. The Tidal Swamp Forest and Wetlands low-lying habitats are normally saturated and may have surface water present. Floodplain Forests are interspersed throughout the Tidal Swamp Forest. Elevation changes as little as a few inches may determine the difference in habitat types. Both the Tidal Swamp Forest and the Floodplain Forest contain examples of Cypress-Gum Swamps which are similar in appearance with typical canopy tree species of bald cypress, water tupelo, and swamp black gum (Schafale and Weakley 1990). Swamp roses and red maples are common on hummocks. Also included in the Floodplain Forests are pockets of Bottomland Hardwoods. The mixed Bottomland Hardwoods found on the game lands are only slightly higher in elevation than the Tidal Swamp Forest and common tree species are water oak, willow oak, sweetgum, and Carolina ash (Schafale and Weakley 1990). The entire Chowan Game Land habitat can be classified as Tidal Swamp Forest.

Recent acquisitions have added thousands of acres of upland pine plantations to the game lands program. These Dry Coniferous Woodlands are located on the Sand Banks Tract, Fort Island Tract, Mapleton Tract, Lower Wiccacon Tract, and a small ridge on the Upper Chowan West

Tract. Dominated by loblolly pine, these habitats offer land managers the greatest flexibility in habitat manipulation of the forest types existing on the Chowan Swamp Game Land. Mechanical harvest and prescribed burns can reduce basal area to promote a ground vegetative layer that typically does not exist in unmanaged stands. These loblolly pine stands are in varying age classes and are being converted to longleaf pine on appropriate sites. The goal for most of the loblolly plantations is to restore the Dry Longleaf Pine Communities that were present prior to commercial timber production.

Most of the drains between the ridges are considered Nonalluvial Mineral Wetlands. These Nonriverine Swamp Forest are not influenced by the river or its wind driven tides and can vary in habitat from moist ground to some seasonal sheet flow water to cypress-gum drains. Many of the drains on the Sand Banks Tract begin as seasonally wet areas, thick in green briar and cane. Scattered Atlantic white cedar and loblolly pine can be found in the ecotone that separates the dryer ridges from the wetter drain centers.

On a small scale, Mesic Forest and Oak Forest habitats can be found outside the floodplain with the rise in elevation, typically on the slopes adjacent to rivers and creeks. Mesic forests are characterized by moist uplands that are protected from fire. Typical canopy dominates include white oak, American beech, and yellow popular (Schafale and Weakley 1990). Oak forests on the drier sites include species such as white oak, hickory, loblolly pine, and sweetgum (Schafale and Weakley 1990). The majority of these stands are found on the Hertford County tracts that were protected from conversions to pine plantations.

Although occupying an extremely small percentage of the land mass of the CSGL, Small Wetland Communities are extremely important to wildlife. Small Depression Ponds and Vernal Pools offer important breeding sites for amphibians. Several beaver ponds exist where culverts have been dammed creating early-successional habitat and open water for waterfowl. Each of these habitat types will be discussed in greater detail in subsequent sections.

Surrounding Land Use

Bertie, Chowan, Gates, and Hertford counties are mostly rural counties with 2013 estimated populations of 20,374, 14,726, 11,650, and 24,431 respectively (U.S. Department of Commerce 2015*a,b,c,d*). The largest towns in each county are Windsor in Bertie, Edenton in Chowan, Gatesville in Gates, and Ahoskie in Herford.

Agriculture and woodlands are the major land uses in Bertie, Chowan, Gates, and Hertford. According to USDA Farm Service Agency (2015*a*) report for 2014, Bertie harvested 121,565 acres or 27% of the county's land area, Chowan harvested 44,558 acres or 30% of the county's land area, Gates harvested 55,173 acres or 25% of the county's land area, and Hertford harvested 43,020 acres or 19% of the county's land area. Major crops for all the counties are cotton, soybeans, peanuts, corn, and wheat. Acres planted in sage are beginning to increase in both Bertie and Chowan counties and have displaced some wheat crops.

All four counties are heavily forested. Bertie County has 304,900 forested acres accounting for 68% of the county's land area. Chowan, Gates and, Hertford counties woodland acreage totals

44,600 acres or 40 % of the land area, 142,400 acres or 65% of the land area, and 136,400 acres of 60% of the land area respectively (Brown 2004).

Within the North Carolina portion of the Chowan River Basin, there are 19 hog operations and many poultry houses.

Cultural Resources

North Carolina is not only known for its natural history, but also its rich historical/cultural resources. The most recent Native Americans to occupy the area were the Algonquian speaking tribes of the Chowanoac on the eastern side of the Chowan River and the Weapemeoc on the western side (North Carolina Department of Environment and Natural Resources 2013). The English began settling the four county area in the 1600's to 1700's. Some evidence of previous land uses can be found on the upland sites. Archaeological sites include prehistoric Indian habitation sites. Because the sites can be easily damaged, unauthorized artifact collecting activities on all state owned property including NCWRC owned lands are prohibited by the Archaeological Resources Protection Act (G.S 70 Article 2)(Appendix I). One known cemetery exists on the Mapleton Tract at 36º25'41"N – 77º00'10"W.

Acquisition History

The first tracts that are now part of the Chowan Swamp Game Land were acquired by the North Carolina Department of Environment and Natural Resources through The Nature Conservancy. These included a small tract on Buckhorn Creek in 1973 and a larger tract on both sides of New Ferry Road south of Gatesville in 1974. The first NCWRC owned tract was acquired in 1978 by donation from Union Camp Corporation to The Nature Conservancy and then to the State. This 963 acre tract lies adjacent to the Chowan River and US 13.

The North Carolina State Natural Resources Foundation Inc., also known as the Forestry Foundation, acquired and leased to the NCWRC, a 3,704 acre tract along Bennetts Creek in 1986. In 1994, 116 acres on Catherine Creek were gifted to the Nature Conservancy and then ownership turned over to the NCWRC. To this point in time, most of the lands were considered Tidal Swamp or Floodplain Forest and mostly accessible by boat. A decade later, the land between US 13 and the old railroad bed in Gates County was acquired from Coastal Forest Resources Company using Clean Water Management Trust Fund monies and Nucor settlement funds. The Bertie County tract of the game land and the Collins-Cooper Tract were also added in 2004. The same funds used in the 2004 acquisition of the Gates County tracts were also used to purchase the Fort Island tracts of the game land.

In 2006, the State of North Carolina partnered again with The Nature Conservancy to acquire nearly 77,000 acres of International Paper Company land across 11 coastal North Carolina counties. This acquisition added the Mapleton Tract, Lower Wiccacon Tract, and the Upper Chowan West tract in Hertford County to the game lands program in 2007. The Petty Shores Tract was added in 2008. The land deal included the Sand Banks Tract, which was added in 2008 using Clean Water Management Trust Fund monies, Natural Heritage Trust Fund monies, an Environmental Defense settlement with Nucor funds, and a National Oceanic and

Atmospheric Administration (NOAA) Coastal and Estuarine Land Conservation Program (CELCP) grant.

As the game land currently stands, the NCWRC owns 21,533 acres throughout Gates, Hertford, and Bertie counties. The NCDENR owns 6,135 of Chowan Swamp Game Land and the North Carolina State Natural Resources Foundation Inc. (Forestry Foundation) owns an additional 3,704 acres in Gates County (Fig. 11).

The Chowan Game Land was purchased in 1986 by the NCWRC.

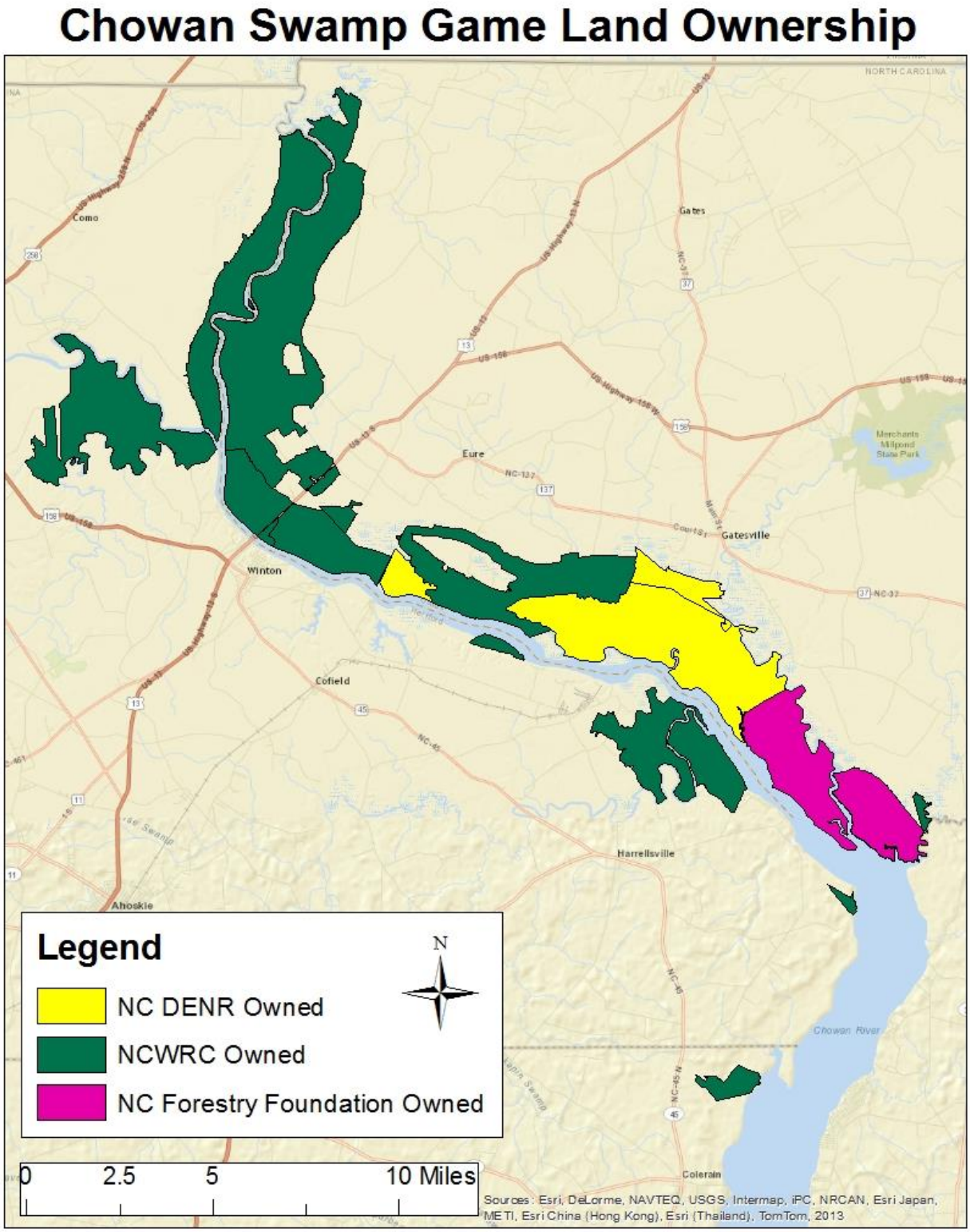

Fig. 11. Ownership of Chowan Swamp Game Land.

Purpose of the Chowan Swamp Game Land and Chowan Game Land

Early acquisitions by the North Carolina Department of Environment and Natural Resources and The Nature Conservancy were likely done in an effort to protect the habitat and adjacent water resources. These large tracts were important for neotropical migrant songbirds, breeding and nesting wood ducks, and migrating and wintering waterfowl. The large expanses of swamp forest along the rivers and creeks served as important travel corridors for black bears.

Later acquisitions connected previously protected habitats and today much of the Tidal Swamps and the Floodplain Forest in Gates and Hertford counties along the rivers are in conservation status. The protected uplands and bottomland forests filter thousands of acres of runoff before reaching the creeks and rivers. Parts of the Chowan River that were once deemed "dead" are now considered Aquatic Significant Natural Habitat Areas (North Carolina Natural Heritage Program 2013). The Chowan River area is notable for its rare state and/or federally listed freshwater mussels. Six listed freshwater mussels and the Chowanoke crayfish may be found in the rivers and creeks of the Chowan (North Carolina Natural Heritage Program 2014)(Table 2).

Part of the game lands were purchased using Clean Water Management Trust Fund monies, Natural Heritage Trust Fund monies, and National Oceanic and Atmospheric Administration (NOAA) Coastal and Estuarine Land Conservation Program (CELCP) grant funds. The CELCP grant funds focuses on protection of shorelines along the rivers and creeks due to their importance as spawning areas for striped bass, blueback herring, alewife, and American shad.

The North Carolina Department of Natural Resources has designated large parts of the CSGL as Dedicated Nature Preserves. The Articles of Dedication designations recognize the natural importance and many times the sensitive nature that the habitats have to human interference (Fig. 12). The Articles of Dedication terms and conditions guide land managers on appropriate uses of the land (Appendix II).

Tidal swamps, bottomland forest, cypress-gum swamps, pine stands, and early-successional habitats create a mosaic of habitats that both animals and people are attracted to. Fitting with the mission of the game lands program, the CSGL and the CGL provides opportunities for hunting, fishing, trapping, and wildlife viewing. Hunting and fishing have a long tradition on CSGL. Early hunters of the CSGL pursued waterfowl and bear. Bear hunting is popular on the vast swamps and deer and turkey hunting has become popular with the newest acquisitions. It is a goal of this document to lay out a path forward that will first conserve the natural resources and recognize the hunters, fishermen, trappers, and wildlife viewers as primary users of the game lands and consider other game land uses to the extent that such uses are compatible with the conservation of natural resources and can be employed without displacing primary users.

With the addition of thousands of acres of pine and in some cases hardwood plantation uplands, land managers are able to harvest timber to alter habitats and restore habitats that once existed on CSGL.

Although extremely small in size, the Chowan Game Land offers neotropical migrant songbird habitat and water resources protection. Hunting is allowed on the CGL but is thought to occur only occasionally due to size and accessibility.

Table 2. NC Natural Heritage Program State-listed aquatic species found near the Chowan Swamp Game Land. See Appendix VI for Status and Ranking descriptions.

Taxonomic Group	Scientific Name	Common Name	NC Status	US Status	NC Ranking	US Ranking
Mussel	*Alasmidonta undulata*	Triangle Floater	T	-	S2	G4
Mussel	*Anodonta implicata*	Alewife Floater	T	-	S1	G5
Mussel	*Lampsilis cariosa*	Yellow Lampmussel	E	-	S1	G3G4
Mussel	*Lampsilis radiata*	Eastern Lampmussel	T	-	S1S2	G5
Mussel	*Leptodea ochracea*	Tidewater Mucket	T	-	S1	G3G4
Mussel	*Ligumia nasuta*	Eastern Pondmussel	T	-	S1	G4
Crayfish	*Orconectes virginiensis*	Chowanoke Crayfish	SC	FSC	S3S4	G3

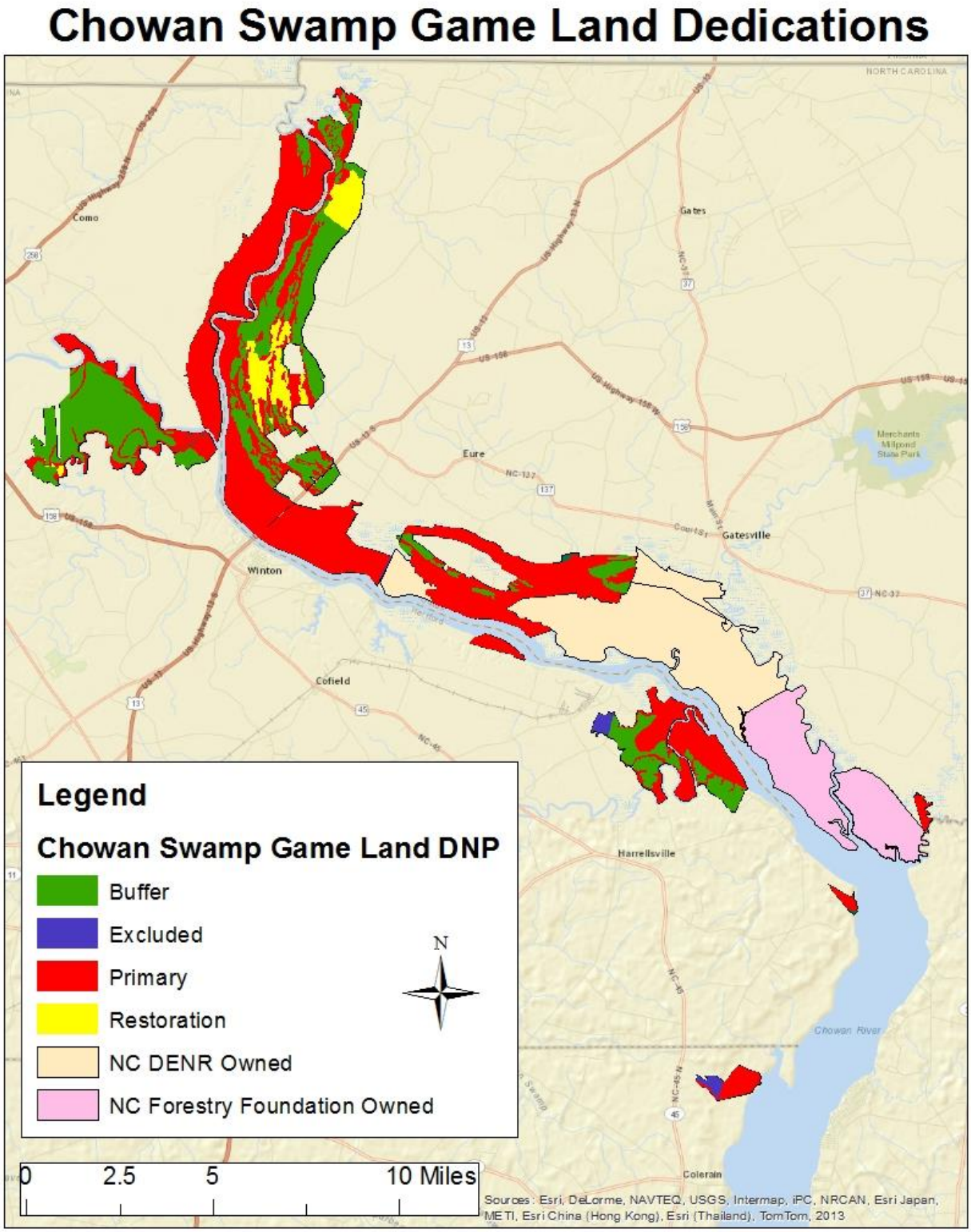

Fig. 12. Articles of Dedication Designations on Chowan Swamp Game Land.

Game Land Goals and Measures of Success

Goals

- Provide for a diversity of habitat types through science based land management practices to ensure that a wide variety of terrestrial and aquatic wildlife species are conserved on the game land.
- Conserve popular game species at huntable levels through science based land management and sound regulations.
- Provide quality habitat across the game land for endangered, threatened, and rare species to promote sustainable and perpetual populations.
- Provide sufficient infrastructure and opportunity to allow game lands users a quality experience while on the game land with minimal habitat degradation and minimal conflict among user groups.
- Develop a method to promote desirable understory species concurrent with longleaf pine establishment.

Measures of Success

- Monitor invasive species in Tidal Swamp and Floodplain Forests.
- Convert 7-8% of loblolly pine or other off-site species stands to longleaf pine with associated native groundcover.
- Have a set Standard Operating Procedure for longleaf pine and groundcover restoration on suitable sites in northeastern North Carolina.
- Meet annual prescribed burn acreage targets through expanding burning window by conducting more growing season burns.
- Progress is being made to achieve Desired Future Condition in Oak Forest and Mesic Forest habitats through management strategies outlined in the *Habitat Communities* section.
- Introduce prescribed fire into appropriate Nonalluvial Mineral Wetlands to restore desirable ecotone between wetlands and uplands.
- Introduce prescribed fine into Small Wetland Communities to reduce shrub layer and leaf litter buildup to promote use by reptiles and amphibians.

- Address priority roads and projects outlined in the *Infrastructure Development and Maintenance* section of this plan.

- Develop management strategies to minimize conflicts between user groups.

- Surveys and inventories of target game species indicate that population levels of these species are being managed at sustainable levels.

- Surveys of game land users indicate a high level of user satisfaction.

- Efforts are made to monitor and provide information from the Green Growth Toolbox to planners for long range transportation planning and local land use planning that may affect habitat quality and the ability to manage habitats on the game land.

Habitat Communities

Tidal Swamp Forest and Wetlands and Floodplain Forest

The habitats on CGL and a large portion of the NCWRC owned portion of CSGL fall into Tidal Swamp Forests or Floodplain Forest. For the purpose of this plan, these two habitat types will be discussed together as both habitats can be difficult to distinguish apart by aerial photography for stand designations, small changes in elevations scattered throughout the landscape dictate which class the habitat would be designated, and the majority of both habitats are protected as Primary Areas through the Articles of Dedication resulting in similar management strategies.

The CSGL and the CGL Tidal Swamp Forest are described as habitats occurring along rivers where flooding is influenced by wind tides (Schafale and Weakley 1990). Typical canopy dominates along the river and creek shores include bald cypress and water tupelo. Scattered bald cypress, water tupelo, swamp black gum, and red maple are canopy dominates throughout the vast swamps. Marsh-like habitats exist at the mouth of Sarem Creek, Wiccacon River, and Bennetts Creek. These marshes are on the fringe next to the creek and river. Typical vegetation includes cattail, southern wildrice, cordgrass, and pickerelweed. Swamp black gum, Carolina ash, and red maple are scattered throughout. The Cypress-Gum Swamps are characterized by seasonal flooding, typically with a closed canopy and a poorly-developed understory. Bald cypress and water tupelo are the dominate species. Both the Tidal Swamp Forest and the Floodplain Forest Cypress-Gum Forest are nearly identical in appearance. Several stands of Atlantic white cedar of varying ages can be found on the Upper Chowan West Tract, Sand Banks Tract, and the Fort Island Area tracts.

The Blackwater subtype of Bottomland Hardwoods forests existing on the CSGL consist of water oaks, red maples, sweetgums, and scattered loblolly pines. Unlike the nutrient rich Bottomland Forest found on Brownwater subtype Floodplain Forest like the Roanoke River floodplain, the slow-moving Chowan, Meherrin, or Wiccacon River does not carry upstream nutrient-laden sediments for deposition into the floodplain resulting in largely organic acidic soils. Switchcane is a common understory species on some sites, while shrub layers are dominant elsewhere. Due to environmental conditions requiring unconventional logging, historical timber harvesting targeted large high value trees. Rotation ages are longer than on adjacent uplands. Consequently, large diameter trees that develop hollows important for cavity-dwelling species are more abundant in these habitats.

Black bear sitting in a large bald cypress. Taken by David Turner.

A. Location and Condition of Habitat (Fig. 13)

The Tidal Swamp Forest and Wetlands and the Floodplain Forest are a widespread habitat type across the CSGL and CGL, occurring on all the game land tracts. The different community types of Floodplain Forest are segregated primarily by landscape position and consequently hydrology. Bottomland Hardwood communities are situated on large flats usually well away from the river channel, while Cypress-Gum Swamps are in basins and drains or are adjacent to the rivers or their tributaries.

Timber stands in these habitats are mostly uniform with few canopy gaps. Beavers damming the headwaters of some smaller creeks and drains provide important waterfowl habitats, however most beaver activities are restricted to rivers and creeks where dams are not needed. Most of the canopy gaps are created during storm events. These gaps create diversity in the forest vegetative structure and may be attractive to some neotropical migrant songbirds. Historically, there have been past logging practices which removed only the highest value trees in some of the timber stands. This practice of "high-grading" has reduced the timber value and tree species diversity of the stands but has increased the age distribution as natural regeneration has filled the canopy gaps. Habitat quality for cavity-oriented species continues to improve as timber stands age. The Tidal Swamp Forests and the Floodplain Forests have not been under a harvest regime for some time; therefore, most are mature stands with high wildlife habitat value. Age class variability in the Bottomland Hardwood type is more likely with the youngest stands on the most accessible

sites and older stands in more remote locations less amenable to logging activity. None of this stand type has been logged since acquisition by the State. The oak dominated stands of this type are significant contributors of mast and are seasonally important wildlife food sources. Swamp black gum is an important soft mast producer to black bears and songbirds in the fall.

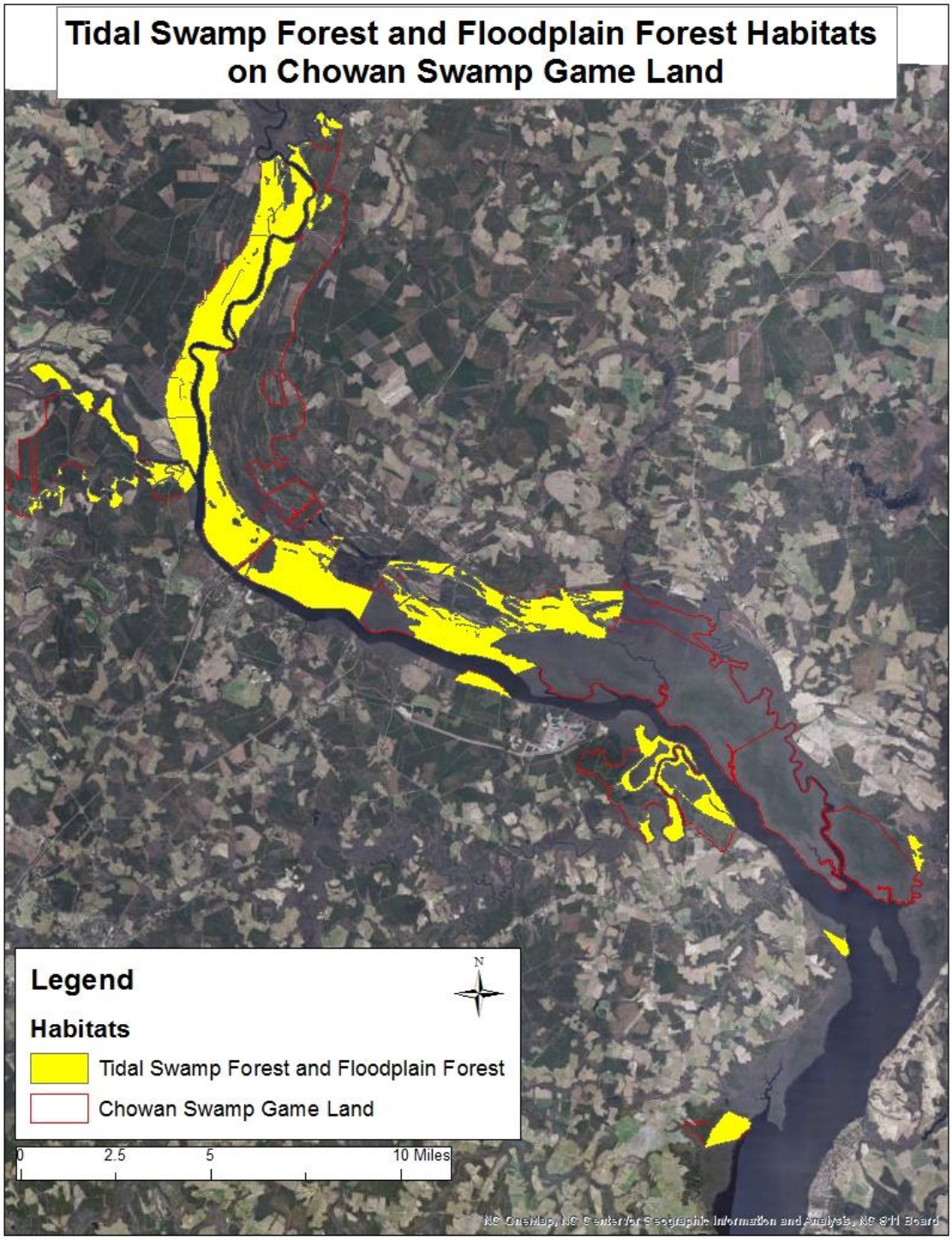

Fig. 12. Tidal Swamp Forests and Floodplain Forest Habitats on CSGL.

B. Priority Species

The priority game and furbearer species identified for the Tidal Swamp Forest and Floodplain Forest type include: river otter, beaver, white-tailed deer, black bear, raccoon, gray squirrel, wood duck, woodcock, and wild turkey. The following table lists nongame species potentially found in this habitat type and their conservation status.

Table 3. Listed non-game species associated with Tidal Swamp Forests and Floodplain Forest habitats. See Appendix VI for Status and Ranking descriptions.

Common Name	Scientific Name	State Status (Federal Status)	Natural Heritage State and Global Rank
Bald Eagle	*Haliaeetus leucocephalus*	T	S_3B, S_3N, G_5
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	T	S_3,$G_3G_4T_3$
Southeastern Bat	*Myotis austroriparius*	SC	S_2,G_3G_4
Star-nosed Mole	*Condylura cristata*	SC	S_2, G_5T_2Q
Four-toed Salamander	*Hemidactylium scutatum*	SC	S_3, G_5
Timber (Canebrake) Rattlesnake	*Crotalus horridus*	SC	S_3, G_5

C. Management Challenges

The Articles of Dedication that apply to these tracts are designed to specifically address Tidal Swamp Forest and Floodplain Forest types for plant community restoration or water quality preservation purposes. The provisions that protect these areas from degradation also restrict potentially beneficial active management practices. In addition to the Dedication restrictions, most of these areas are not conducive to logging.

Rising water levels may change the composition of the marsh-like habitats near the mouths of Bennetts Creek, Sarem Creek, and the Wiccacon River. *Phragmites sp.* should be monitored in these sites and if it presents management concerns, the NCWRC should consult the North Carolina Department of Environment and Natural Resources for recommendations to address *Phargmites sp.* spread.

Cypress-Gum Swamp on the Upper Chowan West Tract. Taken by David Turner.

D. Management Strategies & Needs

The Articles of Dedication would limit timber management activities to a salvage operation of damaged trees following a catastrophic event, such as a hurricane. Since large rain events typically accompany a hurricane, timber salvage operations in these flood-prone sites are an unlikely scenario. Therefore, passive management retaining mature trees for their mast production and cavity potential with minimal site disturbance is the intended strategy.

Suppression of exotic plant species would be a desirable and a conservation easement permissible activity within these habitat types. Initially, monitoring to identify affected areas, species identification, and determining if control is feasible is the current priority. Development and implementation of a control plan before an infestation is too widespread could be within the temporal scope of this document with specific treatment measures formulated in annual planning documents.

E. Desired Future Conditions

In most cases the desired future conditions in the Tidal Swamp Forests and Floodplain Forests of ample mast production, adequate numbers and size of tree cavities, an abundance of coarse woody debris, and conditions for habitat specialists have been met or are proceeding in that direction without additional active management activities.

Dry Coniferous Woodlands (Loblolly/Longleaf Pine Forests)

Representing a major portion of the ownership, second in acreage only to the Tidal Swamp and Floodplain Forest, covering approximately one-third (6,814 acres) of the NCWRC managed portion of the game land. The Dry Coniferous Woodland type primarily consists of loblolly pine, both planted and naturally-regenerated stands, with a minor component of planted longleaf

pine (348 acres). Understory plant dominates are mostly woody species, ranging from oak and chinquapin on the most xeric sites to sweetgum, other mesic hardwood trees, and vines on lower elevations. A grass component, comprised of a mixture of bluestems and oat grass with associated pine savanna herbs, is prevalent on timber stand margins and open canopy stands treated with fire.

A. Location and Current Condition of Habitat (Fig. 14)

Most of the pine acreage is found in the Sand Banks, Mapleton and Wiccacon tracts of CSGL. The Sand Banks has the largest contiguous units, some exceeding 1,000 acres, located on north-south oriented ridges parallel to the Chowan River. The site represents a relatively uncommon forest community of northern longleaf pine sandhill, although the appropriate over story tree has been largely replaced over time through intensive loblolly pine plantation management for fiber production. This forest type on the Mapleton tract is present on the broad plateau between the Meherrin River and Potecasi Creek. A variety of mesic hardwoods are a component of the pine stands on the Mapleton Tract as well. On the Wiccacon Tract, pine stands are on smaller ridge crowns heavily dissected by hardwood-dominated ravines sharing understory species and topography reminiscent of a piedmont site. By contrast the remaining pine acreage on other tracts is relegated to small upland islands, most 20 acres or less in size, nested within the Floodplain Forest type.

Thinned loblolly pine stand on the Sand Banks Tract. Taken by David Turner.

The Dry Coniferous Woodland types occur on elevations ranging from 4’ – 40’ above sea level on CSGL. Soils encompass a range from excessively and well-drained sands on the Sand Banks Tract, to somewhat poorly drained clay soils and moderately well-drained sandy loams on the Mapleton and Wiccacon tracts (U.S. Department of Agriculture 2013, 2015*b*,*c*). In addition to soil type, relatively steep slopes to watercourses have limited pine management to the flatter upland areas favorable for mechanized timber harvesting.

The NCWRC began management of upland sites hosting the Dry Coniferous Woodlands in 2006, so all of the planted loblolly pine stands were in place prior to initiation of NCWRC management. Especially on the Sand Banks Tract, timber age distribution is clumped coinciding with stand reestablishment following logging during wet years, which was the harvesting pattern

of the previous landowner because of site operability for equipment. Planted loblolly pine stands range in age from 8 to 40 years. Some older, less accessible naturally regenerated stands are 60+ years old. On the excessively-drained sands, loblolly pine growth is slow, due to poor site productivity, and pre-merchantable stands are heavily stocked. Under the closed tree canopy on these nutrient poor sites, few wildlife habitat elements are available. A few remnant longleaf pines are scattered across the Sand Banks Tract. Most of the current longleaf pine acreage has been planted since 2009 and range from grass stage to sapling size classes. The young stands possess some early-successional habitat features in grasses and legumes.

Since acquisition by the State, most of the merchantable-sized timber has received a final harvest or thinning treatment, with the remaining stands slated for treatment as they become merchantable for a commercial harvest. A prescribed burning regime with a 2-4 year return interval has been initiated on all of the CSGL tracts with readily accessible uplands, with a focus on treating thinned loblolly and all longleaf pine stands. All the longleaf pine stands established since 2009 have received at least one burn treatment. Presently only about one-half of the target acreage is fire treated annually. In most cases, fire treatments have controlled the woody understory but where the seed bank has been depleted the desired grass/forb understory has been slow to recolonize.

B. Priority Species

The primary game species frequenting the Dry Coniferous Woodland type on CSGL are black bear, white-tailed deer, and wild turkey. The management regime resulting in open canopy timber stands providing early-successional habitat, eastern cottontail rabbit and bobwhite quail are present benefiting from the management regime. Marsh rabbit are present in stands adjacent to wetland forest types and benefit from burn treatments maintaining the upland-wetland vegetation transition in early-successional vegetation. Pine warbler is a representative songbird species in this habitat type. Red-cockaded woodpeckers have been observed foraging on the Sand Banks Tract of CSGL; therefore provisions will be made in timber management prescriptions that will enhance the habitat for this species. The following table lists nongame species potentially found in this habitat type and their conservation status.

Table 4. Listed non-game species associated with Dry Coniferous Woodlands. See Appendix VI for Status and Ranking descriptions.

Common Name	Scientific Name	State Status (Federal Status)	Natural Heritage State and Global Rank
Red-cockaded Woodpecker	*Picoides borealis*	E(E)	S_2G_3
Timber (Canebrake) Rattlesnake	*Crotalus horridus*	SC	S_3, G_5

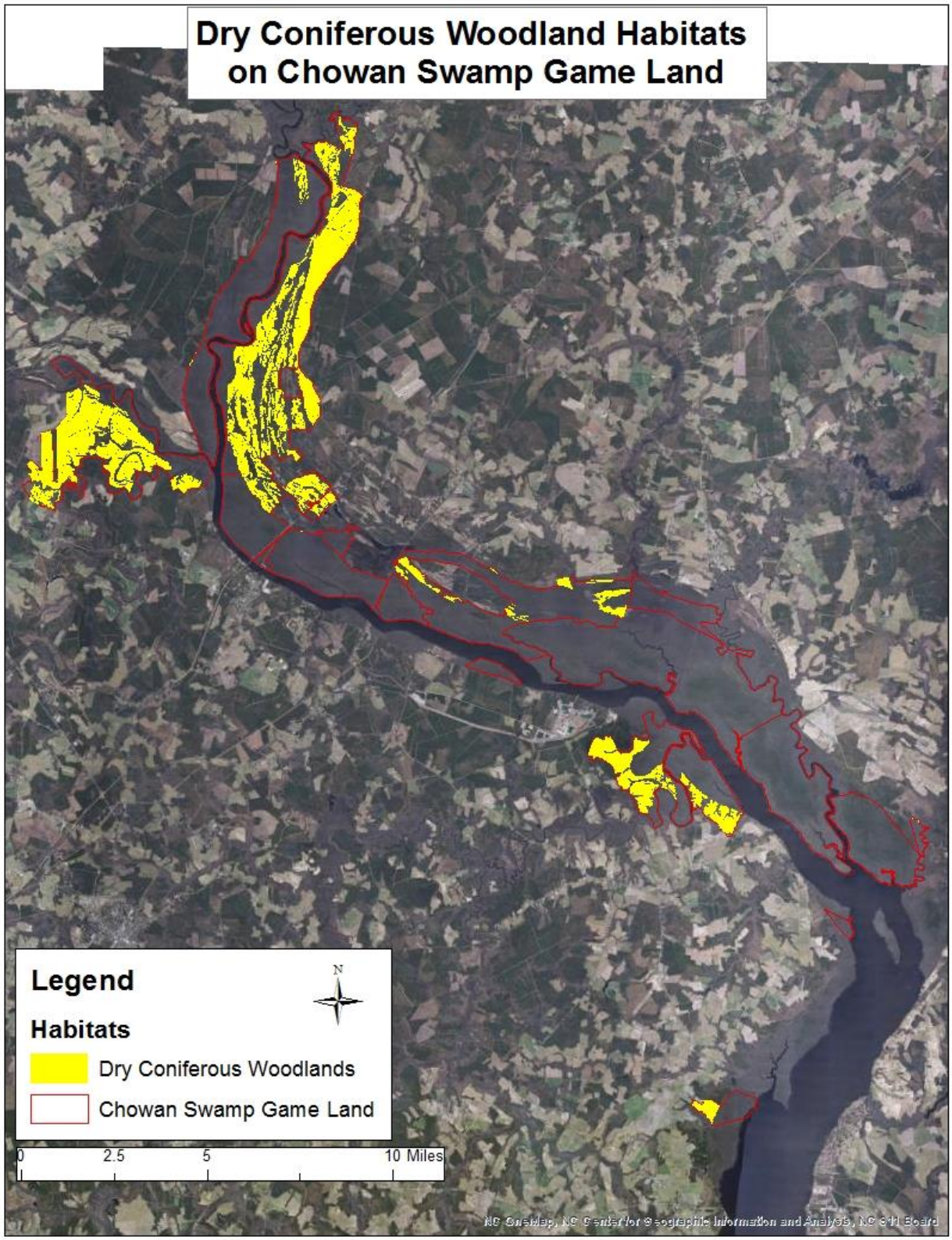

Fig. 14. Dry Coniferous Woodlands on Chowan Swamp Game Land.

C. Management Challenges

To meet the fire management goals identified as a 2-4 year rotation, the current annual prescribed burning acreage would need to double at CSGL. In addition, successful participation in longleaf pine restoration initiatives requires a shift from dormant season fires toward more growing-season burning. There are several impediments, both short and long term, toward meeting this goal. First, a short term issue is that presently young loblolly pine stands embedded within older timber stands complicate the burning effort by limiting burn unit size and window of opportunity. Secondly, most of the eastern boundary of the Sand Banks Tract abuts a paved state road. While it provides a substantial firebreak, it also constitutes a smoke sensitive area immediately adjacent to a major portion of the burnable acreage. Location of the state road requires an easterly wind to minimize smoke impacts, which is a difficult wind direction to meet thresholds for suitable prescribed burning conditions representing a reoccurring long-term obstacle. Third, site geography includes some organic soil sites within logical burn unit boundaries that are burnable in the dormant season under normal hydrology conditions, but may have soil ignition issues during the growing season.

Reestablishment of longleaf pine on suitable sites presents several challenges, although not unique to CSGL. Under the ideal scenario, all loblolly pine stems within a seed fall distance would be removed prior to planting longleaf pine in order to prevent competition from naturally-seeded loblolly pine. However, three situations exist where nearby loblolly pine would be retained and seed longleaf pine regeneration areas. The first condition is when Articles of Dedication applying to adjacent stream buffers with loblolly pines prohibit removal of those stems. The second scenario involves retention of a forage base of loblolly pine for red-cockaded woodpecker management, while under-planting with longleaf or regenerating small areas surrounded by loblolly pine stands. A third condition that is exacerbated on low productivity sites is the lack of desirable vegetation between planted pines in young plantations to fuel prescribed burns and improve wildlife habitat.

D. Management Strategies & Needs

Evolution of the prescribed burning program to larger burn compartments utilizing road and natural breaks already in place will increase burn acreage with little additional effort. Development of a method to promote desirable understory species concurrent with longleaf pine establishment is necessary. Options may involve very selective herbicide site-preparation treatments to preserve what is present, planting of desirable species, or a combination of both.

The NCWRC is an active participant in initiatives to restore longleaf pine and associated understory species on appropriate sites. A large proportion of the area classified as Dry Coniferous Woodland is currently forested in loblolly pine and is suitable for conversion to longleaf pine. Only some of the upland to wetland transitions and isolated islands within the floodplain forest not conducive to prescribed burning will not be converted to longleaf pine over time. In an effort to provide a diversity of timber stand age classes and maintain a forest canopy for wildlife species benefit, the restoration process would be instituted over time in a logical progression. Each timber stand will be evaluated for thinning or final harvest in configurations to facilitate the prescribed burning regime. Once established in longleaf pine, restored stands will be managed on relatively long timber rotations (>60 years). After a first thinning, single–

tree selection or shelter wood harvest methods can be employed as needed to develop uneven-age timber stands and remove naturally regenerated loblolly stems. A 2-4 year prescribed fire regime would be the target standard with a shift toward more growing season burns where timber stand age and site conditions such as hydrology and soil type will allow.

Some sites in the dry coniferous type currently forested in loblolly pine that are small acreage units with poor access to feasibly prescribed burn on the 2-4 year interval to promote longleaf pine may be suitable for conversion to shortleaf pine. While few shortleaf stands remain in the NC north coastal plain, old individual stems on boundary lines indicate the species would have held a place in the regions ecosystem.

Identification of specific stands and the treatment prescription will be defined in the Annual Forest Management Plan generated by field staff.

E. Desired Future Conditions

Continued efforts on understory plant restoration in timber stands reforested to longleaf pine to gain groundcover vegetation characteristics to reclassify them as the Dry Longleaf Pine type. An open canopy longleaf pine savanna with a species diverse grass-forb understory is the long-term management goal for this forest type.

Approximately eight percent of the forest type currently in loblolly pine or other off-site species is slated for conversion to longleaf pine during the 10-year horizon of this management plan. Longer term, possibly greater than 90 percent of the remaining loblolly pine in the Dry Coniferous Woodland type is suitable for conversion to longleaf pine.

Mesic Forest and Oak Forests

Timber stands classified as Oak-Mesic Forest types on CSGL comprise approximately 6% (1,215 ac.) of the property under NCWRC management. On CSGL, the Oak-Mesic Forest type occur on quite variable sites ranging from well-drained soils on elevations as high as 30’ to poorly-drained sites 4’ above sea level. Slopes range from nearly level to fairly steep, sometimes exceeding 20%. On CSGL this type occurs on infrequently flooded and somewhat fire-sheltered locations. Timber stands of the Oak-Mesic Forest type are fairly small, mapped in units ranging from 1-150 acres in size, with an average of about 14 acres. Most are in a mature condition exceeding 50 years in age. Unless subject to a clear cut timber harvest in the recent past, most stands are uneven-aged with regeneration colonizing canopy gaps. Similar soils on adjacent flatter uplands support pine forest types which have been influenced by more frequent fire occurrence and timber harvesting treatments. The Oak-Mesic Forest type on CSGL is primarily a product of a later successional stage where pines have been gradually replaced with a hardwood tree canopy.

Dominant tree species of the CSGL Oak-Mesic Forest type include: American beech, sweetgum, tulip poplar, and a variety of oak and hickory with species composition dependent upon hydrology. Sourwood, redbud, and flowering dogwood are typical mid-story species. Understory diversity is highly variable as well, ranging from a sparse covering of shade tolerant herbs such as heart-leaved ginger and partridgeberry under a closed canopy on well-drained sites

to a well-developed understory of beautyberry, hardwood tree regeneration and, grapes where soil moisture is less of a limiting factor. Occasionally privet is an understory invader on these sites.

A. Location and Condition of Habitat (Fig. 15)

On CSGL, the Oak-Mesic Forest stand types are relegated mostly to slopes adjacent to streams or terraces above Floodplain Forests. The Mapleton and Wiccacon tracts exhibit prime examples of this forest type on well-drained sites with various aspects to Potecasi Creek and Wiccacon, Meherrin, and Chowan rivers. Oak-dominant lower elevation examples are present on CSGL tracts accessed by Fort Island and Peach Orchard roads. Most of the Oak-Mesic Forest type has either poor access or steep slopes so conventional logging has not been an option. In addition on sites tied directly to a watercourse, this forest type has been retained as a streamside water quality buffer. This forest type is of sufficient age and tree diameter to be an important site for tree cavity dwellers.

B. Priority Species

Priority game species for management in this forest type are wild turkey and gray squirrel. Opportunistic use of mast-producing resources by black bear and white-tailed deer occurs seasonally as well. Wood thrush and eastern wood peewee are representative songbird species in the Oak-Mesic Forest habitat type on CSGL.

The following table lists selected nongame species potentially found in this habitat type and their conservation status.

Table 5. Listed non-game species associated with Oak-Mesic Forest. See Appendix VI for Status and Ranking descriptions.

Common Name	Scientific Name	State Status (Federal Status)	Natural Heritage State and Global Rank
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	T	S_3,$G_3G_4T_3$
Star-nosed Mole	*Condylura cristata*	SC	S_2, G_5T_2Q
Four-toed Salamander	*Hemidactylium scutatum*	SC	S_3, G_5
Timber (Canebrake) Rattlesnake	*Crotalus horridus*	SC	S_3, G_5

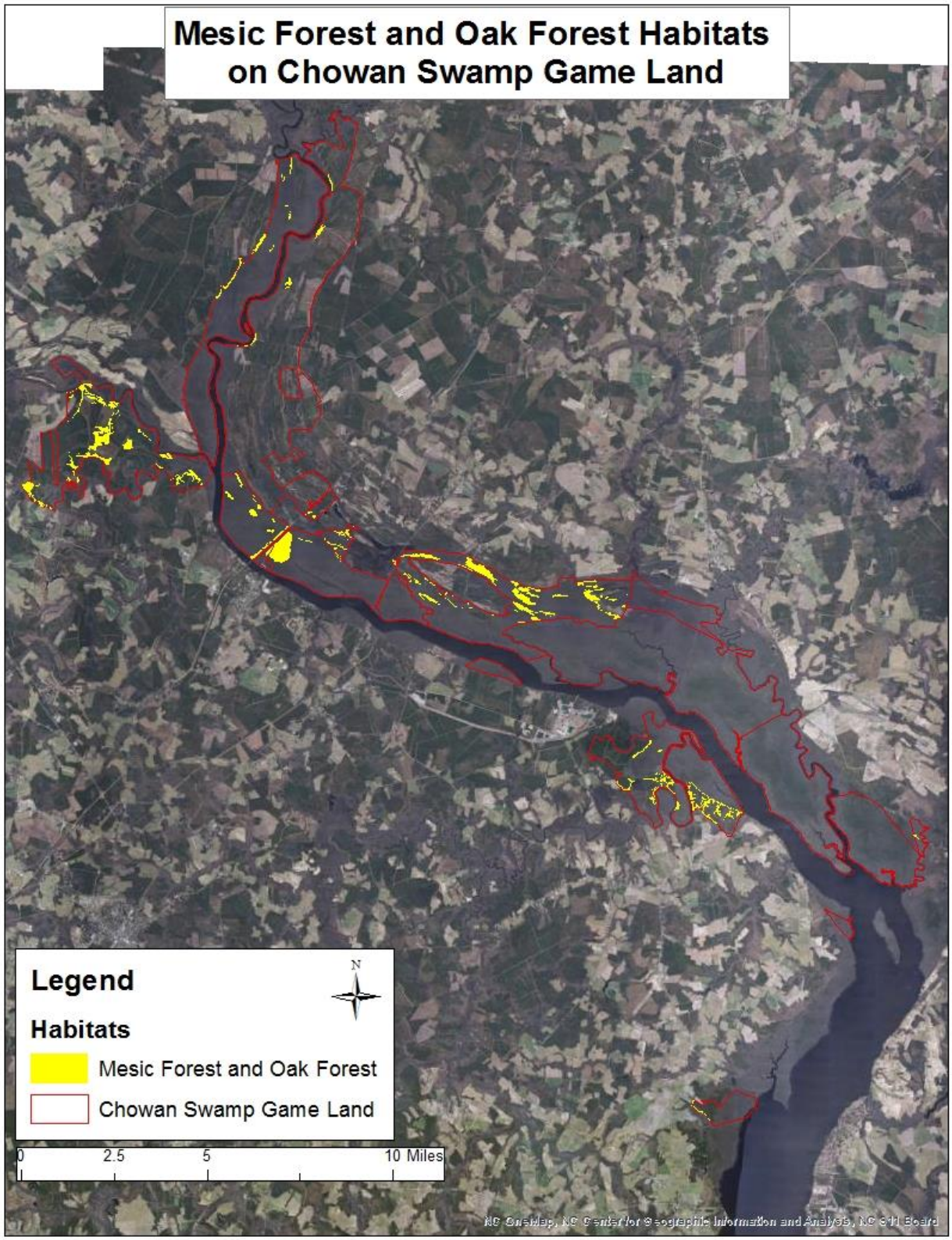

Fig. 15. Mesic Forest and Oak Forest on Chowan Swamp Game Land.

C. Management Challenges

Site inaccessibility for equipment is the primary challenge for work in this community type. Furthermore, most of this type resides within stream buffers or other areas protected by North Carolina Natural Heritage Program Articles of Dedication, so are not available for active management involving mechanical removal of trees regardless of the management intent.

D. Management Strategies & Needs

During the Articles of Dedication process, approximately 130 acres on the Mapleton and Sand Banks tracts that would best support this community type was designated as allowable for restoration. Approaches to restoration likely will be varied temporally and in scale dependent upon location and tree species present. Management intensity may range from commercially-harvested tree removals to herbicide treatment of selected stems to just replanting of desired species. Since this forest type occurs on significant slopes with potential susceptibility to erosion, prescriptions will consider this to avoid site degradation.

Most of the timber stands in the Oak-Mesic Forest type at CSGL are of high habitat quality and in good condition, so restricting management to passive actions will be an appropriate prescription during this document planning horizon. Although not specifically targeted, where it borders the Dry Coniferous Woodland type, the Oak-Mesic Forest type may be included in prescribed burning compartments. Fire breaks in this forest type will consist of wet, raked, or other low impact lines. Fires here are expected to be of low intensity and beneficial to promoting oak regeneration over less desirable tree species for wildlife habitat, such as sweetgum or tulip poplar. Currently, where influenced by adjacent pine management, the timber stand boundaries are very abrupt. Over time, if not mechanically harvested or chemically treated, upland forest type transitions can be expected to widen with fire-tolerant species dominating.

E. Desired Future Conditions

The target condition for this forest type is mature uneven-aged trees, populated by predominately mast-producing species providing a sustained yield of snags, cavities, and down woody material for wildlife habitat. This community type is expected to continue to provide a forested buffer to preserve water quality. With the exception of the areas identified for restoration, most of the timber stands of this type are in the desired condition, so a maintenance mode approach is appropriate.

Small Wetland Communities

Small Depression Ponds, Vernal Pools, and Beaver Ponds exist only on a very small percentage of the game lands. Small Depression Ponds are defined as sites that are permanently flooded, at least in the center, sinkholes, Carolina bays, and other upland depressions that have complex and irregular zones of vegetation (Schafale and Weakley 1990). Vernal Pools are small sites that flood seasonally and dominated by a dense to sparse herb layer (Schafale and Weakley 1990). Beavers Ponds can be either active beaver ponds with dams maintained by beavers or road culverts blocked by debris or plugged by beavers. Most of the known sites are Dedicated

Primary Areas and management will follow guidelines set forth in the Articles of Dedication agreement.

Small Depression Ponds and Vernal Pools are important for reptiles and breeding amphibians (North Carolina Wildlife Resources Commission 2005). Due to the ephemeral nature of these wetland types, fish are usually absent, making these essential reproductive habitats for many amphibian species that are vulnerable to fish predation (Bailey et al. 2006).

Beaver pond on Lower Wiccacon Tract. Taken by David Turner.

A. Location and Condition of Habitat (Fig. 16)

Most of the known Small Depression Ponds and Vernal Pools are found on the Sand Banks Tract of CSGL. These pockets of wetlands are surrounded by upland loblolly pine plantations. Prior to the uplands conversion to loblolly plantations, the uplands likely consisted of a sparse longleaf pine canopy with a scattered scrub oak midstory. Wildfires would burn through the uplands and as far into the wetlands as the fuel would allow. The condition of most of the Small Depressions likely resembles Vernal Pools since they are likely to dry during the summer and fall. With natural stands having been converted to pine plantations by former land owners, fire suppression within the upland stands have allowed hardwood trees and shrubs to encroach on the wetlands. Lack of fires within the wetlands allowed leaf litter to build up to the point that many of the ponds and pools may not have surface water available. Many microsites that exhibit characteristics of Vernal Pools are scattered across the Sand Banks Tract. These sites are embedded within upland habitats in various stages of longleaf pine habitat restoration. Due the small size of the Vernal Pool habitats, many sites will not be designated separately from the surrounding uplands.

Beaver Ponds are scattered throughout the game lands and several are in remote locations. Beavers have advantageously plugged road culverts creating ponds behind them. Beavers are found damming smaller creeks and ditches. Several known beaver ponds are mapped but there

are many more that are not, due to difficulty in recognizing beaver ponds in swamps by aerial photography.

The condition of beaver pond habitats is constantly changing. Beaver dams that cause damage to infrastructure or flood significant timber resources may be removed. Beaver dams on game lands that impact adjacent private land will be considered for removal. Trapping is allowed on the game lands and beavers that are easily accessible to trappers are subject to removal resulting in the deterioration of the dam and possible dewatering of flooded lands. The beaver population seems to be robust and dispersing beavers will repopulate good locations.

B. Priority Species

The priority game and furbearer species identified for the Small Wetland Communities habitat type include: river otter, beaver, black bear, wood duck, mallard, American black duck, hooded merganser, and woodcock. The following table lists the potential listed nongame specie found in this habitat type and its conservation status.

Table 6. Non-game specie associated with Small Wetland Communities. See Appendix VI for Status and Ranking descriptions.

Common Name	Scientific Name	State Status (Federal Status)	Natural Heritage State and Global Rank
Four-toed Salamander	*Hemidactylium scutatum*	SC	S_3, G_5

C. Management Challenges

Depression Ponds and Vernal Pool management challenges are dependent on the management of the adjacent uplands in which the small wetland exists. In the short-term, Depression Ponds and Vernal Pools located in young loblolly plantations may not be burned resulting in accumulating plant debris filling the wetlands. When these young stands are burned in cool-season fires, fuel moistures in the wetlands will dampen the intensity of the fire or may prevent a fire burning across the wetland.

Beaver dams that impact infrastructure, including roads and culverts, will have to be addressed. In these cases, the beavers may have to be removed and the dam destroyed. Land managers will have to work with NCWRC engineers to try to find a solution that maintains the important beaver pond habitats and protects infrastructure.

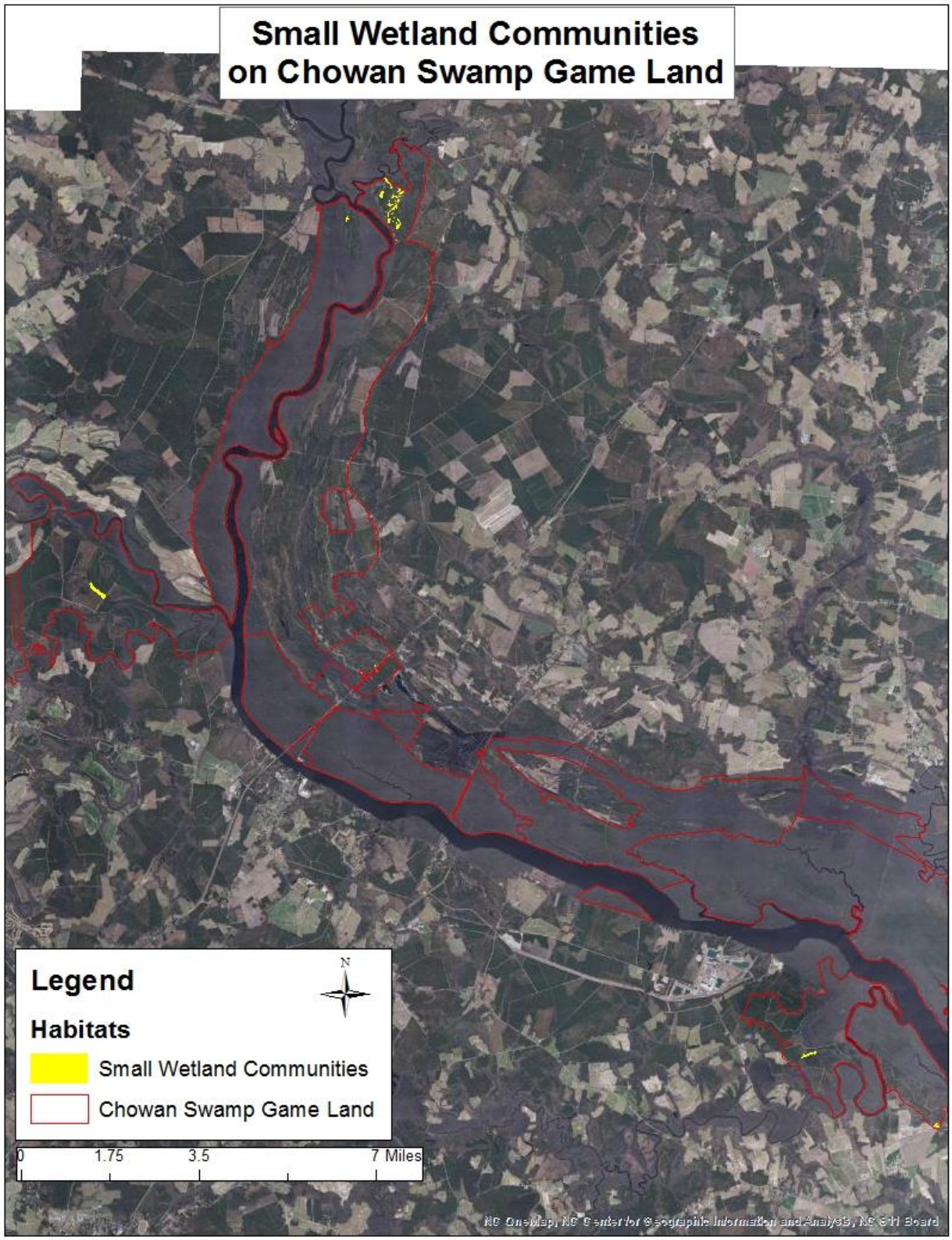

Fig. 16. Small Wetland Communities on Chowan Swamp Game Land.

D. Management Strategies & Needs

The management of Small Depression Ponds and Vernal Pools will be subject to the management of the uplands surrounding them. These small wetland habitats that fall inside young loblolly plantations may not receive the much needed burning or burning at the intensity to remove leaf litter buildup and suppress shrub growth. When adjacent loblolly stands are thinned or clear cut, hotter, more intense fires can be sent through the Depression Ponds and Vernal Pools.

The objective for the uplands surrounding the Small Wetland Communities is to convert loblolly pine plantations into longleaf pine communities complete with a grass/forb understory. Creating these upland transformations will allow land managers to burn the included wetlands more frequently and with more intensity. Most of the prescribed burning takes place during the dormant season. Bailey et al. (2006) recommends burning these seasonally isolated wetlands during periods when water levels are the lowest. As desired habitats on upland sites develop, many upland sites will be burned during the growing season. Growing season fires will allow land managers a greater window to conduct prescribed burns, increasing the acres that can be burned in a year. Growing season fires will give managers better control of hardwood sprouts and help restore native groundcover. During the growing season, the Small Depression Ponds and the Vernal Pools will be the driest allowing prescribed fires to reduce leaf litter buildup and shrub density around the wetlands. Land managers will have to consider the potential for ground fire burning in these wetlands and determine if there is enough buffer to unburned fuel to prevent wildfires.

Beaver Ponds will be passively managed unless there is a substantial threat to infrastructure or timber production on either state-owned lands or private property. Trapping is allowed on the game lands and easily accessible areas are likely to be trapped.

The condition of many of the Depression Ponds and Vernal Pools and the current value to reptiles and amphibians are unknown. Therefore, needs for these areas involve prescribed burning, potential selective thinning of canopy trees within the authorizations of the Articles of Dedication Agreement, and potential amphibian surveys to determine use. Beaver Ponds require only monitoring for damage to timber or infrastructure. Two current locations, one on the Mapleton Tract and the other on the Lower Wiccacon Tract, where beavers have plugged road culverts, will need to be addressed on how to protect the roads and maintain the existing Beaver Ponds. There are no other needs known to maintain them.

E. Desired Future Conditions

In the case of Small Depression Ponds and Vernal Pools, the desired future conditions will be habitats that offer valuable breeding and nesting habitat for reptiles and amphibians. The sites should be ephemeral in nature as not to support predatory fish. Ideally, as upland habitats develop, prescribed fires can be used to maintain the pools and ponds and the ecotone that surrounds them. Many of the known sites will have fire incorporated into management of the adjacent uplands within the term of this plan.

Beaver Ponds will continue to go through a series of succession. Most of the sites where Beaver Ponds are or will be constructed are protected from active management by the Articles of Dedication. Other than maintaining current, well-established beaver ponds along the roads, it is desired that natural succession take its course on the landscape where threats to property are minimal.

Nonalluvial Mineral Wetlands

Most of the drains between the ridges are considered Nonalluvial Mineral Wetlands. These Nonriverine Swamp Forests are not influenced by the rivers or their wind driven tides and can vary in habitat ranging from moist ground to some seasonal sheet flow water to Cypress-Gum drains. These habitats lie outside of the rivers normal floodplain.

A. Location and Condition of Habitat (Fig. 17)

Nonalluvial Mineral Wetlands can be found on the Lower Wiccacon, Upper Chowan West, Mapleton, and the Sand Banks tracts of CSGL. Some of the best examples are the drains located on the Sand Banks Tract lying between the many parallel sand ridges. Many of these drains begin as seasonally wet areas, thick in green briar and cane eventually becoming wider swamps with braided or, at times, a single channel of flowing water through a Cypress-Gum dominated canopy. The Lower Wiccacon Nonriverine Swamp Forest patches are embedded in much larger patches of Tidal Cypress-Gum Swamp on slight rises that are isolated from tidal influence.

Canopy dominates along the drains include scattered Atlantic white cedar, red maple, sweetgum, swamp black gum, bald cypress, various oaks, and loblolly pine. The understory is a dense mix of green briar and shrubs including fetterbush, gallberry holly, and sweet pepperbush. Areas that are wet during most of the year may support *Sphagnum sp.* peat moss.

The Lower Wiccacon Tract Nonriverine Swamp Forest stands are thought to be in good condition. Due to their remoteness, this assessment was made using aerial photography.

The Nonalluvial Mineral Wetlands that are located between the sand ridges are in good condition. Many of these sites were not accessible to logging equipment by the previous landowners and therefore were spared from being cut. A distinct stand delineation line has been created between the pine plantations on the uplands and the wet drains. The natural “feathered edge effect” is not present on many of the sites that may have been present within a wildfire driven ecosystem where fires opportunistically burned into the drains.

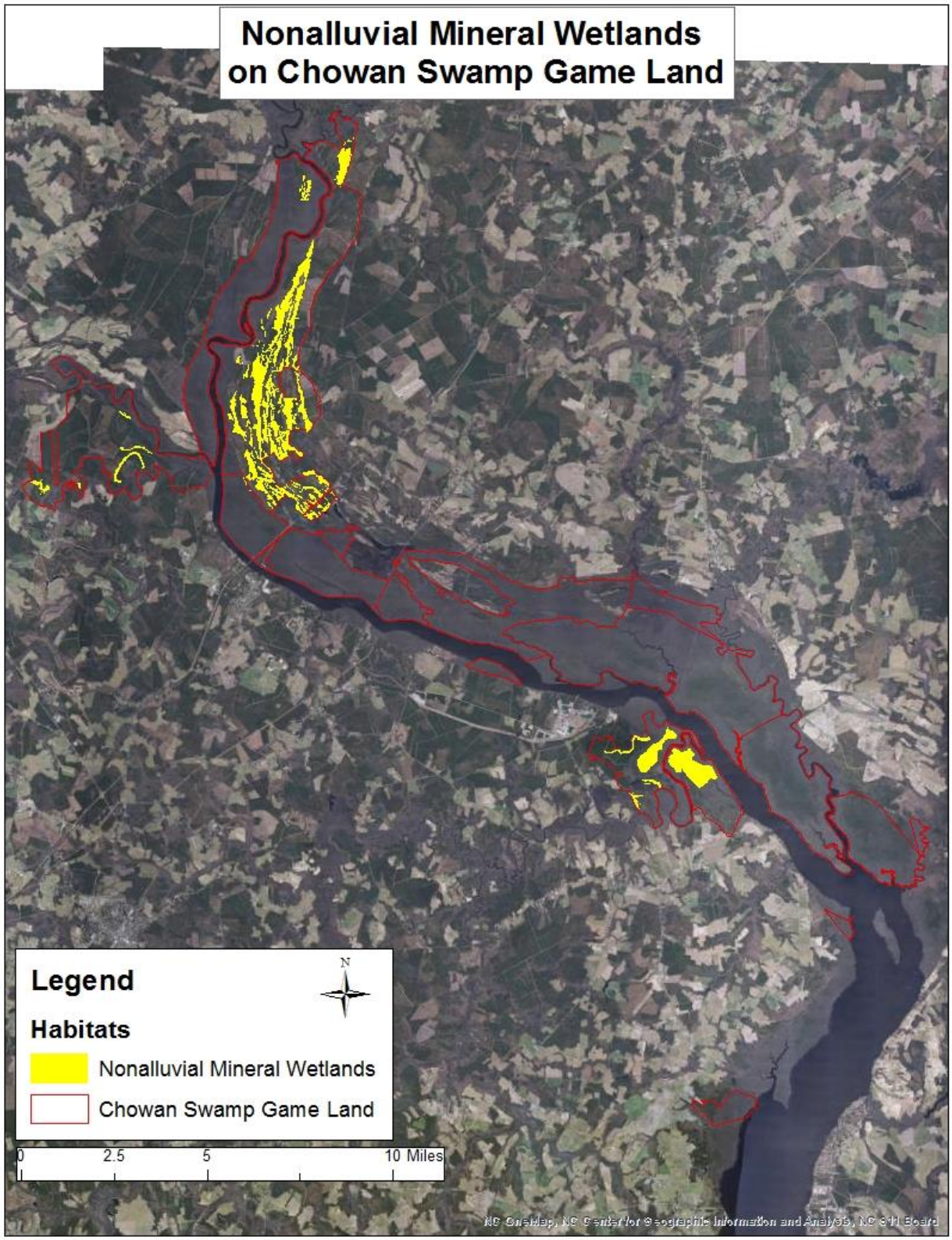

Fig. 17. Nonalluvial Mineral Wetlands on Chowan Swamp Game Land.

B. Priority Species

Priority game species identified for these habitats include: white-tailed deer, black bear, wild turkey, and squirrel. The following table lists non-game species potentially found in these habitats and their conservation status.

Table 7. Listed non-game species associated with Nonalluvial Mineral Wetlands. See Appendix VI for Status and Ranking descriptions.

Common Name	Scientific Name	State Status (Federal Status)	Natural Heritage State and Global Rank
Southeastern Bat	*Myotis austroriparius*	SC	S_2,G_3G_4
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	T	S_3,$G_3G_4T_3$
Timber (Canebrake) Rattlesnake	*Crotalus horridus*	SC	S_3, G_5

C. Management Challenges

Many of the habitats identified as Nonalluvial Mineral Wetlands are located in vast areas of Tidal Swamp Forests or Floodplain Forests. Articles of Dedication designed to protect these and associated areas inhibit some management options. Their remoteness will hamper invasive species control or salvage timber harvests.

Longleaf pine restoration efforts can be complicated by the existing loblolly pine and undesirable hardwood stems left in the adjacent Nonalluvial Mineral Wetlands. The undesirable tree species will cast seed in to the uplands that can affect desirable groundcover establishment. Prescribed fire intensity may be reduced as fuel moistures are typically higher in stands containing hardwoods during dormant season fires.

Many of the drains present a significant risk of ground fires due to the organic characteristics of the soils and duff layer. Land managers should consider the possibility of ground fires during periods of drought, late dormant season, and during the growing season.

D. Management Strategies and Needs

The Articles of Dedication would limit timber management activities to a salvage operation of damaged trees following a catastrophic event, such as a hurricane. Since large rain events typically accompany a hurricane, timber salvage operations in these sites are an unlikely scenario. Therefore, passive management retaining mature trees for their mast production and

cavity potential with minimal site disturbance is the intended strategy. In the event a salvage endeavor was undertaken, water quality buffer guidelines would be followed.

Suppression of exotic plant species would be a desirable and a conservation easement permissible activity within this habitat type. Initially, monitoring to identify affected areas, species identification, and determining if control is feasible is the current priority.

Prescribed fire will be introduced into some of the Nonalluvial Mineral Wetlands where it is advantageous to the site and adjacent uplands. Many of the drains on the Sand Banks Tract, for example, border uplands that are actively managed. When prescribed burning the uplands, managers should consider using the drains as a control line. Returning fire to these wetlands will reduce the density of the shrub layer and promote a more favorable "feathered" transition zone from the uplands to the drains. These ecotones separating the drier uplands and the wet drains are important nesting habitats for wild turkeys and bedding and foraging areas for deer. Plowed lines offer predators greater access within this transition zone and can hinder amphibian movements between habitat types. Managers should avoid plowing fire control lines along these habitats when the natural drains will hold a prescribed burn. When installing firelines downslope tying into these wetlands, avoid using the plow opting instead to using the bulldozers blade to skim the fuel from the surface to reduce soil erosion. Plowed fire breaks should be rehabbed after all threat of the smoldering duff layer is gone.

E. Desired Future Condition

In most cases the desired future conditions in the Nonalluvial Mineral Wetlands of ample mast production, adequate numbers and size of tree cavities, an abundance of coarse woody debris, and conditions for habitat specialists have been met or are proceeding in that direction without additional active management activities.

The wetland habitats that lie adjacent to managed uplands will undergo changes in the understory where fire is reintroduced on the uplands. An ideal condition where the managed uplands meet the wetter drains is to restore the "feathered edge effect" in the transition zone by limiting the use of fire breaks in this ecotone and allowing prescribed fires to burn into the wetlands.

Infrastructure Development and Maintenance

Chowan Swamp Game Lands consist of areas where little or no access is provided due to wetlands or because access is required through private land while other areas have extensive networks of unimproved roads. There is significant need for improvements to roads used for entry into most game land areas. Several of the established main roads should be improved to all-weather surfaces to facilitate access and for timber and habitat management. Opportunities also exist to develop public fishing areas and provide additional parking facilities as demand increases.

Engineering and Lands Management staff evaluated the condition of the existing infrastructure in March of 2015 to determine the current needs and future development potential. The following sections provide a summary of findings and provide specific recommendations for improvements based on current priorities and future goals.

Infrastructure on Chowan Game Land consists solely of boundary maintenance as there is no public access to the site other than by boat. Soils on this game land restrict infrastructure development opportunities.

Road Assessment

There are 51 miles of roads and 17 miles of trails located on Chowan Swamp Game Land (Fig. 18 and Fig. 19). None of the roads can be classified as all-weather roads. This issue is not only burdensome to maintenance staff, it is a limiting factor for users trying to access certain areas and necessary for future development plans. Road accessibility will also be critical for emergency personnel should the need arise, especially in times of inclement weather or longer duration rain events.

Existing Road Conditions

A majority of the roads in use are nothing more than dirt paths. Few roads have any gravel; however, there are isolated areas where the roads have been covered with large aggregate to provide short term stability for timber cutting or spot repairs. Roads lack adequate crown to keep the subsurface soils from becoming saturated. The absence of a crowned road surface combined with inadequate drainage features such as longitudinal ditches and cross pipes limit the ability for traveled roads to remain stable. Areas where roads pass through depressions with no drainage outlet should be filled and adequate drainage measures installed. Some culverts are not functioning properly for various reasons such as siltation, lack of a tail ditch, crushed from overloading, or beaver activity.

Maintenance staff has done well to keep vegetation cut back providing adequate cleared width to install roadside ditches through most areas without requiring additional clearing. There is an absence of vegetation along the edge of the roads (shoulders) that causes soil instability and contributes to erosion and rutting in the traveled path. Soil conditions throughout the game lands vary slightly. Most of the surface soils are well drained sand.

Future Road Improvements

Creating all-weather accessibility through the main roads should be the highest priority in the immediate future. Providing stable road surfaces and drainage systems are necessary to accomplish this goal. Identifying areas where cross pipes are required and installing them prior to filling low areas, constructing stable fills, grading of longitudinal ditches, and providing a crowned road surface should be accomplished prior to installing gravel surfacing and vegetation on shoulders and ditches.

The following list of improvement projects are prioritized based on current need and future development potential. All estimates are based on providing an 8’ width gravel road surface with 4’ grass shoulders on each side. Further engineering evaluation and design will be required to determine specific needs for a given project area.

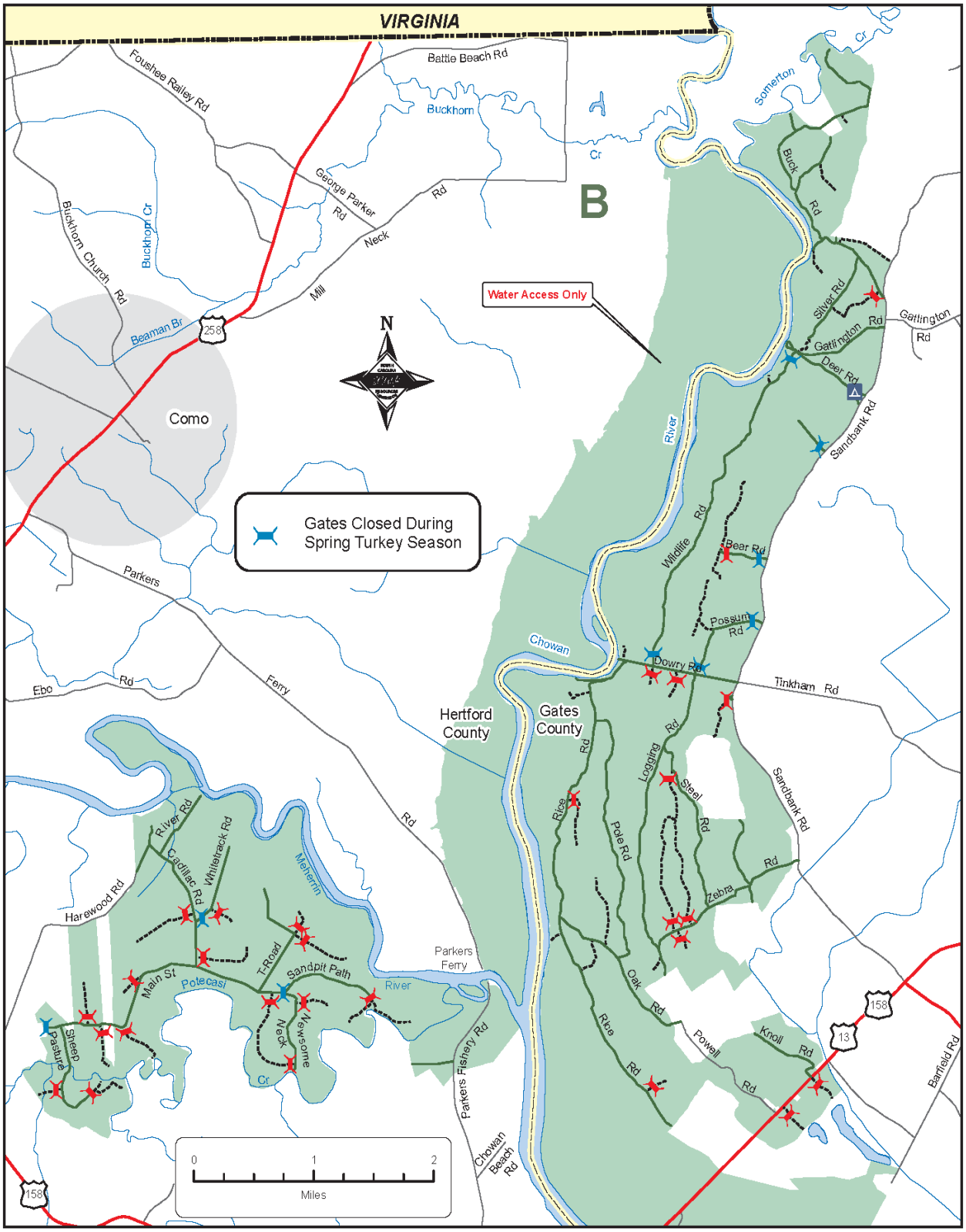

Fig. 18. Road, trail, and gate map for Sand Banks, Mapleton, and Upper Chowan West tracts.

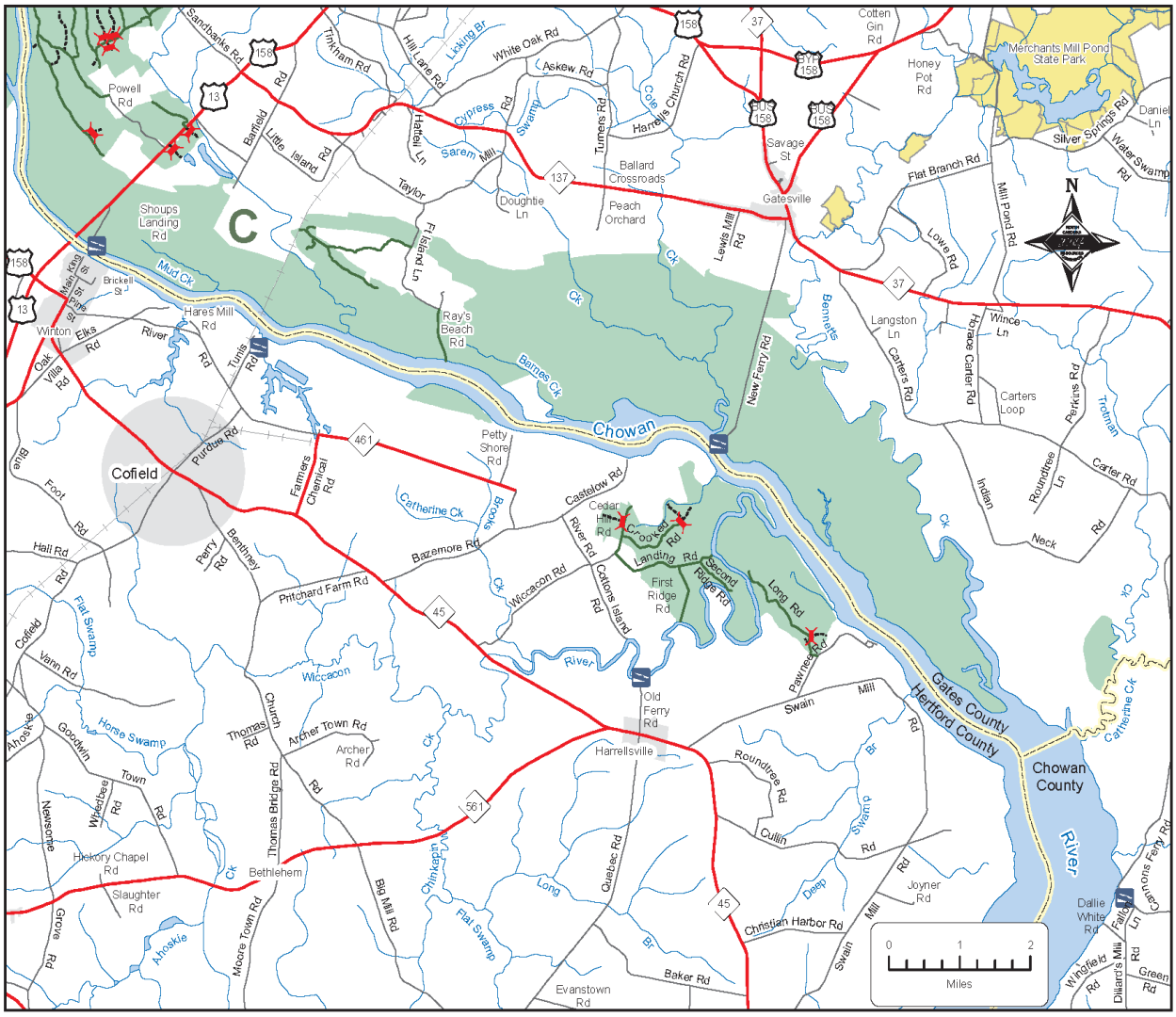

Fig. 19. Road, trail, and gate map for Fort Island Area and the Lower Wiccacon Tract.

High Priority

Cadillac Road – Mapleton

This is the main access road into the Mapleton Tract from the east end of Harewood Road. This is a wide and well-worn soil road that encounters two-way traffic. Grading a crowned road bed and providing a gravel surface is needed to ensure maintaining all-weather access. Improvement costs for this 1.35 mile section are estimated at $202,500.

Landing Road – Lower Wiccacon

This is the main access road into the Lower Wiccacon Tract off of Cedar Hill Road. The road bears to the left approximately 0.35 miles after entering from Cedar Hill Road and ends on the bank of the Wiccacon River. Approximately 0.45 miles of the beginning of this road travels across private property before entering into game land property. Grading a crowned road bed

and providing a gravel surface is needed to ensure maintaining all-weather access. Estimated improvement costs for this road is $273,000.

Main Street (West of Cadillac Road intersection) – Mapleton

Improvements include grading a crowned road bed and providing a gravel surface to ensure maintaining all-weather access. Estimated cost for improvements to this 1.47 mile segment is approximately $257,250.

Main Street (East of Cadillac Road intersection) – Mapleton

A continuation of Cadillac Road to the southeast of its intersection, this road makes up the remainder of the main access road through the Mapleton Tract to the east. Grading and gravel surfacing are needed to create an all-weather main road system through this tract. Estimated costs for improvements for this 0.90 mile segment are $157,500.

First Ridge Road – Lower Wiccacon

First Ridge Road provides access to the southern area of the Lower Wiccacon Tract to the Wiccacon River from its intersection with Landing Road. Improvements include grading a crowned road bed and providing a gravel surface to ensure maintaining all-weather access. Estimated cost for improvements to this 0.80 mile segment is approximately $140,000.

Medium Priority

River Road – Mapleton

From its intersection with Cadillac Road, this road provides excellent access to the Meherrin River. This road is in need of grading and drainage improvements and an all-weather surface. Estimated cost for improvements for this 0.80 mile road is $140,000.

Dowry Road – Sand Banks

One of the few roads that have had some type of stone placed in various locations, Dowry Road will need a gravel surface and spot placement of stabilization stone. Estimated cost for improvements for this 1.14 mile road is $114,000.

Low Priority

T- Road – Mapleton

This road provides access to the northeast portion of the Mapleton Tract. All-weather access on this road is needed because of the large percentage of land area it provides access to. Grading a roadbed with adequate drainage features is needed, along with a stable road surface. Estimated cost to improve this 0.55 mile road is $96,250.

Sheep Pasture Road – Mapleton

This road provides access to the southwestern portion of the Mapleton Tract. Estimated cost for grading, drainage, and gravel surfacing for this 0.7 mile road is $122,500.

Road Maintenance

Maintenance of all road facilities is necessary. The maintenance needs in the Chowan Swamp Game Land are extensive due to the unimproved condition of most of the existing roads. Improving the main roads will free up maintenance staff to extend their effectiveness and promote improvements to other facilities. There are other less travelled roads not mentioned in this report that require continual maintenance. It is recommended that $15,000 be included into annual appropriations to provide for spot repairs and improvements.

Maintenance supervisors should set a routine schedule to inspect facility conditions and identify needed repairs and improvements. Correcting deficiencies quickly will often eliminate the need for more expensive repairs at a later time. The following list of items outlines suggested routine maintenance practices that should be accomplished regularly.

Typical Road Maintenance Practices

- Inspect roads regularly, especially before the winter season and following heavy rains.
- Keep ditches and culverts free from debris (see Culvert Maintenance Section of this Management Plan).
- Remove sediment from the road or ditches where it blocks normal drainage.
- Grade and shape the road surface periodically to maintain proper surface drainage.
    - Typical road should be crowned at approximately 4%, or ½" per foot.
    - Gravel should be distributed at an even depth across the road.
    - Gravel should have an even distribution of fine and course materials.
    - Keep downhill side of the road free of berms, unless intentionally placed to control drainage.
    - Proper maintenance and grading of the road will require a motor grader and a roller.
- Avoid disturbing soil and vegetation in ditches, shoulders, and cut/fill slopes to minimize erosion.
- Maintain shoulders on both sides of the road to ensure oncoming vehicles have enough room to pass. Shoulders should be relatively flat, with a mowed grass surface.
- Maintain an erosion-resistant surfacing such as grass or rip rap in ditches.
- If it is determined that a road needs major repairs or upgrade, contact Regional Supervisor and Design Services to schedule an assessment.

Road Safety Features

- Remove trees and other vegetation as necessary to provide adequate sight distance and clear travel way.
- Install and maintain road signage. This includes:

- Stop signs – Should be installed as necessary at every intersection, with the signs on the minor roads.
- Warning signs – Should be installed to warn the public of any road closures or problems in the game land.
- Road/Route signs – Should be installed at every road intersection on a game land.
- Information kiosks with game land road map – Entry signs should be installed at every entrance to a game land off of a DOT road. Information kiosks should be located near the entrances and in parking areas.
- Signs should be initially installed at areas with higher traffic volumes. Additional signs should be installed as deemed necessary.

Troubleshooting

Road Surface Problems

Problem: Longitudinal erosion of the road surface
Possible Causes:

- Flat or U-Shaped road. A crown or super-elevation of the road is needed to shed water laterally off the outer edges of the road surface.
- Small ridge of soil or grass growth along the outer edge of the road is preventing water from draining off the road surface. Edge needs to be graded to remove this ridge.
- Water is traveling in a wheel rut. Road needs to be regraded. This problem often results from soft roads.
- Road ditch is not large enough and overflows onto road surface. Install more frequent turnouts to get water away from the road or increase the size of the ditch.

Problem: Lateral erosion cutting across the road surface
Possible Causes:

- Most often occurs at a low spot in the road or where a ditch filled in and no longer functions. Water builds up and overtops and erodes the road surface. A culvert should be installed in this location.

Problem: Potholes
Possible Causes:

- Potholes are typically caused by insufficient crown or road cross slope. The road should be re-graded to remove the potholes, then re-crown or super-elevate the road as necessary.

Ditch Problems

Problem: Bottom of ditch is eroding
Possible Causes:

- Slope of ditch is too steep to handle the flow without additional protective measures, which include addition vegetation, erosion control mats, rip rap, check dams, etc.
- Ditch is too small to handle the volume of water flowing through it. May need to install periodic turnouts to reduce flow through the ditch.

- Bottom of ditch is too narrow and needs to be widened to a parabolic shape.

Problem: Sides of ditches are slumping or eroding
Possible Causes:

- Side slopes are too steep and need to be lessened by digging them back to flatten the slope.
- Side slopes need to be stabilized with additional vegetation, erosion control mat, or rip rap.

Special Projects

Ray's Beach

Ray's Beach offers a unique opportunity to create a recreational area that could serve multiple purposes. This site provides access to the Chowan River. Prior to NCWRC acquisition, the local fishing club constructed a small boat ramp, covered shelter, and pier. Since then, the building has been subject to vandalism and the pier has been damaged by high water events. Although the structures have deteriorated over time, some potential exists for this site to be improved. The single lane access road to this site is narrow with swamp on both sides limiting its ability to be used as a boating access area. Several pull-off areas are located along the road to allow vehicles to pass by each other. An annual appropriation of $3,500 in gravel will maintain the 0.7 mile long road. Future consideration should be given to developing or cleaning up the site. Improvement costs for renovating the existing shelter is $15,000 and constructing a new fishing pier is $20,000.

First Ridge Road – Lower Wiccacon – Beaver Pond

Shortly after entering onto First Ridge Road, a low point existing in the road grade is the location of a beaver impoundment. Although drainage pipes pass under the road at this location, beavers have successfully blocked the drainage pipes and created an impoundment that has existed for several years. NCWRC staff has identified this impoundment as a desirable aquatic habitat worthwhile to maintain. Further study from the Engineering and Lands Management staff is required to determine what modifications will be required for the drainage structures and roadway to maintain the beaver pond and protect the road from erosion. Costs for completing this improvement are estimated between $10,000 and $30,000.

T-Road - Mapleton – Beaver Pond

Approximately half way down T-Road where the road grade dips in a low point is the location of a beaver impoundment. Although drainage pipes pass under the road at this location, beavers have successfully blocked the drainage pipes and created an impoundment that has existed for several years. NCWRC staff has identified this impoundment as a desirable aquatic habitat worthwhile to maintain. Further study from the Engineering and Lands Management staff is required to determine what modifications will be required for the drainage structures and roadway to maintain the beaver pond and protect the road from erosion. Costs for completing this improvement are estimated between $10,000 and $30,000.

Access Road to Upper Chowan West – Through Private Property

Administrative use only access to the northwest portion of the game land is through private property from Mill Neck Road. Once on game land property, a 0.64 mile segment of the road needs significant improvement. Providing stone for subgrade stabilization and a gravel road surface is needed. To reach habitat restoration goals, improvements will provide access for logging equipment and habitat management to an estimated 62 acres of loblolly pine. Estimated cost for improving this 0.64 mile segment of road is $96,000.

Road Stabilization

Areas of soft sand or poor drainage in isolated locations are obstacles to access some areas of game lands. These areas require the addition of stabilization stone or compacted earth fill to provide a permanent repair. Additionally, there may be the need for an engineering review of these areas to determine if site drainage is a concern. There are three areas that have been identified requiring stabilization. One area on Zebra Road is approximately 0.30 miles, and two areas on Deer Road are 0.14 miles, and 0.16 miles. Improvements for these areas combined are estimated at $90,000.

Parking Areas

There are no designated parking areas located on CSGL as parking on existing road shoulders have been sufficient to most users. Any new parking area should provide a gravel surface (approximately 6” layer of compacted ABC stone) and provide enough parking for three to five vehicles. Depending on the amount of use, clearing, and grading required, it is estimated that each parking area will cost between $5,000 and $15,000.

Gates

Gates are an important tool in managing the game land. Some roads cannot handle significant traffic. Gates also aid in habitat and wildlife conservation by reducing disturbance. There are many gates located throughout the game land, which limit access to certain roads and portions of the game land. Game land gates are closed outside of the hunting seasons. Some gates on the game land are opened or closed during specific times of the year, typically for deer and turkey hunting seasons.

Most gates observed during the inspection are swing pipe gates in good condition. All gates installed on game lands should be the standard swing gate and painted orange for maximum visibility. No cable gates should be installed and any existing cables should be replaced.

Drainage Structure Assessment

Culverts

Due to the size of the game land and total number of culverts, inspection of all culverts is impractical. However, during the road investigation with field staff, several culverts were identified as needing repair or upgrade. Any culvert upgrade consisting of a single pipe 36” and

greater or a crossing utilizing multiple lines of pipe should include design considerations for fish passage. Specific considerations can be obtained by contacting the Division of Inland Fisheries, Habitat Conservation Program - Technical Guidance Section.

Two of three parallel culverts on Sheep Pasture Road located on the Mapleton Tract will need replacing within this plans planning horizon. The game land road crosses a large drain with perennial water flow. The culverts that need replacing are 60" by 30' long. The estimated cost is $25,000.

Culvert Maintenance

Culvert maintenance is performed to extend the life and ensure proper function of the installed drainage structure. The accumulation of sediment and/or debris at the inlet or outlet of a culvert or damage such as crimping of the pipe effectively reduces the diameter and flow capacity of the pipe.

Culvert maintenance includes removal of accumulated sediment and/or debris that prevents passage of water (and organisms) through culvert inlets, outlets, and connected drainage ways. It may also include reinforcement of eroding inlets and outlets by installing riprap or other erosion control measures. Damaged culverts and culverts requiring frequent repeat maintenance should be considered for future remediation via redesign and reinstallation.

The following items should be checked for and addressed as part of routine maintenance inspections:

- partial or complete blockage of the inlet or outlet of the pipe with sediment, stone, leaves, woody debris, refuse or any other items that could affect flow through the culvert
- evidence of scour, bank or channel bed erosion near the inlet or outlet of the culvert
- evidence of flow overtopping the road at the culvert location
- damage to the pipe including crimping of the inlet or outlet, crushing or piercing of the pipe
- severe corrosion of the pipe
- damage to headwalls

Staff should inspect ditches and culverts as part of their regular road maintenance activities. This inspection is especially important during leaf fall and following periods of heavy rain. Staff should consider the location of the culvert before performing maintenance using heavy equipment. Culverts located in active stream channels, dedicated, or critical habitat areas may require special permission or installation of erosion control measures before maintenance can commence.

Leaves and woody debris that have accumulated in or around the inlet of the culvert should be removed immediately using hand tools if possible. Removal of accumulated silt and/or gravel from ditches approaching the culvert inlet should be performed using a small excavator, backhoe or a tractor equipped with a scrape blade. Sediment in or around the immediate vicinity of the pipe inlet or outlet should be removed using hand tools to prevent damaging the culvert.

Cleaned out material is to be pulled away from the culvert then hauled and spread at a site where it cannot be washed back to the culvert area.

Repeat problems with sediment collecting around the inlet may indicate the existence of an erosion problem originating from the slopes, streams, or ditch lines in the vicinity of the culvert. Identification and stabilization of these problem areas through practices such as seeding or matting could improve performance of the culvert and reduce maintenance requirements.

Flow overtopping the road at the culvert location generally indicates that the pipe is undersized and could warrant resizing and replacement. Any damage to the culvert, as described above, may also necessitate replacement of the pipe. If maintenance staff identifies any culverts that may need replacement, they should contact engineering staff to calculate the peak flow capacity and diameter of the new pipe.

Recreational Facilities Assessment

Boating Access

There are no designated Boating Access Areas (BAA's) on the game lands; however, NCWRC operated Boating Access Areas are critical launching sites to provide public access to remote portions of the game lands not serviced by roads. Six BAA's that are close to CSGL include Murfreesboro BAA on the Meherrin River in Murfreesboro, Shoup's Landing BAA and Public Fishing Area near Winton, Tunis BAA in Tunis, Gatesville BAA outside of Gatesville, Harrellsville BAA on the Wiccacon River in Harrellsville, and Cannons Ferry BAA in Tyner.

Edenhouse Bridge BAA on the Chowan River in Edenton is the closest BAA to the CGL.

Public Fishing Access

There are currently no public fishing areas (PFA) on the game land; however, considerable bank fishing does occur on the Sand Banks, Mapleton, and Lower Wiccacon tracts. A PFA is located at Shoup's Landing BAA and Public Fishing Area near Winton. In the town of Winton, there is a CAMA access fishing area and Merchant's Millpond State Park has a PFA on Millpond Road.

A 600-foot fishing pier is located at the Edenhouse Bridge BAA and PFA outside of Edenton NC.

Shooting Ranges

There is not a shooting range on the game land at this time. Potential shooting range locations will be evaluated. Once developed, all target and recreational shooting on game lands within a 30-mile radius of the range will be directed to that range. In 2018, the NCWRC adopted a rule to prohibit target shooting on the Sand Banks tract of Chowan Swamp Game Land.

Campgrounds

There is one designated primitive campground on CSGL located at the intersection of Sand Banks Road and the game land Deer Road.

Geocaching

Geocaching is a recreational activity, in which participants use a GPS receiver or mobile device to hide and locate hidden containers, or caches located somewhere outdoors. Game lands have become a very popular geocaching location. There are no major infrastructure elements required for this non-traditional use.

Hiking

The game land contains many miles of roads, which have typically been used for hunter access. Hiking is becoming a more popular activity and will continue to be a demand on game lands. Hiking trails should be on existing roads and trails which will allow NCWRC staff to maintain the trails.

Horseback Riding

Horse traffic causes significant damage to the non-graveled roads that exists over much of the game land. Damage to the roads from horses causes excessive wear on vehicles. Roads require more frequent grading prior to gate openings as a result of horse impacts. Given the increased public demand for this use, the NCWRC has adopted a rule to address hunter/horseback rider user conflicts and to protect habitat from horseback riders. The rule states; Horseback riding is prohibited except during May 16 – Aug. 31 and on Sundays only Sept. 1 – May 15 on those roads that are open to vehicular traffic and those gated roads and trails posted for equestrian use. Since the adoption of the above rule, the NCWRC has created a parking lot that can support trucks with horse trailers at the intersection of Gatlington Road and Sandbanks Road. The NCWRC has also marked 9.06 miles of roads as horse riding trails.

Currently, maintenance of the game land is funded in large part by Pittman-Roberson Federal Aid in Wildlife Restoration Act dollars through and excise tax on firearms, archery equipment, and ammunition and based on the number of licensed hunters in the state. Infrastructure improvements for horseback riders should be investigated and is recommended to be self-funded through a game land use fee. Infrastructure needs could include road maintenance and parking for vehicles towing trailers. It is estimated a minimal cost to provide road maintenance at $2,500 per mile and $70,000 per parking area.

Public Uses

As stated previously in the Game Lands Program Mission Statement, primary public uses of North Carolina game lands are hunting, fishing, trapping, and wildlife viewing. However, the Commission recognizes the desirability of providing opportunities for other activities on state-

owned game lands that are feasible and consistent with the agency's mission and compatible with these traditional uses.

As the human population of North Carolina has rapidly grown, state-owned game lands have received increasing pressure to provide public outdoor recreation opportunities. These uses include traditional activities such as hunting, fishing, trapping, and wildlife viewing, as well as other outdoor recreational pursuits. While hunting, fishing, trapping and wildlife viewing are the primary public uses of state-owned game lands, the NCWRC has always allowed other dispersed and non-developed recreational activities. Management work conducted on game lands are cost-shared with federal Pittman-Robertson Act funds derived from an excise tax on guns and ammunition and the states receive a portion of those funds based on the number of license hunters there are in the state. Because of this, the NCWRC must exercise care in providing for recreational activities that may not be compatible with the natural resources for which the lands are valued and the primary management objectives of these lands and the primary users.

As a response to these increasing pressures, the NCWRC developed a Game Lands Use Evaluation Procedure to provide a statewide framework for determining appropriate uses for Commission-owned or controlled game land properties (Appendix III).

Different user groups of the Chowan Swamp Game Land and the Chowan Game Land

Based off of anecdotal information and input received from the public input processes that occurred from 16 February to 10 April 2015, we have made our best determination of different user groups that occur on the CSGL and CGL. The discussion of the different users groups below primarily use responses to question number 3 from the public input meeting and the online comment website: **How do you use this game land?** The user groups are listed below and discussed in greater detail. Please note that the percentages when added together for any question may exceed 100% since many respondents included multipart answers. Appendix IX lists the Public Input Questions as well as all input received with NCWRC response to many comments to questions 4, 5, 6, and 7.

Seventy nine percent of respondents indicated that they use the game land for hunting, with deer hunting being the most common response. Fishing or using the game land for access to the river was recorded by 46% of users.

As with many game lands, conflicts between user groups exist. Whether it is still hunters and dog hunters, hunters and horseback riders, or even hunters using different weapons, CSGL is diverse enough in landholdings to minimize many of the conflicts. Regulating uses to certain times may be the best way to eliminate some of the conflicts.

Traditional Game Land Users

- Hunters
- Fishermen
- Trappers
- Wildlife Viewers

Discussion of Traditional Game Land Users

According to public input comments, hunters make up largest number of traditional users followed by anglers. Wildlife viewing was reported as 33% of activities that game land users participated in. Overall, we believe that traditional users are generally satisfied with the game land. NCWRC staff are receiving increasing reports from hunters of conflicts with other user groups, typically horseback riders. As with most game lands, users would like more roads open to vehicular access. Before roads are gated restricting vehicular access, an assessment was conducted to consider; road condition, the threat of damage during wet periods, level of access via another road, disturbance potential to other users, traditional hunting methods used by lessees prior to State ownership, and sensitive habitats.

Deer Hunters

Excellent deer hunting opportunities are available on CSGL and very limited opportunity on CGL. Sportsmen and women throughout the state and some neighboring states, mainly Virginia, come to take advantage of hunting opportunities offered by the no special hunt permit required game land. Hunters are generally satisfied with the ability to harvest any deer they choose as suggested by the lack of public comment regarding harvest changes. Of the responses received for question 3, (How do you use this game land?) 79% of the respondents indicated that they used the game land for hunting.

Overall, we currently believe that deer hunting opportunities are adequate to satisfy this user group. Most of CSGL is conducive to hunting with the use of dogs and has traditionally been so. Conflicts between still hunters and hunters using dogs have been acknowledged and it is encouraged that each group respect the desires of the other. Still hunters can find secluded areas behind closed gates or in areas that are not heavily hunted by hunters using dogs. There exists an adequate mix of roads and trails throughout most tracts of the game land to meet most of the needs of deer hunters.

When asked what habitats are important or suggestions for management, 42% of respondents stated that the NCRWC should plant more or manage hardwood, primarily oaks, and 25 % of respondents wanted food plots for deer. Habitat recommendations are determined by site. Many sites along the uplands supported a longleaf pine habitat community prior to European settlement. The longleaf community existed as a result of fire from lightning strikes and later through fires started by Native Americans. Oaks on these communities where likely found on island ridges in the swamps or in the wetter drains that could not sustain a fire hot enough to kill oaks and other mast producing hardwoods. When loblolly pine plantations are cut, areas that are not conducive to burning will be planted in hardwoods, with oaks being the dominate species.

Food plots or wildlife openings will be considered on closed roads, logging decks, and the limited openings that exist on CSGL. Typically, soils are nutrient poor on the roads and either extremely sandy or have a hard clay base that limit plant growth. Conditions on the roads can be amended to provide limited foraging areas to wildlife. Log decks usually have too much logging debris to plant with equipment and a resulting hand seeded deck may not meet desired stand establishment goals.

Turkey Hunters

The 2007 and 2008 acquisitions to CSGL provided several thousand acres of a good mix of uplands and drain/bottomland habitats that support fair numbers of turkeys. Six roads that are open for vehicular traffic for the fall and winter hunting seasons are closed for the spring turkey season providing for a better hunt experience by reducing disturbance.

Threats that could jeopardize turkey abundance could be increases in access, overharvest, habitat destruction from other poorly managed uses, and increase disturbances from game land users during nesting and brooding seasons. Threats to the quality of hunt experience to the hunters include disturbance resulting in hiking, target shooting, geocaching, and horseback riding. Turkey hunting is extremely popular on CSGL. Surveys may need to be conducted to determine the number of turkeys and hunters to see if turkey hunting on CSGL should be included in the Permit Hunting Opportunity Program.

We currently believe that turkey hunting opportunities on the CSGL are sufficient. We believe that accessibility to property, habitat management, and the numbers of turkeys available for harvest are at levels to satisfy this user group.

Bear Hunters

CSGL offers excellent opportunities to hunt bears. Most of the bears tend to stay in the vast tidal and floodplain forest. Bear hunting with dogs is the most effective way to hunt bears on the game land. Bear hunting is restricted to the first Saturday, Monday, and Tuesday of the November season and the Monday, Tuesday, and Wednesday of the second week of the December season for most of the CSGL. In these areas, road access is generally good through the tracts. A portion of CSGL in Gates County east of Highway 158/13, south of Highway 158, west of Highway 32, and north of Catherine Creek and the Chowan River is open to bear hunting the entire season. In this area, road access to the game land is limited making it harder to harvest bears with dogs compared to the areas with more vehicular access. Refer to the NC Inland Fishing, Hunting, and Trapping Digest's Game Land section for more information.

The NCWRC's management of CSGL using varied hunting regimes allows ample opportunity to hunt the limited bears on the more accessible tracts while providing bear hunting opportunities to the more remote tracts the entire season.

Waterfowl Hunters

Most of the waterfowl hunting occurs on the Chowan River and creeks that border the game lands. Six Boating Access Areas provide adequate access to the Chowan River and the Wiccacon River and the numerous creeks. There are a few beaver ponds and openings within the game lands that provide waterfowl hunting opportunities. Due to the Articles of Dedication Agreement, habitat management within the wetlands is restricted. Within the existing CSGL boundary, there are no plans to construct waterfowl impoundments or create openings in the swamps.

Small Game Hunters

Small game hunting opportunities are thought to be good on this property. This determination is based on anecdotal information alone because hunters are not required to report small game harvests. Currently, small game hunters have the opportunity to harvest quail, dove, rabbit, gray squirrel, opossum, bobcat, raccoon, fox, woodcock, and beaver.

Thirty five percent of respondents indicated that small game species were important to protect. An extensive effort has been underway to increase the early-successional habitats on the game land through timber management and prescribed burning. These habitats offer excellent cover, brooding, and nesting areas for quail and rabbits. Continued effort should increase the amount and quality of early-successional habitats on CSGL. With the amount of early-successional habitat and the forested bottomlands for squirrel and raccoons, we believe that access for small game hunting is adequate. No additional infrastructure is needed to serve this group.

Fishermen

Bank fishing is very popular with local anglers along the Chowan River, Meherrin River, and the Wiccacon River. There is a Public Fishing Area located at Shoups BAA and Edenhouse Bridge BAA. There is a CAMA Access Fishing Area in Winton. Merchant's Millpond State Park also offers public fishing opportunities at the spillway located on Millpond Road. New Public Fishing Areas will be considered as needed. Littering has always been an issue with the presence of bank fishermen. There are no feasible management strategies that will reduce the amount of litter on the game land.

Trappers

Trapping of furbearers is currently thought to occur at low levels. No public comments were received that indicated satisfaction, or the lack of, with trapping opportunities on CSGL or CGL.

We are currently unaware of any specific infrastructure needs that would provide better opportunities for trappers. Additionally, we believed that ample opportunity is provided to trappers and there are no additional strategies we could implement to increase the use of the game land by trappers.

Wildlife Viewers

Wildlife viewing does take place on the game land but in low numbers. Thirty three percent of respondents indicated that they use the game land for wildlife viewing. Most of the public input respondents likely listed wildlife viewing as an activity conducted on the game land while pursuing other activities such as hiking or horseback riding. With the proximity to Merchant's Millpond State Park, we feel that needs are met for this user group.

Non-traditional Game Land Users

- Bicyclist
- Campers
- Geocachers

- Eco-tourism
- Hikers and runners
- Horseback/trail riders
- Military
- Paddlers
- Photographers
- Researchers, universities, and museums
- Target shooters
- ATV riders and other off-road vehicles
- Other illegal activities
- Joy riders and sightseers

Discussion of Non-traditional Game Land Users

We have attempted to determine all game land users of the CSGL and CGL and have made determinations of appropriateness and compatibility for each use based on the fact that hunting, fishing, trapping, and wildlife viewing are the primary uses. As long as non-traditional uses do not negatively influence the wildlife resources or negatively impact traditional users, they may be determined appropriate and compatible. Some non-traditional uses require special consideration and are only considered to be appropriate and compatible under certain circumstances.

Non-traditional users are strongly encouraged to refer to the *North Carolina Inland Fishing, Hunting, and Trapping Regulations Digest* to identify hunting and trapping seasons as well as specific days and times that hunting and trapping occurs on the game land. Out of safety concerns, game land users are also strongly encouraged to wear blaze orange while using game lands. In reference to the previous statement about designated hunting days, hunting occurs on nearly every day starting the first week in September until the end of February and from early April until mid-May for turkey season. No hunting is allowed on Sundays on game lands. Fishing can occur at any time on the game land.

Bicyclist

Bicycling on CSGL is considered compatible as long as bicyclists stay on designated roads and trails. Impacts to natural resources can be minimized by regulating use through numbers, timing, and conditions of trails. The use of CSGL by bicyclists is currently very low. No new trails will be created as the extensive road system meets the needs for this user group.

Campers

There is 1 existing designated primitive camping area on the game land. Most of the camping is associated with hunting. Camping in the campground is restricted to September 1 through February 28 and March 31 through May 14. Additionally, camping opportunities are offered year-round on nearby State Parks which offer many amenities that are not offered on the game land.

Geocachers

Geocaching is considered a compatible activity as long as the NCWRC's geocaching policy is adhered to (Appendix IV). There are a few geocaches located on CSGL. Geocaches placed in sensitive habitats will be removed. Current infrastructure is adequate to meet the needs of these users.

Eco-tourism

Eco-tourism on some game lands is experiencing a surge in interest from local governments, groups, and entrepreneurs. These people see the game land as a resource to draw in tourism to boost the local economy. Currently, it is not thought that the CSGL or CGL are major attractions for ecotourism activities but the potential exists. Paddlers along the rivers and creeks and hikers are likely activities engaged in on CSGL and CGL. Some visitors from nearby Merchant's Millpond State Park may visit CSGL.

It is important for land managers to monitor the above activities and document any issues that may arise. Over use by these activities can negatively impact the resource and traditional users.

Hikers and Runners

The use of CSGL by hikers and runners is considered compatible because it creates minimal disturbance to the natural resources and is consistent with NCWRC policies and objectives. Hikers and runners traditionally stick to established roads and trails and their impact to the road systems is essentially non-existent.

The existing miles of roads and trails provide adequate areas for hikers and runners. These areas are not currently designated specifically for pedestrians but can be used by both traditional and non-traditional game land users.

Out of safety concerns and respect for traditional game land users, hikers and runners should realize and be considerate of all hunting and trapping activities on the game land and the times that they are likely to occur. Hikers should consider wearing blaze orange during the hunting season or limit hiking to Sunday's when hunting on game lands is prohibited.

Horseback/Trail Riders

When asked how people currently use the game land, only 1 response was gathered at the public input meeting and the online comments listing horseback/trail riding as an activity they do on CSGL. The NCWRC knows that CSGL is a popular riding site and the lack of comment should not drive management implications. Some individuals and groups see the game lands as a place to ride their own horses. Others see the game land as an opportunity to increase eco-tourism and money coming to the county. Some want to profit from an outfitter type business, selling trail rides.

The CSGL is part of a sensitive ecosystem. Care must be taken when a use is being considered for appropriateness. Horseback riding on CSGL can be compatible as long as certain restrictions are in place. Horseback riding, above all other non-traditional uses, has the ability to cause more

harm to the habitats, wildlife, and infrastructure. The NCWRC passed a regulation in 2016 to address hunter/horseback rider user conflicts and to protect habitat from horseback riders. The rule states; Horseback riding is prohibited except during May 16 – Aug. 31 and on Sundays only Sept. 1 – May 15 on those roads that are open to vehicular traffic and those gated roads and trails posted for equestrian use. The rule helps the NCWRC stay in compliance of the Articles of Dedication with the NC Department of Environment and Natural Resources. Since the adoption of the above rule, the NCWRC has created a parking lot that can support trucks with horse trailers at the intersection of Gatlington Road and Sandbanks Road. The NCWRC has also marked 9.06 miles of roads as horse riding trails.

Potential threats to the game land include the introduction of invasive plants and the disturbance to wildlife. Nesting birds in the spring and summer may abandon a nest if disturbed. Newsome *et. al* (2002) conducted a study on the effects of horse riding on national parks and other natural ecosystems in Australia and determined that environmental impacts include, but are not limited to, soil degradation and compaction, erosion, loss of vegetation height and cover, change in plant species composition, degradation of existing roads and trails, the introduction of invasive grass and weed species, accidental transport of fungal pathogens, and the loss of vegetation, which are all common problems associated with horse use.

The NCWRC recognizes the interests in riding horses on game lands. It is recommended that horseback riding on CSGL be a regulated activity to preserve the natural resources, limit deterioration to infrastructure, and reduce conflicts with primary users. Out of safety concerns and respect for traditional game land users, horseback riders should realize and be considerate of all hunting and trapping activities on the game land and the times that they are likely to occur. Horseback riders should limit activities during the hunting season to Sunday's when hunting on game lands is prohibited.

Military

Military training has occurred on CSGL but not in recent years. Trainers are encouraged to contact the NCWRC to schedule training as not to conflict with hunters.

Paddlers

Public waterways do not fall under the jurisdiction of the CSGL or CGL. Potential camping platforms will be considered when approached by paddle trail organizations or other agencies that will partner in the management and upkeep of the platforms.

Photographers

The use of CSGL and CGL by photographers is considered compatible. Photographers create very little impact to the natural resources of the game land and their impacts to roads and trails is minimal.

Researchers, Universities, and Museums

The use of the CSGL and CGL by researchers, universities, and museums is considered compatible and does not impact management objectives of the Game Lands Program. These

entities use the game land for the collection of data for research and educational purposes. It poses very minimal threats to traditional game land users and does not interfere with or disturb the natural resources of this property. These activities are usually handled through NCWRC's permitting process. At times, research activities provide information that may be beneficial to managing the property.

Target Shooters

Unregulated target shooting can displace wildlife, pose a safety concern to other users, and cause destruction to property. The NCWRC is currently involved in the design and development of shooting ranges across the state. Once a shooting range is developed within 30 miles of a game land, all target and recreational shooting activities will be limited to that area. In 2018, the NCWRC adopted a rule that prohibits target shooting on the Sand Banks tract of Chowan Swamp Game Land.

Joy Riders and Sightseers

Joy riding and sightseeing via vehicle on CSGL is allowed. This group should be considerate of other users and be aware of hunting seasons to reduce conflicts between user groups. Hiking is allowed and hikers should use caution during hunting seasons. Hikers should consider wearing blaze orange during the hunting season or limit hiking to Sunday's when hunting on game lands is prohibited.

ATV Riders and other Off-road Vehicles

The use ATV's and other off-road vehicles on CSGL is considered an inappropriate use. More times than not, these vehicles create disturbance and cause destruction to valuable resources on game lands. They greatly degrade roads and trails and create erosion and water quality concerns when driven in and around streams. Because these vehicles are very agile and maneuverable, riders tend to stray away from developed roads and trails and into areas that land managers desire to be undisturbed. These actions can be detrimental to various plant and animal communities and offset previous efforts made to conserve and manage these areas.

Because ATV's and other off-road vehicles have such a great potential to cause harm and create disturbance to natural resources and other game land users, their use on CSGL is prohibited.

Other Illegal Activities

Illegal activities include wildlife/plant/artifact/mineral theft, vandalism, drug use, sexual rendezvous, and trash dumping. These activities are monitored by the Enforcement Division of the NCWRC.

Information Needs

Our current state of knowledge about wildlife occurrences on CGL and CSGL is somewhat limited. Our best knowledge is of big game species. Successful big game hunters are required to identify the game land from which they harvest big game during the registration process. Some surveys of songbirds have been conducted but mainly along the rivers and creeks and along a

portion of the Sand Banks Tract. Bobwhite call surveys are conducted in June. The distribution and occurrence of many cryptic taxa such as reptiles, amphibians, and small mammals (including bats) are under-surveyed and their relative distribution and abundance are unknown and misunderstood. It would be appropriate to work closely with the Natural Heritage Program or other entities to develop a biological inventory.

Our current knowledge of game animals is limited, even though we know the number of registered harvested big game species on the game lands. Currently, there are no surveys in place to track changes in population trends of even the most sought after big game animals (deer and turkey). Management practices and regulations should not be based on assumptions, but on the best available data and science.

The following is our current knowledge of our priority species. These priority species were identified because they are game animals that are hunted or trapped on CSGL or CGL or they have a state or federal status. They are either known or thought to occur on this game land. Included in this information are inventory and management needs and research recommendations for the future. The appropriateness of tracking population trends for some wildlife species will be evaluated and appropriate techniques will be identified when it is determined such actions are warranted and only when appropriate levels of staff and finances are available.

The identification of game land hunters (or other users) would allow the NCWRC to generate a general observation survey in which data on the observations of multiple species could be collected by hunters or any game land user interested in recording the requested information. This cooperation of game land users would supplement our survey efforts and potentially reduce workloads required by NCWRC staff to collect this information. Information derived from these surveys coupled with other information collected by field staff will give NCWRC biologists the ability to better estimate and track population trends. This valuable information will help staff determine the best management techniques to implement in order to achieve management goals.

Reports of diseased animals should be investigated and, when possible, attempts will be made to diagnose the cause of infection or cause of death. Also, as specific disease surveillances are conducted (Chronic Wasting Disease, Lymphoproliferative Disease Virus, etc.), game lands will be incorporated into the effort when appropriate.

Non-game Wildlife Species

- ***Birds***

Neotropical Migratory Songbirds

Current Knowledge

The CSGL supports a large number of landbirds throughout the year, many of which are designated as priority species in the 2015 Wildlife Action Plan (Table 8). Moderate to high levels of use in this area has been substantiated during the spring and fall migration periods (La Puma and Buler 2013)(Appendix V) and during the breeding season (NCWRC, unpublished data; Appendix V). To better illustrate the latter, NCWRC biologist floated tributaries in the

Chowan River Basin on May 15, 2012 while surveying for 13 avian species (Table 9). Results suggest that the Prothonotary warbler was the most abundant breeding neotropical species, followed by northern parula and Acadian flycatcher.

Inventory and Monitoring Needs

Many species that regularly breed in the Coastal Plain, including the swamp habitats of CSGL, are not sampled adequately using conventional methods. As a result, the Wildlife Diversity Program's Riparian Breeding Bird Survey (RBBS) was initiated to collect baseline and trend data in these habitats. These efforts should continue as needed. Songbird surveys are conducted on the Sand Banks Tract of CSGL.

Management Strategy

Articles of Dedication designations restrict active management in some areas. Effort should instead focus on land acquisition which will directly benefit area sensitive species, especially the Prothonotary warbler (Sallabanks et al. 2000). No habitat management is directly targeted toward songbirds; however, habitat management directed toward longleaf pine community restoration will benefit early-successional species.

Table 8. 2015 Wildlife Action Plan priority species likely to occur on Chowan Swamp Game Lands.

Common Name	Scientific Name
Acadian flycatcher	*Empidonax virescens*
American kestrel	*Falco sparverius*
Brown-headed nuthatch	*Sitta pusilla*
Double-crested cormorant	*Phalacrocorax auritus*
Kentucky warbler	*Geothlypis formosa*
Louisiana waterthrush	*Parkesia motacilla*
Merlin	*Falco columbarius*
Northern bobwhite	*Colinus virginianus*
Northern harrier	*Circus cyaneus*
Peregrine falcon	*Falco peregrinus*
Prothonotary warbler	*Protonotaria citrea*
Red-cockaded woodpecker	*Picoides borealis*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Rusty blackbird	*Euphagus carolinus*
Swainson's warbler	*Limnothlypis swainsonii*
Yellow-throated warbler	*Setophaga dominica*

Table 9. Species detected on floating bird surveys, May 15, 2012, in the Chowan River Basin. Acadian flycatcher (ACFL), American redstart (AMRE), hooded warbler (HOWA), northern parula (NOPA), Prothonotary warbler (PROW), wood thrush (WOTH), yellow-

breasted chat (YBCH), and Swainson's warbler (SWWA). Additional target species not detected = Mississippi kite, swallow-tailed kite, bald eagle, cerulean warbler, and Kentucky warbler.

Route	ACFL	AMRE	HOWA	NOPA	PROW	WOTH	YBCH	SWWA
Upper Chowan River	10	7	0	63	43	0	1	1
Lower Chowan River	26	4	0	135	135	0	2	0
Bennetts Creek	11	0	2	37	152	1	2	2
Total	47	11	2	235	330	1	5	3

Research Needs

No research needs are currently warranted within CSGL or CGL. However, monitoring efforts may present opportunities to assist with answering specific questions and conducting hypothesis-driven research in the future.

Red-cockaded Woodpecker (RCW)

Current Knowledge

Chowan Swamp Game Land is not considered a part of the Mid-Atlantic Coastal Plan Recovery Populations but may serve a restricted role in benefitting the Northeast North Carolina/Southeast Virginia Essential Support population. RCW's have been observed foraging in thinned pine stands on the CSGL.

Inventory and Monitoring Needs

An effort should be made to annually check on the status of the known active RCW cluster in Gates County. Furthermore, landowners should be made aware of the RCW Safe Harbor Program.

Stands that meet the RCW Recovery Plan's (USFWS 2003) criteria should be routinely surveyed for cavity trees. This includes:

1. Pine and pine-hardwood stands over sixty (60) years of age;
2. Pine and pine-hardwood stands under sixty (60) years of age containing scattered or clumped pine trees over sixty (60) years of age;
3. Hardwood-pine over sixty (60) years of age adjacent to pine and pine-hardwood stands over thirty (30) years of age; and
4. Pine stands containing saw timber, including stands thought to be generally less than sixty (60) years of age but containing scattered or clumped trees over sixty (60) years of age.

Safe Harbor Program

The RCW Safe Harbor Program was developed to address both the conservation needs of the RCW in the state of North Carolina and the concerns of non-federal property owners who may

be fearful of the presence of an endangered species on their land. The program's two primary objectives are to: 1. protect property owner's rights and 2. maintain or increase the number of RCW groups on non-federal land.

The NCWRC can enroll a property owner under a management agreement if that property owner agrees to maintain or implement a forest management strategy or plan on the enrolled property that would provide foraging and/or nesting habitat for RCWs. In general, this would entail increased timber harvest rotations, uneven-aged silvicultural treatments, and/or the integration of other management activities (e.g., burning or hardwood control), which are necessary to maintain the open, mature pine forests preferred by RCWs.

Any non-federal property owner with land that currently is, or that has the potential to be, an upland pine environment and who is willing to provide a conservation benefit to RCWs may enroll. More information on the Safe Harbor Program can be found on the NCWRC website at www.ncwildlife.org/rcwsafeharbor.

Management Strategy

All land management techniques and practices that may impact RCW habitat should follow the recommendations provided by Part I, Section 3 of the U.S. Fish and Wildlife Service's RCW Recovery Plan (2003:71-117). Restoration of long leaf pine habitat, including prescribed fire, has been shown to benefit other species (Taillie et al. in review) and should be implemented where appropriate on a continual basis.

If and when it is determined that artificial RCW cavities are justified, each cluster should have a minimum of four (4) suitable cavities.

Research Needs

Due to limited occupancy, no RCW research needs are currently warranted within Chowan Swamp Game Lands. However, opportunities should be evaluated as habitat conditions evolve.

Bald Eagle

Current Knowledge

Bald eagles are commonly sighted on the game lands. Many times they can be seen perched in a tree overlooking the Chowan River. Statewide, eagle populations have been recovering since a ban on the agricultural insecticide DDT was instituted in 1972. In 1982, the NCWRC started the North Carolina Bald Eagle Project and released 29 juvenile eagles between 1983 and 1988 from artificial nests near Lake Mattamuskeet. In 1984, the first North Carolina post-DDT ban eagle nest was documented near the lake.

Inventory and Monitoring Needs

Observations of nests or suspected nesting activity should be reported to the Wildlife Diversity Section. When aerial surveys are conducted for wading birds, eagles should also be documented.

Management Strategy

Management practices that would benefit bald eagles include the protection of forested swamplands.

Research Needs

There are currently no known research needs.

- ***Mammals***

Rafinesque's Big-eared Bat

Current Knowledge

Rafinesque's big-eared bat is a non-migratory bat that uses the floodplain forest on the game lands as roost sites and foraging areas. Hollow trees are probably the most preferred roosting and hibernating sites. Unlike many other bat species that are crepuscular, this bat species is nocturnal. They are insectivores and are moth-specialists. They are considered "Threatened" in North Carolina.

Management Strategy

Protection of the tidal and floodplain forests should continue.

Inventory and Monitoring Needs

Although no positive case of White Nose Syndrome (WNS) has been reported in Rafinesque's big-eared bats in North Carolina, NCWRC staff and game land users should report any cases of a white fungus on the nose of bats to the NCWRC.

Research Needs

Research should be focused to determine seasonal roost site selection and specific maternity sites.

Southeastern Myotis

Current Knowledge

Southeastern myotis use the floodplain forest and mesic sites near water on the game lands. Roost sites include tree crevices and at times buildings. They can be found hibernating in small colonies in the winter. The Southeastern myotis is listed as a species of "Special Concern" in North Carolina.

Management Strategy

Protection of the floodplain and mesic forests should continue especially in areas near swamps and open water as these bats prefer to forage over water.

Inventory and Monitoring Needs

Although no positive case of White Nose Syndrome (WNS) has been reported in Southeastern myotis' in North Carolina, NCWRC staff and game land users should report any cases of a white fungus on the nose of bats to the NCWRC.

Research Needs

There are currently no known research needs.

Star-nosed Mole

Current Knowledge

The star-nosed mole is not known to occur on the CSGL or CGL however, the species is predicted to occur on CGL, according to the North Carolina Gap Analysis Project (McKerrow et al. 2006). The coastal habitats for star-nosed moles include pocosins, wetlands, and saturated bottomlands. Neither forest age nor successional stage has been reported as a critical factor determining habitat suitability for this species (Laerm et al. 2007). This coastal plain population in North Carolina is listed as a species of "Special Concern".

Management Strategy

Not enough data currently exist to make detailed management recommendations at this time. However, we believe that protection and management of the previously mentioned habitats are suitable actions for management of star-nosed moles.

Inventory and Monitoring Needs

Observations should be reported to staff or recorded on the NCWRC's online Wildlife Observation Application to document occurrences and/or range expansion for this species.

Research Needs

There are currently no known research needs.

- ***Amphibians and Reptiles***

The distribution of herps in northeastern North Carolina is less studied than in other parts of the state. The only state or federally listed species of herps that potentially could exist on the game land are the four-toed salamander and the timber rattlesnake, each will be covered below. Other non-listed state or federally listed North Carolina Wildlife Action Plan priority species of amphibians and reptiles may exist at CSGL or CGL. The distribution and abundance of WAP Priority turtles, such as the spotted and redbelly, more cryptic species of amphibians, such as the greater and lesser siren, and snakes is unknown through the game land. The newly described Atlantic Coast leopard frog, *Rana kauffeldi*, has been discovered in states to the north with a possible range from Connecticut to North Carolina. Call surveys would be helpful to determine if this species occurs on the game lands.

Any inventory of herps on the game land should be coordinated through the Wildlife Diversity Program of the NCWRC pending available staffing and funding. Observations should be reported to staff or recorded on the NCWRC's online Wildlife Observation Application to document occurrences and/or range expansion for priority species. Surveys targeted at Wildlife Action Plan priority amphibian and reptile species could help determine distribution on these species on game lands.

Management Strategy

No specific management activity is being prescribed strictly for the conservation of amphibians and reptiles, mainly due to the lack of understanding of the species occurrence on the game lands. As upland loblolly pine plantations are converted to longleaf pine habitat communities and fire is reintroduced into the ecosystem, conditions should improve to benefit many in this suite of species. Introducing fire back into the vernal pools, small depression wetlands, and nonalluvial mineral wetlands should improve breeding habitat.

Wildlife Enforcement should monitor suspicious activities on the game lands as some species of herps are targeted by collectors for the illegal pet trade.

Inventory and Monitoring Needs

Any inventory of herps on the game land should be coordinated through the Wildlife Diversity Program of the NCWRC pending available staffing and funding. Observations should be reported to staff or recorded on the NCWRC's online Wildlife Observation Application to document occurrences and/or range expansion for priority species. Surveys targeted at Wildlife Action Plan priority amphibian and reptile species could help determine distribution on these species on game lands.

Research Needs

There are currently no known research needs.

Four-toed Salamander

Current Knowledge

Four-toed salamanders are not currently known to occur on CSGL or CGL but are known to occupy habitats found on these properties. They generally occur in forests surrounding swamps, bogs, marshes, and ephemeral ponds that are free of fish. Their distribution throughout North Carolina is patchy. Four-toed salamanders are of special concern in North Carolina.

Management Strategy

This species of salamander requires shallow, still, and fishless ephemeral ponds for reproduction. Therefore, management techniques to maintain or enhance these ponds should be practiced.

Inventory and Monitoring Needs

A cooperative biological inventory should be conducted with the assistance of the Natural Heritage program to explore and update the vertebrate communities on CSGL. Any inventory of herps on the game land should be coordinated through the Wildlife Diversity Program of the NCWRC pending available staffing and funding. Observations should be reported to staff or recorded on the NCWRC's online Wildlife Observation Application to document occurrences and/or range expansion for this species.

Research Needs

There are currently no known research needs.

Timber (Canebrake) Rattlesnake

Current Knowledge

Timber rattlesnakes are not known to occur on CGL or CSGL, although habitat is suitable on CSGL. In the Coastal Plain, their use of habitat varies from pocosins to pine woodlands. They primarily feed on small rodents but adults are capable of consuming small rabbits and squirrels. They are a long lived species with recorded lifespans of up to 28 years in captivity. Declining trends in populations can be attributed to loss of habitat, wanton killing, road kills, and poaching. Timber rattlesnakes are listed as a species of "Special Concern" in North Carolina.

Management Strategy

Protection and management of upland forest communities will benefit timber rattlesnakes. Techniques include maintaining open canopies of forested areas and the use of prescribed fire. Management of early-successional habitat for small game will also prove beneficial for this species.

Inventory and Monitoring Needs

Observations should be reported to staff or recorded on the NCWRC's online Wildlife Observation Application to document occurrences and/or range expansion for this species.

Research Needs

There are currently no known research needs.

- ***Fish***

Anadromous Fish

Current Knowledge

The CSGL and CGL are located in one of the most important river basins for anadromous fishes in North Carolina. Each spring, blueback herring, alewife, striped bass, American shad, hickory shad and white perch migrate up the Chowan River to spawn. Many streams bordering the game

lands are designated as Anadromous Fish Spawning Areas (North Carolina Division of Marine Fisheries 2015).

River herring have experienced coast wide declines in abundance over the last two decades and are now at all-time low population levels. A combination of many factors, including recreational and commercial fishing as well as habitat loss and degradation, has led to the river herring decline on the Atlantic coast (Atlantic States Marine Fisheries Commission 2009). Current harvest moratoria are designed to protect river herring stocks and may result in increases in abundance.

Management Strategy

Habitat improvements in tributary streams may also facilitate local increases in spawning populations. Impediments to fish migration within streams on CSGL should be identified and removed to facilitate access to spawning habitat. These impediments may include beaver dams, severe log jams or culverts that restrict fish access. Culvert replacement projects should consider improvements to fish passage.

Inventory and Monitoring Needs

Division of Inland Fisheries staff periodically conduct fish sampling in the vicinity of the CSGL. The majority of the sampling is conducted on the Chowan River mainstem, Bennetts, and Sarem Creek which borders part of the game lands.

Research Needs

Currently, NCWRC Inland Fisheries staff, in cooperation with USFWS Edenton National Fish Hatchery, is studying site fidelity of spawning blueback herring in Indian Creek, Bennetts Creek, and Sarem Creek. This study involves collecting brood stock from each of the creeks, marking the fry, collecting genetic samples, and releasing the fry back into the creeks where the parents were collected. This multiyear project hopes to determine whether the fry returns to the same creek to spawn where their parents were collected to spawn.

Catadromous Fish

Current Knowledge

American eel is the lone catadromous fish found in North Carolina. Catadromous fishes spawn in marine environments but migrate as juveniles to freshwater habitats where they grow and mature. It is likely that American eel are also utilizing stream habitats within CSGL and CGL, but sampling data are not available.

Management Strategy

Habitat improvements in tributary streams may benefit eel populations. Impediments to fish migration within streams on the game land should be identified and removed. These

impediments may include beaver dams, severe log jams or culverts that restrict fish access. Culvert replacement projects should consider improvements to fish passage.

Inventory and Monitoring Needs

There are currently no known monitoring needs on the game land.

Research Needs

There are currently no known research needs for the game land.

Aquatic Diversity

Current Knowledge

The CSGL harbors numerous NCWAP priority aquatic species, including fishes (4), freshwater mussels (6), and crayfish (1). Table 10 lists NCWAP priority aquatic species that are known or suspected to live in waterways on or adjacent to CSGL or CGL. Most of these species typically inhabit the Chowan River; however, some species (e.g., Banded Sunfish) inhabit smaller tributaries and swamps.

Inventory and Monitoring Needs

Division of Inland Fisheries staff periodically conduct aquatic diversity sampling activities in the vicinity of the CSGL. These activities should continue as needed.

Management Strategy

Culvert replacement projects should consider improvements to allow for aquatic organism passage. Protection of waterways from sedimentation by maintaining forested riparian corridors and minimizing sedimentation and erosion from roads, firelines, and other soil disturbance activities.

Research Needs

A distributional survey for Bridle Shiner is being developed. Bridle Shiners are known from one location in the Chowan River basin, but not currently known on the game lands. Other surveys for fishes, freshwater mussels, and crayfish will be based on available funding and staffing capabilities.

Table 10. Aquatic non-game species found on the CSGL or in the Chowan River. See Appendix VI for Status and Ranking descriptions.

Taxonomic Group	Scientific Name	Common Name	NC Status	US Status	NC Ranking	US Ranking
Fish	Enneacanthus obesus	Banded Sunfish	SR	-	S3	G5

Fish	Fundulus diaphanus	Banded Killifish	-	-	-	-
Fish	Moxostoma pappillosum	V-Lip Redhorse	-	-	-	-
Fish	Notropis chalybaeus	Ironcolor Shiner	-	-	-	-
Mussel	Alasmidonta undulata	Triangle Floater	T	-	S2	G4
Mussel	Anodonta implicata	Alewife Floater	T	-	S1	G5
Mussel	Lampsilis cariosa	Yellow Lampmussel	E	-	S1	G3G4
Mussel	Lampsilis radiata	Eastern Lampmussel	T	-	S1S2	G5
Mussel	Leptodea ochracea	Tidewater Mucket	T	-	S1	G3G4
Mussel	Ligumia nasuta	Eastern Pondmussel	T	-	S1	G4
Crayfish	Orconectes virginiensis	Chowanoke Crayfish	SC	FSC	S3S4	G3

Game Species

White-tailed Deer

Current Knowledge

White-tailed deer (*Odocoileus virginianus*) is the most abundant big game species on the game land with Bertie and Hertford county deer densities averaging 45 or more deer/mi^2 and Gates County deer densities ranging from 30-44 deer/mi^2 (North Carolina Wildlife Resources Commission 2015). Deer hunting on CSGL and CGL follows the eastern deer season and hunting is allowed 6 days per week. During the Archery Only Season, hunters can hunt any day except Sundays. Deer hunting with the use of dogs is very popular as most of the tracts were in hunting leases with a long history of hunting with hounds prior to state acquisition. The discussion below excludes the CGL and the Bertie County tract on CSGL due to low harvest on those areas.

Based on 2011-2013 averages, the total reported deer harvest per square mile on CSGL was markedly lower than both Gates and Hertford County harvest (all lands includes both private and public lands; i.e., all huntable lands) (Fig. 20). Several factors can influence these numbers including large number of acres on the game lands not accessible to hunters and many of the Tidal Swamp Forest habitats do not support the estimated deer densities for the counties. As a result, most of the deer hunting occurs on the more accessible tracts that contain more upland habitats and the harvest is skewed to those portions of the game land. Antlered buck harvest per

square mile was lower on the game land compared to county averages but falls within statewide management goals of harvesting at least 1 buck/mi^2 (Fig. 20 and Fig. 21).

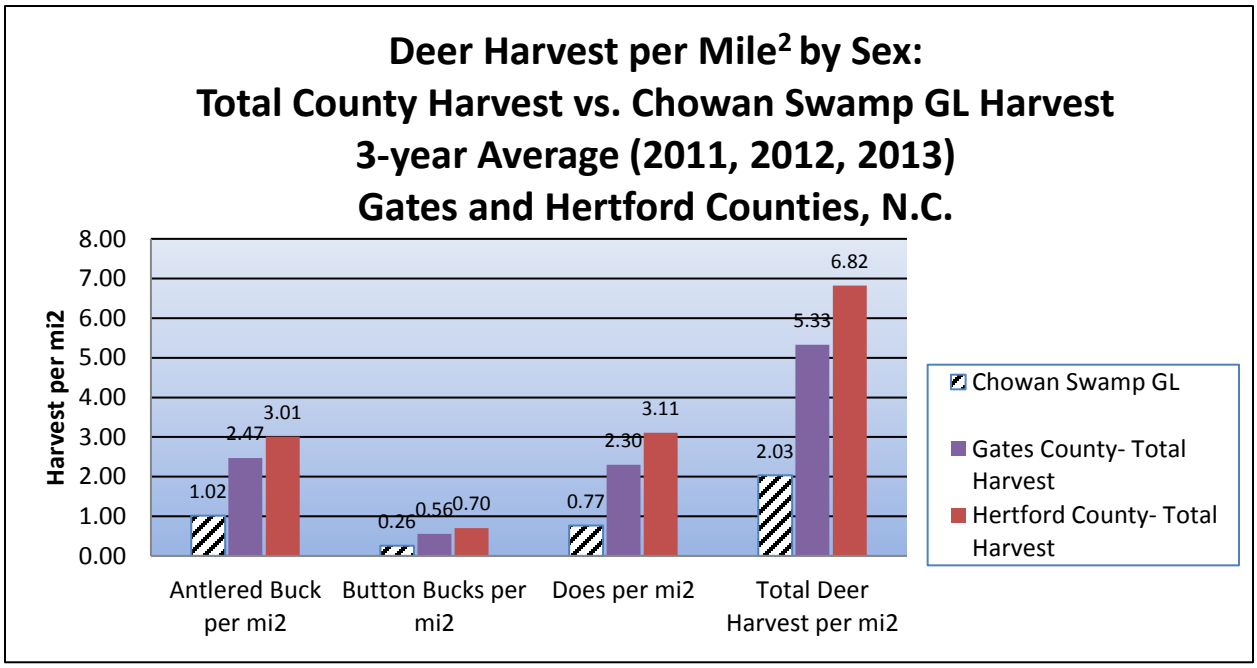

Fig. 20. Game land and county deer harvest per square mile.

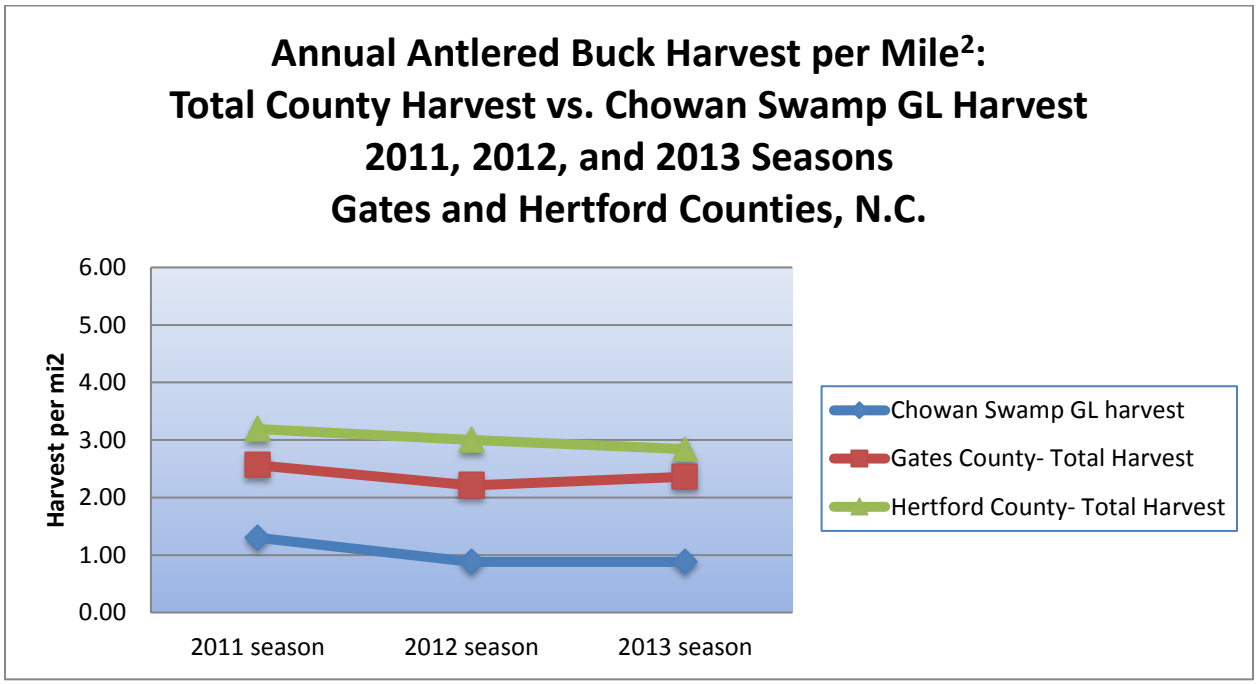

Fig. 21. Game land and county antlered buck harvest per square mile.

The deer harvest on the game land is composed of a higher percentage of male deer (includes button bucks) when compared to Gates and Hertford counties registered harvest (Fig. 22). This

data is gathered from the big game harvest reporting system which can provide for a consistent index of harvest over time. The reasons for the difference in hunter selection between private lands and game lands may vary. Yearling buck movement may increase the buck's chances of being seen and therefore harvested, game land users may be content harvesting any antlered deer and not pass up the smaller bucks, or private land hunters/clubs may have adopted antler restrictions therefore reducing harvest mortality on the younger bucks.

WRC deer management goals include having a total harvest comprised of at least 50% does. The doe harvest per square mile was also lower on the game land compared to Gates and Hertford counties (Fig. 20). Doe harvest on CSGL average 38% (Fig. 22). This level of harvest not reaching statewide goals is acceptable as CSGL game land tracts are thought to have lower deer densities than private lands in the counties.

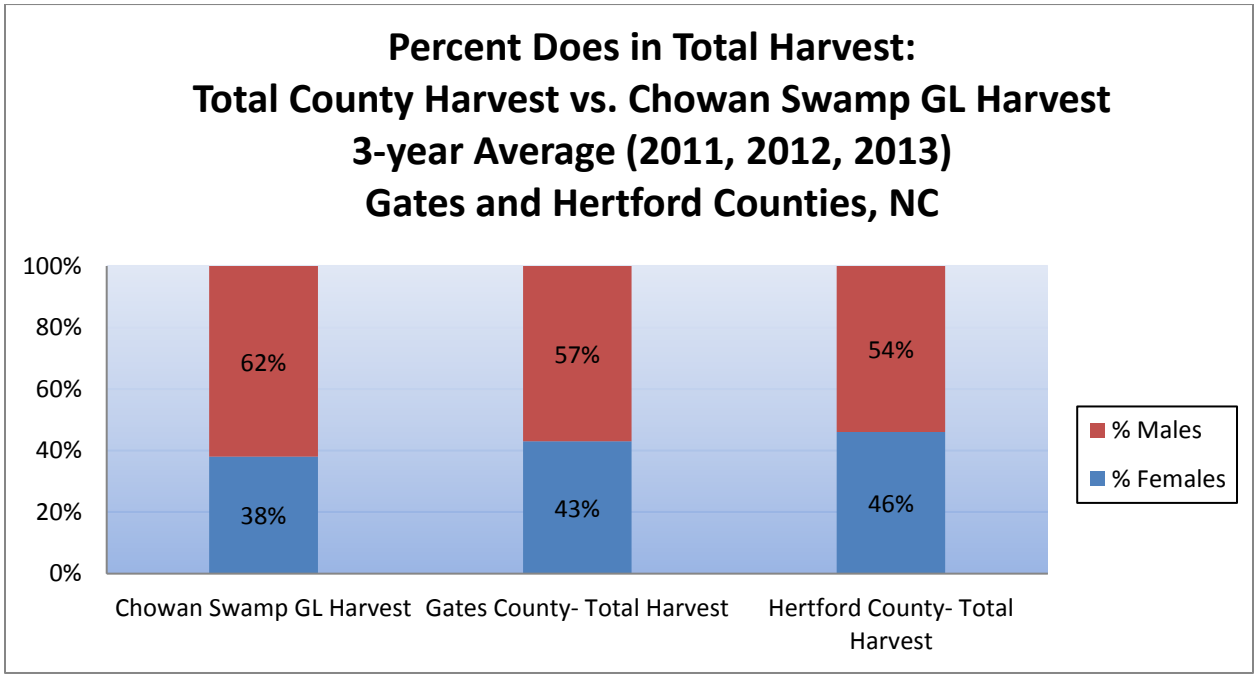

Fig 22. Percent deer harvest by sex.

Inventory and Monitoring Needs

Based on an evaluation of registered harvest and limited biological data, deer harvest levels and harvest composition on CSGL likely represent more "traditional" deer hunting activities (e.g., low selectivity by hunters, focus on antlered deer, etc.). Staff will continue investigating whether other methods may better assist in monitoring and managing the deer population trends on the game lands.

The NCWRC could implement a jawbone/biological data mail survey and/or mail surveys that estimate hunter effort on CSGL that could provide an index of changes in the harvest over time. Baseline information should be collected for deer densities and/or population trends. These data could be collected via forward looking infrared (FLIR), spotlight, and camera trap surveys. Staff should continue to develop ways of annually collecting biological data from deer taken from the game land that will allow monitoring of the deer harvest over time while at the same time

contributing to NCWRC statewide and local biological data collection goals. Biological data collection should also be collected from private land harvest to compare to game land harvest. Collection of biological data from hunter harvested deer on and off the game land is extremely labor intensive and should occur opportunistically and as funding and staffing allows. More biological data must be collected on both the game land and private land in order to use age and sex data to guide deer management actions.

Staff should continue to investigate reports of diseased animals. When a diseased animal is reported on the game land, attempts will be made to diagnose what disease process is occurring. Also, as disease surveillance is conducted, the game land will be incorporated into the surveillance effort when appropriate.

Management Strategies

As a habitat generalist, white-tailed deer will benefit from the continuation of current land management practices. NCWRC will continue to manage the game lands in a manner that supports a wide array of wildlife species. Timber management with an objective to convert loblolly pine plantations into longleaf pine forest with site appropriate herbaceous and shrub understory should increase habitat quality for deer. Oaks and other mast producing hardwoods will be retained in appropriate sites and replanted in areas that are not conducive to burning. Annual food plots will be considered where it is feasible to grow a crop.

Deer management recommendations for the game land to meet the parameters for a well-managed deer herd set by the ad hoc deer evaluation tool are only possible if collection of biological data is increased. Management parameters addressed in the ad hoc deer evaluation tool include:

- "Harvest of at least 1.0 antlered buck/mi2…."
- "Total harvest comprised of at least 50% does".
- "Total adult doe harvest (excluding fawns) is comprised of 30-35% yearling does (1.5 years old)".
- "Total antlered buck harvest (excluding button bucks) is comprised of no more than 30% yearling bucks (1.5 years old)".

CSGL deer harvest does not meet all the goals set for statewide deer herd goals. Hunters are harvesting at least 1.0 antlered buck/mi^2 (1.02 bucks/mi^2). Hunters of CSGL are not harvesting does at a rate to reach the goal of at least 50% of harvest should be comprised of does (38% of 3-year average 2011-2013 for CSGL)(Fig. 22). This harvests rate is acceptable on a 6 day a week game land where hunters are able to harvest any legal deer. NCWRC staff continuously receive comments that there are not the deer on the game land as there were historically. Figure 23 reports registered deer harvest on CSGL from 2004-2013. These numbers can only be used as an index through time as they do not consider deer densities, hunter effort, hunter selectivity, habitat changes, or hunting methods. The sharp increases in harvest in the mid 2000's are correlated to the addition of new tracts of land into CSGL. The rise in harvest also likely represents a reduction in hunter selectivity by former hunt clubs that, after state ownership of the land, are more likely to shoot any legal deer instead of letting smaller bucks go or limiting doe harvest. At

this time, management recommendations are to maintain the current hunting structure until better data is gathered.

Research Needs

No known research needs at present.

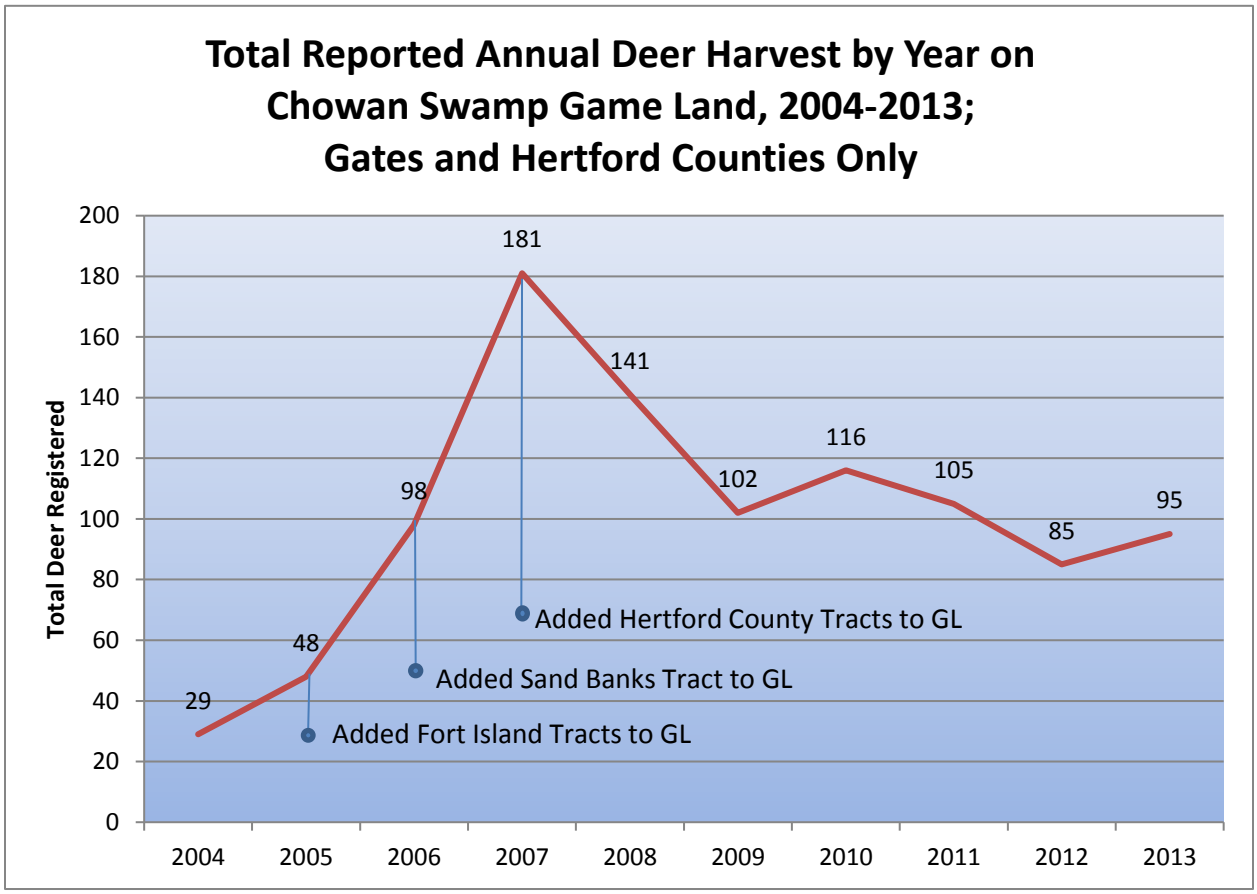

Fig. 23. 10 year total reported deer harvest for Chowan Swamp Game Land.

Eastern Wild Turkey

Current Knowledge

The Chowan River basin, mainly in Hertford County, and the Mapleton Tract in particular, was a source of birds used for the statewide turkey restoration effort. CSGL tracts generally consist of a mix of bottomland hardwoods, managed upland forest stands, hardwood drains, and roads and trails used as brood habitat. These areas provide good numbers of turkeys for public hunting, as well as contributing locally to turkey flocks using surrounding private lands.

The game land harvest per square mile may appear low (Fig. 24) relative to the harvest on private lands in Gates and Hertford counties, however, most of the game land turkey hunting probably occurs in the upland portions of the game land. Intensively managed upland areas compose only a small percentage of the game land as the majority of the acreage is in Tidal

Swamp Forests, so the harvest per square mile of upland areas is likely much higher. The same reasoning exists with the turkey harvest as it did with the deer harvest; a large portion of CSGL is not considered accessible or not considered turkey habitat, therefore skewing the data resulting in lower harvest rates. Turkeys do roost on the fringes of the Tidal Swamp Forest where adjacent to uplands or drier bottomlands.

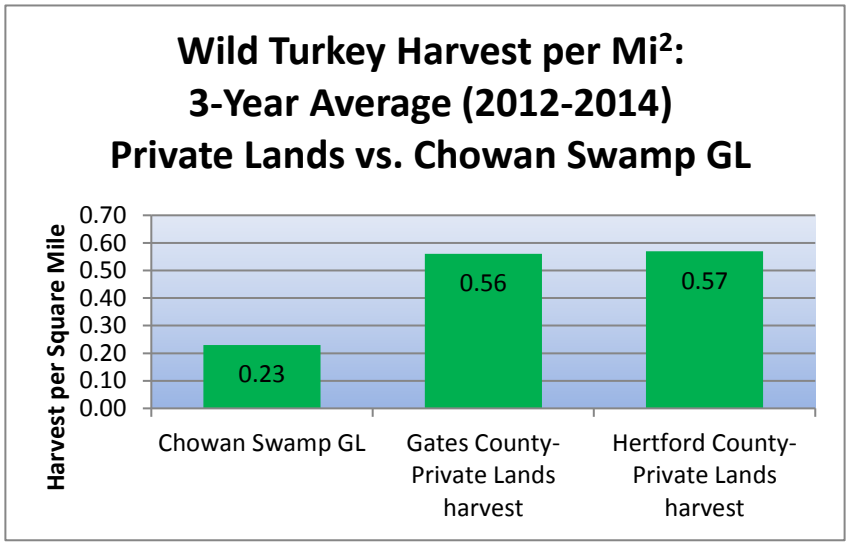

Fig. 24. Wild Turkey harvest per square mile.

Inventory and Monitoring Needs

Currently, there are no baseline data for turkey abundance on the game land. Several options are available to gather these data. One that could be utilized could be the direct observation by chance encounters similar to the Wild Turkey Summer Observation Survey, a turkey hunter observation survey, and/or a deer hunter survey. Another could be gobbling bird point counts.

Staff should continue to investigate reports of diseased animals. When a diseased turkey is reported on the game land, attempts will be made to diagnose what disease process is occurring. Also, as disease surveillance is conducted, the game land will be incorporated into the surveillance effort when appropriate.

Management Strategy

A turkey goal for CSGL is to maintain spring gobbler hunting opportunities on the game land. Timber thinning, restoration of groundcover with native warm season grasses and forbs, and prescribed burning should increase nesting and brooding habitat quality. Smaller established oak patches in stands will be retained and mast producing hardwoods will be planted in areas not conducive to prescribed fire. Most roads and trails will not be mowed until the fall providing excellent bugging areas for growing poults. Continued habitat management on the game land, particularly for quality brood habitat and nesting habitat, will play a key role in maintaining annual turkey numbers on the game land.

The NCWRC has partnered with the North Carolina Chapter of the National Wild Turkey Federation on a Groundcover Restoration Project to replace lost nesting and brooding habitat due to decades of pine fiber production. The NCWRC is also experimenting with planting native warm season grass plugs when replanting longleaf pine seedlings followed by a forb seeding the following spring. With both of these approaches, the NWCRC hopes to accelerate vital early-successional habitat establishment to reach habitat restoration goals.

Establishing baseline data and detecting population trends will assist in management decisions on whether to continue with the hunting structure or explore options to reduce hunting pressure on turkeys to maintain a quality hunting experience.

Research Needs

No known research needs at present.

American Black Bear

Current Knowledge

The vast tidal swamps and floodplain forest on CSGL has supported bears since the 1970's (North Carolina Wildlife Resources Commission 2012). The large undeveloped areas of the Chowan Swamp Bottomlands act as a semi de facto bears sanctuary as hunters find it extremely difficult to hunt bears in the nearly impenetrable swamps. Large diameter hollow bald cypress scattered throughout the swamps and along the creeks and rivers offer important denning sites. CSGL, due to its dense and roadless bottomland areas, provide both travel corridors and a critical "source" of bears for adjacent private lands where hunter access and hunting pressure is greater.

CSGL offer good bear hunting opportunities. The 10 year average (2004-2013) annual bear harvest from the game land is 6.4 bears (Fig. 25). The bear harvest in Hertford County has continued to increase over the last 10 years, due in part to 3 full weeks of bear season beginning in 2010 (Fig. 25).

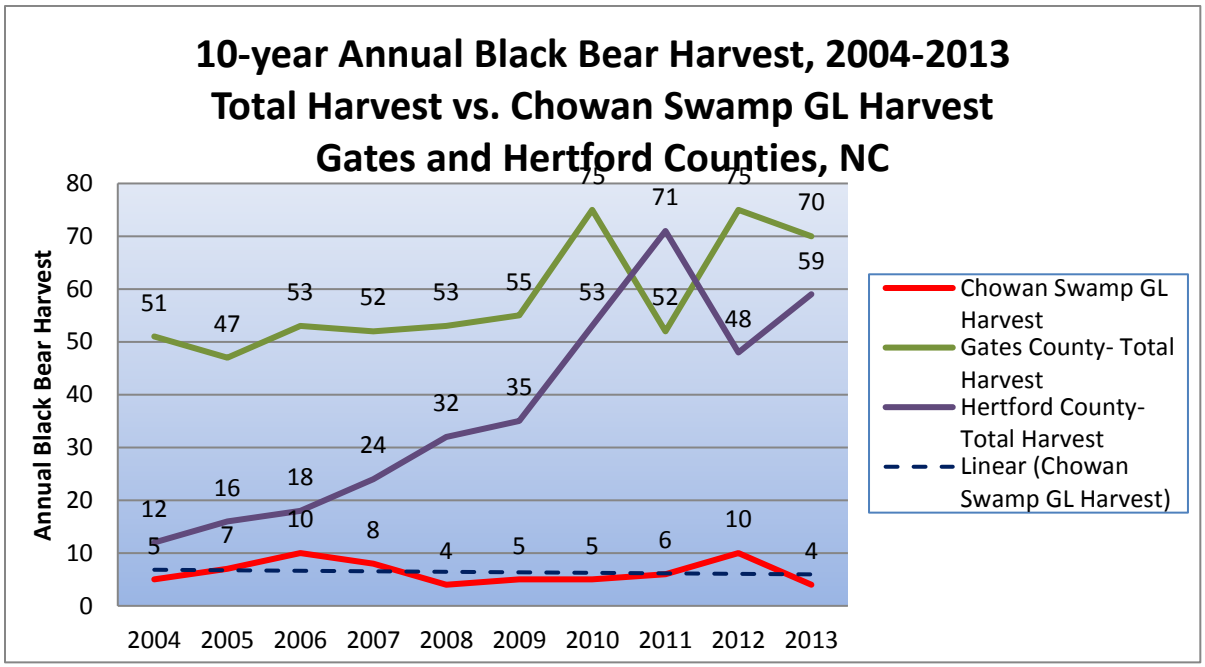

Fig. 25. Bear harvests in Gates County, Hertford County, and CSGL.

Hunters are harvesting a disproportionate number of female bears on CSGL compared to county harvest (Fig. 26). The percent of females in the game land harvest is high and likely due to low selectivity to harvest any legal bear. Hertford County's percent female harvest is typically higher than many other areas, possibly due to landowner desires to remove bears to reduce crop depredation issues and bear hunters access to land depends on the number of bears being taken. Caution must be used when comparing game land black bear harvests to adjacent county harvests due to the low sample size.

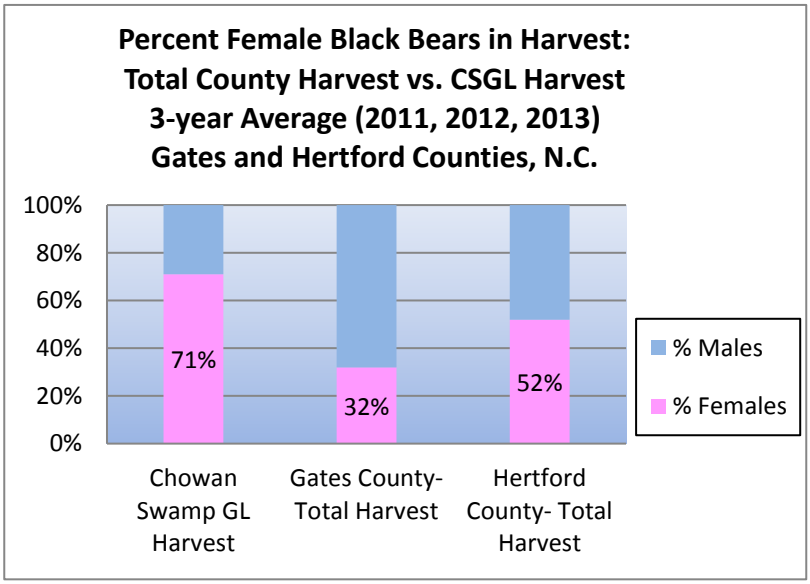

Fig. 26. Percent female harvest of black bears.

Inventory and Monitoring Needs

Inventory and monitoring should be considered on an as needed basis. Registered harvest data will allow NCWRC to tract trends over time. Harvest data collection should continue as NCWRC uses age, location of harvest, and sex of the bear in bear unit management decisions.

Management Strategy

Bears on the game land should be managed following the guidelines outlined in the NC Black Bear Management Plan (NCBBMP) available to the public on the NCWRC website. The NCWRC's management of CSGL using varied hunting regimes allows ample opportunity to hunt the limited number of bears on the more accessible tracts while providing bear hunting opportunities to the more remote tracts the entire season.

Many studies have concluded that black bear habitat preferences are simply a function of food. Therefore, any land management practices to improve/sustain food availability (soft and hard mast) will benefit black bears. Maintaining travel corridors, timber management, and introducing prescribed fire to upland sites will enhance/maintain habitat for black bear. Black bears move extensive distances during certain times of the year. It is important for movement to occur between the various subpopulations of bears across the state to help maintain bear numbers and genetic diversity. Corridors can also assist in reducing human-bear interactions by decreasing the proximity of traveling bears to human development. Large hollow trees, such as cypress and tupelo, should not be removed, as they serve as potential bear den sites.

Continued acquisition of adjacent lands would support efforts to meet the NCBBMP objective 4, strategies 3, 4, 5, and 6 listed below (North Carolina Wildlife Resources Commission 2012).

- 3. Identify, acquire, and maintain property that would provide habitat for black bears.
- 4. Identify key movement corridors and work, either through acquisition, easements, or agreements, to conserve these areas.
- 5. Identify game lands that can be managed to create or maintain bear habitat and bear travel corridors.
- 6. Support habitat management practices that benefit bear management objectives on both private and public lands.

Research Needs

No known research needs at present.

Furbearers

Current Knowledge

Overall, furbearers are thought to be "common" on CSGL. Hunting opportunities exist for bobcat, fox, coyote, opossum, and raccoon. Trapping opportunities exist for beaver, bobcat,

coyote, opossum, raccoon, river otter, mink, muskrat, nutria, and long-tailed weasel. Fox trapping is not allowed by local law in Bertie Hertford County.

Inventory and Monitoring Needs

Inventory and monitoring should be considered on an as needed basis. Scent stations and track counts could be used for some species.

Management Strategy

Maintain current trapping season to allow for trapping opportunities and the harvest of surplus furbearers. Continue current land management techniques to benefit furbearers in each habitat type.

Encourage trappers to utilize the game lands.

United States Department of Agriculture-Wildlife Services, NCWRC staff, and Animal Damage Control Agents may be required to remove beaver from sites impacting infrastructure or significant timber resources.

Research Needs

No known research needs at present.

Gray Squirrel

Current Knowledge

Gray squirrels are a common small game species on the game land. Gray squirrels inhabit numerous forest types, although they are most abundant in hardwood forests containing a variety of mast-producing trees.

Inventory and Monitoring Needs

There are currently no inventory and monitoring needs but they should be considered on an as-needed basis.

Management Strategy

Current hunting opportunities should be maintained. Maintaining mature forest types on the game land will provide for the habitat needs of squirrels.

Research Needs

There are currently no known research needs.

Eastern Cottontail Rabbit and Marsh Rabbit

Current Knowledge

Eastern cottontail rabbits and marsh rabbits occur on the CSGL in thinned stands, regenerated clear-cuts, in transition zones between uplands and wetter drains where shrubs, grasses, and forbs dominate. Briar patches, brush piles, and other dense vegetation are needed for escape cover. Interspersion of different cover types is ideal for rabbits.

Inventory and Monitoring Needs

There are currently no inventory and monitoring needs but they should be considered on an as-needed basis.

Management Strategy

Current hunting opportunities should be maintained. Land management techniques that provide brushy cover will be beneficial for rabbits. These include thinning and burning of pine communities, early-successional habitat management, and the creation and/or protection of brush piles and briar thickets.

Research Needs

Northern Bobwhite Quail

Current Knowledge

Northern bobwhite quail inhabit early-successional habitat found in forest communities with open canopies and an herbaceous understory. Transitional areas found between community types are critical for quail, especially areas between upland sites and linear openings such as roads, trails, and logging skid trails. The amount of area considered suitable quail habitat continues to increase through timber stand improvements. Quail numbers on the game land are extremely low.

Inventory and Monitoring Needs

Call counts should continue to index changes in bobwhite occurrences on the Sand Banks Tract.

Management Strategy

Current hunting opportunities should be maintained. Existing land management practices should continue to provide suitable habitat with an emphasis on improving the quality and acreage of early-successional habitats.

Research Needs

There are currently no known research needs.

Webless Migratory Birds

Current Knowledge

Woodcock may be found in the hardwood drains. Limited dove hunting opportunities exist as open areas to support dove fields are not present on CGL or CSGL. Regenerating clear cuts may provide the best habitat for doves on CSGL.

Inventory and Monitoring Needs

There are no inventory or monitoring needs known.

Management Strategy

No management will specifically target webless migratory birds. Woodcock habitat will be managed opportunistically through prescribed fire and timber harvests in appropriate sites.

Research Needs

There are currently no known research needs.

Waterfowl

Current Knowledge

Waterfowl use on the CSGL and, to a limited degree CGL, is primarily dependent on beaver ponds, creeks, rivers, and open swamp pockets. Common species observed include wood duck, mallard, black duck, and hooded merganser.

Inventory and Monitoring Needs

There are no inventory or monitoring needs known.

Management Strategy

Beaver ponds should be maintained where appropriate. Most of the swamp habitats are protected by Articles of Dedication Agreements and active management in these sites are limited. Wood duck nesting boxes are placed in several creeks by the NCWRC, the Alton Turner Gates County Ducks Unlimited, and private individuals. These boxes should be maintained to supplement natural tree cavities.

Research Needs

There are currently no known research needs.

Financial Assets and Future Needs

The financial assets of the CSGL include a variety of assets in the form of infrastructure, personnel, vehicles, and heavy equipment. It should be noted that the large majority of these assets are also used to manage other game lands in the Northern Coastal Ecoregion and some

assets, including personnel, are periodically used in other areas of North Carolina where they may be needed by the NCWRC to achieve management objectives in those areas.

Equipment and other asset needs are evaluated annually and operating budgets are allocated annually based on these equipment needs, upcoming projects, the costs of normal operations, and the availability of funds. The financial report below in Table 11 is an estimate based on existent infrastructure and habitat maintenance and future infrastructure development. The figures use the 2005-2014 10-year average Consumer Price Index annual inflation rate of rate of 2.28%.

Table 11. Financial Summary of Activities for the CSGL and CGL.

Chowan Swamp Game Land and Chowan Game Land																
Financial Summary of Activities																
Habitat Activities																
Project	**Description**	**Activity**	**Quantity**	**Unit**	**Unit Cost**	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Total**
H	Vegetation Control	Prescribe burning	800	ac	$ 30	24000	24547	25107	25679	26265	26864	27476	28103	28743	29399	$ 266,183
H	Herbaceous Seeding	Seed or maintain	10	ac	$ 175	1750	1790	1831	1872	1915	1959	2003	2049	2096	2144	$ 19,409
H	Firebreaks	Maintain firebreaks	4	mile	$ 525	2100	2148	2197	2247	2298	2351	2404	2459	2515	2572	$ 23,291
															Subtotal	**$ 308,883**
Operation and Maintenance Activities																
Project	**Description**	**Activity**	**Quantity**	**Unit**	**Unit Cost**	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Total**
O & M	Road and Trails	Maintain gates	58	gate	$ 100	5800	5944	6091	6242	6397	6556	6718	6885	7056	7231	$ 64,920
O & M	Road and Trails	Maintain road	42.5	mi	$ 2,500	106250	108885	111585	114353	117189	120095	123073	126125	129253	132459	$ 1,189,267
O & M	Road and Trails	Maintain trail	16.5	mi	$ 2,500	41250	42273	43321	44396	45497	46625	47781	48966	50181	51425	$ 461,716
O & M	Signs and Boundaries	Maintain boundary	35	mi	$ 135	4725	4842	4962	5085	5211	5341	5473	5609	5748	5891	$ 52,887
O & M	Public Use Facilities	Maintain campground	1	ea	$ 225	225	231	236	242	248	254	261	267	274	281	$ 2,518
O & M	Public Use Facilities	Maintain parking area - Ray's Beach	1	ea	$ 225	225	231	236	242	248	254	261	267	274	281	$ 2,518
O & M	Bridge Maintenance	Replace Culverts	2	culvert	$ 2,500	5000	5124	5251	5381	5515	5652	5792	5935	6083	6233	$ 55,966
O & M	Road Upgrade	Ray's Beach Road	1	ea	$ 3,500	3,500	3,587	3,676	3,767	3,860	3,956	4,054	4,155	4,258	4,363	$ 39,176
O & M	Road Upgrade	Annual gravel allocation	1	ea	$ 15,000	15,000	15,372	15,753	16,144	16,544	16,955	17,375	17,806	18,248	18,700	$ 167,897
O & M	Signs and Boundaries	Maintain boundary-CGL	1	mi	$ 135	135	138	142	145	149	153	156	160	164	168	$ 1,646
															Subtotal	**$ 2,038,511**
Development Activities																
Project	**Description**	**Activity**	**Quantity**	**Unit**	**Unit Cost**	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Total**
D	Road Upgrade	Cadillac Road	1.35	mi	$150,000	202,500										$ 202,500
D	Road Upgrade	Landing Road	1.56	mi	$175,000		279,770									$ 279,770
D	Road Upgrade	Main Street-West	1.47	mi	$175,000			270,168								$ 270,168
D	Road Upgrade	Main Street-East	0.9	mi	$175,000				169,511							$ 169,511
D	Road Upgrade	First Ridge Road	0.8	mi	$175,000					154,413						$ 154,413
D	Road Upgrade	River Road	0.8	mi	$175,000						158,243					$ 158,243
D	Road Upgrade	Dowry Road	1.14	mi	$100,000							132,050				$ 132,050
D	Road Upgrade	T-Road	0.55	mi	$175,000								114,255			$ 114,255
D	Road Upgrade	Sheep Pasture Road	0.7	mi	$175,000									149,022		$ 149,022
D	Road Upgrade	Access to Upper Chowan West	0.64	ea	$150,000		98,381									$ 98,381
D	Road Upgrade	First Ridge Road - Beaver Pond	1	ea	$ 20,000					22,059						$ 22,059
D	Road Upgrade	T-Road - Beaver Pond	1	ea	$ 20,000								23,731			$ 23,731
D	Culverts	Sheep Pasture Road	1	ea	$ 25,000									30,413		$ 30,413
D	Road Upgrade	Repair 3 soft spots in roads	1	ea	$ 30,000								35,612	36,495	37,400	$ 109,507
															Subtotal	**$ 1,914,023**
Capital Improvements																
Project	**Description**	**Activity**	**Quantity**	**Unit**	**Unit Cost**	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Total**
C	Shelter	Renovate Ray's Beach Shelter	1	ea	$ 15,000				16,144							$ 16,144
C	Pier	Replace Pier	1	ea	$ 20,000		20,496									$ 20,496
															Subtotal	**$ 36,640**
Inflation rate is calculated from the Consumer Price Index (CPI-U) which is compiled by the U.S. Bureau of Labor Statistics																
2005(3.4%), 2006(3.2%), 2007(2.8%), 2008(3.8%),2009(-0.4%),2010(1.6%), 2011(3.2%), 2012(2.1%), 2013(1.5%), 2014(1.6%)=10 Year AVG(2.28%)														**Grand Total**		**$ 2,261,192**

Staffing

The current game land management staff for the CSGL and CGL are located in Edenton, NC and includes 2 permanent, full-time technicians. Additional staff that assist with management of the game lands includes the Northern Coastal Ecoregion Management Biologist, Northern Coastal Ecoregion Wildlife Forester, and Northern Coastal Ecoregion Technician Supervisor. Technician staff from other depots located throughout the Northern Coastal Ecoregion also provide assistance with larger projects such as prescribed burning, boat ramp renovations, and large road improvements. Overseeing all previously mentioned staff is the Coastal Ecoregion Supervisor that supervises personnel throughout the entire Coastal Region. The Northern Coastal Ecoregion work area consists of 22 game lands totaling 216,329 acres, 50 boating access areas, and 9 public fishing areas (Fig. 28).

There are currently no needs for additional personnel at the Edenton Depot. However, because the previously mentioned staff also conducts management activities on other game lands and boating access areas within the work area, additional staffing needs will be evaluated if demands for more intensive management increases or additional lands are acquired.

Infrastructure

Infrastructure throughout the game land includes miles or roads and trails, numerous culverts for drainage, gates that are used to control access, and a pier with a nearby shelter, both in poor repair. Major infrastructure upgrades planned over the ten year planning horizon are covered in the Infrastructure Development and Maintenance section.

Heavy Equipment and Vehicles

There is currently an adequate supply of heavy equipment and vehicles to conduct management activities on the game lands. Heavy equipment includes farm tractors with various implements, an excavator, motor grader, and 2 bulldozers. Tractor implements include, but are not limited to, disk harrows, rotary mowers, a no-till grain drill, and box blade. Other equipment includes ATV's and boats.

Personnel at the Edenton Depot are currently outfitted with an adequate supply of vehicles. These include pickup trucks including one that is used for prescribed burning operations and the application of herbicide on roadsides. Additional vehicles and equipment often shared with other depots include a hauling unit, dump truck, and a belly-mounted side mower unit.

As previously stated, the replacement or addition of these assets is evaluated annually based on existing and predicted needs and are acquired if funding is available.

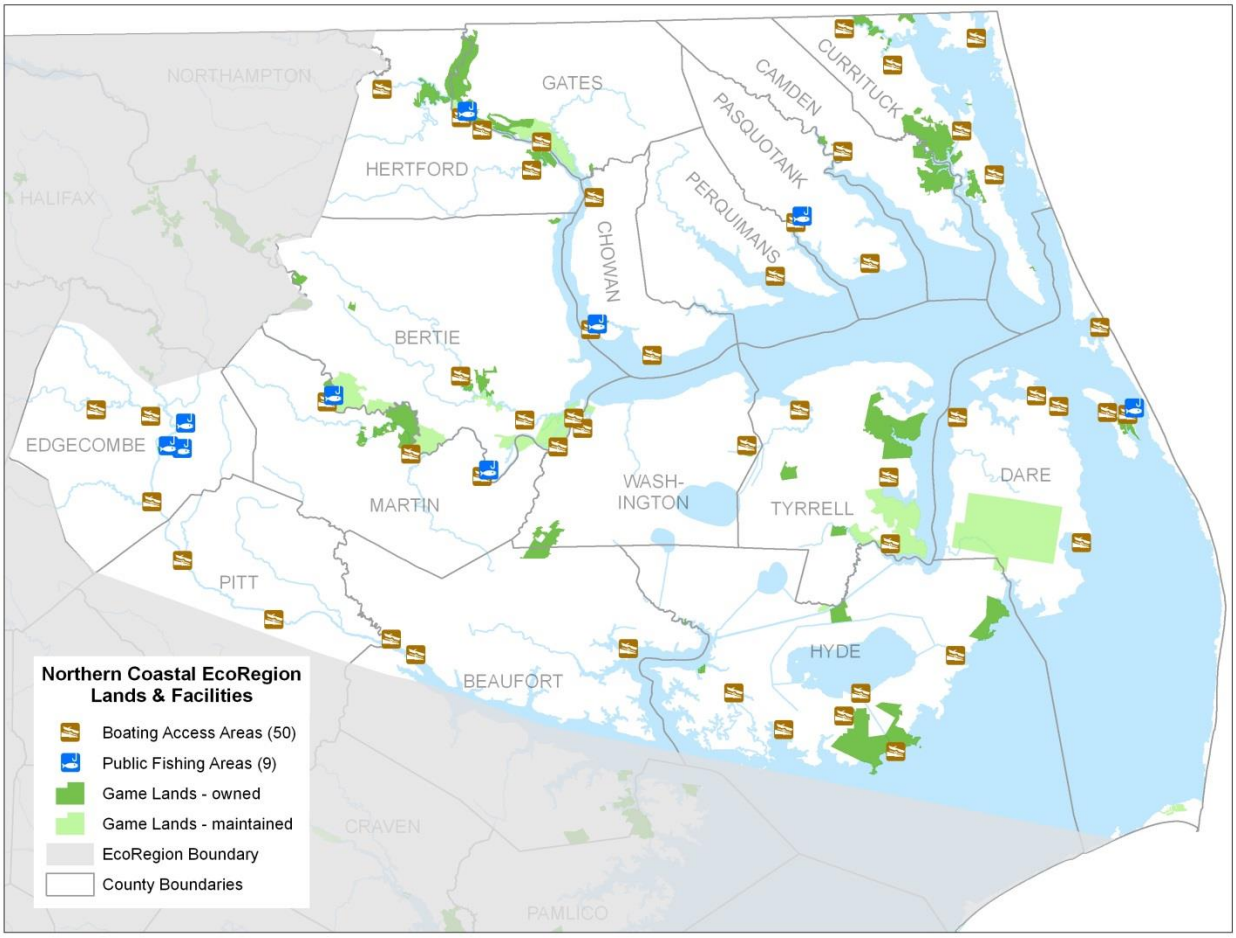

Fig. 28. Northern Coastal EcoRegion Lands and Facilities. Map created by Anna Stefanowicz: Engineering & Lands Management, North Carolina Wildlife Resources Commission.

Acquisition Plan

The NCWRC's plans for future acquisition will include inholdings, adjacent lands, and critical habitats. Critical habitats that have rare and/or endangered species, provide outstanding ecological benefits, or provide outstanding opportunities for game land users will be a high priority. Special considerations will be given to; lands that provide corridors for the connectivity of key parcels or are critical to enhance the NCWRC's ability to protect rare habitats, the land management needs of a property, and the public access and public uses that a property provides. With habitat restoration goals set for some tracts, land managers should evaluate large parcels that will complement habitat community restoration efforts.

Prior to any acquisition, initial land investigations will be conducted by NCWRC staff and evaluations will be submitted to the NCWRC Lands Use Committee. Land will only be acquired from willing sellers and/or through donations, and all acquisitions will be based on available funding.

Regulations and Enforcement

Enforcement of all rules and regulations falls to the Wildlife Enforcement Division of the NCWRC. Primary enforcement activities on the game land include: aircraft patrols, check points for license and game compliance, foot and boat patrols, remote camera setups on bait and littering sites, nighttime poaching setups and surveillance, and routine road patrols. These activities occur throughout the year across the game land, with the highest frequency of enforcement activities occurring during hunting and fishing seasons. Critical times for the Enforcement Division on the game land occur during the bear, deer, waterfowl, turkey seasons, and during the striped bass and herring runs in the spring. Several sites along the rivers are popular locations for drinking, swimming, and "hanging out". These sites are monitored by the Enforcement Division and by county's sheriff department.

As with most game lands, the major enforcement problems on the CSGL pertain to littering, regulation violations, license/permit issues, ATV riding, drug use, baiting, and adjoining landowner issues and conflicts. Engineering and Lands Management staff and the Enforcement Division have an excellent working relationship and communication on game land issues.

Refer to the current North Carolina Inland Fishing, Hunting, and Trapping Regulations Digest for regulations specifically for Chowan Swamp Game Land and Chowan Game Land.

Partnerships and Collaborations

Partnerships and collaborations among various conservation groups, state agencies, non-governmental agencies, non-profit groups, national organizations, clubs, and private citizens have been pivotal to the successful management of the CSGL and CGL. Newly created and continued partnerships between the NCWRC and these groups will be essential for meeting the goals and needs outlined in this plan. Below is a list of partners that have assisted with conservation efforts on CSGL.

Atlantic Coast Joint Venture

> Mission Statement: *"To provide a forum for federal, state, regional and local partners to coordinate and improve the effectiveness of bird conservation planning and implementation in the Atlantic Flyway region of the United States."*

National Oceanic and Atmospheric Administration (NOAA) Coastal and Estuarine Land Conservation Program (CELCP)

> Purpose: *"The Coastal and Estuarine Land Conservation Program (CELCP) provides matching funds to state and local governments to purchase threatened coastal and estuarine lands or obtain conservation easements."*

North American Wetland Conservation Act

> Purpose: *"The North American Wetlands Conservation Act of 1989 provides matching grants to organizations and individuals who have developed partnerships to carry out*

wetlands conservation projects in the United States, Canada, and Mexico for the benefit of wetlands-associated migratory birds and other wildlife."

North Carolina Clean Water Management Trust Fund

Mission Statement*: "to clean up pollution in the State's surface waters and to protect, preserve and conserve those waters that are not yet polluted."*

North Carolina Department of Environment and Natural Resources

Mission Statement: "*To protect North Carolina's environment and natural resources."*

North Carolina Forest Service

Mission Statement: "*To protect, manage and promote forest resources for the citizens of North Carolina."*

North Carolina Natural Heritage Program

Mission Statement: "*To provide science and incentives to inform conservation decisions and support conservation of significant natural areas in our state."*

North Carolina State Chapter of the National Wild Turkey Federation

Mission Statement: "*Dedicated to the conservation of the wild turkey and the preservation of our hunting heritage."*

The Nature Conservancy

Mission Statement: "*To conserve the lands and waters upon which all life depends.*"

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Plan Amendments

Since the completion of the draft plan was submitted for public review, two land acquisitions and two regulations have been approved by the NCWRC. The first of the land acquisitions was a 316-acre tract known as the Eure-Horton Tract (Fig. 29). This tract secures public access to an existing portion of the Fort Island section of the Chowan Swamp Game Land. The second acquisition was purchased from International Paper Company along the east and west banks of Somerton Creek adjacent to the Virginia line. These two tracts are accessible by boat only. The North Carolina Coastal Land Trust partnered with the NCWRC to purchase the 962-acre tract (Fig. 29). The acquisition connects to conservation lands in Virginia and protects over 430 acres of wetlands and a significant natural heritage area, the Wyanoke Sandhills, a longleaf pine-scrub oak forest along an ancient dune ridge.

The NCWRC passed a regulation in 2016 to address hunter/horseback rider user conflicts and to protect habitat from horseback riders. The rule states; Horseback riding is prohibited except during May 16 – Aug. 31 and on Sundays only Sept. 1 – May 15 on those roads that are open to vehicular traffic and those gated roads and trails posted for equestrian use. Since the adoption of the above rule, the NCWRC has created a parking lot that can support trucks with horse trailers at the intersection of Gatlington Road and Sandbanks Road. The NCWRC has also marked 9.06 miles of roads as horse riding trails. The second rule addresses safety concerns from a make-shift target shooting area on Wildlife Road. Target shooters were shooting toward a paved road without an adequate backstop. In 2018, the NCWRC adopted a rule to prohibit target shooting on the Sand Banks tract of Chowan Swamp Game Land.

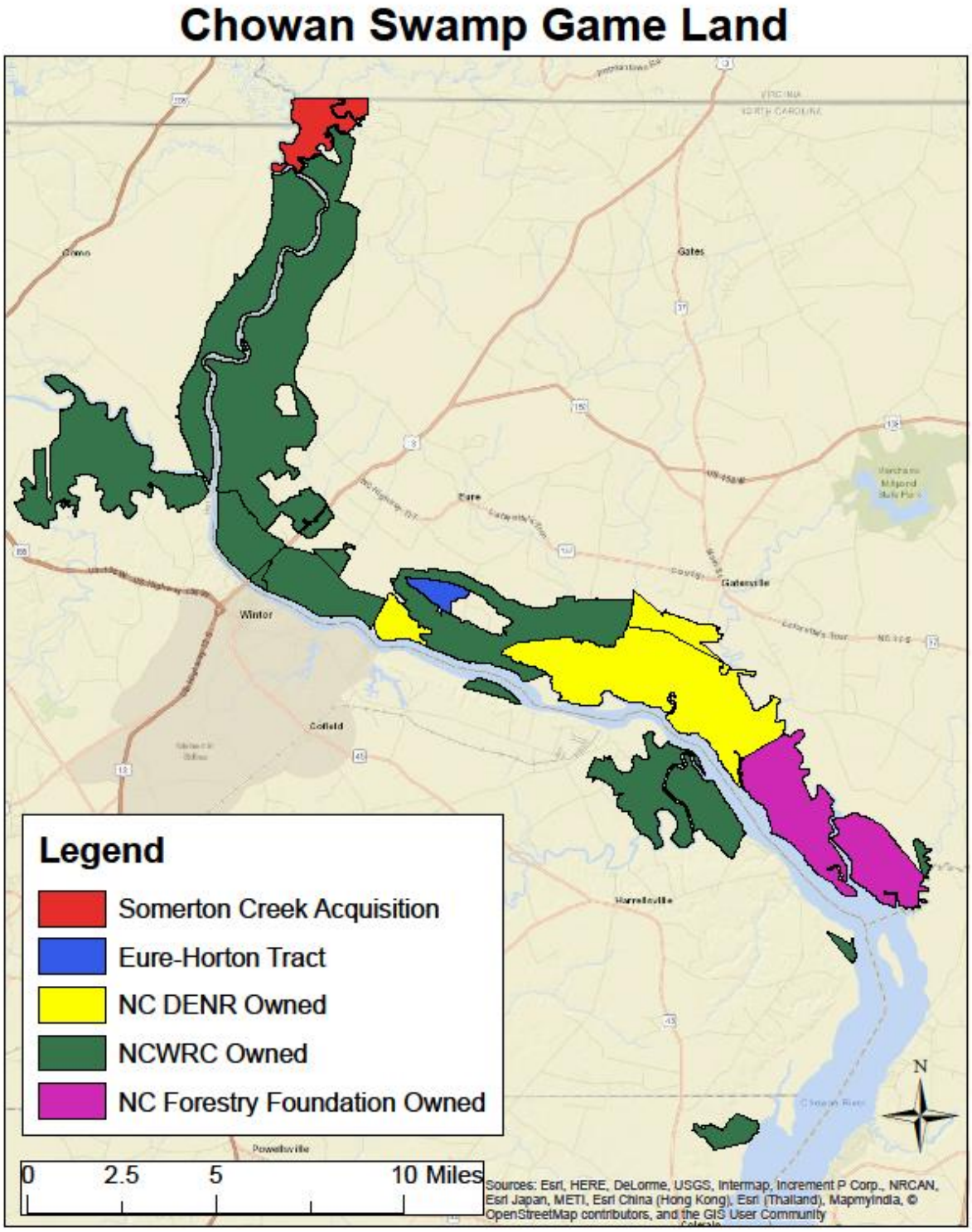


Fig. 29. Map showing new acquisitions.

Development Team and Public Input

A Chowan Swamp Game Land and Chowan Game Land Management Plan Development Team was formed in October 2015 consisting of NCWRC biologist and staff from various areas of expertise. Topics at this meeting included guiding policies and partnerships, adjacent land uses and management, what makes these game lands special, key game and non-game species, game land user groups, landscape and habitat level goals, future acquisitions, existing data and data gaps, threats to the game lands and game land goals, forest management, game land infrastructure, natural resources stakeholders, and enforcement issues.

Public comment was gathered at a Public Input Meeting held at Merchant's Millpond State Park on March 3, 2015. After a presentation on Chowan Swamp and Chowan Game Land, the 41 attendees were split into groups and NCWRC facilitators worked through a list of questions to gather input (Appendix VIII). Attendees included private land owners, horseback riders, hunters, fishermen, and other interested public. Twenty-one questionnaires were returned after the meeting. Some attendees opted to post comments on the online "Comment on Game Land Plans" link through the NCWRC website. Attendees who returned questionnaires at the meeting could also submit comments using the online comment link. Online public comments were accepted February 16, 2015 through April 10, 2015 for the same seven questions that were presented at the public input meeting. All comments are listed in Appendix IX with plan responses to many of them.

One letter from the North Carolina Department of Environment and Natural Resources, North Carolina Natural Heritage Program was also received. This letter emphasizes the natural significance of Chowan Swamp Game (Appendix VII).

After natural resources stakeholders and public comments were considered, a draft plan was developed by the Development Team and circulated for in-house review and edits made. The draft plan was presented to the NCWRC Land Use and Access Committee. After Committee review and edits made, the final draft was available for public comment online. A news release was published on January 4, 2018 stating that the Commission would be accepting comments through February 2, 2018. Two letters were received and included in the public comment appendix. After public comments were considered, this final plan was presented to the Land Use and Access Committee and the full Commission.

Appendices

I. Archeological Resources Protection Act

Archaeological Resources Protection Act North Carolina General Statutes Chapter 70, Article 2

This statute applies to all state-owned, occupied or controlled property except for highway rights-of-way.

The purpose of the statute is to provide for the protection of archaeological resources on state lands. Major provisions of the law are as follows:

1. Archaeological resources are defined as any material remains of past human life or activities which are at least 50 years old and which are of archaeological interest, including pieces of pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, rock paintings, rock carvings, intaglios, graves or human skeletal materials.
2. Permits are required in order to conduct archaeological investigations on state lands.
3. (The 1991 amendment to ARPA, effective July 1, 1991, transferred to the Department of Cultural Resources--from Department of Administration--the authority to issue permits under G.S. 70, Article 2.)
4. Information on archaeological site locations is exempted from unrestricted public access may result in damage to or destruction of the archaeological resources
5. All archaeological resources, equipment and vehicles utilized in conjunction with violation of the law are subject to forfeiture.

Prohibitions and penalties under the law are as follows:

1. No person may excavate, remove, damage or otherwise alter or deface any archaeological resource located on state lands without a permit.
2. No person may sell, purchase, exchange, transport, receive or offer to sell, purchase, exchange, transport or receive any archaeological resource excavated or removed from state lands in violation of the law.
3. Any person who knowingly and willfully violates or employs any other person to violate any prohibition of the law, shall upon conviction, be fined not more than $2,000 or imprisoned not more than six months, or both.
4. Each day on which a violation occurs shall be a separate and distinct offense.
5. Civil penalties may also be assessed against any person who violates the provisions of the act.

II. Articles of Dedication through the North Carolina Natural Heritage Program

North Carolina
Department of Administration

Beverly Eaves Perdue, Governor

Moses Carey, Jr., Secretary

November 7, 2012

Secretary Dee Freeman
Department of Environment and Natural Resources
1615 Mail Service Center
Raleigh, North Carolina 27699-1615

Mr. Gordon S. Myers, Executive Director
N.C. Wildlife Resources Commission
1701 Mail Service Center
Raleigh, North Carolina 27699-1701

Re: Dedication of Portions of the **Chowan Swamp Game Land**, Gates, Hertford and Bertie Counties

Dear Secretary Freeman and Mr. Myers:

Pursuant to Article 9A, Chapter 113A of the North Carolina General Statutes, this letter of allocation is executed for the purpose of dedicating the State-owned lands hereinafter described as a North Carolina Nature Preserve of dedication replace the articles of dedication dated August 31, 2007.

These real properties are currently administered by the North Carolina Wildlife Resources Commission as a portion of the Chowan Swamp Game Land and consist of approximately 23,828 acres located in Gates, Hertford, and Bertie Counties, and composed of:

1. Chowan Swamp Game Land tract (Primary Area)	17,394 acres
2. Chowan Swamp Game Land tract (Buffer Area)	6,434 acres

which are specifically described in Exhibit A, attached hereto and by reference made a part hereof. The dedicated land shall be known collectively as the Chowan Swamp Game Land Nature Preserve.

Dedication of the qualified portion of the tracts fulfills the terms of any prior grant agreements, including the Natural Heritage Trust Fund and the Clean Water Management Trust Fund.

Mailing Address:
1301 Mail Service Center
Raleigh, N.C. 27699-1301

Telephone (919) 807-2425
Fax (919) 733-9571
State Courier #51-01-00
e-mail: moses.carey@doa.nc.gov

Location:
116 West Jones Street
Raleigh, North Carolina

The Governor and Council of State have approved the dedication of the State-owned lands hereinabove described as the Chowan Swamp Game Land Nature Preserve to be held in trust by the Custodian for the uses and purposes expressed in the Nature Preserves Act at a meeting held in the City of Raleigh, North Carolina, on the 7th of August, 2012.

Sincerely,

Moses Carey, Jr.

MC

CONSENTED AND AGREED TO:

Secretary Dee Freeman
Department of Environment and Natural Resources

Gordon S. Myers, Executive Director
Wildlife Resources Commission

EXHIBIT A

CHOWAN SWAMP GAME LAND
DEDICATED NATURE PRESERVE

COUNTY: Gates, Hertford, Bertie County PHYSIOGRAPHIC PROVINCE: Coastal Plain

TOPOGRAPHIC QUADS: Gatesville, Harrellsville, Mintonsville,Valhalla, Colerain, Winton, Riverdale, and Murfreesboro

SIZE OF AREA: ca. 23,828 acres total (primary area 17,394 acres, including several restoration areas totaling 1,158 acres; buffer area 6,434 acres)

OWNER/ADMINISTRATOR: State of NC, Wildlife Resources Commission

DESCRIPTION: Chowan Swamp Game Land includes several tracts in the valley of the Chowan River and its tributaries the Wiccacon River, Meherrin River, and Potecasi Creek. Much of the land near the rivers consists of low organic deposits which are permanently saturated and are subject to wind tides on the river. These areas support Tidal Cypress–Gum Swamp communities dominated by a mix of bald cypress (*Taxodium distichum*), swamp black gum (*Nyssa biflora*), and water tupelo (*Nyssa aquatica*). Vast expanses are mature and in good condition, with trees averaging 10"-14" dbh in different portions. Old remnant trees, especially cypress, 24" to 36" dbh are present. As is typical of this community type, the shrub and herb layers are well-developed and diverse. Common shrubs include cane (*Arundinaria tecta*), titi (*Cyrilla racemiflora*), alder (*Alnus serrulata*), swamp rose (*Cornus stricta*), southern wild raisin (*Viburnum nudum*), Virginia willow (*Itea virginica*), highbush blueberries (*Vaccinium fuscatum*), and a number of others. Common herbs include sedges (*Carex* spp.), false nettle (*Boehmeria cylindrica*), arrowhead (*Peltandra virginica*), jewelweed (*Impatiens capensis*), cinnamon fern (*Osmunda cinnamomea*), and royal fern (*Osmunda regalis*). Woody vines are often prominent. The edges of the swamp along the shoreline are diffuse, with many cypress trees standing in the water. Some large beds of cow lily (*Nuphar advena*) occur along the river.

At the mouth of the Wiccacon River is a small area of Tidal Freshwater Marsh. It is dominated by southern wild rice (*Zizaniopsis miliacea*), with cattails (*Typha latifolia*) and various broad-leaf herbs. Some portions of it are heavily invaded by common reed (*Phragmites australis* ssp. *australis*), but it is otherwise in good condition.

Smaller areas on the inland side of the swamps or on small rises in the interior, support Nonriverine Swamp Forests. These swamps are dominated by swamp black gum, with some bald cypress and sometimes loblolly pine (*Pinus taeda*) or Atlantic white cedar (*Chamaecyparis thyoides*). The understory, shrub, and herb layer are lower in diversity and consist mostly of peatland species such as fetterbush (*Lyonia lucida*), gallberry holly (*Ilex glabra*), sweet pepperbush (*Clethra alnifolia*), netted chainfern (*Woodwardia areolata*), and peat moss (*Sphagnum* spp.). One similar site on the upper Chowan River is a Peatland Atlantic White Cedar Forest, with a canopy of *Chamaecyparis thyoides*. This community, as well as many of the Nonriverine Swamp Forests, suffered heavy wind throw in Hurricane Isabel.

On the east side of the upper Chowan River is a large expanse of stabilized sand dunes known as the Sand Banks. The dunes have a gently rolling irregular surface, but are arranged in large ridges and swales parallel to the river. The dunes are a large expanse of uplands that once supported Pine/Scrub Oak Sandhill communities dominated by longleaf pine (*Pinus palustris*). This area is well north of the range of

wiregrass (*Aristida stricta*) and is near the northern range limit of longleaf pine. It is a distinctive type of sandhill community, marked by the presence of plant species not found in others, such as black huckleberry (*Gaylussacia baccata*) and oatgrass (*Danthonia spicata*), along with more widespread species such as bracken fern (*Pteridium aquilinum*), little bluestem (*Schizachyrium scoparium*), Virginia goat's-rue (*Tephrosia virginiana*), tread-softly (*Cnidoscolus stimulosus*), and fragrant goldenrod (*Solidago odora*). Almost all of the sandhills on the game land were converted to pine plantation in the last several decades. Virtually no longleaf pine remains, and the diverse herbaceous layer is badly degraded by soil disturbance, dense canopy shade, absence of fire, and herbicide use. This area has potential for restoration of more natural sandhill communities. Some areas have excellent potential, with a seed source of characteristic herbs dispersed through the plantations. Other stands have little or no remaining herb layer and have more limited potential.

The swales amid the sandhills in the Sand Banks have muck soils and support Nonriverine Swamp Forest communities which are somewhat different from those embedded in the tidal swamps. The northern part of the Sand Banks has a number of smaller, more round depressions. These look like limesink ponds, but probably are small wind-formed swales. They support a Small Depression Swamp community, or another different form of Nonriverine Swamp Forest.

The Wiccacon River, Meherrin River, and Potecasi Creek are each bordered by bluffs that rise to upland terraces. Most of the uplands are pine plantations, recent clearcuts, or former agricultural fields. A few steep bluffs, and one broader dissected area along Potecasi Creek, contain intact upland natural communities. Most common is Mesic Mixed Hardwood Forest, dominated by beech (*Fagus grandifolia*) and white oak (*Quercus alba*), sometimes with abundant loblolly pine (*Pinus taeda*). A few small patches on the Wiccacon River are Basic Mesic Forest, with similar species but with the addition of others that benefit from richer soils, including black walnut (*Juglans nigra*) and columbine (*Aquilegia canadensis*). Other small bluffs, on both the Wiccacon River and Potecasi Creek, are Piedmont/Coastal Plain Heath Bluff, with a canopy of white oak and other species, but with a shrub layer of mountain laurel (*Kalmia latifolia*). One other bluff on Potecasi Creek is a distinctive Low Elevation Seep, with ground water seeping over the bare, dense clay face and sparse wetland plants growing on it. The drier upland areas are Dry-Mesic Oak-Hickory Forest, dominated by white oak along with red oak (*Quercus rubra*), black oak (*Quercus velutina*), and mockernut hickory (*Carya tomentosa*). Mesic Mixed Hardwood Forest also occurs on a few higher ridges embedded in the tidal swamps in the middle part of the Chowan River swamp. Also present there is Dry Oak-Hickory Forest, with white oak and southern red oak (*Quercus falcata*). Though all of these upland communities are small in extent, all are quite rare this far east in the Coastal Plain and are significant.

The Chowan River and Meherrin River are significant aquatic sites. Several rare species occur in them, including the tidewater mucket (*Leptodea ochracea*), eastern lampmussel (*Lampsilis radiata*), eastern pondmussel (*Ligumia nasuta*), alewife floater (*Anodonta implicata*), and Chowanoke crayfish (*Orconectes virginiensis*).

BOUNDARY JUSTIFICATION: The primary areas are drawn based on the extent of intact natural communities. Communities damaged by natural disturbances such as wind are also included. These include most of the swamps, and limited patches of upland communities. Other areas of the riparian zone along streams and rivers are also dedicated as primary areas, to protect water quality and stream banks. Specifically, 300 feet on each side of the significant aquatic habitats on the Chowan and Meherrin Rivers and 100 feet on each side of any perennial tributaries draining into the significant aquatic habitats are

designated as primary areas, as well as any tributaries required by the Clean Water Management Trust Fund.

Large areas are dedicated as primary restoration areas. Most of the acreage of restoration area is the extensive sandhills, where there is potential to restore a very rare type of community. Some areas of recently clearcut swamps are also dedicated as primary restoration areas. They may be able to spontaneously recover over time, but may need more intensive management to restore them.

More altered lands within the sandhills which retain little intact herbaceous cover are included as buffer areas. Young successional pine stands outside the sandhills are also included as buffer where they are embedded in the primary areas or are adjacent to them.

MANAGEMENT AND USE: The dedicated nature preserve is a portion of the Chowan Swamp Game Land owned by the State and used for public hunting and passive recreation.

The greatest need for management is in the sandhill restoration areas. All portions of the sandhill need restoration of fire in the form of prescribed burning. Fires may need to be very frequent at first, to reverse the effects of past fire suppression and reduce the amount of shrubs and hardwoods. Ongoing burning about every three years will be needed to maintain the restored community. Where hardwoods and shrubs are too dense, mechanical reduction of these layers may be needed, and stem treatment of hardwoods with herbicide may be appropriate. Broadcast herbicide treatment should not be used, as it threatens the any remaining herbaceous species. Gradual replacement of the planted loblolly pine with longleaf is recommended. Some dense plantations need to be thinned soon, while others can be left to mature while the ground cover vegetation is improved by prescribed burning. Given the absence of a seed source, longleaf pine will need to be planted. With limited herbaceous cover at present in most of the restoration area, longleaf pine should be planted in small gaps or under planted under thinned canopy, leaving the loblolly as a source of pine needles to support the prescribed fires that are needed.

The restoration areas in cut-over swamps should be allowed to recover naturally. If appropriate canopy trees have not established in a reasonable amount of time, some additional treatment may be needed to control shrubs or planting of the appropriate trees may be needed.

No special management needs are identified for the tidal swamps. The forests should be allowed to mature. Rising sea level is likely to increasingly affect the forests and some parts may ultimately turn into marshes. At present there is little evidence of stress from rising sea level.

Control of the common reed (*Phragmites australis*) in the Tidal Freshwater Marsh is strongly encouraged. Besides degrading a portion of the marsh at present, this species has high potential to expand into newly developing marshes as sea level rises. Careful herbicide treatment will likely be needed to control this invasive species.

THIS DEDICATION OF THE CHOWAN SWAMP GAME LAND NATURE PRESERVE IS MADE SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS:

1. As used in this Letter, the terms "natural area" and "nature preserve" shall have the same meaning as contained in North Carolina General Statutes, section 113A-164.3.

2. Pursuant to North Carolina General Statutes 113-164.8, all State-owned lands lying within the above designated area(s) are hereby dedicated as a nature preserve to be known collectively as the Chowan Swamp Game Land Nature Preserve (hereinafter "preserve") for the purposes provided in the North Carolina Nature Preserves Act, as amended, and other applicable law, and said State-owned land, shall be held, maintained, and used exclusively for said purposes.

3. **Primary Custodian**: The primary custodian of the preserve will be the North Carolina Wildlife Resources Commission, which will be responsible for managing the preserve in accordance with State Administrative Code 15A NCAC 12H.0300 and .0400.

4. **Primary Classification**: The primary classifications and purposes of the preserve will be conservation, nature education, wildlife management, hunting, fishing, trapping, and other recreational uses authorized by the Primary Custodian. The ecological significance of the preserve is described in Exhibit A.

5. **Management Areas**: For the purposes of management, the preserve shall be considered to consist of a Primary Area (approximately 17,394 acres) and a Buffer Area (approximately 6,434 acres), as more particularly described in Exhibit A, attached thereto and by this reference made a part hereof. The Primary Area consists essentially of the Tidal Cypress-Gum Swamp, Tidal Freshwater Marsh, Nonriverine Swamp Forest, Mesic Mixed Hardwood Forest, Dry-Mesic Oak-Hickory Forest, Dry Oak-Hickory Forest, and restorable Pine/Scrub Oak Sandhill natural communities.

   The Primary Area is deemed by the Secretary of the North Carolina Department of Environment and Natural Resources to qualify as an outstanding natural area under statutory criteria for nature preserve dedication (G.S. 113A-164.6) and further serves all of the public purposes for a dedicated preserve as stated in Administrative Rules 15 NCAC 12H.0301(b).

   The Buffer Area, which contributes to the management and protection of the Primary Area, consists of young, successional pine stands.

6. **Rules for Management of the Primary Area(s)**:

   A. Character of Visitor Activity: The principal visitor activities in the preserve shall be hunting, fishing, trapping, walking, research, and observation. These activities shall be regulated by the Custodian to prevent significant disturbance of the preserve. These activities may specifically be regulated by the Custodian to protect and conserve the natural values of the preserve.

      Activities and uses unrelated to those listed above are prohibited except as otherwise provided in these Articles or unless necessary to carry out the purposes of the preserve. Prohibited activities include, but are not limited to: construction; commercial activities and development; commercial silviculture; agriculture and grazing; gathering of native species of plants or plant products; the removal, disturbance, molestation, or defacement

of minerals, archaeological and natural resources, except for research purposes as approved by the Custodian; and those activities specifically restricted in these Articles.

There shall be no fires, except as necessary for ecological management of the preserve or in conjunction with supervised educational activities of the Custodian, or further excepted as herein provided or otherwise expressly permitted.

B. Consumptive Wildlife Uses: Hunting, fishing, and trapping shall be permitted on the preserve subject to regulations and management by the North Carolina Wildlife Resources Commission.

C. Orientation and Guidance of Visitors: The Custodian reserves the right to orient and guide visitors for educational programs, hunting and fishing uses, scientific research, and for preserve management. Exhibits, programs, and printed materials may be provided by the Custodian in service areas. The Custodian may establish and maintain canoe trails and canoe camping sites in the preserve. The Custodian may restrict access to visitors in those instances or in such areas that restrictions may be determined necessary to safeguard sensitive environmental resources in the preserve.

D. Disturbance of Natural Resources: The cutting or removal of trees, dead or alive, or the disturbance of other natural resources is prohibited except as necessary for removal of hazards to visitors, control of disease or insect infestations that would damage or reduce the significance of the preserve, restoration after severe storm damage, trail clearance and maintenance, or for purposes of maintenance or restoration of natural communities or rare species populations as stipulated in the preserve management plan and that which is consistent with the purposes of these Articles. Specifically, a component of management planning will address restoration of areas (identified as Primary (Restoration) Areas in the Exhibit A map). Hardwood restoration will minimally involve permitting natural succession to occur, but may involve active removal of the pine plantation canopy. Consideration will be given to encouraging advanced hardwood regeneration and minimizing weedy invasion. Restoration of longleaf on the ridges will minimally focus on removal of unnatural canopy components and planting of longleaf. It may additionally involve thinning of dense longleaf to enhance the condition of the ground layer. Site-specific modifications of restoration plans will be addressed through consultation between Wildlife Resources Commission and Natural Heritage Program staff.

Primary Areas defined around existing depressions and swales are identified by both topography and the presence of wetland vegetation. When adjoining Buffer Areas are managed, these features will need to be evaluated and it is mutually recognized that the exact location of Primary Area boundaries may be subject to change.

Salvage timber cuts which may be necessary due to natural catastrophe will be allowed in both Primary and Buffer Areas, but in a manner that will contribute to the recovery of the prevailing natural conditions of the forest and in consultation with the North Carolina Natural Heritage Program.

The following language is being included in this letter of allocation because the dedicated preserve contains habitat types which may be managed for maintenance or recruitment of colonies of the Federally Endangered red-cockaded woodpecker (*Picoides borealis*). In

the Recovery Plan for the Red-Cockaded Woodpecker (*Picoides borealis*) (US Fish and Wildlife Service: Southeast Region, Atlanta, GA), a range of management actions is prescribed for this purpose. While these objectives take precedence in the preserve because of the rarity of the species involved, primary areas should be managed to promote the full range of natural characteristics. Management should focus on prescribed burning. If canopy thinning is needed to meet guidelines, it should be done to the minimum degree necessary, unless it is agreed that other treatment would better promote the natural multi-aged, patchy character of longleaf pine communities. Canopy and midstory treatments should be done in ways that minimize disturbance to the ground cover vegetation and the soil.)

E. Wild Fire Control/Prescribed Burning: Wild fires may mimic natural processes historically occurring in an ecosystem on a landscape level. When the extent of a wild fire does not threaten human life or structures, it may be allowed to burn with minimal control. If wild fire control is necessary, firebreaks may need to be established. When possible, existing roads and firebreaks will be utilized for wild fire control. When new firebreaks need to be established, environmentally sensitive areas will be avoided when possible. Old firebreaks which affect the natural hydrology of wetlands will be filled and allowed to revegetate. Planning of firebreak restoration should occur in consultation with the North Carolina Natural Heritage Program.

F. Water Control: The purpose of water control shall be to maintain the preserve's natural water regime. Water levels that have been altered by man may be changed if necessary to restore the preserve to its natural condition. In a preserve with a long history of managed hydrology, water levels may be managed to perpetuate the ecosystems that have evolved around the hydrology or may be restored to natural condition. This decision should be made in consultation with the Natural Heritage Program. Millponds are an example of situations in which water levels have been historically managed.

G. Pollution and Dumping: There will be no storage or dumping of ashes, trash, garbage, hazardous substances, toxic waste, other unsightly or offensive material, or fill material, including dredge spoil in, on, or under the preserve. No underground storage tanks may be placed within the preserve. No surface or ground waters of the preserve may have pollutants added within the preserve.

H. Control of Vegetational Succession: Control of vegetational succession may be undertaken if necessary to maintain or restore a particular natural ecosystem type or to preserve endangered, threatened, rare, or other unusual species. Controls will be done in the manner that best imitates the natural forces believed responsible for maintaining the natural ecosystem type, or that minimizes unnatural effects on non-target portions of the ecosystem. Prescribed burning is particularly essential to ecosystems where natural wild fire historically suppressed woody vegetation and promoted herbaceous diversity.

I. Control of Populations: Any control of animal or plant populations on the preserve shall be for the purpose of correcting those situations where those populations are significantly affecting natural conditions on the preserve, and in accordance with the Custodian's established regulations for hunting, trapping, or fishing of designated game animals. The Custodian may, in consultation with the North Carolina Natural Heritage Program, apply biological controls, herbicides and pesticides, and other means deemed necessary or

appropriate to control or eradicate exotic or native species of plant or animal that are degrading the natural character of the preserve. Because of potential impacts on native species, no exotic flora or fauna shall be introduced into the preserve.

J. Research and Collecting Permits: Any person wishing to engage in scientific research requiring collecting or otherwise affecting anything within the preserve shall first secure written permission from the Custodian.

K. Roads and Trails: New roads shall not be constructed in the Primary Area. When necessary, the Custodian may construct and maintain access limited to staff use for management purposes, such as service paths (single lane vegetated paths) for patrol, right-of-way maintenance, and other management activities, within the Primary Area. Number and width of new paths will be minimized, and sensitive areas avoided when possible. Existing roads that occur within or form a boundary of the Primary Area may be maintained by grading of the roadbed, replacing culverts, or adding stone as needed in order to maintain the integrity of the road for vehicular use. Daylighting of roads within the Primary Area should be minimized, but may be used if necessary to maintain the condition of the road. Access management and construction will be part of the overall management planning process and will include consultation with the North Carolina Natural Heritage Program.

L. Other Structures and Improvements: Structures or facilities shall not be erected by the Custodian within a preserve, except as may be consistent with the purposes of the preserve as stated in this dedication. Site selection shall be consistent with this dedication.

M. Management Plan: The **Wildlife Resources Commission**, as Primary Custodian of the preserve, shall develop a management plan for the broader managed area, including the preserve. This management plan should be subject to all the provisions of this dedication and with the management principles set forth in the North Carolina Administrative Code 15 NCAC 12H.0300 and .0400. In any case where contradictions may arise between this instrument of dedication and other management regulations, the terms of this dedication shall take precedence.

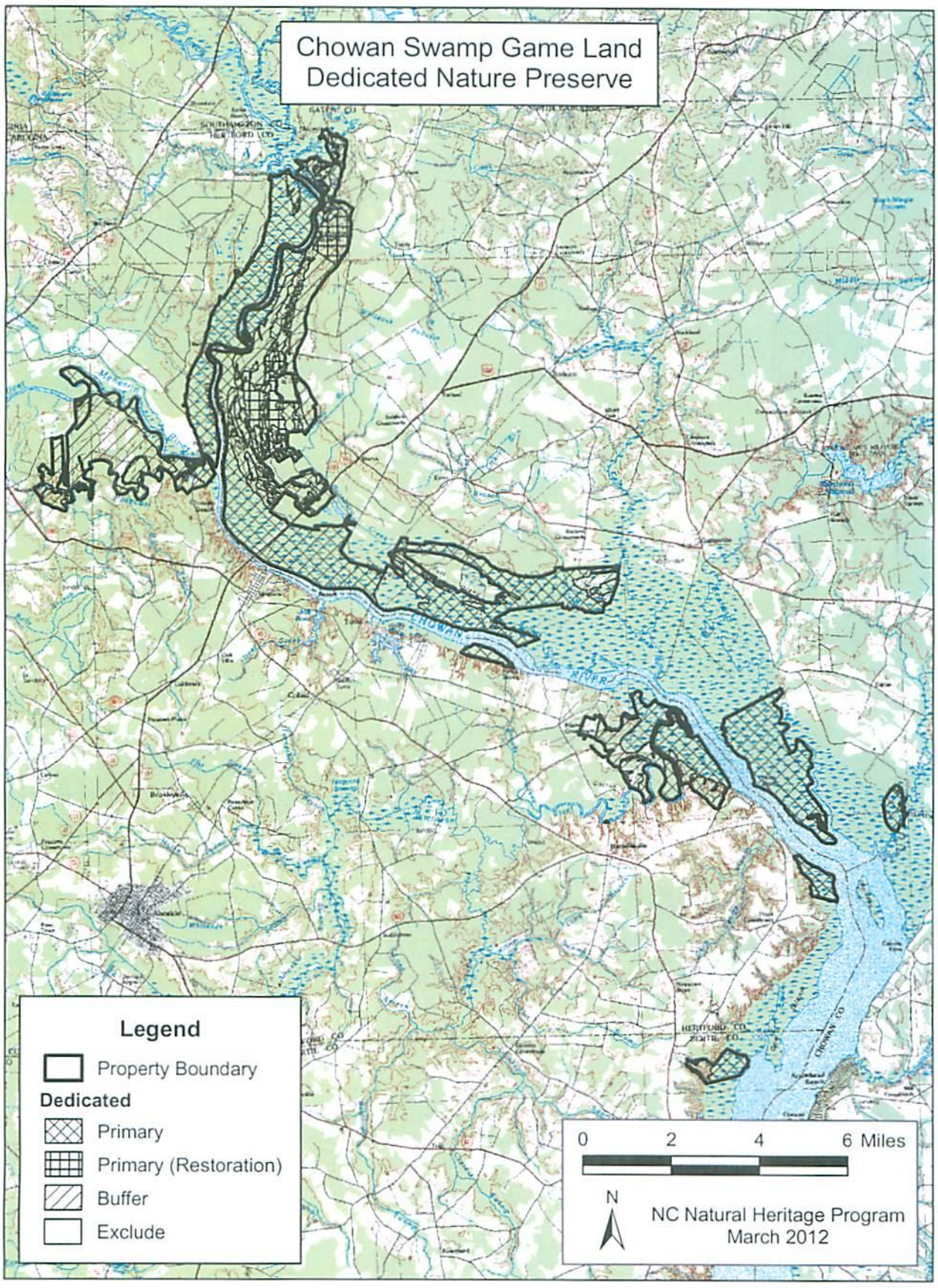
7. **Rules for Management of the Buffer Area(s)**: Primary area rules also apply except that additional forestry and wildlife management activities may be planned and carried out as needed. Construction and maintenance of roads, trails, and other access structures within buffer area(s) of the preserve will be limited to the level necessary to appropriately manage the preserve. These activities will be conducted in accordance with policy of the N.C. Wildlife Resources Commission and general management philosophy as outlined in Commission planning documents, in addition to providing for the buffer functions in relation to the primary area(s). WRC rules and guidelines require the protection and enhancement of wildlife populations and habitat so that hunting, fishing, trapping and other wildlife recreational opportunities are available to citizens of this State. Forest management is primarily conducted to enhance wildlife habitat.

Buffer functions within the dedicated area may include protecting the primary area(s) from indirect detrimental ecological effects, providing additional area for species and ecological processes that require larger areas, and providing important successional stages and disturbance regimes and

other habitat diversity for wildlife. Based on these general objectives, the following buffer functions will be addressed in the management plan.

1) Landscape level function of community type and structure. (Buffer area management may involve timber harvest and other forms of stand manipulation, but will not involve forest canopy type conversion over more than limited areas, other than to restore stands to types suited for the site. Introduction of exotic species known to be invasive in natural communities will be avoided.)
2) Maintenance of habitat connectivity and continuity among primary areas.
3) Providing for habitat diversity.
4) Management needs of rare animal and plant species populations occurring within the buffer area; and
5) Protection of soil and hydrologic resources and processes within the primary area and extending into the buffer. (Buffers will be retained along streams, and watersheds of primary areas will be protected from hydrologic alteration.)

8. **Amendment and Modification**: The terms and conditions of this dedication may be amended or modified upon agreement of the Wildlife Resources Commission and Secretary of the Department of Environment and Natural Resources, and approved by the Council of State. Any portion of the tract dedicated pursuant to this instrument may be removed from dedication in accordance with the provisions of North Carolina General Statutes 113A-164.8.


Chowan Swamp Game Land
Dedicated Nature Preserve
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Property Boundary
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Primary
Primary (Restoration)
Buffer
Exclude
0 2 4 6 Miles
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NC Natural Heritage Program
March 2012

III. Game Land Use Evaluation Procedure

North Carolina Wildlife Resources Commission
Game Lands Use Evaluation Procedure

I. PURPOSE

The North Carolina Wildlife Resources Commission (NCWRC) is the principal advocate for and steward of the wildlife resources of North Carolina and is the primary custodian of numerous tracts of state-owned lands in the Game Lands Program. As the human population of North Carolina continues to grow at a rapid rate, state-owned Game Lands will be subject to increasing pressure to provide public outdoor recreation opportunities. These uses will include traditional activities such as hunting, fishing, trapping, and wildlife viewing, as well as other outdoor recreation pursuits. While hunting, fishing, trapping and wildlife viewing are the primary public uses of state-owned Game Lands, the NCWRC has always allowed and supported other dispersed and non-developed recreational activities. The funding sources of the NCWRC, however, are focused on natural resources management rather than recreational development and there is no on-site staff stationed at each Game Land. Because of this, the NCWRC must exercise care in providing for recreational activities that may not be compatible with the natural resources for which the lands are valued and the primary management objectives of those lands. This document will establish a process to evaluate such activities as they are considered by NCWRC staff, or are requested by the public, on state-owned Game Lands where NCWRC is the primary custodian. These activities will first be evaluated to determine if they are "appropriate" and second to determine whether they are "compatible" with respect to the following management objectives of the Game Lands program:

1. To provide, protect, and actively manage habitats and habitat conditions to benefit aquatic and terrestrial wildlife resources,
2. To provide public opportunities for hunting, fishing, trapping, and wildlife viewing,
3. To provide for other resource-based game land uses to the extent that such uses are compatible with the conservation of natural resources and can be employed without displacing primary users,
4. To provide an optimally sustainable yield of forest products where feasible and appropriate and as directed by wildlife management objectives.

This document provides a statewide framework for determining appropriate uses of NCWRC-owned or controlled Game Land properties (NCWRC Game Lands). In addition, it provides the procedure for determining if appropriate uses are compatible on a particular property.

II. ENABLING LEGISLATION

Statement of Purpose NCGS § 143-239. The purpose of this article is to create a separate State agency to be known as the North Carolina Wildlife Resources Commission, the function, purpose, and duty of which shall be to manage, restore, develop, cultivate, conserve, protect, and regulate the wildlife resources of the State of North Carolina, and to administer the laws relating to game, game and freshwater fishes, and other wildlife enacted by the General Assembly to the end that there may be provided a sound, constructive, comprehensive, continuing, and economical game, game fish, and wildlife program directed by qualified, competent, and representative citizens, who shall have knowledge of or training

in the protection, restoration, proper use and management of wildlife resources. (1947, c. 263, s. 3; 1965, c. 957, s. 13)

III. APPLICATION OF PROCEDURE

This procedure must be considered within the context of the Game Lands Program Mission Statement (GLPMS):

> "Consistent with the original establishment legislation for the WRC, the mission of the game lands program is to enhance, facilitate, and augment delivery of comprehensive and sound wildlife conservation programs. Inherent in delivery of a lands program consistent with this mission is the feasibility and desirability of multiple uses on lands owned by the state within the system. In addition to hunting, fishing, trapping, and wildlife viewing as primary uses, we recognize the desirability of providing opportunities for other activities on state-owned game lands that are feasible and consistent with the agency's mission, and compatible with these traditional uses." (*From motion made December 5, 2007 by Doug Parsons, Chairman, WRC Use and Lands Committee and unanimously approved).*

This procedure applies to all proposed and existing recreational uses of NCWRC Game Lands. It does not apply to the following circumstances:

A. **Situations where reserved rights or legal mandates provide that certain uses must, or must not, be allowed**. For example, there may be prescriptive purposes or other uses that are specifically required or not allowed in the deed or grant that conveyed the property to the state.

B. **Property management activities**. Property management activities are specified in Federal Assistance Work Plans for lands NCWRC purchases or manages with federal assistance, and are updated every five years. These plans specify wildlife, fish, and forest management activities that are not subject to this procedure when conducted by NCWRC staff or an approved cooperator.

C. **Emergencies**. The Director (or a designee) may temporarily suspend, allow or initiate any use of a property if it is determined necessary to immediately act in order to protect the health and safety of the public or any plant, fish or wildlife population.

D. **Specialized uses**. There are many uses (most of them non-recreational) that require specific authorization from NCWRC in the form of a special use permit, letter of authorization or other permit document. Some of the specialized uses that may be considered include scientific research or collections, educational pursuits, field trial use, use of buildings or other facilities, rights-of-way and other encroachments, telecommunications facilities, military, national defense uses, and public safety training. Requests for specialized uses are covered by other NCWRC policies, procedures, or rule, and are subject to separate review procedures. (*See NC Administrative Code, Title 15A, Chapter 10, Subchapter 10D - Game Land Regulations, Rule .0102; General Statutes 113-264*).

E. **Other NCWRC properties.** The NCWRC owns and/or manages lands outside of the Game Land program (e.g., boat ramps and Wildlife Conservation Areas). The use and

management of those properties are covered by other NCWRC policies, procedures, or rule and are subject to separate review procedures. (*See NC Administrative Code, Title 15A Chapter 10, Subchapter 10E - Fishing and Boating Access Areas, Rule .0104; NC Administrative Code, Title 15A Chapter 10, Subchapter 10J - Wildlife Conservation Area Regulations, Rule .0102; General Statues 113-264*).

If a proposed use falls under one of the above five circumstances, it is exempt from review under this procedure. Any other Game Land use requests, whether originating from the public or from NCWRC staff, must be reviewed under this procedure and with consideration of the following guidance:

- **Natural resources-dependent recreational uses** (see definitions below), when compatible with each other, should be considered the priority general public uses of Game Land properties.
- **Other general public uses** that are not natural resources-dependent recreational uses as described herein, and do not contribute to the fulfillment of property purposes or goals or objectives, as described in the GLPMS, are lower priorities for consideration. These uses may conflict with priority general public uses, and may divert property management resources away from priority general public uses or from the responsibility of the NCWRC to protect and manage fish, wildlife, plants and their habitats. Therefore, procedure and practice have a general presumption against allowing such uses on Game Land properties. Regardless of how often they occur or how long they last, appropriateness and compatibility determinations for each use request must be made, as defined in Section V and VI of this procedure.

IV. DEFINITIONS

A. **Natural resources-dependent recreational use** is a use of a property involving: (1) hunting; (2) fishing; (3) trapping; (4) wildlife or other natural resource observation/ education.

B. **Property managers** are the officials employed by NCWRC who direct the management of a property, or the authorized representatives of such officials.

C. **Professional judgment** is a finding, determination or decision that is consistent with the principles of fish and wildlife management and administration, and that makes use of all available science and resources.

V. DETERMINING APPROPRIATE USE

A property use is appropriate if it meets Criterion A ***or*** if it meets all of Criteria B – F (and G, when applicable).

A. It is a natural resources-dependent recreational use of a property. These are: (1) hunting; (2) fishing; (3) trapping; (4) wildlife or other natural resource observation/education.

B. The NCWRC has jurisdiction over the use and, therefore, authority to allow or not allow the use.

C. The use complies with all laws and regulations (federal, state and local).

D. The use is consistent with NCWRC policies and objectives.

E. The use is consistent with public safety. *If the use creates an unreasonable level of risk to visitors or NCWRC staff, or if the use requires NCWRC staff to take unusual safety precautions to assure the safety of the public or other NCWRC staff, the use is not appropriate.*

F. Proceeds of revenue generating uses, by for-profit entities, will be provided to the NCWRC.

G. The use was evaluated under previous administrative review, was deemed inappropriate, and conditions have changed that would now make the use appropriate.

Property managers and other NCWRC staff shall consider the above criteria and complete Exhibit 1 (appended to this document) for each use subjected to the appropriateness test. The findings shall be forwarded to Regional Supervisors and through the chain of supervision to the Director (or a designee) for concurrence. This will serve to promote consistency in determining appropriate uses of NCWRC Game Lands.

VI. DETERMINING COMPATIBILITY

Uses that are determined to be appropriate for Game Land properties will then be evaluated for compatibility to determine if the use will be allowed, and under what conditions the use will be allowed on a specified property. Property managers are required to exercise professional judgment in making these determinations. Compatibility determinations are inherently complex and require the property manager to use field experience and knowledge of land management and of the property's resources, particularly its biological resources. When a property manager is exercising professional judgment, the property manager will use available information that may include consulting with others inside and/or outside the NCWRC. At a minimum, the property manager should consider the following questions.

A. Can the use be accommodated without substantially interfering with or detracting from the fulfillment of Game Lands program management objectives (see page 1, section I)?

B. Is the use compatible with the physical and natural resource characteristics of the property (e.g., topography, soils, plant communities, endangered species concerns)? *The use is generally incompatible if it has a high probability of causing erosion, or sedimentation, or disturbance of plant or animal resources.*

C. Is the use compatible with Natural Heritage Articles of Dedication, Clean Water Management Trust Fund (CWMTF) designations, and/or any deed restrictions or other legal limitations placed upon the property, including those specified for land purchased with Pittman-Robertson Wildlife Restoration Act funds?

D. Is there infrastructure present on the property to support the requested use (e.g., graveled

roads, parking areas, facilities)?

E. Is the requested activity not adequately provided for on other nearby public lands? *If a proposed use is available on other nearby lands, the NCWRC may not feel as strong an obligation to consider that use on Game Lands. Even if a use is <u>not</u> adequately provided for on other nearby public lands, the NCWRC still may not feel such an obligation, but should consider the unique nature of the request.*

F. Will the use necessitate facility, infrastructure development or maintenance and is this use manageable within available budget and staff? *If a proposed use diverts management efforts away from the proper and reasonable management of a property or natural resources-dependent recreational use, the use is generally incompatible.*

G. Will the use be manageable in the future within existing resources? *If the use would lead to recurring requests for the same or similar activities that will be difficult to manage in the future, then the use is generally incompatible. If the use can be managed so that impacts to natural and cultural resources are minimal or inconsequential, or if clearly defined limits can be established, then the use may be compatible.*

H. Is the requesting entity capable of providing any funding, labor, or materials for the development of, and maintenance support for, the activity, if applicable (e.g., trail or road maintenance, rehabilitation to areas that may be damaged by the activity)?

I. If a use is not compatible as initially proposed, can it be made compatible by implementing stipulations that avoid or minimize potential adverse impacts?

Property managers shall consider the above questions, and any other information or issues deemed necessary to make a determination based on professional judgment, and complete Exhibit 2 (appended to this document) for each property use subjected to a compatibility determination. The findings shall be forwarded to the Regional Supervisor and through the chain of supervision to the Director (or a designee) for concurrence. This will serve to promote consistency in determining compatible uses of NCWRC Game Lands.

VII. <u>EVALUATION</u>

The Director (or a designee) shall consider each request and the derived appropriateness and compatibility, and then make a determination as to whether the request will be approved or denied. The Director will forward use requests deemed significant in scope to the Commission's Use and Lands Committee, such as those involving: a) rule change, b) revenue generation, c) expenditure of NCWRC funds, or d) substantial alteration to infrastructure or natural resources.

All approved uses will be evaluated periodically by NCWRC field staff to determine whether such activities remain appropriate and compatible. All efforts will be made by field staff to inform participants of approved uses that issues of incompatibility will be grounds for immediate termination of the approved activity.

This is a living document that may be modified and updated as needed.

EXHIBIT 1

APPROPRIATE USE DETERMINATION

Property Name: _____

Requested or Considered Use: _____

DECISION CRITERIA *(refer to section V)*	YES	NO
A. Is the use a natural resource-dependent recreational use of a property?		
If 'NO' above, then consider the following criteria.		
B. Does the NCWRC have jurisdiction over the use?		
C. Does the use comply with laws and regulations (federal, state or local)?		
D. Is the use consistent with NCWRC policies and objectives?		
E. Is the use consistent with public safety?		
F(i). Is the requesting entity a non-profit? F(ii). If NO to F(i), will any proceeds of the use be provided to the NCWRC? (*Describe for-profit entity and supply information on proceeds to be provided to the NCWRC in the Comments section below*)		
G. If the use was evaluated under previous administrative review and deemed inappropriate, have circumstances changed that would now make the use appropriate? (*leave blank if not applicable*)		

To be found appropriate, answers to Criterion A **OR** Criteria B – F (and G, if applicable) must be YES.

Determination (check one below):

_____ Appropriate _____ Not Appropriate

Comments:

Property Manager: _____ Date: _____

Regional Supervisor: _____ Date: _____

EXHIBIT 2

COMPATIBILITY DETERMINATION

(*Use as much space as needed*)

Property Name: _____

Requested or Considered Use: _____

DECISION CRITERIA *(refer to section VI)*	YES	NO	Comments
A. Use will not interfere with or detract from fulfillment of Game Land program management objectives?			
B. Use is compatible with the physical and natural resource characteristics of the property?			
C. Use is compatible with Natural Heritage Articles of Dedication, CWMTF designations, and/or any deed restrictions or other legal limitations placed upon the property? **OR** (in the absence of the above) do acquisition funding partners otherwise agree to the proposed use?			
D. Infrastructure is present on the property to support the requested use?			
E. Requested activity is not adequately provided for on other nearby public lands?			
F. Use is manageable within available budget & staff?			
G. Will the use be manageable in the future within existing resources?			
H. Is the requesting entity capable of providing any maintenance support for the activity, if applicable?			
I. If the use is not compatible as initially proposed, can it be modified with stipulations that avoid or minimize potential adverse impacts and make the use compatible?			
Other (*insert*):			

To be found compatible, answers to ALL of the above questions must be YES.

Determination (Check one below):

_____ Compatible _____ Not Compatible

Stipulations necessary to ensure compatibility (*e.g., Memorandum of Agreement; performance bond; time, space, or size limitations*):

Justification/Comments:

Property Manager: _____ Date: _____

Regional Supervisor: _____ Date: _____

IV. Geocaching Policy (DRAFT)

GEOCACHING POLICY

~~**November 20, 2013**~~

~~**May 1, 2014**~~

September 29, 2014

CONTENTS

INTRODUCTION

Geocaching is a real-world, outdoor treasure hunting game using GPS-enabled devices. Participants navigate to a specific set of GPS coordinates and then attempt to find the geocache (container) hidden at that location (http://www.geocaching.com/guide). Individuals who participate are known as geocachers.

OBJECTIVES

• Minimize potential impacts of geocaching on WRC-allocated lands.

• Where appropriate and compatible, support geocaching as a means of providing for additional recreational use of WRC-allocated lands and to increase awareness of WRC and its mission.

APPLICATION

This policy applies to all WRC-allocated lands and those WRC-managed properties where the landowner has ceded authority for the management of recreational uses to WRC. On those lands which WRC manages under cooperative agreements which do not cede authority for management of recreational uses in general, geocaching activities are subject to control of the landowner.

CONSENT

On WRC-allocated lands, and those WRC-managed properties where the landowner has ceded authority for the management of recreational uses to WRC, blanket permission is granted for the placement of geocaches which comply with the provisions of this policy. No special license, permit or fee is required at this time.

DEFINITIONS

Archive - Archiving a cache removes the listing from public view on Geocaching.com.

Cache (Geocache) – A hidden container that includes, at minimum, a logbook for geocachers to sign.

EarthCache - An EarthCache is a special place that people can visit to learn about a unique geoscience feature of our Earth. EarthCache pages include a set of educational notes along with cache coordinates. Visitors to EarthCaches can see how our planet has been shaped by geological processes, how we manage its resources and how scientists gather evidence to learn about the Earth.

Geocachers – Individuals who participate in placing and/or seeking geocaches.
GPS - GPS stands for Global Positioning System. It is a system of satellites that work with a GPS receiver to determine your location on the planet.

Multi-Cache (Offset Cache) - A Multi-Cache ("multiple") involves two or more locations. The final location is a physical container. There are many variations, but most Multi-Caches have a hint to find the second cache, and the second cache has a hint to the third, and so on. An offset cache (where you go to a location and get hints to the actual cache) is considered a Multi-Cache.

Physical Cache – Cache consisting of a sealed container and containing at least a logbook and pen or pencil.

Stash Note - In geocaching, a stash note is a note left in a cache container to explain geocaching to any non-cachers who might stumble across the cache.

Virtual Cache – Cache that exists in the form of a location where no physical object is left. **Note**: grandfathered caches are still available to find, but have otherwise been retired as a geocache type and may no longer be created on Geocaching.com.

WRC – Wildlife Resources Commission.

GENERAL GUIDELINES

1. WRC will seek to foster a cooperative partnership with the geocaching community to promote the objectives of this policy

2. Geocachers are encouraged to practice principles of Leave no Trace outdoor ethics.

3. The cache owner must assume all responsibility for the accuracy of online content.

4. WRC accepts no responsibility for the security or maintenance of physical caches.

5. Geocachers are encouraged to wear blaze orange in areas where hunting is allowed.

6. All caches must be registered and comply with www.geocaching.com guidelines finder (see ATTACHMENT 1).

7. Caches may not be used for purposes of advertising, commercial gain, or promotion of political or other social agendas.

8. Acceptable caches include physical caches, virtual caches, multi-caches, and EarthCaches.

CACHE PLACEMENT

9. Caches may not be placed in areas of known archaeological, historical, or ecological significance.

10. Caches may not be placed in stockpiled construction/maintenance materials such as gravel, lime, sand, etc.

11. Caches may not be placed in locations that present a safety risk to those subsequently attempting to locate the cache. Examples include, but are not limited to caves, rock outcrops, top of ledges, base of overhanging cliffs, elevated positions that require climbing above ground level, blind curves adjacent to roadways, etc.

12. Caches may not be placed within 100 feet of any lake, pond, or waterway.

13. Caches may not be placed in locations where public access is prohibited.

14. Cache placement may not involve alternation of the natural environment, such as digging, cutting, or removal of vegetation from its present location except that dead and down vegetation may be used to help with concealment.

15. Caches may not be placed within or attached to any man-made amenity such as buildings, piers, docks, or wildlife nest box structures and may not be attached to any other feature by use of nails, screws, bolts, or wire.

16. Caches may not be placed within cavities of any tree.

17. Marks may not be placed on any natural or man-made feature to aid in locating a cache.

18. Caches may not be placed in maintained landscaped areas, wildlife openings, or areas containing agricultural crops. Areas containing blackened tree trucks, which indicate frequent application of prescribed fire, should be avoided.

CACHE CONTAINERS

19. Containers must be clearly labeled on the exterior as a "geocache", along with the name of the cache as it appears at: http://www.geocaching.com/

20. Containers should be waterproof or sealable.

21. Containers may not exceed a volume greater than 1 cubic foot.
22. Clear (see through) containers are preferred.

23. Containers may not consist of PVC or metal pipe.

CACHE CONTENTS

24. Containers must include contact information of the cache owner, to include at a minimum a daytime phone number or email address.

25. All cache containers should contain a standard geocache "stash note" explaining the activity to an unintentional finder (see ATTACHMENT 2).

26. Contents must be family friendly and appropriate for all ages.

27. Caches may not contain items that are inappropriate, offensive, dangerous, or illegal. Examples of such items include, but are not limited to firearms, weapons, ammo, alcohol, drugs, explosives, items of an adult nature, etc.

28. Caches may not contain food items.

29. The cache should contain a log book and pen or pencil for finders of the cache to log their visit.

30. Trade items are acceptable, provided such items are in compliance with this policy.

ENFORCEMENT

WRC supports responsible non-traditional use of WRC lands and recognizes the enjoyment and recreational value associated with Geocaching. However, we reserve the right to restrict, without prior notice, any cache and/or all Geocaching activities:
• deemed to be in an inappropriate or potentially unsafe location,
• where uses conflict with legal hunting, fishing, trapping, or the Commission's management and administration of WRC lands,
• found to be causing or having the potential to cause undue impact to archaeological, historical, or ecological resources,
• containing inappropriate, offensive, dangerous, or illegal items, or
• determined for any other reason to be in non-compliance with the provisions of this policy.

An immediate attempt will be made to contact the owner of any cache that is removed to provide the owner with an opportunity to retrieve the cache and to alert the owner of the need to archive the cache as quickly as possible.

ATTACHMENT 1 – GEOCACHING.COM

Each cache submitted to Geocaching.com is reviewed to ensure that the cache meets the Geocaching Listing Guidelines (http://www.geocaching.com/about/guidelines.aspx). It may take up to three days for the volunteer to contact you and make your cache live on the web site. Sometimes the volunteer will need to work with you to fine-tune the listing so it can be published..

Following is the general review process and sequence of events:

• Hider places the cache, fills out the appropriate form http://www.geocaching.com/hide/planning.aspx at geocaching.com, and checks off the boxes indicating they have read and understand the guidelines.
• Cache appears in a queue that only the Goecaching.com volunteers and staff can access.
• Cache is reviewed to ensure it meets the guidelines, with specific attention paid to the location in areas known to have a geocaching policy, proximity to other caches, schools, railroads, and other sensitive areas.
• The cache description is verified to make sure it matches the posted waypoint and that the hider lives near enough to properly maintain their hide.
• The cache is then published and posted to geocaching.com for all to see.

ATTACHMENT 2 – GEOCACHE STASH NOTE

GEOCACHE SITE – PLEASE READ

Congratulations, you've found it! Intentionally or not!

What is this hidden container sitting here for? What is this thing doing here with all these things in it?

It is part of a worldwide game dedicated to GPS (Global Positioning System) users, called Geocaching. The game basically involves a GPS user hiding "treasure" (this container and its contents) and publishing the exact coordinates so other GPS users can come on a "treasure hunt" to find it. The only rules are: if you take something from the cache, you must leave something for the cache, and you must write about your visit in the logbook. Hopefully, the person that hid this container found a good spot that is not easily found by uninterested parties. Sometimes, a good spot turns out to be a bad spot, though.

IF YOU FOUND THIS CONTAINER BY ACCIDENT:

Great! You are welcome to join in! Geocaching.com asks only that you:

- Please do not move or vandalize the container. The real treasure is just finding the container and sharing your thoughts with everyone else who finds it.

- If you wish, go ahead and take something. But please also leave something of your own for others to find, and write it in the logbook.

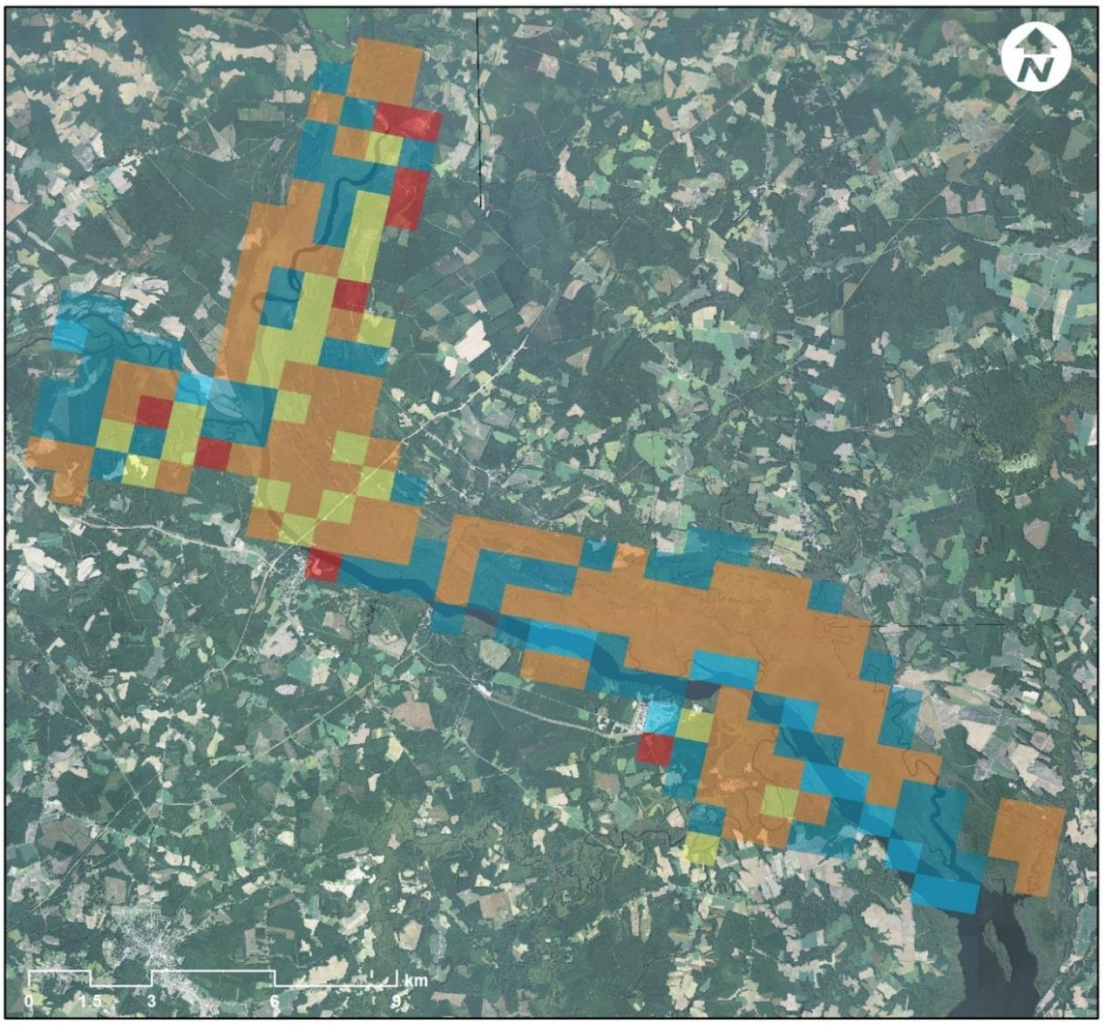
- If possible, let Geocaching.com know you found it by visiting the web site listed below.

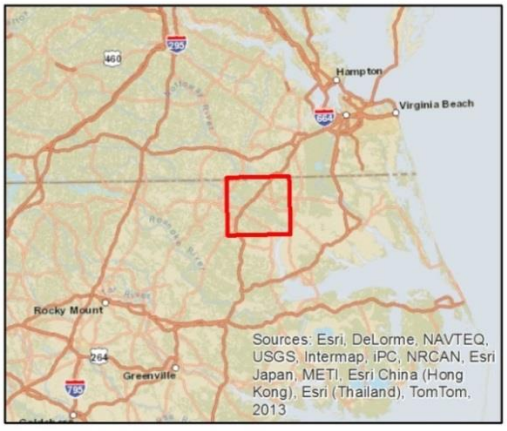
Geocaching is open to everyone with a GPS enabled device and a sense of adventure. There are similar sites all over the world. The organization has its home on the Internet. Visit Geocaching.com if you want to learn more, or have any comments

http://www.geocaching.com

V. Neotropical Bird Use of CSGL

Classified bird stopover density use of Chowan Swamp Game Land during 2009 and 2010 Spring migration seasons (La Puma and Buler 2013).



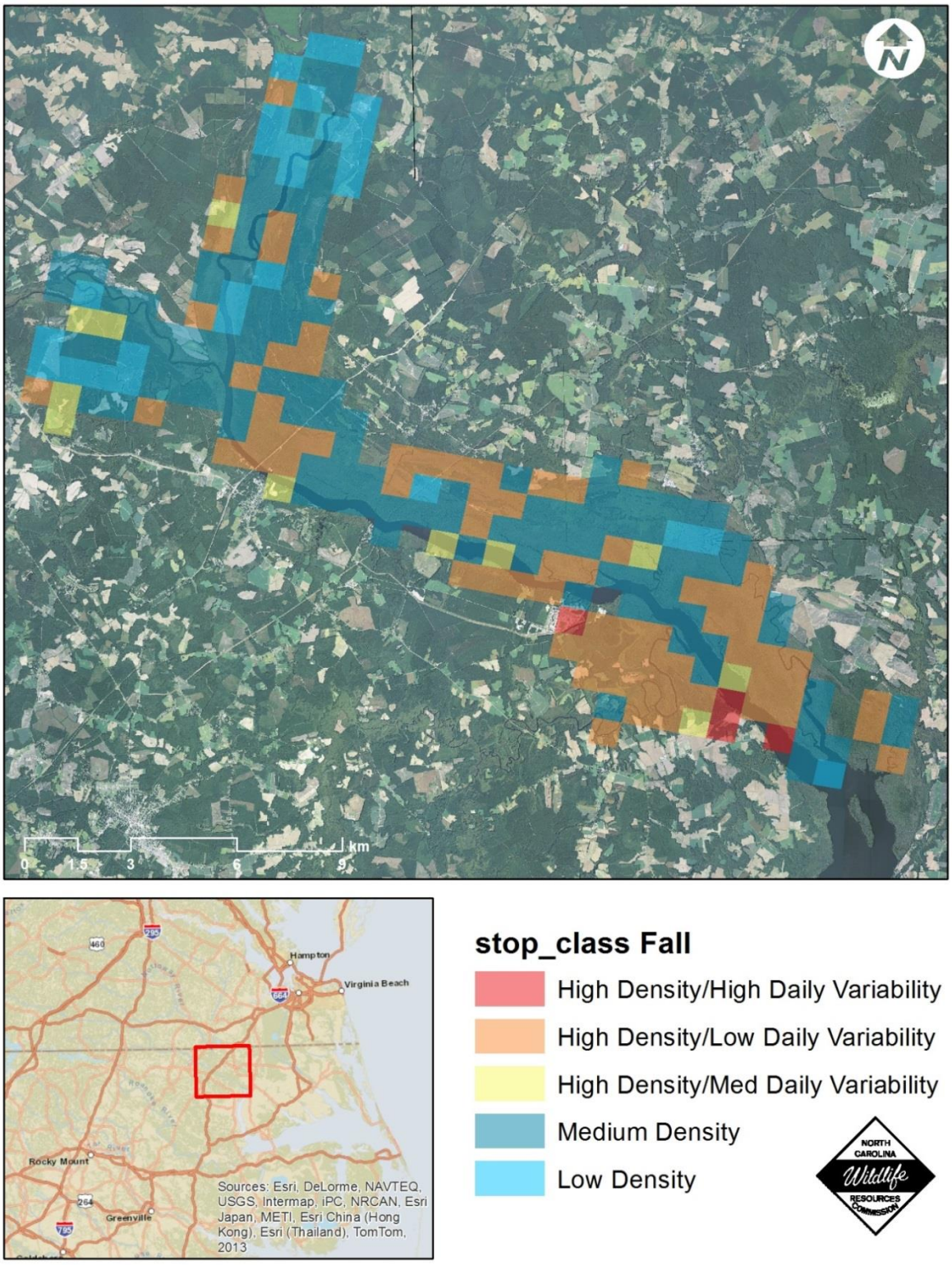


stop_class Spring

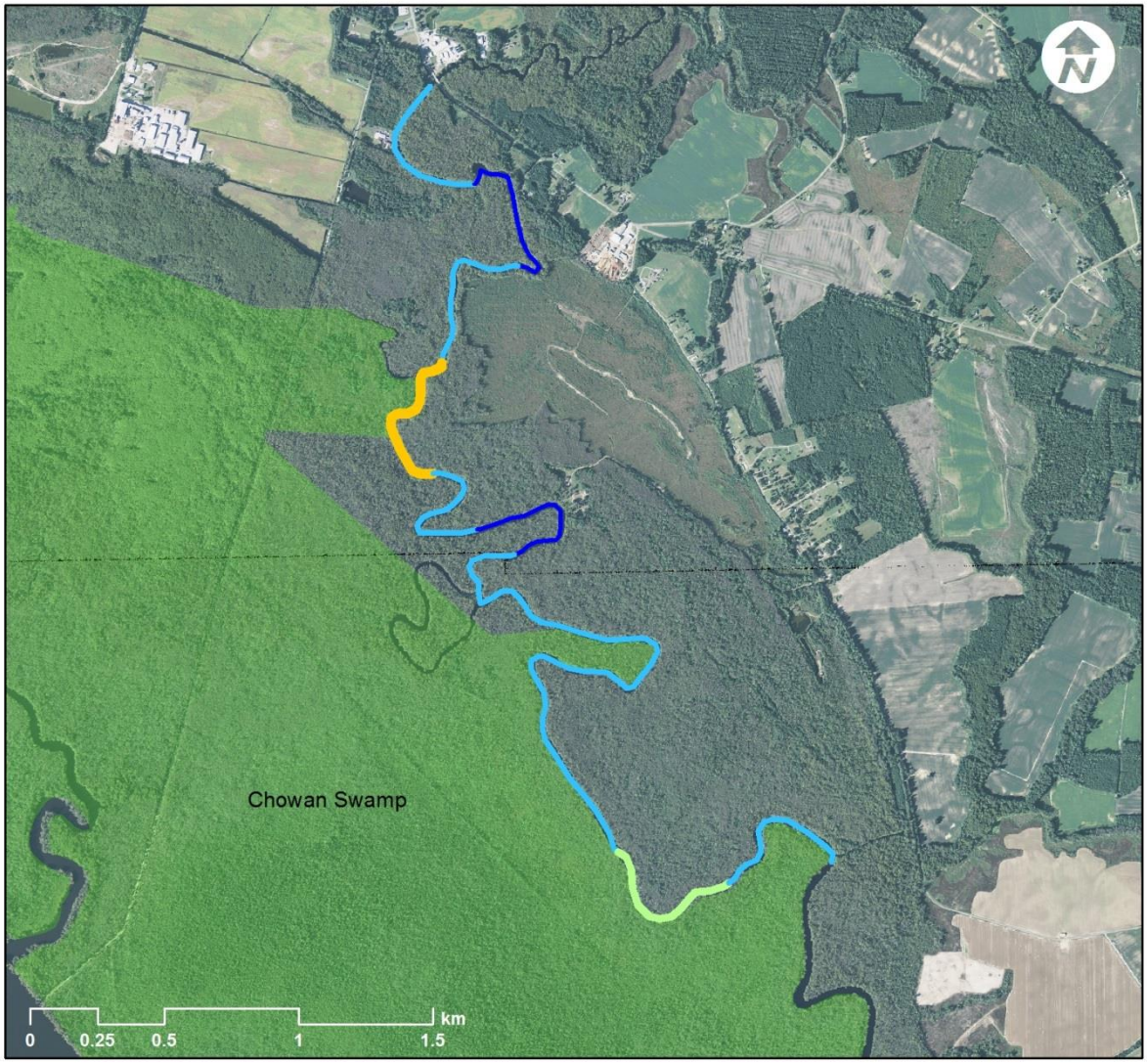
- High Density/High Daily Variability
- High Density/Low Daily Variability
- High Density/Med Daily Variability
- Medium Density
- Low Density

NORTH CAROLINA Wildlife RESOURCES COMMISSION

Classified bird stopover density use of Chowan Swamp Game Land during 2008 and 2009 Fall migration seasons (La Puma and Buler 2013).



Number of target species detected along Bennett's Creek on May 15, 2012.



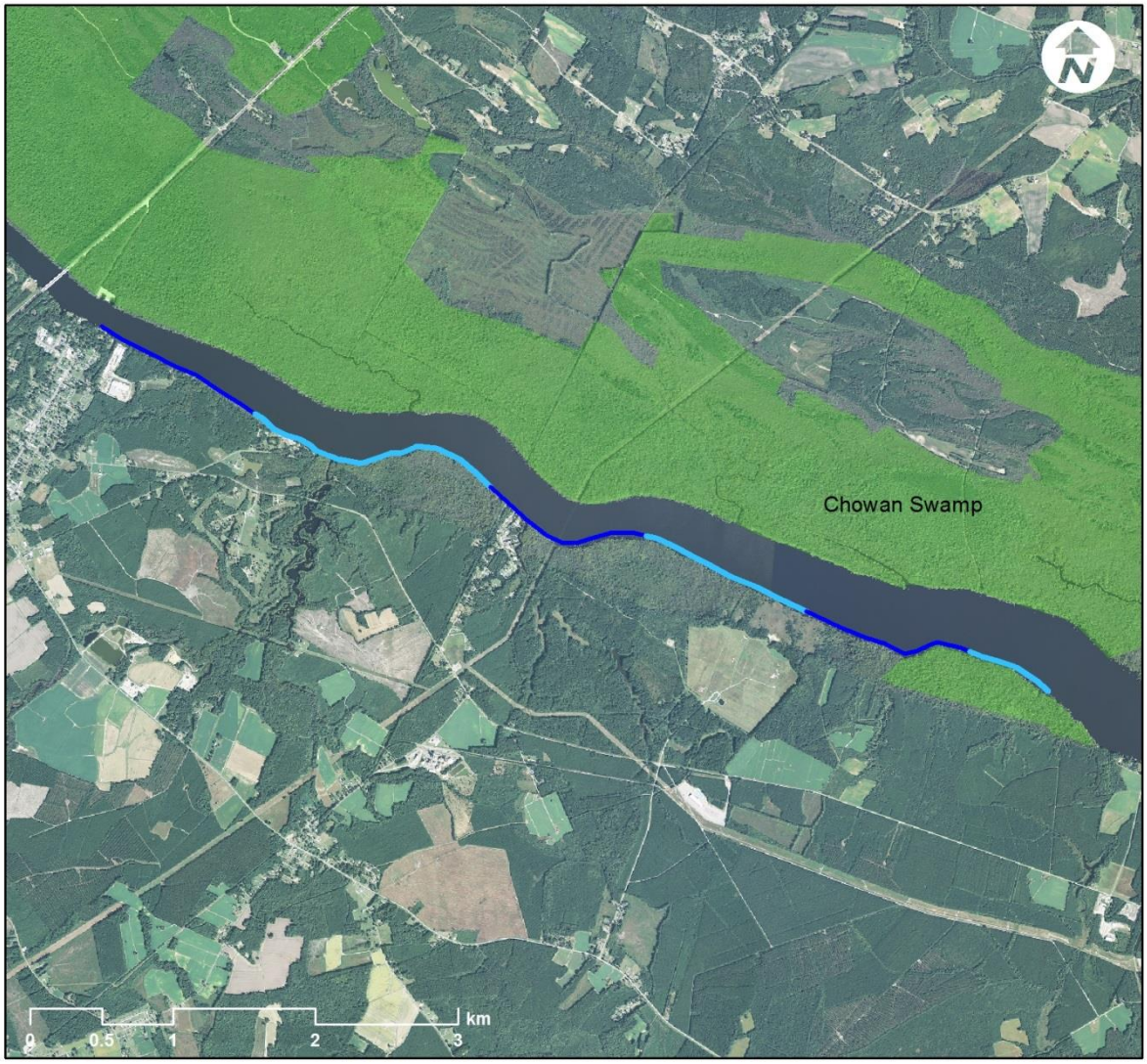
Total birds

- 3 - 11
- 12 - 18
- 19 - 26
- 27 - 33
- 34 - 41

Gameland

NORTH CAROLINA Wildlife RESOURCES COMMISSION

Number of target species detected along upper Chowan River on May 15, 2012.



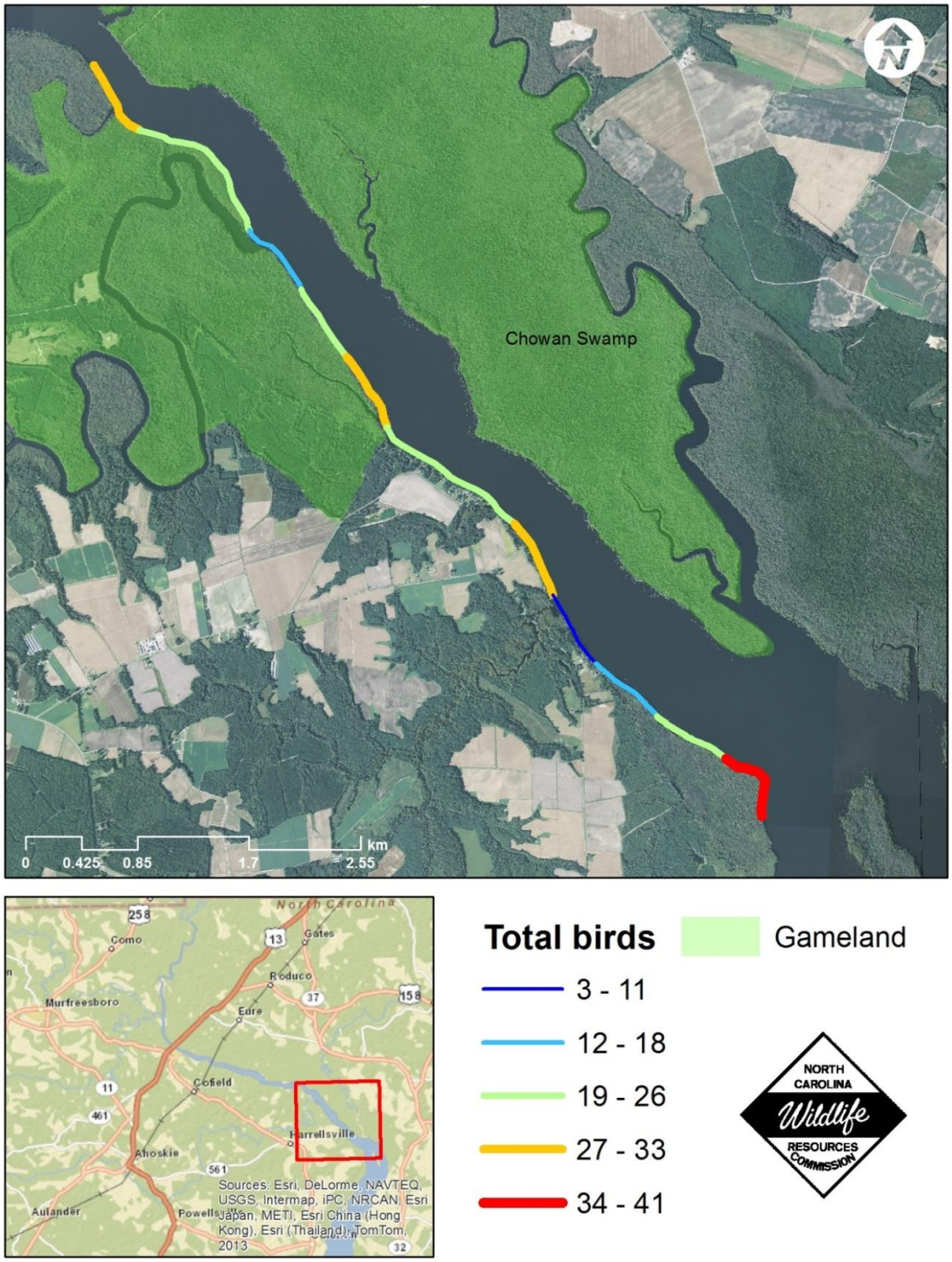
Total birds

- 3 - 11
- 12 - 18
- 19 - 26
- 27 - 33
- 34 - 41

Gameland

NORTH CAROLINA Wildlife RESOURCES COMMISSION

Number of target species detected along lower Chowan River on May 15, 2012.



VI. Species Ranking Sheet

Descriptions and definitions are gathered from LeGrand et al. (2013) and Gadd and Finnegan (2013).

North Carolina Status Designations for Animals

Status Code	Status	Definition
E	Endangered	“Any native or once native species of wild animal whose continued existence as a viable component of the State’s fauna is determined by the Wildlife Resources Commission to be in jeopardy or any species of wild animal determined to be an ‘endangered species’ pursuant to the Endangered Species Act.” (Article 25 of Chapter 113 of the General Statues; 1987).
T	Threatened	"Any native or once-native species of wild animal which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, or one that is designated as a threatened species pursuant to the Endangered Species Act." (Article 25 of Chapter 113 of the General Statues; 1987).
SC	Special Concern	"Any species of wild animal native or once-native to North Carolina which is determined by the Wildlife Resources Commission to require monitoring but which may be taken under regulations adopted under the provisions of this Article." (Article 25 of Chapter 113 of the General Statues; 1987).
SR	Significantly Rare	Any species which has not been listed by the N.C. Wildlife Resources Commission as an Endangered, Threatened, or Special Concern species, but which exists in the state (or recently occurred in the state) in small numbers and has been determined by the N.C. Natural Heritage Program to need monitoring. This is a NC Natural Heritage Program designation.) Significantly Rare species include "peripheral" species, whereby North Carolina lies at the periphery of the species' range as well as species of historical occurrence with some likelihood of re-discovery in the state. Species considered extirpated in the state, with little likelihood of re-discovery, are given no N.C. Status (unless already listed by the N.C. Wildlife Resources Commission as E, T, or SC).

North Carolina Rank Designations of Animals by the North Carolina Natural Heritage Program

Rank	Number of Extant Occurrences	Description
S1	1-5	Critically imperiled - Critically imperiled in North Carolina due to extreme rarity or some factor(s) making it especially vulnerable to extirpation (local extinction) from the state. Typically 5 or fewer occurrences or very few remaining individuals (<1000).
S2	6-20	Imperiled - Imperiled in North Carolina due to rarity or some factor(s) making it very vulnerable to extirpation from the state. Typically 6-20 occurrences or few remaining individuals (1,000-3,000).
S3	21-100	Vulnerable - Vulnerable to extinction in North Carolina either because rare or uncommon, or found only in restricted range (even if abundant at some locations), or due to other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.
S4	100-1000	Apparently secure - Apparently secure and widespread in North Carolina, usually with more than 100 occurrences and more than 10,000 individuals.
_B	1-?	Rank of the breeding population in the state. Used for migratory species only.
_N	1-?	Rank of the non-breeding population in the state. Used for migratory species only.

Federal Status Designations for Animals

Status Code	Status	Definition
FSC	Species of Concern	"The Service remains concerned about these species, but further biological research and field study are needed to resolve the conservation status of these taxa. Many species of concern will be found not to warrant listing, either because they do not qualify as species under the definition in the [Endangered Species] Act. Others may be found to be in greater danger of extinction than some present candidate taxa. The Service is working with the States and other private and public interests to assess their need for protection under the Act. Such species are the pool from which future candidates for listing will be drawn." (Federal Register, Feb 28, 1996). The Service suggests that such taxa be considered as "Species of Concern" which as no official status.

Global Rank Designations of Animals by NatureServe

Rank	Number of Extant Occurrences	Description
G3	21-100	Vulnerable - Vulnerable globally either because very rare throughout its range, found only in restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.
G4	100-1000	Apparently secure - Uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery) and usually widespread. Apparently not vulnerable in most of its range, but possibly cause for long-term concern. Typically with more than 100 occurrences and more than 10,000 individuals.
G5	1000+	Secure - Common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Not vulnerable in most of its range. Typically with considerably more than 100 occurrences and more than 10,000 individuals.

T_	-	The rank of a subspecies or variety. As an example, G4T1 would apply to a subspecies of a species with an overall rank of G4, but the subspecies warranting a rank of G1.
Q	-	Questionable taxonomy that may reduce conservation priority. Distinctiveness of this entity as a taxon at the current level is questionable. Resolution of this uncertainty may result in change from a species to a subspecies or inclusion of this taxon in another taxon, with the resulting Element having a lower-priority conservation status rank.

VII. Game Land Management Plan comment from the North Carolina Natural Heritage Program

NCDENR
North Carolina Department of Environment and Natural Resources
Office of Land and Water Stewardship

Pat McCrory
Governor

Bryan Gossage
Director

Donald R. van der Vaart
Secretary

March 20, 2015

David Turner, Northern Coastal Management Biologist
North Carolina Wildlife Resources Commission
132 Marine Drive
Edenton, NC 27932

Dear Mr. Turner:

The North Carolina Natural Heritage Program appreciates the opportunity to provide input as the North Carolina Wildlife Resources Commission (WRC) develops a management plan for the Chowan Swamp Game Land. We also appreciate the ecosystem management approach that the WRC has historically applied to managing the Game Lands, and would encourage WRC to continue with this management philosophy, especially as natural habitats across North Carolina are degraded, and habitat fragmentation increases. Maintaining high-quality examples of North Carolina's natural ecosystems is important for native wildlife - including rare species - and the citizens of our state.

The Natural Heritage Program (NHP) welcomes a continued partnership in conservation, and of course extends an offer to assist in planning, as well as provide the information on natural resources that we have acquired over the years – often with the help of WRC biologists. We propose that WRC incorporate natural heritage data into the management plan, including the element occurrences of rare species, special animal habitats, and exemplary and rare natural communities, and particularly, the Natural Heritage Areas and Dedicated Nature Preserves that have been identified by the NHP as priorities for conservation. Our information is available spatially through GIS data layers, in site reports, and we will make NHP biologists available to provide specific information on the resources as necessary.

The Chowan Swamp Game Land contains several distinctive outstanding features. The Chowan Sand Banks portion, on the dry uplands east of the river, is the only large remnant of the distinctive northern longleaf pine sandhills, and ongoing restoration efforts are improving its condition. The Chowan Swamp, in the vast wetlands along the river, is one of the outstanding swamps of eastern North Carolina. The wetlands also help protect the Chowan River Aquatic Habitat, with its collection of rare mussels.

There are some specific issues we recommend addressing in the Chowan Swamp Game Lands management plan. The primary specific management issue we would like to see addressed is the need to continue prescribed burning in the Sand Banks portion of the game land. We also hope to see continued work on restoring longleaf pine in this area, while protecting the remaining native ground cover vegetation where it is in good condition.

The Chowan Swamp Game Land management plan intends to help guide management and user activities for the next ten years. During that time, North Carolina will most likely continue to be one of the fastest-growing states in the nation. Maintaining the integrity of natural areas and connectivity for wildlife within the Game Lands will provide a much greater opportunity for North Carolina's native diversity to remain viable. Thank you for your contribution to the conservation of our natural resources in North Carolina. Please contact me or other NHP staff if you have any questions, or would like additional information.

Sincerely,

Scott Pohlman

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-707-8600 \ Internet: www.ncdenr.gov

VIII. Public Comment Questions

Game Land Management Plan

Public Input Meeting

Your input is important to us, so please participate. You can provide written comments on this form, comment online at @ www.ncwildlife.org then click on "Comment on Game Land Plans", or provide verbal comments during the breakout session.

Core Questions

1. What habitats do you think are most important to protect and/or improve on this game land?

2. Considering those that live on land and in water, what species do you think are most important to protect and/or improve on this game land?

3. How do you use this game land?

4. Please explain why you think the current level of access is, or is not, satisfactory on this game land?

5. What suggestions, if any, do you have for changing how this game land is managed and maintained?

6. What would encourage you to start using this game land, or to continue using it more actively?

7. What additional comments do you have regarding this game land?

Game Land:

Date:

Affiliation:

IX. Received Public Input and Comment

1. What habitats do you think are most important to protect and/or improve on this game land?

HABITAT TYPE	NUMBER OF REPONSES	PERCENTAGE OF REPONSES
All Habitats	3	13%
Deer	6	25%
Bear	2	8%
Turkey	2	8%
Small Game	2	8%
Oaks/Hardwoods	10	42%
Swamp Habitats	2	8%
Pine/Upland	3	13%
Food Plots	6	25%
Mixed Forests	2	8%
Songbirds	1	4%
Water Quality	2	8%

Public Input Meeting/Online	Comment
Public Input Meeting	Vegetation for deer and additional food plots should be planted
Public Input Meeting	deer and bear food sources
Public Input Meeting	hardwoods for food supply for deer, berries or those types of plants for bear
Public Input Meeting	mixed tree types, water access
Public Input Meeting	mast-producing hardwood areas, Atlantic white cedar swamps
Public Input Meeting	food plot areas for deer populations
Public Input Meeting	more food
Public Input Meeting	All oak trees. Need to plant more oak trees since this is a tree that supplies food for wildlife
Public Input Meeting	whitetail deer, no oak trees-just pine pine pine
Public Input Meeting	oaks
Public Input Meeting	habitat for songbirds, migrating tropical - restore dogwood
Public Input Meeting	I like take all habitats and bring to the table for food.
Public Input Meeting	n/a
Public Input Meeting	all wildlife
Public Input Meeting	all animals
Public Input Meeting	deer, quail, rabbits, native vegetation, hardwood forests, turkey
Public Input Meeting	oaks
Public Input Meeting	trees and thick cover
Public Input Meeting	water quality, early successional, food plots
Public Input Meeting	mass producing trees, plant ares promoting wildlife/herbaceous plant areas,

	need open areas (3-5 acre food plots) no habitat areas (cover and food)
Public Input Meeting	hardwood management, oak and hickory, seed producing pine, longleaf, food plots
Online	I would like to see a more diverse use of land on all game lands. In particular, I would like to see long leaf pines planted instead of hybrid seedlings. At least along highway, field and river borders. I feel this would benefit wildlife more in general. Also, more hardwoods and fruit bearing trees since all of this is being replaced by weyerhauser seedlings on all private lands.
Online	The Chowan Swamp Game Land contains several distinctive outstanding features. The Chowan Sand Banks portion, on the dry uplands east of the river, is the only large remnant of the distinctive northern longleaf pine sandhills, and ongoing restoration efforts are improving its condition. The Chowan Swamp, in the vast wetlands along the river, is one of the outstanding swamps of eastern North Carolina. The wetlands also help protect the Chowan River Aquatic Habitat, with its collection of rare mussels.
Online	The river itself always and all flora and fauna of the area. More attention to local native plants and trees not just long leaf pine like dogwood trees, beauty berry bush, butterfly weed, lupine etc.

2. Considering those that live on land and in water, what species do you think are most important to protect and/or improve on this game land?

SPECIES	NUMBER OF REPONSES	PERCENTAGE OF REPONSES
Deer	15	75%
Bear	5	25%
Turkey	6	30%
Small Game	7	35%
Waterfowl	1	5%
Fish	2	10%
Songbirds/ Eagles	4	20%
All Game	2	10%
Limit Foxes/ Coyotes	2	10%

PUBLIC INPUT MEETING/ONLINE	COMMENT
Public Input Meeting	Deer, quail, rabbits, turkey
Public Input Meeting	deer, bear
Public Input Meeting	birds, bear, deer, rabbits
Public Input Meeting	improve on deer populations
Public Input Meeting	deer

Public Input Meeting	less thinning of pines so wildlife will have a good place to bed down
Public Input Meeting	quail, almost extinct
Public Input Meeting	small game
Public Input Meeting	bear, turkey, songbirds, ducks
Public Input Meeting	hunting and fishing is improve to all hunting
Public Input Meeting	deer, turkey
Public Input Meeting	deer, turkey, rabbits, all animals
Public Input Meeting	deer
Public Input Meeting	deer, quail, rabbits, turkey, herring
Public Input Meeting	deer, bear
Public Input Meeting	deer, turkeys
Public Input Meeting	deer, turkey, quail, squirrel, limit foxes-coyotes
Public Input Meeting	deer
Public Input Meeting	deer, bear, general wildlife, control coyote population, bird species
Online	1.Birds that are residential and all migratory birds that frequent the river all summer and fall. Parts of the habitat around Dowry Island and others places are ideal for the Bald Eagle and other migratory birds. 2. Fish and mussels of the Chowan and its tributaries which are vital to the health of the Chowan & its tributaries

3. How do you use this game land?

Activity	NUMBER OF REPONSES	PERCENTAGE OF REPONSES
Hunting	19	79%
Fishing/ River Access	11	46%
Wildlife Viewing/ Photography/ Sightseeing	8	33%
Deer Hunting	5	21%
Hiking	3	13%
Bear Hunting	2	8%
Turkey Hunting	2	8%
Small Game Hunting	1	4%
Horseback Riding	1	4%
ATV	1	4%

PUBLIC INPUT MEETING/ONLINE	Comment
Public Input Meeting	pleasure, hunting with hounds, river access
Public Input Meeting	hunting, fishing
Public Input Meeting	to hunt, sightseeing (river views, wildlife views)
Public Input Meeting	fish, hunt, sightsee
Public Input Meeting	bird watching, sightseeing, trail riding, fishing

Public Input Meeting	occasional hunting (turkey)
Public Input Meeting	deer hunting with hounds
Public Input Meeting	hunt with hounds for deer
Public Input Meeting	hunting with dogs
Public Input Meeting	I deer hunt it using dogs
Public Input Meeting	hunting
Public Input Meeting	hunting and fishing
Public Input Meeting	nature watching, photography
Public Input Meeting	hunting and fishing and enjoying the habitats
Public Input Meeting	hunt/fishing
Public Input Meeting	hiking
Public Input Meeting	pleasure
Public Input Meeting	deer hunt, rabbit hunt, bear hunt using hounds
Public Input Meeting	hunting with hounds, fishing
Public Input Meeting	dog hunting
Public Input Meeting	hunt, fish, hiking, ATV
Public Input Meeting	hound hunting, still hunting, turkey, suggestion - pay extra for road maintenance and access issues (open wildlife gates) need rifle usage height limit ~10 feet. Bear days, why is it limited to 3 days per season. Need more game land monitoring - Game warden. What's the difference between ATV's and horses? Need horse regulation
Public Input Meeting	sightseeing, wildlife viewing, hunt, fish, bird watching, photo, solitude
Online	Walking, photographing nature, fishing from shoreline, driving on designated paths, and just observing natural occurrences during different seasons.

4. Please explain why you think the current level of access is or is not, satisfactory on this game land?

CURRENT LEVEL OF ACCESS	NUMBER OF REPONSES	PERCENTAGE OF REPONSES
Increase	8	31%
Keep As Is	5	19%
More Restrictive	4	15%
Open More Gates	4	15%
Maps/ Education	3	12%
Improve Roads	2	8%
Regulated Horseback Riding	2	8%
Equal Use of Land	1	4%
Reduce Disturbance During Off Season	1	4%
Allow ATV/UTV	1	4%
PFA	1	4%
BAA	1	4%
Reduce Hunt Days	1	4%

Trespass/ Enforcement	1	4%
Better Maintenance	1	4%
Institute Use Fee	1	4%

PUBLIC INPUT MEETING/ONLINE	COMMENT	PLAN RESPONSE
Public Input Meeting	I think 6 days a week hunting is too much	
Public Input Meeting	Easier maps with detailed roads, not just state road numbers	Designated hunting seasons, maps with road names, and rules governing the game lands can be found at www.ncwildlife.org. Informational kiosks are being placed at many of the main game land entrances. It is the responsibility of the user to know and understand the area in which they are using.
Public Input Meeting	for most part ok	
Public Input Meeting	plant hardwoods	Addressed in the plan.
Public Input Meeting	I would like to see everyone have equal use of the land	Many different uses are currently allowed on the game lands.
Public Input Meeting	closed gates limit access to game lands	Gates and road closures are addressed in the plan.
Public Input Meeting	The current level of access could be increased slightly and road conditions increased.	Road improvements are addressed in the plan.
Public Input Meeting	not enough food	
Public Input Meeting	The current level of access is satisfactory with 2 accesses to the river	
Public Input Meeting	good access	
Public Input Meeting	need public boating access and public fishing area	There are 6 boats ramps that serve CSGL users. Public fishing areas are located at Shoups BAA and PFA, Winton at a CAMA access, and Edenhouse Bridge BAA and PFA in Edenton. Additional PFA's will be evaluated as needed.
Public Input Meeting	I think is very satisfactory	
Public Input Meeting	need more access during off season	
Public Input Meeting	is not sat. too much access	
Public Input Meeting	not satisfactory, too many gates	
Public Input Meeting	satisfactory, except adjoining hunt clubs and landowner that adjoin game land should have access to retrieve hounds	
Public Input Meeting	more trails should be open during	Gates and trails are covered in the plan.

	hunting season	
Public Input Meeting	open more gates	
Public Input Meeting	more access during the off season, close gates after the hunting season, wildlife needs a break, need access to retrieve dogs, open gate at the end of Bear Rd.	Balancing still hunter and hunters using dogs needs is a difficult challenge. Keeping Bear Road gate closed at the "T" allows still hunters a place to hunt without having a truck constantly drive by them. The decision to close the road beyond the "T" was made since there was adequate access surrounding that tract of woods.
Public Input Meeting	Sunday ATV rides, If it is open to horseback riders then it should be open to other activities.	
Public Input Meeting	Restrict horseback riding, no horseback riding on hunt days, need fee for other game land user groups	Comments noted.
Public Input Meeting	Protect adjacent landowners, boundary near Parker's Ferry and Camp PD. More education and communication.	The NCWRC maintains boundary with paint and signs and strives to ensure maps are as accurate as possible. Adjacent landowners are encouraged to mark their boundary. If trespass issues persist, contact an Enforcement Officer. Designated hunting seasons, maps with road names, and rules governing the game lands can be found at www.ncwildlife.org. Informational kiosks are being placed at many of the main game land entrances. It is the responsibility of the user to know and understand the area in which they are using.
Public Input Meeting	maintain Rays Beach, leave veg. on side or road, drag with smaller equipment, maintain Gatlington	
Online	Of all people allowed access, only hunters are required to pay for this access. I would like to see all who enjoy this resource to help support it. Access it cut on many game lands to 2 or 3 days for hunters with no restrictions for others. This needs to be corrected.	Comment noted.
Online	We ride our horses at the "Sand Banks" or Chowan Swamp game lands. The property is outstanding and well kept, what a treasure. Comments; up to date trail map and mark trails. By marking trails	Designated hunting seasons, maps with road names, and rules governing the game lands can be found at www.ncwildlife.org. Informational kiosks are being placed at many of the main game land entrances. It is the responsibility of the user to know and understand the area in

	with names or numbers it allows quick feedback to emergency personal on location.	which they are using. NCWRC has worked with Gates County Emergency Management to number all the gates on the Sand Banks Tract to facilitate first responder's needs.
Online	it seems that vast amount of land is catered to small groups of hunters, and not developed for other recreational uses as boating, fishing, walking trails, horseback riding, etc. With planning and support could be tied in with Merchants Millpond State Park thru creeks etc. for paddle boating, canoeing etc. The Millpond draws nature enthusiasts from all over the US and beyond.	Chowan Swamp Game Land is an extremely popular game land with hunters coming from across the state and from neighboring states to hunt. It is not a small group of hunters that use the game land. Many fishermen also use the game land. The NCWRC can work with Merchants Millpond State Park if the need is justified.

5. What suggestions, if any, do you have for changing how this game land is managed and maintained?

CHANGES TO HOW THE GAME LAND IS MANAGED	NUMBER OF REPONSES	PERCENTAGE OF REPONSES
Slow Down Logging/ Stop Clear Cutting	5	22%
More Access	3	13%
Add BAA or PFA	2	9%
Limit/Eliminate Horseback Riding	2	9%
Institute All Users Fee	2	9%
Unlock Gates	2	9%
Plant Oaks/ Hardwoods	2	9%
Restrict Use of Rifles	2	9%
Maintain Current Management	1	4%
Add Camping	1	4%
Prohibit Sunday Hunting	1	4%
Upgrade Roads	1	4%
Increase Fishing Opportunities	1	4%
Add No Hunting Areas	1	4%
Continue to Allow Hunting With Dogs	1	4%
No BAA on Game Land	1	4%
Regulation/Enforcement	1	4%
Maps/Education	1	4%

PUBLIC INPUT MEETING/ONLINE	COMMENT	PLAN RESPONSE
Public Input Meeting	Slow down the logging, too much has already been cut	Timber harvest in plantations is important to tree health and vigor. Pine plantations that do not support desirable groundcover add little to overall forest health and habitat to a wide range of fauna. It is a NCWRC goal to restore the native habitat communities that once existed on the game land. the Articles of Dedication agreement also requires restoration activities.
Public Input Meeting	boat ramps in game land areas	There are a sufficient number of boat ramps that serve CSGL and CGL.
Public Input Meeting	stop clear cutting the beautiful pine forest that you have	Addressed above.
Public Input Meeting	add more camping areas near water, add boat access at Gatlington	There currently is a BAA at Shoups in Gates County.
Public Input Meeting	Prohibit Sunday hunting to allow other access(i.e. hiking, horseback riding, etc.)	Hunting game lands on Sunday's is unlawful.
Public Input Meeting	hunter purchase licenses to hunt on game lands but other users (horseback riding for example) pay no fees. Everyone should pay access fees not just hunters. Designated days to limit horseback riding.	Comments noted.
Public Input Meeting	All that use the game lands should be permitted and help (like the hunters) with cost of maintenance	Comments noted.
Public Input Meeting	keep horse off and unlock gates	The NCWRC will not support total exclusion of horseback riders on most game lands. Gates are addressed in the plan.
Public Input Meeting	less tree cutting, continue upgrading the quality of the roads	Timber harvest is addressed above. Road improvements are addressed in the plan.
Public Input Meeting	no more clear cutting	Addressed above.
Public Input Meeting	more oak tress	Small stands of desirable mast producing hardwoods are identified and protected from harvest. Additional information can be found in the Habitat Communities section of the plan under Dry Coniferous Woodland and Oak Forest and Mesic Forest.
Public Input Meeting	better access for nature watching, fishing	These activities are currently allowed.

Public Input Meeting	open more gates	Addressed in the plan.
Public Input Meeting	n/a	
Public Input Meeting	separate some for no hunting at all	One of the main objectives of the game lands program is to provide hunting opportunities. Hunting is not allowed on State Parks. Visit http://ncparks.gov/Visit/main.php for more information.
Public Input Meeting	stop rifle hunting	The use of rifles on CSGL and CGL are allowed and restricting their use overall will significantly impact hunters ability to harvest deer and bear. Most areas are conducive to hunting with rifles. It is the hunter's responsibility to know their target and what is beyond it.
Public Input Meeting	Please continue to allow hound hunting here, no boat ramp at Gatlington.	
Public Input Meeting	No hunting with large caliber rifles on the Sandbanks	The use of rifles on CSGL and CGL are allowed and restricting their use overall will significantly impact hunters ability to harvest deer and bear. Most areas are conducive to hunting with rifles. It is the hunter's responsibility to know their target and what is beyond it.
Public Input Meeting	volunteer, communication with adjacent hunt clubs, public input meetings	
Public Input Meeting	Police littering and people, make management maps available	
Public Input Meeting	stop clear cutting beautiful pines, control predation, plant oak/hickory	Timber harvest is addressed above as well as in the plan. Hunting and trapping is allowed by sportsmen and women who want to target predators. Improving habitat quality has been proven to lessen the effects of predators. Lawful harvest of predators as well as habitat improvements are the best tools the NCWRC has for managing predation. Oak forest management is addressed in the plan.
Online	Too numerous to name and am hoping to learn of some changes and long range plans from the meeting.	
Online	The primary specific management issue we would like to see addressed is the need to continue prescribed burning in the Sand Banks portion of the game land. We also hope to see	Conversion of loblolly pine plantations to longleaf pine forest with desirable native groundcover is a restoration goal set by the NCWRC and NC Natural Heritage Program. Management of pine forest and associated ground cover will be achieved through prescribed burning. More

	continued work on restoring longleaf pine in this area, while protecting the remaining native ground cover vegetation where it is in good condition.	information can be found in the Dry Coniferous Woodland section of the plan.

6. What would encourage you to start using, or to continue using, Chowan Swamp Game Land or Chowan Game Land it more actively?

SUBJECT	NUMBER OF REPONSES	PERCENTAGE OF REPONSES
Restrict Use of Rifles	4	18%
Better/ More Boat Ramps	4	18%
Continue Allowing Use of Dogs	3	14%
Upgrade Roads	3	14%
Better Mapping/ Information	2	9%
Allow ATV	2	9%
Increase Non-hunting Uses	2	9%
Less Dog Hunting	1	5%
More Still Hunting	1	5%
Plant Food Plots	1	5%
Improve Deer Population	1	5%
Less Hunting	1	5%
Maintain Family Area	1	5%

PUBLIC INPUT MEETING/ONLINE	COMMENT	PLAN RESPONSE
Public Input Meeting	I've always dog hunted this land since I was a child, I am now 58 years old and want to continue to hunt this property with my hounds	
Public Input Meeting	less dog hunting and more still hunting, shooting lanes	Hunting with the use of dogs will be supported where it is conducive to do so. There are many areas on CSGL that are not as conducive to hunting with dogs and get little pressure. The Lower Roanoke River Wetlands Game Land in Bertie and Martin counties offer excellent deer hunting opportunities. The federal tracts in Bertie prohibit the use of dogs for deer hunting and many of the state-owned tracts are not conducive to hunting with dogs. For more information on these hunts, please refer to the

		Special Hunt Opportunities booklet at www.ncwildlife.org.
Public Input Meeting	no centerfire rifles	The use of rifles on CSGL and CGL are allowed and restricting their use overall will significantly impact hunters ability to harvest deer and bear. Most areas are conducive to hunting with rifles. It is the hunter's responsibility to know their target and what is beyond it.
Public Input Meeting	ban cernterfire rifles	Addressed above.
Public Input Meeting	safe paths with hunting	
Public Input Meeting	better mapping/layout of where lands are (public education), non hunting season ATV use allowance	Designated hunting seasons, maps with road names, and rules governing the game lands can be found at www.ncwildlife.org. Informational kiosks are being placed at many of the main game land entrances. It is the responsibility of the user to know and understand the area in which they are using.
Public Input Meeting	Plant food plots for deer to encourage sustainability for deer herds in game land areas. Improve roads.	Planting of food plots will be considered in appropriate sites. Roads improvements are addressed in the plan.
Public Input Meeting	Improvement of deer populations.	Planting of food plots will be considered in appropriate sites.
Public Input Meeting	If hunter were up tree still hunting - no rifles	
Public Input Meeting	I currently use the land to hunt deer with dogs.	
Public Input Meeting	Better boat ramps.	There are 6 boats ramps that serve CSGL users.
Public Input Meeting	more public use other than hunting	Most other uses are allowed and occur in significant amounts on the game lands.
Public Input Meeting	I live there, I hunt there, I eat there, I sleep there	
Public Input Meeting	Better boat ramps.	Addressed above.
Public Input Meeting	Less hunting	
Public Input Meeting	Dog hunting	
Public Input Meeting	Have used the Chowan River Basin for recreation and hunting all my life (5 gen)	
Public Input Meeting	No rifles on the Sand Banks	Addressed above.

Public Input Meeting	better boat ramps, first responder concerns, maintain paths	NCWRC has been a active partner working with county emergency management on concerns on the game lands. Roads are addressed in the plan.
Public Input Meeting	hunting season ATV use, camping along the river in summer at Dowry and Gatlington, people abusing ATV use and access, boating access, leave Dowry access as is	
Public Input Meeting	Maintain family area, Co-op work maintain area	
Online	More public signage stating hunting seasons so other naturalist would be aware of the dangers of being on these lands at the same time. More markers naming and indicating which paths are accessible to all citizens and are not dead ends. Naming each path names designated by local people & clubs of the paths and area.	Designated hunting seasons, maps with road names, and rules governing the game lands can be found at www.ncwildlife.org. Informational kiosks are being placed at many of the main game land entrances. It is the responsibility of the user to know and understand the area in which they are using.

7. What additional comments do you have about Chowan Swamp Game Land or Chowan Game Land?

Subject	NUMBER OF REPONSES	PERCENTAGE OF REPONSES
Restrict Use of Rifles	6	29%
Manage For More Hardwoods	3	14%
Continue to Allow Use of Hounds	3	14%
Restrict Horseback Riding	2	10%
Maintain Roads	1	5%
Protect Adjacent Property Owners	1	5%
Open More Gates	1	5%
Better Signage	1	5%
Plant Food Plots	1	5%
Address Litter	1	5%
Limit Access	1	5%
New BAA or PFA	1	5%
Create Still Hunt Only Areas	1	5%

PUBLIC INPUT MEETING/ONLINE	COMMENT	PLAN RESPONSE
Public Input Meeting	This land has been protected for generations by local people who feel it is a honor and privledge to have this wonderful place. Offer incentive to eliminate coyotes.	
Public Input Meeting	Rays Beach needs to be maintained and kept accessable.	Addressed in plan.
Public Input Meeting	What additional measures do you plan to take to protect adjacent landowners from trespassing? Restrict horseback riding to non-hunting season days. Protect adjacent landowners.	The NCWRC maintains boundary with paint and signs and strives to ensure maps are as accurate as possible. Adjacent landowners are encouraged to mark their boundary. If trespass issues persist, contact an Enforcement Officer. The NCWRC recognizes conflicts exist between hunters and horseback riders. Comment will be considered.
Public Input Meeting	Open more gates to allow access to retrieve dogs or deer that was harvested. Deer season should be extended for guns and dogs. Length is not long enough.	Roads and gates are discussed in the plan. Deer season on CSGL and CGL match the counties season. Extending the deer season is beyond the scope of this plan.
Public Input Meeting	Manage more hardwood areas	Addressed in plan.
Public Input Meeting	no horse and rifles	The NCWRC will not prohibit horseback riding on most game lands. The use of rifles on CSGL and CGL are allowed and restricting their use overall will significantly impact hunters ability to harvest deer and bear. Most areas are conducive to hunting with rifles. It is the hunter's responsibility to know their target and what is beyond it.
Public Input Meeting	This land should remain open to using dogs to deer hunt with. Baiting deer for hunting would be nice. A longer bear season should exist for the bear hunters.	The NCWRC recognizes the tradition of hunting with hounds and supports their use where appropriate. Bear hunting on some tracts of CSGL are restricted where road access is considered good. By limiting the number of hunt days, the NCWRC can help maintain the bear resource.
Public Input Meeting	no centerfire rifles	The use of rifles on CSGL and CGL are allowed and restricting their use overall will significantly impact hunters ability to harvest deer and bear. Most areas are conducive to hunting with rifles. It is the hunter's responsibility to know their

		target and what is beyond it.
Public Input Meeting	Better, clearer signage designating hunting days, family gathering areas	Designated hunting seasons, maps with road names, and rules governing the game lands can be found at www.ncwildlife.org. Informational kiosks are being placed at many of the main game land entrances. It is the responsibility of the user to know and understand the area in which they are using.
Public Input Meeting	shotgun only	Addressed above.
Public Input Meeting	need to stop the use of rifles	Addressed above.
Public Input Meeting	leave some hardwoods	Forest management plans will consider hardwood areas and maintain where appropriate. Areas that are currently loblolly pine plantations not conducive to prescribed burning are likely to be replanted with hardwoods after final harvest.
Public Input Meeting	keep dog hunting	Addressed above.
Public Input Meeting	I love the Sand Banks. My family would be devastated if we lost access to hunt, fish, and recreate. Note: I have lived here and enjoyed this land all my life. I feel that I am a stake holder.	
Public Input Meeting	too many idiots running around with rifles	Addressed above.
Public Input Meeting	Keep game lands open to hunting with dogs	Addressed above.
Public Input Meeting	Stop the use of rifles (restricted firearm zone)	Addressed above.
Public Input Meeting	regulate trash, more soil evaluation, food plots - oats, clover, (plant stuff that comes back), designate open areas, game land near Camp PD:Como - food plots, thinning	Planting of food plots will be considered in appropriate sites.
Public Input Meeting	small hardwood sites (inclusions), limit night access	Small stands of desirable mast producing hardwoods are identified and protected from harvest. Examples can be found on the Mapleton Tract and Sand Banks Tract of CSGL.
Online	I continue to have problems hunting the game lands. I have reported the issues with Warden Wadsworth concerning dog hunters. The bottom line is if areas are not designated still hunting only, the dog hunters	Lands Management staff are aware of the concerns of some landowners in the Parker's Ferry area of the game land and they will take the comment into consideration. Please note that any changes made could also affect adjacent landowners and lessees. There are areas on CSGL that are less conducive to hunting with dogs

	are going to kill someone. Officer Wadsworth is informed on the Parkers ferry rd hunting area problems. All to often the still hunter is overrun by dogs and his hunt is over. Why don't still hunters have the same rights to hunt using stealth as dog hunters do using dogs. Its clear both cant happen in the same area. So set up areas for each style of hunting. Both types are legal, they just dont work together. Please consider my plee, my son was hit by buckshot during a still hunt two years ago, by a blast from a excited group of dog hunters shooting at running deer. He has not hunted since that day.	than the Mapleton, Lower Wiccacon, or Sand Banks tract. Even on the tracts listed above, areas do exist that receive little dog hunting pressure. Another option is for hunters to consider other game lands. The Lower Roanoke River Wetlands Game Land in Bertie and Martin counties offer excellent deer hunting opportunities. The federal tracts in Bertie prohibit the use of dogs for deer hunting and many of the state -owned tracts are not conducive to hunting with dogs. For more information on these hunts, please refer to the Special Hunt Opportunities booklet at www.ncwildlife.org.
Online	As a neighbor of Chowan Swamp Game Lands we would really like to see a boating access installed at Gatlington Landing as well as some additional piers for the residents of Gates & NC in general to use. The closest landing is Shoups in Winton, NC, Hertford County and the majority of times the land and parking are at least 75% Virginians.	There are six Boating Access Areas (BAA) that serve CSGL. The closest BAA to the Sand Banks Tract is Shoups BAA in Gates County, 3 miles from Story's Crossroads. Public Fishing Areas are addressed in the plan.

Comments received from public review of draft plan.

Email Comment Received.

I can say I love this area for turkey hunting. I won't give away my honey holes but I've heard as many as 6 gobblers gobbling from the roost one morning in one particular area. I killed a very good gobbler in the 2017 spring season.

I don't necessarily deer or bear hunt on it because of the dog hunters. They basically take over the woods in the gamelands and the surrounding properties. The way they hunt is sometimes not safe or respectful to other hunters or surrounding landowners. But that is a statewide problem not just at the gamelands.

I can say I definitely appreciate the gamelands being 10 minutes from my house. Especially when spring turkey season rolls around.

Thanks

Email Comment Received – North Carolina Natural Heritage Program.

NC DEPARTMENT OF
NATURAL AND CULTURAL RESOURCES

Roy Cooper, Governor
Susi Hamilton, Secretary
Walter Clark, Director, Land and Water Stewardship

February 2, 2018

David Turner, Management Biologist
Chowan Swamp Game Land

Dear Mr. Turner:

The North Carolina Natural Heritage Program appreciates the opportunity to review the draft Chowan Swamp Game Land Management Plan. We also welcome a continued partnership with the NC Wildlife Resources Commission (WRC) as it moves forward to implement the final management plan.

The North Carolina Natural Heritage Program (NHP) appreciates the plan's approach to include consistency with the Articles of Dedication. We also appreciate that the extensive swamp and floodplain forests are acknowledged in the plan for helping to maintain water quality and habitat of the Chowan River, and the importance of the Chowan River for anadromous fish and other aquatic species.

We are pleased to note the importance placed on the longleaf pine communities and the recognition of their value, including the goal of restoring longleaf pine in loblolly pine-dominated stands where appropriate, the goal of restoring ground cover vegetation as well as the tree canopy, the emphasis on minimizing the impact of firebreaks, and the intent of frequent prescribed burning in the longleaf pine habitats.

We appreciate the ecosystem management approach that the WRC has historically applied to managing the Game Lands and encourage WRC to continue with this management philosophy, especially as natural habitats across North Carolina are degraded, and habitat fragmentation increases. Maintaining high-quality examples of North Carolina's natural ecosystems is important for native wildlife--including rare species--and for the citizens of our state.

Maintaining the integrity of natural areas and connectivity for wildlife within the Game Lands will provide a much greater opportunity for North Carolina's native diversity to remain viable. Thank you for your contribution to the conservation of our natural resources in North Carolina. Please contact me or other NHP staff if you have any questions, or would like additional information.

Sincerely,

Scott Pohlman

Scott Pohlman

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